

BP

User Manual

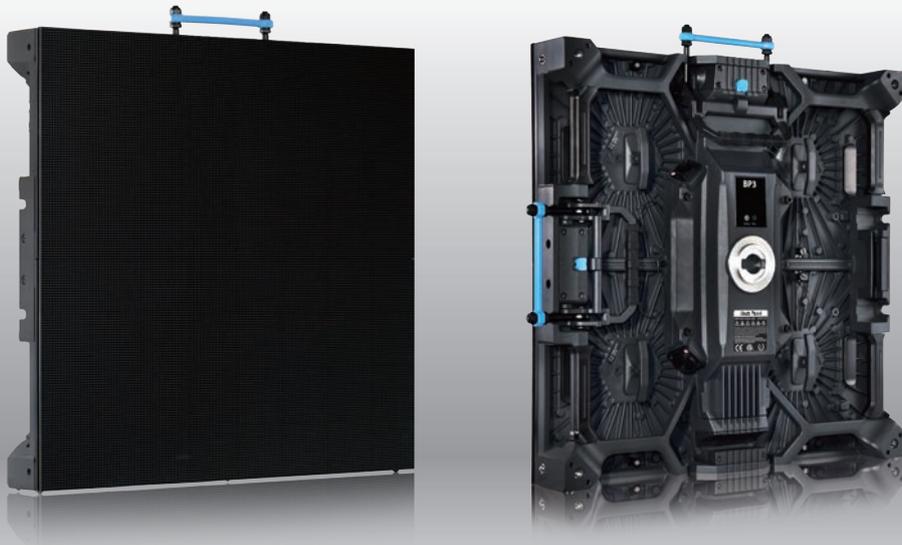


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Safety Information:



WARNING!

Read the safety precautions in this section before installing, powering, operating or servicing this product.

The following symbols are used to identify important safety information on the product and in this manual:



WARNING!

Safety hazard.
Risk of severe injury or death.



WARNING!

Refer to manual before installing, powering or servicing.



WARNING!

Hazardous voltage.
Risk of lethal or severe electric shock.



WARNING!

Hot surface.
Do not touch.



WARNING!

Fire hazard.



WARNING!

Emission hazardous to eyesight.



- This product is for professional use only. It is not for household use.
- This product presents risks of severe injury or death due to fire hazards, electric shock and falls.



- Read this manual before installing, powering or servicing this product, follow the safety precautions listed below and observe all warnings in this manual and printed on the product.
- If you have questions about how to operate the tile safely, please contact your ROE supplier.



PROTECTION FROM ELECTRIC SHOCK

- Connect the product to AC mains power within the range 100-240V nominal at 50 or 60 Hz only.
- Disconnect the product from power when not in use.
- Always ground (earth) the product electrically.
- Before using the product, check that all power distribution equipment and cables are in perfect condition and rated for the current requirements of all connected devices.
 - Do not use the product if the power cable or a power plug is in any way damaged, defective or showing signs of overheating.
- Do not attempt to open any cover.
- Refer any service operation not described in this manual to a qualified technician.



PROTECTION FROM FIRE

- Do not stick filters, masks or other materials directly onto LED modules.
- Do not modify the product in any way not described in this manual.
- Install only genuine ROE parts in or on the product unless an alternative is described in this manual.
- Do not operate the product full load if the ambient temperature of power units (Ta) exceeds 50°C (122° F) or less than -20°C(-4° F).



PROTECTION FROM INJURY

- Create an installation by installing tiles at the top and working downwards. Disassemble an installation by removing tiles at the bottom and working upwards.
- Check that all external covers and rigging hardware are securely fastened.
- Block access below the work area and work from a stable platform whenever installing, servicing or moving the product.

Important warnings

Maximum and minimum ambient temperature:

The maximum ambient temperature for the LED wall is 50 °C; the minimum temperature is (-20°C.)

High leakage current:

The combination of power boxes in an installation results in increased levels of Leakage current. In order to avoid risk of electric shock due to high leakage current, proper grounding of the installation is required.

This equipment **MUST** be earthed:

In order 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.

Power system

Mains cords:

The power cords delivered with this system have special properties for safety. They are not user Serviceable. If the power cords are damaged, replace them only with new ones. Never try to repair a power cord.

Data cables:

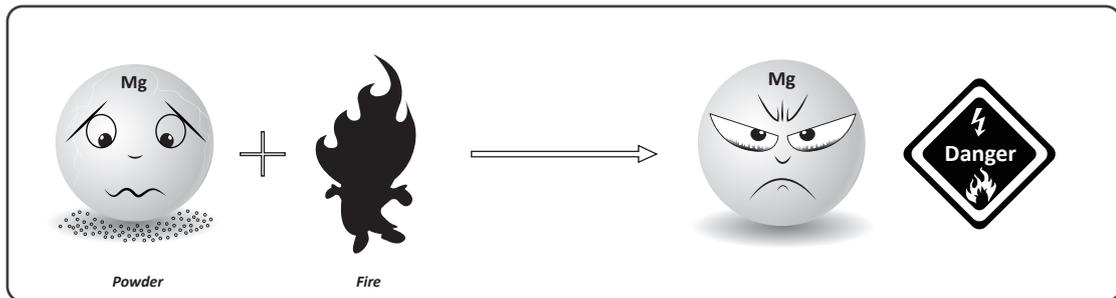
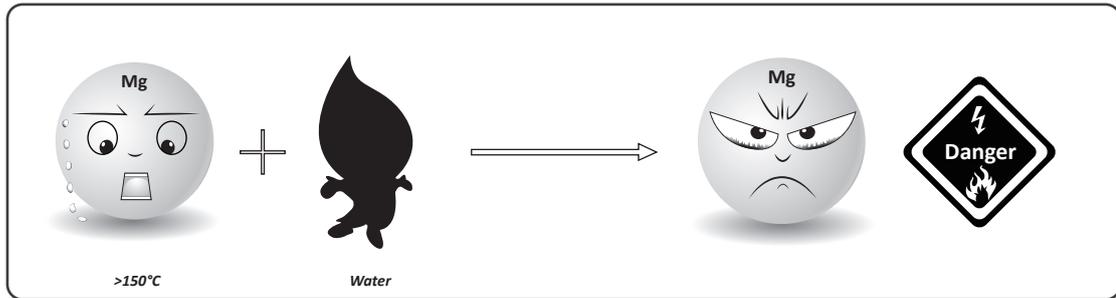
The data cables provided with this system have special properties for safety. They are not user serviceable. If the data cables are damaged, replace them only with new ones. Never try to repair a data cable. Per requirements of the National Electrical Code® in the USA, the length of a data cable must not exceed 100 m (332 feet). Avoid exposure of data cables to accidental contact with lightning or power conductors.

Black Pearl tiles cannot be hot swapped:

Always disconnect the power cord from the control box before connecting or disconnecting the cable string or one of Black Pearl tiles.



FRAME PROTECTION



Note: At normal temperature environment, Magnesium alloy is absolutely stable and safe.
It's dangerous only in:

1. Temperature higher than 150°C with water;
2. Powder with fire.

Certification

POWER SUPPLY

HWA200-4V6

INPUT

100-240V~, 50/60HZ

OUTPUT

POWER CONSUMPTION: 160W



CONFORMS TO UL STD.60950-1
CERTIFIED TO CSA STD.

C22.2 NO.60950-1-07

ROE Visual Co.,Ltd

Pn=160W Un=4.6V In=35A

Max.Operating temperature is 50°C.

02 Specification:

The Black Pearl is a cost-efficient version from Black Onyx. It has the same award-winning tile design. The innovative design has successively won many famous design awards including IF Gold Award, Reddot Award, G-Mark Design Award, Design For Asia Award.

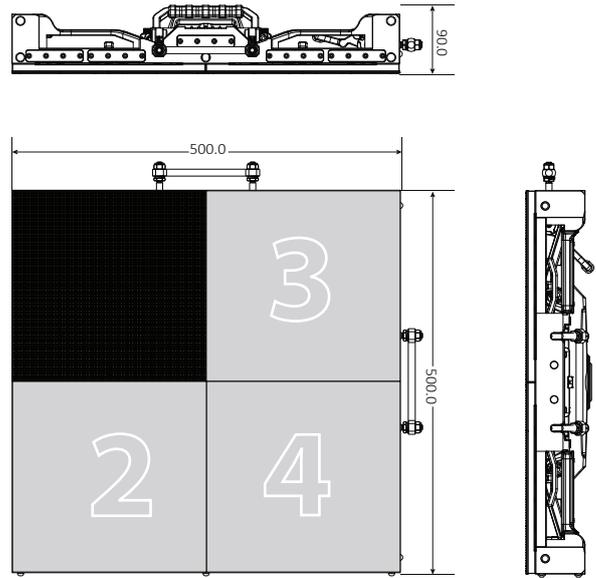
The innovative and friendly design supports a fast and simple setup for both flown and ground-supported setups well suited to the needs of large events, concerts and exhibitions. Featuring a HD pixel pitch(3.9mm) and outstanding color processing, the product also promises high-end performance in TV studios and lecture halls.

Black Pearl Specification:

Black Pearl	BP2	BP3	BP5
Pixel Pitch	2.84mm	3.91mm	5.21mm
Pixel/Tile	176×176	128×128	96×96
Pixel Density	123,904/sqm	65,536/sqm	36,864/sqm
Max. Brightness (After calibration)	1,500 nits MultiColor 1515	1,500 nits NationStar 2020	1,500 nits NationStar 2020
Refresh Rate	1920Hz	3000Hz	3840Hz
Scan	1/11	1/16	1/6
Max. Power/Tile	160W	160W	160W
Tile Weight	9.35kg/20.61lbs	8.7kg/19.2lbs	8.7kg/19.2lbs
Contrast	6000:1	5000:1	5000:1
Processor	Evision	Evision	Evision
LED Configuration	Black SMD 3-in-1		
Viewing Angle	140H/140V degrees		
Tile Dimension(W×H×D)	500.0×500.0×90.0(mm) 19.7"×19.7"×3.5"		
Tile Material	Magnesium Alloy		
Gray Scale	16bit		
Max. Stacking	12 tiles		
Max. Hanging	1×20 tiles (0.5m hanging bar)		
Max. Hanging	1×17 tiles (1m hanging bar)		
Curve(optional)	Max. Concave 10°, Max. Convex 10°		
Certifications	CE, ETL, FCC		
Lifetime	≥500000h		
Operating Temp/Humidity	-20°C~50°C, 10~90%RH		
Storage Temp/Humidity	-40°C~60°C, 10~90%RH		

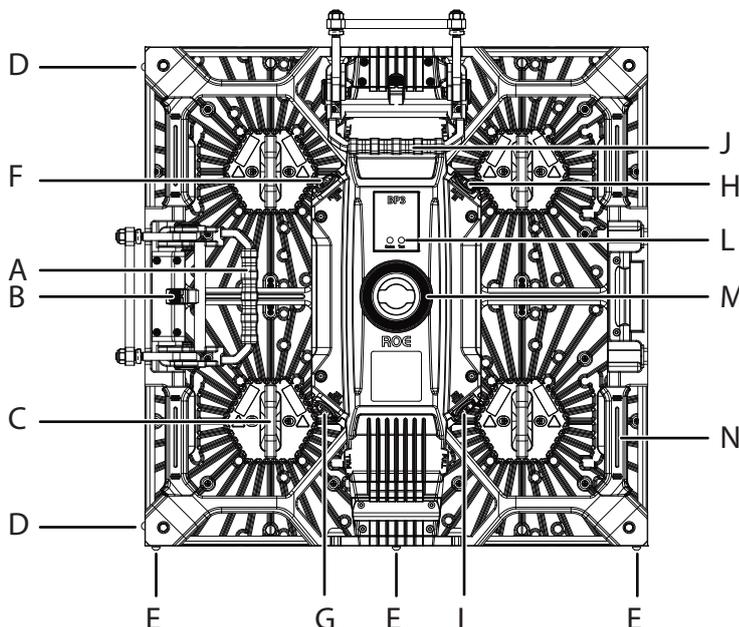
* Notes:
The max. hanging supports up to 20 tiles when the safety factor is 5.
The convex capability only applies to custom tile, not the standard one.

Black Pearl Dimension:



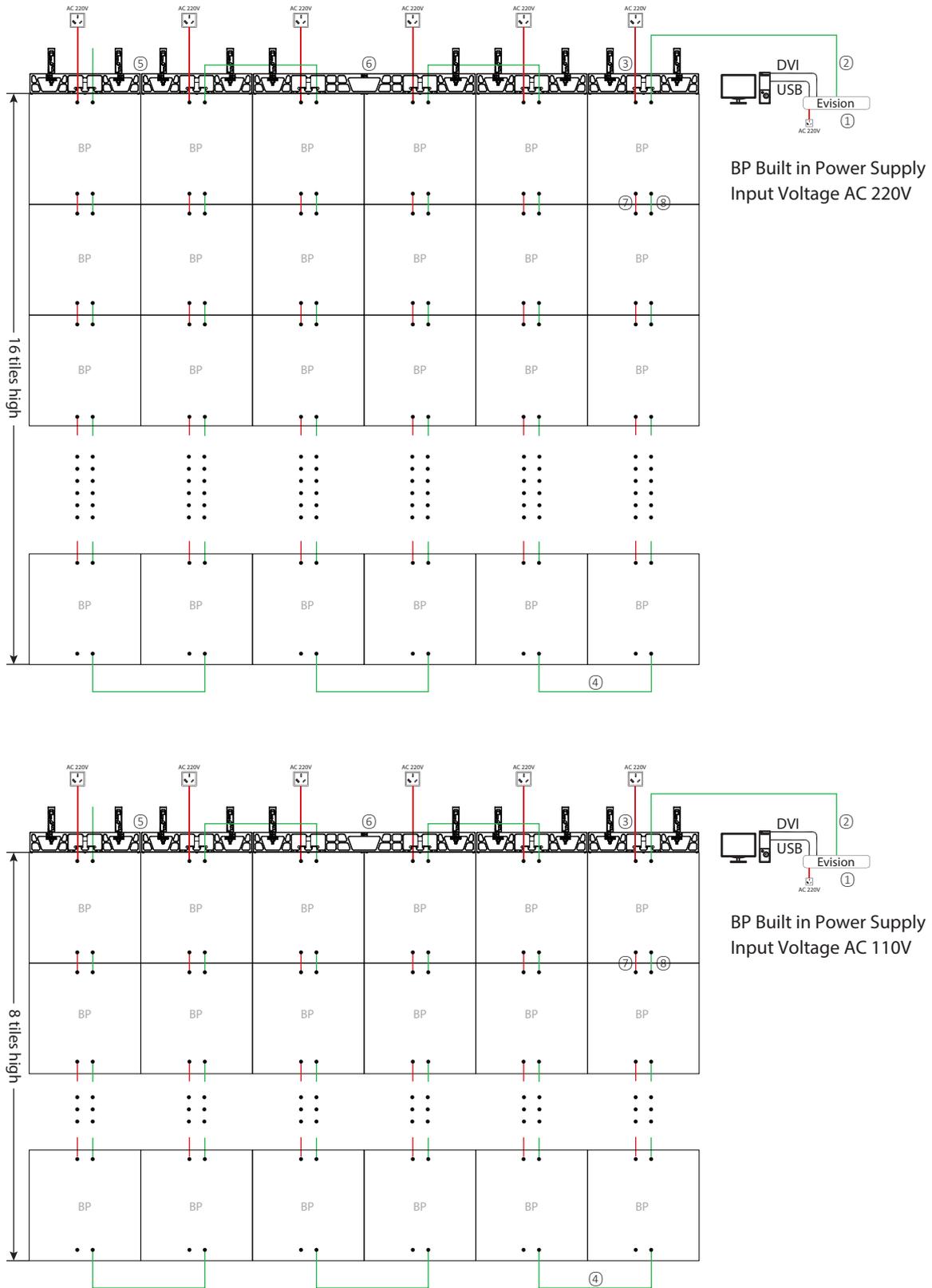
(Unit: mm)

BP tiles rear components



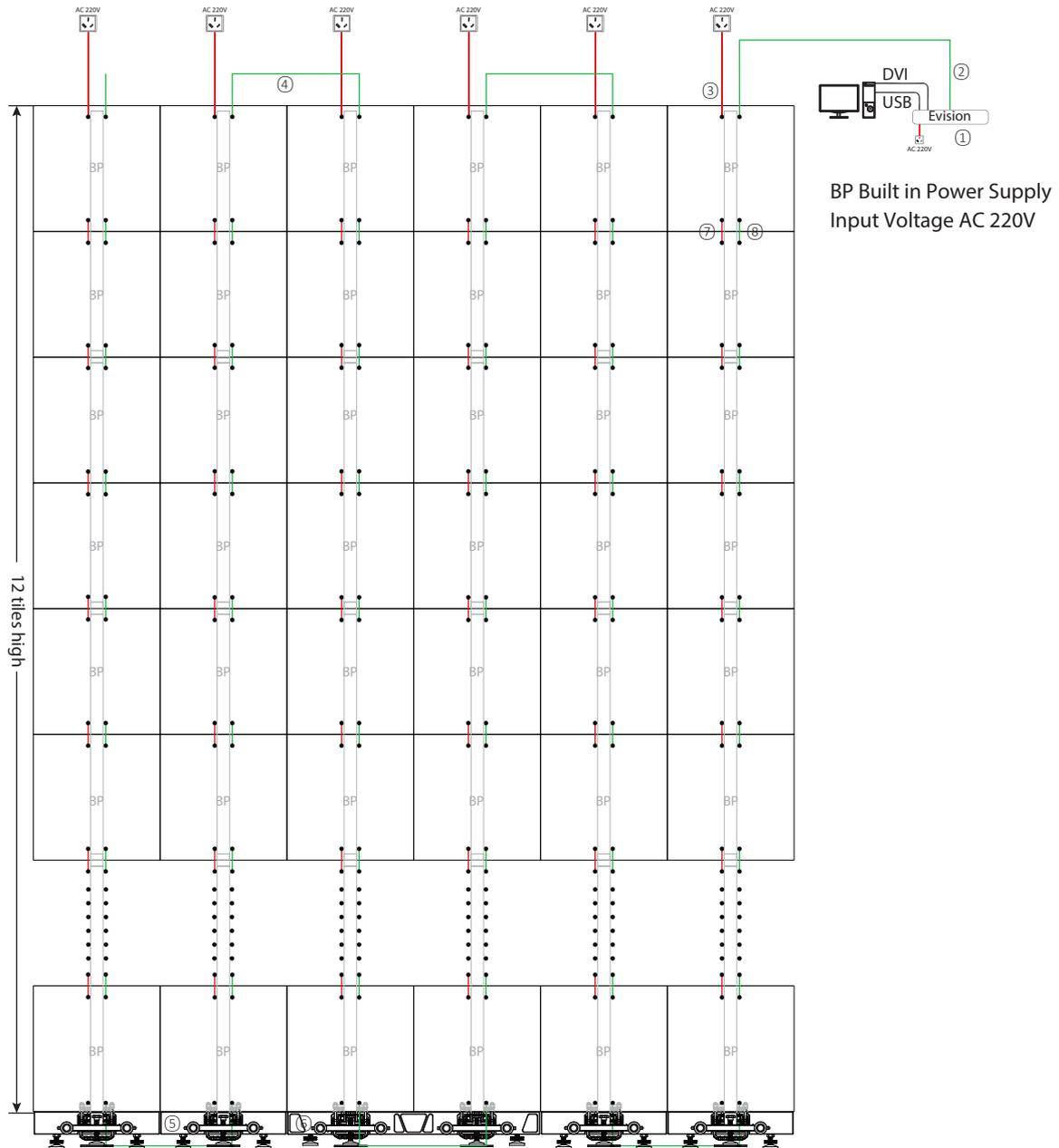
- A. Horizontal Connector
- B. Control Button
- C. Handle
- D. Horizontal Assistant Position bead
- E. Vertical Assistant Position bead
- F. Power In
- G. Power Out
- H. Data In
- I. Data Out
- J. Vertical Connector
- L. Function Button
- M. Hole-Assisted for stacking system
- N. Rubber Grip

Hanging System

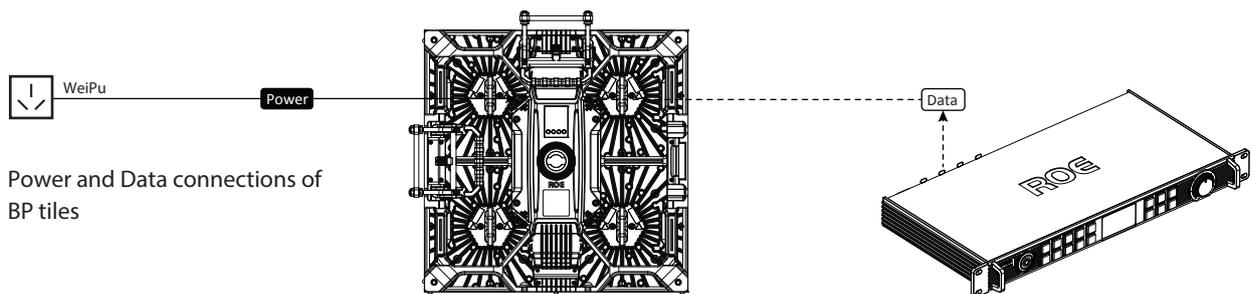


- Notes:**
1. Neither Header nor Connector can load more than 20 tiles of BP.
 2. When the Input Voltage is 220V, one Power Cable can load 16 tiles of BP; and the Input Voltage is 110V, one Power Cable can load 8 tiles of BP.

Stacking System



- Notes:**
1. Base Bar can load no more than 12 tiles of BP.
 2. When the Input Voltage is 220V, one Power Cable can load 16 tiles of BP; and the Input Voltage is 110V, one Power Cable can load 8 tiles of BP.



HD101 Processor loading with BP3

This document is valid for Evison system with:

Processor firmware: FPGA: 2.63 / ARM 3.07 / LCD 1.15

Tile firmware: FPGA 9.60

Input resolutions for the processor:

1024 x 768	1366 x 768	1440 x 900	1920 x 1080
1280 x 720	1400 x 1536 (max height)	1680 x 1050	2560 x 820 (max width)

Tile resolution:

128 x 128 pixels (500mm x 500mm)

Max tiles per processor output

50Hz: 38 tiles

60Hz: 32 tiles

Recommended mapping for standard frame delay (1 frames @ processor, 1 frame @ receiver card):

Every port supports a rectangular area, below tables show the possible number of tiles high and wide (for 50 and 60Hz). If in a creative setup there are gaps or missing tiles, the supported rectangular area stays the same as if there would be tiles.

	H/W	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	50Hz	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
3		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
5		✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
6		✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
7		✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
8		✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
9		✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
10		✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
11		✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
12		✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

	H/W	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	60Hz	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗
3		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
5		✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
6		✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
7		✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
8		✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
9		✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
10		✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
11		✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
12		✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

- Example 1: 50Hz, 9 tiles wide, 4 tiles high → OK
- Example 2: 50Hz, 9 tiles wide, 5 tiles high → not OK
- Example 3: 60Hz, 9 tiles wide, 4 tiles high → not OK

Recommended mapping for minimum frame delay (0 frames @ processor, 1 frame @ receiver card):

Max width per port is 512 pixels.
According tables for standard frame delay, but max 4 tiles wide.

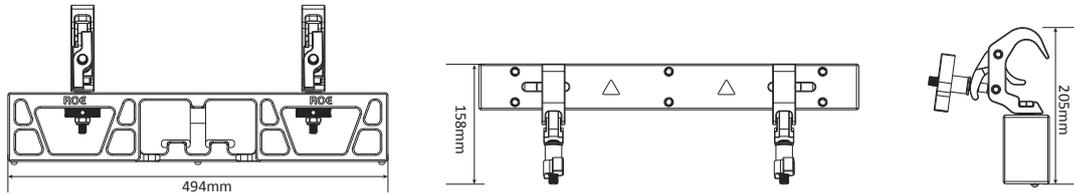
- Example 1: 50Hz, 9 tiles wide, 4 tiles high → not OK, too wide
- Example 2: 50Hz, 4 tiles wide, 9 tiles high → OK
- Example 3: 60Hz, 4 tiles wide, 9 tiles high → not OK

04 Accessories

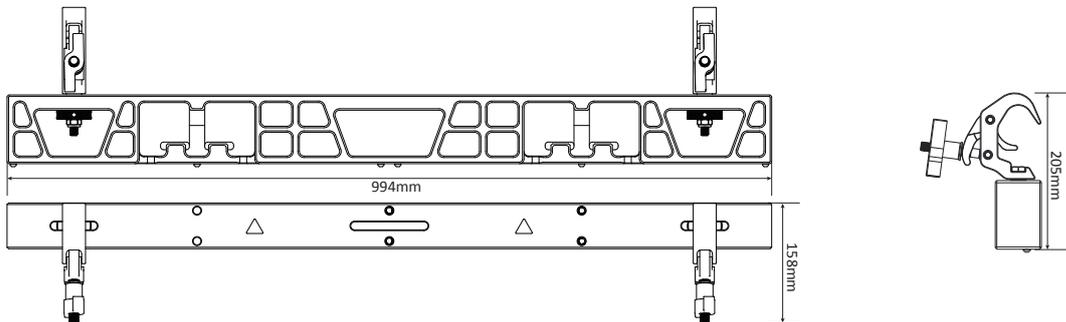
<p>①</p>  <p>Name : Evision SAP No. : 201000S0007 Dimension: W480×H45×D240mm Weight : 2.30kg</p>	<p>②</p>  <p>Name : Data Cable SAP No. : 208004S0242 Dimension : 30m Weight : 1.42kg Max Length : 100m</p>	<p>③</p>  <p>Name : Power Cable SAP No. : 208001S0754 Dimension : 10m Weight : 1.60kg Max Current : 16A</p>	<p>④</p>  <p>Name : Data Cable SAP No. : 201000S0243 Dimension : 0.75m Weight : 0.16kg</p>
<p>⑤</p>  <p>Name : Hanging Bar SAP No. : 207002S0046 Dimension : W494×H158×D205mm Weight : 4.50Kg Material : Aluminium 6063 Max loading : 20945N(safe factor 5) Max loading of tiles: Max loading/5/weight of tile≈20 tiles</p>	<p>⑥</p>  <p>Name : Hanging Bar SAP No. : 207002S0047 Dimension : W94×H158×D205mm Weight : 7.70Kg Material : Aluminium 6063 Max loading : 16295N(safe factor 5) Max loading of tiles : Max loading/5/2/weight of tile≈17 tiles</p>		
<p>⑤</p>  <p>Name : Stacking Bar SAP No. : 207002S0057 Dimension: W494×H60×D135mm Weight : 7.90Kg Material : Aluminium 6063</p>	<p>⑥</p>  <p>Name : Stacking Bar SAP No. : 207002S0058 Dimension: W994×H60×D135mm Weight : 11.87Kg Material : Aluminium 6063</p>	<p>⑦</p>  <p>Name : Power Cable SAP No. : 208001S0862 Dimension : 0.35m Weight : 0.1kg</p>	<p>⑧</p>  <p>Name : Data Cable SAP No. : 208004S0244 Dimension : 0.35m Weight : 0.08kg</p>
<p>■</p>  <p>Name : Base Truss SAP No. : 304012-00503 Dimension: W1000×H290×D50mm Weight : 7.40Kg Material : Aluminium 6063</p>	<p>■</p>  <p>Name : Rear Support Truss SAP No. : 304012-00504 Dimension: W1000×H290×D50mm Weight : 4.35Kg Material : Aluminium 6063</p>	<p>■</p>  <p>Name : Rear Bridge SAP No. : 206002S0178 Dimension: W182×H133×D35mm Weight : 0.93Kg Material : Aluminium 6063</p>	<p>■</p>  <p>Name : Flightcase SAP No. : 309003-00106 Dimension : W1165×H835×D617mm Max.Capacity: 8 tiles of BP</p>

Hanging System

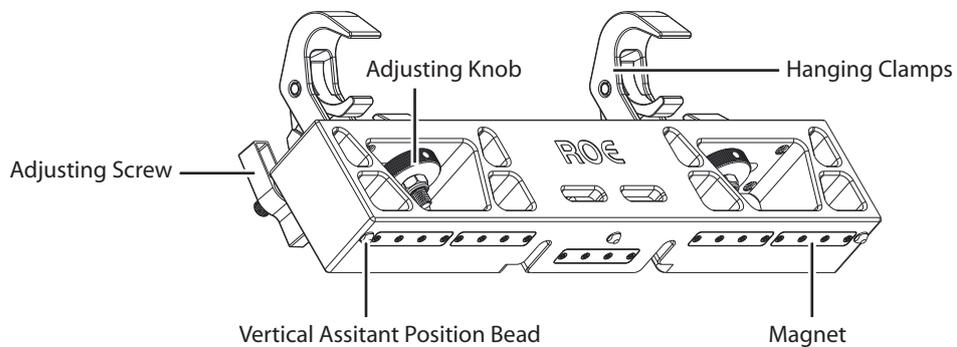
0.5m Hanging bar Dimensions:



1m Hanging bar Dimensions:



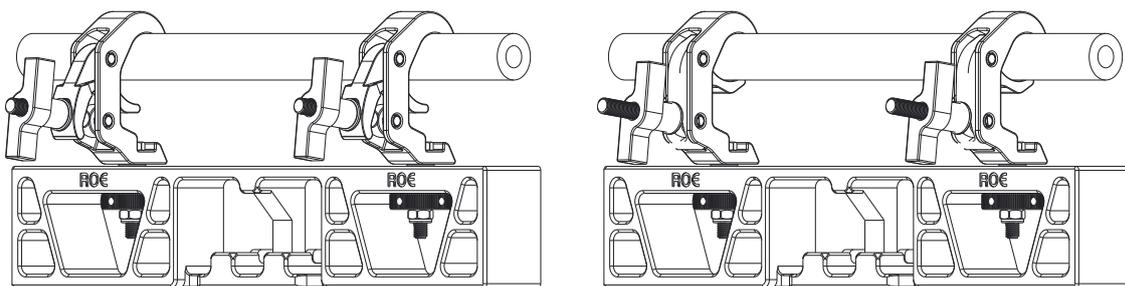
Hanging bar components:



Hanging Installation

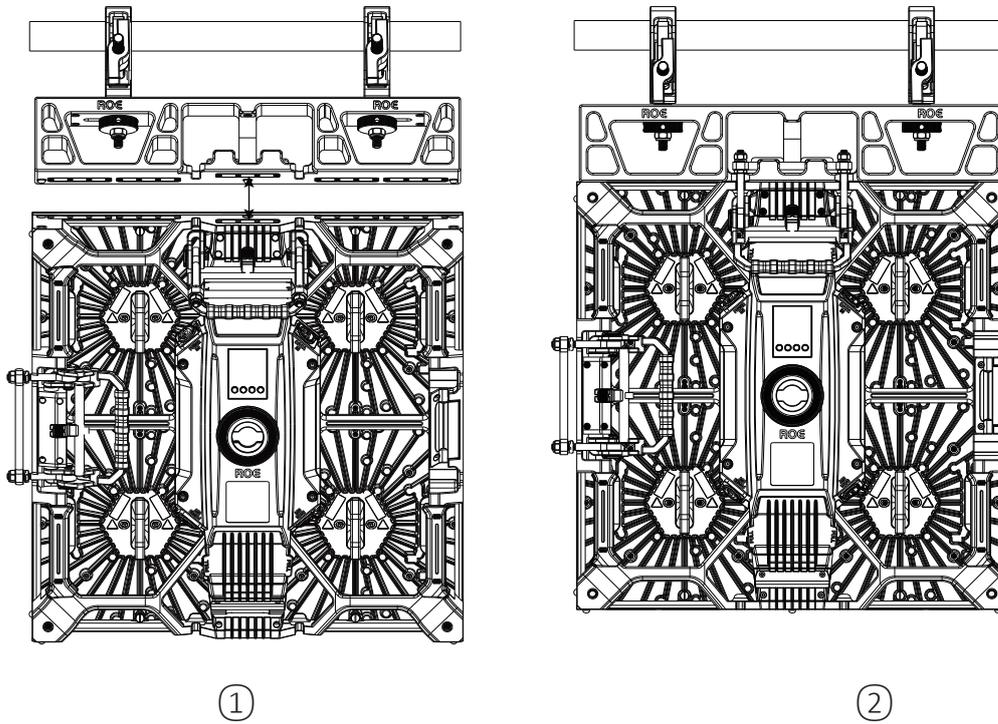
1. Fix the Hanging Bar on the Truss

Just turn the Adjusting Screw, to make the Clamps close, the Hanging Bar will be fixed on the Truss safely.



2. Connect Black Pearl tiles with the hanging bar

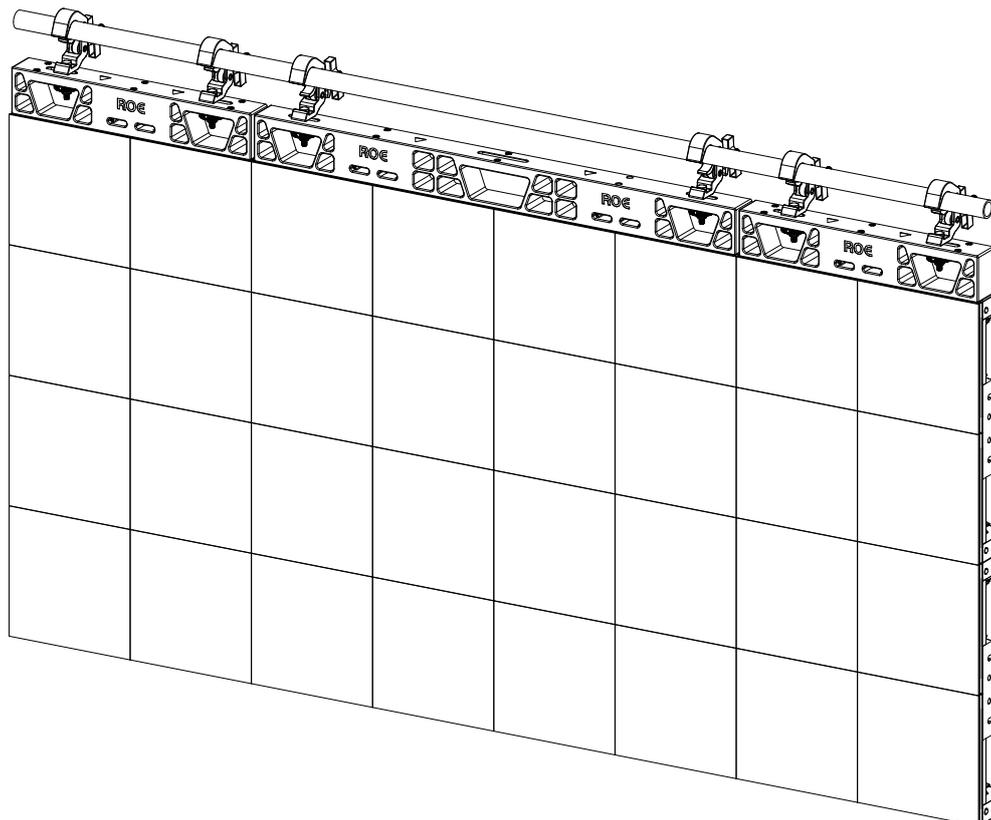
- ① Tiles will be attached to the hanging bar by Magnets automatically.
- ② Press the red button and lock the tiles by Vertical Connector.



Notes: (For Safety) Please do this by two persons.

3. Hanging Installation

Tile(2x4)

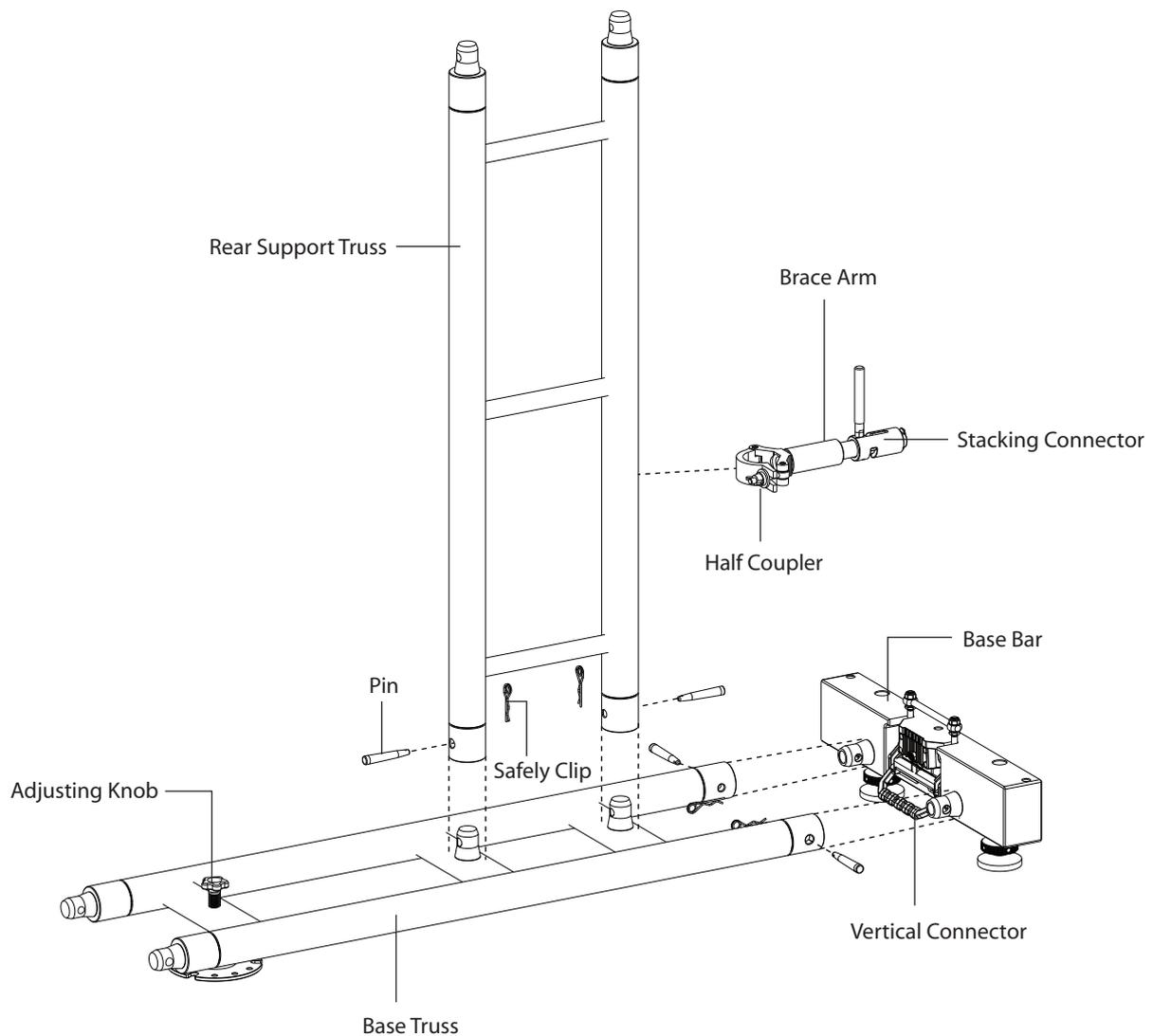


Stacking System

Stacking System Support Components

Major components of the Stacking System support assembly are:

1. Base Bar
2. Base Truss
3. Rear Support Truss
4. Rear Bridge(Half Coupler, Brace Arm, Stacking Connector)

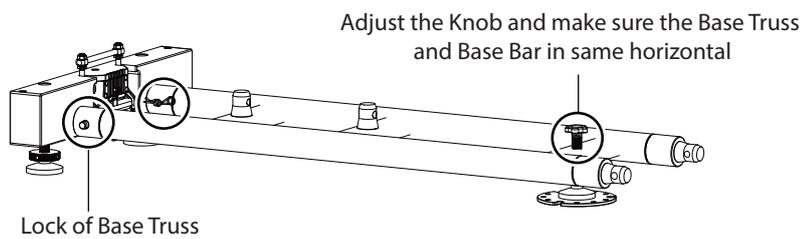
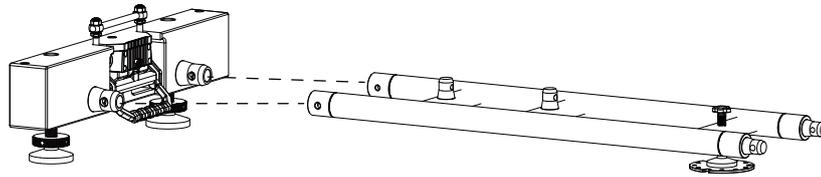


Stacking system assembly exploded diagram.

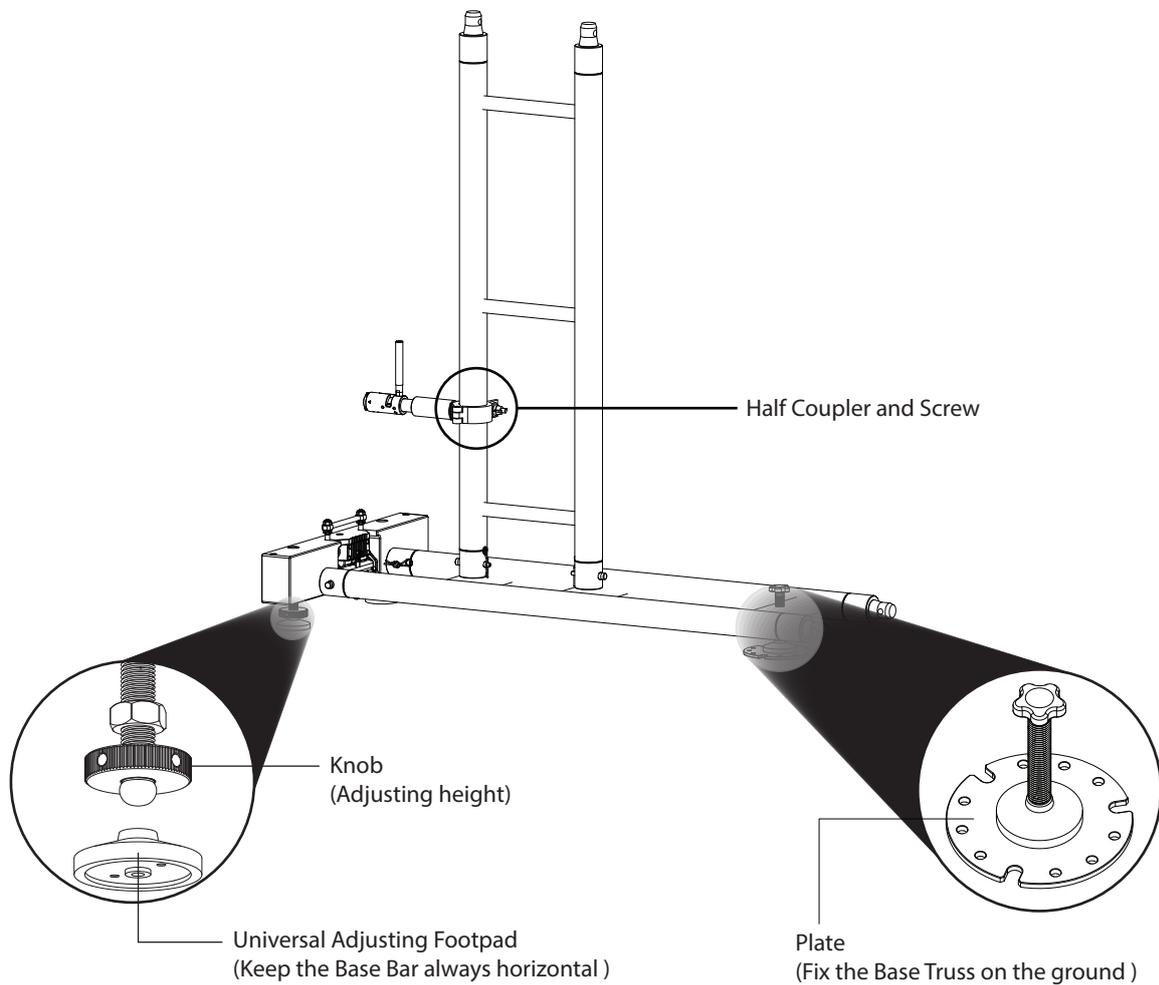
Stacking Installation

1. Base Bar connection with Base Truss

Connect the Base Bar and Base Truss by Pin and Safety Clip.

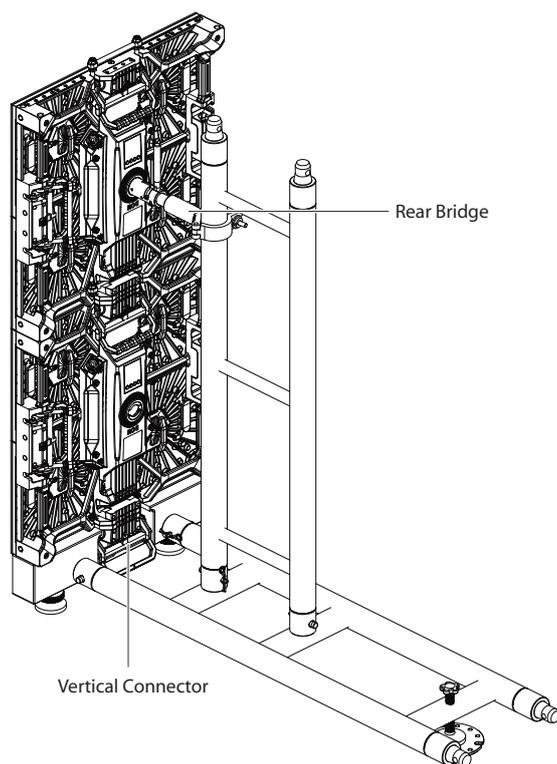


2. Rear Support Truss and Rear Bridge installation



3. Tiles Installation

Connect the tiles and Base Bar by Vertical Connector, and Rear Support Truss by Rear bridge.



4. Stacking Installation

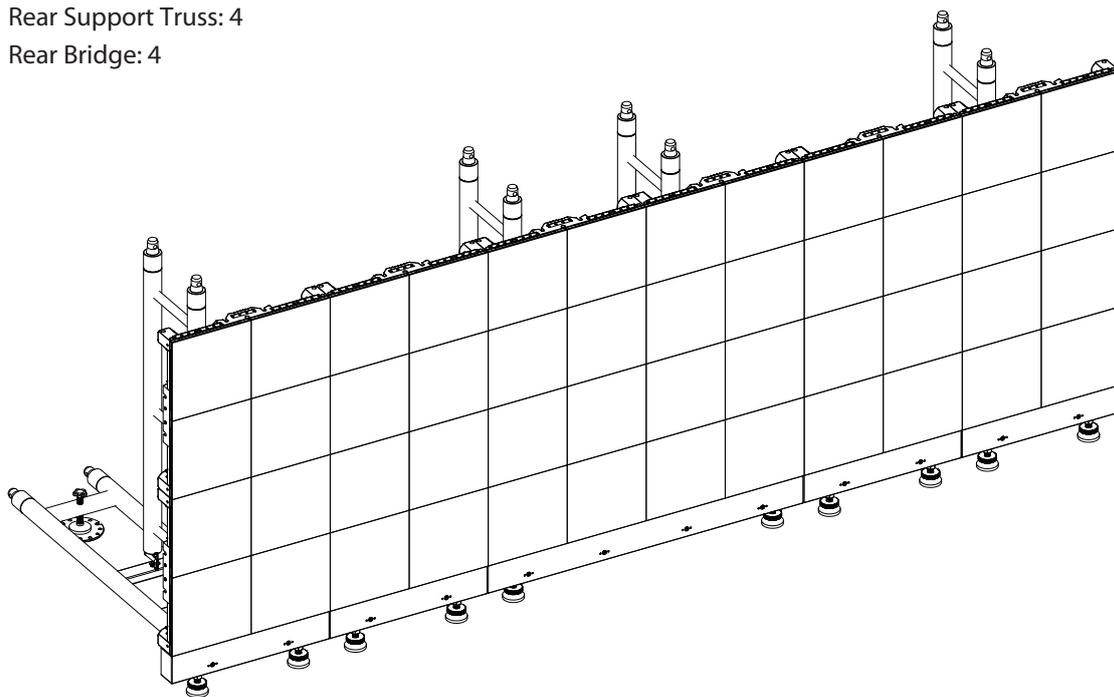
Tile(2x6)Accessories Count:

Base Bar: 4x0.5m, 1x1m

Base Truss: 4

Rear Support Truss: 4

Rear Bridge: 4



Black Pearl Ballastconfigurator v1

Global truss ROE version

Hallen wind:125N/m2

Table shows ballast in KG per tile width.

Length factor:2.5

		Width Tiles Black Pearl																													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Height Tiles Black Pearl	1	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
	2	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	223	231	239
	3	18	36	54	72	90	108	126	144	162	180	198	216	233	251	269	287	305	323	341	359	377	395	413	431	448	466	484	502	520	538
	4	32	64	96	128	160	192	223	255	287	319	351	383	415	446	478	510	542	574	606	638	669	701	733	765	797	829	861	892	924	956
	5	50	100	150	200	249	299	349	399	448	498	548	598	648	697	747	797	847	896	946	996	1046	1096	1145	1195	1245	1295	1344	1394	1444	1494
	6	72	144	216	287	359	431	502	574	646	717	789	861	932	1004	1076	1147	1219	1291	1362	1434	1506	1577	1649	1721	1792	1864	1936	2007	2079	2151
	7	98	196	293	391	488	586	683	781	879	976	1074	1171	1269	1366	1464	1561	1659	1757	1854	1952	2049	2147	2244	2342	2439	2537	2635	2732	2830	2927
	8	128	255	383	510	638	765	892	1020	1147	1275	1402	1530	1657	1784	1912	2039	2167	2294	2421	2549	2676	2804	2931	3059	3186	3313	3441	3568	3696	3823
	9	162	323	484	646	807	968	1129	1291	1452	1613	1774	1936	2097	2258	2420	2581	2742	2903	3065	3226	3387	3548	3710	3871	4032	4193	4355	4516	4677	4839
	10	200	399	598	797	996	1195	1394	1593	1792	1991	2191	2390	2589	2788	2987	3186	3385	3584	3783	3982	4182	4381	4580	4779	4978	5177	5376	5575	5774	5973
	11	241	482	723	964	1205	1446	1687	1928	2169	2410	2650	2891	3132	3373	3614	3855	4096	4337	4578	4819	5060	5300	5541	5782	6023	6264	6505	6746	6987	7228
	12	287	574	861	1147	1434	1721	2007	2294	2581	2867	3154	3441	3728	4014	4301	4588	4874	5161	5448	5734	6021	6308	6595	6881	7168	7455	7741	8028	8315	8601

100 cm stacking depth, Length factor is 1,5;

60 cm stacking depth, Length factor is 2,5.

Notes: From a height of 4.0m (8 tiles) an additional 48x3 mm tube should be used to stabilize the truss towers.

Ballast weight calculation for ground support system

Condition:

- A. maximum wind force 8 grade
- B. 1.5 times safety parameter
- C. 0.6M base bar

Formula:

$$Z = 5X^2/Y(\text{kg})$$

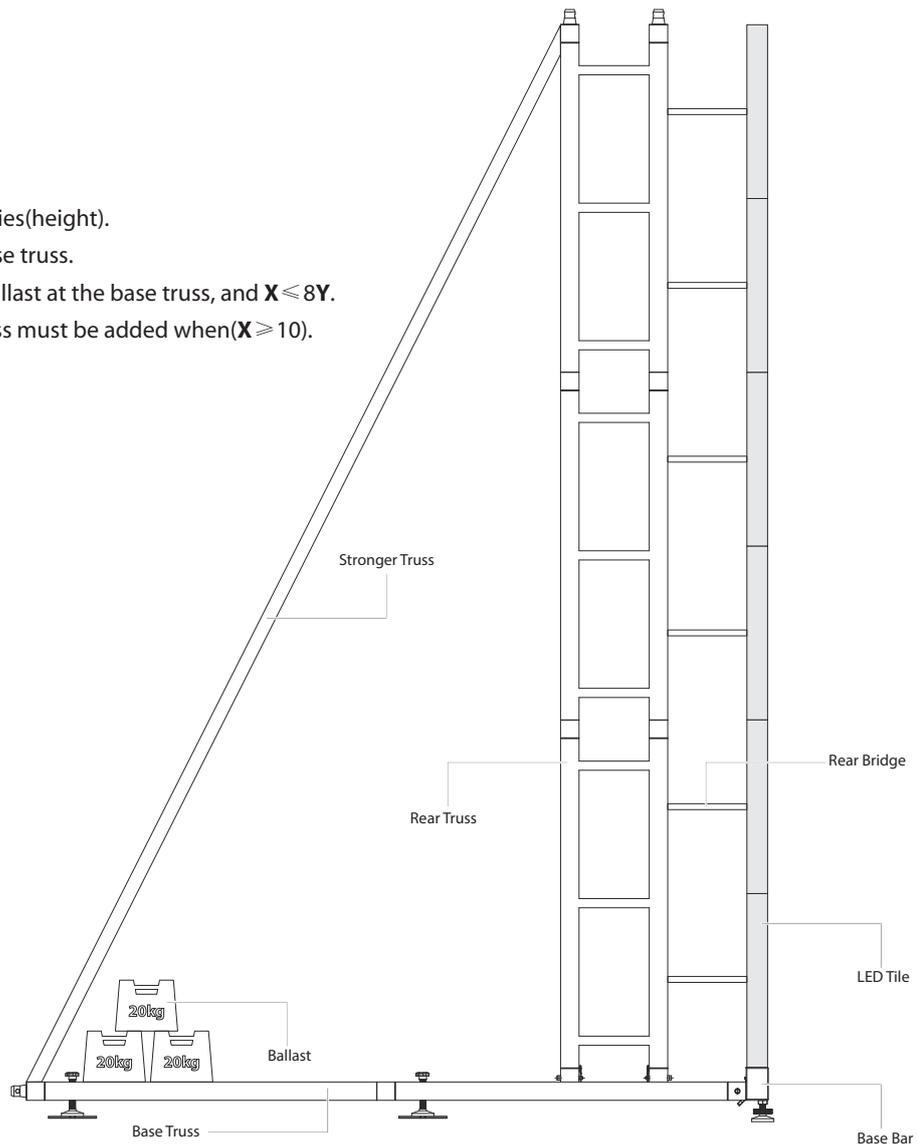
Notes:

X for stacking tile quantities(height).

Y for the quantities of base truss.

Z means the weight of ballast at the base truss, and $X \leq 8Y$.

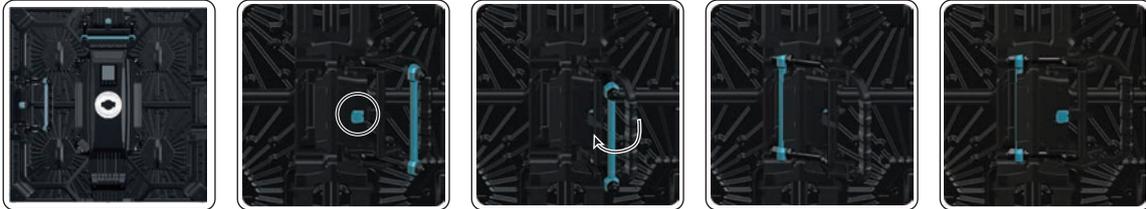
additional stronger truss must be added when $(X \geq 10)$.



06 Physical Connection:

Straight Installation

Horizontal connector operation



- Picture 1 Picture 2 Picture 3 Picture 4 Picture 5
1. Press the horizontal blue button to loosen the handle.(pic2)
 2. Pull the handle to turn the connecting bar.(pic3)
 3. Connect two tiles and align them.(pic 4)
 4. Push handle back for locking.(pic5)

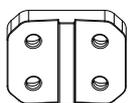
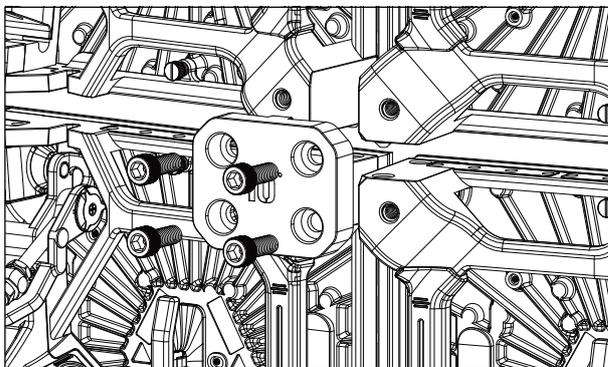
Vertical connector operation



- Picture 1 Picture 2 Picture 3 Picture 4 Picture 5
- Tiles will be attached together by magnets automatically.(pic1)
2. Press the vertical blue button to loosen the handle.(pic2)
 3. Pull the handle to turn the connecting bar.(pic3)
 4. Connect two tiles and align them.(pic 4)
 5. Push handle back for locking.(pic5)

Curve Installation

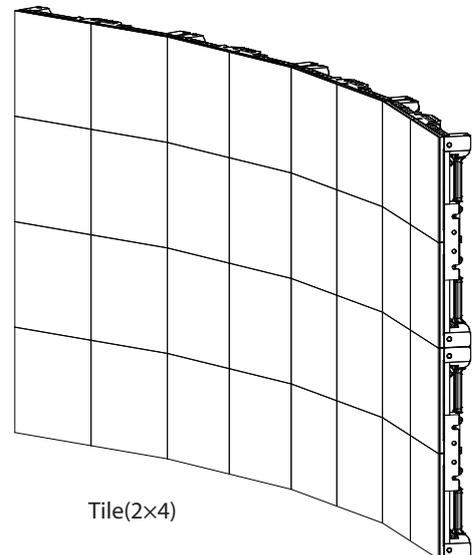
The range of curve: 0~10°(horizontally inner arc).



Concave Connector



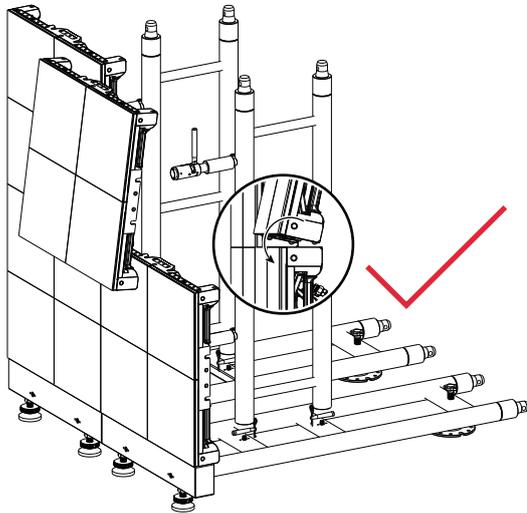
M10 Hex Socket head cap screws



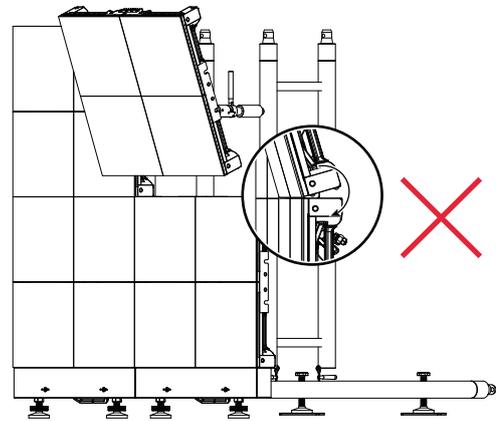
Tile(2x4)

Notes: To keep the lights which on the edge of the module from damaging, please operate it as follows.

Stacking Installation

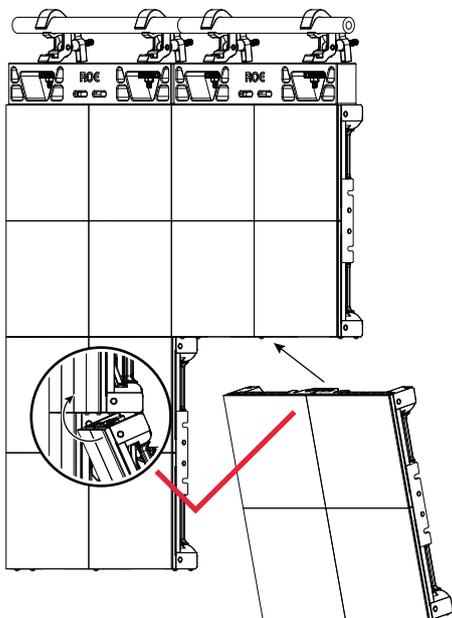


The Correct way

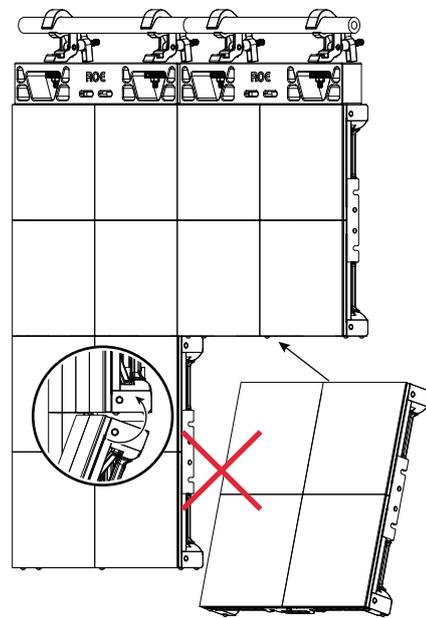


The Wrong way

Hanging Installation



The Correct way

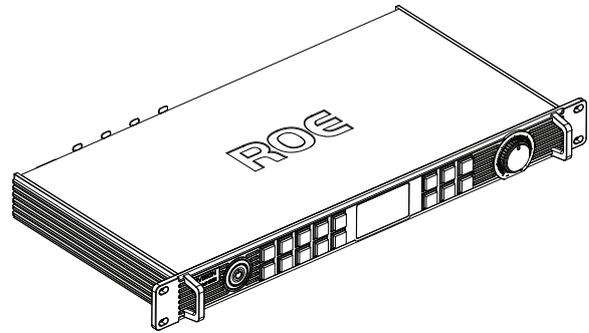


The Wrong way

The control system of Black Pearl series consist of receiving card and sending card. Receiving card is integrated with LED tiles.

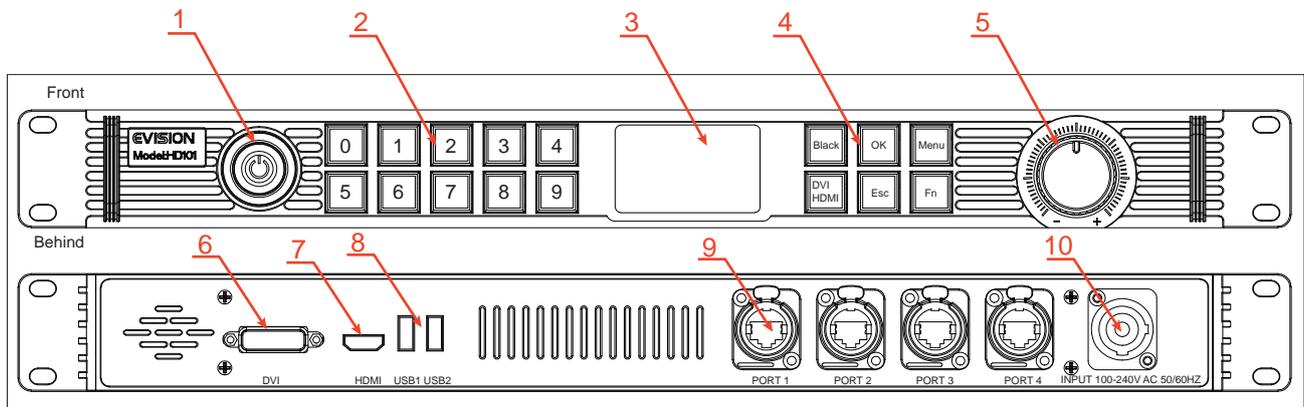
Specifications

Working voltage	100-240V AC
Power	< 20W
Working temperature	-20°C to 45°C
Input port	DVI
Output ports number	4 ports
Communication port	USB/RJ45
Max.Resolution(Input)	1920×1080 60Hz
Data transmission port	Gigabit Ethernet
Material	AL6061
Dimension	W480×H45×D240mm
Weight	2.30kg



Evision (20100050007)

Diagram:



1. Power switch
2. Number keys
3. LCD screen
4. Function keys
5. Knob

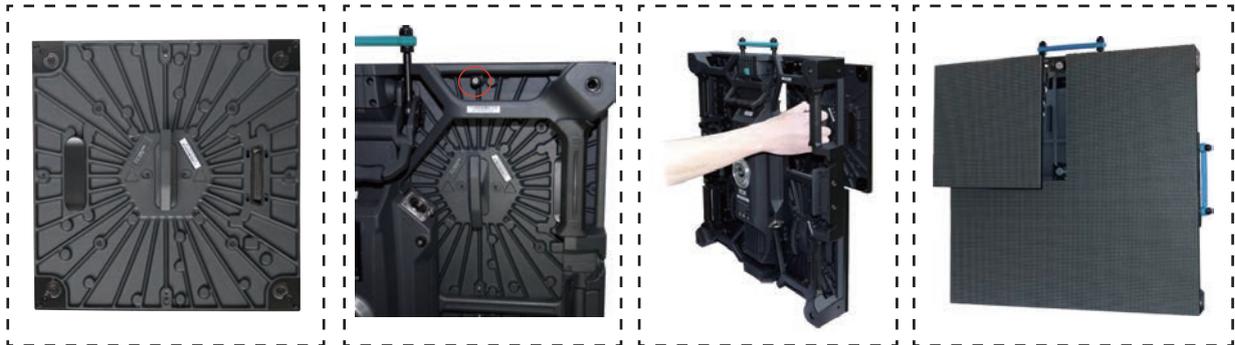
6. DVI port
7. HDMI port
8. USB port
9. RJ45 data port
10. Power port

Software:

Please read software manual firstly, (download link as below): [Http://www.roevisual.com/how-to-make-led-display](http://www.roevisual.com/how-to-make-led-display).

08 Service and Maintenance:

Rear Maintenance



Picture 1

Picture 2

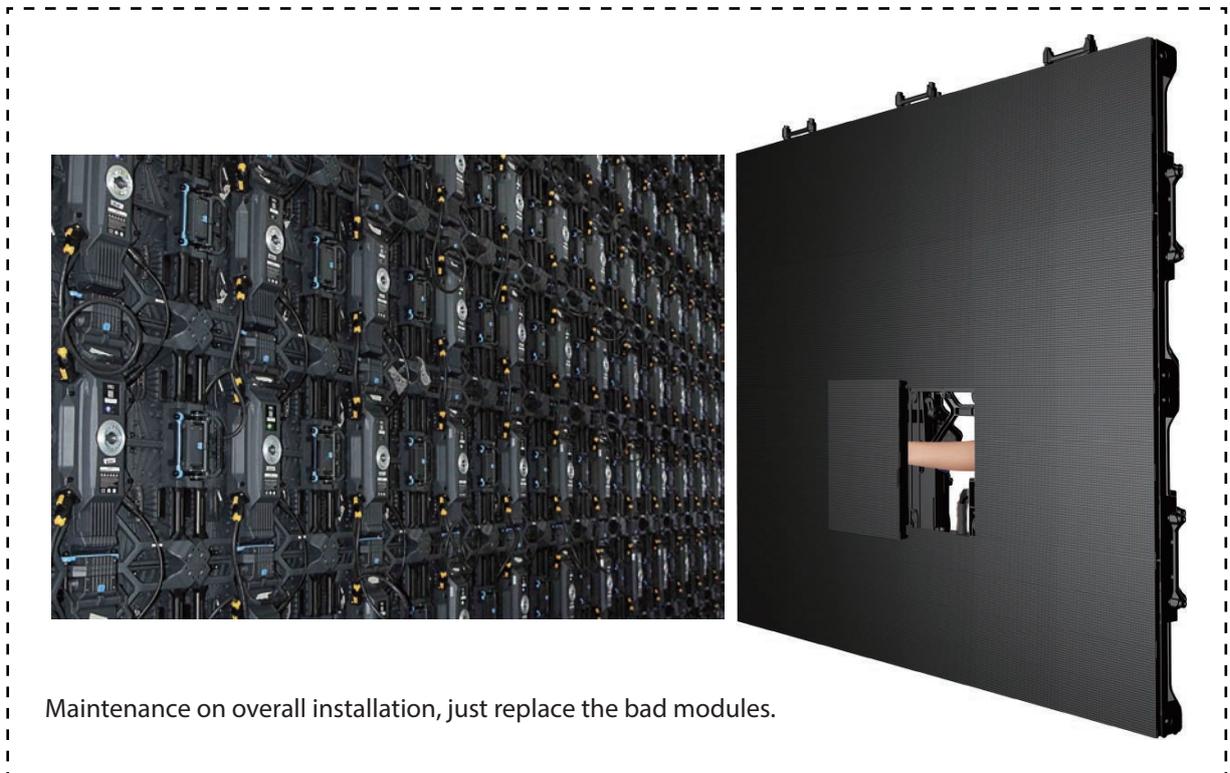
Picture 3

Picture 3

Easy Maintenance with push-out module and all the modules are the same design.

1. A single modules.(Picture 1)
2. Remove the screw in red.(Picture 2)
3. Hold the handle and push the module.(Picture 3)

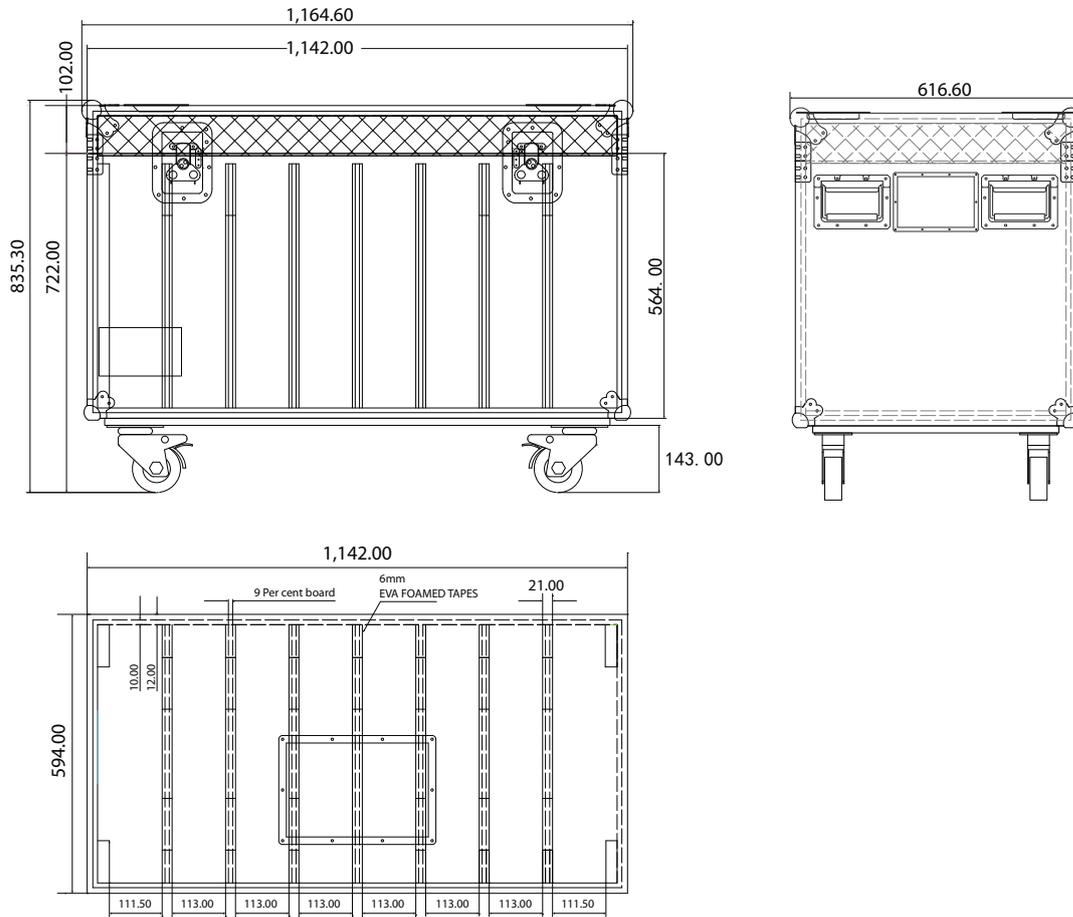
Application example



Maintenance on overall installation, just replace the bad modules.

09 Package

Flightcase Dimensions:



8 pcs LED tiles per Flightcase



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