

The SPL-500 3D Laser scanner Product instructions for use



★ This operation guide is only for routine and simple operations. If you need a complete version of the instruction manual, please download the ★ on the southern official website



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Instructions for the use of this manual

For readers

This manual is applicable to users operating for the installation, operation, maintenance and data processing of the SPL-500 3D laser scanner.

Manual use

Please read this manual carefully before using this product and follow the steps described in the manual during the installation operation

operate. Please keep this manual in a place for operation and maintenance personnel.

The contents of the manual will be constantly updated and corrected, and it is inevitable that there are any discrepancy or errors with the physical objects. Please user to purchase the product be as the criterion.

Warning logo

Since this equipment is a laser product, please read the section of Safety Notes in this manual and keep in mind Note, to avoid danger.

In order to ensure the personal and property safety when using the product, this manual adopts the following possibilities

The symbols used highlight:

Note / Description: indicate conditions or operations that may cause damage to the product or other property.

Warning: indicate conditions or operations that may cause personal injury or life threatening.

Danger: indicate that must cause personal injury or life-threatening conditions or operations

Please memorize the above safety marks and use the equipment correctly to avoid causing personal injury, death and material damage.

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1. Introduction

The Southern SPL-500 laser scanner is a high-speed 3 D laser scanner suitable for 3 D real-scene measurement. The SPL-500 laser scanner uses laser technology to produce highly detailed three-dimensional images of complex environments and geometries in a few minutes. The images produced by the device consisted of millions of 3D measurement points. These scanners are designed to scan objects with a distance range of 2 m and approximately 100,450 and 1000 m.

This user manual is the instructions for the use of the Southern SPL-500 laser scanner. Since the equipment is a laser product, please read the section of this manual carefully before use, and remember the precautions to avoid danger. During the installation operation, strictly follow the steps described in the manual.

1. Working principle

The southern SPL-500 laser scanner ranging principle uses the time-of-flight method (TOF). Inject the infrared laser beam to the center of the rotating optical mirror. The optical mirror will bias the laser beam in the direction rotated vertically around the scanning environment; then the scattered light from the surrounding object is reflected back to the scanner.

This technical method is characterized by strong ability to adapt to environmental conditions such as illumination, target surface reflection and roughness, and far measurement distance.

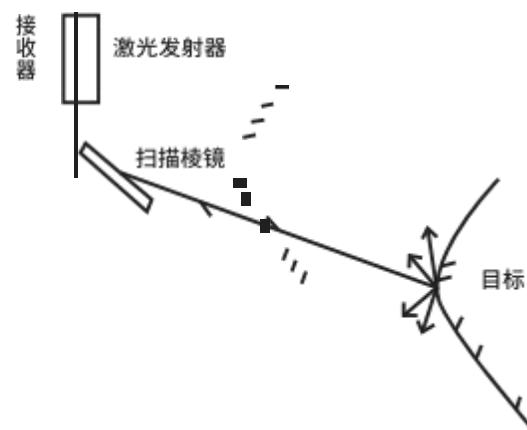


Figure 1-1 The ranging principle of the 3 D laser scanner

2. Product characteristics

The main features of the Southern SPL-500 laser scanner include:

1. High-precision
2. high-resolution
3. high-speed scanning, with a scanning speed of up to 1,200,000points per second.
4. It can be visually controlled by the built-in touch screen display.
5. Small size, light weight, integrated fast rechargeable batteries, resulting in high mobility.
6. Realistic three-dimensional color scanning, performed with an integrated color camera.
7. Integrated biaxial compensator, used for automatically leveling the captured scan data
8. integrated GPS sensor, used to determine the position of the scanner.
9. Integrated compass and altimeter, used to provide direction and height information for scanning.
10. WLAN, for the remote control scanner.
11. Super-long ranging, ranging up to 620m.
12. A wide scan field with an angle of 300° (vertical) 360° (horizontal).
13. Ultra-high data collection efficiency, 1,200,000 points / second.
14. Built-in dual cameras, can obtain real color image data at the same time, restore the real color of point cloud.
15. Can be adapted to complex environment measurements.
16. Quick disassembly design, one-click lock, fast deployment.
17. Ultra-low noise, scan quiet.
18. 24 hours all day scan, the infrared laser beam ignores the night effect.
19. One-click scan, intelligent operation, can be fixed scene scanning, or can adjust the scan parameters according to the user requirements.
20. Supporting point cloud processing software, support point cloud browsing, coordinate conversion, splicing, cutting, point cloud classification and other functions.



Figure 1-2 Southern SPL-1500, a laser scanner

3. Technical Indicators

The southern SPL-500 laser scanner ranging principle uses the time-of-flight method (TOF). Inject the infrared laser beam to the center of the rotating optical mirror. The optical mirror will bias the laser beam in the direction rotated vertically around the scanning environment; then the scattered light from the surrounding object is reflected back to the scanner.

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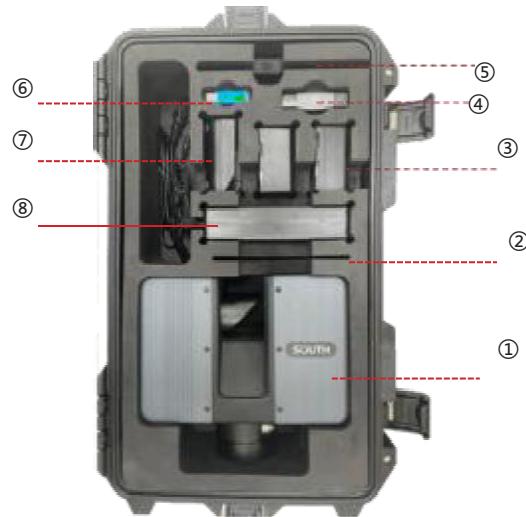
model	SPL-500
operational principle	impulse type
scanning scope	1.5 -620m
ranging accuracy	5mm @100m
Measurement speed	1,200,000 points / second
Angular accuracy	0.001° (horizontal) / 0.001° (vertical)
Scan the scene	Vertical 300° / horizontal 360°
Laser grade	Level 1 laser
laser wave length	1550nm
beam divergence angle	0.3mrad
communication interface	USB3.0, external power supply, Gigabit Ethernet
data storage	Support for hot-swap USB 3.0 U disk (256G)
camera	Built-in camera
control method	The 5-inch HD (7201280) touch screen WLAN connection with PC / tablet / phone

sensor	Double axis compensation	±15°, accuracy 0.008°
	altimeter	built-in
	thermometer	built-in
	Electronic compass	built-in
	G NSS	GPS (L 1) Beidou (B 1)
power supply mode	Battery or external power supply (+ 24 ~ +36V)	
Average power consumption	25w	
Battery life	4 hours to support hot-plugging	
working temperature	-20°C ~ 60°C	
Storage temperature	-35° C ~ 70° C	
levels of protection	IP 64	
Host weight	6kg (excluding battery and base)	

Table 1-1 Technical indicators of SPL-1500

2. Equipment

The SPL-500 laser scanner is equipped with the following standard equipment:



- ① SPL-500, a laser scanner
- ② Software CD (optional)
- ③ Lithium battery (1 pair)
- ④ USB3.0 U disk
- ⑤ Product Quick Start guide
- ⑥ The software dongle
- ⑦ battery charger
- ⑧ Power supply adapter

Recommended additional equipment:

1. standby battery

Please keep all the packaging materials for future use.

The USB 3.0 U disk, lithium battery and carbon tripod are the minimum equipment requirements required to perform the scanning project.

3. Parts and their functions

1. Scanner parts

• Display device side

The SPL-500 laser scanner is equipped with the following standard equipment:



Figure 3-1: Display side of the laser scanner

- ① Power switch button: Press this button to open the laser scanner power supply. If the scanner power is on and running, press this button to turn off its power. Holding the button for more than 3 seconds will turn off the laser scanner without shutdown. This option can only be used in abnormal situations, such as when the shutdown mechanism is not working properly or when the laser scanner is unresponsive.
- ② Touch the display screen
- ③ Panorama lens 1
- ④ Panorama lens # 2

2. Front



Figure 3-2: Front view of the laser scanner

- ① The scanner is an optical mirror
- ② Scanner quick removal base

3.1.3 Quick dismantling parts



Figure 3-3: Base of the laser scanner

2. Battery charger



Figure 3-4: Battery Charger

- ① power light
- ② power line
- ③ battery slot

• LED behavior when the seat charger is connected to the power supply

When the seat charger is connected to the scanner or the power supply, each status description is listed below:

pigment	state
red	Battery in-charging
green	The battery is fully charged, and the battery is fully charged

4. Safety precautions

Before using the product, read this user manual carefully and use it for reference.

Pay special attention to all the warnings and follow the instructions for each step.

1. Planned purpose

Use of this product in accordance with the operating conditions and restrictions described in this user manual.

2. Improper use

Improper use is the use of this product for purposes other than those described in this user manual, or under conditions different from the conditions described in this manual.

Improper use of this product may damage the protection provided by the product and may cause damage to the product or serious personal injury.

3. Operator

For safety reasons, the laser scanner and its accessories shall be competent, trained and read. And understand this manual and take into account any hazardous operators involved.

We recommend that the operator participate in the training provided by the Southern 3 D laser.

4. General security information

pay attention to:

Do not scan objects with high reflectivity, such as full station prism, glass products in bright flashlight, etc.

Do not scan with other laser scanners or laser-emitting equipment.

Do not open the enclosure. If the shell is opened, it may cause serious personal injury and may damage the product, thus affecting the product warranty.

Do not use parts not supplied or recommended by the Southern 3 D laser. Only the replacement parts authorized by the Southern 3 D laser can be used as described by the Southern 3 D laser.

Do not expose the Southern 3 D laser laser scanner and its accessories to extreme temperatures. The ambient temperature shall not be below or above the temperature specified in the specification.

Do not use a SPL-500 laser scanner near heat sources that include radiators, heaters, or other heat-producing products (including amplifiers).

Do not immerse the SPL-500 laser scanner into water. Fluiquid entering the product enclosure may cause product damage, fire or electrical shock.

Damage, catch fire, or electric shock.

Correct disposal of products and batteries according to national regulations.

Do not use the SPL-500 laser scanner and its accessories in an explosive environment. Do not operate the device when flammable gas or smoke is present. Operating any electrical equipment in this environment will definitely constitute a security threat.

Do not use near the magnetic field or electric field of the intense SPL-500 laser scanner.

To operate the SPL-500 laser scanner and its accessories in hazardous areas, please contact the local security authority and security experts before doing this.

When used outdoors, use the battery as a power source, and always protect the equipment from rain or splashing water. Scanner, which shall be used in a no-condensing environment.

When transferring the product from cold environments to much warmer environments, the water may condense on certain elements inside the scanner. To avoid this, it is recommended to place the scanner in a sealed plastic bag before transfer. This creates condensation on the bag rather than in the scanner. If the scanner cannot be sealed, wait until the observable condensate evaporates from the scanner before opening the SPL-500 laser scanner.

4. 5 Electrical safety



Do not open the enclosure. Hazardous high-voltage power is present in the casing. Only the qualified maintenance personnel can open the shell.

Do not push any object into this product through the gap, as they may contact dangerous voltage points or cause a short circuit. This can cause a fire or electric shock and damage to the product.

This product can be operated only by a power supply or battery supplied or recommended by the S 3 D laser. Ensure your line voltage meets the specifications of the converter. If you do not know the power line voltage in the area, please consult your local power company.

.5.14. Battery safety measures

The following safety measures must be observed when using the batteries:

The battery can only be charged using the charger suggested by the Southern 3 D laser.

Do not charge or discharge the damaged battery.

Do not charge the battery when the Southern 3 D laser scanner is stored in the shipping box.

Do not use wet or unclean batteries in SPL-500 laser scanner or charger.

Charge within the temperature limit of 0° C (32° F) to 45° C (113° F). Suggested charging temperature: 10°

C (50° F)

To 30° C (86° F).

Discharge within the temperature limit of -20° C (-4° F) to 60° C (140° F). Recommended operating temperature: 5° C (41° F)

To 40° C (104° F).

Can only be inserted or removed into the laser scanner in a dry and dust-free environment.

Remove the battery when the SPL-500 laser scanner is not used for a long time.

The battery should be charged before storage (at least 60% charge). When long-term storage, it is recommended to charge the battery once a year.

Storage temperature: -20° C (-4° F) to 45° C (113° F), storage humidity range: 0% to 80%. Store in ventilation

Good as in the region. Do not store with metal objects. Short circuit can cause a fire.

Do not expose the metal to the battery terminals. In this case, the terminal may short-circuit and generate heat.

Do not throw the battery in water or fire (explosion hazard).

Please discard the battery in accordance with the environmental regulations. Please contact your local waste disposal management agency for relevant information

Treatment regulations for lithium-ion batteries.

4.5.2 Safety measures for the battery charger

Observe the following safety measures when using the battery charger:

Do not use the charger to charge any battery other than the SPL-500 laser scanner battery.

Check the plug, the cable, and the charger itself periodically. If any damage occurs, please contact Southern 3 D Laser Services.

Do not let the metal or liquid contact the charger terminals. In this case, the terminal may short-circuit and generate heat.

To avoid electric shocks, only chargers and power units can be used in a dry indoor environment.

Do not operate the charger in an environment that may be damp or in contact with flammable liquids or gases. There is an explosion danger!

The charger shall be placed in a dry place.

.64 Mechanical safety



The rotating imaging unit rotates at a high speed during and for a short time after the scan. When the imaging unit rotates, keep the distance from the product and do not touch the rotating imaging unit with your hands, fingers or any object to avoid personal injury and damage to the SPL-1500 laser scanner.



general service

The SPL-1500 laser scanner can only be used on a smooth surface. If the SPL-1500 laser scanner collapses, possible injury. Please use only the equipment recommended by Southern 3 D Laser and follow the installation instructions in this manual or the equipment manufacturer's manual.

Do not open the enclosure

If the shell is opened, it may cause serious personal injury



Handcart use

If using a handcart, take extra care when moving this equipment. Do not move the car by pulling in the power cord. Excessive force, emergency stop or uneven surface may cause the SPL-1500 laser scanner to overturn.

Spinning scanner

The SPL-1500 laser scanner can be rotated up to 360 degrees clockwise when scanning. During scanning, ensure that the scanning head of the SPL-1500 laser scanner rotates freely and without touching any objects.

.74 Shipping

The following precautions must be taken when transporting the laser scanner equipment:

The laser scanner must be closed during shipment or delivery using a shipping box.

Remove the battery from the laser scanner prior to delivery.

When moving the laser scanner, be careful not to let it drop. A strong impact may damage the laser scanner, causing

It doesn't work properly.

Remove the laser scanner from its equipment, or use the original shipper to provide optimal protection.

When carrying the laser scanner by train, ship, aircraft, or land vehicle, ensure to use its original shipping container and

Suitable external carton to provide optimum collision and vibration protection.

The SPL-500 battery is a lithium-ion battery, so it is dangerous goods. While handling or transporting

the SPL-500 battery,

Ensure compliance with all relevant local and international regulations and regulations. For further information, please go before shipping or shipping

Contact with the local transportation company.

4.8 Storage

Before storing the laser scanner for a long time:

Remove the battery.

Place the scanner and battery in the box to avoid damage from environmental disadvantages and

Store all components in an environment with low humidity and relatively stable temperature without receiving extreme temperature and environmental conditions

Or the effects of a violent vibration.

4.9 Maintenance

It must be maintained and repaired only by qualified maintenance personnel authorized by the Southern 3 D laser. In the following cases,

Please remove this product from the power outlet, remove the battery and ask qualified maintenance personnel for maintenance assistance:

The power cord or plug is damaged.

Products are exposed to rain water, water, or other liquids.

Product drop or damage.

A foreign body falls into the product.

Cannot operate the product normally according to the operating instructions.

The product performance has changed significantly.

To the required overhaul and calibration date.

5. Get started quickly

This chapter describes the preparatory steps and basic SPL-1500 laser scanner operations and will you step by step from setting up the SPL-1500 laser scanner to recording the first scan.

.15. Charge the battery

The SPL-500 battery can be charged using a battery charger.

It is recommended to fully charge the battery before use. Prepare spare batteries during the scan program if required.



Do not throw the battery in the water or in the fire.

Do not expose the metal to the battery terminals.

In this case, the battery may short-circuit and generate heat. There is an explosion or fire hazard.



Always protect this device from rain

water or splashing water. The power supply unit can be used in many countries / regions.



- Charge the battery with a battery charger
 - a . Connect the power unit cable to the power socket of the battery charger.



Figure 5-1: Battery charger connected to the power cord

- b . Connect the AC power cord to the power unit and the power outlet. Before connecting, view the input voltage on the type label.

1. When the power supply is properly connected, the LED of the battery charger lights up in red.
2. Place the battery on top of the battery charger. Ensure the battery terminals is properly aligned with the charger pin. Connect the battery card to place.



Figure 5-2: Place the battery above the battery charger

- 3. Start charging automatically; the LED lights up according to the current charging state of the battery.
- f . After charging, carefully remove the battery.

5.1.2, Battery use prompt

Charge the battery on the day or the day before its use. The power level of the unused rechargeable batteries will gradually decrease over time.

If the battery runs out quickly after being fully charged, replace it with a new battery.

To achieve optimal battery performance, it is recommended at ambient temperatures of 0°C (32° F) to 40°C (104° F). Battery performance and running time in colder or hotter places may be temporarily reduced.

5.2 Install the SPL-500, the laser scanner



warn

There is a risk of injury, especially for children and people with mobility difficulties.

If the SPL-500 laser scanner collapses, possible injury.

The SPL-500 laser scanner can only be used on a smooth surface.

If using a handcart, take extra care when moving this equipment. Do not move the car by pulling in the power cord. Excessive force, emergency stop or uneven surface may cause the SPL-1500 laser scanner to overturn.

When windy, sandbag each foot of the tripod. You can also place a weight on the ground under the tripod, and then tie a rope or damping line between the tripod center hook and the weight.

This procedure includes the following steps.

- Place a tripod, as shown in Figure Figure 5-3.



Figure 5-3 Open the tripod

- Attach the base to the tripod, as shown in Figure Figure 5-4.

Expand the foot of the tripod

Ensure the tripod is stable, fixed, and the platform remains as horizontal as possible.

Stand height is suitable for surveyor height



Figure 5-4 Attach the base to a tripod

Point the main engine at the tripod slot, insert the slot, the side of the base has a fixed spiral, clockwise lock, in order to install it

Mount on a tripod for tightening.

17

18

- Adjust the circular level of air bubbles

By adjusting the height of the tripod to center the circular level bubbles, such as the bubble near the center point can also be directly by rotating the foot spiral to let it in the center.

The scanner is now physically installed and can be scanned. Before starting the scan, check the external package for any signs of damage or deformation. Check whether the mirror image is damaged due to scraping, fragmentation, and deformation, and check its cleanliness.



Figure 5-5 Adjust the circular level bubble to the center

6.1 Storage system

• Prepare the U disk

The SPL-500 laser scanner stores the recorded scans on the U disk. This U disk SPL-500 laser scanner

Store established engineering and scan data to the U disk automatically, and copy historical data from internal storage to the U disk.



Risk of data loss

Do not remove the U disk from the scanner when used, otherwise there is a risk of damaging the data in the U disk. The U disk icon in the status bar of the controller software indicates that the U disk is in the working state.

When removing the SPL-1500 laser scanner U disk from the computer, you should always use the "Safe Remove Hardware" option from the system tray, otherwise there is a risk of damaging the U disk data. To securely remove the hardware in the Windows, double-click the Secure Remove Hardware button in the system tray and select the device you want to remove from the list.

• Insert into the U disk



Figure 5-6: Insert the U disk

- Open the battery hatch cover and find the U disk card slot under the battery compartment.
- Prepare the U disk.
- Confirm the direction of the U disk. If you force in the U disk in the wrong direction, the data in the U disk may be damaged.
- Close the protective cover.

• Remove the U disk

To remove the U disk from the scanner, open the U disk slot cover and gently remove the U disk.

Do not pull out the U disk when it is busy.

Please be careful not to loosen the U disk and drop it.

.45 Turn on the laser scanner

Long press the scanner button to start the start process when the monitor screen lights up. Home page of the scanner controller software

Will appear on the integrated touchscreen. All the functions of the laser scanner are operated by simply tapping the elements on the screen.

You can also navigate through the user interface using a capacitive stylus.

Note: When the laser scanner is opened for the first time, prompt [the current equipment has no engineering, whether to create], click [OK]

Create a new project. See 5.7 for how to create a new project.

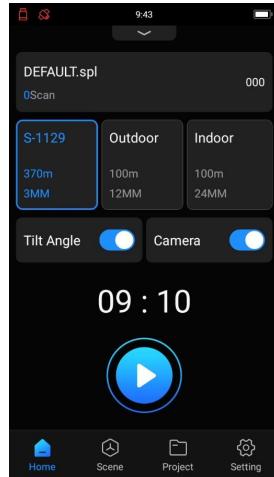
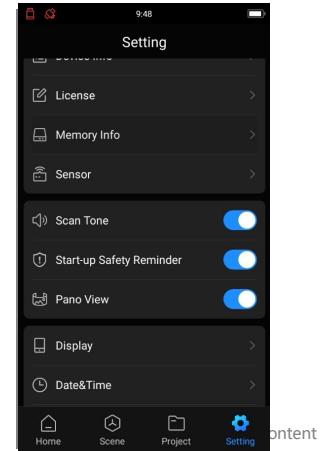


Figure 5-7: Initial interface of the laser scanner

5.5 Basic settings

This section will brief you on how to use the scanr the initial scanner settings on an integrated touch screen.[System Settings] [Basic settings] in Figure 5-8.



5.7.1 Wireless connection

If you want to edit the relevant parameters of the SPL-500 laser scanner through the image processing software, you can use this function to connect the computer to the mobile network of the device for data transmission.

Specific steps: Find [system Settings] [Basic Settings] [wireless connection] from the navigation interface, search the network of the device on the computer or other mobile devices, and connect as shown in Figure 5-9.



5.7.2 Change the screen brightness and sleep time

If you need to change the screen brightness and sleep time, you can modify it through the [display] page, as shown in Figure 5-10.

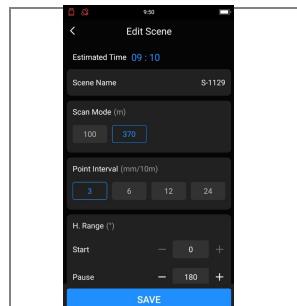


Figure 5-10 Adjust the brightness as well as the dormancy time

5.7.3 Set the date and time

If you need to change the date and time settings, go to [System Settings] [Basic Settings] [Date and Time]. As shown in Figure 5-11.

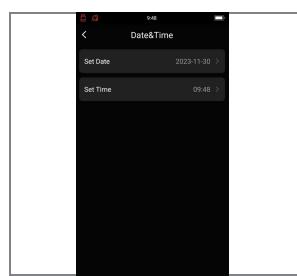


Figure 5-11 Set the date and time

[Time format (24 hours)]: tap can be set time format. The scanner can be used for 24 hours or 12 small Time-only display time. Slide the button to On for a 24-hour option. Slide the button to the off, and you will select 12 hour system.

[Set the Date Format]: Tap to select the date format. The current selected date format is displayed along with the options.

5.5.4 View the scanner information

Tap to set the internal clock of the SPL-1500 laser scanner.

If you need to view the specific model of the current laser scanner and the current firmware version, you can go to [System Settings] [Basic settings] [scanner information] as shown in Figure 5-12.

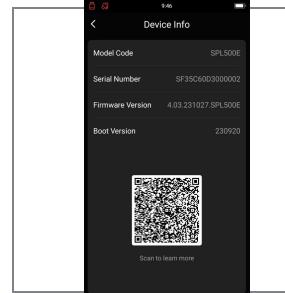


Figure 5-12 View the scanner information

5.5.5 Register the host

If you need to view the current registration information of the SPL-1500 laser scanner, you can go to [System Settings] [Basic settings] [place]→ [Host registration] View, as shown in Figure 5-13.

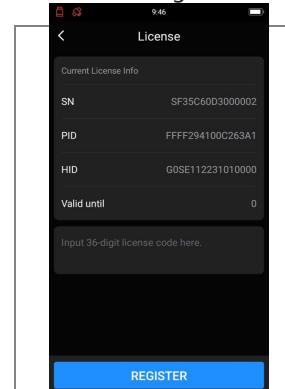


Figure 5-13, for the registered host

This feature helps you view the registration information for the current SPL-1500 laser scanner and enable host registration by entering a 36-bit registration code.

.5.65 About

If you need to view the current software version and update the software, you can go to [System Settings]

[Basic Settings] [off

View at], as shown in Figure 5-14.



Figure 5-14 Software inspection updates

Tap [check update] to realize the function of software update, if the system prompts [currently is the latest version], no

Software needs to be updated.

.65. Create a new project

If you need a new project, you can find the [System Settings] [Project List] [New Project] in the navigation interface,

In the [New Project] page, you can customize the project name, file name prefix, first code, and remarks information etc.

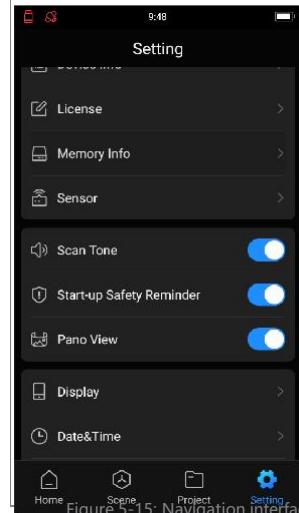


Figure 5-15: Navigation interface

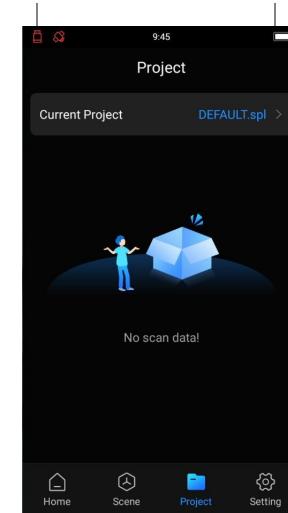


Figure 5-16: Open the new project interface

Click Save to save the new project and view the new project in [System Settings] [Project Li

5.5 Set the scan parameters

This chapter briefed you on how to set scan parameters to capture scans. Usually before you start scanning the project, you want to provide and enter the scan parameter information first.

Go to the navigation interface [parameter setting] for details as shown in Figure 5-17.

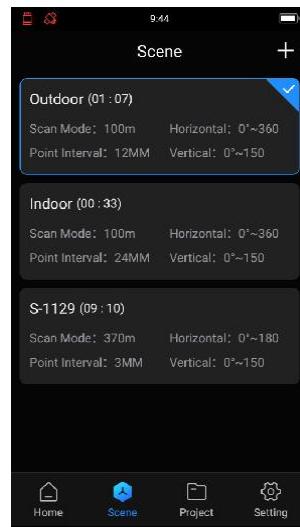


Figure 5-17 for Setting of the scan parameters

Scan parameters (such as resolution, quality, or scan angle) are the parameters used by the scanner to record the scan data. In the choice

When you scan a profile, its settings will override the scan parameters.

There are two ways to set the scan parameters:

- ① Change these parameters manually and implement them through [New Scene]
- ② Select the scan profile as a set of predefined scan parameters by selecting the [application scenario] preset by the system

realize.

5.5.1 View the application scenarios

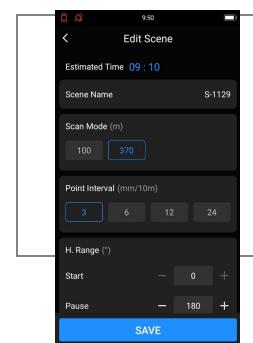


Figure 5-18 Default application scenario of the system

25.7 Create a new application scenario

If you need to manually change the scan parameters, you need to create a new application scenario by going to [System setting] [Application scenario] [New scenario], as shown in Figure 5-19.

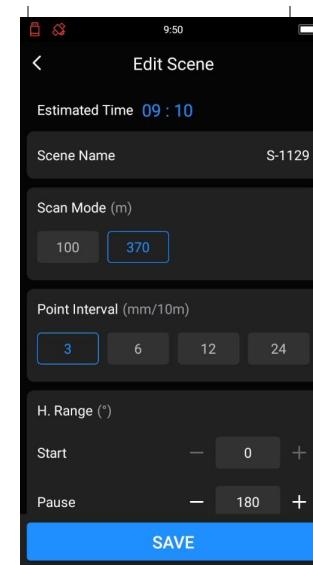


Figure 5-19, Create a new scene

[Scene Name]: Customize the scene name according to different scenes.

[Scan Parameters]: Click [Scan Parameters] to enter the parameter change, where the scan mode can select 100m / 370m,

The point distance can be selected as 3cm / 6cm / 12cm / 24cm. The scanning time and point distance can be viewed on this page, as shown in Figure 5-20.

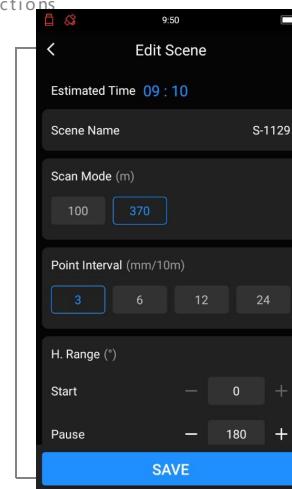


Figure 5-20 Setting of the scan parameters

[Scan range]: Display the scan range in [New Scene] [Scan range], which includes horizontal and vertical start angles and termination angles (in degrees).

Horizontal range: the size of the horizontal scan area (in degrees). The tapping field can enter values for both the horizontal start angle and the horizontal end angle values.

Vertical range: the size of the vertical scan area (in degrees). The tapping field can enter values for both the vertical start angle and the vertical end angle. As shown in Figure 5 – 21.

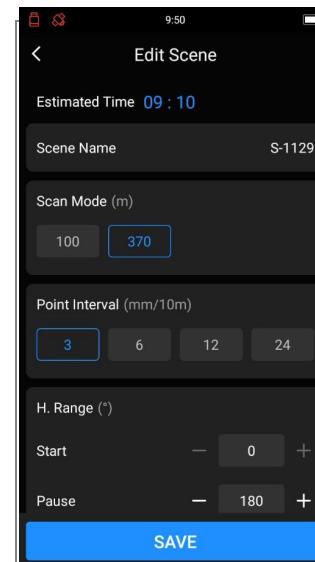


Figure 5-21 Setting the scan range

[Angle acquisition]: Slide the button to "on" inclination acquisition function. Swiping the button to "off" turns off the inclination acquisition function, as shown in Figure 5-22.

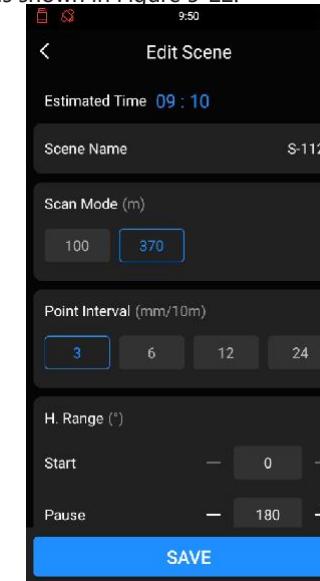
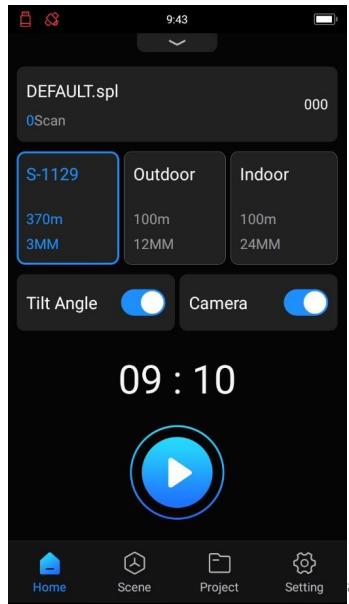


Figure 5-22 Turn on the inclination angle acquisition function

[Camera]: can select [built-in camera] or [not used] for operation, touch the camera for camera type selection,

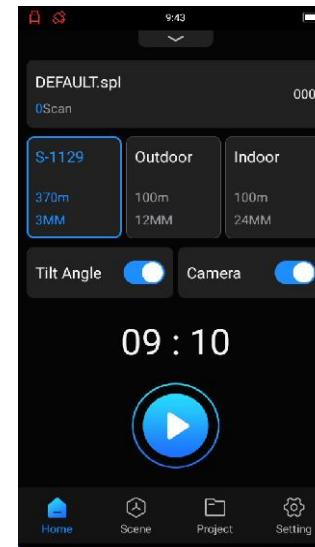
A red dot is a successful check. As shown in Figure Figure 5 – 23.



Click [Save] to save the new application scenario.

.85 Start scanning

From the drop-down information bar at the top of the controller software screen, you can view the current project information and confirm the current selected project, tap the home page [Start Scan] button on the controller software screen to start scanning. As shown in Figure Figure 5 – 24.



Figures 5-24, starting the scan

Note: the scanner will rotate and the imaging unit will rotate at a high speed. Make sure the scanner moves freely and that no objects touch the imaging unit.

If there is not enough space on the U disk, a prompt is given and the scanner refuses the scan. In this case, remove the scan data from the memory card or insert a new card, and then try again.

At the beginning of the scan process, the scanner's laser is turned on and the scan view is displayed. During scanning, the scanner rotates clockwise for 180°. If a color scan is performed, the scanner continues to rotate for 360° to take photos. The processing steps performed are displayed in the status bar of the scan screen, and the scan progress is indicated by the progress bar.

To stop scanning, press the [End Scan] button in the scan view.

5.3 Cleaning instructions for the optical devices

Major contamination and improper cleaning of optical devices and lenses can affect the scanning quality. Serious part damage or wear may occur

Complete replacement is required.

To avoid unnecessary damage or wear, clean the optics only if contamination affects normal function,

For example, increased noise or reduced scan range have been observed. Major contamination may affect the scan quality. In this case, the recommendations are made

Proper clean the external optical devices (rotating optical mirror module or sensor glass cover).

In either case, cleaning must be performed by trained personnel only, and damage to the customer may occur

Resulting in a complete replacement of the entire part at the customer's expense. If you have any questions, you can contact the customer service of Southern 3 D laser

Department of affairs.

Do not touch the optical surface directly by hand or try without wearing laboratory gloves.

We recommend the use of latex gloves. If you are allergic to latex, use suitable gloves for you. After taking off the gloves, make the

The gloves were gently wiped with a lab cloth. Use isopropyl alcohol to remove grease and dirt.

Do not allow the forceps or forceps to touch the optical lens.

Only a cleaning solution without acetone shall be used.

• Equipment or materials required

Before starting the procedure in this chapter, prepare the following items.

- Compressed air, non-flammable spray (no oil)
- Non-acetone, non-flammable optical cleaning solution
- Scrub paper, available in optical stores:
- Small drop bottles and medium-sized washing bottles are available in optical or chemical stores:
- Stainless steel clamps, optical or chemical supplies stores are available:
- Powder-free laboratory gloves (PVC or silicone) are available in optical or chemical stores.
- Mild neutral soap can be used for highly polluting optical devices, sold in optical or chemical stores.

5.4 Clean the optical devices with mild pollution



Hand injury

If the scanner opens unexpectedly, the optical mirror may start to rotate. Before starting any cleaning activities:

Close the laser scanner module and remove the battery pack.

If using an external power supply, disconnect the power cord. Prevent the optical mirror from rotating during the cleaning process.

2.16 Dry pre-cleaning (non-contact cleaning)

Always first use compressed dry air or a dedicated spray filter (dry clean gas) to remove the optical mirror or
Dust or droplet contaminants on the sensor cover plate.



Do not shake the spray bottle.

Be sure not to shake the bottle or reverse it when
using the spray filter.



Damage of the scanner optical
mirror and lens

Direct contact with the optical
surfaces is avoided at all times

1. Gently blow the particles off the optical surface with compressed air.
2. Perform a visual inspection.
3. If necessary, dry and clean if necessary.
4. Continue with step 6.2.2

6.2.2 Use lens paper and isopropanyl alcohol for wet cleaning



Damage of the scanner optical mirror and lens
Use a pair of clean (new) gloves while
performing the following steps.

Step 1: Prepare the cleaning film

- 4.1 Overlap 2 or 3 pieces of optical device cleaning paper together.
- 4.2 Repeat the cleaning sheet in half, fold the long side twice, then turn 90°, and fold twice to form a soft sheet about 30 mm long.
- 4.3 Use the to with with, as shown. Leave at least 2-3 mm between the edges of the cleaning sheet and the pliers.
- 4.4 Gently squeeze the cleaning piece on the top of the spare cleaning paper to make it a T-shaped cleaning piece.
- 4.5 Use a small drop bottle to wet the film with isopropyl alcohol or cleaning solution
- Step 2: Clean the optical mirror module or sensor cover plate
- c. Use a cleaning sheet to gently wipe the optical mirror or sensor glass with a one-way continuous linear action from one end to the other blind flange
- d. After each cleaning cycle, discard the cleaner piece and prepare a new one as described above.
- e. Repeat the cleaning to wipe the entire optical mirror or the sensor cover aperture.
- f. Visually check the cleaning status.
- g. Prepare another cleaning sheet with isopropyl alcohol or optical cleaning solution (see [2], recommended) and perform the final steps.
- h. Gently wipe the entire optical mirror surface once in the linear direction of low pressure.
- i. Visually check the cleaning status. Ensure that there is no contamination residue. Otherwise, repeat repeatedly with isopropanol or optical cleaning solution as needed.

6.3 Clean the seriously polluted optical devices



Hand injury

If the scanner opens unexpectedly, the optical mirror may start to rotate. Therefore, turn off the laser scanner module and remove the battery pack before starting any cleaning activity.

If using an external power supply, disconnect the power cord. This prevents the optical mirror from rotating during the cleaning process.

3.16 Dry pre-cleaning (non-contact cleaning)

Always first use compressed dry air or a dedicated spray filter (dry clean gas) to remove the optical mirror or

Dust or droplet contaminants on the sensor cover plate.



Do not shake the spray bottle.

Be sure not to shake the bottle or reverse it when using the spray filter



Damage of the scanner optical mirror and lens

Avoid direct contact with the optical surfaces at all times!

- Gently blow off the particles on the optical surface.
- Perform a visual inspection.
- If necessary, dry and clean if necessary.
- Continue with step 6.3.2.

6.3.2 Wmoist cleaning with water or diluted mild soap

Provide a solid base, such as a desktop or the top of the shipping box, as a safe basis for performing the following cleaning steps. Cleaning steps:

1. Remove the laser scanner unit from the tripod.
2. Turn the scanner and place it on the long side.
3. Ensure that the optical mirror is freely movable and convenient for wet cleaning.
4. Rotate the optical mirror module to a vertical position, where the optical mirror points in a direction from the scanner. Use the fingertip to fix the imaging unit to hold it in this position.
5. Clean the optical mirror module by washing with water or diluted neutral soap by oscillation action (the sensor cover plate is similarly operated). matters need attention:
 - .1 Visinspect the cleaning status.
 - .2 Repeat the rinse step until the contamination is significantly reduced or even completely removed.
 - .3 Wait for the optics to dry out.

.4 Turn the laser scanner to a vertical (normal) position and ensure stable position. For example, place a scanner on a desktop or shipping box. Or use a tripod for the installation.

.5 Continue using "use lens paper and isopropanol for wet cleaning"