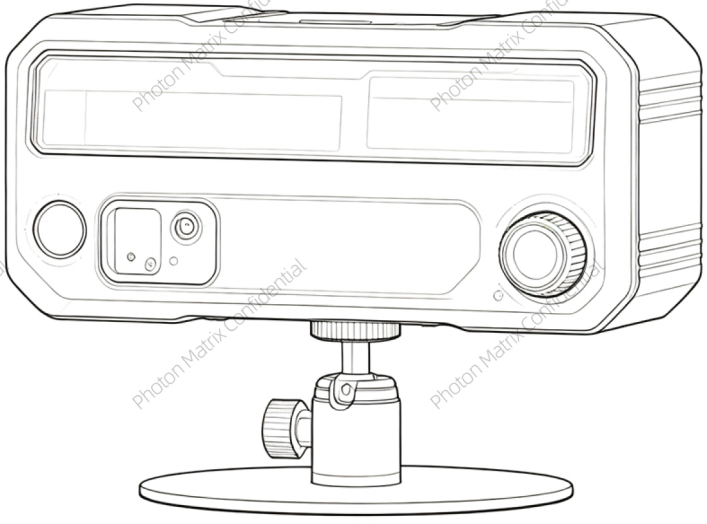
PHOTON MATRIX

Laser Mosquito Air Defense System

User Manual



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V1.4 | August 2026

PHOTON MATRIX
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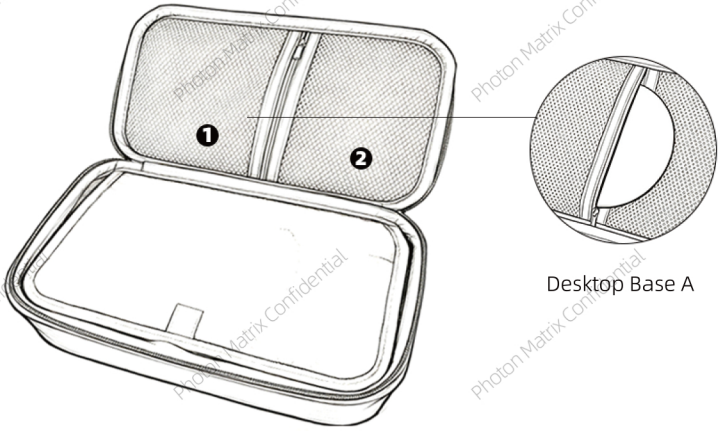
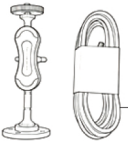
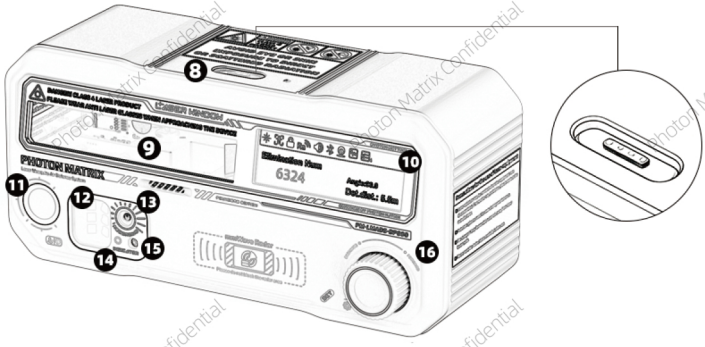


Desktop Base A

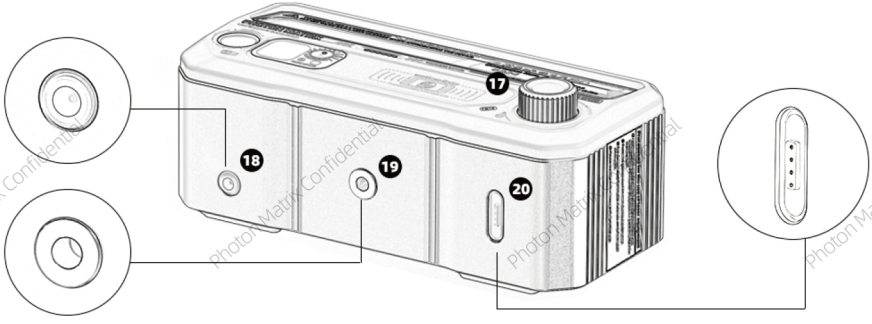
Desktop Base A+B



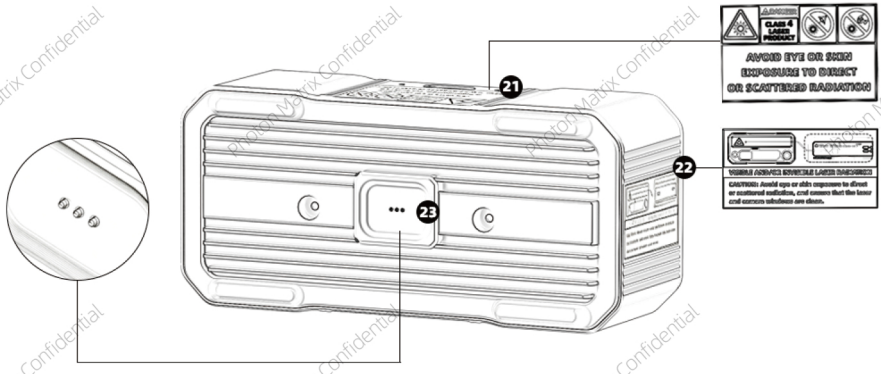
Fixed Bracket + DC Extension Cable 2M



[Front View]



[Base View]



[Rear View]

1 Safety Information

1.1 Safety Warnings

- The appliance is only to be used with the power supply unit provided with the appliance.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
- Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.

1.2 Laser Components

Component	Wavelength	Power	Pulse Width	Class	Function
LiDAR (ToF ranging)	905 nm	65W pulse	≤10 ms	Class 1	Background scanning, target ranging
Strike Laser (Infrared)	976 nm	150W pulse	≤10 ms	Class 4	Disable mosquito wings
Strike Laser (Blue)	450 nm	50-70W pulse	≤10 ms	Class 4	Disable mosquito wings
Indicator Laser (Infrared only)	Visible (Green)	≈0.3W	Continuous	Class 1/2	Beam path visualization, can be turned off

2 Product Overview

2.1 Introduction

Photon Matrix is the World's Frst Portable Laser Mosquito Air Defense System. It combines LiDAR + millimeter-wave radar + vision AI module for multi-layered detection, delivering high-power short-pulse laser strikes to precisely disable flying mosquitoes – chemical-free, nearly silent, suitable for both indoor and outdoor use. The device features multiple safety protection mech -anisms and smart control via a mobile app.

2.2 How It Works

① Target Detection Phase

The LiDAR galvanometer scans reciprocally within a horizontal 90° sector at a 6-meter radius. When a mosquito enters the scanning plane, the ranging value in that direction changes, and the system locks onto the target.

② Target Identification & Confirmation

The system performs multi-dimensional continuous sampling and identification on the target. Only when all characteristics match the preset parameters does the system consider the target valid and lock onto it.

③ Safety Condition Verification

mmWave radar confirms no person or large animal is in the scanning plane; visual recognition checks whether a person or animal is within range and whether the background meets require-ments, assisting in identifying flammable/explosive items or reflective objects such as glass.

④ Laser Strike

A high-power pulse laser (≤10ms) is fired, precisely disabling the mosquito's wings. The Infrared version includes a visible indicator laser; the Blue version produces a visible blue flash.

⑤ Recording & Logging

The device records each firing event. History and statistics can be viewed via the APP.

2.3 Package Contents

Item	Qty	Description
Photon Matrix Pro Main Unit (Blue/Infrared)	1	Main device
2m DC Extension Cable	1	Extends power supply range
Power Adapter	1	Select plug type (CN/EU/US/UK/AU)
Fixed Bracket	1	For wall/eave installation
Desktop Base	1	Assembly required; for flat surface placement
Storage Bag	1	For storing device and accessories
User Manual	1	Product introduction
Quick Start Guide	1	Instructions for quick use of the product

2.4 Optional Accessories

Accessory	Use	Illustration	Applicable Version
DC Extension Cable (3m/5m/10m)	Extend power supply range		Universal
Type-C to DC Adapter Cable	Power device via PD/QC fast-charge power bank		Universal
Rotating Base	Magnetic interface: enables 360° planar rotation, recommended for outdoor use		Universal

3 Components & Interfaces

3.1 Main Components

Component	Function
LiDAR Module	905nm pulsed ranging; mosquito detection & tracking
High-Power Laser Module	Infrared 976nm / Blue 450nm; disables mosquito wings
Indicator Laser (Infrared only)	Display Infrared Laser Path
mmWave Radar	Person/large animal detection

Vision AI Module	Person/animal and environmental recognition
Fingerprint Module	User authentication

3.2 External Interfaces

Interface	Type	Function
Power Input	DC-022B	24V DC power supply
Safety Sensor Interface	Magnetic pogo pin	Connect external safety sensors
Expansion Interface	Magnetic pogo pin	Connect fill light and other accessories
Threaded Mount	1/4" (1/4"-20 UNC)	Compatible with desktop base, fixed mounting bracket, tripod,

4 Technical Specifications

Parameter	Specification
LiDAR	905nm / 65W pulse / Class 1
Strike Laser (infrared)	976nm / 150W pulse / Class 4
Strike Laser (Blue)	450nm / 50-70W pulse / Class 4
Scan Method	Galvanometer horizontal reciprocating scan， 90° sector
Effective Range	6-meter radius
Target Size	2-20mm
Person Detection	mmWave radar + vision module
Bluetooth / WiFi	BLE 5.0 / 2.4GHz 802.11 b/g/n/ac/ax
Input	100-240V AC (adapter)， 50/60Hz → 24V DC 1.2A / PD/QC power bank supported， need to use the original adapter cable.
Power Consumption	~20W
Dimensions	~200 × 92 × 88 mm
Weight	~1220 g
Ingress Protection	IP56 splash-resistant
Enclosure	Aluminum alloy + engineering plastic
Operating Temperature	0~40℃
Operating Humidity	40%-60% RH
Storage Temperature	-20-60℃

5 Quick Start

5.1 Installation Guidelines

- Scanning plane (90° horizontal sector) must have a clear field of view
- Recommended installation height: above head height (≥1.8m), so the scanning plane passes clearly above people's heads
- Avoid pointing toward windows, mirrors, polished metal, or other highly reflective surfaces
- Indoors: mount on wall, scanning fan facing main activity area
- Outdoors: install under eaves or in shaded areas
- Keep away from locations accessible to children and unauthorized persons

5.2 Installation Steps

Step 1: Check Package Integrity

Confirm all items are present and undamaged: main unit, power adapter, cables, mounting bracket, desktop base, quick start guide.

Step 2: Select Installation Location

Determine device orientation and installation height based on Section 5.1 guidelines.

Step 3: Mount the Bracket (Wall Installation)

Secure the fixed mounting bracket to the wall or eaves using expansion screws. Adjust the angle so the scanning plane is horizontal.

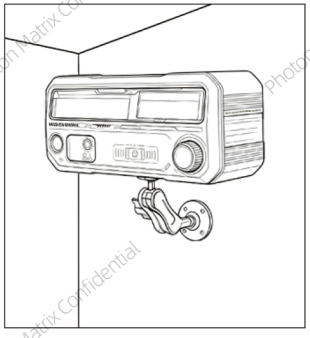
Step 4: Connect Power

Use the included power adapter or a PD/QC fast-charge power bank with the original adapter cable. Confirm the power indicator lights up.

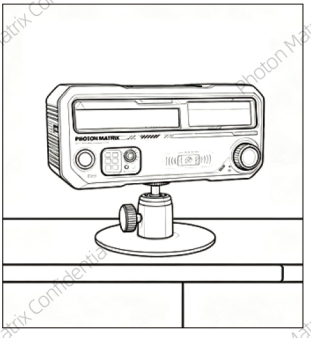
Step 5: Complete Authorization

Refer to Section 5.3 for APP binding, safety assessment, and fingerprint enrollment (Suggested).

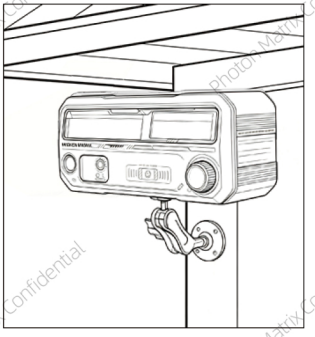
Installation Diagrams (Wall, Desktop, Eaves):



Wall



Desktop



Eaves

5.3 Download APP & Complete Authorization

Download the "Photon Matrix" app from Apple App Store or Google Play. Register an account, complete the safety training and assessment (15 scenario-based safety questions; 100% pass rate required). After passing, bind your device (via QR code scan or Bluetooth), set a passcode, and enroll fingerprints(Suggested).

5.4 Start Using

Power on → Unlock with fingerprint or passcode → Wait for initialization (~10–30 sec) → Enable "Armed " mode on the device / APP → Device begins eliminate mosquito automatically.

No continuous manual operation required.

6 Daily Use & APP

6.1 Status Indicator

Indicator	Meaning
Green Solid	Device in standby or scan mode
Blue Solid	System initializing
Yellow Solid	System alarm, fault warning, personnel approaching
Red Flashing	Device in Armed mode or normal working mode

6.2 Power Off

Long-press the physical button or tap "Device Control" in the APP → Device automatically locks.

In an emergency, disconnect the device from the power supply immediately, or briefly press the device's control knob to shut down operation.

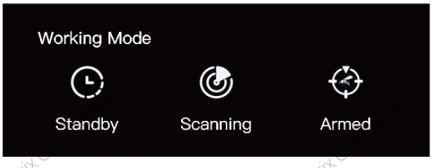
6.3 APP Overview

The Photon Matrix APP provides: device start/stop control, mode switching, working boundary configuration,firmware upgrades, event logging, and mosquito activity statistics. All data is transmitted with encryption and can be exported or deleted at any time.

6.4 APP Scan Modes

The device supports switching between three modes:

1. Standby Mode: The device is in standby state, with no scanning and no laser emission.
2. Scanning Mode (Default at Power-on): Only detection and scanning, no laser emission.
3. Armed Mode: The device operates in scan + Armed mode. It starts detecting mosquitoes and automatically emits laser to disable mosquito wings.



Tap the desired mode in the APP to switch.

On the device, access the "Mode" menu to choose between Standby, Scanning, and Armed.

7 Safety Protection Mechanisms

This product features multiple independent safety protection mechanisms. Any single trigger disables the high-power laser:

#	Protection Mechanism	Implementation	Function
A	mmWave Radar Person Detection	mmWave radar continuously monitors moving objects within the scanning plane	Stops laser immediately when a person or large animal enters the scanning plane
B	Safety Blind Zone Design	Enforced non-operational blind zone near the device	Ensures adequate response time for nearby persons
C	Background Distance Constraint	LiDAR continuously measures background distance in real time	Refuses laser emission when background exceeds effective range or is absent
D	Reflective Surface Detection	System detects reflective characteristics of the background	Disables laser in areas with high-reflectivity surfaces
E	Dual Identity Authentication	Fingerprint lock / APP passcode	Prevents unauthorized operation
F	External Sensor Interface	Supports connection of light curtains and other external safety sensors	Immediately shuts down laser when external sensor is triggered
G	Visible Beam Path Indicator (Infrared)	Indicator laser activates synchronously with strike laser	Allows users to observe the working path in real time
H	Target Size Matching	Detect target object dimensions	Only targets sized 2-20 mm (mosquito-sized) will enter the strike sequence

8 Maintenance

8.1 Routine Cleaning

Every 2–4 weeks, wipe the laser window and radar cover with a clean, soft cloth or lens cloth. Do not use solvent-based cleaners. Keep ventilation openings clear.

Item	Interval	Method
Laser window cleanliness	Every 2-4 weeks	Visual inspection
Fingerprint recognition	Monthly	Test unlock function
APP connectivity	Monthly	confirm normal control
Firmware update	Quarterly	Check in APP
Overall appearance & structure	Quarterly	Check enclosure for abnormalities
Enclosure & cables	Quarterly	Check for damage or looseness

Do not disassemble or attempt internal repairs. Any unauthorized modification will compromise the safety mechanisms and void the warranty.

9 Troubleshooting

9.1 Device Faults

Fault	Possible Cause	Solution
Device won't power on	Power not connected; adapter fault	Check connections; replace adapter
Fingerprint not recognized	Dirty/moist finger; module contamination	Clean and retry; clean fingerprint module
Initialization timeout	Too many obstacles; laser window dirty	Clear obstacles; clean laser window
APP can't connect	WiFi/Bluetooth signal weak; device locked	Move closer; restart APP and device
Red light flashing	Safety trigger activated; person in scanning plane	Check area; re-authenticate
Low mosquito capture rate	Laser window dirty; poor placement	Clean window; reposition device
Device won't enter strike mode	Safety assessment not passed; authorization expired	Re-complete safety assessment in APP

9.2 Rotating Base Faults

Fault	Possible Cause	Solution
Base not rotating	Power not connected; magnetic interface loose	Check power; reseat magnetic interface
Uneven rotation	Debris on track; base not level	Clean track; ensure level placement
Base noise during rotation	Track needs lubrication; foreign object	Clean track; apply light lubrication
Device not recognized	Magnetic interface dirty	Clean magnetic contacts
360° scan incomplete	Obstruction in rotation path	Clear rotation path
Base not responding to APP	Bluetooth connection issue	Restart base; reconnect via APP
Intermittent rotation	Power supply unstable	Check power adapter and connections

10 Warranty & Compliance

10.1 Warranty

Standard warranty: 12 months (or as required by local laws and regulations). Covers laser module, LiDAR sensor, mainboard, power adapter, and galvanometer system. Excludes: user-caused damage, unauthorized disassembly, use of non-original accessories.

After-sales contact: info@photonmatrixlab.com, Provide order number, device serial number (SN),fault description, and clear photos/videos. Response within 2–7 business days.

10.2 Certifications

This product certifications include: CE (LVD/EMC/RED), IEC 60825-1 Laser Safety, FCC, FDA, RoHS, REACH.The product complies with the WEEE Directive. Dispose of at designated e-waste recycling points.

10.3 Manufacturer Information

Manufacturer/Brand Owner: Chang Zhou Guang Zhi Ju Zhi Neng Ke Ji Co., Ltd

Address: Floor 8, Chuangzhi Building, Xinbei District, Changzhou City, Jiangsu, China

Sales Entity: Photon Matrix Limited. / Photon Matrix Lab Limited.

For more detailed information, please visit our official website or official store

Please follow our social media for more updates

FaceBook TikTok Instagram Youtube X Linkin

Professional-use laser device, for commercial use only

CLASS 4 LASER PRODUCT | Read safety instructions before use

①This product contains Class 4 high-power lasers (Infrared: 976nm / Blue: 450nm). ②All users must complete the in-app safety assessment before operation. Unauthorized use is prohibited. ③Do not stare directly into the laser beam ④ Wear laser safety goggles (OD 5+, for 976nm /450nm) when operating near the device ⑤Do not use facing reflective surfaces such as mirrors, polished metal, glass, or liquids, as well as transparent solids and liquids ⑥Do not disassemble or modify the device ⑦Do not aim the laser at people or animals.