PENSARLED

IMMERSIVE

User Manual

2025

Contents

1.0 Safety

This chapter contains important information to prevent personal injury and product damage when you install the display. Read this chapter and keep it properly. Ensure that you understand and follow all the safety instructions and warnings in this chapter before installing.

Personal Protection

⚠️	**Warning:** Ensure that you understand and follow all the safety instructions, warnings mentioned in this manual
⚡	**Warning:** Pay Attention to electric shock.
🪖	**Warning:** Wear a hard hat to reduce the risk of personal injury.
⚠️	**Warning:** Be aware of suspended loads.
⚠️	**Warning:** Mind your fingers while dealing with heavy loads.

Personnel of installation and maintenance

The installation and maintenance of this product must be performed by authorized and qualified technical personnel only. The manufacturer does not take responsibility for the results caused by incorrect, improper, irresponsible, and unsafe actions.

GND and Lightning protection

Do not underestimate the safety protection of grounding plug/socket. If the supplied plug/socket is defective, replace the defective parts. Ground the product correctly to avoid electric shock caused by large electricity leakage.

Disconnect the power in the time of lightning, or provide other suitable lightning protection devices. Disconnect the power plug when the product is not used for a long period.

Ambiance of installation and use

- The ambient temperature for LED display: max 50°C, min -20°C.

- Ensure that the ventilation is good. Do not jam or drop metal particles and cable pieces into the ventilation opening. Keep the ventilation surface clear without foreign matters like wrapping materials. False actions may lead to poor ventilation and cause fire,malfunction, and error.

- Install LED display far away from radiator, heater, furnace, and other equipment hindering ventilation and heat dissipation (including but not limited to amplifier, laser, ultrasonic vibration devices), flammable materials (like curtains), and other unsafe devices.

- I/O signal cables should be shielded to restrain the high-frequency interference.

- LED display cannot contact with any corrosive and abrasive matter. Do not use the LED display in a moist ambiance, in an ambiance containing airborne contaminants, dust, oily fume, corrosive gas, and flammable gas, and in an ambiance with vibration and shock.

- This LED indoor product is designed only for indoor use. Never install and use it in the outdoor environment and keep it far away from direct sunlight, dust, and moisture.

ESD and LED:
　　LED components are ESD (Electro-static Discharge) sensitive. Do not touch LED components when the display is in operation or switched off.

Disconnect device:
　　When the appliance inlets of the individual tiles are not accessible, the socket outlets supplying the rack shall be installed near the equipment and be easily accessible, or a readily accessible general disconnect device shall be incorporated into the fixed wiring.

Mounting parts:
　　The mounting parts are only used to install LED displays. Do not repair or copy. Only use parts appointed by the manufacturer. Contact Pensar LED if you want a customized application.

Product care:
Inspect all installations on a routine basis to check security, wear, deformation, corrosion, or any other situation that reduces load-carrying capability. Increase inspection frequency for key parts. Keep structural and mounting parts dry, clean, lubricated (only if recommended), coated properly, and maintain complying with part design. Defective parts must be removed or replaced at once.

Installation and wiring:
LED components are ESD (Electro-static Discharge) sensitive. Do not touch LED components when the display is in operation or switched off.

Risk of electric shock:

- To avoid electric shock and damage, do not dismantle the inside electrical parts.

- Do not hot-plug the cables to prevent electric shock or circuit damage.

- Keep clean after installing and cabling. Ensure all the devices and terminals are covered before turning on the power.

- Do not touch the terminals when power is on. Clean and screw the terminals when the power is off.

Moving or transporting products:
Do not hit the corners of LED tiles when installing or dismantling LED tiles. Be careful when moving or transporting the product to prevent any damage.

LED tiles cannot be transported in containers other than the original packaging. Even the use of the original packaging does not guarantee the LED tiles against damage due to excessive force of impacts. All warranty claims regarding damaged modules due to incorrect packing will be rendered invalid.

2.0 INSTALLATION REQUIREMENTS

This chapter specifies the requirements for safety, mechanism, electricity, and control software of the Immersive Series LED display.

⚠️ **Warning:** This LED indoor product is designed only for indoor use. Never install and use it in an outdoor environment and keep it far away from direct sunlight, dust, and moisture.

2.1 Mechanical Requirements

Weight

⚠️ **Warning:** Do not underestimate the weight of a complete Immersive series LED display. Be sure that the floor or mounting, concludes the weight of any other load.

Caution: One Cabinet weighs is than 6.85 Lb.

Horizontal surface

For floor installation, the floor on which the Immersive series LED display is installed must be horizontal. Never install the Immersive series LED display on a slant surface.

Ballast

Depending on the height of the display and the position of the LED display upon the foot beams (somewhere between the front and middle) additional weight (ballast) will be required. Consult professionals of Pensar LED to calculate the minimum ballast you require for the safe installation of the Immersive series LED display.

Installation

Environmental conditions: Humidity, ventilation, temperature, etc.

Location: Altitude, etc.

Front clearances: For optimal effect, ensure that enough free space is supplied in front of the LED display and respect the minimum viewing distance.

Comply with local regulations regarding such installations.

About This Manual

This document is used to guide users. The screenshots and diagrams in this document are for explanation only. The actual situation may vary.

- We do our best to ensure that the information in this manual is correct. Information is subject to change without prior notice due to upgrades or other reasons.

- This manual can be used as a guide for the use of multiple models of products. However, the usage information of each product is not listed. Please check it according to the actual product.

3.0 SYSTEM INTRODUCTION

3.1 Brief Introduction

Immersive series is a Micro Flip-Chip Common-Cathode COB indoor display product of Pensar LED that uses a high-strength aluminum alloy frame with CNC high precision machining techniques. With its compact, light, and handy exterior, the LED cabinet is easy to install and disassemble. As the tile dimension is of very high precision, the whole display keeps in high flatness and seamless.

3.1.1 Key Benefits

This document is used to guide users. The screenshots and diagrams in this document are for explanation only. The actual situation may vary.

- High resolution and high pixel density, reproducing the reality of high-definition video

- Uniform color and high contrast, ensuring clear and sharp picture

- High precision high-strength aluminum alloy frame, achieving high flatness and seamless matching of the whole display

- Fan-less design with good heat dissipation, achieving noise-free

- Light and slim tile, easier to handle and transport

- High stability and reliability, prolonging the lifespan of the display

- Dual power supply/dual receiver card version Optional.

3.1.2 Applications

The indoor, multi-functional conference, performing arts, theater, stage, command and control center, and many other applications.

3.2 System Components

TFP series LED display system includes the following basic components:

- **LED Display:** TFP LED display tiles, power supply cables, signal cables, connectors
- **Control System:** LED display controller, Control system software
- **Power Distribution System:** DC/DC power distribution box, power cables (only off-board)
- **Peripheral Devices:** Optical fiber transmitter(optional)

N°	Name	Function /Explanation
LED Display Components		
1	Immersive GenZ Series display tile	Tile size: 640mm*337.5mm*28mm, Weight: ≤ 6.85 Lb
2	Power cord plug and socket	Used for power cable loop connection between tiles; plug for input and socket for output
3	RJ45 data cord plug and socket	Used for data link between tiles; both sockets can be used for output or input
Control System Components		
1	Controller (Sending card)	Configure and transmit video signal
2	Receiver card	Receive signal data (One card for determined pixel load)
3	Light sensor (options)	Adjust brightness automatically according to environment brightness
4	Multi-Function card (options)	Support power supply remote control, support feeding back humidity and temperature information.
5	LED control system software	1. Control, configure, and publish playlist on LED display 2. Support calibration on-site 3. Support manual and automatic brightness adjustment 4. Support turning on/off LED display through remote network

N°	Name	Function /Explanation
Power Distribution System Components		
1	Main power distributor	Supply power for LED screen (110v-220v AC)
2	Power distribution box	Support power supply LED screen (48v DC)
3	Lightning arrester (options)	International brand, to avoid lightning
4	Power cable	Comply with international standards
Peripheral Devices		
1	Video processor (options)	Support for peripheral video source
2	Optical fiber transmitter (options)	Both single-mode and multiple modes optical fiber transmitters can be used; multiple modes transmitters for R M, and single mode transmitters for 20KM
3	Optical fiber (options)	8 cores of optical fiber with premium brand

⚠️ **Warning:** LED display modules can be easily damaged, so the original packing materials are needed for the maintenance of modules. All the warranty claims are invalid for the damage caused by the wrong package.

3.3 LED Display Components

Immersive Series Cabinet: This Series LED display is built with Flip-Chip COB modules. A cabinet consists of high-strength aluminum alloy frames in high accuracy, front maintenance modules, a switching power supply, receiver cards, and some other mechanical and electrical connection parts. The Series die-casting aluminum frame adopts one-time die-casting and CNC precision processing technology with high-quality aluminum to ensure the high accuracy of the frame and the uniformity of the whole display.

The introduction of the main components Immersive Series cabinet is shown below with related images.

3.3.1 Die-Casting Aluminum Frame

Each high-strength aluminum alloy frame is installed with 8 modules. There are LED signal receiver cards and low voltage DC switching power supply inside the frame, and they all have electrical connections with 8 modules. There are special designs for fixing and connecting the cabinets, and there is a redundant power supply design, dual signal inputs, automatically detecting the failure and switch, ensuring the whole system's stability and reliability.
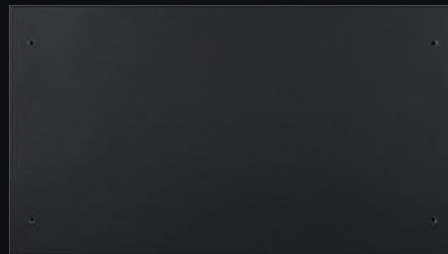
1. Immersive unit cabinet has 8 modules to be installed in. All of the modules can be maintained by front access by special suction tools. The precise positioning ensures the precise positioning of all modules.

- The outer dimensions of the fine-pitch LED unit cabinet are shown as foll

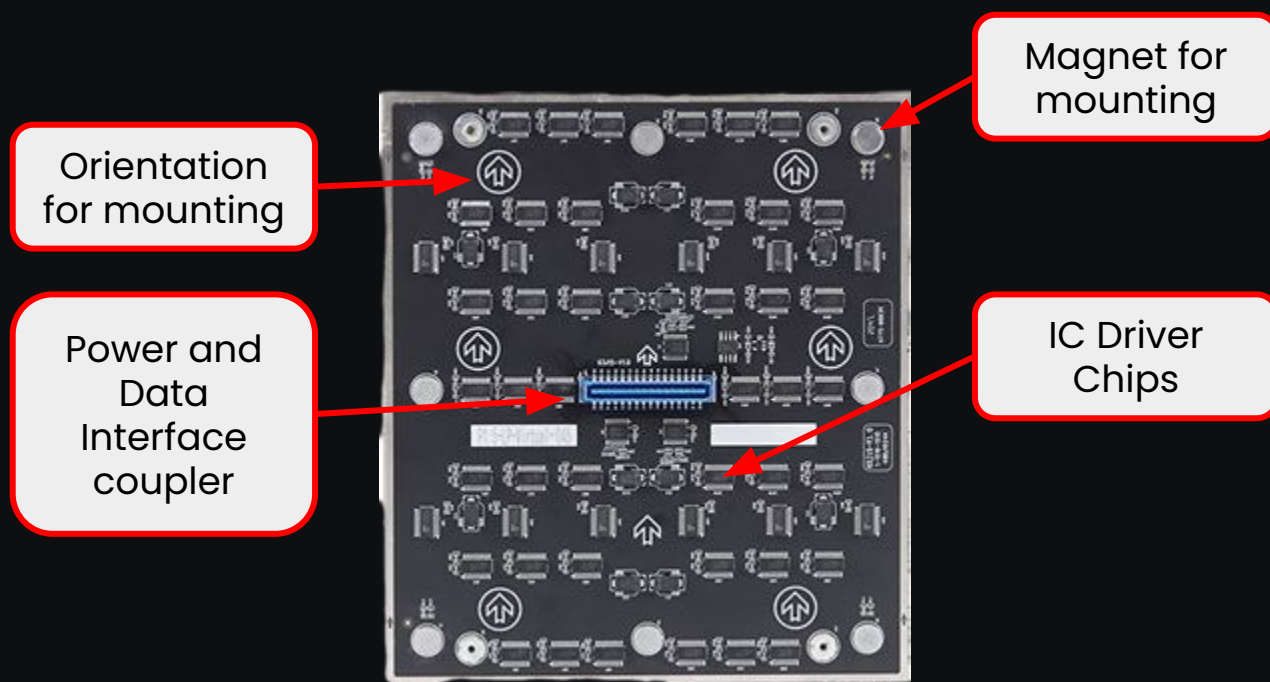

600mm   42mm

337.5mm
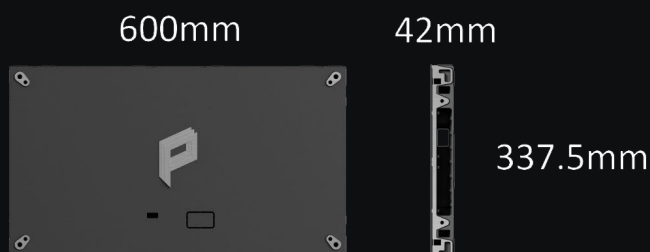
3.3.2 Immersive Series Module

The module includes PCB, Flip Chip COB, Common Cathode chip, Power, and Signal connector. The COB lamp array lies in front of the PCBA.

⚠️ **Warning: The Immersive** Series is a die-casting aluminum frame that can only install indoor display modules.
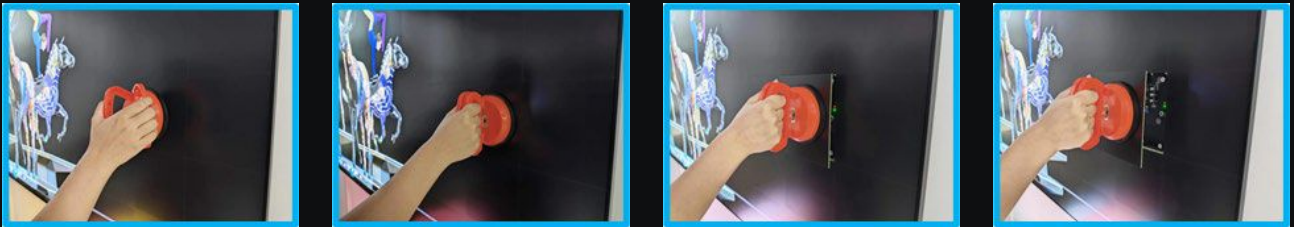
Magnet for mounting

Orientation for mounting

Power and Data Interface coupler

IC Driver Chips

Flip-Chip COB Module

3.4 Servicing the panel modules

EASY FRONT SERVICE DESIGN

The cabinet and module are separately packed, first, install the cabinet and then install the modules, Cabinets and modules are connected by pin headers. Smart adjustment: Unique 8-axis alignment features to ensure the video wall is perfectly aligned and seamless, and the flatness tolerance of the screen is less than 0.1mm

The final installation of the product requires the fixation of the steel structure bracket, and the LED module is removed using the professional pre-maintenance tool.

3.5 Detail Product Picture

Frame

Hub Card

Modules

Interconnect power point

Receiver Card

Cabinet connecting Points between cabinets

Orientation

Module connecting point

Incoming Power

Module mounting point adjustment

Bidirectional Data RJ45 port

Power Supply
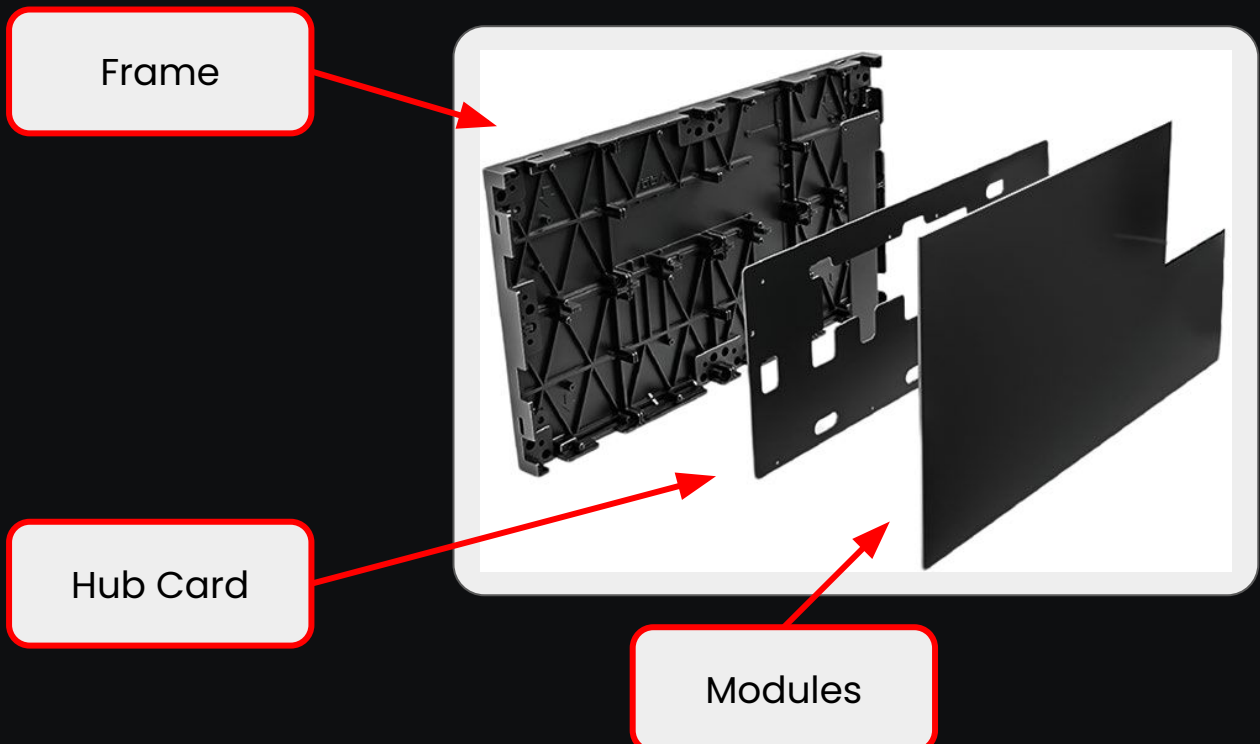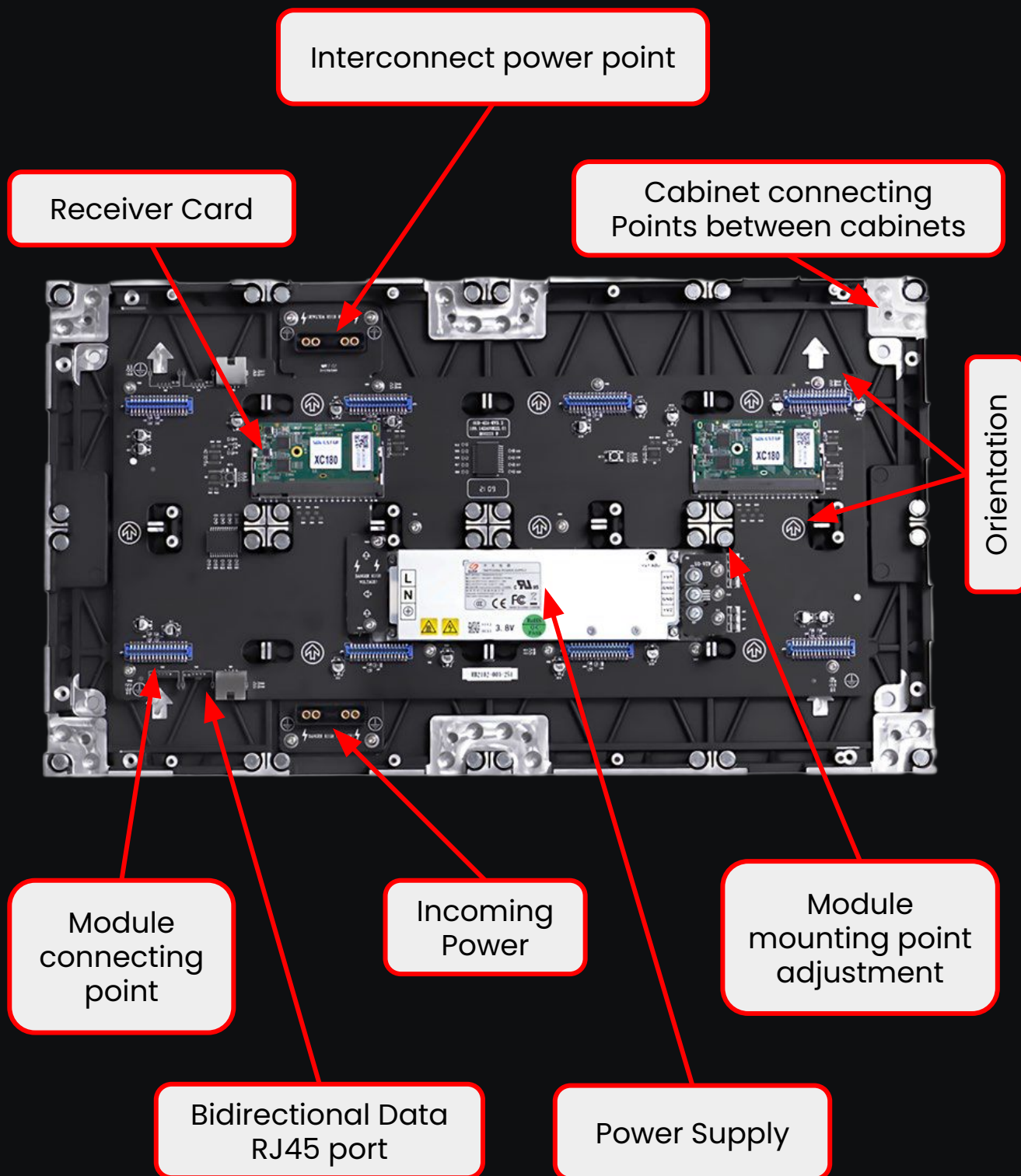
4.0 Setup Process

4.1 Installation Preparation
Please refer to the mounting section on page 18 if you are using a factory mounting system.

Unpack cabinets and prep by placing the hanging screws in the back of the cabinet. The bottom row of cabinets requires all 4 mounting points to have screws and all additional rows only place the screws in the top 2 holes.

4.2 Hanging Cabinets
After the bottom row is in place set up a plum line. Pensar recommends using a laser for a plum line. Plum bottom row to level and connect cabinets side to side. Please make all power and data connected and verify that you have power and data in all cabinets before proceeding. If there is a problem rectify it before moving forward. After everything has a connection remove power and continue to build the wall out.

Moving to the next rows place the cabinet on top of the bottom and use a level to plum. Complete by inserting the connecting plate and attaching the cabinets.

4.3 Connecting Cabinets
The cabinet is connected with the connecting plates, and the flatness must be ensured when assembling for true flatness.

4.4 Sample Cabinet Numbering Layout

4.5 Module position numbers are shown below:

4.6 Final Connections

After the cabinet is installed, connect network cables and power cables. Before powering on, it is necessary to test whether the power cable is firmly in contact, whether there are leakage and short circuits, and whether the ground cable is firm. If no abnormal conditions are found, power on.

After powering on, check whether the power supply works normally and whether the control card works normally; If any exception is found, replace it in time.

Turn off the power when no abnormality occurs, and start assembling the module.

The number on the module must correspond to the cabinet. Case numbers are as follows:

When installing the module, matching the module number with the cabinet number will ensure a perfect fit and marriage with the receiving card.

Wear gloves during installation to help from marking the modules with the oil and dirt on your hands and fingers. The gap and flatness between modules should be adjusted during the assembly.

After the module is installed, use the control system to connect the screen and then power on the test.

Note: The flatness between the Flip chip COB modules is very important when installing it.

Diagonal cutting

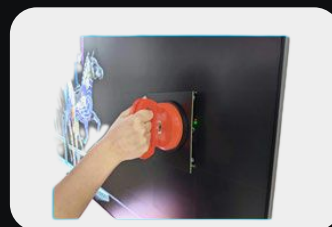

Combination pliers

Screw drivers

L shape alien key

Wrench set

Magnetic handle

Socket set

Digital multimeter

Rubber hammer

Power Distribution System Components		
Electric drill	1pc	Drill holes in the wall or frame
Rivet drill	1pc	Fix the cabinet in place
Electric adhesive plaster	Several	Isolate electricity after the wire connected
Tape measure	1pc	——————————————
High-brightness flashlight	1pc	Used in the dark area
Safety rope	Ref.	Personal safety is very important
220V power outlet board	1pc	Power supply
Level & vertical ruler	1pc	Test the level of the frame

5.0 Hardware Troubleshooting Analysis

Module Failure

| Failure Type	Failure Description	Issue and Solutions	Reasons
LED	The light is not bright	Replace a module	Poor welding
LED Pixel Block	Black or a chroma of Pixel Block	Replace the IC or module	Driver IC/resistor is poorly soldered or does not work
LED Module	One or more LED modules in a row are black or faulty	Check the connection between the module and the conversion board	Disconnected or poorly connected

Power Supply Failure

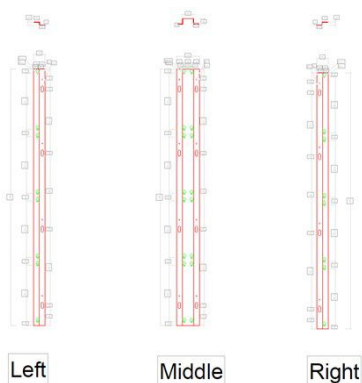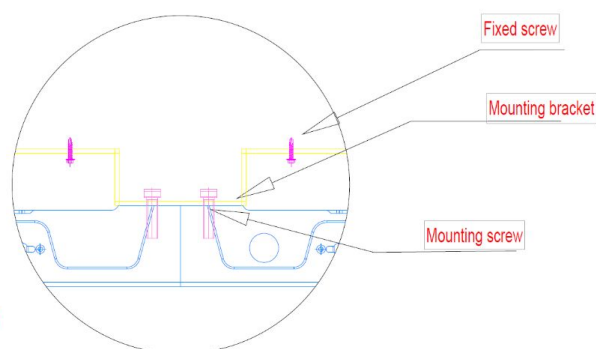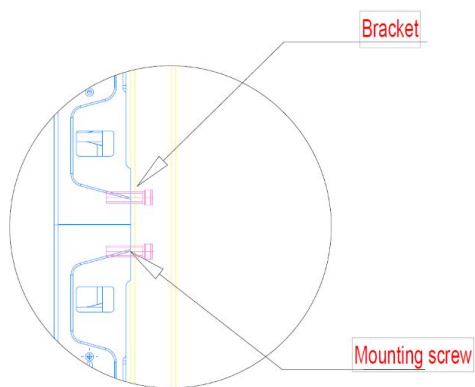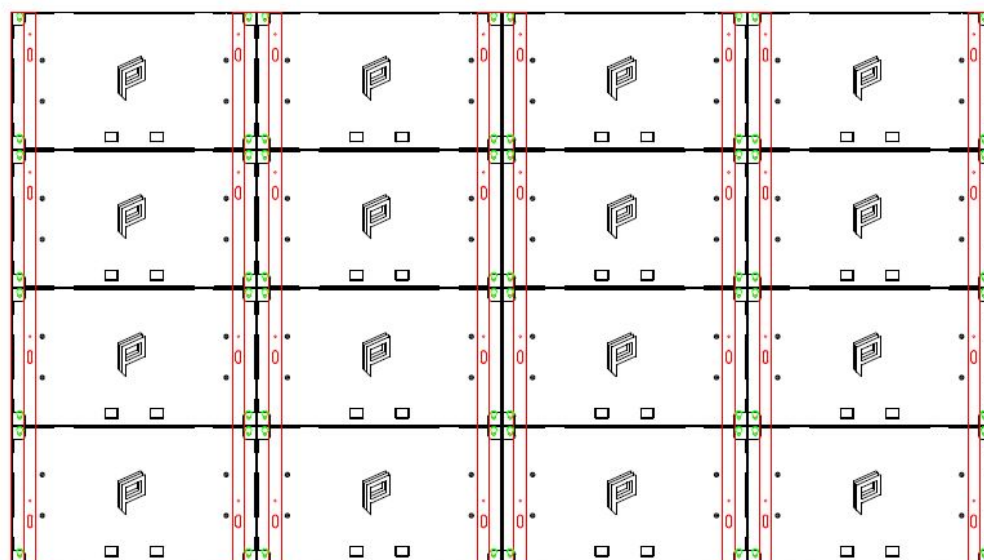| Failure Type	Failure Description	Issue and Solutions	Reasons
Module Power Supply	The entire module is black	Check the power connection of the module	The power supply is improperly connected to the module
Power Supply	The entire module is black	Replace the faulty power supply	There is a problem with the power supply to the receiving card
Power Supply	Adjacent module areas are black	Replace the faulty power supply	The power supply to the module is faulty

Module Failure

Failure Type	Failure Description	Issue and Solutions	Reasons
Optical Fiber	Blank Screen	Check the optical fiber connection and data I/O sequence	The cable is damaged or the data I/O is incorrect
Category 5 network cables	The screen is completely black	Check the network cable between the sending box and the first scanning card	Poor connection or faulty RJ45 cable
Category 5 network cables	One of the modules in a column is black	Check the RJ45 cables between modules	Poor connection or faulty RJ45 cable
Category 5 network cables	All modules are lit, but the order of each column is incorrect	Check and correct the RJ45 cable connection sequence	Incorrect connection sequence

6.0 Wall Mount

Fixed screw hole
Screw mounting hole
Mounting brakcet
LED panel
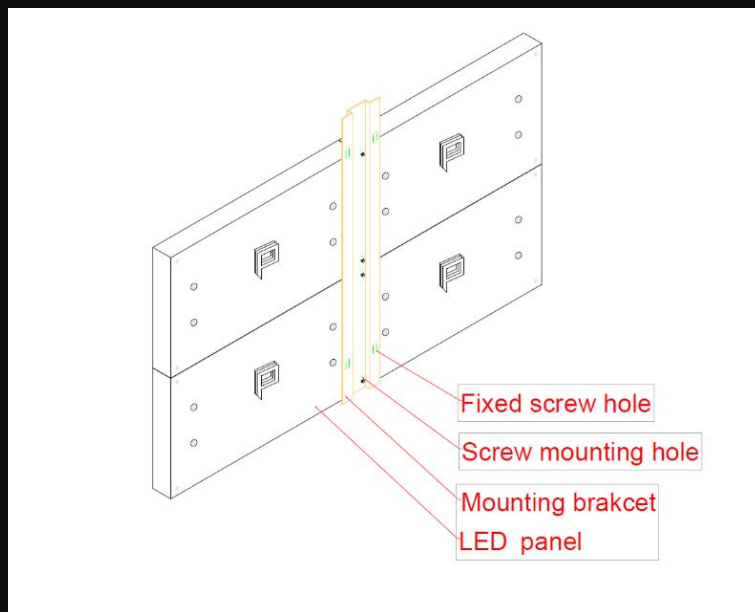
Steps for mounting the frame

1. Find the center of the wall location. The mounting will be construed from the center out.

2. Determine the elevation on the wall and mark it.

3. Use a laser to lay out the starting point by laying an X/Y line on your wall.

4. If you have an even number of columns then use the H template to determine your center to mount your first mount upright. (make sure your orientation of the keyhole is correct with the small opening aiming down)

5. If you have an odd number of columns mark the center of the mount upright and align with the center point of the wall location.

6. Using a 5/16 lag and washer lag mount upright verify that the mount is level in all directions.

7. Leave your X line up for a reference of level on build out of wall. Take a panel and hang it on the mount that is in place. Take a mount upright and slide in place on the other side of the panel. Place a level on the panel and raise the mount until the panel becomes level and lag. Then double-check that the mounting upright is level in all directions.

8. Continue the steps until the wall mount is complete.

Install screw
Install bracket
LED panel

Bracket

Mounting screw

Fixed screw

Mounting bracket

Mounting screw

Left

Middle

Right
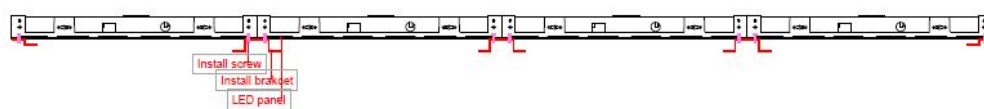
6.1 Exploded view of mounting point

Note: The panel size and hole position of different products are different, but the installation method is similar.

7.0 Data and Power Cabling

Connect the power cable and signal cable as below: for its design, the power cable should be connected line by line, The factory's original main power cable is 2.5mm2, for safe use, If the local voltage is 220V, each cable is limited to connected 15 cabinets. The signal cable connect from the first cabinet entry connects to the last one.

Example of power connection
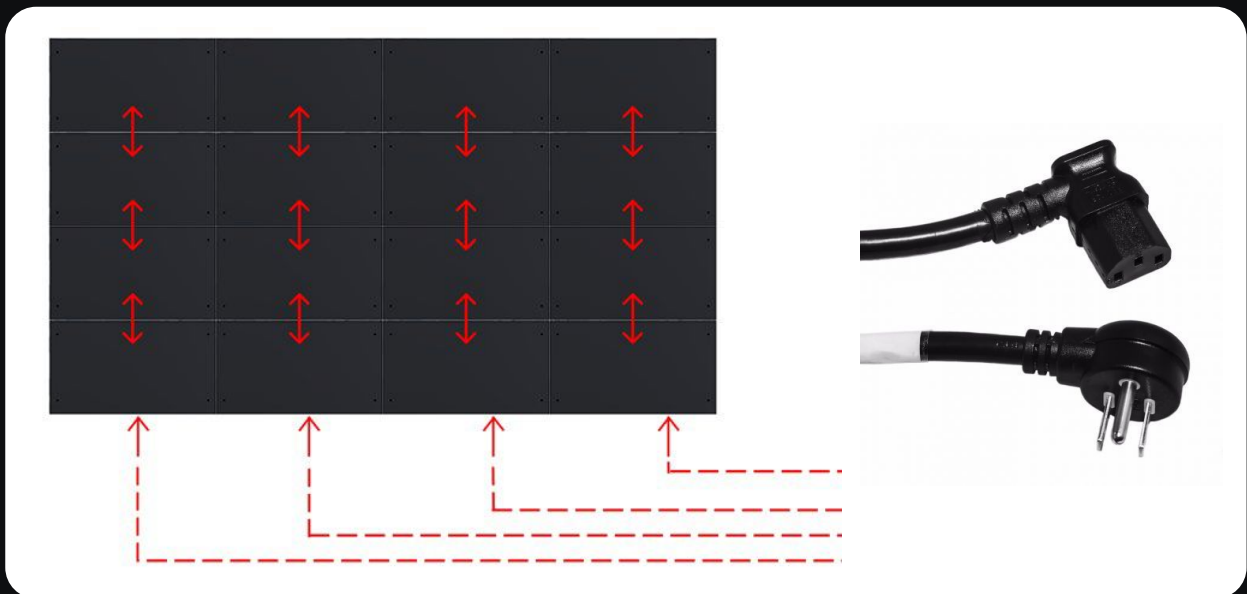
Note: 10A terminal single power cord is used inside the product, with a maximum of 10 cabinet.

Example of data connection
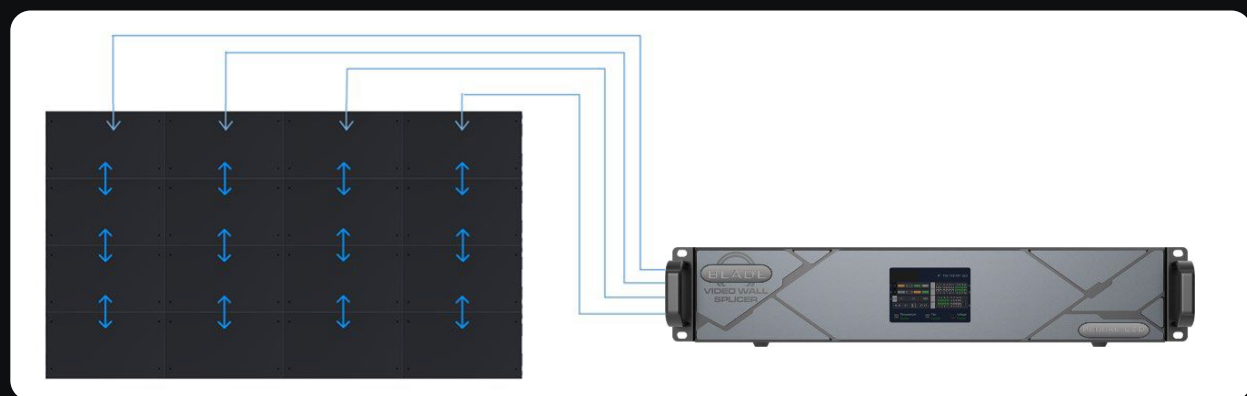
8.0 MAINTENANCE

Example of power connection

1. Make sure the LED display is well-ventilated, dry, and running at a suitable temperature.

2. Regularly check the internal cables inside the LED display are in stable connection, the power supplies are working well, the ground wires are connected well, and the lightning arrester is running well.

3. Regularly wipe the dust on the surface of the LED tile with a soft cloth, and keep the LED display surface clean to avoid brightness differences between clean and unclean LED tiles.

Cautions for use

1. Before powering on the LED display, start your computer first, and then turn on the power of the LED display.

2. Before turning off the display system, first turn off the power of the LED display, and then turn off the computer.

3. When you are editing a video playlist, you had better keep the LED display closed.

4. When failure appears, first turn off the power of the LED display, then contact with service department of Pensar LEDfor technical support.

9.0 Notes

Statement

Thank you for choosing Pensar LED product. This document Is Intended to help you understand and use the product. For accuracy and reliability, Pensar LED may make Improvements and/or changes to this document at any time and without notice. If you experience any problems In use or have any suggestions, please contact us via the contact information given in this document. We will do our best to solve any issues, as well as evaluate and implement suggestions.

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