

LAMPRO⁷

LST Series

Stablize Your DOOH in All Weather



PRODUCT MANUAL

Shenzhen LAMP Technology Co., Ltd.

Table of Contents

Table of Contents.....	II
Foreword	IV
1. Safety.....	- 1 -
1.1 Safety Guidelines	- 1 -
1.2 Important Safety Instructions	- 2 -
1.3 Important Warnings	- 4 -
1.3.1 Important warnings.....	- 4 -
1.3.2 Highest and lowest ambient temperatures	- 4 -
1.3.3 Large current leakage may occur.....	- 4 -
1.3.4 Flammable materials	- 4 -
1.3.5 ESD & LED.....	- 5 -
1.3.6 Electric shock hazard / fire hazard	- 5 -
1.3.7 Circuit breaker equipment	- 5 -
1.3.8 Power system.....	- 5 -
1.3.9 Power cord.....	- 5 -
1.4 Proper Use	- 6 -
2. About LST Series Products	- 9 -
2.1 Product Introduction.....	- 9 -
2.2 Product Parameters.....	- 10 -
2.3 Product Components	- 11 -
2.4 Mounting structure	- 13 -
2.4.1 Front mounting and front maintenance	- 13 -
2.4.2 Rear mounting and rear maintenance	- 14 -
2.5 Product Packaging.....	- 14 -
2.6 Accessories.....	- 16 -
3. Product Installation	- 17 -
3.1 Installation of Display Cabinet.....	- 17 -
3.2 Testing of the Screen Power Supply System (the power supply in the power distribution cabinet and the cabinet needs to be tested by the inspectors with electrician knowledge).....	- 18 -
3.3 Precautions for Display Screen Mounting.....	- 18 -
3.4 Assembly	- 19 -
3.5 Wiring.....	- 21 -
4. Product Maintenance	- 22 -
4.1 Module Disassembly and Assembly.....	- 22 -
4.2 Control box maintenance.....	- 24 -
4.3 Precautions for Daily Maintenance of the Display.....	- 27 -
4.4 Cleaning of Fixed Display Panel.....	- 28 -
4.5 Daily Maintenance of the Screen	- 33 -
4.6 Common Troubleshooting	- 35 -
4.6.1 Method for problem determination.....	- 35 -

4.6.2 LED Common faults of LED display and its troubleshooting..... - 35 -

5. Description on After-sales Services - 39 -

5.1 Pre-sales Services (Technical Consultation)..... - 39 -

5.2 After-sales Services - 39 -

Foreword

LAMPRO Tech provides this Manual in accordance with the actual product and disclaims any express or implied liability, including but not limited to implied liability or merchantability and fitness for a particular purpose. LAMPRO Tech may make improvements or changes to the products or programs described in this Manual at any time without notice.

This Manual may contain technical inaccuracies or typing errors. The information in this Manual will be changed periodically and will be included in the new version of the Manual.

Version & Copyright ©

All rights reserved. No part of this document may be copied, reproduced or translated. No part of this document may be recorded, transmitted, or stored in a searchable system without the prior written permission of LAMPRO Tech.

English Version - Federal Communications Commission (FCC Statement)

This equipment has been tested to comply with the standards for Class A digital equipment and to comply with the requirements of Section 15 of the FCC Rules. These standards are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment radiates radio frequency energy when used and may cause harmful interference to radio communications if installed and used without the instructions in the operating manual. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be responsible for correcting the interference.

EN55022/CISPR22 Class A ITE (Information Technology Equipment)

Class A ITE is all other ITE categories that meet the Class A ITE limit but do not meet the Class B ITE limit. Such equipment should not be restricted when it is sold, but the following warnings should be included in the instructions for use:

Warning: This is a Class A product. This product may cause radio interference in a domestic environment. In this case, the user may need to take appropriate measures to eliminate the interference.

English Version - Warranty and Compensation

As part of the legally enforceable terms of warranty, LAMPRO Tech provides the relevant warranty. When receiving a product, the purchaser must immediately check for damage to all delivered items during transport and whether material and manufacturing failures have occurred. If any, you must notify LAMPRO Tech of the relevant issues immediately in writing. Upon approval of the notice of the issue, LAMPRO Tech

will resolve the failure or provide a replacement plan on a case-by-case basis during the appropriate period. If the purchaser or third party modifies or repairs the items delivered by LAMPRO Tech, or if the items are not handled properly, especially if the system is not operated properly during the test run, or the item is affected by other factors in the contract that are not agreed upon after the risk transfer, all purchaser's warranty claims will be considered null and void. System failures due to procedures or special circuit system failures provided by the purchaser are not covered by the warranty, such as the interface. Aging and normal cleaning maintenance are not covered by the warranty provided by LAMPRO Tech. Customers must follow the operating environment conditions as well as service and repair specifications specified in this Manual.

English Version - Trademark

The brands and product names mentioned in this Manual are the trademarks, registered trademarks or copyrights of their respective holders. All brand and product names referred to in this Manual are used as notes or examples and shall not be regarded as advertisements of the corresponding products or other manufacturers.

Scope of application of the User Manual.

This User Manual is applicable to LST series LED full-color display screen produced by LAMPRO Tech.

LAMPRO Tech LST series displays include LST4,LST6,LST8,LST10.

1. Safety

1.1 Safety Guidelines



Warning: It is important to understand and follow all safety guidelines, safety instructions, warnings, and precautions in this Manual.



Warning: Be careful when the load is heavy.



Warning: Please operate carefully when the load is heavy to avoid finger injury.



Warning: Wear a safety helmet to avoid personal injury.



Warning: Please read the following text carefully and follow the installation instructions strictly!

Installation Technician

This installation must only be performed by qualified technicians qualified or authorized by LAMPRO Tech. This type of display is extremely demanding on safety. Qualified installations must ensure the safety of the system in terms of site, structure, assembly, connection, use, disassembly, and transportation.

Caution

You can only begin the installation if you are fully familiar with all applicable safety checks and installation instructions. Failure to do so will increase the risk and risk of personal injury to the user. Assembly components are only suitable for assembling LED displays produced by LAMPRO Tech.

Do not modify or copy any components. LAMPRO Tech uses special materials and manufacturing processes to achieve the required part strength. For help with custom apps, please consult LAMPRO Tech. Be sure to follow the installation instructions provided by LAMPRO Tech. If you have any questions about the safety of an app, please contact LAMPRO Tech. LAMPRO Tech is not responsible for incorrect, inappropriate,

Display A Better World

irresponsible or unsafe display assembly.

Product Maintenance

Construction and assembly components should be kept dry, clean, lubricated or otherwise maintained in a manner consistent with the design features of the components. LAMPRO Tech products must be used in a manner that meets the design characteristics of the product. The product must be regularly inspected for safety and reliability, and for wear, deformation, corrosion, and other conditions that may affect the load handling capacity of the parts.

Safety

LAMPRO Tech recommends regular inspection of all installed units. For more important installations, the frequency of inspections should be increased. If the parts are damaged, the load handling capacity may be reduced and the damaged parts must be immediately removed for repair or replacement. To repair parts, please contact LAMPRO Tech. Under no circumstances should any other individual or entity repair the parts of the LED display produced by LAMPRO Tech.

1.2 Important Safety Instructions

Instructions:

- Read these instructions.
- Keep these instructions in a safe place.
- Pay attention to all warning messages.
- Follow all operating instructions.
- Before powering up the LED display, check whether all AC power supplies are properly connected.
- Before performing any maintenance on the LED display, turn off all power supplies, including the internal power supply of the screen, computer terminals, system boxes, etc. to ensure the safety of you and the equipment.
- Do not press objects on cables such as power cords, signal cables, and communication cables. Cables should be prevented from being stepped on or pinched to prevent the risk of electric leakage or short circuit.
- When replacing the module of the LED display, please hook a secure rope on the module and the

corresponding panel.

- Operating ambient humidity: At the highest operating temperature, the ambient humidity of the screen should be less than 90%.

- Operating ambient temperature: $-20^{\circ}\text{C} \leq T \leq 50^{\circ}\text{C}$.

- Storage ambient temperature: $-40^{\circ}\text{C} \leq T \leq 60^{\circ}\text{C}$.

- The power supply must meet the requirements:

① LED display's power supply voltage: $100\text{V} \sim 220\text{V} \pm 10\%$ Frequency: $50\text{HZ} \sim 60\text{HZ} \pm 5\%$

□ When the total power of the LED display is less than 5KW, it can be powered by a single-phase voltage; when it is greater than 5KW, in order to distribute the current evenly, it is necessary to be powered by a three-phase five-wire voltage.

□ The ground wire must be in reliable contact with the earth and properly separated from the N wire. The power supply to be connected should be kept away from high-power electrical equipment.

- When there is dust on the mask of the module, please clean it in time to avoid local color cast of the display.

- When maintaining the display, all the removed screws should be installed back to avoid water leakage of the display cabinet.



- Meaning of the logo: The equipment with this logo is designed and evaluated only at an altitude of 2000m. Therefore, it is only suitable for safe use at an altitude of less than 2000m, and may have potential safety hazards when used at an altitude of more than 2000m.



- Meaning of the logo: The equipment with this logo is designed and evaluated for safety only in non-tropical climates. Therefore, it is only suitable for safe use in non-tropical climates. When used in tropical climates, there may be safety hazards.

- If the steel structure of the screen body is relatively closed, it is necessary to consider the ventilation and heat dissipation of the screen body and increase the ventilation equipment. Do not exhaust the indoor warm air into the screen body.

- Use only materials or chemicals that are inert, non-abrasive, non-corrosive and leave no traces for cleaning. If you have any questions about the cleaning process, please consult the manufacturer for more advice.

- Do not block the vents, follow the manufacturer's instructions for installation.

- Do not install this equipment near heat sources such as radiators, heaters, stoves, or other devices that generate heat, including amplifiers.

- Do not neglect the safety protection of the poles or the grounding of plugs and sockets. If the supplied sockets or plugs are damaged, you must immediately take appropriate measures to replace the damaged parts.
- Do not step on the power supply, data cable, especially the plug, power outlet, and power/data cable from the device. The damaged power supply or data cable should be replaced immediately.
- Use only accessories specified by the manufacturer.
- When there is lightning, disconnect the power supply of this equipment or provide other applicable lightning protection. If you do not use the equipment for a long time, unplug the power plug.
- Repairs should be performed by qualified technicians. When this equipment is damaged for various reasons (such as damage to the power cord or plug, equipment is not working properly, or the equipment is dropped), contact the LAMPRO Tech's maintenance personnel for repair.
- This equipment may only be used in conjunction with systems or peripherals specified by the manufacturer or included with the equipment. Be careful when lifting, moving, or transporting the equipment to prevent it from being damaged by tipping over.

1.3 Important Warnings

1.3.1 Important warnings

Danger of electric shock: Do not open. In order to reduce the risk of electric shock, do not remove the back cover of the cabinet. Please have qualified maintenance personnel to perform repairs.

1.3.2 Highest and lowest ambient temperatures

The maximum ambient temperature of the LED display is 50°C and the minimum ambient temperature is -30°C.

1.3.3 Large current leakage may occur

The combination of multiple unit cabinets in the installed equipment results in increased leakage current. In order to avoid the risk of electric shock caused by a large amount of leakage current, the equipment plug must be properly grounded during installation.

1.3.4 Flammable materials

Keep flammable materials away from equipment. A large amount of electrical energy is converted into heat. Ensure that the ventilation is smooth during installation so that the equipment can operate safely. Appropriate ventilation must be provided.

1.3.5 ESD & LED

The LED components used in the display are susceptible to ESD (electrostatic discharge) damage. In order to prevent damage to the LED components, wear antistatic gloves when operating (installation, disassembly, etc.). Do not touch while the equipment is running or when it is turned off.

1.3.6 Electric shock hazard / fire hazard

In order to avoid the fire caused by overload of power cable, please pay attention to the rated voltage and assembly quantity.

1.3.7 Circuit breaker equipment

When you are unable to access the power outlets of each cabinet, install a power outlet near the equipment for operation, or install accessible universal circuit breaker equipment into a fixed circuit. This equipment must be grounded. In order to prevent electric shock, the equipment should be properly grounded during installation. Do not ignore the role of the grounding plug, otherwise there is a risk of electric shock.

1.3.8 Power system

It is recommended to use a TN-S power distribution system (a power distribution system with a separate N wire and ground conductor) to avoid large ground current loops due to voltage differences in the neutral conductors. The entire electrical installation process should be protected using a power-off switch, circuit breaker, over-voltage protector, and ground-fault current interrupter with appropriate power ratings. Installation should be performed in accordance with local electrical installation specifications. If in Europe, special attention should be paid to EN 60364, which is the electrical installation standard for buildings. If in Germany, the VDE0100 specification should be followed. If in the United States, special attention should be paid to the National Electrical Code ANSI/NFPA70.

1.3.9 Power cord

The power cord supplied with this system has special security features. Users cannot repair it. If the power cord is damaged, you can only replace it with a new one. Do not try to repair the power cord.

Special precautions

1. During the handling process, please pay attention to handling it gently, and there should be no dragging or cabinet stacking, so as to avoid bumps or cracks in the module or the cabinet.
2. When plugging in the power plug, please plug in the direction of rotation of the plug. Please do not use brute force to directly plug in, and do not operate with power.
3. When replacing the spare receiving card or HUB adapter plate, make sure that the Pin angle is not

skewed, and do not operate with power.

4. Please keep the inside of the flight case dry and clean. Prevent the LED lamp beads from getting damp or the cabinet from rusting due to the heavy moisture inside the flight case.

1.4 Proper Use

Proper use of the display

- Do not expose any part of the display to any moist substances.
- Do not expose any part of the display to any abrasive substances.
- Do not expose any part of the display to any dust.
- Do not expose any part of the display to any corrosive substances.
- The display should be used in an environment that complies with the operating specifications.
- The display should not be used in environments containing airborne contaminants [for example, contaminants produced by fog machines (cracked oil) or similar devices that deposit a thin layer of grease on the LED indicator optics to reduce performance].
- The display should not be exposed to extreme heat or extreme cold conditions that exceed temperature specifications.
- The display should not be exposed to any conditions or situations that would cause any part of the display to become hot and not function properly. Such conditions include, but are not limited to, lasers, ultrasonic vibrations, or any substances that prevent normal ventilation and heat dissipation of the display panel.
- The display should not be exposed to the environment where moisture may condense or collect on any component.
- The power supply connected to the display must comply with the specifications described in the installation manual.
- When installing or disassembling the display, avoid any accidental collision at each corner of the cabinet. Since the module's LED lamps are mounted near the edges of the LED boards, the corners of the cabinet are highly susceptible to mechanical damage. Therefore, the cabinet must be handled with care at all times.
- Do not place the cabinet or module on the surface of the LED lamp to prevent damage to the LED lamp.
- When disassembling or installing a module, always ensure that the LED side of the module is parallel to the LED side of the remaining adjacent modules, avoiding any mechanical stress on the corners of the module.

- Do not apply an external force to the LED. Damage to the LED lamp due to mechanical stress is not covered by the warranty.
- The security features and functional characteristics of the display cannot be compromised.
- It is not allowed to hang any other equipment on the back of the cabinet. It is not allowed to hang anything on the cable of the cabinet.
- In the event of a malfunction, appropriate measures must be taken immediately (whether the equipment is returned). The failed equipment cannot be allowed to continue to run.
- The components can only be connected using the cable specified for this display. In addition, be careful to connect the signals only as described in the installation manual.
- The display should not be used near equipment that is not certified by 3C, CE, and UL/ETL.
- When reconnecting the components of the display, it must be wired in strict accordance with the installation manual to prevent damage to the cables or other parts of the cabinet.
- In order to disassemble the module, you need to gently push the module from the back to avoid forced unraveling.
- In addition to LAMPRO Tech's flight case or unit packaging box, other shipping tools should not be used to transport the cabinet. In addition, even if transported using LAMPRO Tech's flight case or packaging materials, there is no guarantee that the cabinet will not be damaged by excessive force. Packaging materials can be ordered from LAMPRO Tech. All warranty claims for damage to the cabinet due to incorrect packaging are null and void.
- The LED module mask can only be removed using the approved mask removal method described in the installation manual.
- Clean the cabinet only in accordance with the procedures specified in the instruction manual.

Precautions

1. When opening the screen, please turn on the computer before turning on the LED display. When the LED display is powered on, there will be a regional flashing, indicating that the screen is energized. When the screen is off, first turn off the power of the LED screen, then turn off the control software, and finally turn off the computer.
2. The newly installed LED display must be tested on the screen for the following operating procedures:
 - A. When starting up for the first time, the screen brightness is set to 10% and keep this brightness for 2 hours. Shut down for half an hour, then start up again and run according to this setting. Execute the program for 4 cycles.

- B. After completing Step 1 above, set the screen brightness to 30% and keep 30% of the screen brightness for 8 hours. Shut down for 1 hour, then turn it on again and run according to this setting. Execute this program for 2 cycles.
- C. After completing Step 2 above, set the screen brightness to 50% and keep 50% of the screen brightness for 8 hours. Shut down for 1 hour, then turn it on again and run according to this setting. Execute this program for 2 cycles.
- D. After completing Step 3 above, set the screen brightness to 70% and keep 70% of the screen brightness for 8 hours. Shut down for 1 hour, then turn it on again and run according to this setting. Execute this program for 2 cycles.
- E. After the above test run is completed, set the screen brightness to 100%. Start running for 2 hours and monitor whether the screen functions normally. After everything is normal, set the items such as screen on/off time, time period brightness switching, screen power temperature monitoring, screen communication monitoring, etc. according to customer requirements.
3. The LED screen has been installed. If it is not turned on for a long time, the video will be aging. The aging process refers to the newly installed LED screen's trial operation procedure.
4. For the calibration effect maintenance of the corrected display, please refer to the calibration maintenance manual attached to our CD-ROM.

2. About LST Series Products

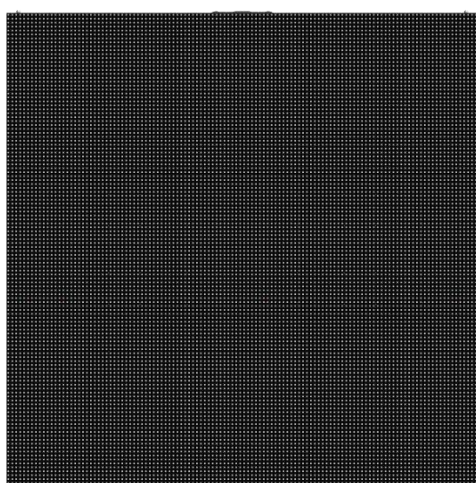
2.1 Product Introduction

LST series includes four pixel pitch : LST4/ UST4/ LST4.44/ UST4.44/ LST5.7/ UST5.7/ LST6/ UST6/ LST8/ UST8/ LST10/ UST10/ LST4 Pro/ UST4 Pro/ LST4.44 Pro/ UST4 .44Pro/ LST5.7 Pro/ UST5.7 Pro/ LST6 Pro/ UST6 Pro/ LST8 Pro/ UST8 Pro/ LST10 Pro/ UST10 Pro to meet the needs of large standard outdoor commercial LED screen. (Below all product pictures only for reference, new outlook will not inform here)

The standard size of the cabinet W: 960x H:960mm, Support IP65 protection level, even in the harsh environment can be stable and normal work, with many configurations to choose from, up to 10000nits brightness, in the face of direct sunlight can also display images clearly.

The product uses die-casting cabinet frame to ensure the box flatness, while making the product overall simple and generous. Ultra-thin and ultra-light body, including the control box is only 91mm thick, the average weight $\leq 25\text{kg}$ /panel, support the installation of fast, saving installation time.

Module, power supply and control card support front maintenance and rear maintenance.



Front View



Back View

2.2 Product Parameters

Specifications:

Parameter	Value			
Model	LST4.4	LST6	LST8	LST10
Pixel Configuration	SMD1921	SMD2727	SMD2727	SMD2727
Pixel Pitch (mm)	4.44	6.67	8	10
Pixel matrix per module	108X72	72X48	60X40	48X32
Pixel density (pixels/sq.m.)	50625	22500	15625	10000
Cabinet Dimensions (WxHxD)/(mm)	960x960x91			
Module Dimensions (WxH)/(mm)	480X320			
Cabinet weight (kg/panel)	25			
Color Grayscale (Bit)	14bit			
Gray Scale per Color (level)	16384			
Refresh Rate (Hz)	3840	3840	3840	3840
Brightness (nits)	5500-8000	6000-10000	6000-10000	6000-10000
Optimal Horizontal Viewing Angle (°)	160	160	140	150
Optimal Vertical Viewing Angle (°)	Up40/Down60	Up40/Down60	Up50/Down60	Up50/Down60
Contrast ratio	5500-10000:1	5500-10000:1	5500-10000:1	6000-10000:1
AC Input Power Maximum Value (W/m ²)	650-750	640-750	600-710	600-710
AC Input Power Typical Value (W/m ²)	216-250	213-250	200-240	200-240
Storage Temperature (°C)	-40-60			
Working Temperature (°C)	-20-50			
IP rating (Front/Rear)	IP65			
Storage Humidity (RH)	10%~90%non-condensing			
Working Humidity (RH)	10%~90%non-condensing			
Lifetime Typical Value (hrs)	100000			

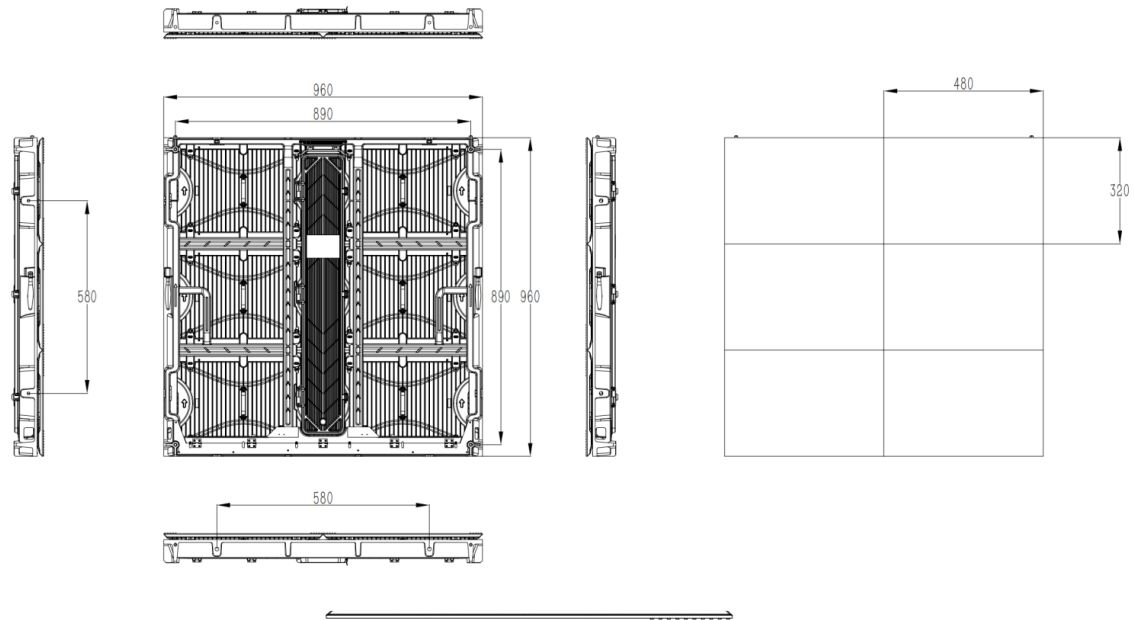
Remark:

Product pictures are for illustration only, the actual product effects (including but not limited to appearance, color, size) may be slightly different, please refer to the actual product.

The specification parameters are reference values. Part of the data comes from Unilumin's internal laboratory and is obtained under a specific test environment. In actual use, it may be slightly different due to product batch differences, configuration differences, software versions, use conditions and environmental factors. Actual usage shall prevail.

2.3 Product Components

Cabinet Section



Cascade signal cable between cabinets (CAT5 OR CAT6)



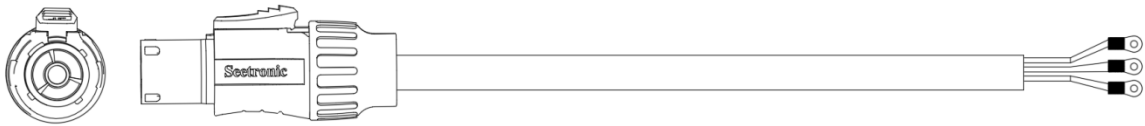
Cascade male plug for power cord



Cascade female socket for power cord



Main power supply cord



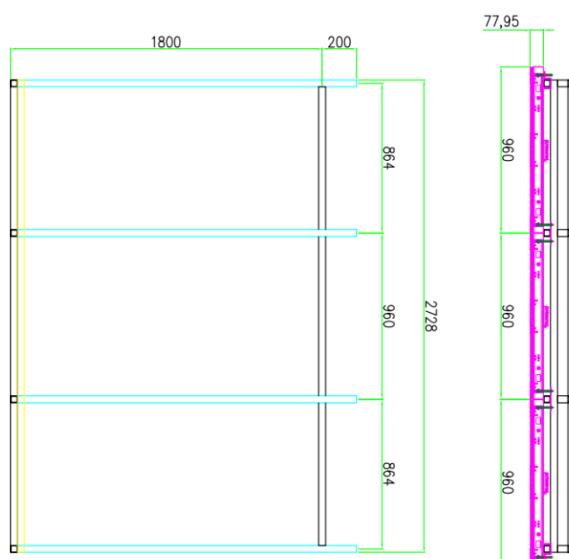
2.4 Mounting structure

This product supports both front and rear mounting, with slightly different mounting structure and accessories.

2.4.1 Front mounting and front maintenance

This product is generally used for wall-mounted wall mounting in case of front installation. LAMPRO Tech can provide customers with installation structures or drawings of supporting steel structures.

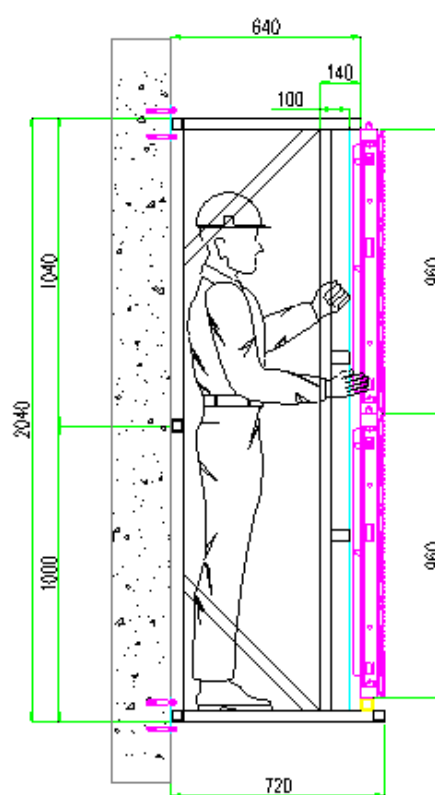
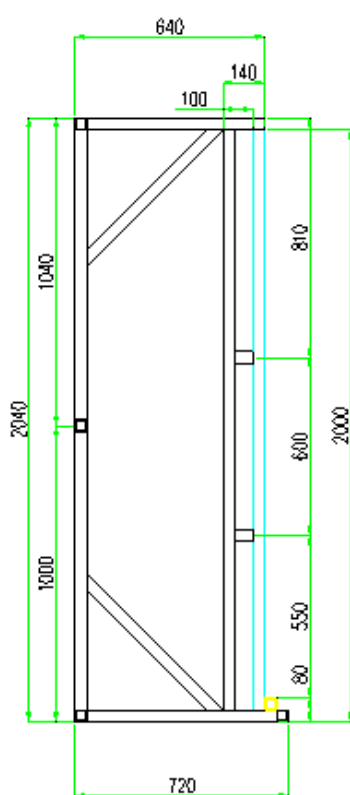
1. Determine the installation location and make the installation hole position;
2. Use the self-tapping screws or expansion screws to fix the first front mounting structure vertical strip to the wall;
3. Fix the second and subsequent front mounting structures to the wall wall with supporting fixture;
4. The empty cabinets are successively fixed to the hoist holes of the structure through the hanging pins behind the four corners of each cabinet (it is recommended to connect 2 or more cabinets on the horizontal surface first, lock the quick lock and the connecting piece, and fix them together on the structure);
5. Connect the wires and put them back into the module.



2.4.2 Rear mounting and rear maintenance

LAMPRO Tech can also provide customers with steel structure installation drawings and steel structures, and the usage of steel structures according to specific project information (the following steel structure and screen size are for demonstration purposes only):

1. Fix the position of the screen, and use M8*100 self-tapping screws or expansion screws to fix the horizontal structure on the wall;
2. Use a foot pin or welding method to connect the vertical structure with the horizontal structure;
3. Fixing the box body to the vertical structure through the connecting pieces and the M10 screws;
4. Connect the wires.

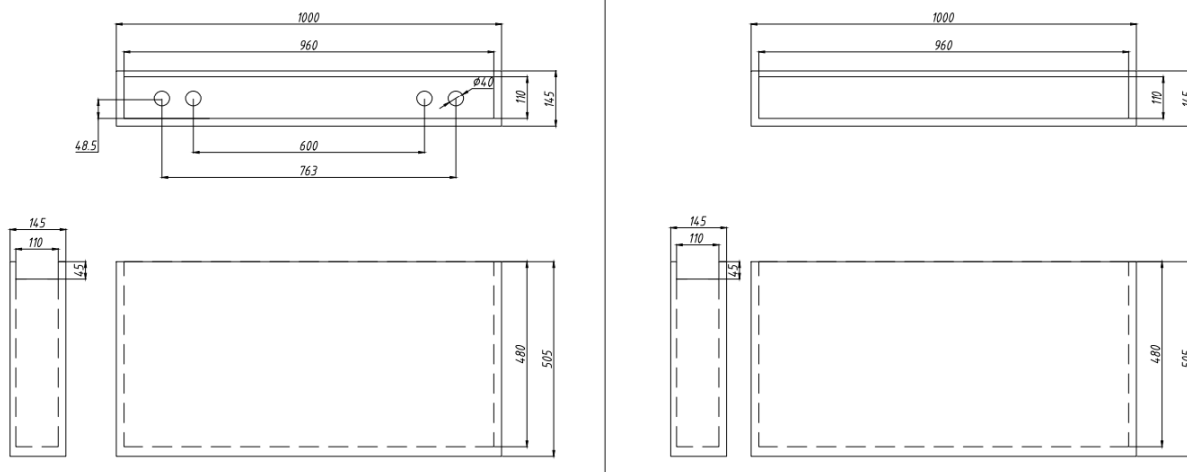


2.5 Product Packaging

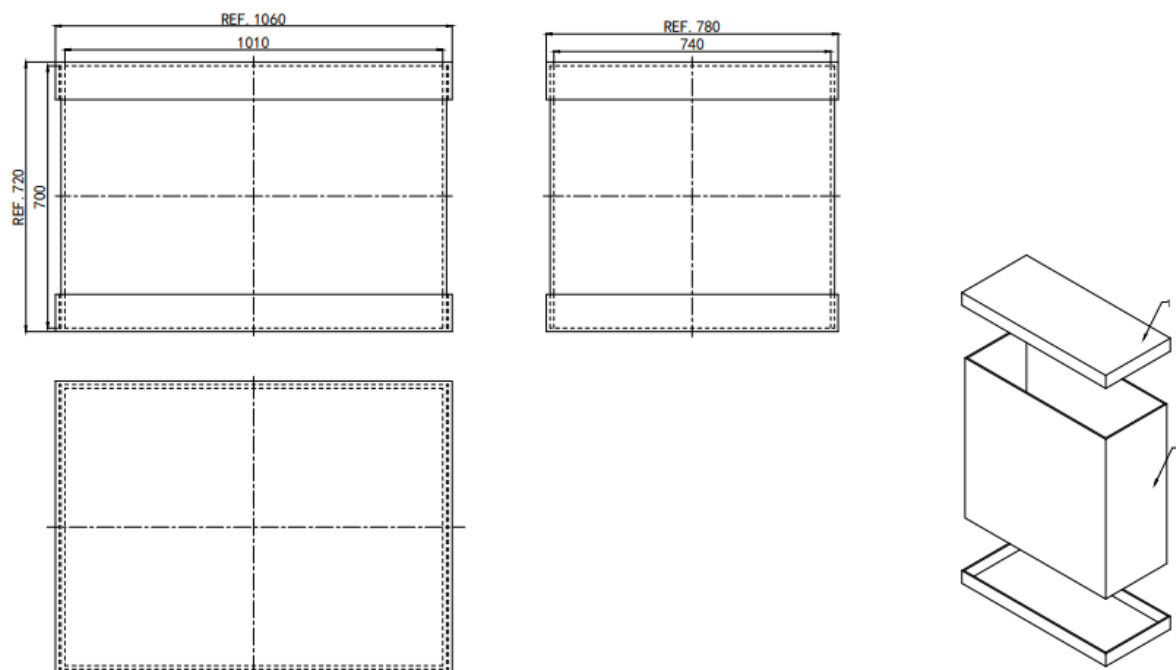
The product package includes moisture-proof bags, inner packaging boxes, anti-collision foam, wooden boxes (flight cases can be designed and provided), desiccants, etc.

Moisture-proof bag: General plastic bags made of PE environment-friendly materials, packing the boxes and sealing.

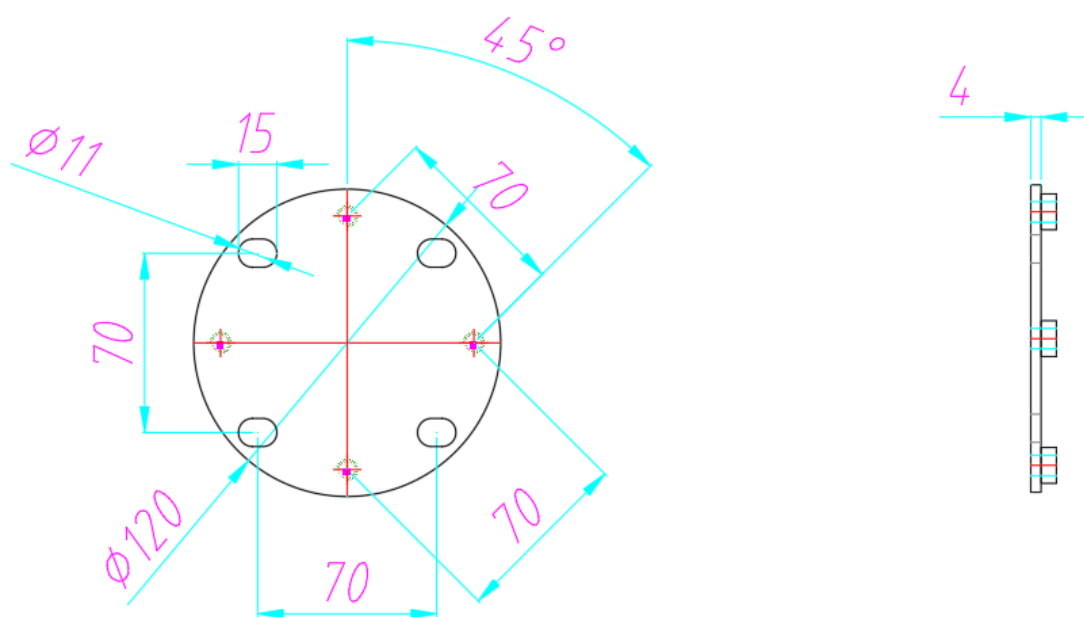
Box packaging (pearl cotton box)



External box packaging (wooden box)



2.6 Accessories



Connecting piece (main connecting piece)



Module extraction tool

(Note that the front and rear maintenance tools are different in dimensions)

3.Product Installation



Warning: Safety first. Create an installation area before starting to install the display.

Make sure that you read, understand and follow all of the "safety" tips or instructions in this Manual. In addition, all installation requirements for the display must be met. See the "Installation Requirements"

3.1Installation of Display Cabinet

1) Steps for installing the display cabinet

Step 1: Open the top cover of the outer packaging of the cabinet and move out of the cabinet.

Step 2: Unpack the anti-static plastic bag/moisture-proof plastic bag and check the appearance of the cabinet for damage.

Step 3: Unpack the cabinet rear cover, and check all the screws, cables, and power cables for looseness or detachment.

2) Precautions during installation

A. Handle the cabinet with care, and put a protective layer (paper or carpet) on the ground to prevent bumps, scratches, falls, etc.

B. When installing the cabinet, it is absolutely not allowed to hit the cabinet with iron items such as iron hammers, or construct in barbaric manners such as kicking.

C. When installing the cabinet, if the gap between the two cabinets is too large, it can be padded with hard objects to ensure the parallelism and verticality (Note: The gap between the cabinets should be less than 0.1mm).

3.2 Testing of the Screen Power Supply System (the power supply in the power distribution cabinet and the cabinet needs to be tested by the inspectors with electrician knowledge)

- A. Test the L wire, N wire and ground wire (FG) for short circuit.
- B. Test the N wire and ground wire (FG) for short circuit, and the resistance should be ∞ .
- C. Test the receiving card +4.2V power supply and GND (30~50 Ω), ground wire (FG), L wire, and N wire for short circuit, and the resistance should be ∞ .
- D. Test the receiving board GND, ground wire (FG), L wire, and N wire for short circuit, and the resistance should be ∞ .
- E. Test each power supply output +4.2V and GND for short circuit, and the resistance should be 30~50 Ω .

3.3 Precautions for Display Screen Mounting

- A. After the display screen is installed, the screen body is protected against lightning strikes. The main distribution input terminal is connected with an arrester.
- B. The display is strictly prohibited from operating with electricity.
- C. The sending system does not support hot swapping. Be sure to unplug the power cord before plugging in the connections between various devices.
- D. It must be fixed firmly during the process of fixing the cabinet. Meanwhile, the cabinet is prevented from colliding during the fixing process, causing damage to the display product.
- E. Workers should take safety measures during the installation process (wearing protective helmets, safety belts, etc.).
- F. When disassembling the control system board and other equipment, it is necessary to prevent static electricity (wear anti-static gloves, etc.).

Installation instructions

- A. This product is only suitable for indoor installation and the installation environment is between -30 and 50 degrees. Do not install on top of a hot object or on top of a stove, as this may cause damage to the product.
- B. In order to ensure your safety, the installation of this product must be performed by a professional.
- C. Cut off the power supply before installing the product, check whether the insulation of the power

supply circuit of the product is intact, and ensure that the local voltage is consistent with the rated voltage of the display screen. If it is not used for a long period of time within the rated voltage range, it may cause overheating of the product and thus cause damage.

D. Ensure the reliability of the product and installation connections. Make sure that the connection is reliable before installing the product to prevent potential safety hazards.

E. Be careful during the installation operation. The safety of the support and the installer must be ensured to prevent the center of gravity from falling down.

F. Be sure to install the ground wire.

G. Non-professionals should not open for repairs.

Precautions for installation

For other questions in the operational process, please refer to our relevant instructions. If you have any further questions, please contact us. The above considerations are not comprehensive, and will be supplemented later in the course of use. We also hope that you can make more suggestions to jointly maintain and use the display.



Warning: The fixed objects (such as screws) and quantities are for reference only. The installer should determine the appropriate fixtures and quantities based on the actual installation environment.

3.4 Assembly

Cabinet assembly

When the upper and lower adjacent cabinets are assembled, the upper and lower positioning pins of the lower cabinet must be aligned with the positioning pin holes of the upper cabinet, and placed vertically on the lower cabinet to prevent damage caused by the tilting of the cabinet.

When the left and right adjacent cabinets are assembled, the left and right locking members of the adjacent cabinets are aligned with their corresponding locking holes and passed through the locking to avoid tilting.

Cabinet connection instructions:

1. Remove the modules on the left and right sides, and the two horizontal boxes are firmly connected and locked by the left and right screws.

-
2. The two boxes in the vertical direction are positioned by the upper and lower positioning pins, and are rotated and locked by the self-contained lifting and locking device.

Operational requirements:

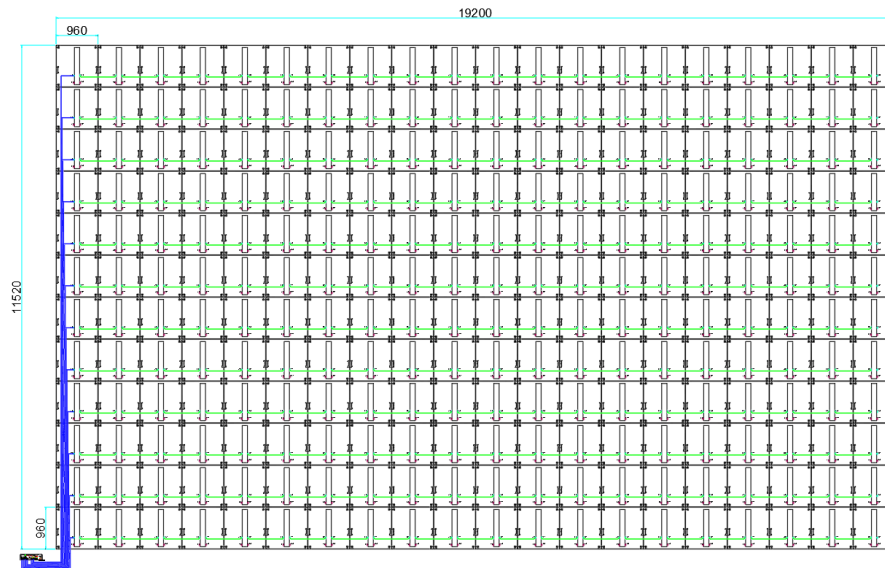
1. During the installation process, the connection between the cabinets should be fastened to ensure the verticality of each column.
2. Check if the connection lock between the cabinets in the columns is fastened (make corrections if any).



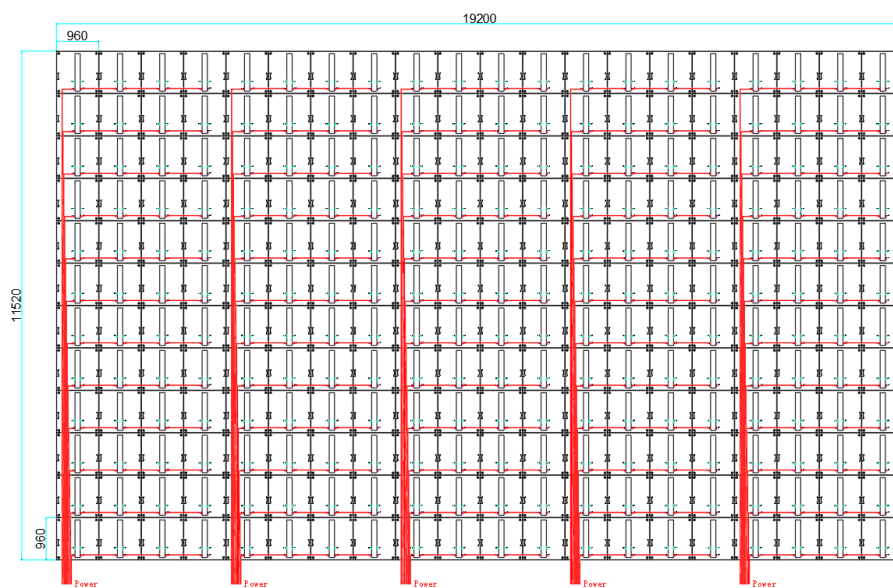
3.5 Wiring

Cabinet usage

For the screen wiring method, please refer to the box wiring diagram attached to the shipment.
For instance:



Signal Cable Connection Diagram



Power Cable Connection Diagram

4. Product Maintenance

4.1 Module Disassembly and Assembly

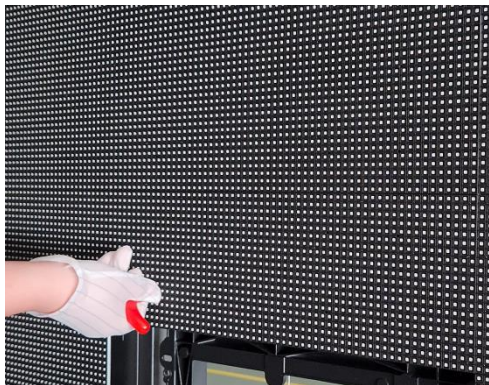
This product is equipped with maintain tool

Module disassembly:

Front Maintenance:

1. There are maintain holes on the module.

(Each module has four maintenance holes, located at the four corners of the module)



2. Use Pre-maintenance tool to open 4 modular locks from the front (loose the left and tighten the right).



3. Remove the module

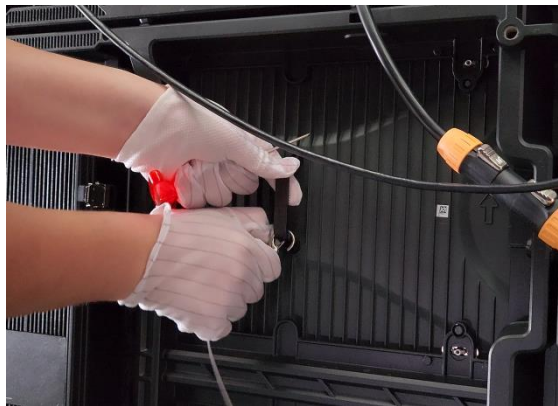


Front Maintenance:

1. Use the hexagonal tool to rotate 90° clockwise to loosen the upper and lower fixing knobs of the module (4pcs)



2. Unbuckle the safety rope on the module



3. Push the module forward



4. Tilt the module and remove it from the empty space reserved for the cabinet



Module assembly:

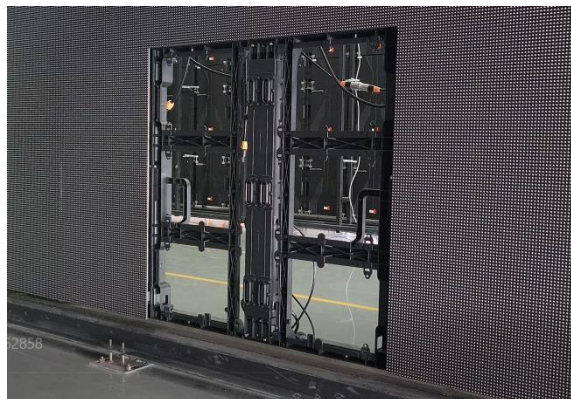
1. Align the positioning pin on the module with the corresponding hole on the box.
2. Move the module vertically to the box assembly surface at a slow speed.
3. Use an Allen wrench to lock the module lock and complete the assembly.

4.2 Control box maintenance

This product is equipped with front maintain tool

Front Maintenance:

1. Remove all modules from the front



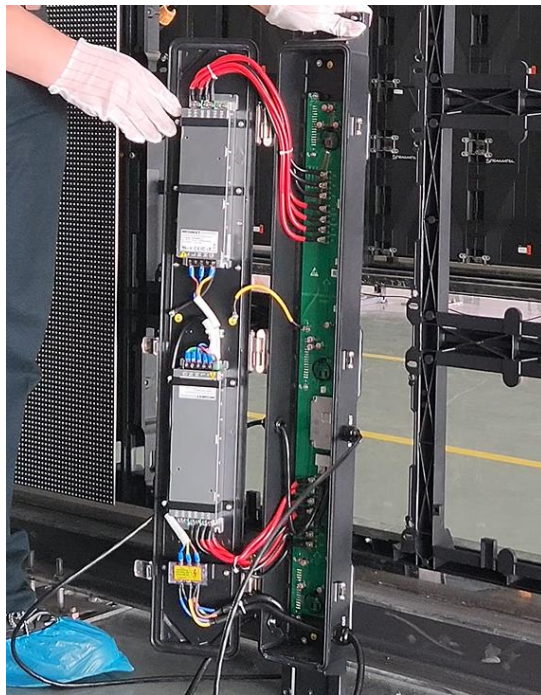
2. Unscrew the screws fixing the control box from the front (2 on each side)



3. Remove the control box

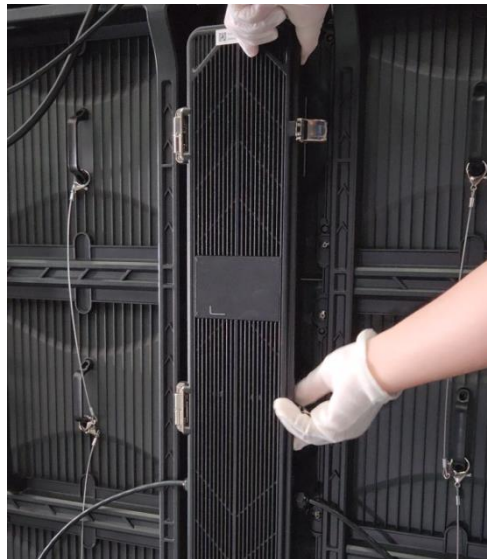


4. Open the latch of the control box to maintain the interior



Rear Maintenance:

1. Open the control box buckle



2. Maintenance can be performed on internal power supplies, receiver cards, HUB cards and other devices



4.3 Precautions for Daily Maintenance of the Display

With the full spread of LED displays in the market, many consumers often overlook the daily maintenance of the display. Long-term use not only affects the user's visual experience, but also shortens the life of the display. Please pay attention to the daily maintenance of the LED display.

1、Avoid being hurt by hard objects

If the LED display is accidentally damaged or scratched by hard objects, this display will be damaged. Therefore, be careful not to let the hard object damage the screen of the LED display.

2、Do not let water or iron powder into the screen.

It is strictly forbidden to let water, iron powder and other easily conductive metal objects into the LED display screen. LAMPRO Tech also recommends using LED displays in a low-dust environment. Dust will have a great impact on the display effect, and will cause damage to the circuit. In case of water ingress for various reasons, immediately disconnect the power and ask for maintenance personnel. The display can be used only after drying.

3、Moisture-proof and temperature requirements are as follows: At the highest operating humidity, the LED display should be less than 90% of the relative humidity.

4、The temperature is appropriate, and the temperature requirements are as follows: The operating ambient temperature is $-30^{\circ}\text{C} \leq T \leq 50^{\circ}\text{C}$, and the storage ambient temperature is -40°C to 60°C .

4.4 Cleaning of Fixed Display Panel



Warning: Isopropanol (200-661-7)

Dangerous goods, irritating to eyes and skin. Always use in areas with good ventilation. Steam can cause drowsiness and dizziness. Avoid contact with skin and eyes. If it accidentally comes into contact with your eyes, rinse immediately with plenty of water and seek medical advice.



Warning: Isopropanol (200-661-7)

Dangerous goods, flammable. Always use in areas with good ventilation. Keep away from fire. Smoking is prohibited when operating with isopropanol. Store in a well-sealed, original container in a cool, well-ventilated, and fire-resistant storage space.



Attention: The LED components used in the fixed display are susceptible to ESC (electrostatic discharge) damage. In order to avoid damage to the LED, take the necessary precautions.

Necessary Tools

1. Air compressor.
2. Isopropanol.
3. Antistatic damp cloth.
4. Vacuum cleaner.
5. Mild detergent.

Clean the exterior of the display fixing plate

1. Turn off the display

Use compressed air to blow off dust from one side of the display (LED indicator). A safe distance of 10cm is maintained between the nozzle of the compressor and the LED indicator.

2. Clean one side of the display (LED indicator) with a damp cloth. Clean the LED indicator with isopropanol as the solvent.
3. Use a vacuum cleaner to clean the dust from the ventilation grille of the module and control cabinet.



Warning: Make sure that the area is well ventilated. Smoking is prohibited when operating with isopropanol.



Attention: Do not use a brush to clean the LEDs to avoid scratching.



Attention: The LED components used in the display are susceptible to ESC (electrostatic discharge) damage. In order to avoid damage to the LED, take the necessary precautions.



Attention: Do not use a vacuum cleaner to clean the display side (LED indicator) due to ESD.



Attention: Do not push hard or sharp objects onto the LED soft lens to avoid damaging the LED. The maximum load allowed on the LED soft lens is 300g/LED.



Tip: Use a soft brush nozzle to avoid scratching.

4. Clean the casing of the rental frame and control cabinet with a damp cloth. You can use a slightly damp cloth and a mild detergent to remove stubborn stains.

Clean all display panels of the LED display each time to avoid the difference in brightness between the cleaned and uncleaned display panels.

It is recommended to use a vacuum cleaner to regularly clean the dust from the ventilation grille, modules and control cabinet. Therefore, use a vacuum cleaner with a soft brush nozzle.

Pay special attention when using or maintaining the display:



Before turning on the power switch, please check if the local AC power supply voltage meets the requirements of this product.



Do not touch the power supply when the power switch is not turned off.



Please turn off the power supply before performing any maintenance, including all switches including LED display and computer terminal monitor.



Beware of electric shock

In order to prevent electric shock, please make sure that the power cable is connected, the grounding wire is correct, and the connection is in good condition.



Dampproof



Handle with care



Keep upright

When storing the product, be careful not to place it in a damp environment. Pay attention to moisture. Handle with care when handling and moving, so as to avoid damaging to the product due to collision or large vibration. Pay attention to the direction when placing, and place according to the marked direction to avoid damage to the product.

- Do not press objects on cables such as power cords, signal cables, and communication cables. Cables should be prevented from being stepped on or pinched to prevent the risk of electric leakage or short circuit.
- When replacing the module of the LED display, please hook a secure rope on the module and the corresponding panel.
- Operating ambient humidity: At the highest operating temperature, the ambient humidity of the screen should be less than 90%.
- Operating ambient temperature: $-30^{\circ}\text{C} \leq T \leq 50^{\circ}\text{C}$.
- Storage ambient temperature: $-40^{\circ}\text{C} \leq T \leq 60^{\circ}\text{C}$.

• The power supply must meet the requirements:

- ① LED display's power supply voltage: $100\text{V} \sim 220\text{V} \pm 10\%$; Frequency: $50\text{HZ} \sim 60\text{HZ} \pm 5\%$

□ When the total power of the LED display is less than 5KW, it can be powered by a single-phase voltage; when it is greater than 5KW, in order to distribute the current evenly, it is necessary to be powered by a three-phase five-wire voltage.

□ The ground wire must be in reliable contact with the earth and properly separated from the N wire. The power supply to be connected should be kept away from high-power electrical equipment.

• When there is dust on the mask of the module, please clean it in time to avoid local color cast of the display.

• When maintaining the display, all the removed screws should be installed back to avoid water leakage of the display cabinet.



• Meaning of the logo: The equipment with this logo is designed and evaluated only at an altitude of 2000m. Therefore, it is only suitable for safe use at an altitude of less than 2000m, and may have potential safety hazards when used at an altitude of more than 2000m.










• Meaning of the logo: The equipment with this logo is designed and evaluated for safety only in non-tropical climates. Therefore, it is only suitable for safe use in non-tropical climates. When used in tropical climates, there may be safety hazards.

• If the steel structure of the screen body is relatively closed, it is necessary to consider the ventilation and heat dissipation of the screen body and increase the ventilation equipment. Do not exhaust the indoor warm air into the screen body.

4.5 Daily Maintenance of the Screen

Personnel protection:

	<u>Warning: Be sure to understand and follow all safety guidelines, safety instructions, warnings, and precautions in this Manual.</u>
	<u>Warning: Any maintenance or repairs must be made with the power turned</u>
	<u>off and all tools and equipment must be grounded.</u>
	<u>Warning: Pay attention to the suspended load.</u>
	<u>Warning: Be careful when the load is heavy.</u>
	<u>Warning: Please operate carefully when the load is heavy to avoid finger injury.</u>
	<u>Warning: Wear a safety helmet to avoid personal injury.</u>

Precautions for safety

- Use a striking fence and a “No Entry” mark to block a restricted area at least 3m around the LED screen, preventing unauthorized personnel from accessing the LED display during the repair process.
- Check whether the entire LED display is safe and reliable, and check for wear, deformation, corrosion, and other conditions that may affect the load handling capabilities of the parts.
- Do not modify and/or copy any components. LAMPRO Tech uses special materials and manufacturing processes to achieve the required part strength. Any parts other than LAMPRO Tech parts are not allowed.
- You must rely on your hands to repair the LED display. Therefore, it is forbidden to use a ladder to access the display panel, only scaffolding or Z-lifts are allowed.

Common maintenance tools



Electric screwdrivers: Used to install and remove screws of various specifications.



Screwdriver: Used to install and remove the screws and nuts.



Multimeter: Used for testing during repair or maintenance.

4.6 Common Troubleshooting

4.6.1 Method for problem determination

The problems must be determined on a priority basis. Deal with the obvious and serious problems first, and the minor ones later. Short circuit shall be of highest priority.

1. Resistance detection method: Adjust the multimeter to the resistance level. Detect the resistance at a point on a normal circuit board. Then, check whether the resistance value tested at the same point of the same circuit board is different from the normal resistance value. If it is different, the scope of the problem will be determined.
2. Voltage detection method: Adjust the multimeter to the voltage level. Detect the voltage at a point in the circuit suspected of having a problem and compare whether it is similar to the normal value. If not, the scope of the problem will be determined.
3. Short-circuit detection method: Adjust the multimeter to the short-circuit detection level (some are diode voltage drop level or resistance level, with general alarm function). Test for short circuit. After the short circuit is found, it should be solved first, so that it does not burn other devices. This method must be operated in the event of a power failure to avoid damage to the multimeter.
4. Voltage drop detection method: Adjust the multimeter to the diode voltage drop detection level. Since all ICs are made up of a large number of basic cells, they are only miniaturized. Therefore, when there is current on one of its pins, there is a voltage drop across the pin. Generally, the voltage drop across the same pin of the IC of the same model is similar. According to the voltage drop value on the pin, it is necessary to operate under the condition that the circuit is powered off. This method has certain limitations. For example, if the device under test is of high-resistance, it will not be detected.

4.6.2 LED Common faults of LED display and its troubleshooting

1. The entire screen is not lit (blank screen)

A: Check the power supply of the screen. Use a screwdriver with voltage tester or a multimeter to check if there is power at the electrical appliance. There may be a problem with the switch or it may be broken.

B: For displays that are synchronized with the computer, first check if the computer enters dormant state or screen saver state. In case of in dormant state, first enter the "Control Panel" to click "Power Management", then select the "Never" option for the "System Waiting" and "Close Monitor" options, so that the computer will not enter the dormant state and the display will function normally. In case of not in dormant state, you can open the case to check whether the control card and communication cable are

firmly connected, and check whether the communication cable is disconnected, which can basically solve the above problems.

C: Check whether the communication cable is connected, and check for errors and synchronizing panel. Please follow the connection diagram to connect and check.

D: Check if the green signal indicator of the sending card is flashing.

E: Check if the graphics card settings are normal and the FPD is turned on.

F: Check if the signal indicator on the receiving card is flashing normally.

2. The whole unit board is not lit (blank screen)

A: If several consecutive boards are not in the horizontal direction, check whether the connection between the normal unit board and the abnormal unit board is connected. If several consecutive boards are not lit in the vertical direction, check if the power supply of this column is normal.

B: Check if the position of a receiving card is not lit, check if the receiving card voltage is 5V, and whether the network cable input to the receiving card is normal.

C: If a unit board is not lit, check if the cable input to the unit board is loose.

3. Incomplete display file or incorrect position

A: First check whether the parameters of "display position" and "screen size" in the software are consistent with those given in the installation project. If you don't remember, you can count the number of pixels in the length and width on the screen. After the "screen size" is determined, you can see how much difference is displayed on the screen, and then go back to the computer and adjust it until the position is consistent.

B: In case of incomplete display, check if the file size is the same as the "screen size" of the screen.

C: Open the case and check if the conductor is dropped on the control card.

4. Communication display is not available for communication

A: Check if the parameters in the software are consistent with the installation project.

B: Check if the serial port is connected and if the communication cable is disconnected.

5. The display is jittery, with horizontal stripes:

Check if the common ground wire connected to the computer is loose, or if the communication cable is loose. If the operator cannot determine the cause of the problem or is not familiar with the computer, do not open the case easily. If the problem of the display is very serious, please contact us in time, and then diagnose with the consent and instructions of our staff.

6. No sound on the screen

It is because the sound controller that comes with the graphics card conflicts with the sound controller in the computer. Turn off the sound controller in the computer. The operation is as follows:

Open the "Attributes" of My Computer, find the "Device Manager" in "Hardware", select the sound controller, and then disable "Realtek high definition Audio".

7. Fail to play DVD or video files

A: The computer does not have a video file player installed.

B: This file format is not supported by the player itself.

C: You can install WINDVD or POWER player.

8. Display screen blurring or flashing

A: Check if the DVI cable is plugged in.

B: Check the network cable for short circuit or disconnection.

C: Check if the screen refresh rate of the monitor is set at 60HZ.

D: Check if the transmission distance of the network cable is too long and thus cause flashing.

9. Output problem

A: Check if the cable from the output interface to the signal output IC is connected or short-circuited.

B: Check if the clock latch signal of the output port is normal.

C: Check whether the cascaded output data port between the last driver IC is connected to the data port of the output interface or is short-circuited.

D: Check if the output signals are short-circuited to each other.

E: Check if the output cable is in good condition.

10. The display is confusing and the output is abnormal.

A: Check if the clock CLK latch STB signal is short-circuited.

B: Check if the clock CLK of 245 has an input or an output.

C: Check if the clock signal is short-circuited to other cables.

Note: It mainly detects clock and latch signal.

11. The display is confusing, but the signal output to the next board is normal.

A: Check if the STB latch output terminal corresponding to the 245 is connected to the latch terminal of the driver IC or the signal is short-circuited to other circuits.

B: Check if there is an open circuit or a virtual soldering or short circuit between the A, B, C and D output terminals corresponding to 245 and 138.

C: Check if there is a short circuit between the signals of A, B, C, and D or a short circuit between a signal and ground.

Note: The ABCD line signal is mainly detected.

12. Display lack of color

A: Check if the data terminal of the color of 245 has an input and output.

B: Check if the data signal of this color is short-circuited to other circuits.

C: Check if the cascade data port between the driver ICs of this color has an open circuit or short circuit or a virtual solder.

Note: It is easier to find the problem by means of voltage detection. Check whether the voltage of the data port is different from the normal voltage and thus determine the fault area.

5. Description on After-sales Services

5.1 Pre-sales Services (Technical Consultation)

LAMPRO Tech provides pre-sales consulting services to its customers. The main purpose of pre-sales services is to assist customers in engineering planning and system requirements analysis, so that our products can meet the needs of users to the greatest extent, and at the same time enable customers to maximize the overall economic benefits.

5.2 After-sales Services

Shenzhen LAMPRO Tech has established a complete engineering file for each project, has a technically competent engineering team, and is equipped with professional maintenance personnel to provide customers with after-sales services and respond to customer needs. We provide a free warranty and lifetime warranty for all products that have already been delivered. During the free warranty period, all faults caused by component quality or production and installation processes can be unconditionally repaired free of charge. However, the failure caused by violation of the regulations or some irresistible external factors (such as power supply parameters exceeding the standard, lightning strikes, etc.) is not included in the free warranty, and the service fee is charged as appropriate.

5.2.1.Warranty period:

The product is warranted for one year from the date of shipment from the factory. During the warranty period, the product is faulty and is repaired free of charge by the technical staff of the company for normal use (used in accordance with the product manual and its precautions).

5.2.2.Warranty scope:

LED modules, switching power supplies, control systems and other major accessories (products not purchased directly from our company are not covered by this warranty).

5.2.3.Warranty method:

Send to repair, by express mail or other means.

5.2.4.Response speed

1. Send to repair: The repair service shall be performed within 24 hours after receipt of the repaired product and sent back to the repairer or to a trained third party authorized by LAMPRO Tech for repair.
2. Telephone or network: Contact the user within 2 hours and provide a solution within 8 hours.
3. On-site maintenance (only for customers in China). According to the maintenance requirements, the response shall be within 48 hours in Guangdong province and within 72 hours outside Guangdong province.

In case of special circumstances, both parties shall solve the problems through friendly consultation.

Product exchange and return

Our company supplies strictly according to the contract list. If the quantity or specification does not match the actual situation, the buyer may file an objection within 3 days after receiving the goods, and the equivalent value will be exchanged or supplemented after validation by our company.

Accidental damage repair:

In case of improper operation or accidental damage during use, our company can provide the corresponding accessories, and only charge the cost of the accessories without any additional fees.

Upgrade service:

Our products will be upgraded from time to time without prior notice. If the user needs to upgrade the product, we will try our best to provide assistance.

After-sales services beyond the warranty period:

Our company only charges maintenance costs (labor fees, accessories costs, and travel expenses).

Contact information for after-sales services:

Headquarters (Shenzhen)

Address: 6 Lanjing North Road, Pingshan District, Shenzhen 518118 China

Contact number: 0755-27657656

Fax: 0755-27653206

Email: postsale_service@szlamp.net

Dutch station (Rotterdam)

Address: Albert van 't Hartweg 17 2911 LE Nieuwerkerk a/d IJssel, the Netherlands Contact number:

+31 6 85 74 56 30

Email: postsale_service@szlamp.net

Under one of the following circumstances, no one can enjoy free repair or replacement:

- A. Unable to provide valid proof that it is LAMPRO Tech's product.
- B. The serial number on the product is damaged or has traces of alteration.

- C. Failure and damage caused by improper installation, improper use or self-disassembly.
- D. Failure and damage caused by transportation, falling, etc. after the acceptance.
- E. Failure or damage caused by force majeure such as fire, flood, earthquake, etc., or pollution, moisture, corrosive gases, etc.
- F. Failure or damage caused by abnormal voltage, abnormal current, etc.
- G. Failure or damage caused by use beyond the specified range.
- H. Gifted products.
- I. Failure or damage not attributable to the company.
- J. Modification and repair by the user or disassembly, modification and repair by a third party not permitted by LAMPRO.
- K. Due to improper storage or use.
- L. Beyond the free warranty period.
- M. Others.

Please save the warranty card, and no replacement if lost. The warranty card is only for domestic use in China. This warranty card stipulates that any part of the warranty card shall be guaranteed.

N. The company reserves the right of final modification and interpretation of the above terms.

