

EDGE

User Guide

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THOR:

EDGE LED PANEL INSTRUCTIONS

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated and/or potentially dangerous voltage within the products enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



IMPORTANT SAFETY INSTRUCTIONS

1. Intended use for the EDGE series is for indoor applications.
2. Inspect all products and perform safety related checks before deployment.
3. Read and understand this entire manual.
4. Keep this manual available for reference.
5. Heed all warnings and precautions in this manual and notices marked on the product.
6. Do not use this product near water or damp environments.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Provide for proper airflow around product. Do not install near products that produce high levels of heat. Do not expose the unit to direct sun light or heating units as the internal components' temperature may rise and shorten the life of the components.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they connect to the product. Do not use the unit if the electrical power cord is frayed or broken.
11. THOR AV products must be used in accordance with local, state, federal and industry regulations. The responsibility to evaluate the reliability of any rigging or mounting method for their application is solely the user's responsibility. Rigging is to be carried out by experienced professionals.
12. Abide by the Working Load Limit (WLL) of third party equipment for suspension points, chain hoists and additional rigging hardware.
13. Verify structural integrity meets engineering requirements for flying, ground stacking and wall mounting applications.
14. THOR AV is not responsible for any rigging, attachments and accessories provided by third party manufacturers.
15. Utilize safety measures at all times, including safety slings and cables.
16. Unplug this product during lightning storms or when unused for long periods of time.
17. Refer all servicing to qualified service personnel. There are no user serviceable components inside the product.
18. The product shall not be exposed to moisture. Do not touch the unit with wet hands. Do not handle the unit or power cord when your hands are wet or damp.
19. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.

CARE

- From time to time you should wipe off the front and side panels and the cabinet with a dry soft cloth. Do not use rough material, thinners, alcohol or other chemical solvents or cloths since this may damage the finish or remove the panel lettering.
- The manufacturer cannot be held responsible for damages caused to persons, personal possessions, or data due to an improper or missing ground connection.

THOR:

THOR LIMITED WARRANTY

All THOR AV LED products are warranted to the original purchaser to be free of defects in materials and workmanship for a period of two years from date of purchase. During this period, THOR AV will, at its discretion, repair the defective unit or replace it with a new or rebuilt one.

The warranty does NOT cover:

- Damages caused by abuse, accident, improper use, improper handling, improper operation, improper installation/disassembly of the display or any other customer misconduct.
- Damages due to installation of any unauthorized hardware, accessories, consumable parts or components.
- Defects, malfunctions or damages caused during transportation.
- Units on which the product serial number has been removed or altered.
- Units that have been serviced by unauthorized personnel.

All implied warranties, including warranties on merchantability and fitness, are limited in time to the length of this warranty. Some states do not allow time limitations on implied warranties, so this limitation may not apply to you. THOR AV's liability is limited to the repair or replacement of its product. THOR AV shall in no way be held liable for incidental or consequential damages resulting from the use of their product or its software, including, without limitation, damages from loss of business profits, business interruption, loss of business information or other pecuniary loss. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

REPAIR POLICY

Please contact support@thorav.us to obtain an RMA number prior to returning your product to THOR AV. Do not return the product to the place of purchase. Write the RMA number on the outside of the shipping carton. Any product sent to us without a valid RMA number will be refused.

Shipping Address:
THOR AV
Attn: RMA Number
8821 Zealand Ave. N, Ste. B
Brooklyn Park, MN 55445 USA

Include the following with the product: a brief description of the problem, your name, return shipping address, phone number and the RMA number. Do not include any accessories. THOR AV is not responsible for any damage to or loss of the product during transit. We recommend that customers obtain a receipt and tracking number for all packages shipped to us. Turnaround time on repairs is generally ten business days. If you live outside of the United States, please contact your local distributor for warranty service.

WARRANTY SERVICE

You will be responsible for shipping charges to THOR AV and the product will be returned by THOR AV. We reserve the right to inspect any product that may be the subject of any warranty claim before repair is carried out. To qualify for warranty service, documentation showing the date of purchase may be required. Final determination of warranty coverage lies solely with THOR AV.

NON-WARRANTY SERVICE

If it is determined that the product does not meet the terms of our warranty, you will be billed for labor, materials, return shipping and insurance. There is a \$100 USD minimum charge for materials and labor. Appropriate shipping charges will be applied. We require payment in advance of repair by credit card; we accept Visa and Master Card. In the event the charges are over the minimum charge, THOR AV will contact you and inform you of the cost of the repair before any work is completed.

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THOR:

EDGE LED PANEL



INDOOR LED WALL PANEL

For ground stacked or flown LED walls, the EDGE series of LED video walls are quick to set up and offer incredible high performance with options that will fit your budget and creativity. With unparalleled on-camera performance, EDGE LED video walls are distraction-free and excel in live and broadcast scenarios.

- 3.4mm, and 3.9mm pixel pitches
- Brompton or NovaStar processor options
- 500mm x 500mm or 500mm x 1000mm cabinet options
- Superior on-camera performance
- Front and rear maintenance access
- Up to 1250 nit calibrated brightness
- Straight or curved option

THOR:

SPECIFICATIONS

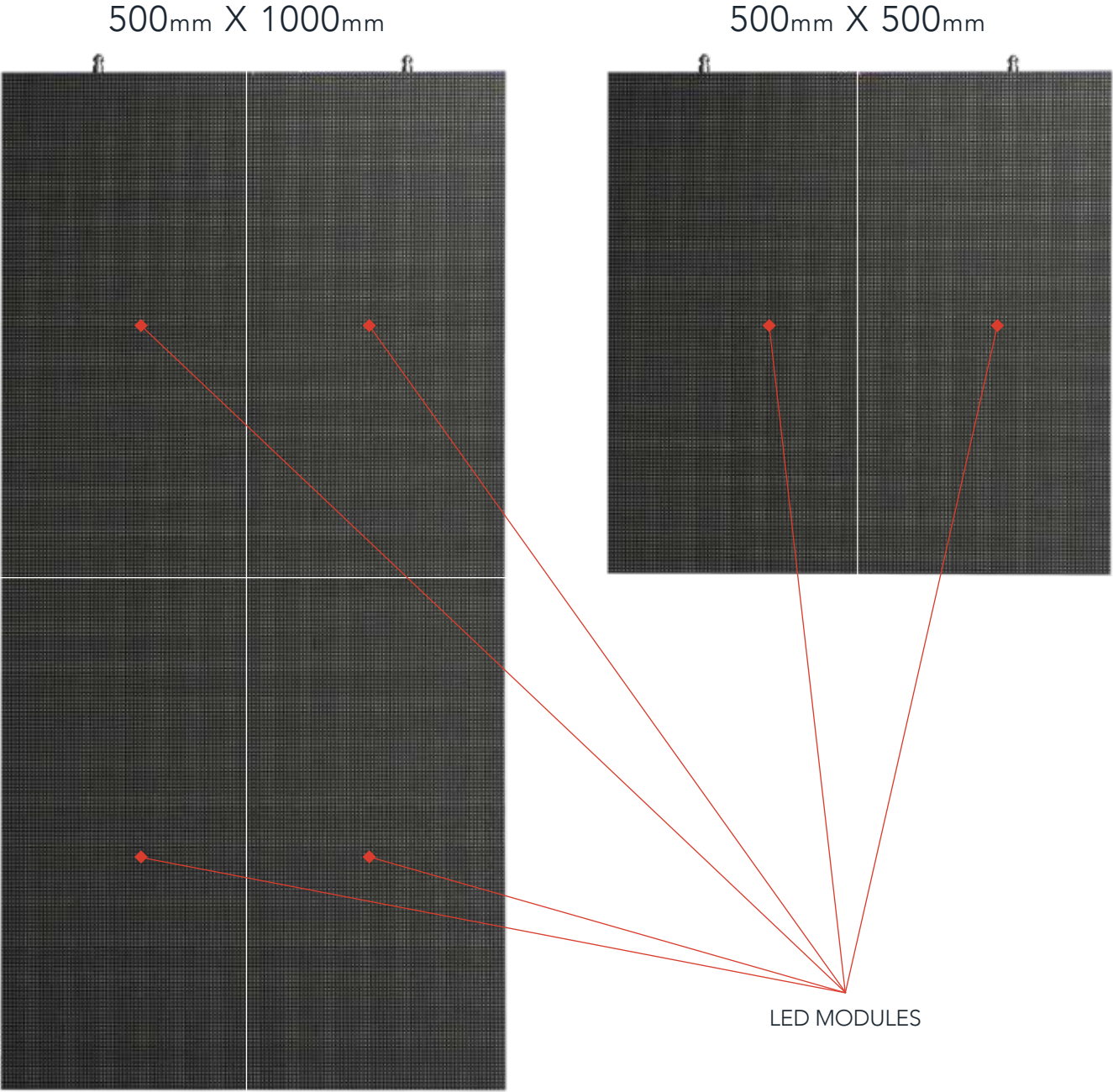
		3.4 Brompton 3.4i NovaStar	3.9i NovaStar
Pixel Pitch		3.47mm	3.9mm
Calibrated Brightness		1,250 nits	1,250 nits
Viewing Angle		140° x 140°	140° x 140°
Closest Viewer		15 FT / 4M	18FT / 5M
LED Module		SMD 2020 gold wire	SMD 2020 gold wire
LED Driver IC		MBI IC with S-PWM	MBI IC with S-PWM
Serviceability		Front / Rear	Front / Rear
Panel Dimensions	500mm x 1000mm	500 x 1000 x 88mm (19.7" x 39.37" x 3.5")	500 x 1000 x 88mm (19.7" x 39.37" x 3.5")
	500mm x 500mm	500 x 500 x 88mm (19.7" x 19.7" x 3.5")	500 x 500 x 88mm (19.7" x 19.7" x 3.5")
Hardware Options		Fly & Ground Stack	Fly & Ground Stack
Receiving Card	Brompton	Brompton R2 +	N/A
	NovaStar	NovaStar A8s	NovaStar A5s Plus
Driving Method		1/12 scan	1/16 scan
Gray Scale		14 bit	14 bit
Refresh Rate		3,840+ Hz	3,840+ Hz
Pixel Configuration	500mm x 1000mm	144 x 288 (w x h) 41,472	128 x 256 (w x h) 32,768
	500mm x 500mm	144 x 144 (w x h) 20,736	128 x 128 (w x h) 16,384
Chassis		Straight	Straight
Chassis - Curving Option*		+/- 0°, 2.5°, 5°, 7.5°, 10°	+/- 0°, 2.5°, 5°, 7.5°, 10°
Operating Temperature		-30° to 50° C	-30° to 50° C
Operating Humidity		10% to 90%	10% to 90%
Power Input		120/240 Volt at 50/60 Hz	120/240 Volt at 50/60 Hz
Power Consumption	500mm x 1000mm	300W max. 100W avg.	300W max. 100W avg.
	500mm x 500mm	200W max. 75W avg.	200W max. 75W avg.
BTU/hr	500mm x 1000mm	1024 max. 342 avg.	1024 max. 342 avg.
	500mm x 500mm	683 max. 256 avg.	683 max. 256 avg.
Electrical Circuits 120V/20A (Recommended)	500mm x 1000mm	10 panels	10 panels
	500mm x 500mm	18 panels	18 panels
Flown Maximum Rigging Height		14M (46')	14M (46')
Ground Stacked Maximum Height		6M (20')	6M (20')
Chassis Material		Die Cast Aluminum	Die Cast Aluminum
Weight	500mm x 1000mm	14.5 kg (32 lbs)	14.5 kg (32 lbs)
	500mm x 500mm	10.5 kg (24 lbs)	10.5 kg (24 lbs)
IP Rating		IP31	IP31
Certifications		FCC, ETL, CE	FCC, ETL, CE
Life Span		100,000+ Hours	100,000+ Hours
Limited Warranty		2 years	2 years

*Special Order Only



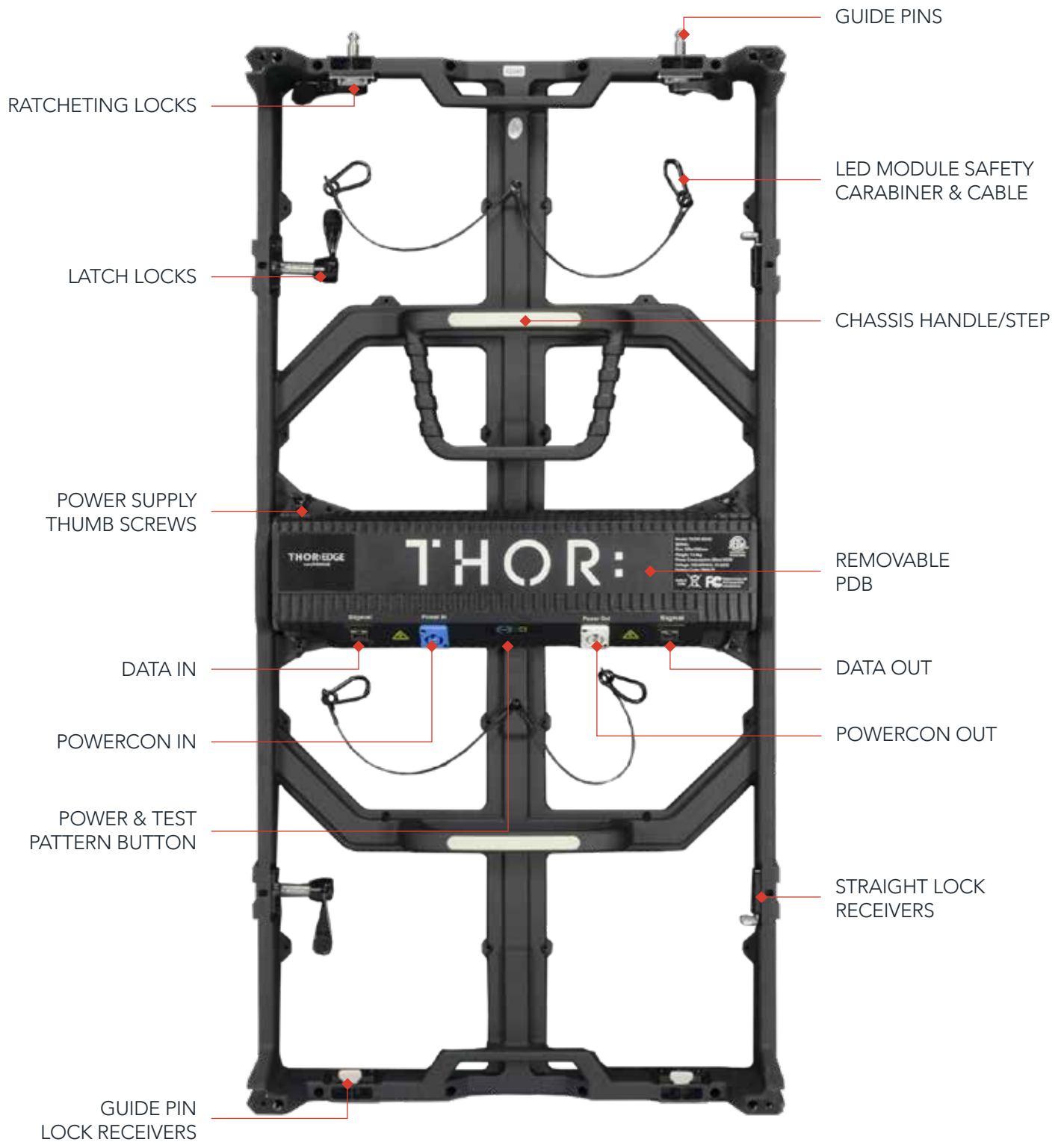
THOR:

FRONT VIEW



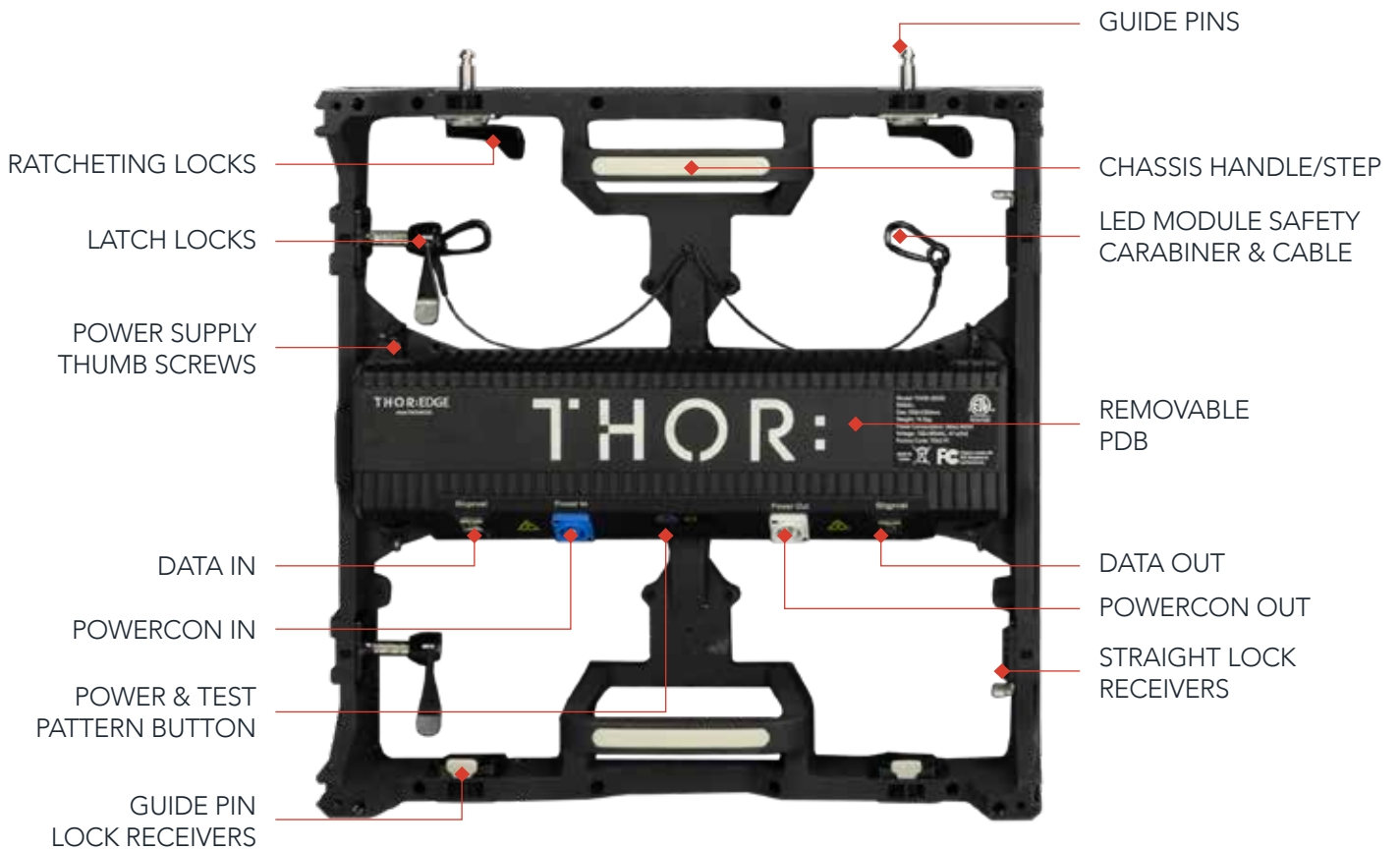
THOR:

REAR VIEW 500mm X 1000mm



THOR:

REAR VIEW 500mm X 500mm



THOR:

PARTS

Flown and Ground Stack Install

Flybar/Ground Stack Bar .5M

500mm x 170mm x 100mm
19 ¹¹/₁₆" x 6 ¹¹/₁₆" x 3 ¹⁵/₁₆"
4.63 kg / 10.2 lbs



Flybar/Ground Stack Bar 1M

1000mm x 170mm x 100mm
39 ³/₈" x 6 ¹¹/₁₆" x 3 ¹⁵/₁₆"
8.89 kg / 19.6 lbs



Ground Stack Install

Rear Ground Bar .9M

900mm x 80mm x 120mm
31 ¹/₂" x 3 ¹/₈" x 4 ³/₄"
8.16 kg / 18 lbs



Square Frame Truss

1000mm 250mm x 50mm
39 ³/₈" x 9 ¹³/₁₆" x 1 ¹⁵/₁₆"
3.76 kg / 8.3 lbs



Locking Clamp

230mm x 120mm x 64mm
9" x 4 ³/₄" x 2 ¹/₂"
.72 kg / 1.6 lbs



THOR:

PARTS

Ground Stack Install

Draw Bar .6M

600mm x 50mm x 50mm
23 $\frac{5}{8}$ " x 1 $\frac{15}{16}$ " x 1 $\frac{15}{16}$ "
.9 kg / 2 lbs



Draw Bar 1M

1000mm x 50mm x 50mm
39 $\frac{3}{8}$ " x 1 $\frac{15}{16}$ " x 1 $\frac{15}{16}$ "
1.59 kg / 3.5 lbs



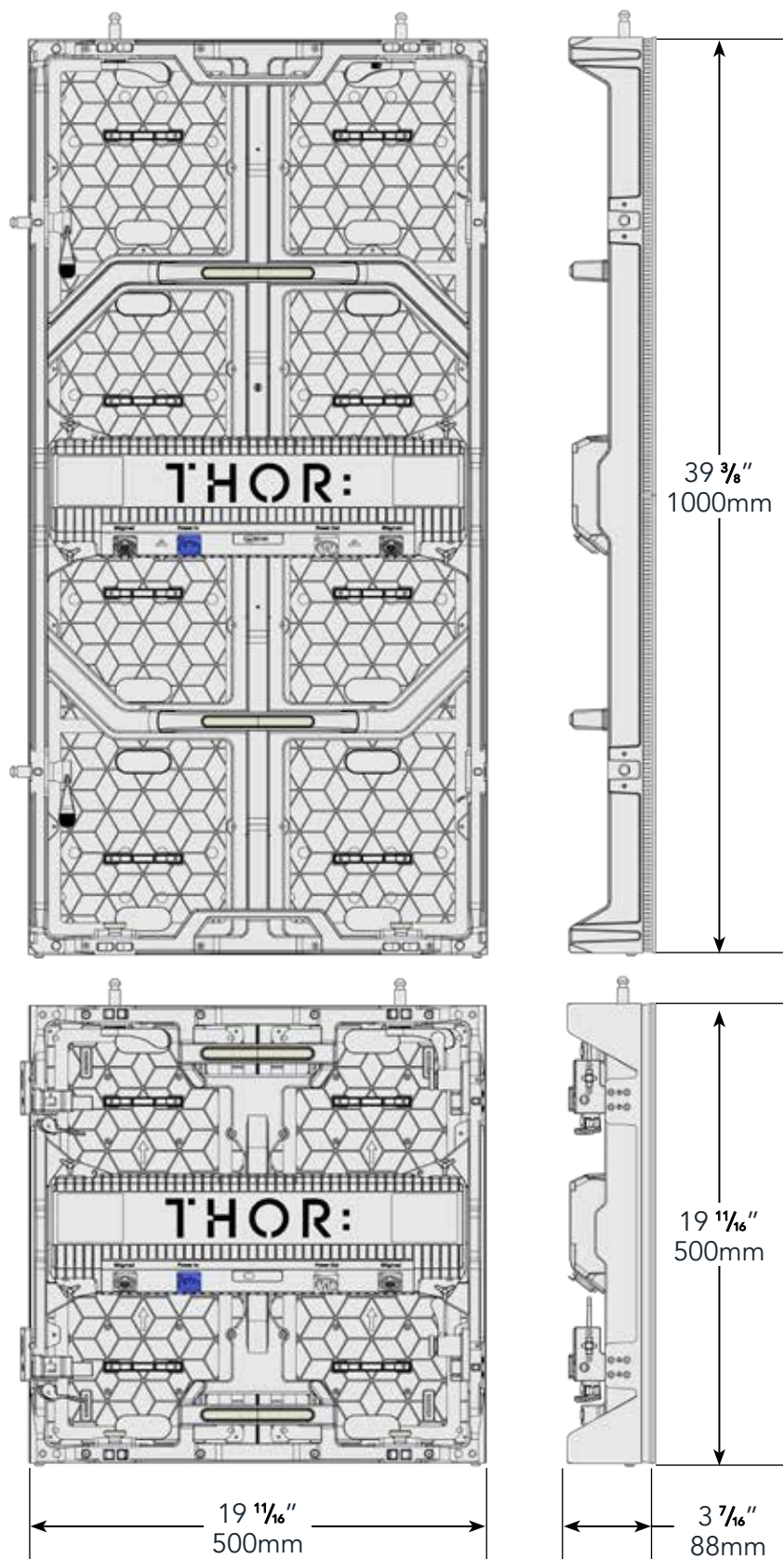
Adjustable Draw Bar 1M

1257mm x 200mm x 102mm
49 $\frac{1}{2}$ " x 8" x 4"
2.7 kg / 6 lbs



THOR:

DIMENSIONS



THOR:

MECHANICAL

See [Important Safety Considerations](#) on page 16.

STRUCTURAL

Structural integrity for all types of LED wall installation applications (Flown and Ground Stack) is required for each site and verified by a structural engineer.

RIGGING

Verify the mounting structure load capacity (truss, purlins, schedule 80 pipe, unistrut, etc). Determine adequate amount of pick points for stabilizing LED wall.

BALLASTING

Ground Stack LED walls require ballasting a percentage of the total weight. Ballast the LED wall by distributing evenly on the Rear Ground Bars.

Ballast Weight Calculator

Wall Height, 1-3 meters — 50% of wall weight

Wall Height, 4 meters — 75% of wall weight

Wall Height, 5 meters — 100% of wall weight

Wall Height, 6 meters — 100%* of wall weight

If a wall weighs 3,300lbs., then the total ballasting weight is 1650lbs. If there are 12 Rear Ground Bars for this LED wall, 137.5lbs. is needed for each Rear Ground Bar.

*At 6 meters we recommend adding another row of Rear Ground Bar and another set of Rear Ground Truss.

ELECTRICAL

POWER

EDGE Panels require 110-240 VAC, 50-60 Hz and should be 16A or less. Proper grounding is required.

THOR:

VIDEO SYSTEM

PROCESSING

THOR LED Panels are available with Brompton and NovaStar processing. Contact THOR for specifics.

LED PANELS PER PROCESSOR PORT

Pixel capacity per port may vary based on LED wall mapping configuration and pixel pitch.

EDGE LED Panel
500mm x 500mm



	EDGE 3.4				EDGE 3.9			
	60Hz	120Hz	180Hz	240Hz	60Hz	120Hz	180Hz	240Hz
8 bit Panel Qty	25	12	8	6	32	16	10	8
10 bit Panel Qty	20	10	6	5	25	12	8	6
12 bit Panel Qty	16	8	5	4	21	10	7	5

EDGE LED Panel
500mm x 1000mm



	EDGE 3.4				EDGE 3.9			
	60Hz	120Hz	180Hz	240Hz	60Hz	120Hz	180Hz	240Hz
8 bit Panel Qty	12	6	4	3	16	8	5	4
10 bit Panel Qty	10	5	3	2	12	6	4	3
12 bit Panel Qty	8	4	2	2	10	5	3	2

THOR:

IMPORTANT SAFETY CONSIDERATIONS

THOR AV products must be used in accordance with local, state, federal and industry regulations. In addition to this, THOR AV is not responsible for any rigging, attachments and accessories provided by third party manufacturers.

INTENDED USE

The EDGE series LED panels are for indoor applications only. Installations require professionally trained personnel.

Do not use this product near water or damp environments. Do not expose the unit to direct sun light or heating units as the internal components' temperature may rise and shorten the life of the components. Provide for proper airflow around product. Do not install near products that produce high levels of heat.

INSPECT PRODUCT

Inspect all products and perform safety related checks before deployment. Heed all warnings and precautions in this manual and notices marked on the product.

Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they connect to the product. Do not use the unit if the electrical power cord is frayed or broken.

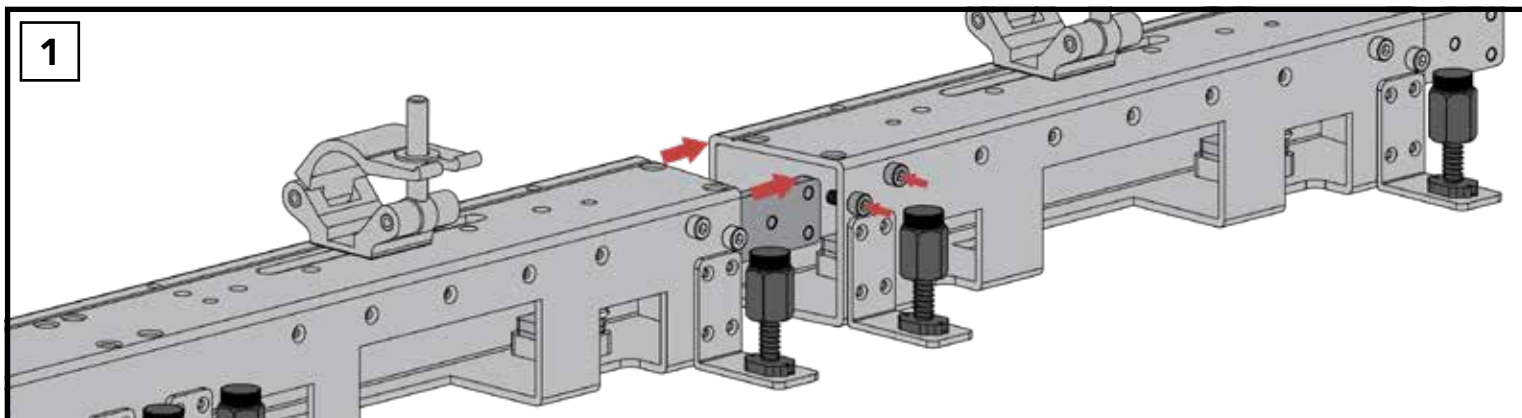
INSTALLATION GUIDELINES

The responsibility to evaluate the reliability of any rigging or mounting method for their application is solely the user's responsibility. Rigging is to be carried out by experienced professionals. Abide by the Working Load Limit (WLL) of third party equipment for suspension points, chain hoists and additional rigging hardware.

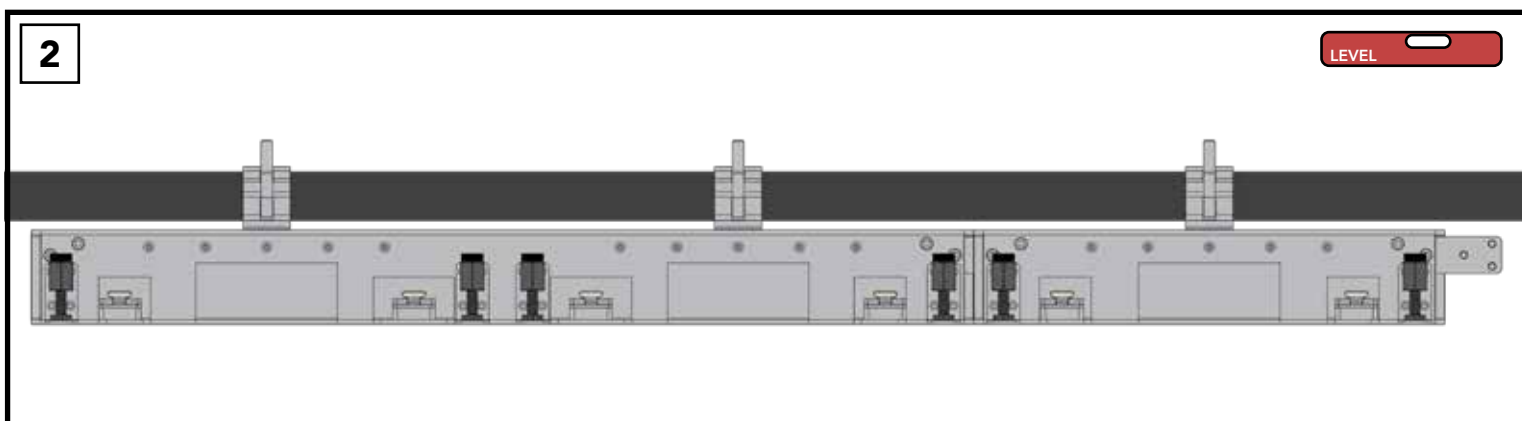
Verify structural integrity meets engineering requirements for flying, ground stacking and wall mounting applications. Utilize safety measures at all times, including safety slings and cables.

THOR:

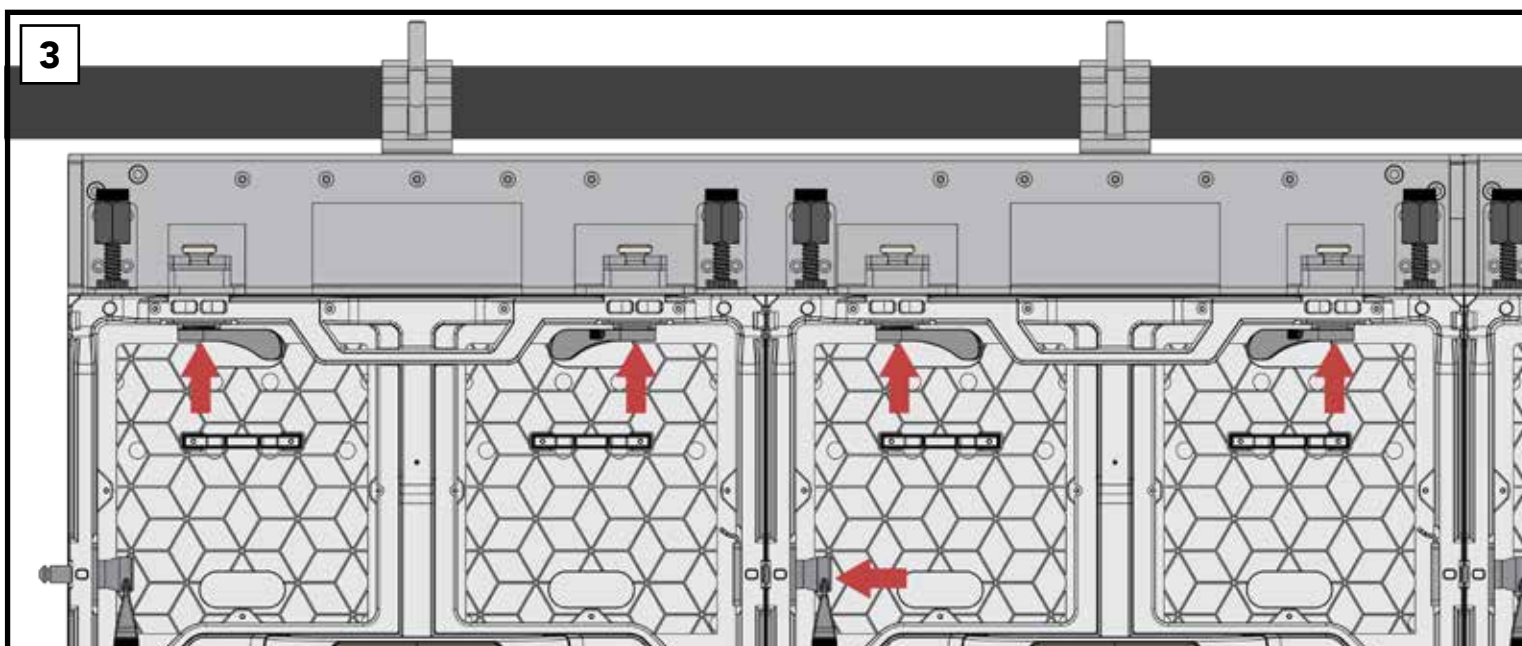
FLOWN APPLICATION



Loosely secure Flybars together with Flybar Bracket.



Secure and level Flybars to weight bearing structure using Clamps or Eyebolts.

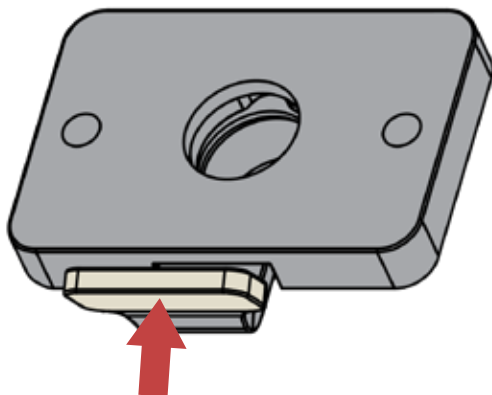


Insert Latch Guide Pins into receiving holes on Flybar and adjacent panels. Align panels and lock into position by twisting the Latch Guide Pin. Do not over tighten. Continue until first row is complete. Tighten Flybar Brackets (figure 1). For additional rows, align panels and lock into position.

THOR:

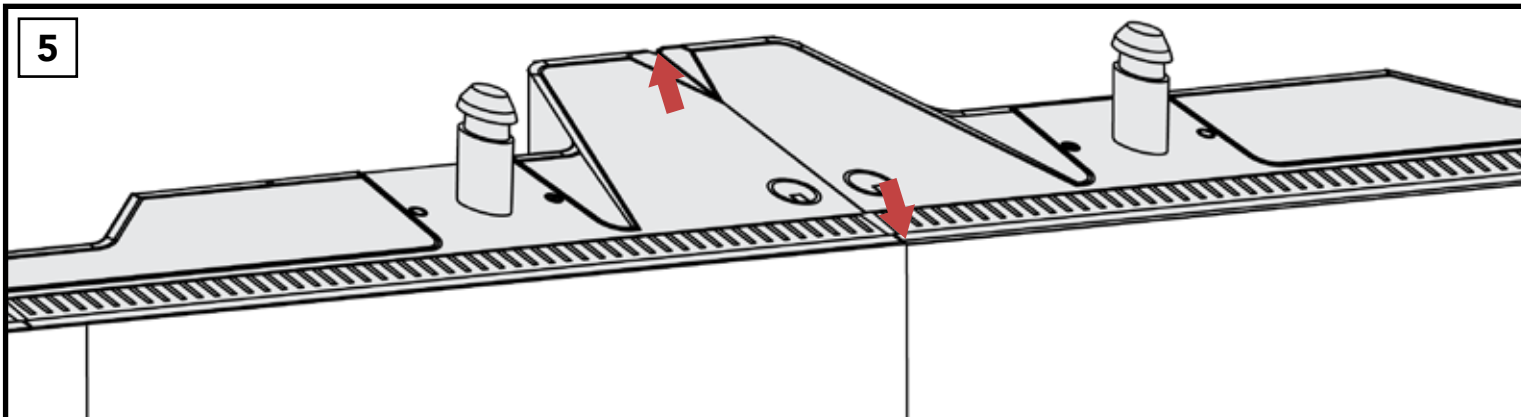
FLOWN APPLICATION

4



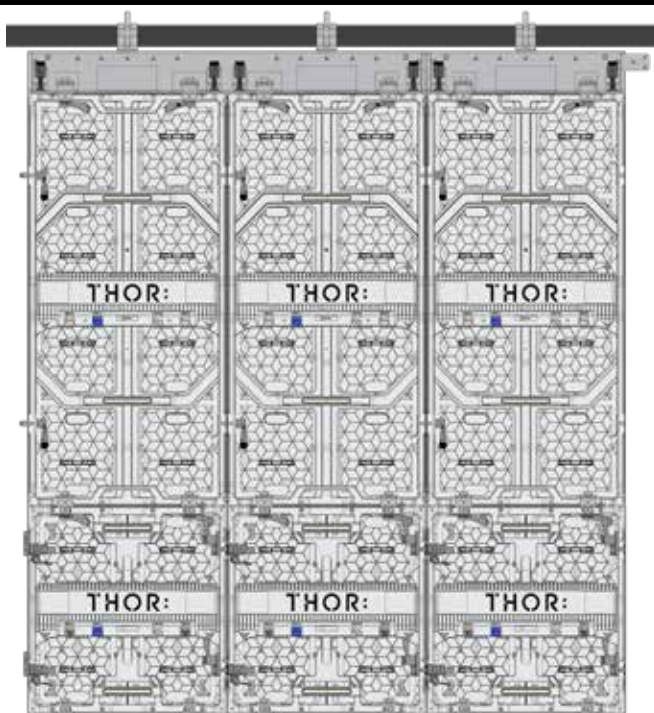
Push latch lever, on Flybar or panel, to lock or release Latch Guide Pins. New Latch lever may need to be pushed in and out a few times for Latch Guide Pins to properly secure into place.

5



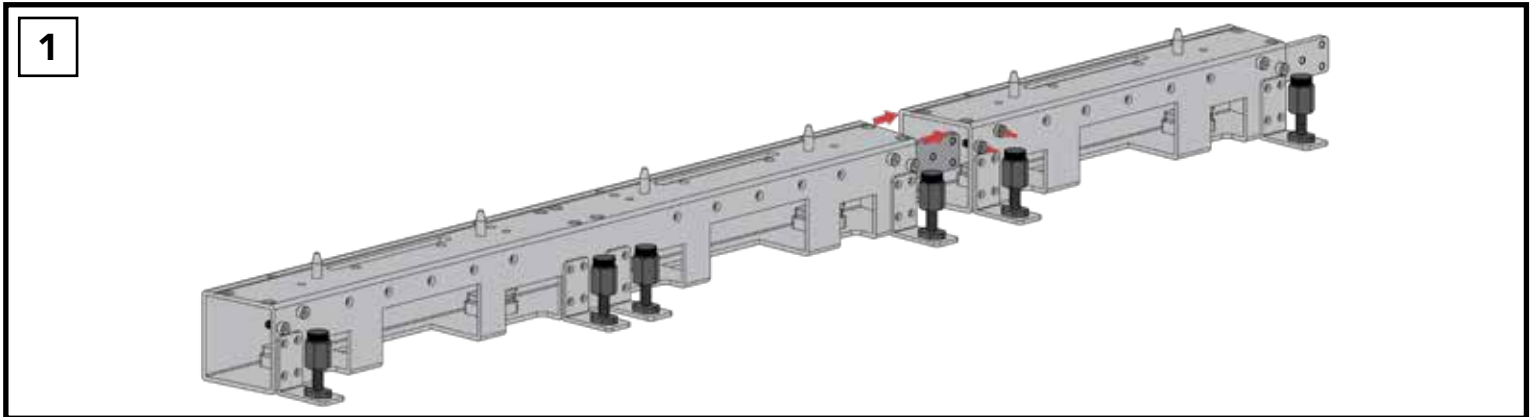
Verify LED panels are aligned before tightening into place.

6

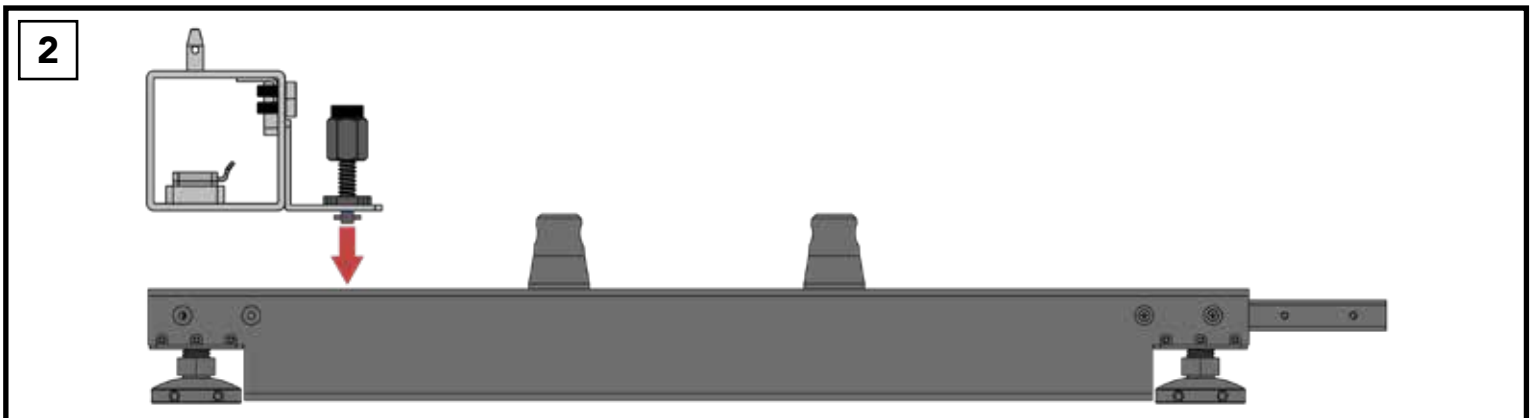


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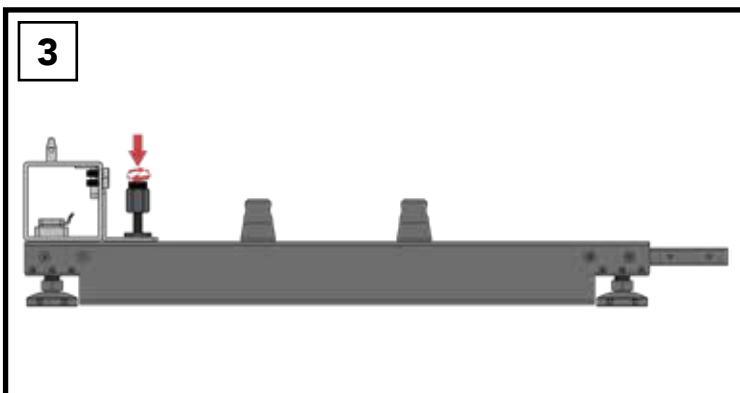
GROUND STACKED LED WALL



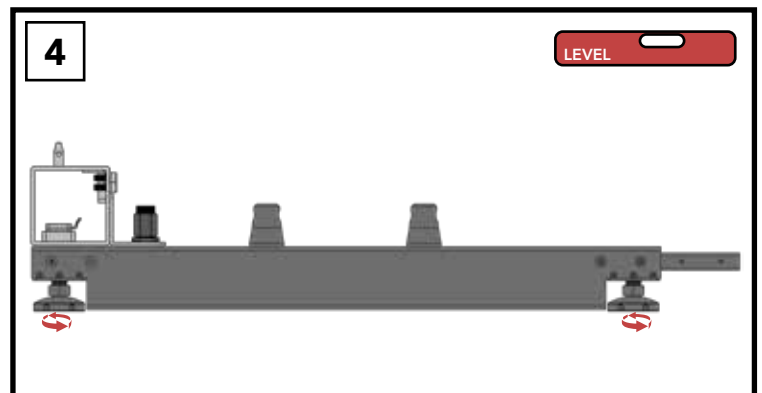
Attach Ground/Flybar to adjacent Ground/Flybar by loosely securing bracket to adjacent Ground/Flybar using a 6mm hex until first row panels are in place. Tighten or loosen as needed. Do not over tighten.



Align Ground/Flybar onto Rear Ground Bar.



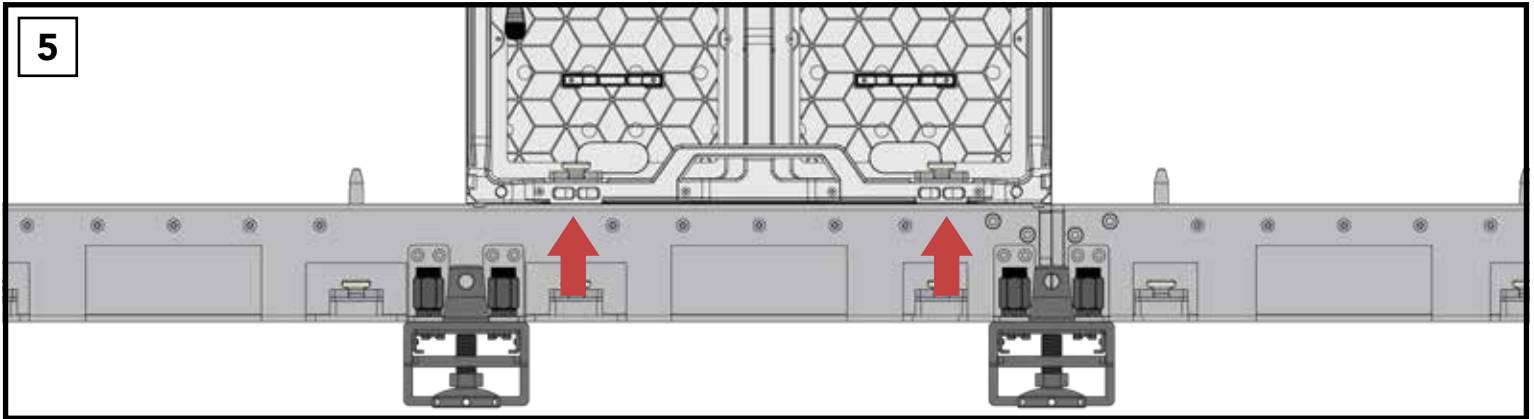
Insert and twist Ground/Flybar Spring Bolt into Rear Ground Bar. Tighten when positioned accordingly.



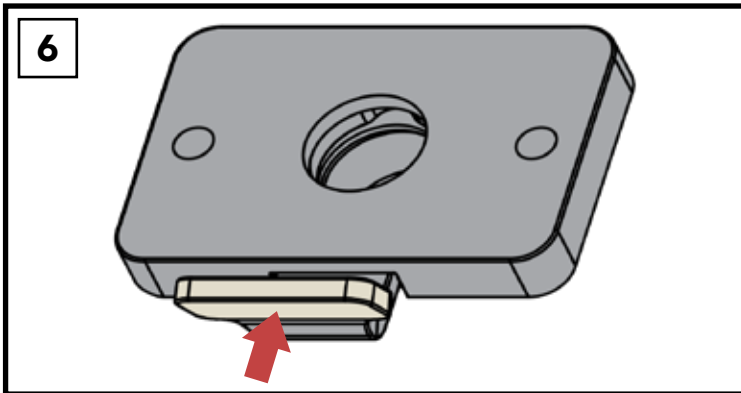
Level Ground/Flybars using Rear Ground Bar Feet either by hand or using inset hex. Level feet to eliminate seams in the LED wall as more panels are added.

THOR:

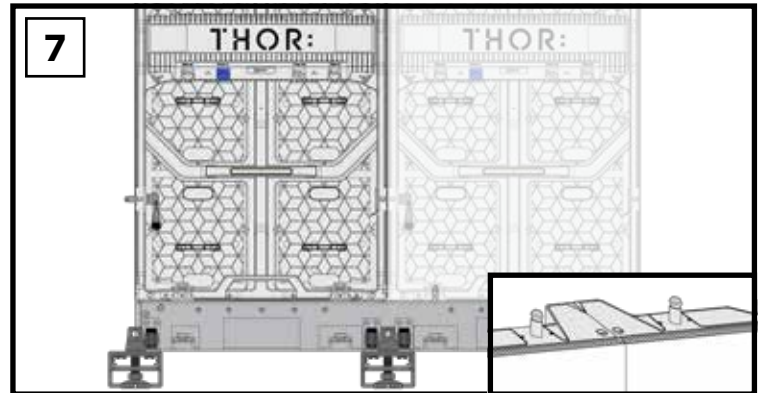
GROUND STACKED LED WALL



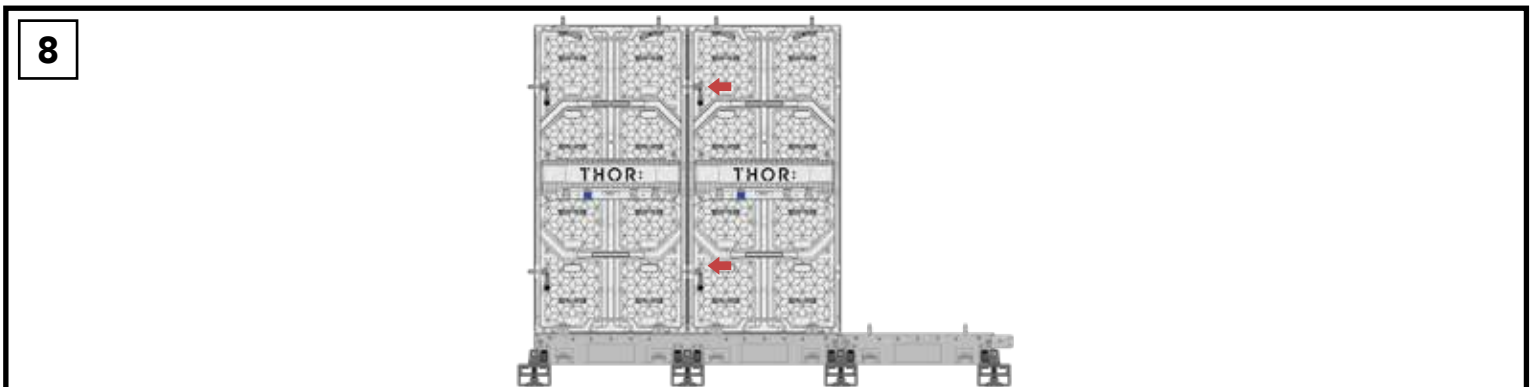
Insert Latch Guide Pins into receiving holes on panel.



The receiving hole on panel, locks the Ground/Flybar Guide Pins into position. Push to lock or release.



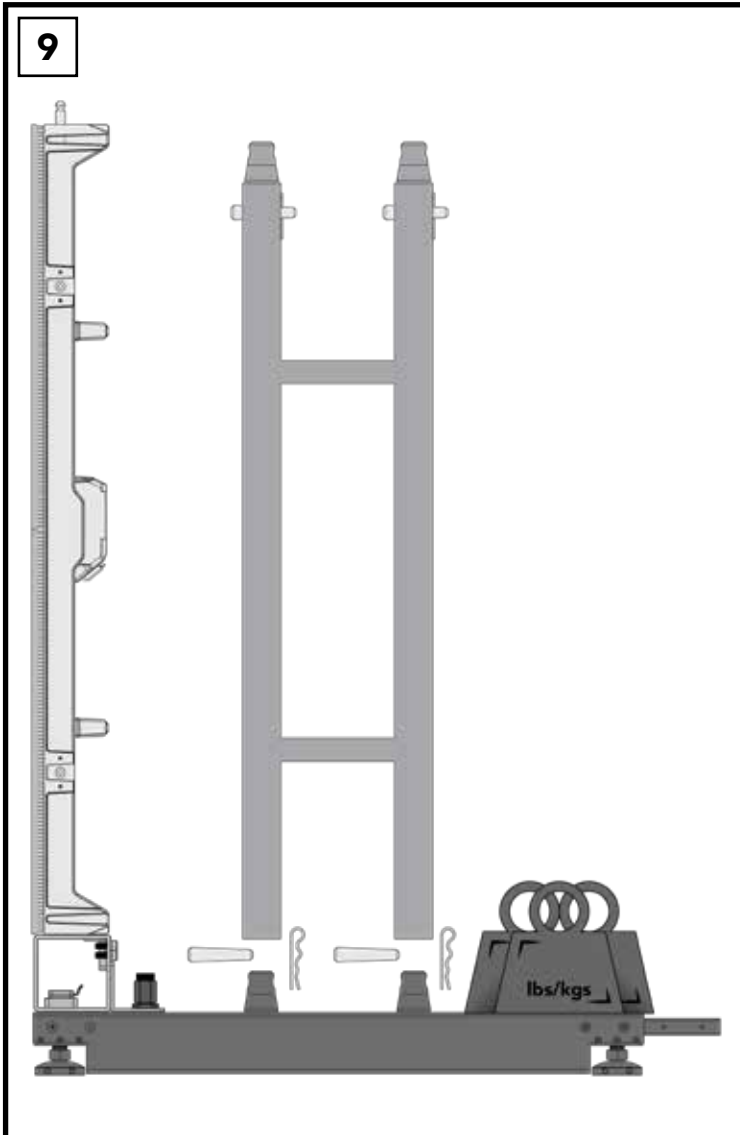
Place other panels next to each other and insert Latch Guide Pins into receiving holes on panel and twist to lock into place. Check that face (LED Modules) of panels are flush with each other before tightening into place.



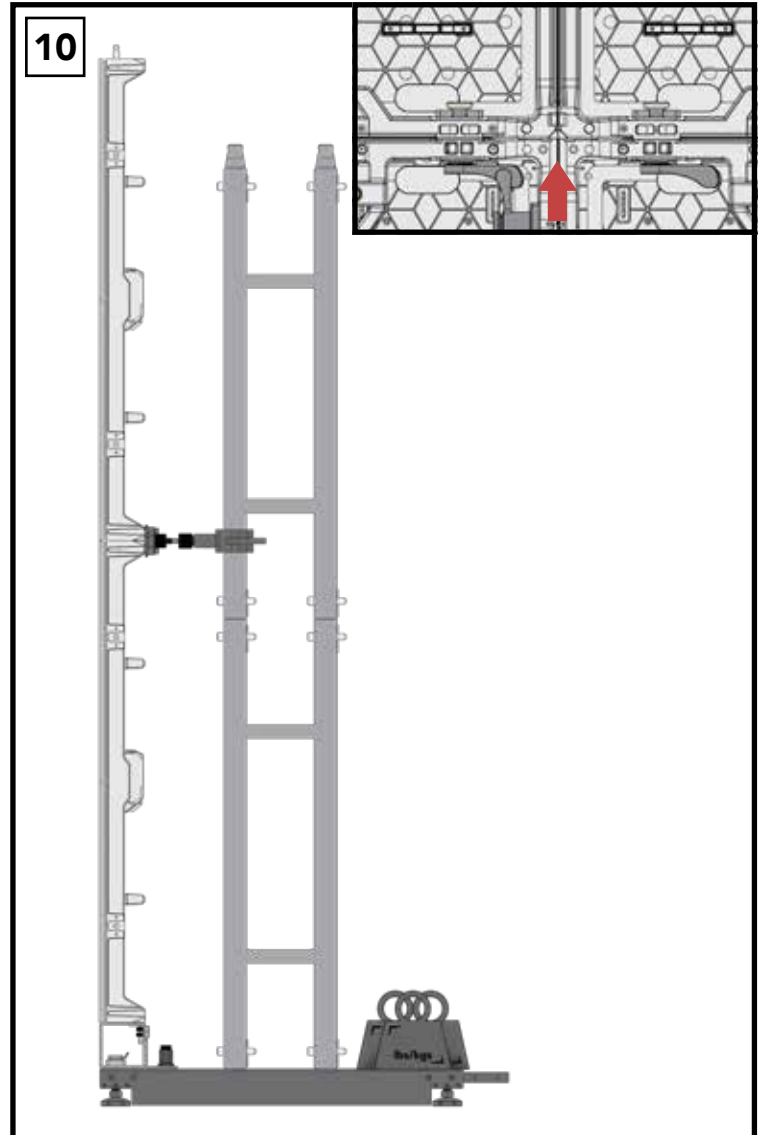
Insert Latch Guide Pins into adjacent panel. Aligning panels, lock into position by twisting the Latch Guide Pin. Do not over tighten. Continue steps 7-8 until first row is complete. Adjust Rear Ground Bar Feet as more weight is added to each row. For additional rows, align panels into position. To remove seams, loosen Latch Locks and adjust feet and tighten Latch Locks again. Finally, tighten Flybar Brackets (figure 1).

THOR:

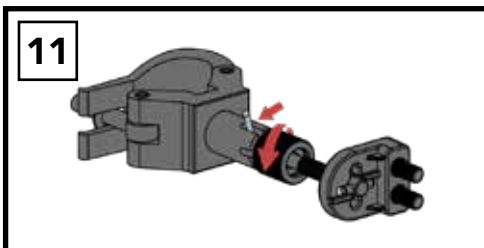
GROUND STACKED LED WALL



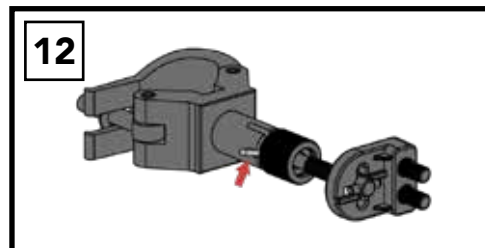
Connect Square Frame Truss to Rear Ground Bar. Insert truss bolts and cotter pins into Rear Ground Bar holes. Holes are tapered. Add Ballasting or anchoring.



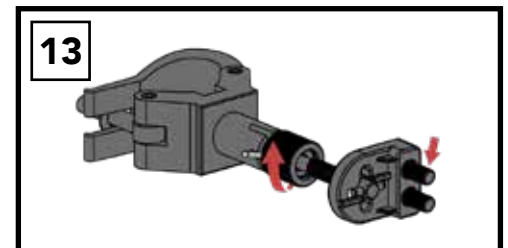
Loosely attach Locking Clamp with wing nut to Square Frame Truss. Align Locking Clamp with panel. Tighten Locking Clamp to Square Frame Truss and screw onto panel (figures 11-13).



Loosen Locking Sleeve. Locking Pin should be on long slot when attaching clamp to Square Frame Truss.



After attached to Square Frame Truss, move Locking Pin to short slot.



Tighten screws to panels and Locking Sleeve to lock clamp into place.

THOR:

GROUND STACKED LED WALL

14

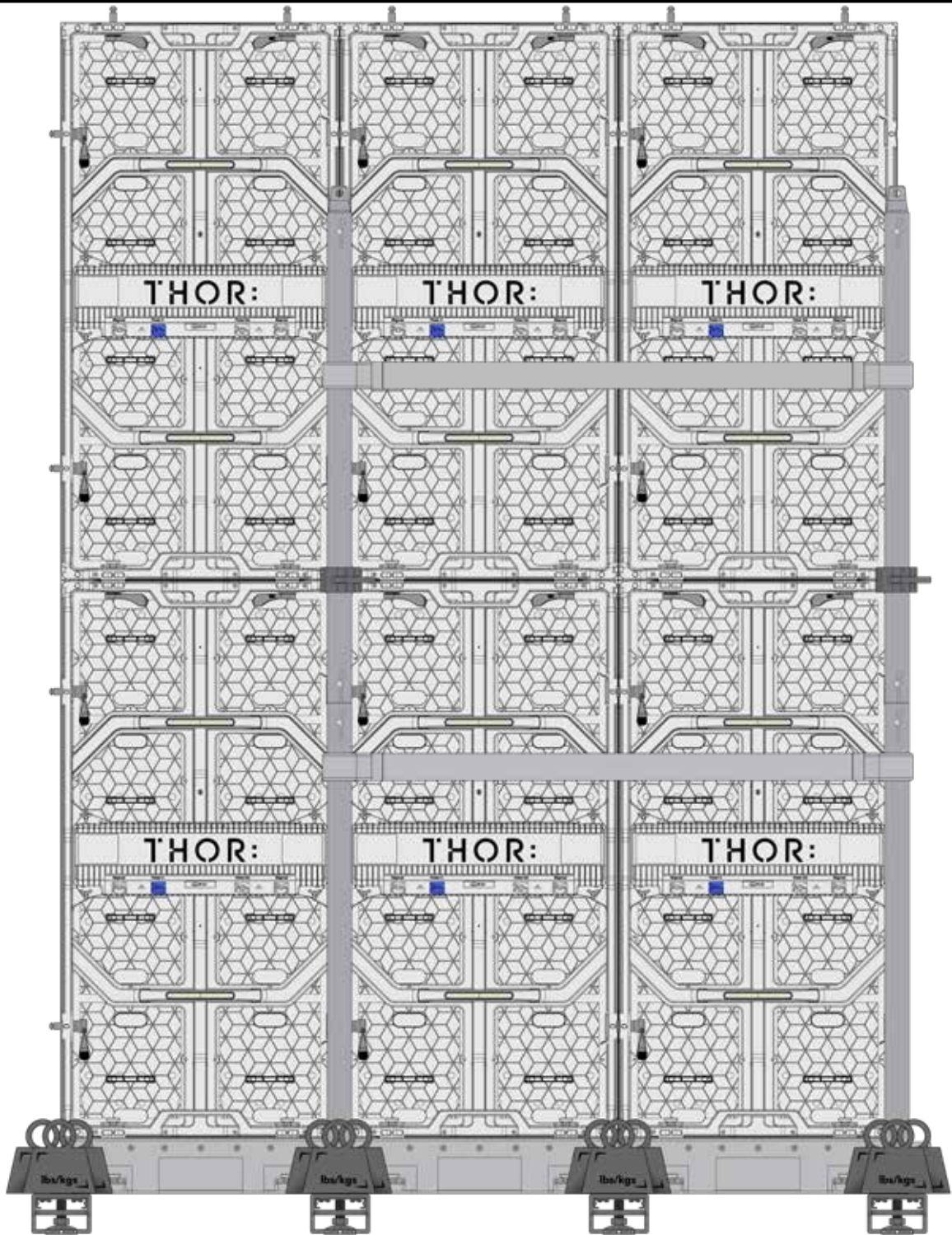


Repeat steps 9-13 for each Ground/Flybar section.

THOR:

GROUND STACKED LED WALL

15

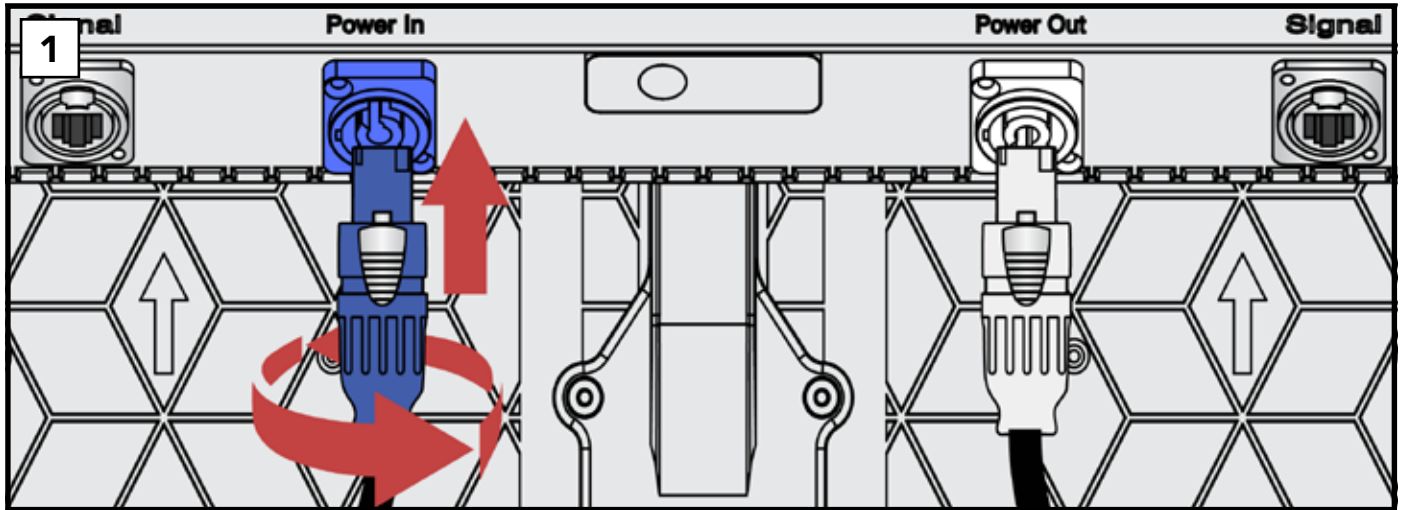


Attach Draw Bars to Square Frame Truss columns.

THOR:

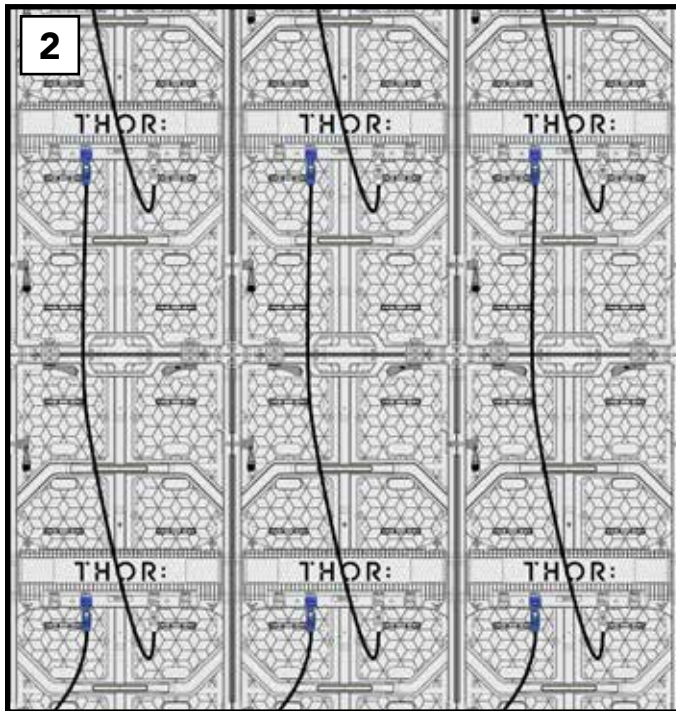
POWER CONNECTION

Power can run either horizontally or vertically. Connect adjacent panels with Neutrik jumper cables. Power is directional, Blue is IN and White is OUT. Connect electrical circuit power cable to first LED panel. See data sheet (pg 6) for load capacity.

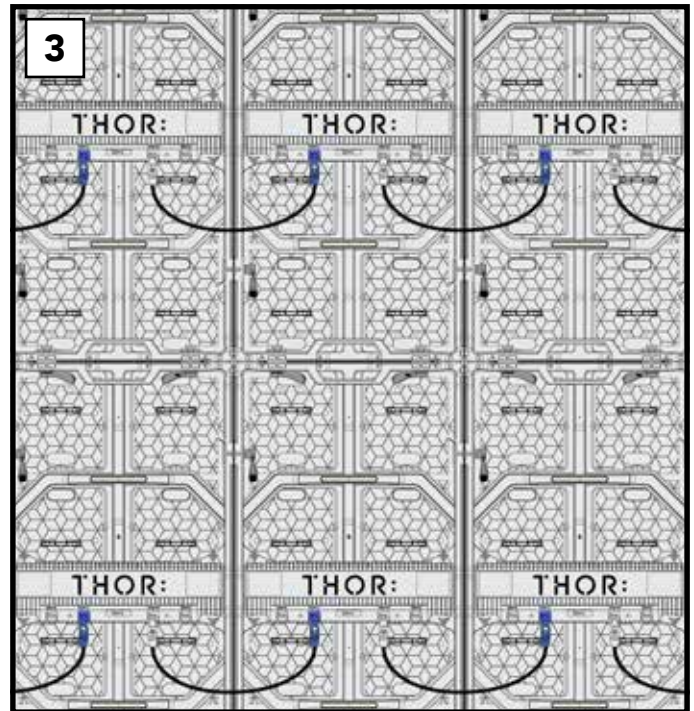


Insert power cable and twist clockwise.

To disconnect power cable, pull back release button on the connector, twist counter-clockwise and remove.



Panels chain together both horizontally or vertically (depending on length of cable). Power enters from Left Side (rear view).



For panels chained horizontally, power enters from Left Side (rear view) or Right Side (front facing).

THOR:

DATA CONNECTION

Generally, one data port on the processor supports up to about 525,000 pixels, depending on system solution.

If data redundancy is required, each Primary Data Run needs an additional (redundant) data cable; using two data ports on the processor.

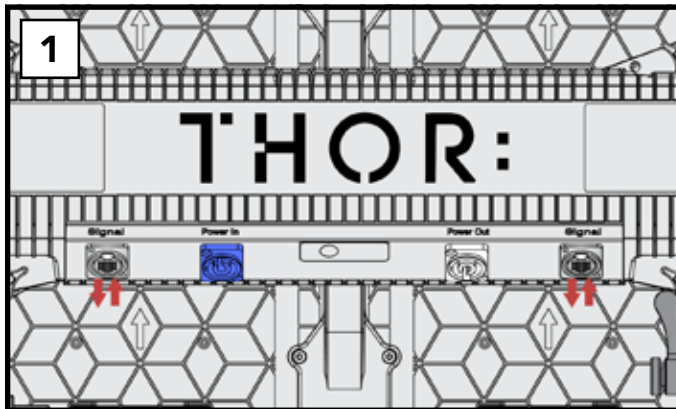
When mapping the processor, verify the perspective view defined by the software. With a different perspective selected, the mapping direction will be reversed.

Maximum recommended CAT6 cable length is 100 meters. Fiber transport is utilized for distances exceeding 100 meters.

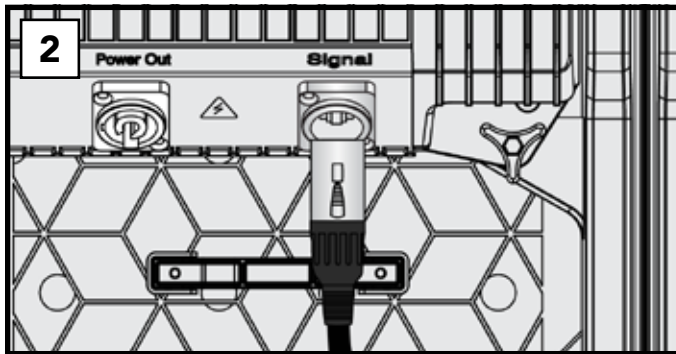
Connect LED panels to the processor data ports with cables provided.
Connect control PC / laptop via the Ethernet/USB port to the processor.
Connect a video source to the processor's video input.

Data Redundancy

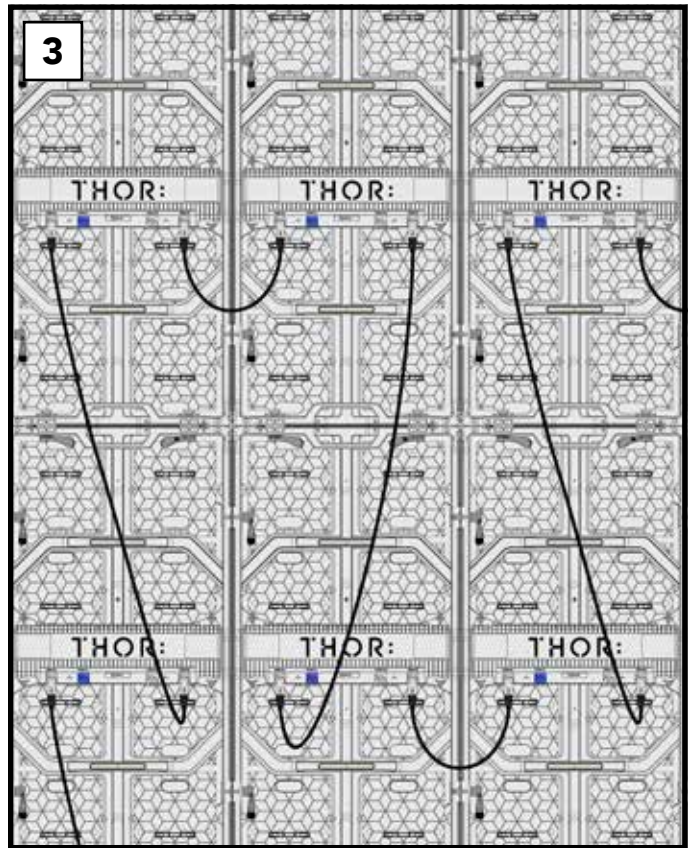
LED panels have two data ports. Redundancy auto switches to receive data from a secondary port on the processor to ensure data connectivity. One port is required for the primary data feed and an additional port is required for the secondary data feed. Verify LED wall configuration is supported by the processor.



Each signal port can be input or output. If one signal port is the input data, the other port is the output data.



Plug in CAT6 data cable: Push cable into data port until it clicks.
Unplug data cable: Push button on the socket to release cable and remove.



Panels can be chained vertically or horizontally. Be sure each panel only has one signal in and one signal out.

THOR:

PROCESSORS

THOR AV partners with Brompton Technology and Novastar processor manufacturers.



BROMPTON TECHNOLOGY

For more information on LED wall setup using Brompton processors, refer to www.bromptontech.com.



NOVASTAR

For more information on LED wall setup using Novastar processors, refer to www.novastar.tech.

THOR:

SERVICE & MAINTENANCE

REPLACING POWER DATA BOX

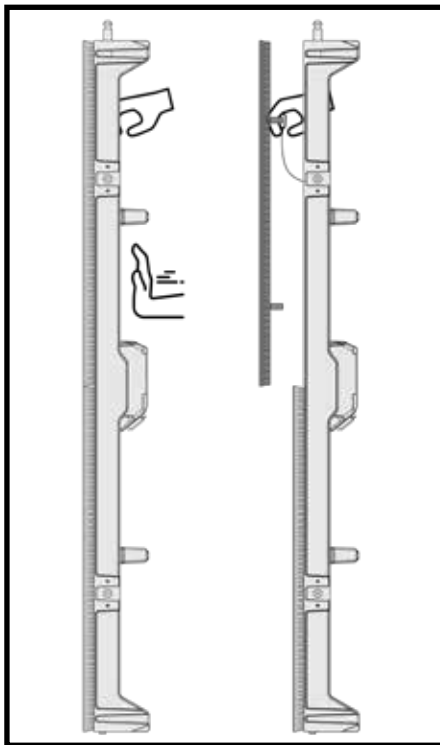


Unscrew the four thumb screws that hold the Power Data Box onto the panel, pull it off, and replace. All Power Data Boxes are programmed for 500mm x 1000mm. If replacing a 500mm x 500mm, contact us at support@thorav.us.

CLEANING MODULES

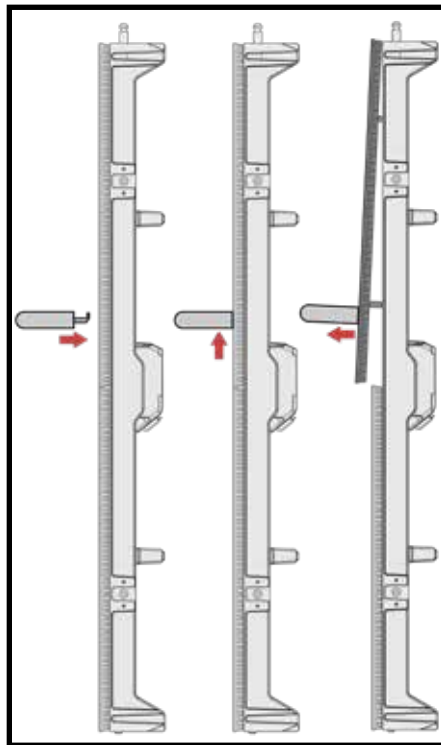
Use a dry microfiber towel to wipe the face of the LED wall.

REMOVING MODULES



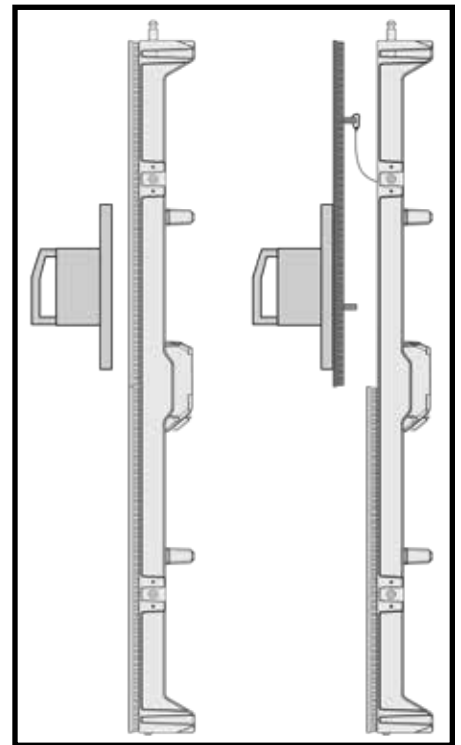
While holding the Module Handle, push the portion of the module that is closest to the Power Data Box (PDB) to separate it from the panel chassis magnets. Apply some force.

Disconnect Safety Carabiner from module.



Insert the Module Removal Tool into the thin slots on the front of the module (figure 1). Slide tool upwards to hook into module (figure 2). Using some force, pull the module toward you.

Disconnect Safety Carabiner from module.



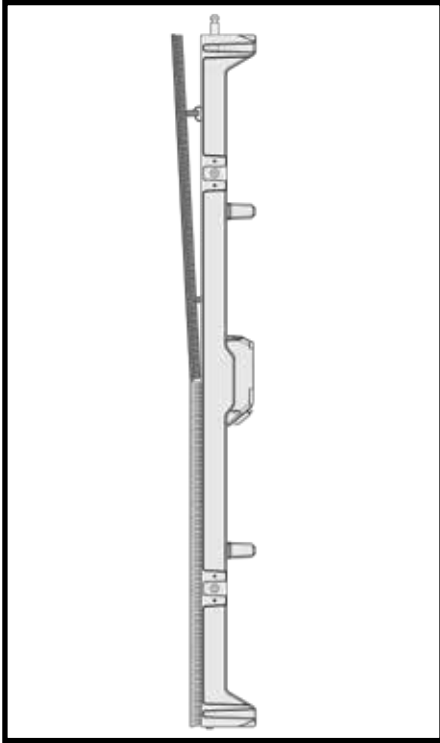
Position vacuum onto module near Power Data Box. Turn on and wait for suction to build. Carefully pull module to separate from chassis magnets and Power Data Box.

Disconnect Safety Carabiner from module.

THOR:

SERVICE & MAINTENANCE

REPLACING MODULES



Modules can be reattached from the front or rear of the panel.

Remove Module Connector Plug for proper connection between the module and Power Data Box (PDB).

Align module with PDB. Module will snap into place.

Connect Safety Carabiner to module.

Brompton Product:

Depending on PDB firmware, power cycle may be required.
Contact your THOR dealer for support.

NovaStar Product:

Depending on PDB firmware, power cycle and/or module reflash may be required.
Contact your THOR dealer for support.

THOR:

TROUBLESHOOTING

What if a block of my LED panels aren't working right?

Try replacing a data cable. Usually between the last panel that is working and the first panel that has stopped working.

How do I flash the receiving card and why?

Please contact your dealer for more information and instructional guides.

Is there a reason why power cables connect stage left to right?

Yes. Power is not bi-directional.

Are the EDGE power data boxes "hot swappable"?

Yes. The EDGE power data box contains the power supply, PCB, and receiving card for your video feed data. Unscrew the four thumb screws that hold the power data box onto the panel, pull it off, and replace.

My display has moiré issues.

Wavy lines! Moiré is an image artifact that appears when two fine patterns overlap at an angle. One of the easiest ways to reduce the moiré effect is to soften its direct focus by focusing on something else, like an individual. Slightly soften the focus on the screen itself to reduce the on-camera moiré effect with LED screens.

Focus points matter when using cameras. Focusing on the LED wall creates moiré no matter what your camera resolution is set to.

Another way is to use shallow depth of field if your subject is in front of the LED screen; the subject will be in focus and the background LED screen will be softly blurred. Image sensors found in digital cameras have their pixels arranged in a very fine pattern; when videoing an LED display, the camera's fine patterns will not line up with the fine pattern of the LED's.

THOR:

TROUBLESHOOTING

Why do I have to reconfigure the LED wall every time I restart the system?

When changing settings in NovaStar's NovaLCT, all software settings need to be "Saved to Hardware". If this has not happened, the wall will return to the state of the last saved setting. This applies to every setting in the software, including: brightness, color temperature, wire flow, and calibration settings.

How do I remove a module if there are faulty pixels?

Each module on an LED panel has magnets to keep them in the proper position. Use the included module removal tool. Edge LED panels — Verify that the module's safety cable is detached. Carefully insert the module removal tool into the top front of the module via the thin slots and then slide the tool upwards to secure. While holding onto the removal tool, place forearm parallel against the module and use a curling motion (think lifting weights in the fitness room) to pull the top of the module toward you. This separates the module and panel chassis magnets. Some force will be needed.

THOR:

CONTACT

SUPPORT PROCESS INFORMATION

All LED orders ship with Advanced Replacements.

Please contact support@thorav.us to obtain an RMA number prior to returning your product to THOR AV. Do not return the product to the place of purchase. Write the RMA number on the outside of the shipping carton. ***Any product sent to us without a valid RMA number will be refused.***

Shipping Address:
THOR AV
Attn: RMA Number
8821 Zealand Ave. N, Ste. B
Brooklyn Park, MN 55445 USA

Include the following with the product: a brief description of the problem, your name, return shipping address, phone number and the RMA number. Do not include any accessories. THOR AV is not responsible for any damage to or loss of the product during transit. We recommend that customers obtain a receipt and tracking number for all packages shipped to us. Turnaround time on repairs is generally ten business days. If you live outside of the United States, please contact your local distributor for warranty service.

WARRANTY SERVICE

You will be responsible for shipping charges to THOR AV and the product will be returned by THOR AV. We reserve the right to inspect any product that may be the subject of any warranty claim before repair is carried out. To qualify for warranty service, documentation showing the date of purchase may be required. Final determination of warranty coverage lies solely with THOR AV.

NON-WARRANTY SERVICE

If it is determined that the product does not meet the terms of our warranty, you will be billed for labor, materials, return shipping and insurance. There is a \$100 USD minimum charge for materials and labor. Appropriate shipping charges will be applied. We require payment in advance of repair by credit card; we accept Visa and Master Card. In the event the charges are over the minimum charge, THOR AV will contact you and inform you of the cost of the repair before any work is completed.

THOR:

GLOSSARY

Aspect Ratio	The ratio of width to height of an image or a screen. Typical video aspect ratios are 16:10 and 16:9.
Bit Depth	The higher the bit depth of an LED panel, the more colors it is capable of reproducing. Bit depth quantifies how many unique colors an LED panel is capable of or are available in an LED panels color palette. The higher the bit depth, the greater level of color precision. For a grayscale video content, the bit depth quantifies how many unique shades are available.
Brightness	Brightness in an LED wall refers to how much illumination comes from the LED panels. There is a difference between the Maximum Brightness which is the brightest possible setting and the Calibrated Brightness which is the maximum setting at which all LEDs are the same brightness. With Maximum brightness, it is possible that not ALL the LEDs will be at that brightness level, it is the brightest that some LEDs in the panel will display. Brightness is particularly important if you will use LED walls in high ambient light such as sunlight or heavily lit venues.
BTU	The British Thermal Unit is a measurement of how much heat is emitted from a device.
Certification	<p>Certifications ensure that an LED wall has been tested and complies with emissions, power, and safety regulations. Look for the following certifications to ensure your LED walls comply with regulations.</p> <ul style="list-style-type: none">• FCC – This mark ensures the LED panels will not interfere with audio or radio signals• ETL – Proves compliance with power safety standards.• EMC – This mark shows compliance with electromagnetic emissions standards and ensures the LED Panels will not interfere with other gear.• UL – UL certification is an assurance that companies follow UL's safety standards with continual checks to make sure the products are constructed correctly and continue to comply with the designated safety standards.
Chassis	The frame that holds LED modules, the power supply, and receiving card in an LED panel is the chassis.
Closest Viewer	The closest viewer specification is an estimation by the manufacturer of LED panels that describes how far the LED wall should be mounted from the closest viewer. Ideally, this rating is the distance from which a viewer will not be able to see the individual pixels in a video wall.
Color Correction	Color correction is part of customizing an LED walls color by using a video processor. Adjustments to the color, contrast, and exposure enables video content to appear lifelike — natural and unprocessed.
Contrast	The difference in appearance between the lightest part of an image and the darkest part of an image.

THOR:

Curving Radius	Some LED panels can have a slight curve for use in studios, corporate offices or other applications where a flat wall is not desirable.
Distance from Presenter to LED wall	Refers to the distance of the subject on the stage and the LED wall behind them. This is important for the camera setting needed to have the correct depth of field, minimizing moiré.
Driving Method	Sometimes referred to as Scan Mode, the driving method tells you how many LEDs are active at one time. LEDs are turning off and on at a visually imperceptible speed, this is what helps control the perceived brightness. If a Driving Method is 1/15 scan, that means that at any given time only 1/15th of the LEDs are active. This happens so fast however that it will not be detected by the eye.
Gray Scale	<p>A bit of a misnomer, Gray Scale refers to the color depth, or simply (perhaps too simply), the number of available colors.</p> <ul style="list-style-type: none">• A 12-bit gray scale will have a potential of 4096 colors (2^{12})• A 14-bit gray scale will have a potential of 2^{14} color or 16,384• A 16-bit gray scale offers a 2^{16} color potential or 65,536 colors
HDR – High Dynamic Range	HDR is a series of technologies that improve the range of color and contrast in a video image. By offering higher brightness, wider color ranges, more detail and higher headroom, HDR provides more lifelike depth and image quality.
IC Driver	The IC Driver controls the state of each individual LED in the LED panel. It controls the on-off state through Pulse Width Modulation (PWM) or the more advances Scrambles Pulse Width Modulation (S-PWN). The refresh rate of each LED panel is determined by the IC Driver.
IP Rating	Ingress Protection rating provides a range for the level of protection from solid objects or liquid for electrical enclosures or mechanical casings.
Lot	Pixels are divided into batches of similar color values. Due to the rate we manufacture and move panels, it is highly unlikely that panels purchased at a future date will be from the same batch as a previous purchase — there are only ~30 million pixels per batch. Although we have very tight parameters on our LED batching, some differences between batching is unavoidable. This will result in a color mismatch if the panels from two different batches are mixed.
Mask	Masks are an extra layer of protection for LED pixels. They also significantly improve the overall image quality and create a more efficient display. Also known as louvers or shaders, masks are black plastic screens that cover the face of the module.
Module	A module in an LED panel houses the LED's themselves. Often two or more modules will be a part of a single LED Panel.

THOR:

Wavy lines! Moiré is an image artifact that appears when two fine patterns overlap at an angle. One of the easiest ways to reduce the moiré effect is to soften its direct focus by focusing on something else, like an individual. Slightly soften the focus on the screen itself to reduce the on-camera moiré effect with LED screens.

Moiré	<p>Focus points matter when using cameras. Focusing on the LED wall creates moiré no matter what your camera resolution is set to.</p> <p>Another way is to use shallow depth of field if your subject is in front of the LED screen; the subject will be in focus and the background LED screen will be softly blurred. Image sensors found in digital cameras have their pixels arranged in a very fine pattern; when videoing an LED display, the camera's fine patterns will not line up with the fine pattern of the LED's.</p>
Nit	<p>A nit is the measurement of the intensity of a visible light source. Brightness is measured in nits.</p>
Pixel Pitch	<p>Pixel Pitch is the distance between two LED's in an LED panel. It is measured from the center of one LED to the center of the adjacent LED horizontally or vertically. Usually measured in millimeters, a smaller pixel pitch generally allows the viewer to be closer to the LED wall.</p>
Power Supply	<p>Power to the LED wall is provided in a pass-through daisy chain configuration. Power enters the wall at one of the LED panel's Power Data Boxes and then each subsequent panel receives power from the panel before it.</p>
Processor	<p>The Processor takes your video image, applies filters and adjustments, and outputs to the video wall. The processor also formats the output so that it displays correctly across multiple LED panels.</p>
Receiving Card	<p>The receiving card is the part of the LED panel that receives a signal from the sending card in the Processor. The "first" LED panel in the LED wall connects directly to the processor via a CAT5 or CAT6 cable and then each subsequent LED panel (up to the maximum pixel count on the channel) is connected in a daisy chain fashion.</p>
Refresh Rate	<p>The refresh rate is how often the image is redrawn on the screen. The images on a screen are redrawn many times per second. The refresh rate is particularly important when using a camera that captures the LED wall in the video feed. If the refresh rate is not high enough, or if the camera is configured improperly, the refresh or scan lines can be caught on the camera.</p>
Resolution	<p>Resolution is the number of pixels in a digital display. It is measured as width by height. There are a number of standard resolutions such as 1080p, WUXGA, 4K, etc. Each resolution will have an aspect ratio which is the ratio of pixels in the format width:height.</p>
Rigging	<p>Rigging is the frame system that holds up and supports the LED wall. Rigging can be used on the ground, hung from a ceiling, mounted on a wall or constructed into a frame depending on the stage requirements.</p>

THOR:

Sending Card

A sending card is a part of the Processor that outputs a “channel” of video content to the receiving card on the back of the LED panel. Each processor can have multiple sending cards to output multiple channels of content.

Viewing Angle

The viewing angle specifies the maximum angle an LED panel is viewable; with 90° being a front view and 180° being parallel with the LED panel on either side.

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