GKGD 山西高科视像科技有限公司
Shanxi Hi-Tech Visual Technology Co.,Ltd

# 产品规格书

## SPECIFICATION FOR APPROVAL

规格书编号：2501009SX
Specification No. 2501009SX

客户名称 Customer：_____

产品名称 Description：P1.87 实像素共阳 COB 模块

产品型号 Model：M-NMA187RA

样品编号 Lot No.:2501009SX

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## 1. 适用范围 Scope of application

本产品规格书仅适用于 P1.87 户内全彩 COB 模组，规格型号 M-NMA187RA。

This specification for product is only applicable to P1.87 indoor full color COB module, specification model M-NMA187RA.

## 2. 产品说明 Product description

本产品使用倒装芯片用锡膏焊接并进行 COB 封装。

This product is welded with solder paste of full flip chip and COB packaged.

本产品是精英款系列，在画质、稳定性等方面展现出显著优势。广泛应用于高端会议室、展馆展厅等领域，是追求高品质显示效果的理想选择。

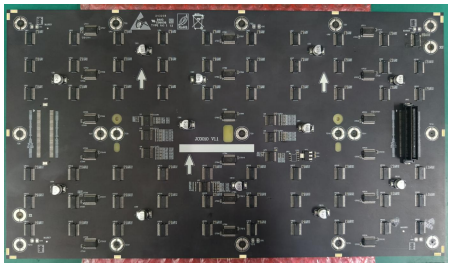
This product is part of the elite series, showing significant advantages in terms of picture quality and stability. It is widely used in high-end conference rooms, exhibition, and other fields, making it an ideal choice for those seeking high-quality display effects.

RGB 芯片、驱动 IC、电容、电阻贴装在 PCB 板上，形成单元模块。

The RGB chip, driver IC, capacitor and resistor are pasted on the PCB board to form a unit module.

四个单元模块背面的铁片吸附在箱体的磁柱上，从而拼接成整屏。

The four modules can be spliced into a whole screen through the iron sheet on the back of the modules on the magnetic column of the box.

| 模块正面 Module front | 模组背面 Back of the module |
|---|---|
|  |  |

**模块接口定义 Module interface definition**

| | | | | | |
|---|---|---|---|---|---|
| 输出电源 Output power | EXT4.2V | 1 | 2 | EXT4.2V | 输出电源 Output power |
| | EXT4.2V | 3 | 4 | EXT4.2V | |
| | EXT4.2V | 5 | 6 | EXT4.2V | |
| | EXT4.2V | 7 | 8 | EXT4.2V | |
| 接地 Grounding | GND | 9 | 10 | GND | 接地 Grounding |
| | GND | 11 | 12 | GND | |
| | GND | 13 | 14 | GND | |
| | GND | 15 | 16 | GND | |
| / | R1 | 17 | 18 | R2 | / |
| | G1 | 19 | 20 | G2 | |

| | | | | | |
|---|---|---|---|---|---|
| | B1 | 21 | 22 | B2 | |
| | R3 | 23 | 24 | R4 | |
| | G3 | 25 | 26 | G4 | |
| | B3 | 27 | 28 | B4 | |
| 接地 Grounding | GND | 29 | 30 | GND | 接地 Grounding |
| / | R5 | 31 | 32 | R6 | / |
| | G5 | 33 | 34 | G6 | |
| | B5 | 35 | 36 | B6 | |
| | R7 | 37 | 38 | R8 | |
| | G7 | 39 | 40 | G8 | |
| | B7 | 41 | 42 | B8 | |
| 接地 Grounding | GND | 43 | 44 | GND | 接地 Grounding |
| 行译码信号 Translation code signal | HA1 | 45 | 46 | HB1 | 行译码信号 Translation code signal |
| | HC1 | 47 | 48 | HD1 | |
| | HE1 | 49 | 50 | HLAT1 | 锁存信号 Latch signal |
| 接地 Grounding | GND | 51 | 52 | GND | 接地 Grounding |
| 移位时钟 Shift clock | HDCLK1 | 53 | 54 | HOE1 | 显示使能 Display enable |
| 接地 Grounding | GND | 55 | 56 | GND | 接地 Grounding |
| 串行接口时钟信号 Serial interface clock signal | HUB-SPI-CLK1 | 57 | 58 | EXT-4.2V | 输出电源 Output power |
| 串行接口 CS 信号 Serial interface CS signal | HUB-SPI-CS1 | 59 | 60 | EXT-4.2V | |
| 灯板 Flash 存储数据输入 Flash storage data input for the light board. | HUB-SPI-MOSII | 61 | 62 | GND | 接地 Grounding |
| 灯板 Flash 存储数据输出 Flash storage data output for the light board. | HUB-SPI-MOS1 | 63 | 64 | GND | |
| 接地 Grounding | GND | 65 | 66 | GND | |
| | GND | 67 | 68 | GND | |
| | GND | 69 | 70 | GND | |
| | GND | 71 | 72 | GND | |
| 输出电源 Output power | EXT-4.2V | 73 | 74 | EXT-4.2V | 输出电源 Output power |
| | EXT-4.2V | 75 | 76 | EXT-4.2V | |
| | EXT-4.2V | 77 | 78 | EXT-4.2V | |
| | EXT-4.2V | 79 | 80 | EXT-4.2V | |

## 3. 规格型号定义 Specification model definition

M-NMA187RA

M--表示成品模块；N-户内产品；M-精英款；A--共阳；像素间距：1.87mm；芯片排布方式：R--普通实像素；PCB 板型：A（300*168.75mm）；

M--indicates finished module; N-indoor product; M-elite model; A--common anode; pixel pitch: 1.87mm; chip arrangement method: R--ordinary solid pixel; PCB board type: A (300*168.75mm);

## 4. 技术参数 Technical parameters

| 序号 No. | 项目名称 Project name | 参数及指标 Parameters and indicators |
|---|---|---|
| 单元模块 module | | |
| 1 | 封装方式 Encapsulation mode | 倒装芯片 COB 封装 Flip chip COB package |
| 2 | 水平视角 Horizontal perspective | ≥160° |
| 3 | 垂直视角 Vertical perspective | ≥160° |
| 4 | 像素组成 Pixel composition | 1R1G1B-COB |
| 5 | 点间距 Point spacing | 1.87mm |
| 6 | 扫描方式 Scanning mode | 1/45扫描 S |
| 7 | 驱动方式 Driving mode | 恒流驱动 Constant current drive |
| 8 | 分辨率 Resolution | 160*90 点 |
| 9 | 尺寸 Size | 300*168.75mm |
| 10 | 重量 Weight | 0.28kg |
| 11 | 类型 Type | 灯驱合一 Combination of lamp and drive |
| 12 | 工作电压 Operating voltage | DC4.2V |
| 13 | 平均功率 Average power | ≤6W |
| 14 | 最大功率 Maximum power | ≤9W |
| 单元箱体 Unit housing | | |
| 1 | 模块分布 Module distribution | 2*2 块 |
| 2 | 平整度 Flatness | ≦0.1mm |
| 3 | 箱体分辨率 Resolution | 320*180 点 |
| 4 | 箱体平均功率 Average power | ≤15W |
| 5 | 箱体最大功率 Maximum power | ≤35W |
| 6 | 亮度均匀性 Light uniformity | 98% |
| 7 | 色度均匀性 Color uniformity | Cx，Cy ±0.003 |
| 8 | 箱体尺寸 Dimension（含灯板模组）（Including light board module） | 600×337.5×34.85mm（金刚箱体）(Transformers series)<br>600×337.5×38.45mm（磐石箱体）(Monolith series)<br>600×337.5×33.45mm（青锋箱体）（Qingfeng series )600×337.5×26.8mm(墨玉箱体）(Black Jade series) |

| | | |
|---|---|---|
| 9 | 箱体重量 Weight | 3.5KG（金刚）(Transformers)/4.3KG（磐石）(Monolith)/ 3.53KG（青锋）(Qingfeng)/3.5KG（墨玉）(Black Jade) |
| 10 | 箱体颜色 Color | 黑色 Black |
| 整屏 Full screen | | |
| 1 | 使用环境 Usage environment | 室内 |
| 2 | 白平衡亮度 White balance brightness | 600-800 |
| 3 | 静态对比度 Static contrast | 5000：1 |
| 4 | 箱体平整度 Flatness | ≦0.1mm |
| 5 | 水平视角 Horizontal perspective | ≧160° |
| 6 | 垂直视角 Vertical perspective | ≧160° |
| 7 | 色温 Color temperature | 3000-18000K 可调 3000-18000K Tunable |
| 8 | 箱体平均功率 Average power | ≤115W/m² 800nit |
| 9 | 箱体最大功率 Maximum power | ≤230W/m² 800nit |
| 10 | 像素密度（点/平方米）Pixel density | 284089 |
| 11 | 供电方式 Power supply | AC100-240V,50/60Hz |
| 12 | 对地漏电流 Current against floor drain | ＜2mA |
| 13 | 工作环境温度 Operating ambient temperature | -10℃～40℃ |
| 14 | 工作环境湿度 Ambient humidity | 10%～90%无结露 Dew free |
| 15 | 存储环境温度 Storage ambient temperature | -20℃～60℃ |
| 16 | 存储环境湿度 Storage environment humidity | 10%～90%无结露 Dew free |
| 17 | 换帧频率 Frame change frequency | 60Hz |
| 18 | 刷新频率 Refresh frequency | ≥3840Hz |
| 19 | 最佳视距 Optimum visual distance | ≥1.4m |
| 20 | 灰度/颜色 Grayscale/color | 281 万亿 |
| 21 | 亮度调节软件 Brightness adjustment software | 软件 14 级调节/14 级自动调节 Software 14 level adjustment /14 level automatic adjustment |
| 22 | 控制方式 Control mode | 与电脑显示屏同步显示 Synchronized display with computer display |
| 23 | 无中继有效通讯距离 Valid communication distance without relay | 非屏蔽双绞线最大传送距离 90 米，，多模光纤传输距离可达 500 米，单模光纤传输距离可达 15 公里 |

| | | |
|---|---|---|
| | | The maximum transmission distance of unshielded twisted pair is 90 meters, the transmission distance of multi-mode fiber can reach 500 meters, and the transmission distance of single-mode fiber can reach 15 kilometers |
| 24 | 计算机操作系统 Operating system | Windows(XP、Vista)、Win7、Win8、Win10 |
| 25 | 视频信号 Video signal | VGA、DVI、RF、S-Video、RGBHV YUV、YC、COMPOSITION 等 |
| 26 | 平均无故障时间 Mean time to failure | ≥10000 小时 |
| 27 | LED 芯片寿命典型值<br>Typical value of chip life | 100000 小时 |
| 28 | 杂点率 Stray point rate | ≤1/10000 |
| 29 | 稳定性 Stability | 支持 7*24H 连续工作 |
| 30 | 阻燃（防火）<br>Flame retardant (fire prevention) | PCB 的阻燃等级达到 UL94 V-0 级 |
| 注：参数指标可根据实际情况定制，最终解释权归山西高科视像科技有限公司。<br>Note: The parameters and indicators can be customized according to the actual situation.The rig ht to the final interpretation belongs to Shanxi Hi-Tech Shixiang Technology Co., Ltd. | | |

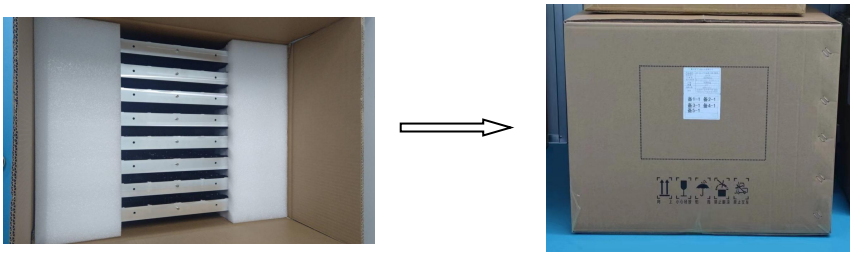
## 5. 包装 Packing

**每箱有 2 层珍珠棉，一层棉可以装 16 张灯板，一个纸箱共 32 张模块。**

Each box has 2 layers of pearl cotton, one layer of cotton can hold 16 light boards, a carton of 32 modules.

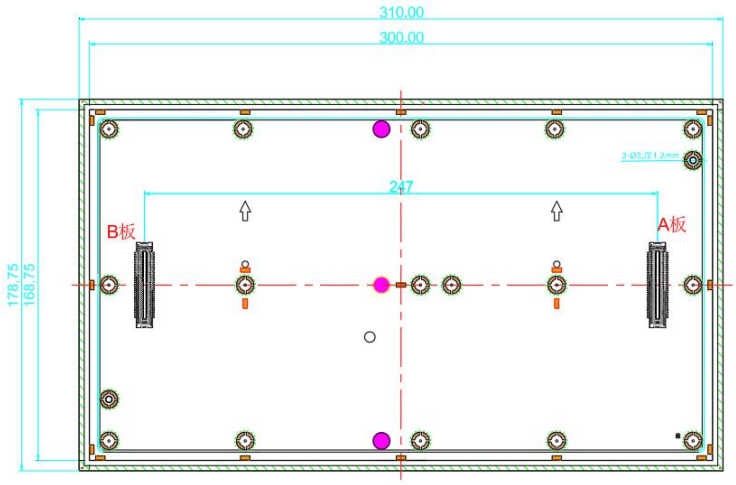


**每箱放置 8 个箱体** There are 8 cabinet in the box。



## 6. 安装指导 Installation guide

### 6.1 模块安装孔位图 Hole site of installing




### 6.2 模块信号线连接方式 Module signal cable connection

由于本产品为微小间距、高精度产品，仅适配高精度的封闭式压铸箱体，并且为硬连接方式，电源和信号在同一个 80P 的浮动连接器上输出，在安装模组之前需将电源、转接板、接收卡安装好，并且将电源的输入线接至电源，电源输与转接板定位固定，另将信号的输入输出线接至转接板上。单元模块电源及信号的连接方式如下：

Because this product is a product with small spacing and high precision, only suitable for high precision closed die-cast box, and is hard connected, the power supply and signal are output on the same 80P floating connector. Before installing the module, install the power supply, switching board and receiving card, and connect the input line of the power supply to the power supply, and the power supply and switching board are fixed. In addition, the input and output lines of the signal are connected to the switching board。Unit module power and signal connections are as follows：

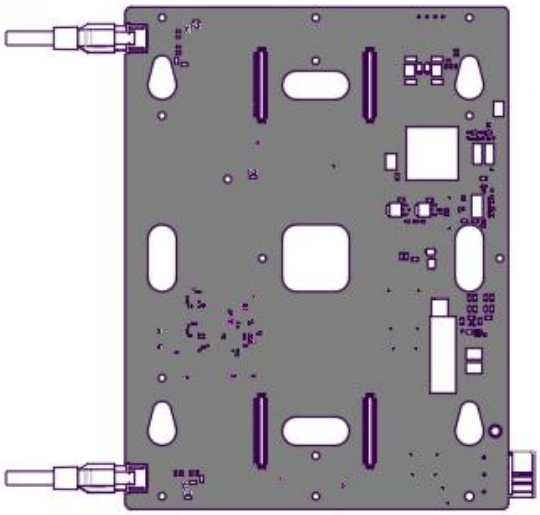
（我公司定制点亮程序，满足带载像素）：(Our company customized lighting program to meet the on-load pixel) :

**转接板结构图：**

Structure diagram of adapter board:

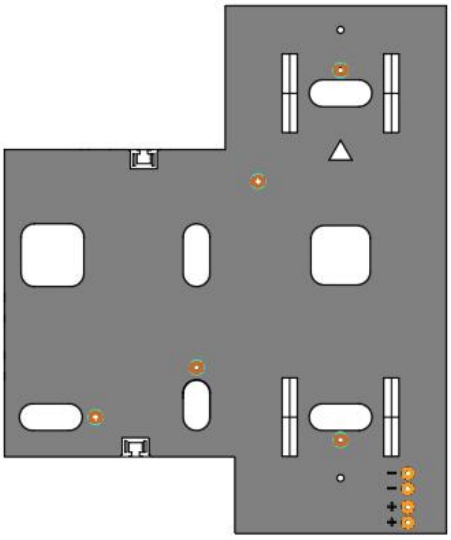
**三合一转接板：**

3-in-1 Adapter Board:



**二合一转接板：**

2-in-1 Adapter Board:



## 6.3 模块安装

6.3 Module Installation

箱体上磁柱位置与模块上铁片螺丝位置对应，箱体上自带安装磁柱，将模组紧密配合磁吸在安装好转接板、线材的箱体上即可（注意拼接缝隙、符合平整度要求）。

The position of the magnetic column on the box corresponds to the position of the iron screws on the module. The magnetic column is installed on the box. The module can be closely connected with the magnetic magnet on the box that is installed with the connecting plate and cable (pay attention to the stitching of gaps and meet the flatness requirements).

## 6.4 箱体安装要求

6.4 Cabinet installation requirements

本箱体为我公司自主设计铝合金箱体（也可采用市面上尺寸及孔位相同的箱体），采用压铸模具一次成型，具有重量轻，结构合理，精度高，散热效果好，基本可实现无缝拼接等优点。

The Display box is a self-designed aluminum alloy box (and can use the market size and hole of the same box in the market),it's molded by the die casting die, with light weight, reasonable structure, high precision, good heat dissipation effect, can realize the advantages of seamless splicing.

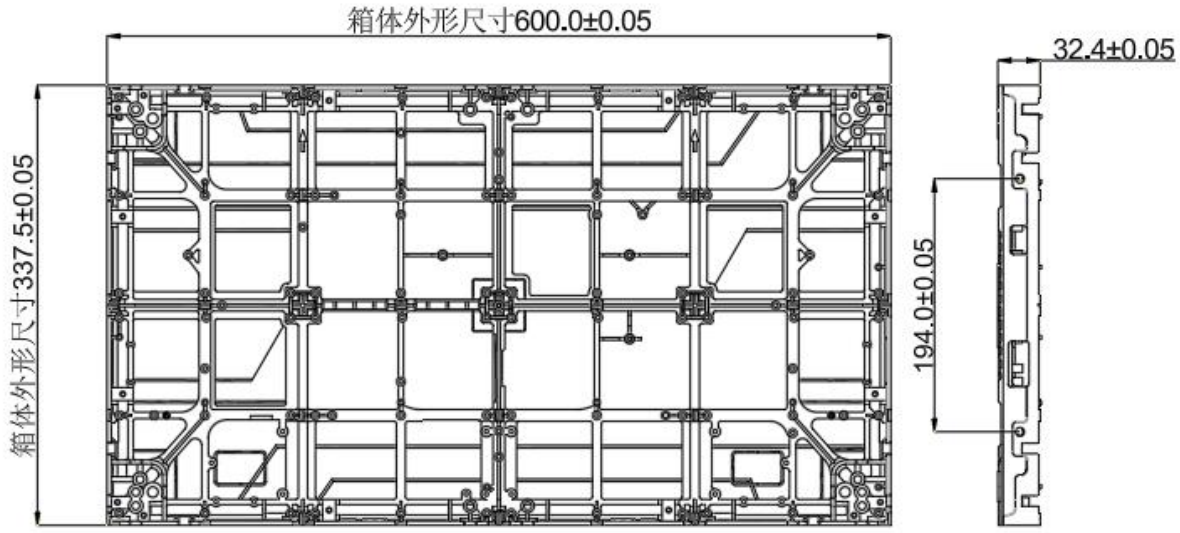
箱体内部的转接板都从正面安装及拆卸，可以实现箱体全前维护。箱体上下左右连接采用快速锁紧机构，安装简便，模组通过磁柱吸附于箱体上，每个箱体上吸附 4 个模块。

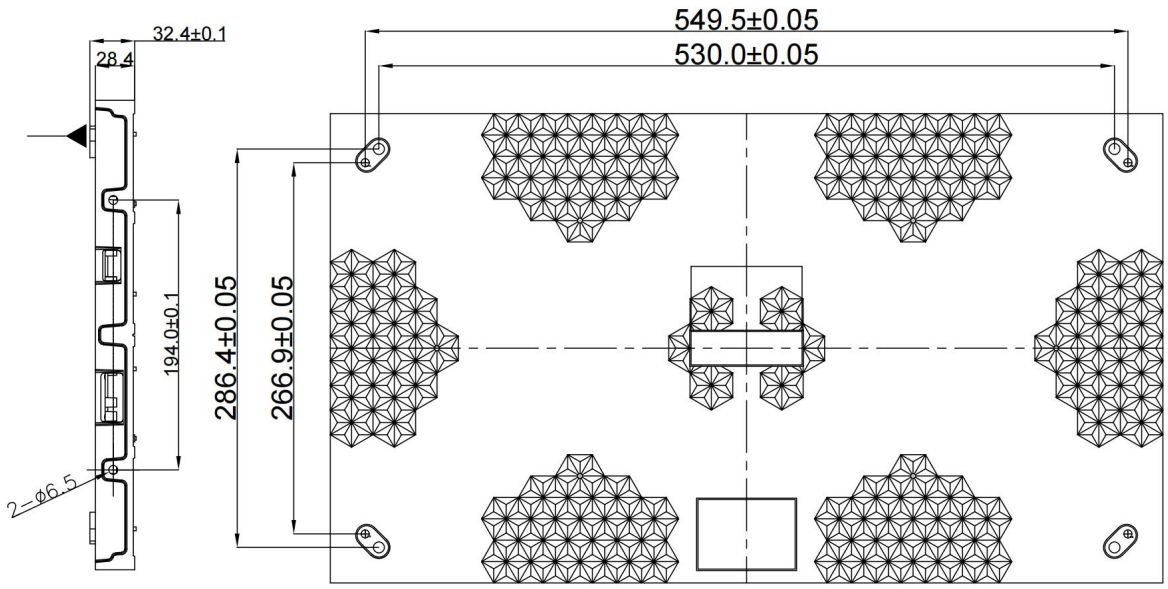
The switching board inside the box are installed and removed from the front of the box to realize full front maintenance . The upper and lower parts of the box are connected by a fast locking mechanism, easy installation. The modules are adsorbed on the box through the magnetic column, and 4 modules are adsorbed on each box.

箱体安装尺寸图（后续出货以金刚箱体二代和青锋箱体为主）

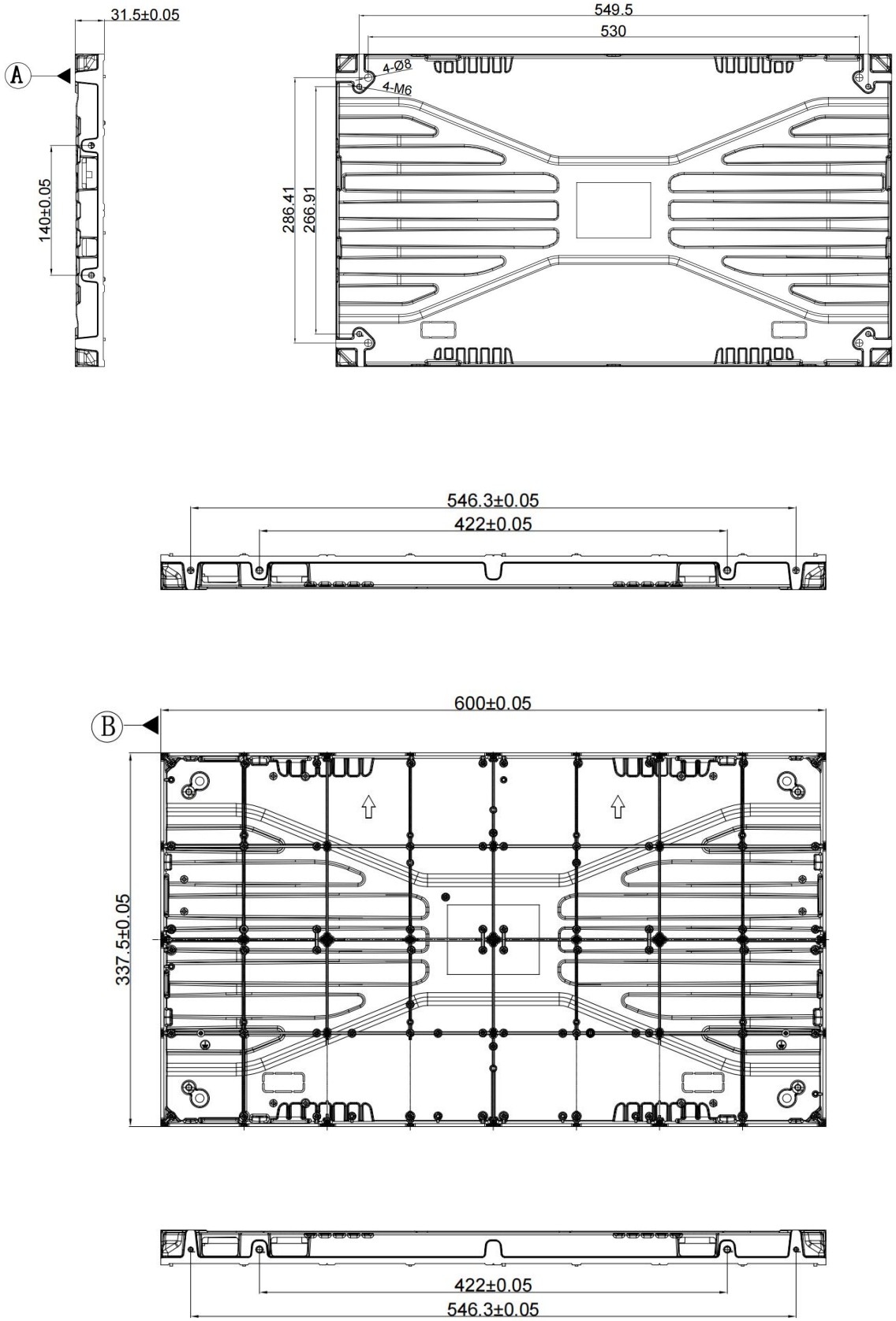
Dimension drawing of box installation（The subsequent shipments will mainly consist of transformers series and Qingfeng series）

金刚箱体二代 The second transformers series

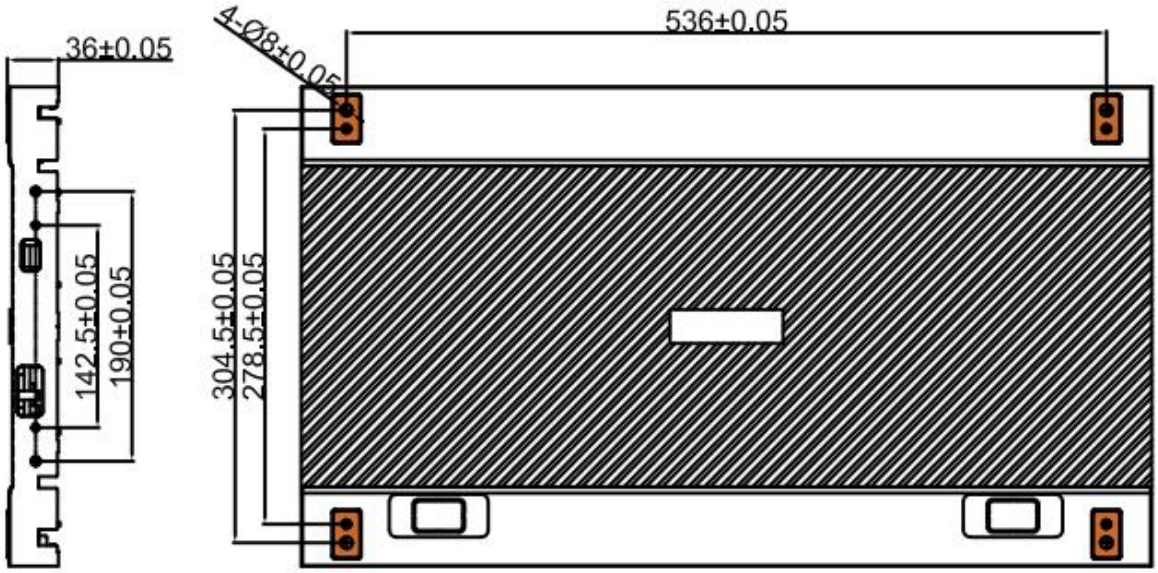


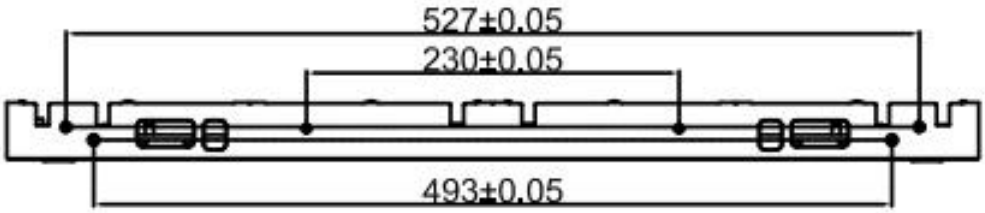



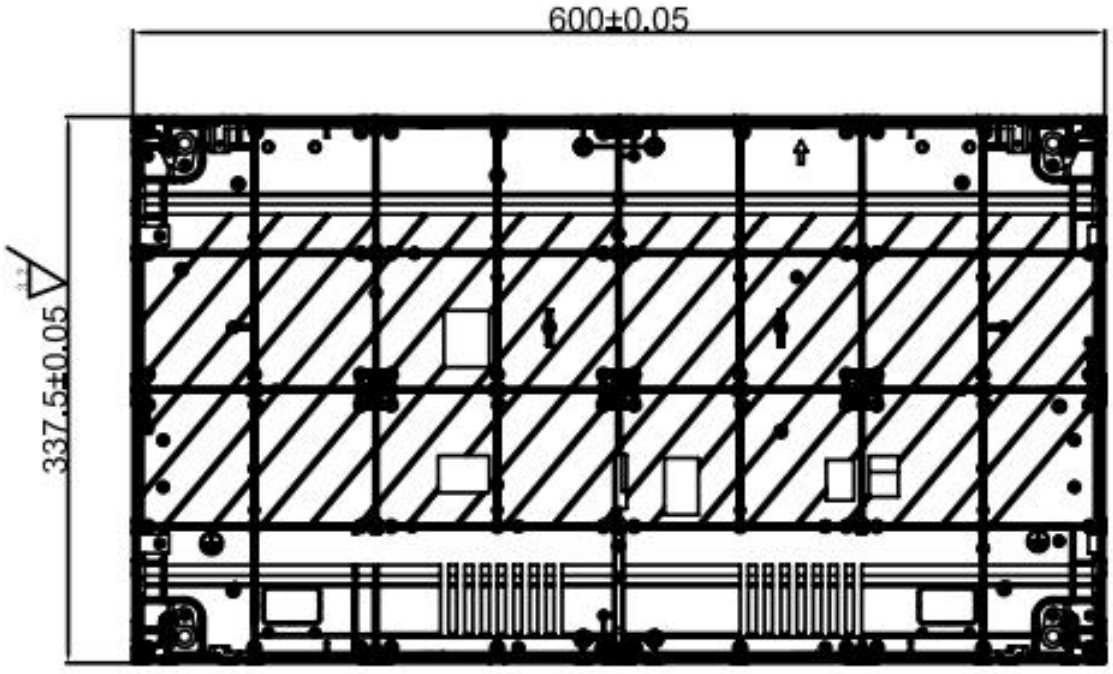
## 青锋箱体 Qingfeng series



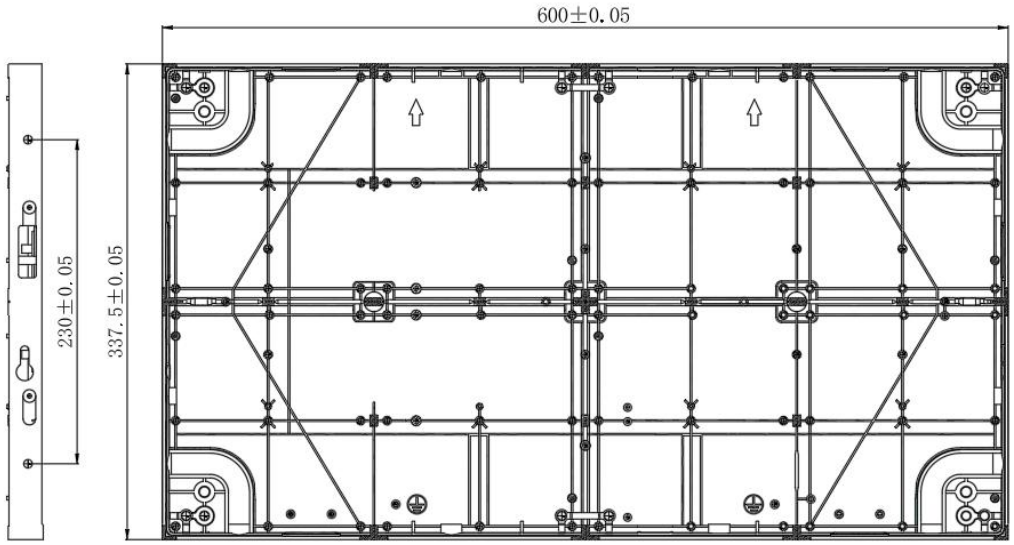
磐石箱体 Monolith series

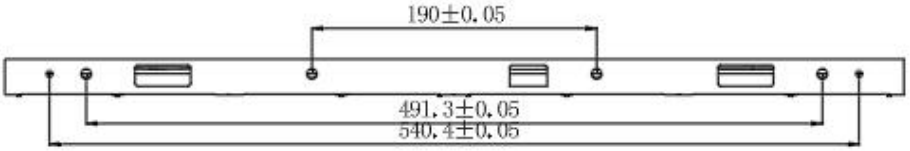


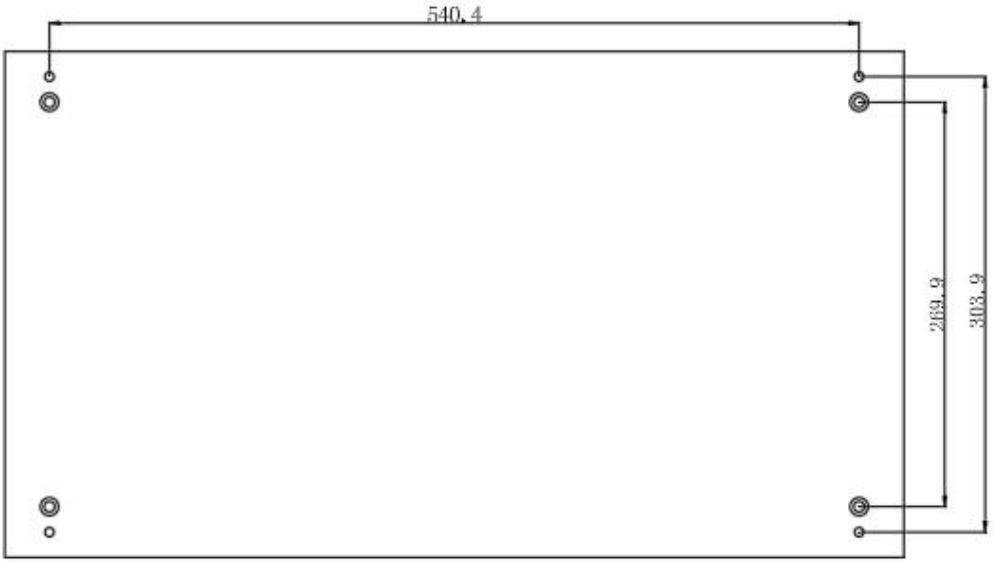



## 墨玉箱体 Black Jade series



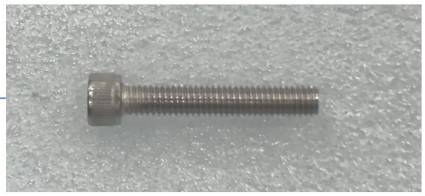
采用钢结构安装时使用

**It is used when it is installed with steel structure**

金刚箱体二代 The second transformers series

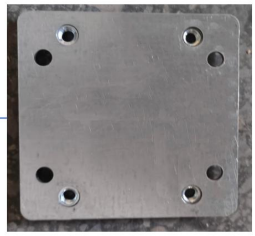
箱体侧边连接螺丝 M6*20mm

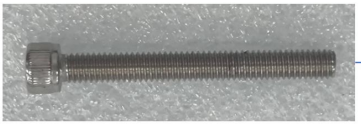
Side connection screws M6*20mm



后安装连接片

Install the connecting piece at the rear





后安装连接片配套螺丝 M6*60mm

Install the matching screws of the connecting plate at the rear M6*60mm

青锋箱体 Qingfeng series

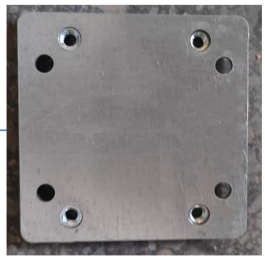
箱体侧边连接螺丝 M6*20mm

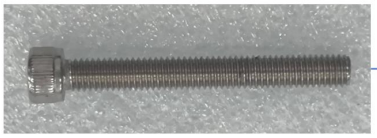
Side connection screws M6*20mm



后安装连接片

Install the connecting piece at the rear





后安装连接片配套螺丝 M6*60mm

Install the matching screws of the connecting plate at the rear M6*60mm

磐石箱体（F 款）

Monolith series-F




磐石箱体（D 款）

Monolith series-D




## 6.5 箱体安装 Mounting

首先采用 40×40 方钢搭建钢架结构，用水平尺调节钢架结构至水平（水平长 7m 内的平面度在±1mm 以内）；用铅锤对立柱进行垂直度的测量，确保钢架前端所有方钢面处于同一个平面上。

The 40×40 square steel is used to build the steel frame structure, and the steel frame

structure is adjusted to the horizontal with a level (the flatness within 7m of the horizontal length is within ±1mm). Measure the perpendicularity of the column with a plumb hammer to ensure that all square steel faces at the front end of the steel frame are on the same plane.

用箱体连接片将箱体拼接，从钢架结构中间放置第一个箱体，连接片紧贴钢架结构，扣上安装箱体方钢连接片，用 4-M6*12 螺栓（磐石与金刚通用）将箱体和连接片锁紧，然后向两侧逐个放置箱体，箱体之间通过定位销定位，用将快速锁紧机构锁紧， 保证相邻箱体间缝隙≤0.1mm，直至第一层箱体固定安装完毕，以此类推完成剩余箱体的安装。（墨玉箱体不使用后连接片）

The box is spliced with the box connecting piece, the first box is placed in the middle of the steel frame structure, and the connecting piece is close to the steel frame structure, the box is installed on the square steel connecting piece, the box and the connecting piece are locked with 4-M6*12 bolts（Transformers series and Monolith series）bolts, and then the box is placed on both sides one by one, the box is positioned by the positioning pin, and the fast locking mechanism is used to lock. Ensure that the gap between adjacent containers is less than or equal to 0.1mm. Install the remaining containers until the first layer of containers is installed.(Black Jade series  Do not use the rear connector)

### 6.6 箱体信号/电源连接 Signal/power Connection

注意此箱体拼接与其它箱体是完全不同的，箱体拼接时，电源线和信号线连接号好之后要将线材通过箱体之间的过孔置于箱体内部，供电需采用专门配备的 3×2.5mm$^2$ FV-LOCK 插头电源线，采用串接方式，当输入电压为 220V，串接箱体建议数量不超过 30 个；当输入电压为 110V 时，串接箱体建议数量不超过 15 个。

Note that the box splicing is completely different from other boxes,so when splicing the box, place the wire inside the box through the holes between the boxes after the power and network cables are connected. The specially equipped 3×2.5mm2 FV-LOCK power cable with plug is required for power supply, and is connected in series.When the input voltage is 220V, the recommended number of serial enclosures does not exceed 30; When the input voltage is 110V, the recommended number of serial cabinets is not more than 15.

箱体的信号连接采用专用配备的 STP 单屏蔽超五类信号线，串接箱体数量不超过发送卡的单网口最大带载点数。

The signal connection of the box adopts the specially equipped STP single-shielded super five signal cables, and the number of connected boxes does not exceed the maximum number of load points of the single network port of the sending card.

## 6.7 显示屏维护 Display Maintenance

箱体出现故障时可以进行前维护，前维护时必须使用专用的吸盘，操作时要求轻拿轻放，不得用力磕碰灯面，需特别留意防止拆装过程中模组跌落。

When the box is faulty, use a special sucker. Handle the sucker gently and do not knock the lamp surface with force. Pay special attention to prevent the module from falling in the course of disassembly and assembly.

将吸盘紧贴垂直于单元板表面，启动吸盘施力抽取，即可将单元板从箱体上分离。

The suction cup is pressed perpendicular to the surface of the unit plate, and the suction cup is used to extract the unit plate. Then the unit plate can be separated from the box.



## 6.8 显示屏安装注意事项 Installation Precautions

### 6.8.1 防水、防潮 Waterproof and Moisture-proof

电子设备被淋湿或严重受潮会引起短路甚至起火，引发故障甚至火灾，造成损失。要求屏体与建筑的结合部必须严格防水防漏，避开通水管路。

If the electronic equipment is wet or severely damp, it can cause short circuit or even fire. Then it will cause trouble or even fire. It is a big loss.The joint of the screen body and the building must be strictly waterproof and leak proof, and avoid the water pipeline.

### 6.8.2 通风、降温 Ventilation and cooling

显示屏工作时本身就要产生一定的热量，如果环境温度过高且散热不良，集成电路

可能工作不正常，甚至被烧毁，从而使显示系统无法正常工作。

The display itself generates a certain amount of heat when working. If the ambient temperature is too high and the heat dissipation is poor, the integrated circuit may not work properly or even be burned, so that the display system cannot work properly.

要求安装通风设备降温，使屏体内部温度在-10℃～50℃之间。屏体背后上方安装温控风扇排出热量。

Ventilation equipment is required to be installed to cool the internal temperature of the screen body between -10 ° C and 50 ° C. A temperature-controlled fan is installed behind and above the screen body to expel heat.

不易维修、维护的安装方式建议安装远程监控保护设施。

Remote monitoring and protection devices are recommended if the installation mode is not easy to repair or maintain.

**6.8.3 软件安装 Software installation**

显示屏控制和节目制作软件，与软件使用说明书，从控制系统官方网站下载。按照软件使用说明书安装和使用软件，对软件使用有疑问请与我公司售后服务咨询或与控制系统厂商售后服务咨询。

Display control and program production software, with software instructions, downloaded from the official website of the control system. Install and use the software according to the software instruction manual. If you have any questions about the software use, please contact our company for after-sales service consultation in our company or the control system manufacturer.

控制系统使用的接收卡程序，从随货 U 盘下载。不同的模组驱动 IC，可能需要不同版本的控制和节目制作软件，也可能需要将接收卡固件升级到指定的版本。控制和节目制作软件及接收卡固件版本不正确，会导致显示不正常， 或性能不能调试到理想状态。具体要求请咨询高科视像售后服务电话。

The control system's receiver card software is downloaded from the accompanying USB drive. Different module driver ICs may require different versions of control and program production software, or necessitate firmware upgrades to specified versions. Inaccurate versions of control/program production software or receiver card firmware can lead to display anomalies or performance issues that cannot be properly resolved. For specific requirements,

please contact Gaokexiang's after-sales service hotline.

## 7. 安全要求 Safety requirement

### 7.1 单元板使用安全要求 Installation requirements for ESD prevention

#### 7.1.1 安装静电防护要求

COB 单元板使用过程要严格注意静电防护，接触模组人员必须佩戴有接地的静电手环或静电手套。

Pay attention to ESD protection when using the COB module. The person who touches the module must wear a grounded ESD bracelet or ESD gloves.

#### 7.1.2 安装接地要求 Grounding requirements for installation

为防止雷击或浪涌损坏芯片，模组装配过程中，各种电动工具必须良好接地，箱体中的开关电源外壳、屏体等要求正确接地（与强电地必须分开）。

To prevent the chip from being damaged by lightning or surge, all power tools must be properly grounded during module assembly. The switching power supply shell and screen body in the box must be properly grounded (separated from the strong electric ground).

#### 7.1.3 单元板清洁要求 Unit board cleaning requirements

清洁单元板要求使用干净的软碎布蘸取酒精轻轻擦拭模组表面，不可使用作用未知的化学液体擦拭，以免损坏或腐蚀单元板灯面胶体。清洁后，待模组表面完全晾干再通电使用显示屏。

To clean the unit board, you should use a clean soft cloth dipped in water to gently wipe the module surface. Do not use chemical liquids with unknown effects to wipe, in order to avoid damage or corrosion of the colloid on the lamp surface of the unit board. After cleaning, let the module surface completely dry before using the display.

#### 7.1.4 维修要求 Maintenance requirement

COB 单元板出现故障需返厂维修。The COB unit board is faulty and needs to be returned to the factory for maintenance.

### 7.1.5 防止磕碰要求 Knock prevention requirements

COB 单元板四角与边缘均采用泡沫棉防护，运输过程中严禁用力摔、推、挤、压包装，搬运需轻拿轻放，防止跌落挤压；在拆开安装过程中需轻拿轻放，严禁跌落磕碰，以免发生套件破裂、刮伤边缘像素、胶面脱落、胶面破损、元器件脱落等问题。

The four corners and edges of the COB unit board are protected by foam cotton. During transportation, it is strictly prohibited to throw, push, squeeze or press the packaging. Handling should be handled gently to prevent falling and squeezing. In the process of disassembly and installation, it is necessary to handle gently. It is strictly prohibited to fall and knock, so as to avoid problems such as kit cracking, scraping edge pixels, rubber surface falling off, rubber surface damage, components falling off and so on.

## 7.2 显示屏使用安全要求 Display safety requirements

### 7.2.1 环境温度要求 Ambient temperature requirement

为保证显示屏工作稳定与达到设计的使用寿命，要求 COB 单元板工作时的表面温度<85℃，显示屏体内部空气温度<50℃。根据显示屏实际工作环境，采取必要的冷却措施，如增加抽、排风扇形成散热风道或安装空调制冷。

In order to ensure the stability of the display and achieve the designed service life, the surface temperature of the COB unit plate is required to work below 85℃, and the air temperature inside the display body below 50℃. Take necessary cooling measures based on the actual operating environment of the display, for example, adding pumping and exhaust fans to form heat dissipation ducts or installing air conditioners to cool the display.

### 7.2.2 显示内容要求 Display content requirement

为避免出现局部亮度严重衰减或死灯，使显示屏达到设计使用寿命，不可长期显示静止画面或静止文字，必须播放滚动画面或文字。

In order to avoid severe attenuation of local brightness or the death camp. You must play rolling pictures or text instead of displaying static pictures or static text for a long time,.so that the display screen can reach the designed service life.

### 7.2.3 电源连接要求 Power connection requirements

必须使用显示屏专用开关电源，单个开关电源连接的多个模组的总电流，不可超过电源额定最大输出电流的 80%。连接模组与电源的导线需要使用优质铜导线，并保证模组电源座处电压 U 范围为 U±0.2V。

The dedicated switching power supply for the display must be used. The total current of multiple modules connected to a single switching power supply cannot exceed 80% of the rated maximum output current of the power supply. You should use high-quality copper wires to connect the module to the power supply, and ensure that the voltage U at the power base of the module is within the range of U±0.2V.

连接电源时，必须注意模组电源座与开关电源输出端正负极对应，如果正负极接反模组会被烧毁,甚至发生火灾。

When connecting the power supply, it must be noted that the module power base corresponds to the positive and negative terminals of the switching power supply. If the positive and negative terminals are reversely connected, it will be burned, or even fire.

模组不得连接交流 220V，会造成模组立即烧毁。

Modules shall not be connected to AC 220V, which will cause the modules to burn immediately.

电源接线时需确保模组插头、插座连接可靠，开关电源电源座接线端螺钉拧紧。插头、插座和螺钉松动会导致接触电阻增大引起烧线或产品损坏问题。

When connecting power cables, you should ensure that the module plug and socket are connected reliably, and the screw at the terminal of the power socket of the switching power supply is tightened. Loose plugs, sockets, and screws can increase contact resistance and cause wire burning or product damage.

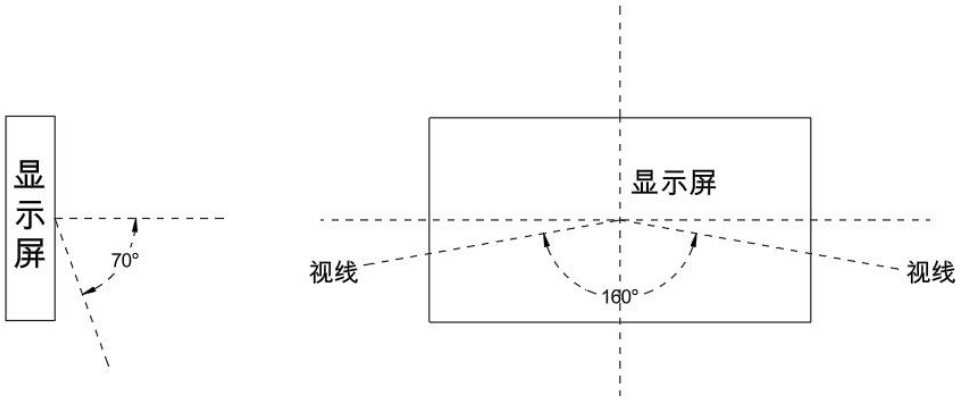
## 7.3 整屏验收要求及方法 Full screen acceptance requirements and methods

### 7.3.1 显示屏亮度验收 Screen brightness acceptance

将显示屏调成全亮状态，5 分钟内使用亮度计完成显示屏亮度测量。测量亮度时，要求亮度计光轴垂直于屏体。调整亮度计与显示屏距离，确保让亮度计目镜内黑色圆点或圆圈覆盖 16 个以上像素点，调整焦距使目镜内可清晰看到 LED 灯珠，然后测量并

读取亮度数据。可视角度验收如下图，在屏体左右 80°位置，和显示屏下视角 70°位置观看，要求屏体无明显黑斑、无明显暗块现象。

Turn the display to the bright state and use the luminance meter to measure the brightness of the display within 5 minutes. When measuring brightness, the optical axis of luminance meter should be perpendicular to the screen.Adjust the distance between the luminance meter and the display screen,you should ensure that the black dots or circles in the eyepiece of the luminance meter cover more than 16 pixels. Adjust the focal length so that the LED beads can be clearly seen in the eyepiece, and then measure and read the brightness data. Viewing Angle acceptance as shown in the figure below. Viewing Angle at 80° around the screen body and 70° under the display screen should be observed without obvious black spots or dark patches.




### 7.3.2 接地检查 Grounding check

开关电源外壳、箱体、显示屏外框必须良好接地，要求接地电阻≤10 欧，每半年检查一次接地电阻。

The shell, enclosure, and display frame of the switching power supply must be well grounded. The grounding resistance must be less than or equal to 10 ohms. Check the grounding resistance once every six months.

### 7.3.3 防雷设施检查 Check lightning protection facilities

要求 LED 显示屏可靠接地，要求配电箱有配浪涌保护器，对避雷设施，每半年进行一次检查。雷雨天气应避免使用显示屏。

The LED display should be grounded reliably, the distribution box should be equipped

with a surge protector, and the lightning protection facilities should be inspected every six months. Avoid using the display screen in a thunderstorm.

### 7.4 防烧屏操作要求标准操作 Burn screen operation requires standard operation

整屏断电情况下连接信号排线和电源线，检查连接良好后再给整屏上电，发现显示不良立即整屏断电，整改接线后再整屏上电检验。

If the whole screen is powered off, you should connect the signal bar and the power cable, and power on the whole screen after checking that the connection is good. If the display is not good, power off the whole screen immediately, rectify the cable connection, and power on the whole screen again.

#### 7.4.1 带电安装操作 Live installation operate

需要带电安装时，必须按以下顺序操作：先接信号输入排线，再接信号输出排线，最后接模组电源插头。模组必须逐张安装调试，不得连续安装多张显示不正常模组后再调试。

When live installation is required, it must be performed in the following order: first connect the signal input bar, then the signal output bar, and finally connect the module power plug. Modules must be installed and debugged one by one, not after installing multiple modules with abnormal display.

#### 7.4.2 整屏使用中显示不正常处理 Display is abnormal in use

用户在使用过程中发现显示不正常，特别是有整行高亮现象，立即整屏断电后检修，避免在此情况下长时间供电。When users find the display is abnormal in the process of use, especially the whole line of highlighting phenomenon, they should immediately repair the whole screen after cutting up the electricity, so as to avoid power supply for a long time in this case.

## 8. 声明：Declaration

| |
|---|
| 警告：在居住环境中，运行此设备可能会造成无线电干扰。<br>Warning: In a residential environment, running this device may cause radio interference. |