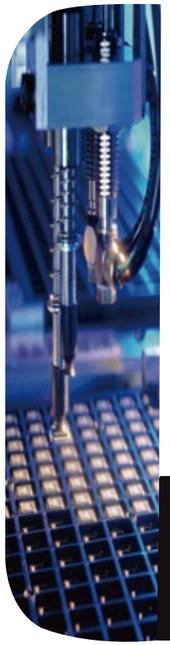
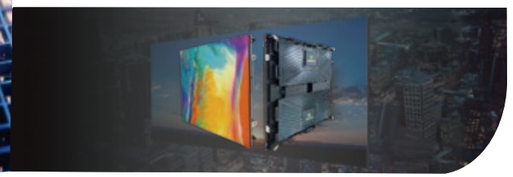
依鲁光电



LED SMALL PITCH
HIGH-DEFINITION DISPLAY SCREEN PRODUCT MANUAL AND APPLICATION EXAMPLES





— SHOW THE WORLD WITH WISDOM —

依鲁光电

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SHANDONG ELU PHOTOELECTRIC TECHNOLOGY CO., LTD.



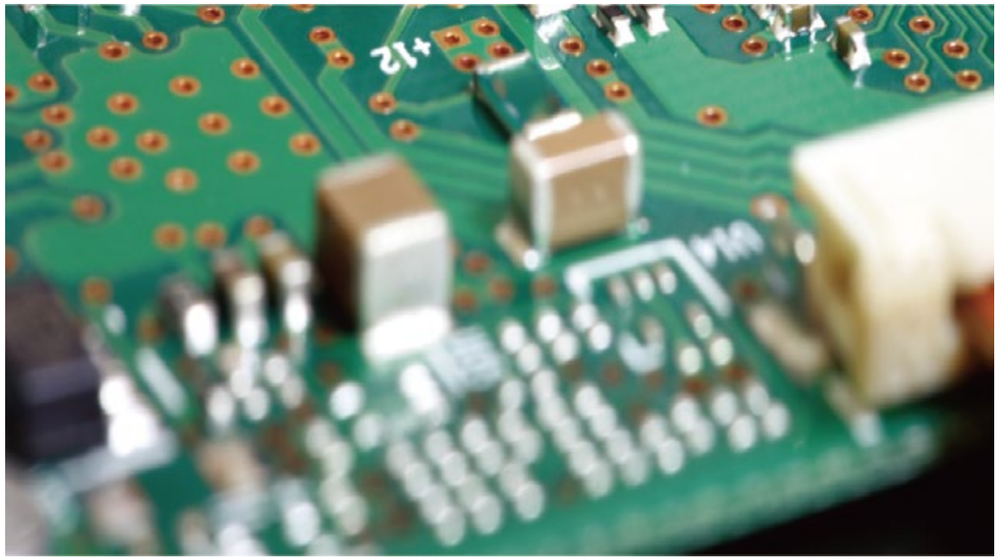
COMPANY INTRODUCTION

Shandong Elu Photoelectric Technology Co., Ltd. is located in Qingdao, a city with red-tiled roofs, green trees, blue seas, and clear skies, with its headquarters in the Tian'an Digital City in the core area of Chengyang District. For 27 years since its establishment, the company has focused on developing and manufacturing LED displays and their control systems based on cutting-edge technologies such as advanced electronics, control, software, and intelligence. It provides comprehensive solutions for LED display systems tailored to various scenarios. Supporting customization, from demand analysis and solution design to production and delivery, we offer customized product services for special models, ensuring perfect alignment with clients' application scenarios and requirements.

In recent years, we have accelerated the deep integration of our company's products with 5G communication technology, cloud data, modern artificial intelligence, and information technology. Significant progress has been made in the fields of information integration and empowerment within application scenarios centered around our core products. We possess strong technical capabilities and extensive project experience in cluster management and intelligent control of outdoor LED displays, as well as in energy-saving and protection technologies. Our services primarily cater to public institutions, large enterprises, and SMEs, covering areas such as smart transportation, outdoor electronic media, big data centers, digital exhibition halls, smart cities, and smart cultural tourism. The company is an innovative high-tech enterprise, recognized as both a "High-Tech Enterprise" and a "Specialized and Innovative Enterprise." It has obtained ISO 9001 Quality Management System certification, as well as product quality certifications like "3C, " "CE," and "RoHS." Additionally, it has been awarded the "China Green Energy-Saving Product" certification, is a well-known trademark in Qingdao, a Shandong brand, and serves as the Qingdao LED Optoelectronic Display Application Technology Innovation Center

Partnering with outdoor display expert workstation hosting units, the company boasts tens of thousands of successful cases and provides services to thousands of users across China and some overseas countries with its unique products and technologies.

Innovation









As a high-tech enterprise, Elu Photoelectric has established a strategic plan to drive company growth through technological innovation since its inception. The company serves as the Qingdao LED Optoelectronic Display Application Technology Innovation Center, which includes the Electronic and Electrical R&D Department, Software R&D Department, Structural Design Department, and Laboratory. Equipped with various advanced testing and experimental instruments, the center provides an excellent R&D and innovation platform for specialized high-end talents in software design, hardware circuit design, process design, inspection and testing, structural design, and project planning.

Meanwhile, the R&D center has established industry-academia-research collaboration bases with multiple universities and research institutes, as well as a municipal-level expert workstation, focusing primarily on LED display technology and intelligent control technology. Since its inception, the R&D center has adopted a forward-looking market-oriented approach, leveraging its unique strengths to achieve significant scientific and technological advancements in areas such as technical breakthroughs and innovation. It has secured dozens of original intellectual property rights, including national invention patents, utility model patents, and software copyrights.

Implementation

Elu Photoelectric has professional engineering construction capabilities and on-site implementation solution capabilities, as well as construction labor resources

With a quality and safety production license, the company has a construction and design team with solid business foundation, skilled technology, excellent professionalism, and years of construction and installation experience. It is composed of several construction design backbones who have grown together with the company, leading a group of young engineering and technical personnel. Their construction footprint covers various regional markets in China and overseas markets,

The total installed screen quantity of LED electronic screens at home and abroad exceeds 30000, which has been widely praised by people from all walks of life and trusted by users.



Production






Excellent talent resources and advanced equipment resources: Elu Photoelectric deeply understands the imp ortance of talent for enterprise development, especially in the production of high-precision and cutting-edg e products. Therefore, it has been striving to build a broad development platform for employees, focusing on cultivating their professional and technical abilities. Gradually, it has cultivated a group of technically out standing, hardworking, and dedicated technical backbone and excellent employees, effectively ensuring the speed of technological innovation iteration, product quality, and production efficiency, and ensuring the ef ficiency of delivering products on time or even ahead of schedule.

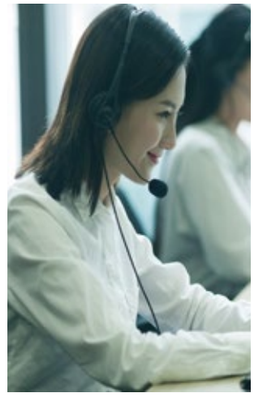
Elu Photoelectric has gradually introduced and built an automatic production line for high-end LED display screens. We have a series of professional automatic production equipment, including high-speed SMT surfa ce mount machines, reflow soldering machines, wave soldering machines, lamp tube corner cutting machin es, computer wire stripping machines, automatic printing machines, glue filling machines, automatic LED ve rtical plug-in machines, spiral air compressors, fully automatic soldering robots, automatic screw machines, automatic spraying machines, automatic cutting machines, as well as testing and inspection equipment suc h as light guns, high and low temperature experimental cabinets, photoelectric testers, oscilloscopes, volta ge testers, signal generators, etc. Our annual LED display screen production capacity reaches 30000 square meters. In terms of production management, Yilu Optoelectronics strictly implements the ISO 9001 quality management system. Its products have passed CCC certification, CE certification, ROHS certification, and tr ansportation products have been tested and issued batch production licenses by the Ministry of Transport a nd the Ministry of Public Security. The LED display series products have been awarded the title of "Shandon g Famous Brand" and China Energy saving Product Certification.

Service

The LED display industry is a scenario based customization and empowerment industry. After the pre-sales consultants and business personnel of Elu Photoelectric have a preliminary understanding and communication with customers' needs and product (or project) uses, the R&D center develops targeted software and hardware technology designs based on customer needs, provides reasonable and professional product purchase or project construction suggestions for customers, and after reaching a consensus with customers, cooperates with professional technical personnel to conduct on-site investigation and research, and effectively communicates with customers again. Based on the specific situation on site, a reasonable and in line with customer expectations proposal is designed.

We have ITSS operation and maintenance service qualifications. We have established a smart operation and maintenance system through smart IoT, which enables automatic fault feedback, rapid personnel response, timely resolution, user training, and timely follow-up. This is our requirement for after-sales engineers and a strong guarantee for customers. Based on these advantages, Elu Photoelectric will comprehensively enhance its brand, strengthen innovation, and improve services in the future, laying a solid foundation for becoming a leading first-class optoelectronic enterprise in China.






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Qualifications





























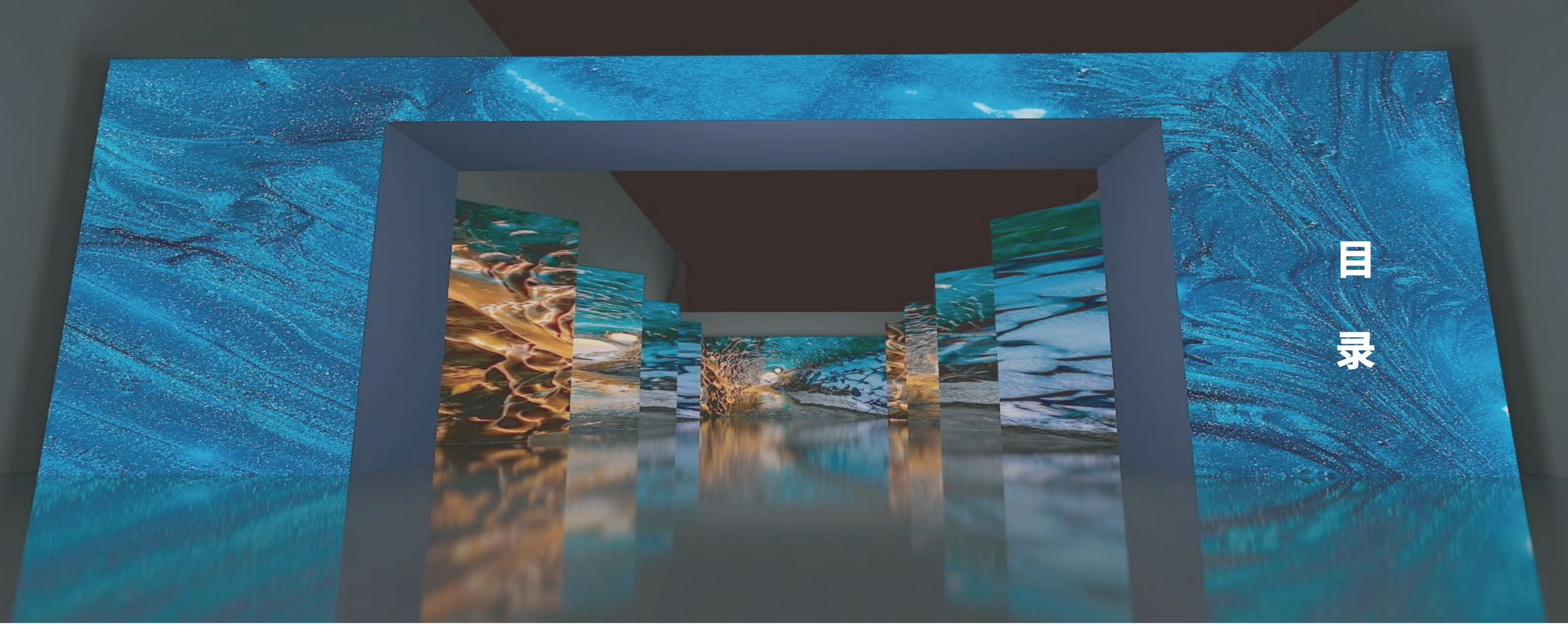












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LED Display Products





1. Indoor Fine-Pitch LED Displays

COB Fine-Pitch High-Definition LED Displays



COB stands for Chip On Board, meaning chip-on-board integrated packaging. The light-emitting chips are directly welded onto the PCB board using solid-state ultrasonic bonding technology, and then encapsulated with a high fill-factor packaging technique to form an integrated packaging structure. This protects the light-emitting chips with zero contact to the external environment, providing enhanced stability, saving space, and enabling smaller pixel pitches.









MODEL

EL-PH0.7SN-COB EL-PH0.9SN-COB EL-PH1.2SN-COB

Parameter	P0.78	Parameter	P0.9375	Parameter	P1.25
Pixel Pitch	P0.78	Pixel Pitch	P0.9375	Pixel Pitch	P1.25
Surface Finish	Matte / Anti-Glare	Surface Finish	Matte / Anti-Glare	Surface Finish	Matte / Anti-Glare
Circuit Solution	Full Flip-Chip Common Cathode	Circuit Solution	Full Flip-Chip Common Cathode	Circuit Solution	Full Flip-Chip Common Cathode
Display Unit Size	27" (600×337.5×39mm)	Display Unit Size	27" (600×337.5×39mm)	Display Unit Size	27" (600×337.5×39mm)
Display Unit Resolution	768×432	Display Unit Resolution	640×360	Display Unit Resolution	480×270
Weight	5.6kg	Weight	5.6kg	Weight	5.6kg
Contrast Ratio	1,000,000:1	Contrast Ratio	1,000,000:1	Contrast Ratio	1,000,000:1
Peak Power Consumption	<400W/m²	Peak Power Consumption	<400W/m²	Peak Power Consumption	<400W/m²
Average Power Consumption	<130W/m²	Average Power Consumption	<130W/m²	Average Power Consumption	<130W/m²
Pixel Density	1,638,400 dots/m²	Pixel Density	1,137,777 dots/m²	Pixel Density	640,000 dots/m²
Frame Rate	>60 fps	Frame Rate	>60 fps	Frame Rate	>60 fps
Refresh Rate	3840Hz	Refresh Rate	3840Hz	Refresh Rate	3840Hz
IP Rating	IP65	IP Rating	IP65	IP Rating	IP65
Grayscale	18-bit	Grayscale	18-bit	Grayscale	18-bit
Brightness Adjustment Range	0 – 1000 nits	Brightness Adjustment Range	0 – 1000 nits	Brightness Adjustment Range	0 – 1000 nits
Power Supply	50/60Hz, 100V – 240V	Power Supply	50/60Hz, 100V – 240V	Power Supply	50/60Hz, 100V – 240V
Operating Temperature	– 20°C ~ +50°C	Operating Temperature	– 20°C ~ +50°C	Operating Temperature	– 20°C ~ +50°C
Operating Humidity	10% – 90% RH	Operating Humidity	10% – 90% RH	Operating Humidity	10% – 90% RH
Viewing Angle	H:175°, V:175°	Viewing Angle	H:175°, V:175°	Viewing Angle	H:175°, V:175°



Elu Photoelectric COB fine-pitch LED displays offer the following advantages:

1. Smaller pixel pitch and higher resolution.
2. High reliability, superior protection, and strong environmental adaptability.
3. Eye-friendly and healthy – no eye strain.
4. High cost-performance ratio and excellent energy efficiency.
5. Repairable.
6. High contrast ratio, with low-brightness high-grayscale and high-refresh-rate performance.
7. Touch-enabled, supports 3D functionality, and complies with high-definition video standards.





Leading Thermal Design

The display modules are directly fixed to the die-cast aluminum cabinet without any plastic intermediate components. Compared with conventional displays, this design offers higher thermal conduction efficiency and faster, more effective heat dissipation. The cabinet incorporates high-efficiency, ultra-thin PFC switching power supplies with a fanless, zero-noise design.

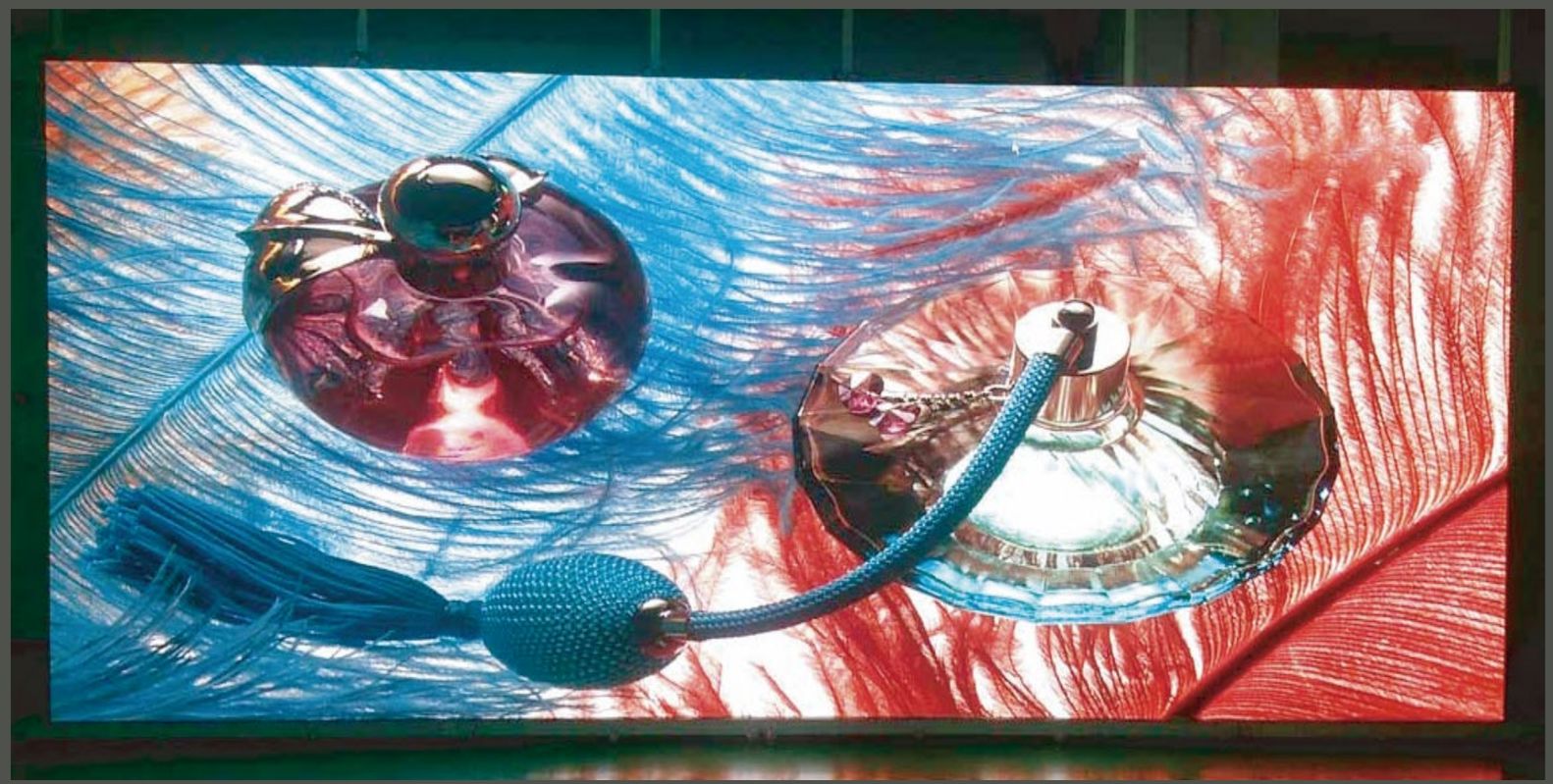


Reliable Structural Design

Adopting a bracket-free design, the display modules are directly fixed to the high-performance thermally conductive aluminum-magnesium alloy cabinet, ensuring rapid heat transfer, low temperature rise, and extended display lifespan. The cabinet base features a patented pulley structure that distributes expansion coefficients, reducing compression damage to light-emitting chips caused by thermal expansion.



SMD Fine-Pitch High-Definition LED Displays







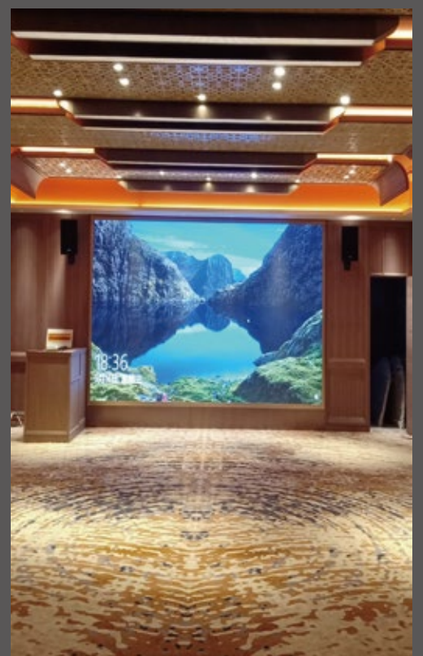


Product Introduction

Primarily used for indoor high-definition display installation, this is a patented upgrade and replacement product for die-cast aluminum cabinets.

1. Specially customized and designed extruded aluminum profiles.
2. Sturdy yet lightweight frame structure.
3. Customizable dimensions and shapes.
4. Specially designed high-strength positioning support back strips.
5. Convenient installation and maintenance of power supplies and control systems; uniform panel fitting with no gaps and excellent flatness consistency.











Product Parameters

Product Model	EL-PH0.9-SN	EL-PH1.25-SN	EL-PH1.37-SN	EL-PH1.53-SN
Pixel Pitch (mm)	0.9	1.25	1.37	1.53
Pixel Density (dots/m²)	1,137,778	640,000	525,625	422,500
Module Size (mm)	300×168.75	320×160	320×160	320×160
Module Resolution (dots)	320×180	256×128	232×116	208×104
Average Cabinet Power (W/m²)	≤300			
Pixel Configuration	1R1G1B			
Brightness (cd/m²)	≥600			
Viewing Angle	Horizontal ≥160°, Vertical ≥140°			
Drive Mode	Constant-Current Drive			
Refresh Rate (Hz)	≥3840			
Operating Temperature & Humidity	–10°C to +40°C, 10% – 90% RH (non-condensing)			

Product Parameters

Product Model	EL-PH1.66-SN	EL-PH1.86-SN	EL-PH2-SN	EL-PH2.5-SN
Pixel Pitch (mm)	1.66	1.86	2	2.5
Pixel Density (dots/m²)	360,000	288,906	250,000	160,000
Module Size (mm)	320×160	320×160	320×160	320×160
Module Resolution (dots)	192×96	172×86	160×80	128×64
Average Cabinet Power (W/m²)	≤300			
Pixel Configuration	1R1G1B			
Brightness (cd/m²)	≥600			
Viewing Angle	Horizontal ≥160°, Vertical ≥140°			
Drive Mode	Constant-Current Drive			
Refresh Rate (Hz)	≥3840			
Operating Temperature & Humidity	–10°C to +40°C, 10% – 90% RH (non-condensing)			

Indoor Creative LED Displays

The perfect combination of creativity and LED



An LED creative display is a new type of display device that uses LED lamp beads to form display panels of various shapes and sizes, and achieves multimedia content playback and interactive functions through a control system.







Product Advantages

1. High Brightness: The brightness of LED creative displays can reach up to 1000 cd/m², enabling normal operation under more intense lighting conditions, with excellent resistance to direct sunlight and strong anti-glare performance.
2. Vivid Colors: LED creative displays utilize high-quality LED lamp beads and driver chips, delivering high color reproduction accuracy.

3. Clear Image Quality: LED creative displays can achieve resolutions up to 4K, whereas traditional projectors typically only reach 1080P. As a result, LED creative displays deliver more detailed and lifelike visuals, ensuring that text, images, video, and animation are all clearly visible.
4. Rich Interactivity: LED creative displays not only play static or dynamic content but also support various interactive functions, such as touch control.

5. Flexible Sizing:
The dimensions of LED creative displays can be customized according to exhibition hall space and design requirements. Whether for large-scale walls, ceilings, or floors, or for smaller counters, desktops, or windows, LED creative displays can be installed and spliced into various shapes and angles—such as circular, curved, or wavy configurations—breaking the planar limitations of traditional display methods.











2. Outdoor LED Displays

Through-Hole Energy-Saving Full-Color LED Display



Product Features:

1. Brightness reaches up to 8,000 cd/m² or higher, ensuring crystal-clear image quality even under direct sunlight.
2. Average power consumption <100W/m², delivering excellent energy efficiency.
3. Low-current drive technology slows down the degradation of light-emitting chips, extending service life.
4. No additional auxiliary cooling equipment (such as air conditioning) is required.
5. Reduces upfront investment in cables and power capacity upgrades, as well as ongoing operational costs.















Outdoor Fine-Pitch SMD High-Definition Series

Product Advantages:

1. Uniform display color with a contrast ratio of up to 8000:1, delivering more vivid, clearer, and truer-to-life images.
2. Supports diverse installation methods including floor-standing, wall-mounted, and embedded mounting.
3. Self-developed cabinet with outstanding heat dissipation performance. Protection rating up to IP65, with superior waterproof and dustproof capabilities.
4. Ultra-high refresh rate ensures smooth, seamless, and natural motion graphics.
5. Supports loop communication backup, offering high communication reliability and strong disaster tolerance; employs pixel-by-pixel correction technology for excellent brightness and chromaticity consistency.
6. Self-driven heat dissipation – based on the company's proprietary self-driven heat-dissipating screen structure technology, eliminating the need for expensive air conditioning cooling and reducing costs.
7. Energy-saving technology – centered around the screen environment monitoring and control system, and through optimized power supply and display module design, Elu Photoelectric's energy-saving HD displays achieve over 20% energy savings compared to conventional displays.

Elu Photoelectric's outdoor high-definition LED display product series utilizes high-density, fine-pitch SMD packaged LEDs as the display panel. It supports seamless whole-screen splicing and enables display systems of arbitrary shapes through splicing in any direction and dimension. The standard display size design ensures that images are displayed without compression, delivering clear, true-to-life visuals with perfect visual effects.

The self-flowing frame structure technology and screen environment monitoring and control technology (patented) designed specifically for outdoor screens make the display more energy-efficient, intelligent, and stable. The series fully meets the diverse application needs of outdoor advertising, sports venues, electronic bulletin boards, electronic curtain walls, urban lighting, and many other fields. Representing the latest direction in outdoor display technology, it leads the development trend of outdoor display solutions with its outstanding performance.



Self-developed patented cabinet design featuring high strength, strong toughness, high precision, and resistance to deformation. With a thickness of <80mm, it offers excellent heat dissipation and waterproof performance.



Product Parameters

Product Model	EL-PH2-SW	EL-PH2.5-SW	EL-PH3-SW	EL-PH4-SW
Pixel Pitch (mm)	2	2.5	3	4
Pixel Density (dots/m²)	250,000	160,000	111,111	62,500
Module Size (mm)	320×160	320×160	192×192	320×160
Module Resolution (dots)	160×80	128×64	64×64	80×40
Average Cabinet Power (W/m²)	≤300			
Pixel Configuration	1R1G1B(Full Color)			
Brightness (cd/m²)	≥4500			
Viewing Angle	≥140°			
Drive Mode	Constant-Current Drive			
Refresh Rate (Hz)	≥3840			
Operating Temperature & Humidity	–40°C to +80°C, 10% – 80%RH (non-condensing)			



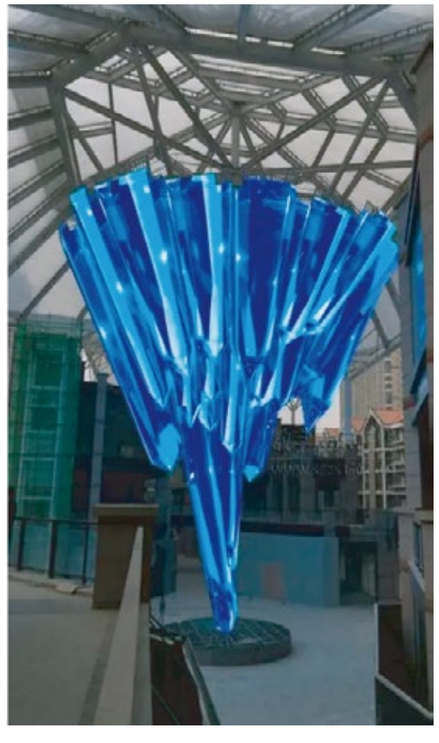
Outdoor Creative LED Displays

Outdoor creative display screen



LED displays offer high definition, high brightness, vivid colors, distinctive themes, and innovative designs, featuring lively imagery, simplicity, and synchronized playback of text, graphics, audio, and video. Elu Photoelectric's meticulously designed and manufactured outdoor high-definition LED display products utilize high-quality LED tubes as the primary light-emitting components. With thoughtful human-centric design, a powerful display and control system, and stunning visual imagery, they demonstrate display quality at an internationally advanced level. They serve as ideal advertising display terminals integrating text, images, 3D animation, and more.



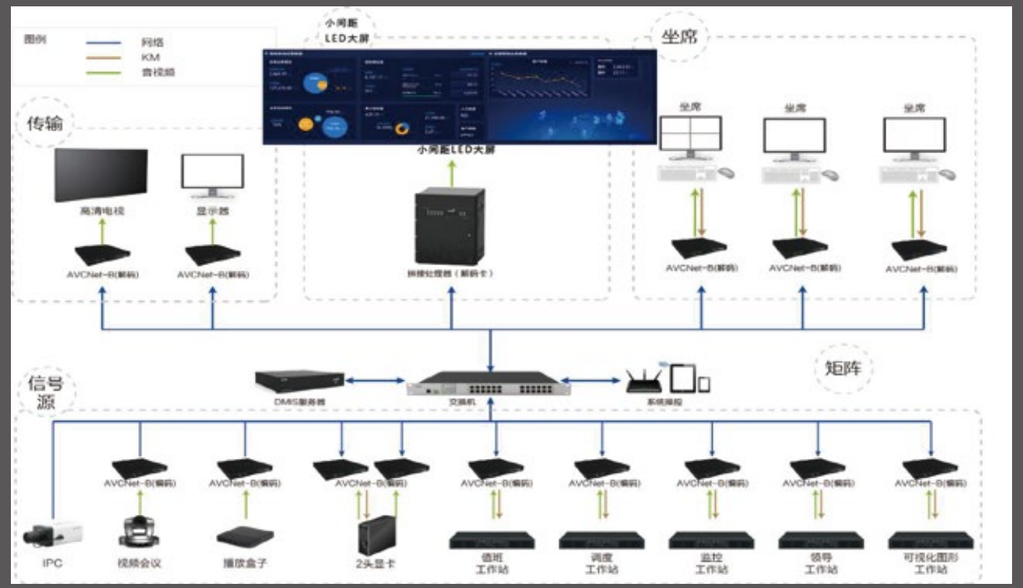






Scenario-Enabled LED Display Systems

Command and Control (Emergency Dispatch) Center / Big Data and Monitoring Center – with Case Studies









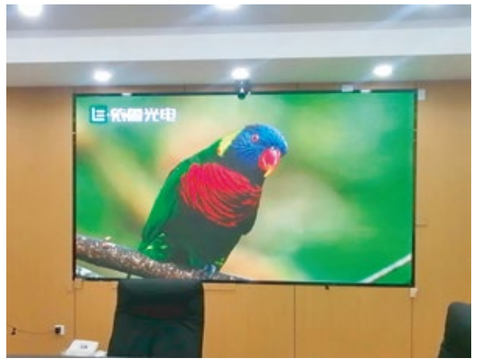
Product Introduction

Elu Photoelectric has developed an integrated solution for government departments, comprising a gridded full-color LED display, control system, and conference system. The display utilizes indoor high-definition fine-pitch LED screens, paired with a touch-control LED system, enabling analog and digital video signal switching, video image behavior analysis, video encoding/decoding, centralized management and storage of compressed video data, real-time network preview, logging, user and permission management, and device maintenance functions—all in one. It supports full-screen touch interaction on the LED display for presenting operations and maintenance data, courseware demonstrations, on-screen annotations, and more.

High-End Conference Rooms, Auditoriums, Academic Centers, Multi-Function Halls – with Case Studies









Leveraging years of software and hardware R&D experience, Elu Photoelectric has launched specially customized high-end LED products. The Black Beauty Smart Board is based on fine-pitch LED displays, integrating human-machine interactive intelligent technology into LED display systems, and offers customized R&D, production, and services tailored to specific user requirements. The company has successively introduced the LED intelligent conference system electronic blackboard, intelligent teaching system electronic blackboard, and the Black Beauty Smart Board, applying computer, LED display, and intelligent interactive technologies to innovative models for conference and teaching presentation systems, effectively addressing the numerous challenges inherent in traditional conference and teaching environments.





Exhibition Halls, Reception Halls, Museums, Planning Exhibition Halls – with Case Studies



















A good exhibition hall leaves the audience with a clear and strong impression. Simplicity and clarity are the best ways to attract visitors—photos, charts , and textual descriptions should be clear and concise. Given the limited floor area of exhibition halls, it is essential to present rich content within a confined space while also conveying the dynamic nature of the displayed material.

Therefore, the use of large-screen projection to play high-quality corporate promotional videos delivers a powerful audio-visual impact to visitors, allowing them to experience the company's strong capabilities, growth momentum, and promising vision. Elu Photoelectric's high-definition indoor fine-pitch full-color LED displays, designed for exhibition halls, reception halls, museums, and planning exhibition halls, are paired with touch-control LED systems and integrated with human-machine interactive intelligent technology.











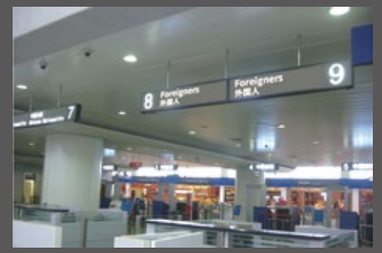


Civic Center Administrative Service Halls, Customs Declaration Halls – with Case Studies

The administrative office multimedia publishing and inquiry system helps build a comprehensive, multi-dimensional administrative information publishing and playback system, enabling centralized management and real-time updates of published information. It facilitates the timely dissemination of various types of information —such as administrative procedures, government news, promotional images, weather forecasts, and public notices—ensuring that publicly available government information is delivered to the public without delay.













Home Digital Media Centers – with Case Studies

The home digital media center is a newly designed digital, intelligent, and networked luxury entertainment home theater system developed by our company. The theater's core equipment is centered around a high-definition large LED display or a premium large-size LCD screen, complemented by high-fidelity amplifiers and speakers, media players, intelligent controllers, and other devices. It supports home entertainment (karaoke, cinema), as well as modern information services such as remote video conferencing, education, and telehealth.

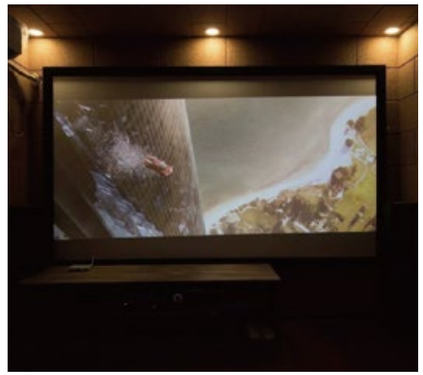














Sports Arenas and Stadiums – with Case Studies





Elu Photoelectric has developed comprehensive system solutions for large-scale electronic displays in sports venues, stage backdrops, commercial presentations, and similar applications. Through years of customer use and validation, the precise and responsive operating system, high-grade protection design, and weather-resistant manufacturing processes ensure superior stability and reliability of the LED display products.

With true-to-life color reproduction for live broadcasts, the system creates a vivid multimedia experience, clearly and promptly presenting real-time event footage and delivering a spectacular visual feast.

















Open Space Media

Outdoor media can be further categorized based on the materials used, including flat outdoor signage such as copper letters, iron letters, acrylic letters, solid wood plaques, neon lights, corporate image sculptures in public spaces, LED outdoor electronic screens, outdoor LCD advertising machines, outdoor electronic newspaper kiosks, outdoor touch LCDs, and more. This represents the development trend of the advertising industry in the 21st century.

Electronic Bulletin Boards – with Case Studies







To disseminate various types of public information, it is necessary to install bulletin boards in prominent locations. With the advancement of electronic and information technology, the use of large LED display screens to replace traditional handwritten whiteboards or blackboards is an inevitable trend. LED displays are not only aesthetically pleasing and practical but can also show information such as weather forecasts, time, various service procedures, and welcome messages.











