Handheld Vision Screener

User Manual

Table of Contents

Chapter 1: Foreword 3

1.1 Product Features 3

1.2 Abbreviations 3

1.2 Copyright Statement 3

Chapter 2: Overview 4

2.1 Models & Specifications: SL-100, SL-100P, SL-100S 4

2.2 Embedded Software Release Version: V1 4

2.3 Structural Composition: 4

2.4 Intended Use 5

2.5 Performance Specifications 5

2.6 Target Population 6

2.7 Contraindications 6

2.8 Operating Environment 6

2.9 Operating Conditions 6

2.10 Network Security 6

2.11 Safety Classification 6

2.12 Parameter Abbreviations 7

Chapter 3: Safety Precautions 7

3.1 Pre-Operational Precautions 7

3.2 Operational Precautions 8

3.3 Waste Disposal Precautions 9

Chapter 4: Operating Instructions 9

4.1 Power On 9

4.2 Home Screen 10

4.3 Screening 10

4.4 Screening Results 15

4.5 View History Records 16

4.6 Tools 17

4.7 Power Off 23

Figure 30: External Charging 25

Chapter 5 Maintenance & Care 25

5.1 Warranty 25

5.2 Routine Maintenance 25

5.3 Storage & Transport 26

5.4 Dimensions & Weight 27

Chapter 6 Troubleshooting 27

Chapter 7 Service Life 28

Chapter 8 Symbol Explanation 28

Chapter 9 Configuration 29

Chapter 10 Basic Information 29

Chapter 11 Electromagnetic Compatibility 30

11.1 Important Notes 30

11.2 Declaration of Conformity 32

Chapter 1: Foreword

Welcome to using the Handheld Vision Screener (hereinafter referred to as "the Product") from Shanghai topview. This manual details the product'sfeatures, operating procedures, precautions, maintenance, and related information.

To ensure effective use, please read this manual carefully before operation, understand all precautions, and follow the instructions. For installation issues or technical support, contact our After-Sales Service Department. Retain this manual for future reference.

1.1 Product Features

The Handheld Vision Screener is a precision opto-electro-mechanical device for measuring refractive error (Refraction). It is intended solely for patient vision screening and cannot be used for ophthalmic refraction or spectacle prescription. It is operated handheld without direct patient contact.

1.2 Abbreviations

"The Company": Shanghai Top View Industrial Co.,Ltd.

"The Product": Handheld Vision Screener.

"Operator": Healthcare professional using the device.

"Patient": Individual being screened.

1.2 Copyright Statement

Trademarks and copyrights related to this product belong to Shanghai Top View Industrial Co.,Ltd. reserves the final right of interpretation forthis manual. No part of this manual may be reproduced, modified, distributed,leased, adapted, or translated without prior written permission from Shanghai Top View Industrial Co.,Ltd.

Shanghai Top View Industrial Co., Ltd

Shanghai Top View Industrial Co.,Ltd.makes no warranties, express or implied , including but not limited to warranties of merchantability or fitness for a particular purpose.

Chapter 2: Overview

The product is primarily used for preliminary vision screening in infants, children, adolescents, and adults. It acquires binocular parameters including Spherical Power (SPH), Cylindrical Power (CYL), Cylinder Axis (AX), Pupil Diameter (PDia), Pupillary Distance (PD), and Spherical Equivalent (SE) through a single non-contact measurement. Its portability, ease of use, low patient cooperation requirement, fast screening speed, rich output parameters, and versatile data transmission make it widely applicable for individual and mass vision screenings.

2.1 Models & Specifications: SL-100, SL-100P, SL-100S

2.2 Embedded Software Release Version: V1

2.3 Structural Composition:

The product consists of the Host Unit and Power Adapter. The host is shown in Figure 1.

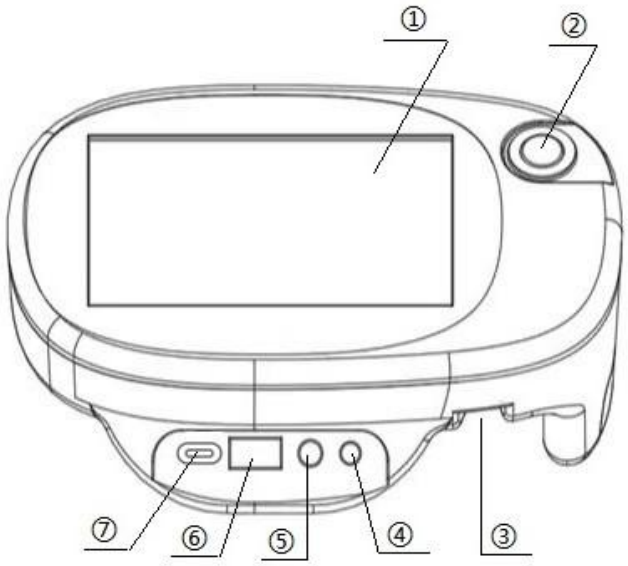


Figure 1 Product Diagram

- ① Display Screen: Touchscreen for device operation and information display.

- ② Batch Screening Button: Used for rapid saving of current results and switching to the next patient during batch screening. Not recommended for individual screening.
- ③ Strap Mounting Post: For attaching wrist or shoulder straps.
- ④ Indicator Light: Green during use, blue while charging, green when fully charged.
- ⑤ Power Button: Press to power on. Press and hold to power off.
- ⑥ USB Port: Connect to a computer or USB drive for data import/export.
- ⑦ Charging Port: Connect power adapter for charging.

2.4 Intended Use

For measuring refractive error. Intended for patient vision screening only.

Not for ophthalmic refraction or spectacle prescription.

2.5 Performance Specifications

2.5.1 Spherical Power (DS)

Measurable Range: -10.00D to +10.00D. Display Resolution & Tolerance per Table 1.

2.5.2 Cylindrical Power (DC)

Measurable Range: -3.00 D to +3.00 D. Display Resolution & Tolerance per Table 1.

2.5.3 Cylinder Axis (AX)

Measurable Range: 1° to 180°, Display Resolution & Tolerance per Table 1.

2.5.4 Pupil Diameter (PDia)

Measurable Range: 3.2 mm to 9.0 mm, Display Resolution & Tolerance per Table 1.

2.5.5 Pupillary Distance (PD)

Measurable Range: 35 mm to 80 mm, Display Resolution & Tolerance per Table 1.

2.5.6 Spherical Equivalent (SE)

Measurable Range: -11.50D to +11.50D,Display Resolution & Tolerance per Table 1.

Table 1

Parameter	Measurable Range	Display Resolution	Tolerance
Spherical Power	[-10D,+10D]	0.25D/0.01D	±0.5D
Cylindrical Power	[-3D,+3D]	0.25D/0.01D	±0.5D

Cylinder Axis	1°~180°	1°	±5°
Pupil Diameter	3.2mm～9.0mm	0.1mm	±0.1mm
Pupillary Distance	35mm～80mm	1mm	±1mm
Spherical Equiv.	[-11.5D,+11.5D]	0.25D/0.01D	±1.0D

2.6 Target Population

Infants, children, adolescents, and adults requiring vision screening.

2.7 Contraindications

None.

2.8 Operating Environment

This product is intended for hospitals, optometry centers, optical shops.

- Ambient Temperature: 0°C to +40°C
- Relative Humidity: 30% to 80%
- Atmospheric Pressure: 700 hPa to 1060 hPa
- Ambient Illuminance: ≤ 50 lux

No strong impact/vibration, flammable/explosive, corrosive, humid, strong electromagnetic fields; well-ventilated.

2.9 Operating Conditions

- Rated Charging Voltage: 100-240 VAC 50/60Hz
- Input Current: 9.5 VDC, 1.8 A
- Internal Power Supply: 7.4 V Li-ion battery, Capacity 4750 mAh
- Keep away from strong magnetic/electrical fields, intense light, dust.

2.10 Network Security

User Access Control: Cloud access requires login credentials (username/password) for patient data input/retrieval.

❖ Electronic Interfaces:

(1) Bluetooth Protocol: Enables communication with Bluetooth printers.

(2) Wi-Fi Protocol: Enables communication with printers.

(3) Data Import/Export via USB in .xlsx format.

2.11 Safety Classification

- Medical Electrical Equipment Safety Class: Group 1, Class B

- Means of Protection Against Electric Shock: Class II Internally Powered Equipment
- Degree of Protection Against Electric Shock: No application section
- Ingress Protection (IP) Rating: IPX0

2.12 Parameter Abbreviations

Spherical Power	DS	Cylindrical Power	DC
Cylinder Axis	AX/AXIS	Pupil Diameter	PDia/PS
Pupillary Distance	PD	Spherical Equiv.	SE
Left Eye	OS	Right Eye	OD

Chapter 3: Safety Precautions

3.1 Pre-Operational Precautions

- This product is restricted to indoor use under compliant lighting conditions (≥50 lux).
- Never disassemble or modify the instrument without authorization.
- Do not use accessories (e.g., batteries, adapters) not specified in this manual.
- WARNING:Never drape charging cables around the neck – risk of strangulation.
- This product is intended only for use by trained medical professionals – thoroughly review all instructions before operation.
- Do not use this product for purposes outside its permitted scope of use.
- Do not operate this product using method other than those described in this manual.
- The instrument cannot function normally or be stored/transported outside the conditions specified herein. Handle with care during transport to avoid impacts, severe vibration, and humidity.
- Retain all accessories and accompanying documents for warranty validation. Failure to do so voids warranty coverage.
- Preserve original packaging materials to ensure instrument safety during

relocation.

- Before use, confirm the absence of strong electromagnetic field sources nearby to prevent interference.
- Immediately cease use upon any abnormality and contact our after-sales service personnel. Never attempt self-repair.
- Improper disposal of end-of-life internal batteries may harm human health and the environment.
- If moving the instrument from a cold to operational environment, allow several hours for temperature equilibration before startup to prevent surface condensation.
- After physical impact (e.g.,collision, drop, water immersion), immediately conduct a functional inspection. Return for factory repair if necessary.。
- Place the instrument away from direct sunlight and unnecessary heat exposure
- Maintenance of critical components (batteries, power adapters) must be performed only by authorized company personnel.

3.2 Operational Precautions

- Do not perform maintenance during device operation.
- Insects may interfere with normal operation – ensure an insect-free environment before use.
- Hold the device horizontally at eye level, approximately 1 meter directly in front of the patient.
- Instruct the patient to remove eyeglasses and clear hair obstructing the eyelids to ensure an unobstructed view.
- For infants/preschoolers exhibiting hyperactivity/poor cooperation: Require caregiver assistance to stabilize fixation; Activate audio prompts; Use guided engagement techniques to attract attention.
- For patients with long eyelashes: Instruct to widen eyes or tilt the device downward at an appropriate angle to capture valid image data.
- For watery eyes: Wipe away tears before measurement to avoid compromising image quality.

- Excessively small pupils may compromise measurement efficiency and data accuracy.
- If "Pupil Too Small" or "Pupil Undetected" appears: Adjust ambient lighting; Position the patient facing away from light source.
- For USB batch-screening imports, Exclusively use the exported template from this device,Avoid patient IDs starting with "P" (conflicts with auto-generated IDs); Define filename as "patients.xlsx".
- Real-time battery level is shown at the top-right corner – confirm sufficient power before use.
- When one battery bar remains: Immediately charge or replace the battery.
- Charge only using the provided power adapter. Avoid operation while charging.
- Vision screening measures instantaneous dynamic refraction, which changes over time – conduct screenings periodically.

3.3 Waste Disposal Precautions

- When the product reaches end-of-life: Recycle metal/plastic components; Submit batteries to certified waste handlers for decontamination (Do not discard).
- Discarded PCBs and power adapters must be processed by licensed recyclers per local regulations. Unauthorized disposal causes environmental pollution and reduces recycling value.

Chapter 4: Operating Instructions

4.1 Power On

Press the power button to enter the startup interface, as shown in Figure 2.



Figure 2 Startup Interface

4.2 Home Screen

After startup, the system enters the main interface, as shown in Figure 3.

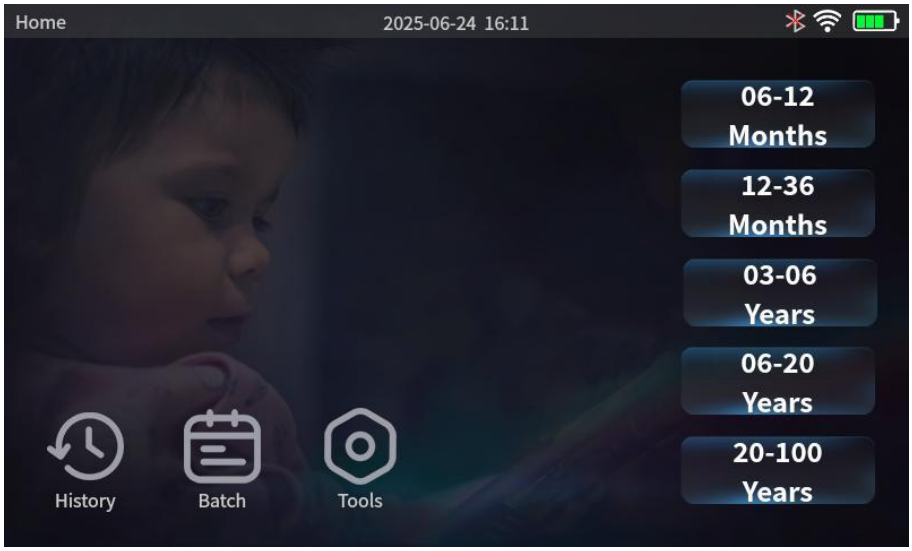


Figure 3 Main Interface

- ❖ History Records: View historical test results and edit patient information.
- ❖ Batch Screening: Click to enter batch screening mode.

Tools: Click to access system settings and auxiliary functions.

4.3 Screening

Two screening modes are available: Individual Screening and Batch Screening. Select based on clinical needs.

4.3.1 Individual Screening Mode

- ❖ Click the age-group button (06-12mo, 12-36mo, 03-06yr, 06-20yr, 20-100yr) to

start measurement. Ultrasound module activates with audio prompts (mute via speaker icon). If distance is incorrect, "Too Close" or "Too Far" appears (Figure 4).

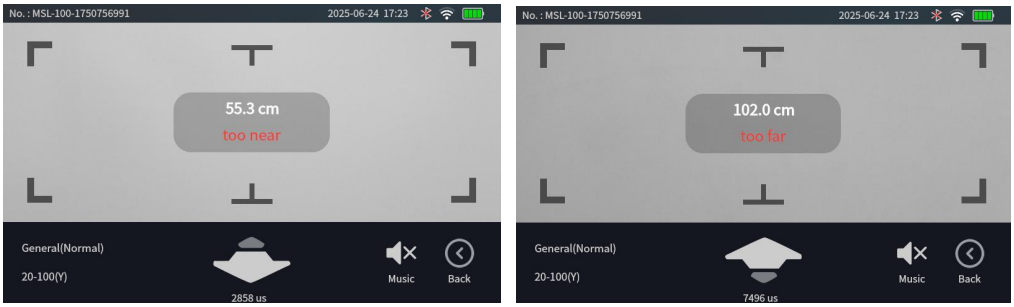


Figure 4 Distance Alert Interface

Adjust device forward/backward to optimal range (930-980mm). When "Hold Steady" appears (Figure 5), keep device still for image capture. If "Pupil Too Small" or "Pupil Undetected" appears, adjust lighting or reposition patient away from light source.

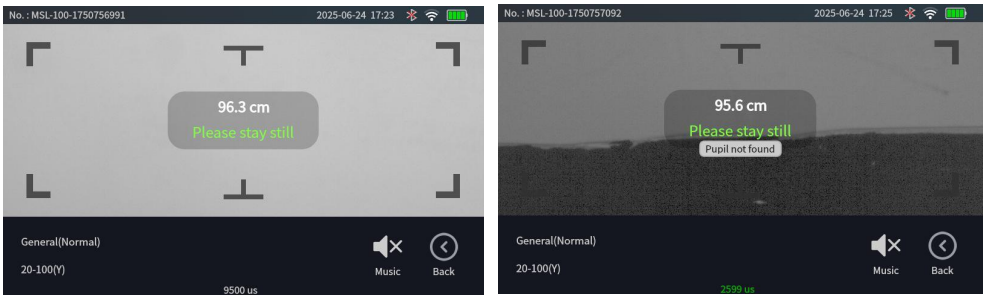


Figure 5 Instruction Interface

❖ Successful screening generates a patient ID and displays results (Figure 6).

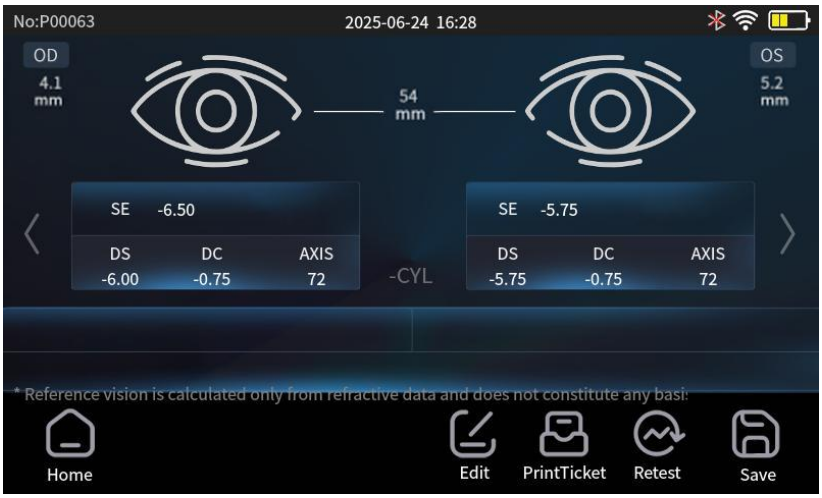


Figure 6: Result Display Interface

➢ Save: Save results and go to History Records.

- Remeasure: Return to test screen without saving.
- Print: Print results via connected Wi-Fi/Bluetooth thermal printer.
- Edit: Input patient info (name, gender, birthdate, etc.).
- Home: Choose "Save? Yes/No" before returning to main interface.

4.3.2 Batch Screening Mode

（1）The Batch Screening Mode provides two data import methods:USB Import (via external USB drive); Bulk Import Button (within the Batch Screening interface).

- USB Import: Export template: Home > Batch Screening > Import/Export > Export. On PC, fill template: Start IDs with letters other than P (e.g., "A") to avoid conflict.Enter patient name, gender, birthdate (YYYYMMDD), phone, WeChat, address (optional). Save as "patients.xlsx" → Insert USB into device → Import.

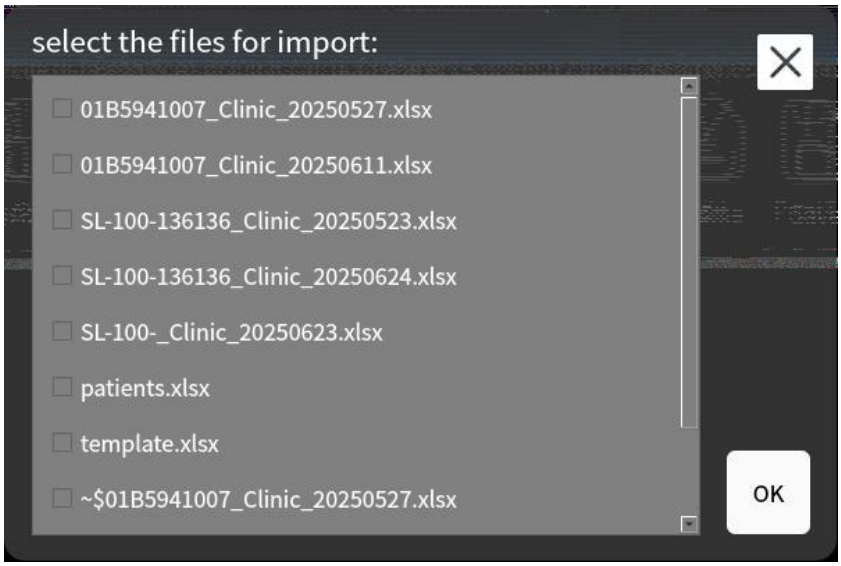


Figure 7 Template Import Interface

- Batch Import: Import Excel content via USB (Figure 8).

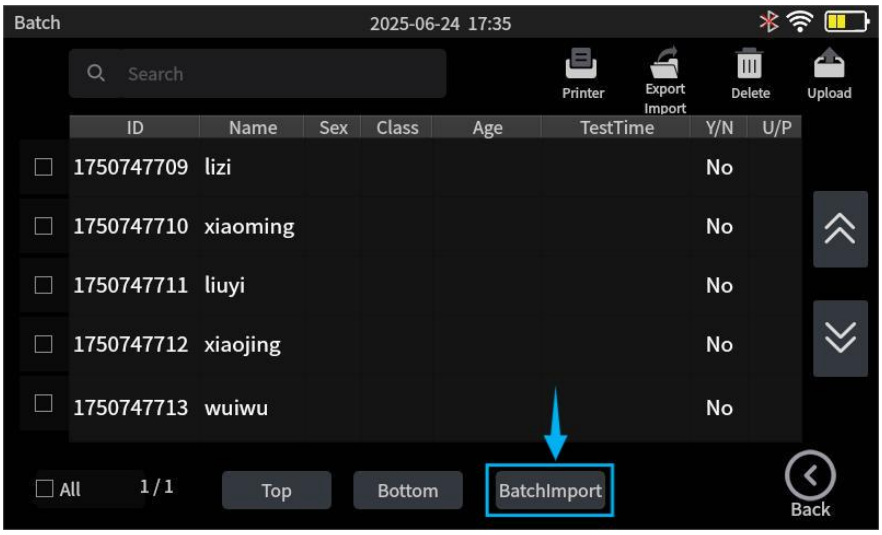


Figure 8 Batch Import Interface

（2）Execute Batch Screening

If the table data is successfully imported, the Batch Screening interface will display the subject list; if the import fails, re-import must be performed.

- Screening: Click the "Batch Screening" button on the Home Screen, the system will enter the Batch Screening interface (as shown in Figure 9); click the information row of the target subject requiring screening, confirm the subject details are correct, then click "Test" to initiate screening，as shown in Figure 10.

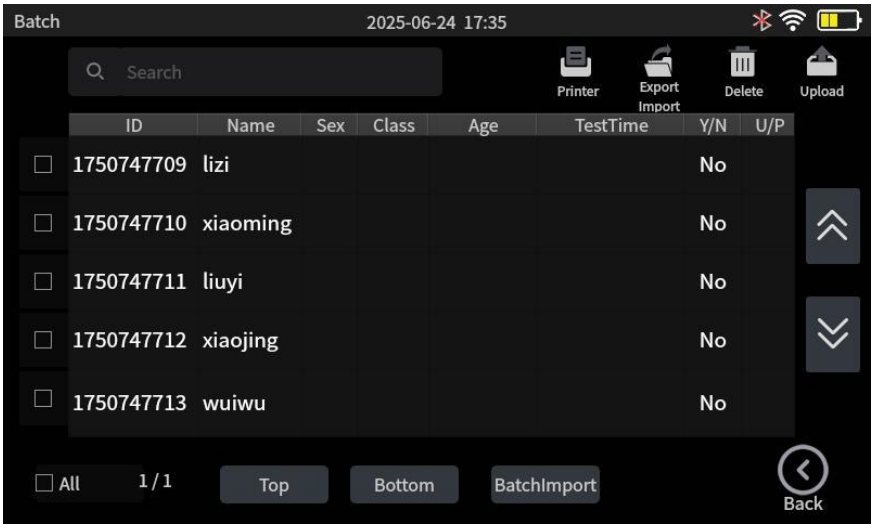


Figure 9 Patient List



Figure 10 Patient Details

- The ultrasound module activates at this point, and the main interface will display "Too Far" or "Too Close" prompts. When "Hold Steady" appears, the instrument begins screening.
- If screening is successful, the system will enter the "Result Display" interface. As shown in Figure 11.

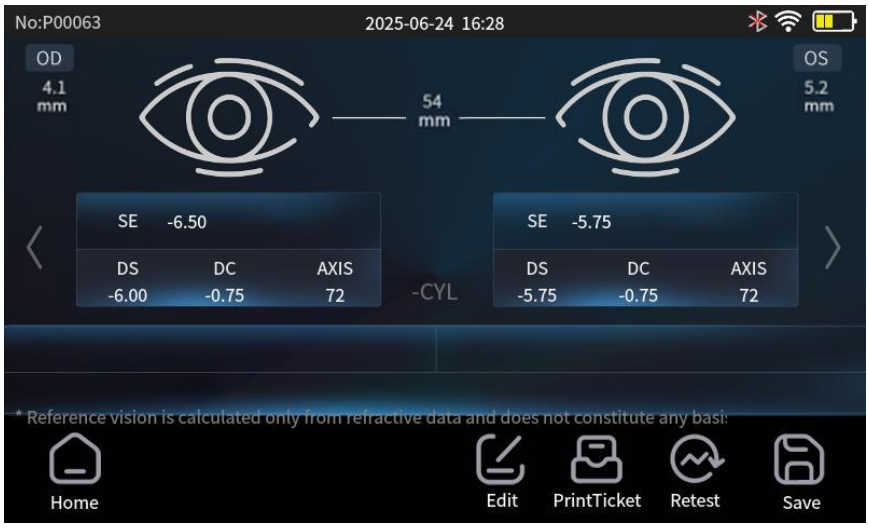


Figure 11 Result Interface

- Home: Click the "Home" button, a "Save/Cancel" dialog will pop up (Save: result images will be saved to the gallery, system returns to Home Screen; Cancel: results won't be saved, system returns to Home Screen).
- Edit: Input screener information (name, gender, date of birth, etc.), after completion return to the current results page.
- Print: Print results via connected printer.

- Remeasure: Return to test screen.
- Save: Return to patient list → Continue screening.
- Return: Return to previous screen if data is saved.
- Click the "◇" button on the panel, the current results will automatically save and switch to the next subject's screening interface in numerical order; if the next ID has been screened (i.e., data exists), it will skip automatically.

(3) Data Export

After screening completion, insert the USB drive into the product, sequentiallyclick"Batch Screening" > "Select All" or select data to export > "Import/Export" >"Export". Screening data will export from the product to the USB drive. Exportduration depends on data volume; success triggers a completion prompt.

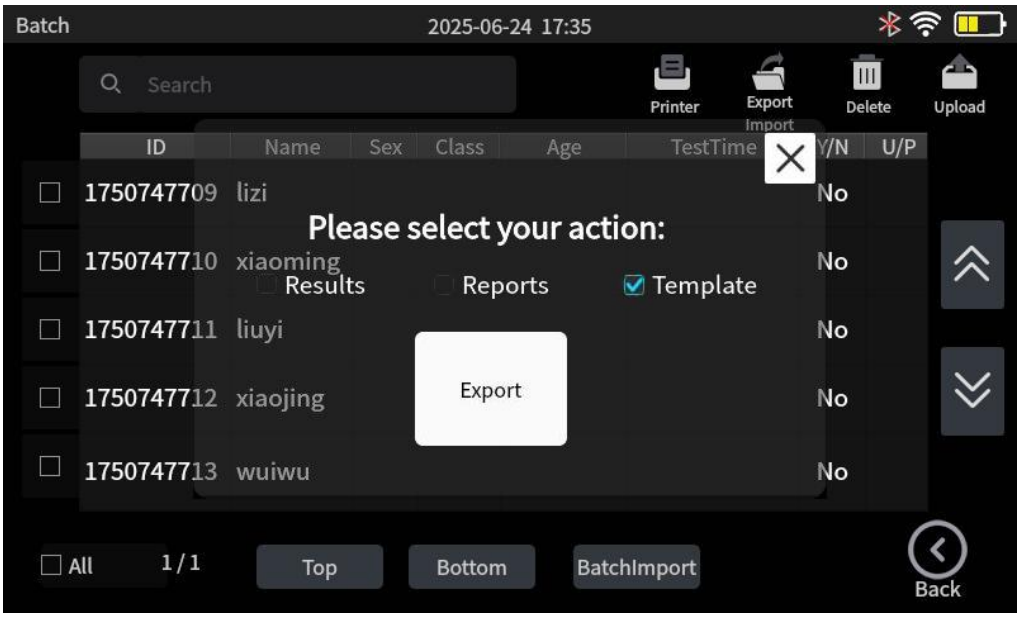


Figure 12 Export Interface

After export, click the "Delete" button to clear data.

4.4 Screening Results

- Upon successful image acquisition, the system analyzes the obtained image data and displays test/screening results, including: Spherical Power (SPH), Cylindrical Power (CYL), Cylinder Axis (AX), Pupil Diameter (PDia), Pupillary Distance (PD), and Spherical Equivalent (SE).

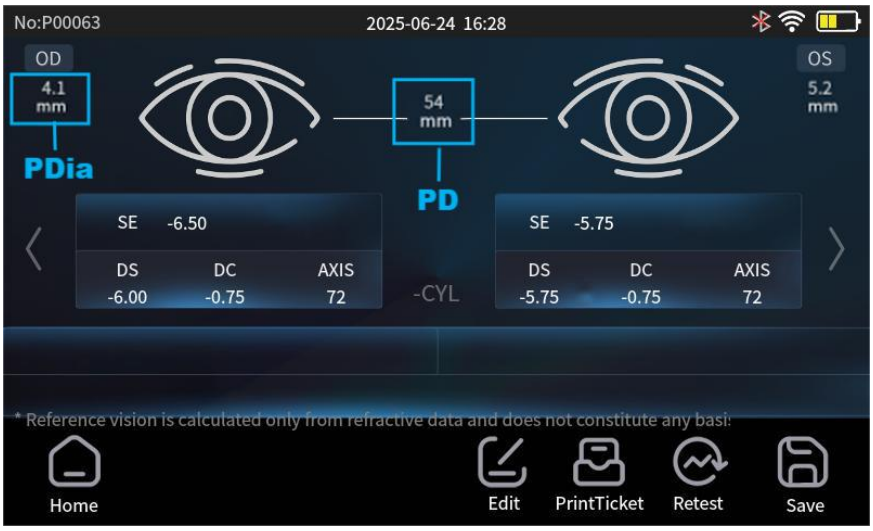


Figure 13 Result Metrics Interface

4.5 View History Records

❖ Home Screen -> History Records -> Click any screening record

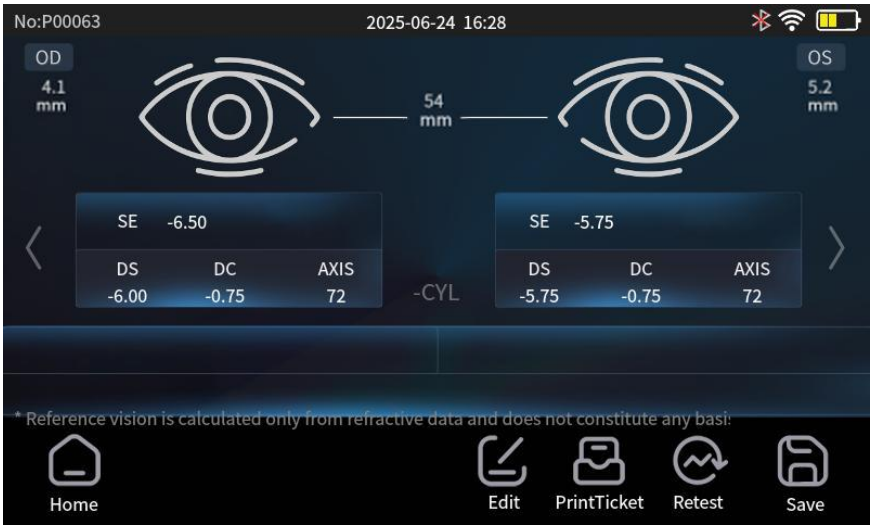


Figure 14 History Details

- Home: Click this button to return to the Home Screen.
- Edit: Input subject information (name, gender, date of birth, etc. Note: Screening-completed IDs cannot be altered), returns to current results after input.
- Print: Print screening results via Wi-Fi/Bluetooth thermal printer.
- Remeasure: Returns to current subject's testing interface.
- Return: Navigates back to previous interface.

4.6 Tools

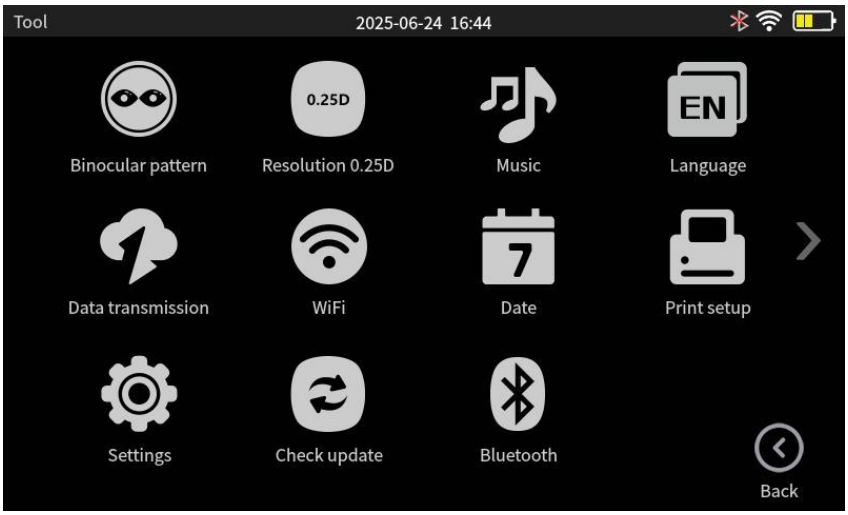


Figure 15: Tools Interface (a)



Figure 16: Tools Interface (b)

(1) Binocular Mode: Screens both eyes simultaneously.

Left Eye Mode: Screens left eye only.

Right Eye Mode: Screens right eye only.

(2) Music: Select any background music, set single-loop/playlist-loop modes and volume level.

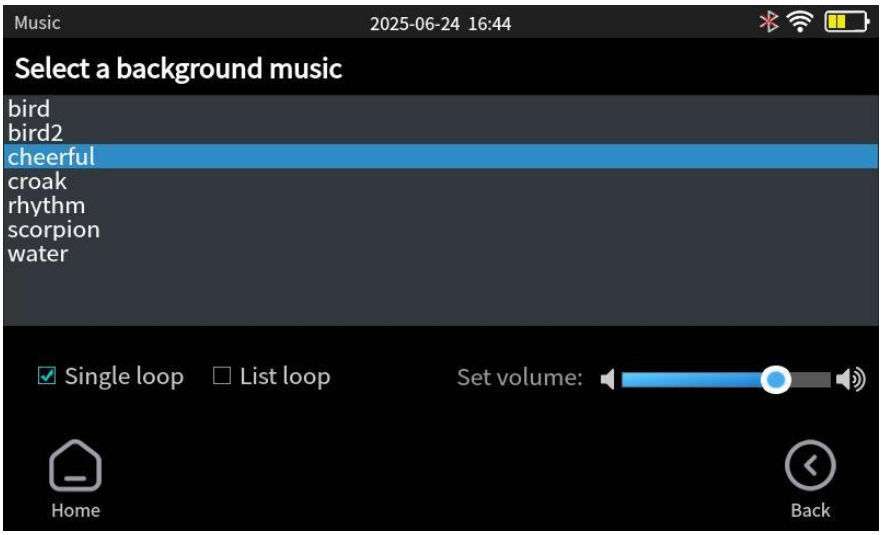


Figure 17 Music Settings

(3) Language: Switch between Chinese and English UI.

(4) Data Transfer: Configure transfer content and paths.



Figure 18 Data Transfer Interface

(5) WIFI: Turn on/off Wi-Fi, view Wi-Fi details, select networks and connect.



Figure 19 Wi-Fi Interface

(6) Date: Set date and time.

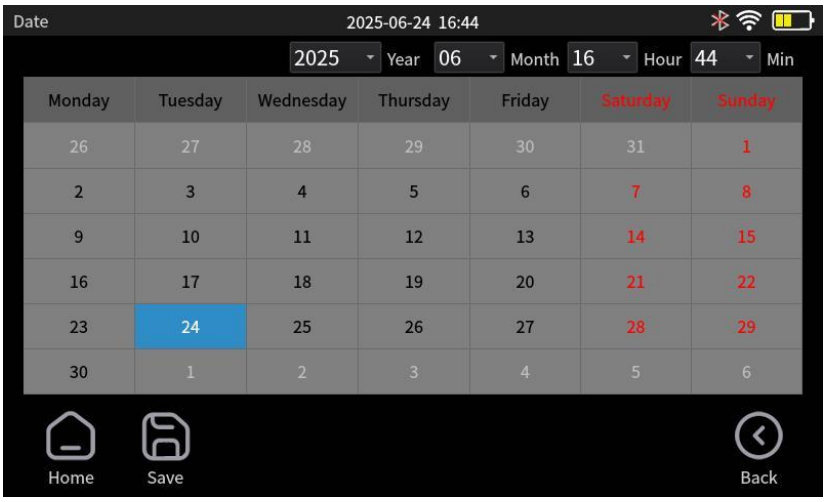


Figure 20 Date Settings

(7) Print Settings:

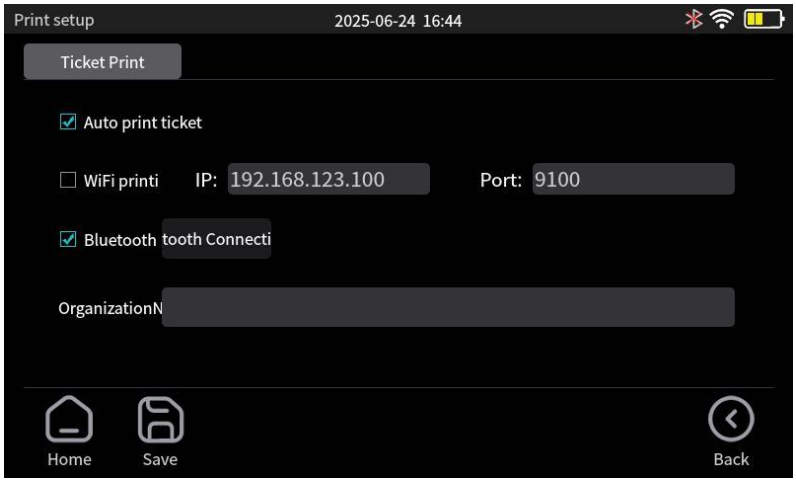


Figure 21 Print Settings

- Auto-Print Results:

Checked: Automatically prints after saving screening results.

Unchecked: No auto-print.

- WIFI Print:

Checked: Prints via Wi-Fi printer (device connected to printer's hotspot/same network).

Unchecked: No print command sent to Wi-Fi post-screening.

- Bluetooth Print:

Checked: Prints via connected Bluetooth printer.

Unchecked: No Bluetooth print command sent.

When connected to printer, print historical/screening results.

Note: ⚠ Users must procure qualified printers.

(8) Settings:



Figure 22 Settings Interface

- Distance Alert:

Checked: Distance prompts during screening.

Unchecked: No prompts.

- Generate Report:

Checked: Saves individual report post-screening (Note: Images show only if "Preview Image" enabled).

Unchecked: No report saved.

- Login Password:

Checked: Requires password at startup.

Unchecked: No password required.

- Change Password: Modify startup password (Username: admin; Default: 123456).
- Default Age Group: Set default age for quick screening.
- Reset Settings: Restore factory defaults.
- Memory Status: Real-time memory/CPU usage display.



Figure 23 Memory Status Interface

- Screening Timeout: 30sec (default), 1min, 3min, Off.
- Auto-Shutdown (Inactivity) : Off, 15min, 30min, 1hr, 2hr.
- Screen Brightness: 20%, 40%, 60%, 80%.
- Update
- Server: Default: http://download.shtopview.com/screener/BasicNew(9)

Check Updates:

If update available: "New version found. Update?"

If no update: "No updates available now."

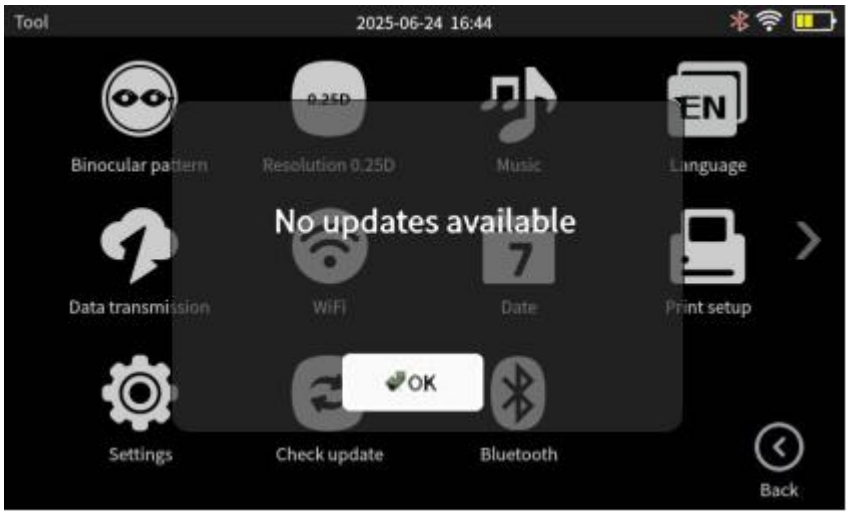


Figure 24 Update Interface

(10) Bluetooth: Select device→Click Connect →"Connected"or"Not Connected" status displayed.

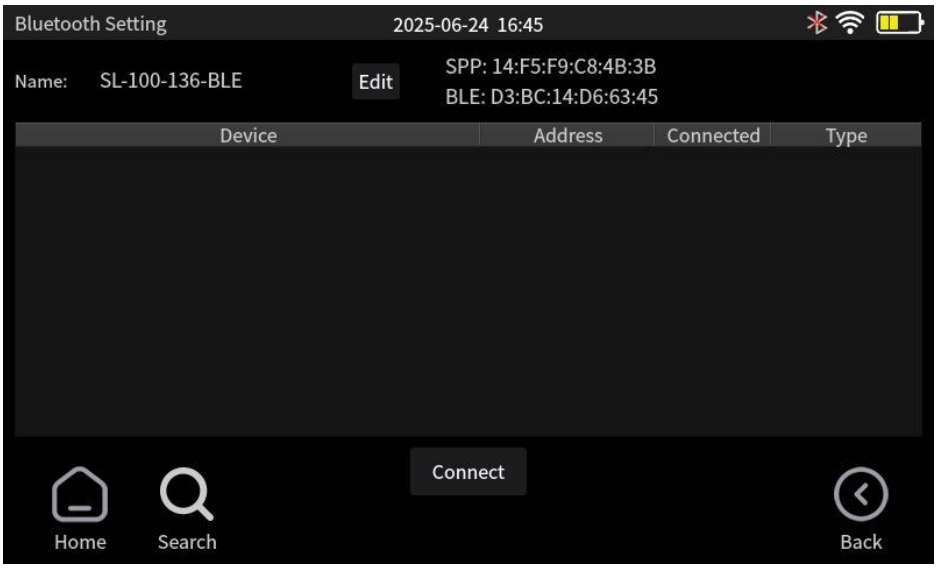


Figure 25 Bluetooth Interface

(11) Refraction Resolution: 0.01D or 0.25D (default: 0.25D).

(12) About: View product diagram/model/serial number/software version.

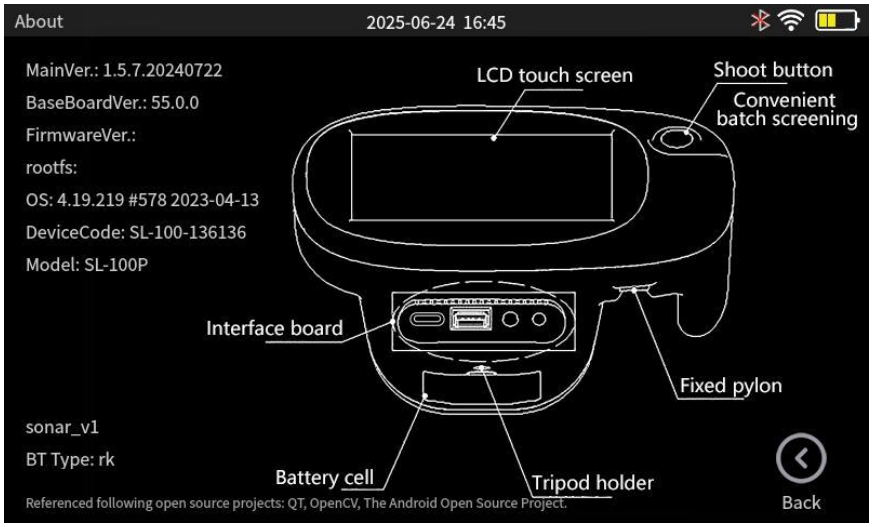


Figure 26 About Interface

4.7 Power Off

Long-press power button → Confirm "shut down the system?" → Click Yes.

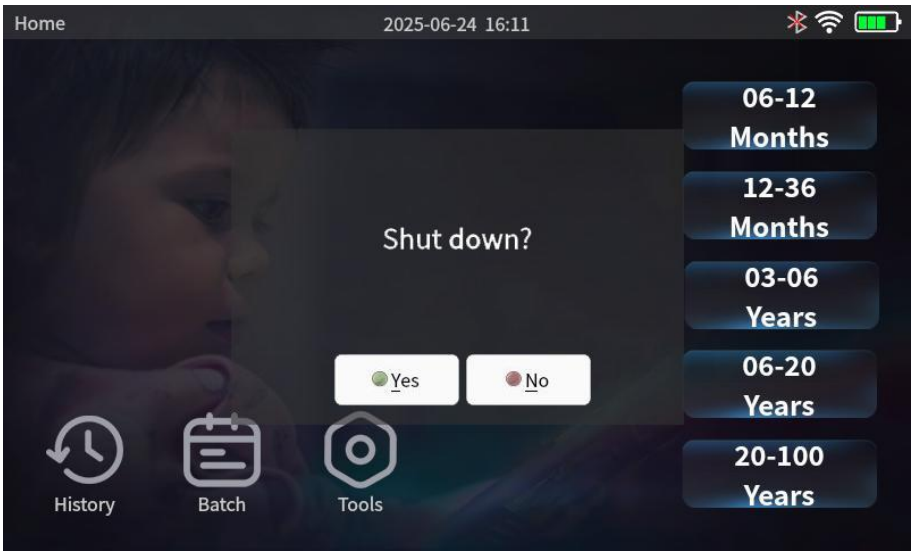


Figure 27 Shutdown Interface

4.8 Battery Replacement & Charging

The handheld vision screener is internally powered.Ensure correct battery orientation during insertion to prevent device/battery damage. Replace depleted batteries to resume operation. Battery installation shown in Figure 28.



Figure 28 Battery Installation

When battery nears depletion, the top-right status bar turns red. Charge using the included adapter. During charging: Device indicator shows blue; Status bar displays charging icon (Figure 29); Users may also remove the battery for external charging (Figure 30).



Figure 29 Charging Display



Figure 30: External Charging

Note: Battery charging requires 6~8 hours; a full charge supports ~4 hours of continuous screening. Battery cycle life: ≥300 cycles.

Depleted batteries or during extended storage: Remove batteries to prevent leakage damage.

End-of-life batteries cannot power the device: Replace promptly. Dispose per local regulations or return to manufacturer for processing.

Chapter 5 Maintenance & Care

During product maintenance, only perform approved operations below. Contact After-Sales Service for all other procedures to prevent loss, injury, or compromised device efficacy.

5.1 Warranty

Refer to packaging documents for product details; warranty terms are specified in the warranty card.

- Front Cover/Lens Interior Cleaning: Generally unnecessary. Contact us if required.
- Warranty Voidance: Do not break sealed components during cleaning.
- Repairs: Contact After-Sales Service immediately. Designated technicians may request circuit diagrams/component lists for guided repairs.

5.2 Routine Maintenance

- External Front Cover Cleaning:

Use lens cleaner exclusively;

Blow debris/dust away with air blower;

Gently wipe outward from center using lens-cleaning cotton;

No organic solvents.

- Approved Materials: Cotton swabs, oil-free microfiber cloth.
- Prohibited Materials: Linen cloth/gauze-wrapped tweezers (risk of scratches).
- When cleaning the device body, ensure the power is turned off to prevent electric shock hazards.
- Wipe the device using warm water and neutral detergent with a lint-free soft damp cloth; do not use volatile solvents.
- ABSOLUTELY prevent liquids (e.g., water) or foreign substances from entering the device interior to avoid damage and hazards.
- Maintenance must be performed by certified personnel with the power off and system de-energized, exclusively in a clean environment. Maintenance cycle: Every 6 months.

5.3 Storage & Transport

- Do not place the product in areas exposed to direct sunlight, high temperatures, humidity, or air containing dust, salt, sulfur, or other chemicals, as this may adversely affect the product.
- Do not place the device on sloped, vibrating, or impact-prone surfaces.
- Avoid locations storing chemicals, corrosive gases, or poorly ventilated indoor spaces.
- Position the device away from direct sunlight to minimize unnecessary light/heat exposure.
- When placing, ensure bright light sources face the rear of the lens. Avoid excessively bright rooms to reduce stray light interference.
- Keep away from strong electromagnetic fields and dusty environments.
- If packaged for >3 months, remove from the box, conduct a power-on functional check, and only return to storage after verifying normal operation.

❖ Storage/Transport Conditions:

Temperature: -20℃ ~ +55℃

Humidity: ≤93% RH

Pressure: 700hPa ~ 1060hPa

❖ Transportation Method:The product must be secured in its matching packaging case to prevent damage. During transit, avoid exposure to rain/snow, severe vibration, and mechanical impacts.

5.4 Dimensions & Weight

➢ Dimensions: 205mm*185mm*115mm

➢ Weight: Approx. 1kg

Chapter 6 Troubleshooting

If the instrument malfunctions, refer to the table below for solutions. Contact After-Sales Service or authorized dealers if issues persist.

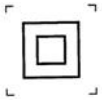
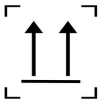
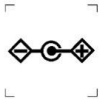
Falult Symptom	Cause	Resolution Method
Freezing after startup	Insufficient memory	Clear data: Go to History Records > Delete all data (WARNING: Irreversible).
Bluetooth/Wi-Fi connection failure	Excessive distance	Move within effective operational range.
	Bluetooth/Wi-Fi resource occupied	Release occupied resources and reconnect.
USB drive unreadable	Incompatible file system format	Use a FAT32-formatted USB drive or reformat existing drive to FAT32.

Chapter 7 Service Life

Production Date: See label

Service Life: 10 years

Chapter 8 Symbol Explanation

Symbol	Explanation	Symbol	Explanation
	Caution		Refer to instruction
	Class II equipment		Keep dry
	Keep away from Sunlight		Fragile – Handle with Care
	This Side Up		Non-ionizing Radiation
	Recyclable Material		On/Off (Push-Push)
	USB Interface		WEEE Disposal (Comply with local regulations)
	Manufacturer		Service Life
	DC Power Polarity: Left: Outer Terminal Right: Inner Terminal		Start Measurement

Chapter 9 Configuration

Item No.	Product Name	Qty.	Unit
1	Host Unit	1	Set
2	Rechargeable Lithium Battery	2	Pc
3	Power Adapter (Input: 100-240VAC)	1	Pc
4	User Manual	1	Copy
5	Certificate of Conformity	1	Card
6	Warranty Card	1	Card
7	Adjustable Shoulder Strap	1	Strap
8	Detachable Wrist Strap	1	Strap

Chapter 10 Basic Information

Registrant/Manufacturer:

Shanghai Top View Industrial Co.,Ltd.

Registered Address: Room 1001-1005,10th floor, No.102-2, Xianlie Middle Road, Yuexiu District, Guangzhou City,Guangdong Province,P.R. China

Production Site(s): South Road, Shiqi Town, Panyu District, Guangzhou City, Guangdong Province, P.R. China

MD Registration Certificate No.: GDDA Registration No. 20182160836

Production License No.: GDDA Medical Device Prod. Permit 20183260

After-Sales Service Unit:

Shanghai Top View Industrial Co.,Ltd.

Contact: 8616621522796

Email: s a l e s 0 5 s h t o p v i e w . c o m

Date Prepared: 11/12/2023 Revision: A0

Chapter 11 Electromagnetic Compatibility

11.1 Important Notes

WORNING：

- Use the specified accessories, optional accessories, and cables.
- Otherwise increased emissions or decreased immunity of the device may result.
- Do not use the device near,on, or under other electronic equipment.。

CAUTION：

- The device needs special precautions regarding EMC.
- The device needs to be installed and used in accordance with the EMC information provided in this manual.
- Portable and mobile RF communications equipment can affect the device,

Specified cable：

No.	Part name	Length（m）	Cable Shielded
1	Power cord (220 V)	1.5	NO

Essential performance: NON

Guidance and manufacturer's declaration - electromagnetic emissions			
Product Specifications			
Transmission frequency	Modulation type	Frequency characteristics	Effective radiated power
WIFI： 2.400 GHz	DBPSK/DQPSK/CCK(DSSS)、 BPSK/QPSK/16QAM/64QA	Receive Sensitivity (11b) @8% PER：	802.11b /11Mbps : 16 dBm ± 1.5 dB @ EVM

~2.497 GHz (2.4 GHz ISM Band)	M(OFDM)	1Mbps PER@-94dBm、 2Mbps PER @ -88 dBm 、 5.5Mbps PER @ -86 dBm、 11Mbps PER @ -85 dBm Receive Sensitivity (11g) @10% PER ： 6Mbps PER @ -88 dBm、 9Mbps PER @ -86 dBm 、 12Mbps PER @ -85 dBm 、 18Mbps PER @ -83 dBm 、 24Mbps PER @ -81 dBm 、 36Mbps PER @ -78 dBm 、 48Mbps PER @ -74 dBm 、 54Mbps PER @ -72 dBm	≤-9dB 802.11g /54Mbps : 15 dBm ± 1.5 dB @ EVM≤-25dB
WIFI： 4.900 GHz ~5.845GHz (5.0 GHz ISM Band)	802.11a/n : 64-QAM,16-QAM, QPSK, BPSK 802.11ac : 256-QAM, 64-QAM,16-QAM, QPSK, BPSK	Receive Sensitivity (11a, 20MHz) @10% PER： 6Mbps PER @ -87 dBm、 9Mbps PER @ -85dBm、 6Mbps PER @ -87 dBm、 12Mbps PER @ -84dBm、 18Mbps PER @ -82 dBm、 24Mbps PER @ -78dBm、 36Mbps PER @ -75dBm 、 48Mbps PER @ -70dBm 、 54Mbps PER @ -69 dBm	802.11a /54Mbps： 13 dBm±1.5 dB @ EVM -25dB
蓝牙： 2402MHz ~ 2480MHz	GFSK, π/4-DQPSK, 8DPSK	Sensitivity @ BER=0.1% for GFSK (1Mbps) ： -85 dBm~-80 dBm	2 dBm~ 8 dBm（Typical.：5dBm）

		Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)： -85 dBm~-80 dBm Sensitivity @ BER=0.01% for 8DPSK (3Mbps)： -85 dBm~-80 dBm	

11.2 Declaration of Conformity

Guidance and manufacturer's declaration - electromagnetic emissions		
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure		
Emissions test	Compliance	Electromagnetic environment -guidance
RF emissions CISPR 11	Group 1	The device uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The device is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes,
Harmonic emissions IEC 61000-3-2	*1	
Voltage fluctuations/ Flicker emissions IEC 61000-3-3	*2	

Guidance and manufacturer's declaration - electromagnetic immunity			
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance

Electrostatic Discharge (ESD) IEC 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	Floor should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ±1 kV for input/output lines	± 2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2kV common mode	±1 kV differential mode ±2kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage, dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T(>95% dip in U_T)for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5%U_T(>95% dip in U_T) for 5 sec	<5% U_T(> 95% dip in U_T)for 0.5 cycle 40% U_T(60% dip inU_T) for 5 cycles 70% U_T(30% dip in U_T) for 25 cycles <5% U_T(> 95% dip in U_T)for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3A/m	3A/m，50Hz/60Hz	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity

<table>
<tr><td colspan="4">The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure</td></tr>
<tr><td>Immunity test</td><td>IEC 60601 test level</td><td>Compliance level</td><td>Electromagnetic environment -guidance</td></tr>
<tr><td>Conducted RF
IEC 61000-4-6

Radiated RF
IEC 61000-4-3</td><td>3Vrms
150 kHz to 80 MHz

3V/m
80 MHz to 2.5 GHz</td><td>3 Vrms
(V_1=3)

3 V/m
(E_1=3)</td><td>Portable and mobile RF communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.

Recommended separation distance
$d = 1.2\sqrt{P}$ 150 kHz to 80 MHz

$d = 1.2\sqrt{P}$ 80 MHz to 800 MHz
$d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz
where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).
Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b]
Interference may occur in the vicinity of equipment marked with the following symbol: </td></tr>
<tr><td colspan="4">NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</td></tr>
</table>

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the device is used exceeds the applicable RF compliance level above, the device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the device.

b Over the frequency range 150kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the device

The device is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the device as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz ～ 80 MHz $d = 1.2\sqrt{P}$	80 MHz ～ 800 MHz $d = 1.2\sqrt{P}$	800 MHz ～ 2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.