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LSM-L340
HANDHELD 3D SCANNER
OPERATION MANUAL

V2

1. Product Introduction

1.1. Product Overview

The LSM-L340 3D scanner uses three laser line modes to cover a variety of scenarios to obtain the data of the object surface. When the operating environment changes, the mode can be switched in real time to adapt to different environments to achieve better measurement results.

Compared with other handheld 3D scanners, the LSM-L340 offers superioraccuracy and employs a real-time meshing algorithm to convert pre-processed data into a mesh model instantaneously, enhancing operational convenience.

LSM-L340 has the advantages of being lightweight and easy to operate as well as the excellent measurement accuracy. It is suitable for use in various industrial production environments and can provide more efficient, accurate and convenient scanning.

1.2. Product Specifications

Technical parameter

Scanning mode	hige-speed scanning	26 crossed blue laser lines
	precision scanning	7 parallel blue laser lines
	deep hole scanning	1 blue laser line
Maximum scanning speed		5400000 measurements/s
Maximum scanning field		650mm×550mm
Highest precision		0.020mm
Maximum resolution		0.01mm
Volume accuracy		0.015mm+0.035mm/m
Depth of field		550mm
Reference distance		300mm
Laser class		CLASS II (eye-safe)
Output format		asc, igs, txt, umk, stl, ply, obj, etc. can be configured as needed
Interface		USB 3.0
Power supply		100-240V, 50/60HZ
Dimension (L×W×H)		315×140×85mm

* Minimum computer configuration:
System: Win10 and above, 64-bit;
Graphics card: NVIDIA GTX, RTX4060;
Video memory: 8 GB; Processor: ≥ I7-13700h and above;
Memory: ≥ 32GB.

2. Product Hardware

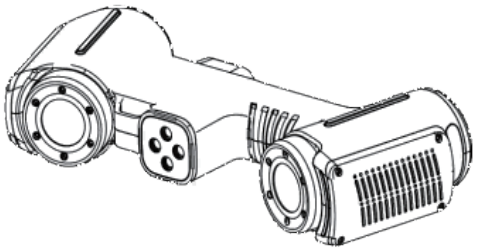
2.1. Hardware Support Kit

The LSM-L340 and its supporting hardware are all stored in the instrument box.

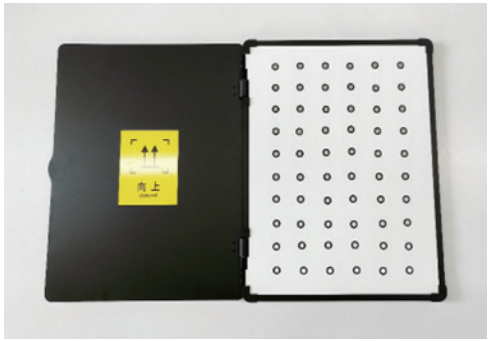
2.1.1. Instrument box composition

The instrument box generally includes LSM-L340 equipment, integrated wiring harnesses (power lines and information data transmission lines), reference marking points, quick calibration boards, hardware encryption locks, and USB flash drives.

(1) LSM-L340 3D scanner body. Its exterior is shown as following.



(2) Calibration plate: Used to quickly calibrate the camera parameters of the scanner before using. It is recommended to use the calibration plate for camera calibration before each accuracy measurement. The exterior of the rapid calibration board is depicted as following.



The rapid calibration board is located beneath the foam insert that houses the scanner. Please exercise caution when removing or inserting the calibration board and scanner to avoid damage.

(3) Marker point box. This box contains a set of marker points, which are adhesive targets used to assist the scanner in positioning objects during the scanning. The exterior of the marker point box is shown as following.



(4) U disk and Dongle box: used to place U disk and dongle. The U disk mainly stores supporting software installation packages, Dongle is used for software protection, and realizes the function of software limited time/limited times/limited function modules through authorization.
Its exterior is shown as following.

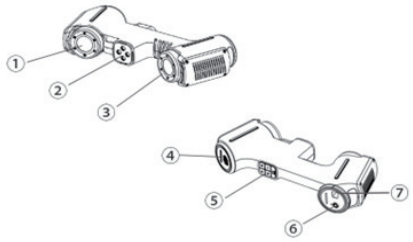


(5) Integrated wiring harness: includes power adapter and Integrated power&data cable. The Type A interface of the data cable is connected to the computer to transmit data, and the Type B interface is connected to the scanner to receive data. The 4-pin aviation head interface of the power cable is connected to the scanner, and the buckle design is used to prevent it from falling off during use.
Its exterior is shown as following.



(6) Related documents: including test reports, product warranty cards, user manuals, etc. Generally, the default is electronic version, which is stored in the U disk.

2.1.2. Scanner Structure
(1) A detailed view of the scanner is provided as following.



① Camera A
② Laser Unit
③ Camera B
④ Scan Distance Indicator
⑤ Control Buttons
⑥ USB Cable Power Interface
⑦ USB TYPE-B

(2) The scanner components and button functions are described as following table.

Key name	Function description	
④ Indicator lighting	Red: Not connected, Green: Connected but not in working, Light blue: Connected and in working, Dark blue: Connected and working is in pause.	
⑤ Function buttons	M button	Click to switch between marker scanning mode and laser scanning mode.
	+/- button	Click to zoom view Click to increase/decrease exposure.
	☆ button	Single click to toggle +/- button function (view and exposure adjustment).
	▭ button	Single click to start/stop scanning Double click to switch laser type.
⑥ Power interface	Used to insert 4pin aviation plug power cable.	
⑦ TYPE B interface	For inserting Type B interface data cable.	

3. Product Software

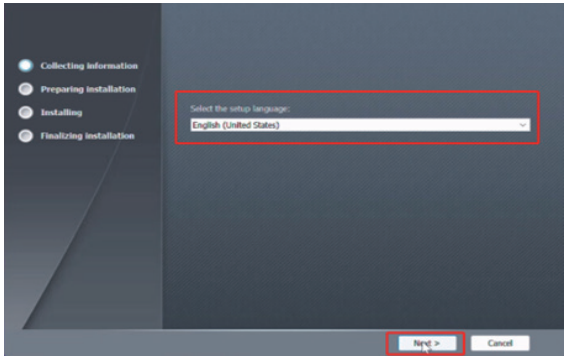
To use LSM-L340 3D scanner, you need to install the scanning software 3D Viewer. The scanning software 3D Viewer is a software specially developed for 3D scanner data processing. It also has real-time control, data optimization and other functions, aiming to facilitate users' daily use. This chapter mainly describes the software's operating environment, installation steps and operations.
(You need to install 3D Viewer before using the device. The latest version of the software will be updated later due to version upgrades without further notice).

3.1 Software Installation

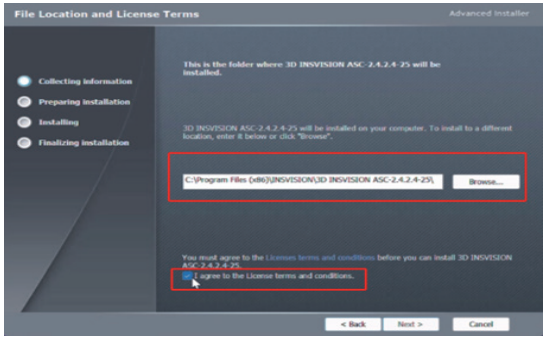
Here, the installation in the recommended configuration environment is used as an example.
(1) Double-click to open the installation package "3D Viewer.exe" in the USB drive, as shown.



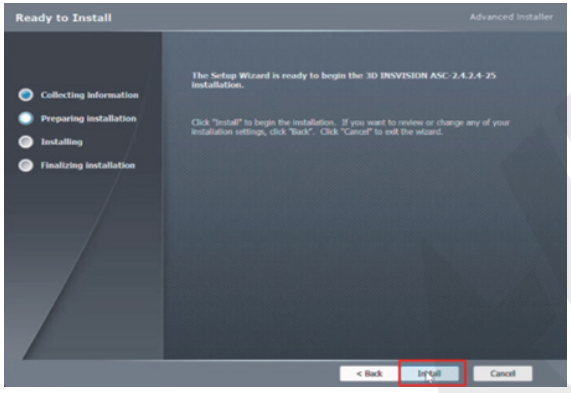
(2) The software installation interface pops up. Select "Language" and click "Next". As shown in the following picture.



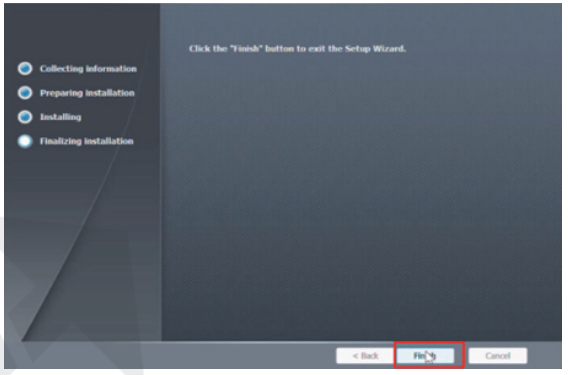
(3) According to the installation wizard, click "Next" and select the path to be installed. Here, the default path is used for installation. Check "I agree to the License terms and conditions." and click "Next."



(4) Click “Install” as shown.



(5) The installation loading interface pops up. Please wait patiently. After the installation is completed, click "Finish" to exit the installation wizard. As shown.



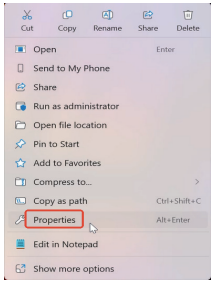
(6) After the installation is complete, a "3D Viewer" software shortcut will appear on the desktop , as shown.



3.2. Software Operating Environment Configuration

After the software is installed, in order to ensure the smooth operation and use of the software, the software operating environment needs to be configured. This section mainly describes the configuration of the computer operating environment after the scanning software "3D Viewer" is installed.

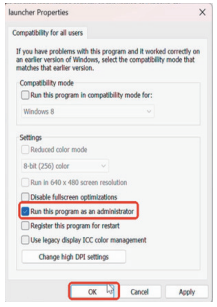
Run with administrator privileges:
(1) Right-click the software icon and click "Properties".



(2) In the tab bar of the System Properties window, select the "Compatibility" tab, check the "Run this program as an administrator" checkbox, and click the "Change settings for all users" button.



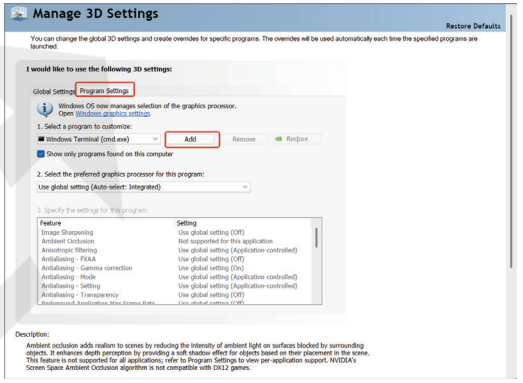
(3) In the pop-up settings window, check "Run this program as an administrator" and click the "OK" button.



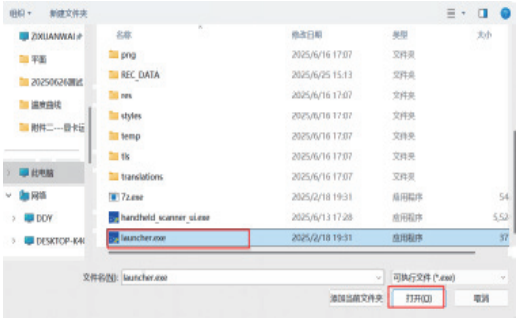
(4) Click the "OK" button.



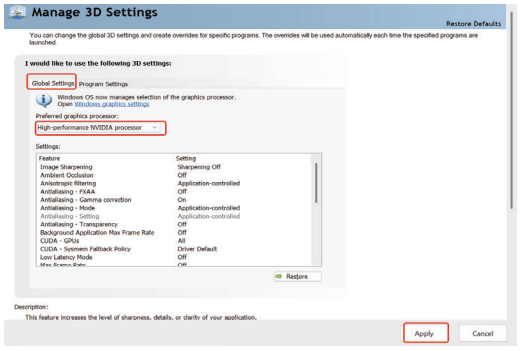
Run with GPU:
(1) Right-click on a blank area of the desktop and select "NVIDIA Control Panel" from the pop-up menu. Select "3D Settings" on the left taskbar of the pop-up dialog box. Select "Manage 3D Settings" at the bottom. Select the "Program Settings" tab on the right. Click the "Add" button in the column for selecting the program to be customized.



(2) Find the 3D Viewer software and add it.



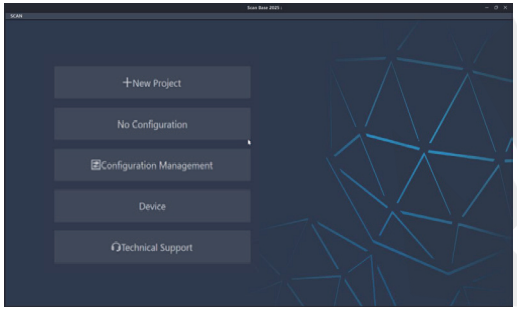
(3) Click the "global setting" tab on the right and select "High-performance NVIDIA processor" in the Select the preferred graphics processor for this program column (if this option is not available, skip this step). Finally, click "Apply".



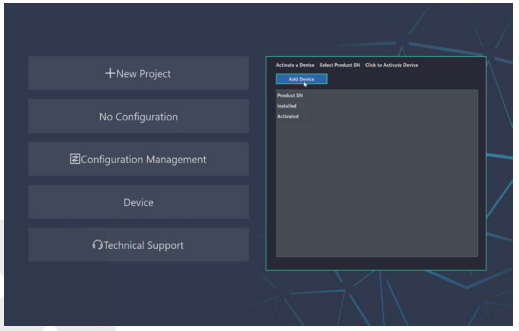
After completing all the above steps, restart the computer, plug in the dongle, start the software, and start working.

3.3. Initial Configuration Management

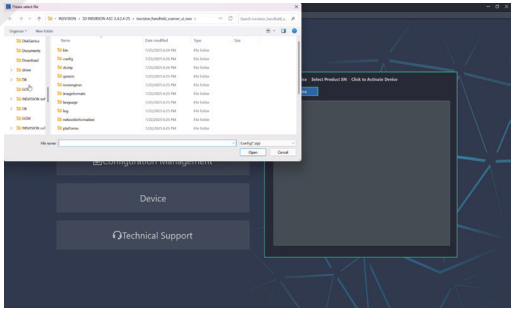
Each device has corresponding configuration parameters. Double-click "3D Viewer" to enter the software and we are ready to configure the parameters, as shown.



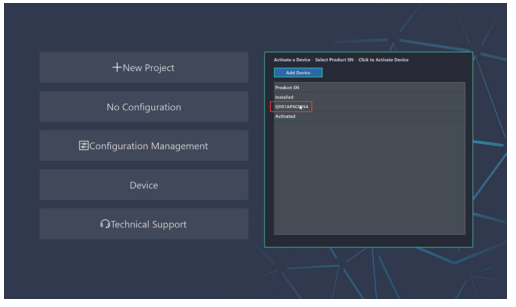
(1) Click "Configuration Management", then click "Add New Product", and a pop-up window will appear to select a folder.



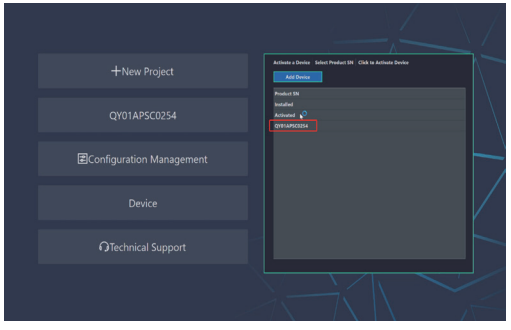
(2) Select the corresponding configuration compressed package in the USB drive and click "Open".



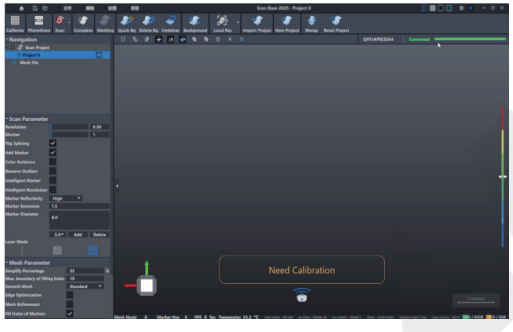
(3) The configuration file you just selected will appear under Installed.



(4) After clicking the configuration file under "Installed", the configuration file appears under "Activated", indicating that the activation is successful.

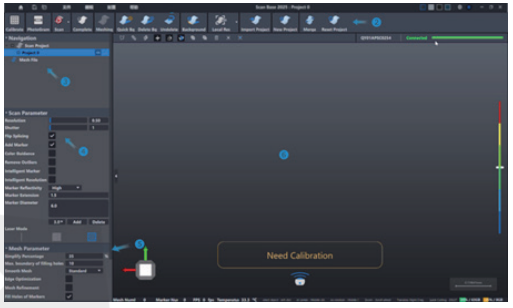


(5) After successful activation, click "New Project" to enter the home page. After a few seconds, if the camera connection status changes to "Connected", it means the connection is successful.



3.4. Software Icon

This section primarily describes the software interface and related icons.
The software interface is as shown.

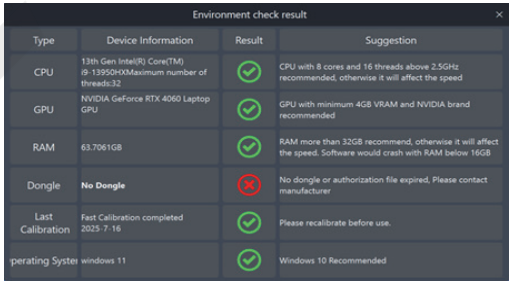


① Menu bar
② Work bar
③ Navigation bar
④ Scan parameter bar
⑤ Mesh parameter bar
⑥ Scan display area

3.4.1. Menu Bar Button Descriptions

Menu bar button	Icon	Function description
File	File	1) Import mesh: After clicking "Import mesh", the screen displays the file directory reading interface. After selecting the corresponding mesh file, the software display area displays the relevant mesh file. 2) Export mesh: After clicking the "Export grid" button, the screen displays the file save directory interface, select the save path, enter the file name, and after the prompt that the save is successful, the file will be saved to the selected path. 3) Export cloud point: After meshing, select the mesh file and click "Export point cloud" to export the corresponding point cloud file. 4) Import marker: After clicking the "Import marker points" button, the screen displays the file directory reading interface. After selecting the corresponding marker point file, the software displays the relevant marker point file. 5) Export marker: After clicking the "Import marker points" button, the screendisplays the file directory reading interface. After selecting the corresponding marker point file, the software displays the relevant marker point file. 6) Import project : After clicking the "Import project" button, the screen displays the file directory reading interface. After selecting the corresponding project file, the software displays the relevant project files. 7) Save project: After clicking the "Save project" button, the screen displays the file directory save interface, select the save path, enter the file name, and after the prompt that the save is successful, the file will be saved to the selected path.
Edit	Edit	1) Fill holes: Select a mesh file (hole filling operations only support PLY format ,if you import mesh file from other place.), click the "Fill holes" button to enter the hole filling mode, and the hole filling interface will be displayed in the middle of the screen. The red area is the area that can be filled. Move the mouse to the red area and it will turn green, click to fill the hole. After the operation is completed, click "Exit Fill Hole" on the left to exit. 2) Calculate normal vector: After meshing, select the mesh file and click "Calculate normal vector" to calculate the normal vector.

Config	Config	1) Environmental detection: After clicking the "Environmental detection" button, the environmental detection result window will pop up in the center of the screen (displaying the detection type, current device information, detection results, and suggestions), as shown in Figure 20. 2) Language: After clicking "Language", a language selection window will pop up. Click the language you need and the software can switch the language automatically.
Help	Help	About: After clicking the About button, you can obtain the company's service hotline, contact information, email, address and other information.



3.4.2. Taskbar Button Description

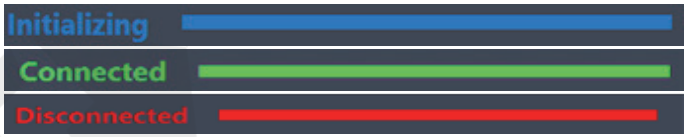
Toolbar button	Icon	Function description
Calibration		Click the calibration button to enter the quick calibration interface, and then you can perform the quick calibration operation. After the quick calibration is completed, the current accuracy will be displayed.
Scanning		After clicking, the mark point scanning will start by default. You can click the inverted triangle on the right side of the scan to select the laser point scanning and mark point scanning.

Complete		Click the "Complete" button to end the current scan, automatically complete the current scan task, and display the corresponding cloud point file.
Meshing		After clicking the "Meshing" button, the current cloud point project will be automatically meshed and post-processed.
Reset Project		Click Reset to clear all items in the navigation bar. But please Click "Scan" to pause or click "Complete" to finish before reset project.
Quick Background		Click to automatically create a background plane, recommended before scanning laser points.
Delete Bg		Click Delete Background to delete the background plane selected in the left navigation bar.
Undelete		Clicking "Undelete" will undo the delete operation.
Background		After adding the background plane, scanner will only scan the part above the plane.
Local Res		Click Local Resolution and enter the value. Click Apply to set the local resolution for the selected area. You can also click the drop-down arrow on the right side of the icon to set the default local resolution.
Import Project		After clicking Import Project, a window will pop up to select the folder location.
New project		Click New Project to add an empty project in the left navigation bar.
Merge		Click Merge to open the interface, where you can merge two projects.

3.4.3. Connection Status Bar

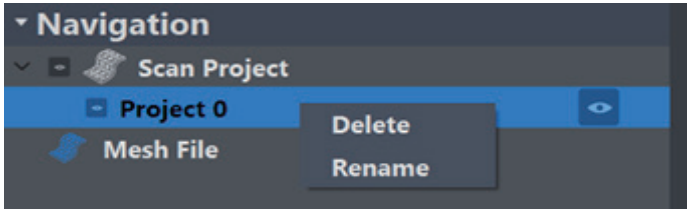
The connection status bar can be used to view the serial number and connection status in real time.
The connection status is divided into "Initialization" , "Connected" , and "Disconnected" , as shown in the figure.

When you initially open the software and set up the configuration file, the status will change from "Initializing" to "Connected". After it displays "Connected", you can start calibration and scanning.
If the camera status is "Initializing "or" "Disconnect" for a long time, it may be that the scanner is not connected or the scanner configuration file is abnormal.



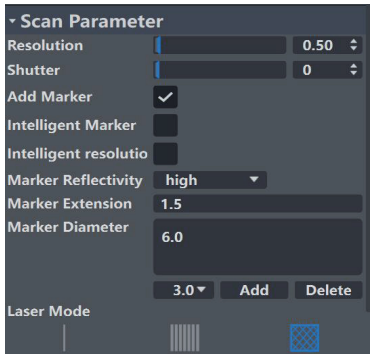
3.4.4. Navigation Bar

The navigation bar consists of scan projects and mesh files. The background plane is in the drop down list of the scanning project to which it belongs. Click the arrow on the left side of the project name to expand background plane. Right-click the project or background plane and you can delete or rename them.



3.4.5. Scan parameter column

Scanning parameters are often adjusted before scanning begins, and the resolution, shutter, laser mode, etc. can be switched.



(1) Resolution: The resolution is the resolution of the scanned object image. The smaller the value, the finer the image. The default value is 0.5.

(2) Shutter: The shutter is the exposure of the camera and can be adjusted in real time when scanning objects with different reflective/absorbent levels.

(3) Flip splicing: After checking it, the flip splicing function will be enabled in the scanning marker mode.

(4) Add marker: If checked, software can recognize new markers. If not checked, software cant recognize new markers.

(5) Color guidance: You can check the box by yourself. After checking the box, the color guidance function will be enabled in the laser point scanning mode (the parts of the workpiece that have been scanned will be displayed in blue, and the parts that need to be scanned will be displayed in yellow).

(6) Remove outliers: You can check it yourself. After checking it, the Removing outliers function will be turned on in the laser point scanning mode, which can remove some of the noise in real time.

(7) Intelligent Marker: The smart intelligent Marker can display the Confidence level of the markers real time.

(8) Intelligent resolution: You can check it yourself. After checking it, the resolution of holes, edges, corners, and details can be automatically adjusted in the laser point scanning mode.

(9) Marker reflectivity: Pull down to select the reflectivity of the marked point. The default setting is high reflectivity.

(10) Marker Extension: The Marker Extension is the distance extending outward from the reflective block on the marked point.

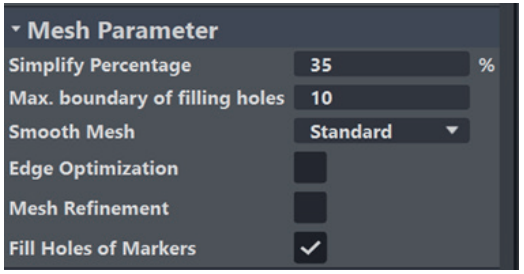
(11) Marker diameter: The Marker diameter is the diameter of the reflective block inside the marking point.

(12) Laser mode: The laser mode is currently divided into single-line mode, seven-line mode, and cross-line mode, which can be switched in real time during scanning.

Note: Except for "Shutter" and "Laser Mode" which can be changed during scanning, and "Add Target Point" which can be changed during pause, other parameters need to be set before or after scanning.

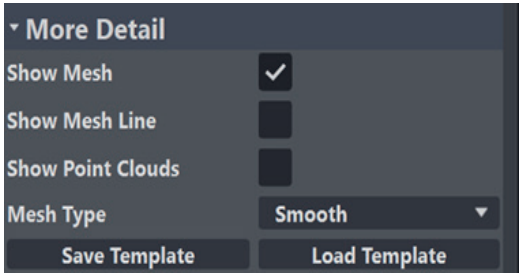
3.4.6. Meshing Parameters Column

Meshing parameters are parameters that need to be adjusted before meshing, including hole filling boundaries, smoothing level, edge optimization, and mesh refinement.



3.4.7. More details column

More details include Show Mesh, Show Mesh Lines, Show Point Cloud and Mesh Type.



Note:
Saving a template will save the scanning parameters, meshing parameters, and the current parameters in More Details as a template, but will not save the "Mesh Type" parameters

3.4.8. Scanning display area

Scan Display Area Button Description.

Scan display area	Icon	Function description
Choose		Includes lasso selection, polygon selection and rectangle selection. Lasso selection is selected by default.
Connection Item		After selecting the connection item button, you can click to select a whole connected to it (including the marked point).
Invert		Click the Invert button to select all targets in the current display frame except the selected target (used with "Select Marker"' and "Select Mesh").
Through		Click the penetration mode to select the back and below parts of the area (used with "Select Marker" and "Select Mesh").
Marker		Clicking the Invert Selection button selects all targets within the current display frame, except for those already selected.
Mesh		Click the Select Mesh
Select All		Click the Select All button to select all data in one project.
None		Click the Unselect All button to cancel all currently selected data.
Maximize		Clicking the maximize button will hide the toolbar, navigation bar, etc. Please press the ESC key and if you wanna to exit to maximize windows, tell me.
Delete		Click the Delete button to delete the currently selected data.
Best viewing angle		Click the Best View button to switch to the best view.

3.5. Common mouse operation commands

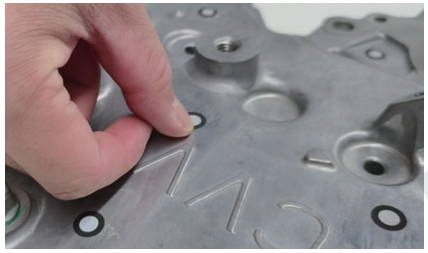
Default scan shortcuts for displayed areas.

Instructions	Quick Operations
Selected area	Long press the left mouse button
Stereo Rotation	Middle mouse button drag
Setting Center	Middle mouse button click
Pan	Right mouse button drag
Quick Delete	Keyboard Delete key
Zoom	Mouse wheel
Choose	Keyboard left mouse click
Start/Pause Scan	Keyboard Space key
Revocation	Keyboard Ctrl+Z

4. Workflow

4.1 Scanning Operation

4.1.1. Arrange Marker.



4.1.2. Connecting devices

The integrated power port (left) is connected to the scanner power port. Integrated cable TYPE B connected to the scanner data interface.



The integrated power cord part is connected to the power adapter cord. Plug the power adapter cord into an outlet.



Integrated cable TYPE A connected to computer.



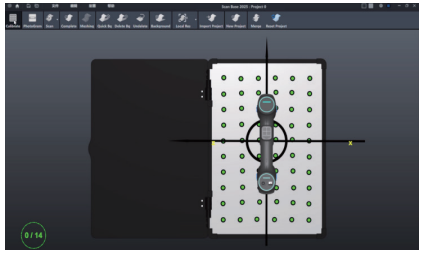
4.1.3. Calibration

(1) It is recommended to perform a quick calibration before starting the scanning operation.

When operating, please take out the calibration plate first and ensure that the calibration plate is placed in the positive direction (open the upper cover to the left).



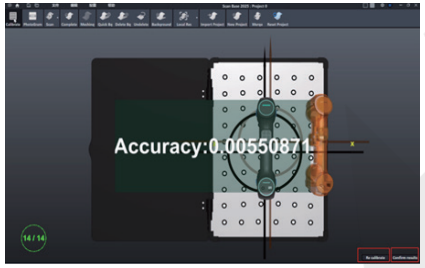
(2) Click the Calibrate button in the scanning software 3D Viewer , and the scanner and calibration plate images will appear on the display interface.



(3) Place the calibration plate on a horizontal and stable surface, point the scanner at the calibration plate, press the button on the scanner, and after the laser is fully projected onto the calibration plate, follow the prompts to calibrate.

(4) After the calibration is completed, the interface will display the current calibration accuracy, indicating that the calibration is complete. If it is prompted that the current accuracy is too low, please re-calibrate.

(5) Click the "confirm result" to save the current calibration data and exit calibration.



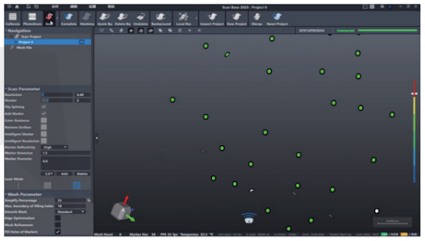
▲ Make sure the calibration plate is placed in the positive direction and the scanner is facing the calibration plate.

▲ No other marking points should exist around the calibration plate.

4.1.4. Marker point scanning

Before scanning begins, the marked points on the workpiece surface need to be scanned to determine the relative coordinates and position of the workpiece.

(1) After the connection is normal, you can start scanning the marker points. Click the "Scan" button in the menu bar to start scanning the marker points (the default initialization is marker point scanning).



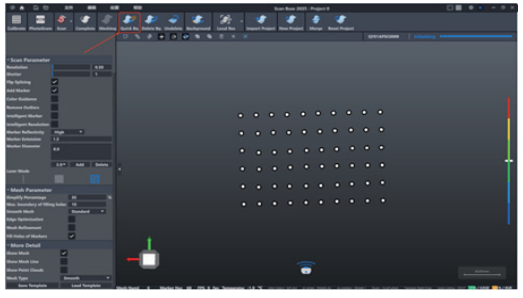
(2) Different shutter can be selected for scanning depending on the workpiece, and can be modified in real time in the "Shutter" of the scanning parameter bar.

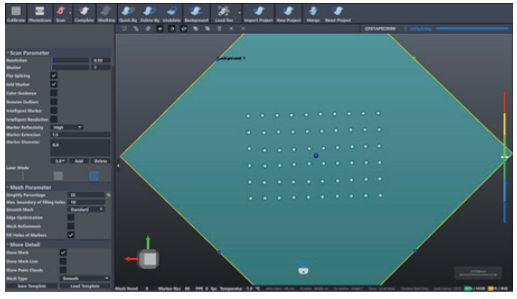


(3) After the marker point scan is completed, you can choose to continue scanning or export the marker points. If you want to export the marker points, first click "Finish Scan", then click "File" in the menu bar, and select Export Marker Points in the drop-down box.

4.1.5. Quick Background

Before scanning, you can choose to create a background plane to isolate the part from the work surface. After creating the background plane, the laser point data which is below background plane will not be scanned during laser point scanning. After scanning the mark point, you can pause the scanning operation as shown in the figure and click Quick Background. The software automatically creates a background plane.





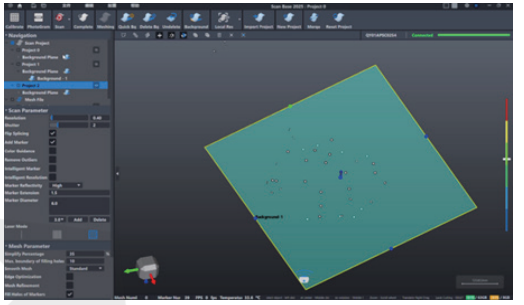
4.1.6. Manually add background planes

Click the "Background" button, select the creation mode as "Fit". Select at least four markers in the same plane to create the background plane, then click Create.

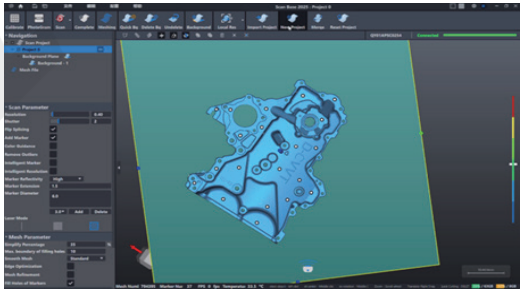


4.1.7. Automatic flip and splicing function

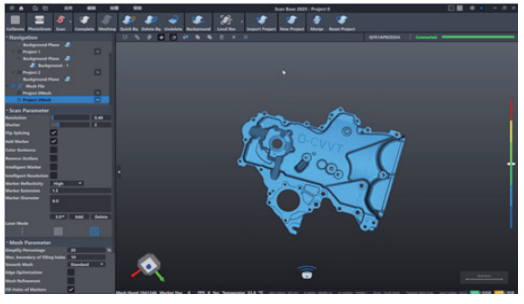
(1) First, scan the marker points of front and side, then set the background plane according to the actual situation.



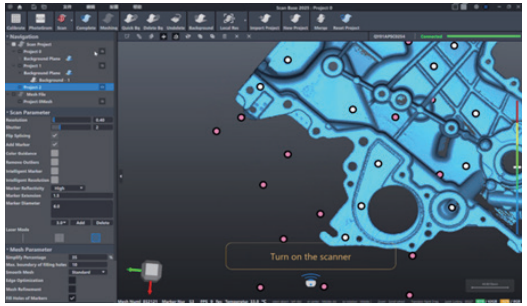
(2) Scan the laser points of front and side.



(3) Delete all marker points outside the workpiece.



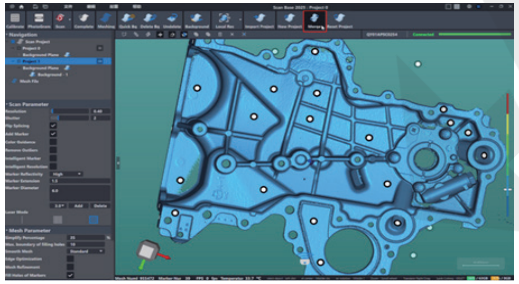
(4) Turn the workpiece over and scan the marking points, which will enable automatic splicing.



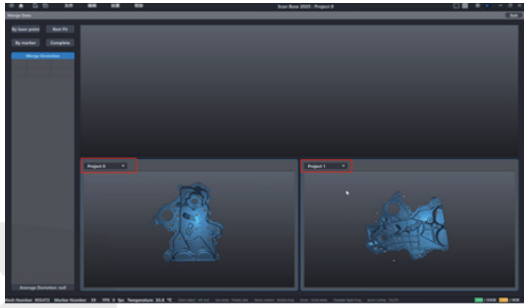
(5) Continue scanning the laser line to complete the scanning of the back and side of the workpiece.

4.1.8. Manual merge function

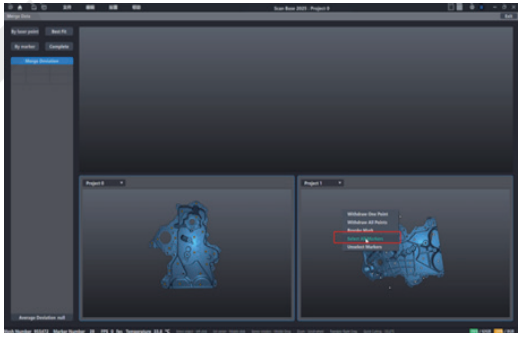
(1) Scan the front and back of the same project as two projects. After scanning, click the "merge" button.



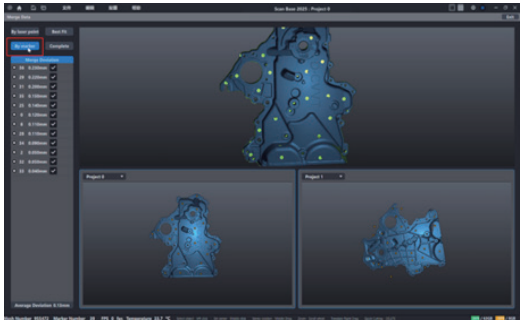
(2) Select two items separately.



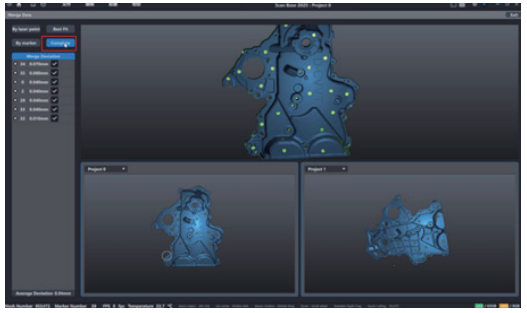
(3) Select common marking points on the two project artifacts. Or you can right click to choose all marker and the software can calculate the same marker.



(4) Click the "By marker" button and remove the marker points that have large display errors.



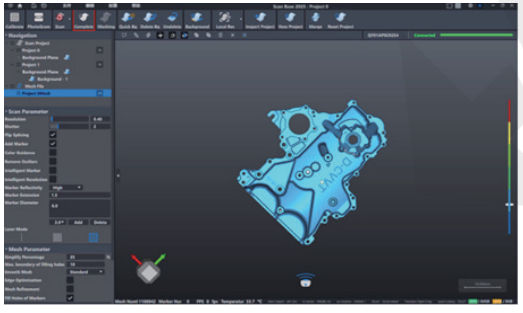
(5) Click the "Complete" button to complete the merge. The merged file will overwrite the project file originally selected on the left.



(6) Click the "Complete" button to complete the merge. The merged file will overwrite the project file originally selected on the left.

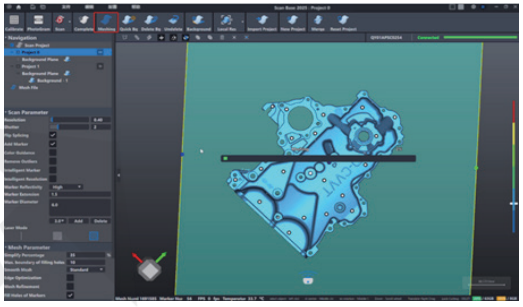
4.1.9. Point cloud scanning and processing

After the scan is completed, you can click "Finish" to complete the scan and process the point cloud data. By checking the connection function, select the point cloud data to be retained, click the inverse selection, and the unnecessary point cloud data will be selected. Click Delete to delete the unnecessary point cloud data. After the data processing is completed, the mesh parameters can be set through the mesh parameter bar on the left. After the setting is completed, click Mesh to complete the point cloud data mesh.



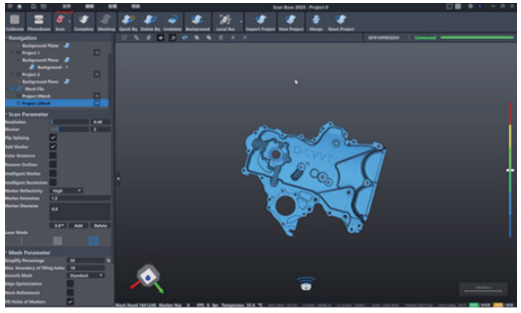
4.2.0. Mesh Optimization

Click Meshing to automatically complete the packaging process.



4.2.1. Saving Data

After completing the meshing, select the corresponding mesh data and click the file in the upper left corner to export the mesh data, point cloud data and marker points as needed.



5. General Troubleshooting

5.1 Unable to open software

· Check whether the software is installed correctly;
· Check the software operating environment configuration.

5.2 The message "No dongle found" appears

· Check whether the key is inserted correctly;
· Check if the key is damaged.

5.3 Device connection failed

· Check whether the power supply is connected normally;
· Check if the USB connection is normal;
· Check whether the configuration file is correct.

5.4 The device cannot be calibrated

· Check whether the configuration file is correct;
· Check whether the calibration plate is damaged.

5.5 The device freezes during operation

· Check whether the marker has moved;
· Check if the computer power supply is loose or disconnected;
· Check if the USB connection is normal.

6. Precautions

· Please don’t disassemble or assemble the device without permission;
· Please use the device with our software;
· Please use the device with recommended power adapter.

6.1 Usage

Pay attention to the following matters, otherwise it may cause damage and failure to the device.
· Please avoid large vibrations and collisions when using scanner;
LSM-L340 is a high-precision device with a precise internal structure. Severe vibration or collision may damage the structure and the optical part.

· Please use this device within the recommended temperature and humidity.

· Make sure the suitable environment , the power socket is well grounded, and the power interface is intact.

6.2 Maintenance matters

· To clean the device, please use cotton cloth dipped in diluted neutral detergent, wring it out and wipe it.
Please do not use damp cloth, volatile oil, thinner or other liquids to wipe the device, otherwise it may cause damage to the appearance of the device, and in serious cases, it may cause damage to the device parts.

·Store the device in the instrument case in a cool and dry place with a relatively stable temperature. Avoid the following places:
Places with too high or too low temperature and humidity.

Dusty places:
Places with corrosive or flammable gases and liquids.