SHINING 3D

FreeScan UE Pro

V 2.0.1.5

User Manual

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Overview

Welcome

Symbol conventions

Symbol	Description
	Note: This symbol is used to inform you of the additional information of the product.
	Caution: This symbol is used to inform you of incorrect operations that may damage the device or result in data loss. Any damages resulting from misuse are not covered by the warranty.
	Warning: This symbol is used to inform you of the potential risks that may result in serious personal injury and other safety incidents.

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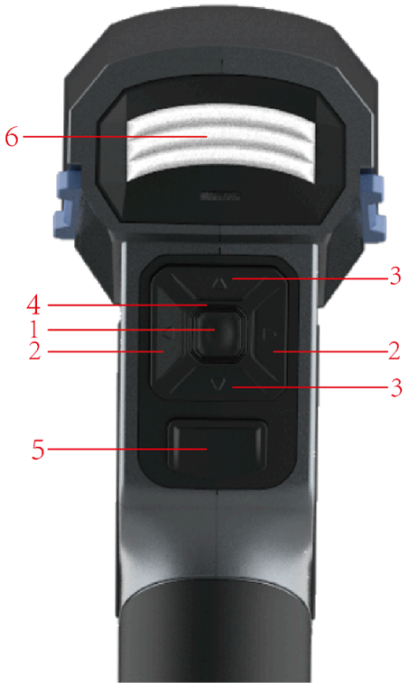
Device

FreeScan UE Pro is a handheld laser 3D scanner independently developed by SHINING 3D, featured in the fast scanning speed, complete data acquisition, light weight, and convenient handholding operation. Besides, the device supports repeatable high-precision operations, without discrimination on the material and color of the objects to be scanned. Therefore, black or reflective surfaces are still scannable. This device is mainly used in industries such as automobile industry, transportation, aerospace, mold inspection and machinery manufacturing.

Appearance

Appearance	Button
	

No.	Name	Description
1	Menu	• Press: The menu pops up. • Press and hold: Change the number of laser lines.
2	Adjustment button	• Press the left button: Decrease the brightness. Press and hold the left button: Switch scan modes. • Press the right button: Increase the brightness. Press and hold the right button: Switch scan object modes.
3	Zoom button	/
4	Power indicator	Only after the power indicator lights on, the user can operate.
5	Scanning button	• Press: Preview/Start Scan/Pause Scan. • Press and hold: To do markers optimization.(scan markers mode and photogrammetry mode)
6	Scanning distance indicator	• Blue：Too far. • Green：Proper distance. • Red：Too close.

Laser Information

Class 2 Laser Product

Laser power: <1mW

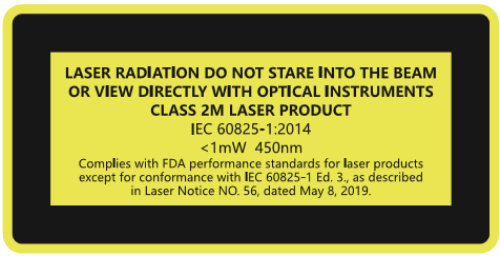
Wavelength: 450nm

Complies with FDA performance standards for laser products except for conformance with IEC 60825-1 Ed.3., as described in Laser Notice No.56, dated May 8,2019.

> ⚠ **Caution**
>
> Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

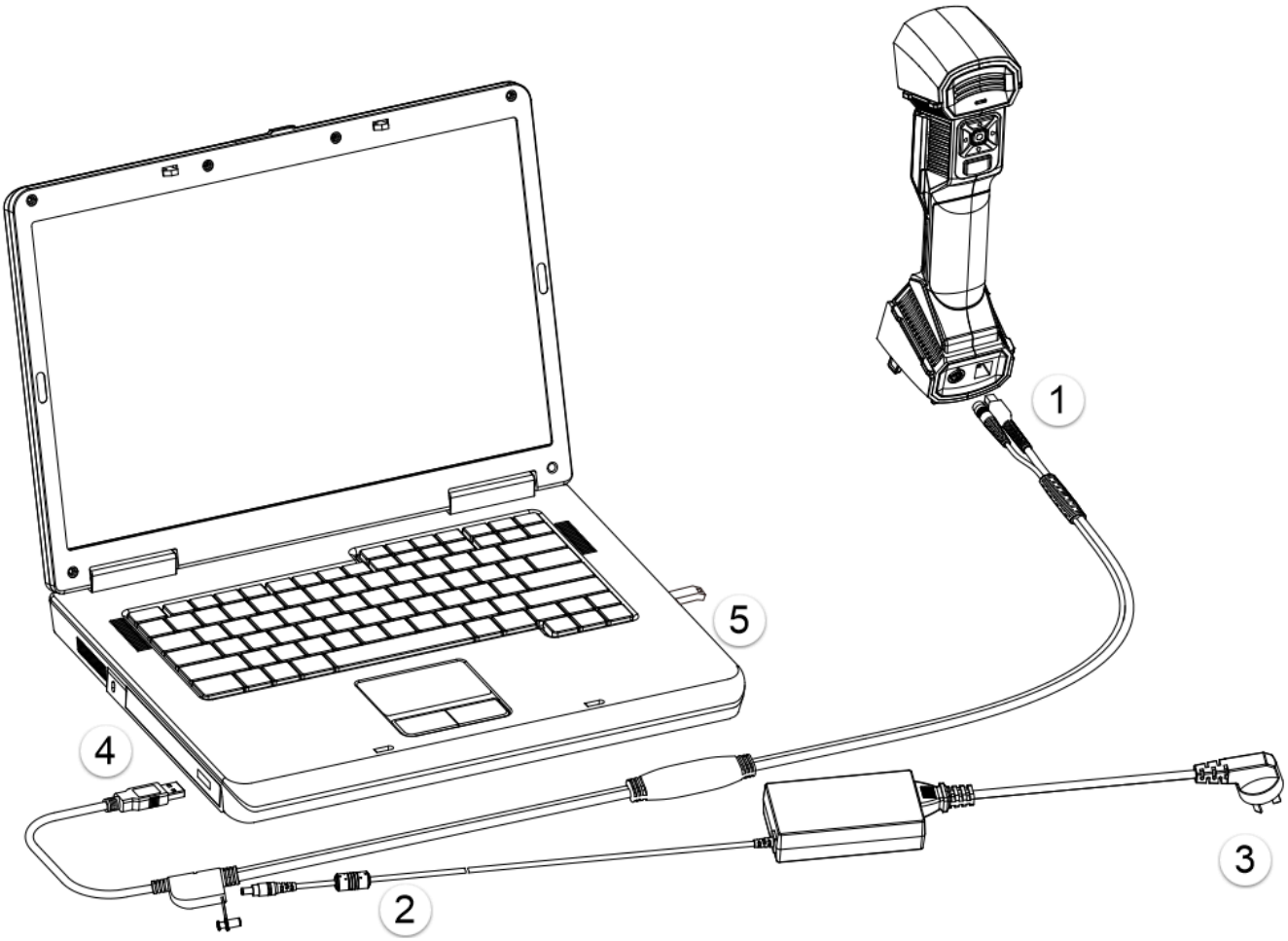
Labels

Read the content on the yellow sticker carefully before using the device.

Identification Label	Warning Label & Certification Label	Laser Logotype Label
		

Logo	Description
CE	**LVD/EMC Directive** This product complies with the European Low Voltage Directive 2014/35/EU and EMC Directive 2014/30/EU.
	WEEE Directive-2012/19/EU The product this manual refers to is covered by the Waste Electrical&Electronic Equipment(WEEE) Directive and must be disposed of in a responsible manner.
UK CA	The UKCA marking is the product marking used for products being placed on the market in Great Britain (England, Scotland and Wales).

Connect Cables



> **Caution**
>
> Make sure you are using the correct power adapter (12 V / 5 A).

Steps

1. Connect aviation cable (4) to power port and USB port on the scanner.
2. Connect power cord (3) and the power adapter (2).
3. Connect power adapter (2) into aviation cable (4).
4. Connect USB port on the aviation cable to the PC USB 3.0 port.
5. Insert the Dongle (5) into the PC USB port.

Note

- Please ensure that the external adapter for the computer is plugged in.
- It is recommended to use hardware configuration with dual-channel memory.

Installation

Install FreeScan to use the scanner(hereinafter referred to as the "software").

Recommended PC configuration

Configuration	Recommendation
CPU	Intel® Core™ i7-8700 or above
Graphics Card	NVIDIA RTX 3060 or above
VRAM	6 GB or above
RAM	32 GB or above
USB	USB 3.0
Operation System	Windows 10(64-bit) and Windows 11 Pro(64-bit)

Software installation

Steps

1. Insert the flash drive.
2. Copy the installation file to the PC and run it.
3. Install the software by following the installation wizard.
4. Click **Finish** and run the software.

Note

- Administrator rights are required for the software installation. The initial installation environment may take a long time, please wait patiently.
- Please do not install the software in **C:\Program Files or C:\Program Files (x86)**. The software will not run when installed under these folders due to restricted rights.
- After installing the software, please follow these steps to ensure smooth operation: Go to **Windows Settings** > **About** > **Advanced system settings** > **Performance** > **Adjust for best performance**. By adjusting the system settings for optimal performance, you can ensure that the software runs smoothly.
- If you don't insert the dongle and only connect the device, the software will automatically enter guest mode when you start it. If you need to use the full functionality, please insert the dongle and click on the **navigation bar > Device** to reconnect the scanner.

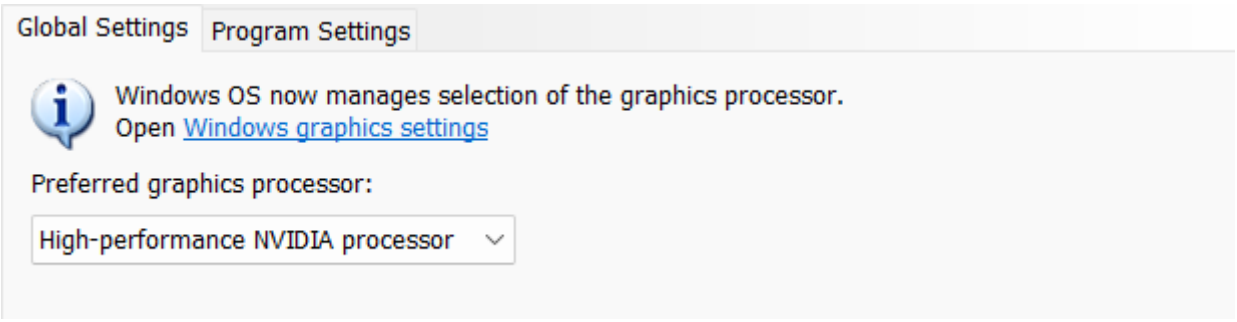
Graphics card

It is recommend to use a discrete graphics card instead of integrated graphics card for better performance.
Desktop

- Connect your display to the port of discrete graphics card on the back of your computer.

Laptop

- Launch **NVIDIA Settings** on your laptop.
- In **3D Settings Manage 3D Settings** > **Global Settings**, select **High-performance NVIDIA processor** and click **Apply**.

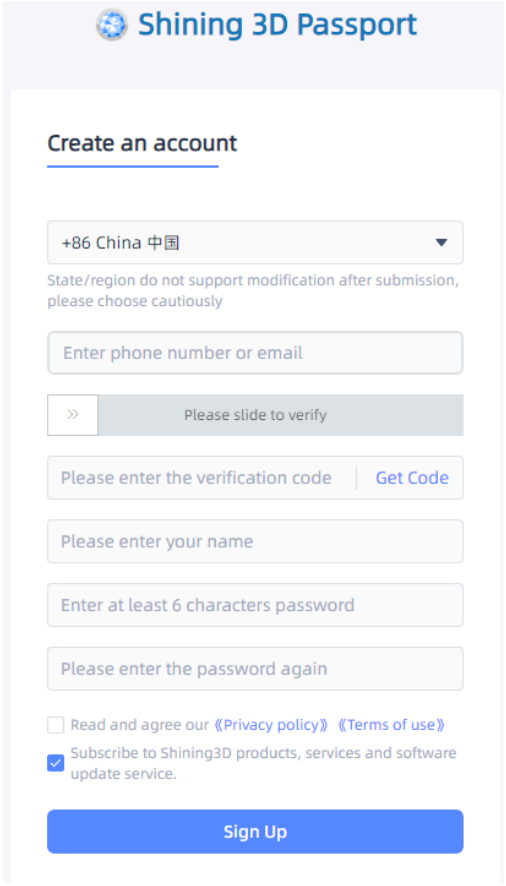


Activation

When using the scanner for the first time, please register an account to activate the device.

Registration

Click **Register** and fill in the account information in the registration pop-up.



Note

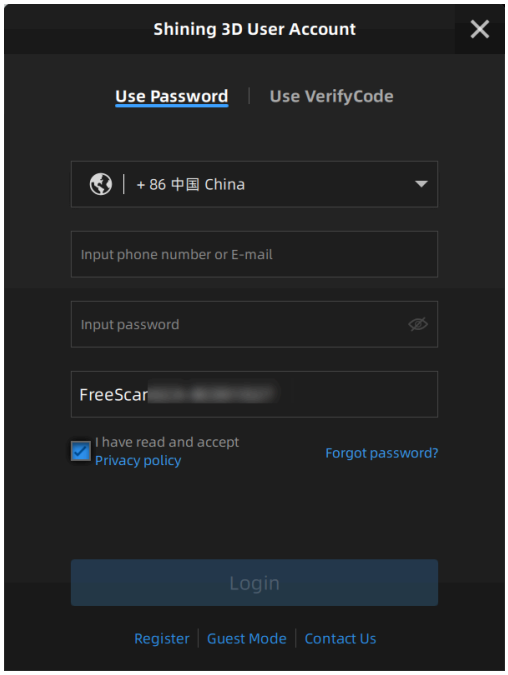
- Enter valid email or phone number to get verify code for registration.
- Fill in correct user information for better service.

Login

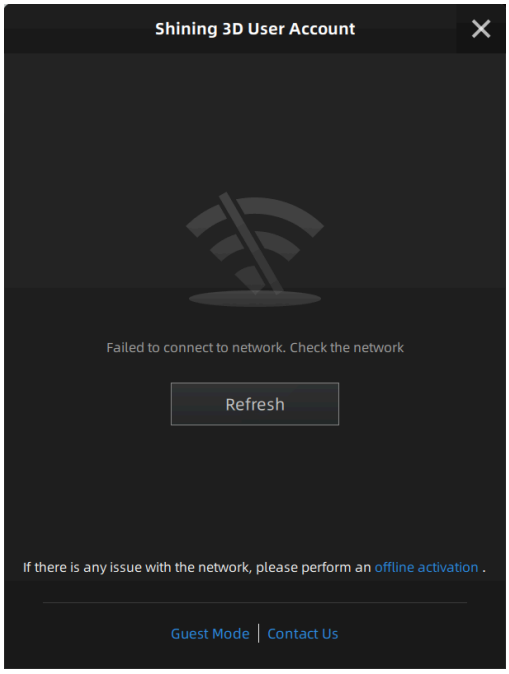
Log in Shining 3D User Account from the pop-up window when launching FreeScan.

If your computer failed to connect to the network:

- Check the network connection and click Refresh to reconnect to the network. It will jump back to the login interface after successfully connecting to the network.
- If your computer can not connect to the network successfully, click offline activation to directly perform the offline activation.



Passport



Network Not Available

Device activation

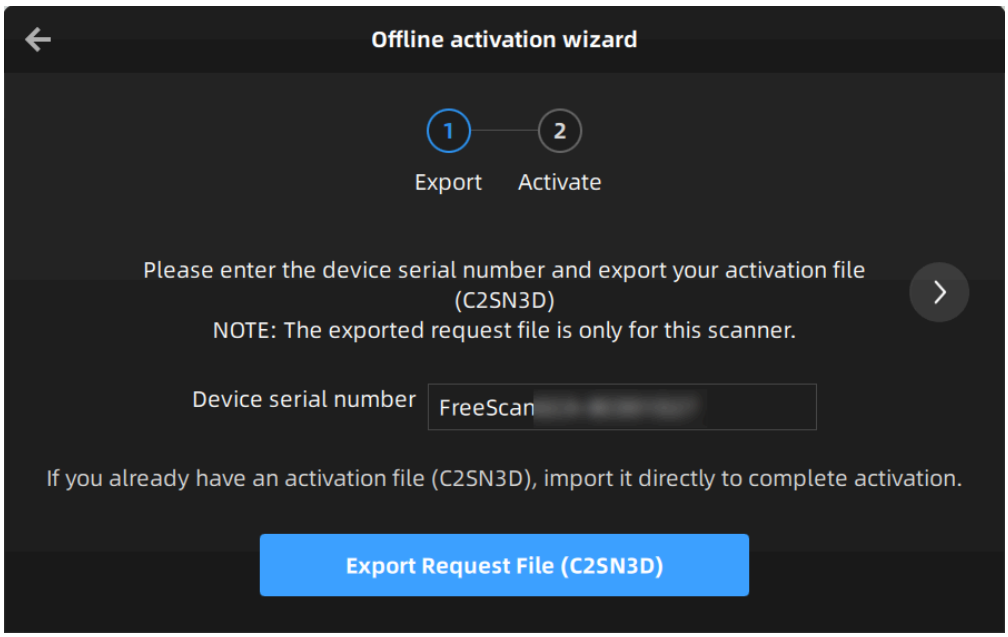
Online activation

The activation will be completed automatically after logging in successfully on the networked computer.

Offline activation

If the PC cannot be networked, activate the scanner offline.

1. Export C2SN3D file.
    a. Prepare a USB flash drive or portable hard disk.
    b. Insert the dongle to your PC.
    c. Enter the device serial number.
    d. Click **Export**. And save the C2SN3D file to a USB flash drive.



2. Upload C2SN3D file.

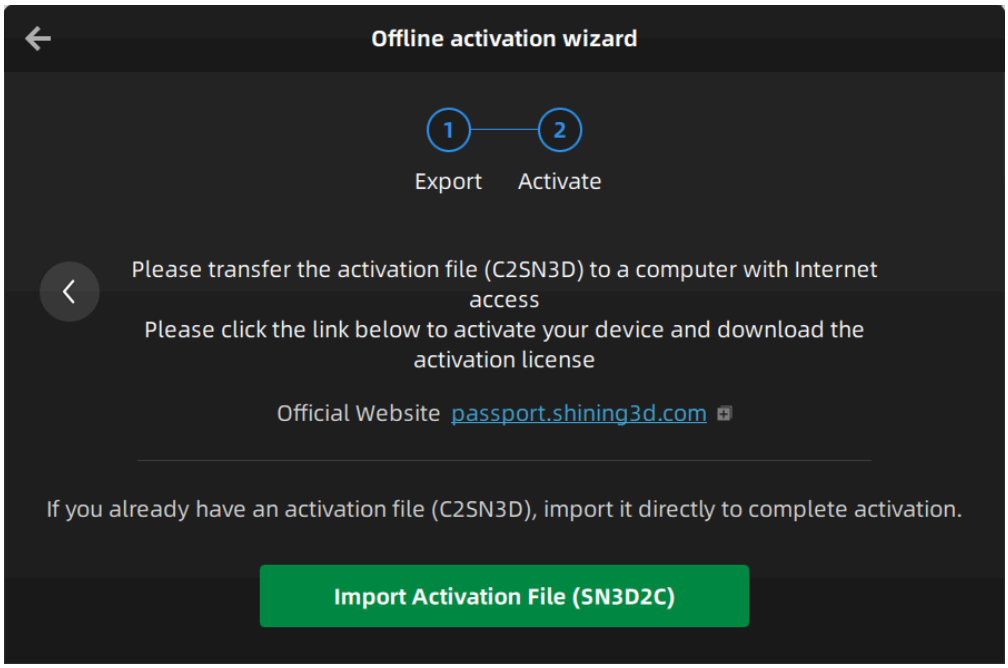
   a. Enter https://passport.shining3d.com/login on the networked computer. Then log in or register a new account.

   b. Click **OFFLINE ACTIVATION**.

   c. Upload the C2SN3D file.

3. Export the SN3D2C file corresponding to your scanner account to your USB flash drive.

4. Import the SN3D2C file to your Shining Pass (in your PC with the software). Then insert the dongle to the PC to enter the software main interface.



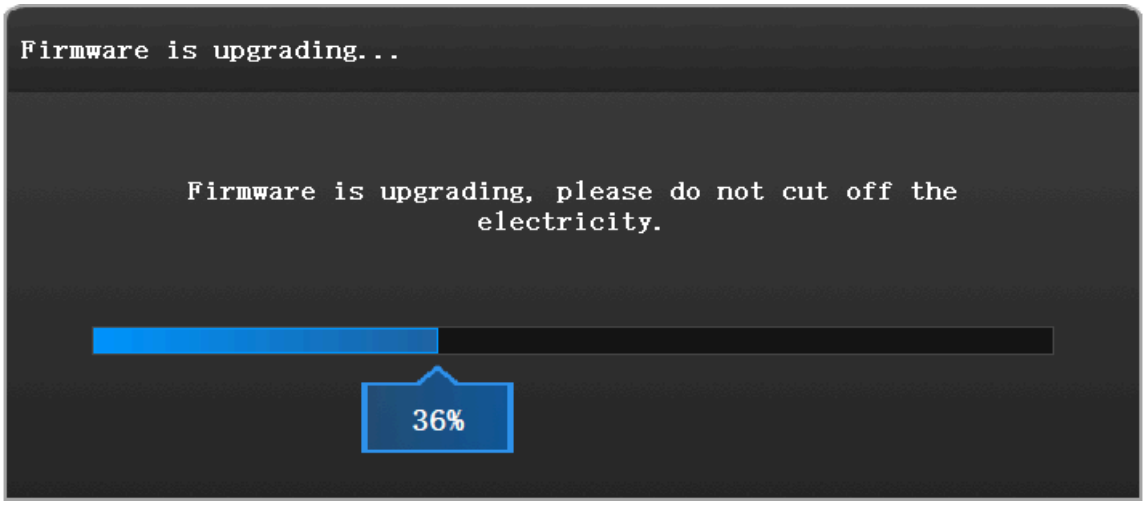
> **Note**
>
> Please contact the supplier or technical support if none of the above methods can activate your device.

Upgrade

When a new version of the software is released or a higher firmware version is available, you will be prompted when launching the software.

Firmware upgrade

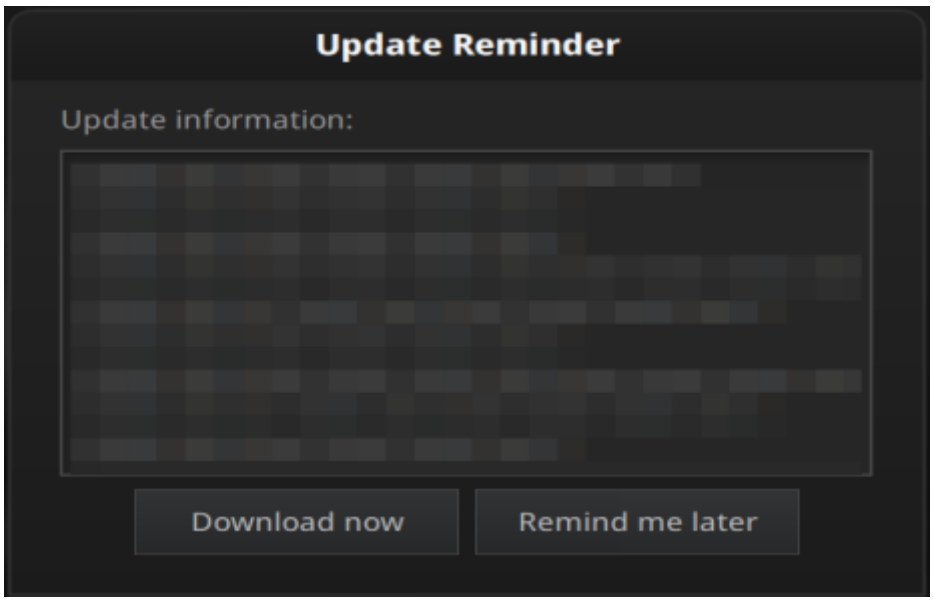
Update the firmware for better performance, stability or bug fixing. Click **Upgrade** to start the firmware upgrade, as shown below.



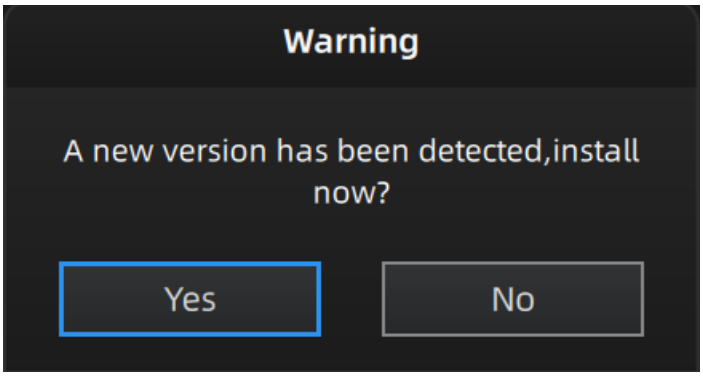
> **Caution**
>
> - Make sure that the device is powered on during the upgrade; avoid interruption of the upgrade due to power cuts.
> - Do not use mismatched software, firmware and scanners, because this may affect the scanning effect. If in doubt, please contact your supplier or technical support.
> - If the upgrade fails, please power off the device and reconnect it to upgrade again.

Software upgrade

Update the software for better performance, new functions or bug fixing.
It is recommended to use the latest software. Otherwise, the following prompt box will pop up when launching the software.



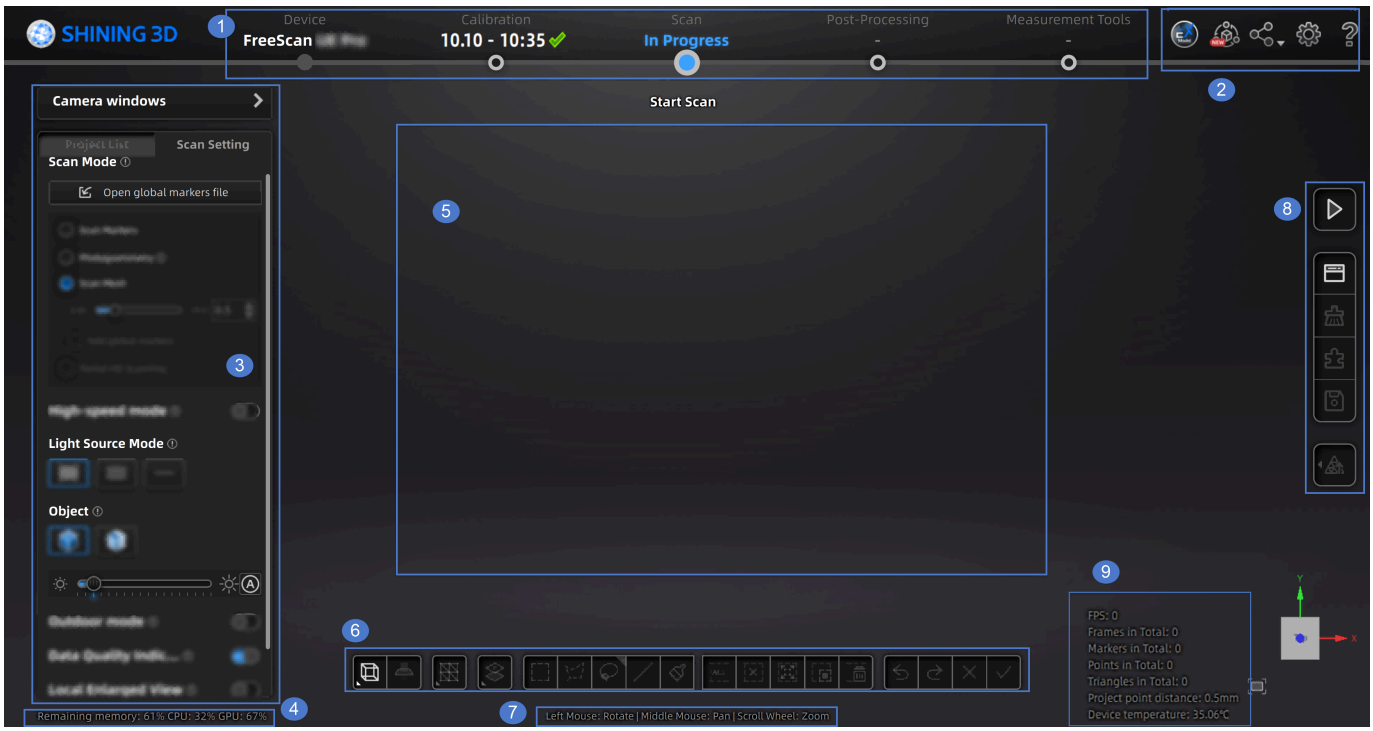
Click **Download Now** will download the installation package in the background. Do not close the software during the download process. When the download is completed, a window automatically pops up for users to decide whether the new version shall be installed immediately.



Click **Yes** to start installing.

> ⚠ **Caution**
>
> The software will be closed during upgrading. Please save your projects properly before upgrading.

Interface



①Navigation bar

- Device: Display the device name and status: online / offline. Click to reconnect when the scanner is offline.
- Calibration: Click it to calibrate.
- Scan: Go into scan process.
- Post processing: Go into post processing after scanning, which includes mesh editing and mesh optimizationg
- Measurement tools: To measure your model.

②Settings and help

View the relevant information for EXModel and our technical support contact.

- If you have not installed the EXModel, click in the top-right corner and choose the corresponding version on the pop-up window to get it.
- If you have installed the EXModel, click to directly switch to it.
- If you have installed the EXModel and you are in the post-processing or measurement interface with mesh data, click to switch to the EXModel and import the data into it; if there is no mesh data, clicking this button will only switch to the EXModel.

Reverse Engineering Service

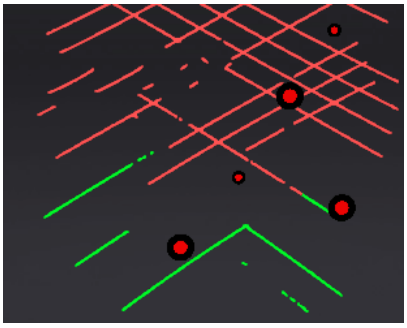
- Official website：Open the official website of Shining 3D to learn about the company's products and information.
- Facebook：Enter Shining 3D's Facebook to view product introduction and other operations.
- Support platform: Enter Shining 3D's support platform to view product introduction and other operations.

General settings

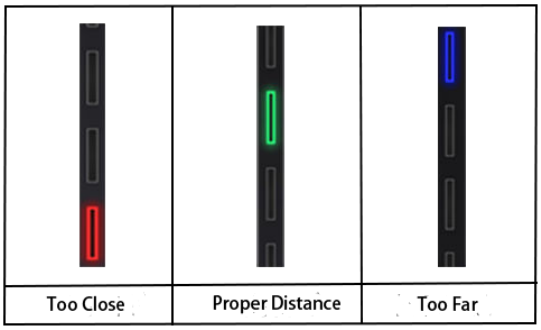
- Select language: set the language displayed in the software.
- Preview：You can preview the scanning effect before the actual scanning when enabling the function.
- Advanced Mode: Enabling the function allows you to choose a smaller resolution when creating a new project. For more, see resolution.
- Shape detection optimization：It can improve the accuracy of sphere diameter but may affect some details of the scanned data.
- Scanner tone：Adjust the volume of the scanner's beep sound.

Laser scan settings

- Scanning distance indication method：There are two methods to indicate the scanning distance.
  During scanning, you can adjust the scanning distance based on the color indication. Here is the color code for distance adjustment:
  Blue: It indicates that the scanning distance is too far.
  Green: It indicates that the distance is proper.
  Red: It indicates that the scanning distance is too close.
  By observing the color of the laser line or distance bar, you can make adjustments to ensure the scanning distance is appropriate.



Laserline indicator



scanning distance indicator

- The laser line closes intelligently：If the scanner fails to recognized enough markers, it will not project the laser line during scanning when enabling the function.

Factory default

Click **Recover** to initialize all settings and the software will automatically restart.

- About：View related scanner information, software version, etc.
- System diagnose：Check whether computer configuration meet the operating conditions. If it shows , it means that the configuration meets the operation requirements. If not, please repair the problem according to the interface prompts. Click **Refresh** to diagnose again.
- Support：You can open the user manual, get remote assistance and check contact information of technical support here.

③Scanning Settings

- Camera windows: To preview the actual scene during scanning. Parameters can be adjusted accurately through the camera window.
- Project group: To manage projects and the project group. For more, see Project and Project Group.
- Scanning parameters: To set scanning parameters. For more, see Setting.

④Memory/CPU/GPU

- Remaining memory
- CPU usage: If the running program occupies a large proportion, it is recommended to close other software.
- GPU usage.

⑤Preview/Scanning Window

Window for viewing the preview and scanning model.

⑥Edit toolbar

There are several tools available to edit scanned data to reduce noise. For more, see Data Editing.

⑦Shortcuts

Quickly move the model or adjust the angle through shortcut keys.

⑧Side toolbar

For more, see Scanning and other functions.

⑨Other information

To show information about FPS, Frames in Total, Points in Total, etc.

Quick guide

Step 1

If you are using the scanner for the first time, please perform the calibration first. Once the calibration is completed, the software will automatically skip this step when you enter it again.

→ Calibrate

Step 2

Before starting the scan, you need to select the storage path for the files and create a project.

→ Create a project

Step 3

After creating the project, you can set the scan parameters for the project to get better scanning results.

→ Set up

Step 4

Scan the object and obtain the data.

→ Scan

Step 5

Step 6

Edit scanned data.

→ Edit

Save scanned data.

→ Save

Quick calibration

Through calibration, the device parameters are recalculated, which not only ensures the accuracy of the device, but also improve the scanning quality.

Through calibration, the device parameters are recalculated, which not only ensures the accuracy of the device, but also improve the scanning quality.

Calibration is required under the following conditions:

- When the scanner is used for the first time, or when it is reused after being laid idle for a long period of time (1—2 weeks).
- The scanner was severely shaken or vibrated, such as shaken during transportation.
- Severe accuracy reduction, such as frequent errors in alignment or unrecognized markers.
- Incomplete data is acquired during the scanning or serious deterioration of the quality of scanned data.

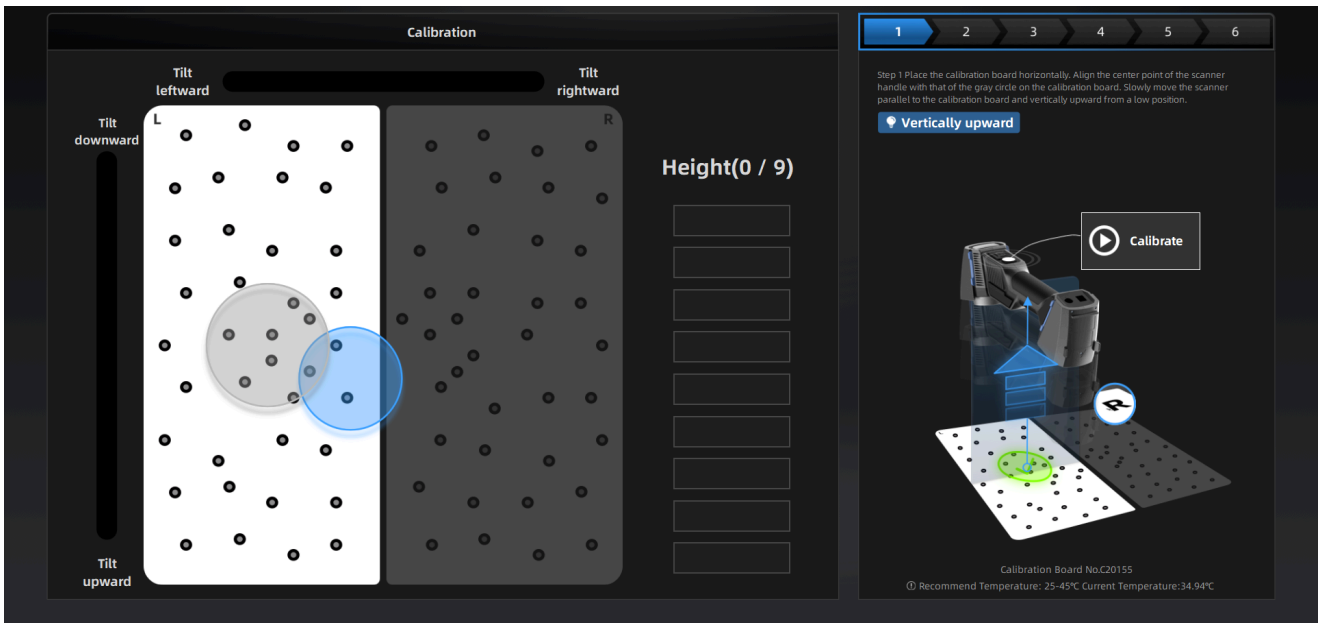
Caution

- Start to calibrate when the temperature of the device get high enough(35℃).
- The calibration board is matched to the device. Calibrating with an mismatched calibration board will lead to inaccuracy or fail to get good scanned data.
- Always make sure that both sides of the calibration board are clean and free of scratches.
- Do not place heavy objects or sundries on the calibration board.
- Keep the calibration board away from corrosives, metals and sharp objects to avoid corrosion or damage.
- It is not recommended to wipe the calibration board. If needed, gently wipe it with a piece of a clean damp cloth. Do not use a cloth with chemicals or alcohols to wipe the calibration board.
- After using the calibration board, put it in a flannel bag.

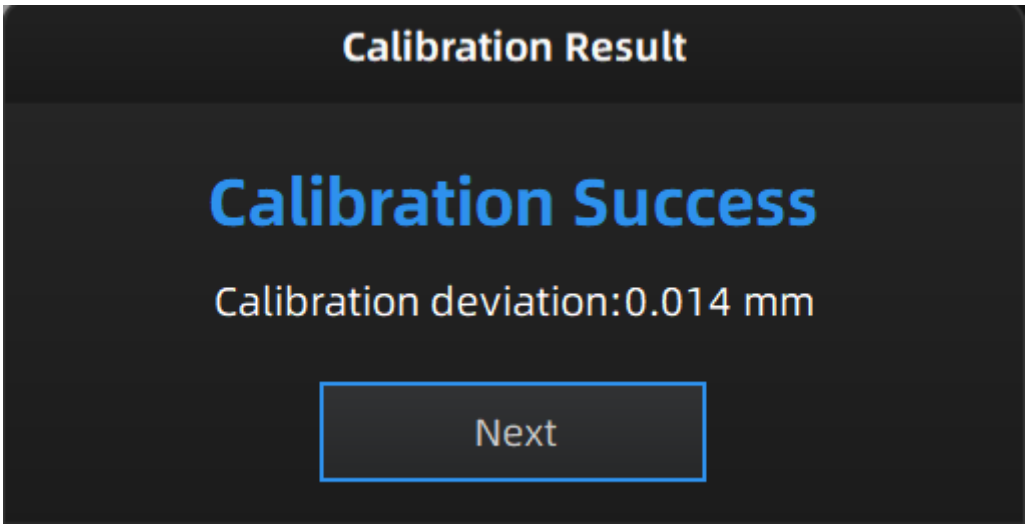
Steps

Follow the steps provided by the calibration wizard on the right side of the interface.

1. Place the calibration board horizontally.
2. Place the scanner in the same direction as shown in the figure.
3. Align the center point of the Device’s handle with the center point of the gray circle on the calibration board.
4. Press the scan button on the scanner to start calibration.



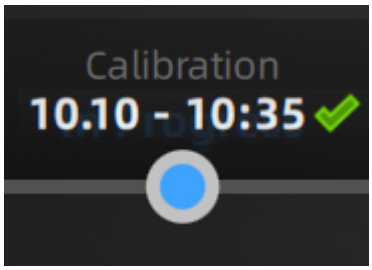
5. Move the device slowly and adjust the distance between the scanner and the calibration board according to the height indicating box.
6. Keep moving until all height boxes turn green.
7. Check the calibration result.



Note

- Please calibrate again if the calibration fails.
- During the calibration process, please ensure that there are not a large number of markers around the calibration board, so as not to affect the calibration accuracy.
- Please contact the supplier or technical support if the calibration still fails after several attempts.

The navigation bar at the top of the interface will display the time when the calibration was completed successfully. If no further calibration is performed within 7 days after the completion of the previous calibration, will appear. It is recommended to perform calibration again to ensure scanning accuracy.



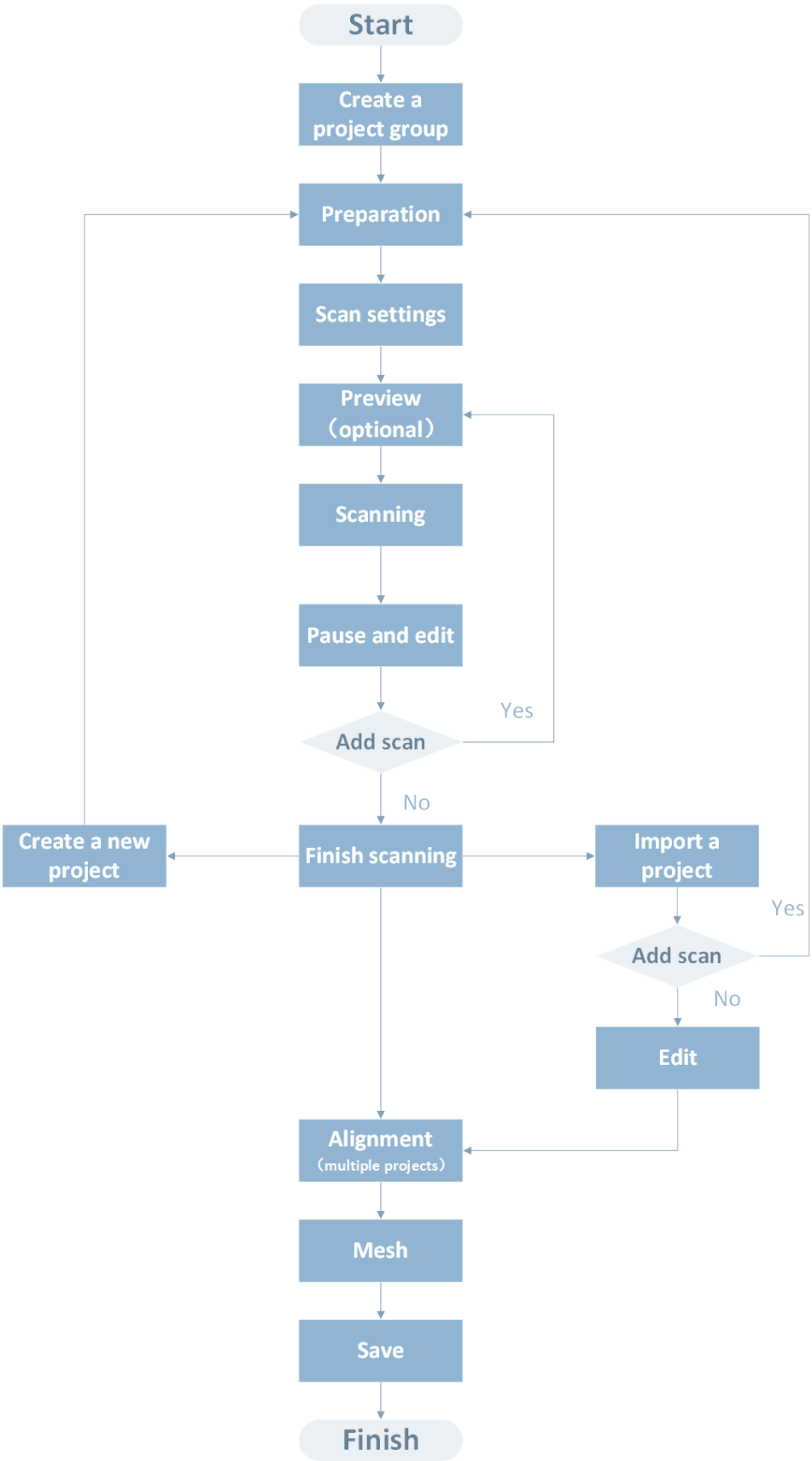
Scan

Workflow

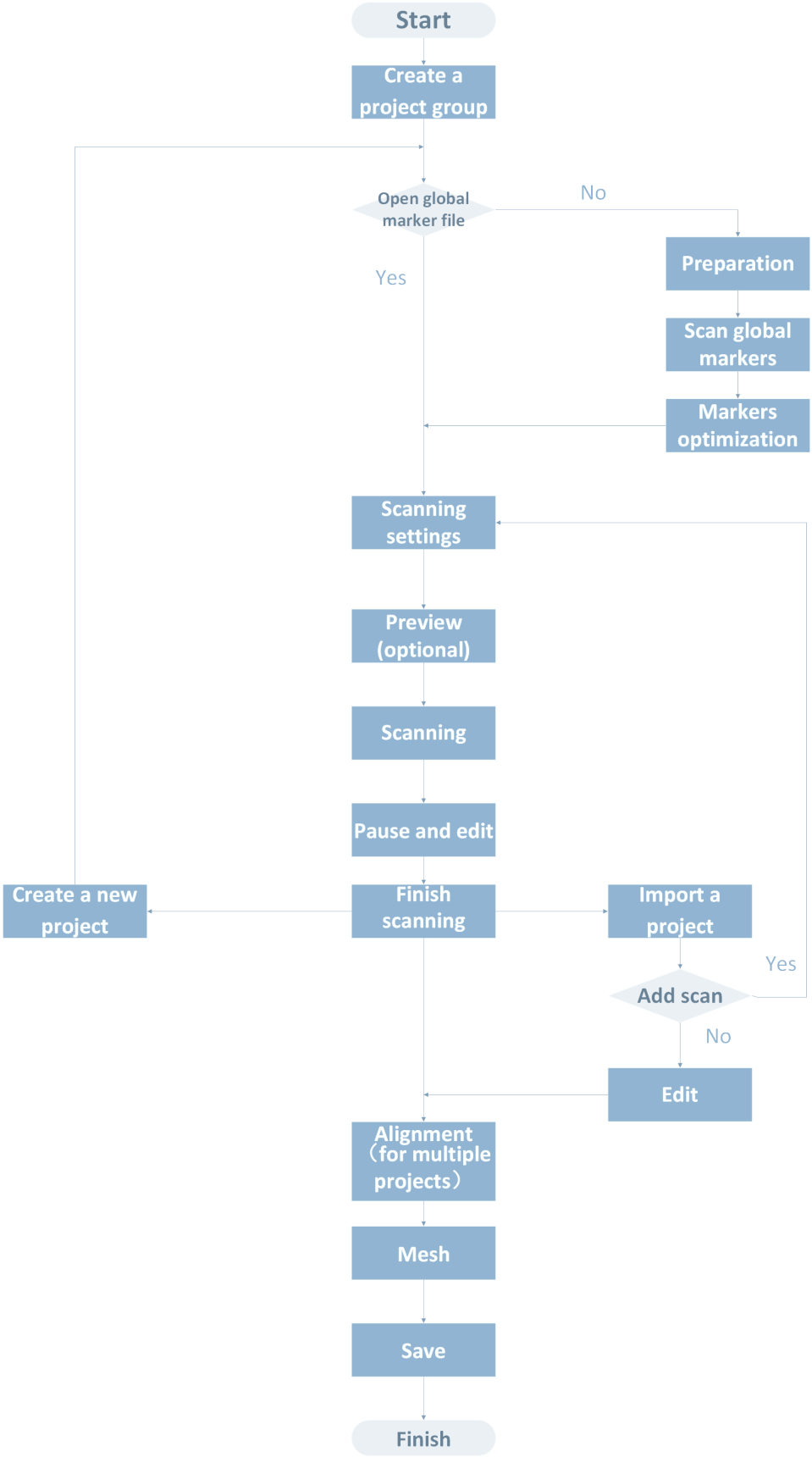
There are two different workflows: Basic workflow, Global marker workflow.

The basic scanning mode can meet most of general scanning needs, and the global markers scanning mode can be used when you need to scan for higher accuracy or scan thin-walled parts.

Basic Scanning Workflow



Global Markers Scanning Workflow



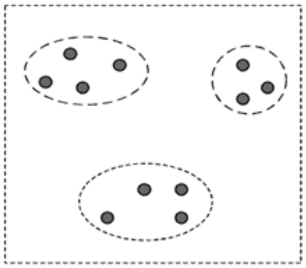
Preparation

Make some preparations when scanning different objects.

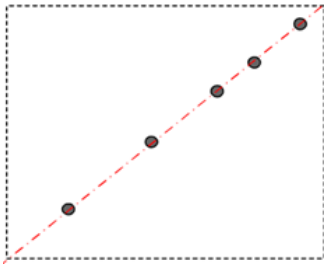
Marker

Markers shall be attached to models. If the device fails to catch markers, it will not emit laser lines in the laser scan mode.

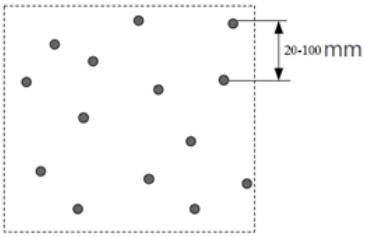
- Attach the markers evenly and randomly.
- Four markers are required for the alignment at communal areas.
- Ensure that the device's camera can scan at least 4 markers within the normal scanning range.
- Please attach small markers[1] on the edges or at small facets of the model.
- Do not attach the markers on the surface with high curvature.
- Do not use damaged or incomplete markers.
- Do not use greasy, dusty, or dirty markers.



Error1：Artificial grouping of markers



Error2：Attach markers only on one line



Markers are attached correctly

Spraying

Spray the washable or specified imaging agent on the transparent, shiny or reflective model before scanning.

Note

Objects are not recommend to scan:

- Moving or vibrating objects. Frequent changes in the coordinates of such objects will result in poor scanning quality.
- Soft material objects.

1. 3mm markers are the minimum markers identidied in the laser scan mode. ↩

Project and project group

Create or open a project group before scanning.

Project group

Project group is the standard file structure of the software. It contains one project or more. Each project contains the scan data of its own. Project group is mainly used in the following scenarios:

Project Group	Scenario	Description
Only one project in the project group	One object needs to scan with only one alignment mode.	Only one alignment mode can be used in the same project.
Multiple projects in the project group	• One object needs to scan with multiple alignment modes. • Multiple objects or one large object need to scan with one or more alignment modes.	It is recommended to create multiple projects within one project group when scanning the large object, multiple objects and one projects with multiple alignment modes. After scanning, you can align these projects one by one.

Create a project group

Two ways to create a project group:

Method One: Click **New project group** after selecting the scan mode process in the navigation bar.

Method Two: Click and select **New project group** on the scanning page.

In the prompt window, select the storage path, name the project group and click **New**. All scanned data will be saved to the folder with the name you just set.

Open a project group

Two ways to open a project group:

Method One: Click **Open project group** after selecting the scan mode.

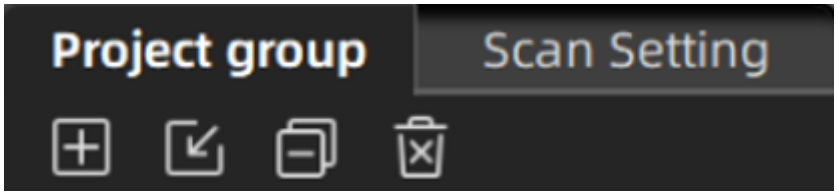
Method Two: Click and select **Open project group** on the scanning page.

In the prompt window, select the project group file and then click **open**.

> **Note**
>
> - The current project group will be saved automatically when opening a project group.
> - Only the project group scanned in the same scan mode can be opened.

Project

Each **project** is a part of the **project group**. All operations of **project** can be done by the following buttons.



Icon	Function	Description	Note & Caution
	New Project	Two ways to create a project: 1. A project will be created automatically after click **New project group**. 2. Click to create a new project on the scanning interface.	• The project only can be created when the scanner is connected. • The last project in the project list is the current project. Only the current project can continue to scan.
	Open Project	Two ways to open the project: 1. All projects of this group will be loaded to the software after opening the project group. 2. Click to open the project group.	Cannot open the project group with different resolution or texture setting at the same time.
	Remove Project	Click to remove selected project from the project tree.	The project can be opened again when needed.
	Delete Project	Click to delete the project from the project tree, and delete all the data of this project.	The scanned data will be deleted from the computer permanently.
	Visible/Invisible	After clicking, the scanned data of the porject can be displayed; click it again to hide the data.	/

Project setting

Laser scan

In laser scanning mode, you can adjust the point distance to meet different scanning requirements. The point distance can be adjusted in three stages: before scanning, pause, and after scanning. The specific range of point distance adjustment can be found in resolution.

Scanning

Setting

Laser scan

Scan mode

Choose the proper scanning mode to scan.

Scan markers

You can only scan markers on the surface of an object and the scanner does not project laser lines during the scanning process. You can quickly obtain the markers data of an object in this way.

Caution

When switching to **Scan Markers**, the current scanned data will be cleaned up and the data can not be recovered.

Scan mesh

You can directly scanning mesh data.
You can also import the global markers file before scanning.

Partial HD scanning

Partial HD Scanning means selecting the area to be rescanned when the requirement of resolution is high. Targeted scanning can save scanning time and make the data obtained completer.

Resolution

Note

- When there is only one project within the project group, you can adjust the resolution in real-time in the scan mesh mode.
- When there are multiple projects within the project group, you cannot adjust the resolution anymore in the scan mesh mode.

Scan mode	Point distance
Scan mesh	Standard：0.05 mm ~ 10.0 mm Advanced mode：0.01 mm ~ 10.0 mm
Partial HD scanning	Standard：0.02 mm ~ 3.0 mm Advanced mode：0.01 mm ~ 3.0 mm

High-speed Mode

The high-speed mode of the scanner will lose some details. Please turn off the mode when the point distance is less than 0.1mm.

Light source mode

According to the scanning requirements, you can choose different laser line modes.

Light Source Mode	Description
26 Lines	13 cross laser lines to scan large objects quickly
5 or 7 Lines[1]	5 or 7 parallel laser lines to scan fine details
1 Line	A single laser line for deep holes and pocket area scanning

Object

Select different brightness levels according to the materials of different objects.

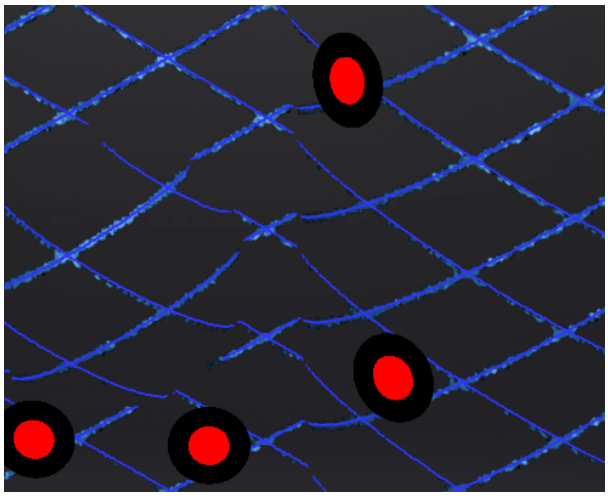
Data quality indicator

Differentiating scan quality in colors: blue represents high-quality scanned data and yellow represents insufficient scanned data that requires further scanning. Insufficiently scanned data may disappear or become anomalous after editing.

> **Note**
>
> This function is not available for scanning in scan markers mode or photogrammetry mode.

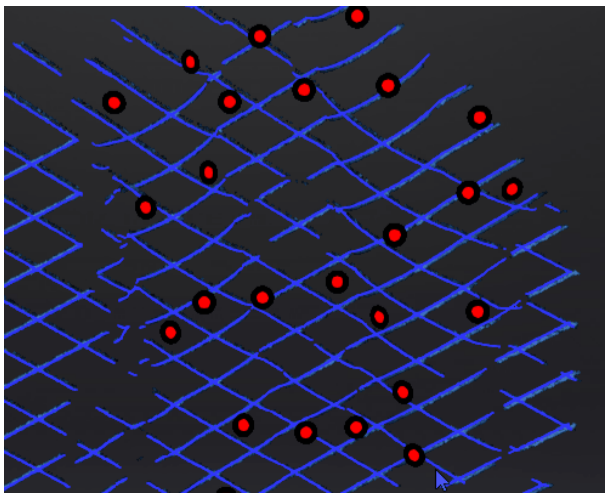
Local enlarged view

When the function is enabled, the scanning interface only displays the local perspective of the scanned object, which can be used for supplementary scanning of small holes. It is recommended to enable under 0.2 mm point distance.



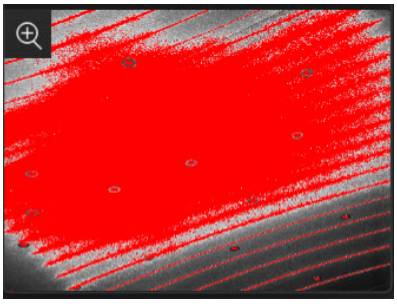
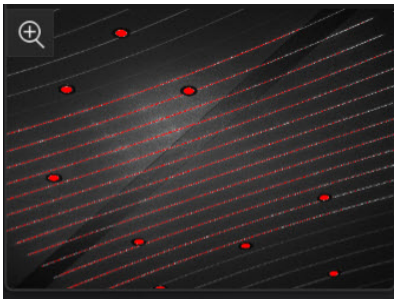
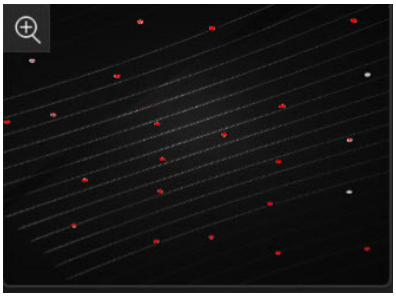
View lock

The object view will be locked during scanning and not follow the scanning path, when the function is enabled.



Brightness

For objects of different materials and colors, adjust the brightness of the scanner to scan better.

Too Bright	Proper	Too Dark
		

1. Please refer to the scanner you actually ordered and received. ↩

Scanning

Preview / Start scan / Pause scan

You can switch in these 3 status with the trigger on the scanner, or click the button in the software. The normal order is: **Preview**(optional) -- **Scan** -- **Pause**.

Function	Icon	Instruction
Preview(optional)		Preview and adjust the scan parameters for better scanning effects. You can open/close the function in > **General setting**.
Start Scan		Click to scan. During scanning, keep the scanner parallel to the surface, keep a proper distance from the object, and adjust the brightness depending on the ambient light or texture of the object.
Pause Scan		Edit the scan data or change the view angle after pausing.

> ⚠ **Caution**
>
> - Please hold the scanner upright to start to preview/scan.
> - When performing a scan, please ensure that there is sufficient VRAM (video random access memory) to prevent any scanning abnormalities or issues.
> - When scanning for details or small holes, scan as close as possible to the object.

Generate data

Laser Mode

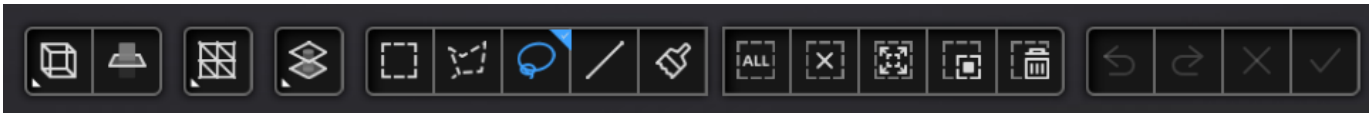
After completing the scanning, you can edit the data, align the data, or optimize the data.

Data editing

To edit the scanned data when you pause or after you generate the point cloud.

Edit scanned data

When you pause or finish the scanning, you can use the following tools to edit the scanned data.



Icon	Function	Instruction
	Multi View	6 different view angles to choose.
	Cutting Plane	Create a plane to do quick cut. For more, see Cutting plane.

Icon	Function	Instruction
	Data editing	Edit the selected data. Click again will toggle the editing mode.
	Edit markers	Select the data area and the markers in this area will be shown in red. The red markers can be edited at this time.

Icon	Function	Description
	Select Visible	To select data on the front view only.
	Select Through	The surface data and the interior data can be selected at the same time.

Icon	Function	Instruction
	Rectangular	Select/Deselect a rectangular area. The selected area is displayed in red.
	Polygon	Select/Deselect a polygon area.
	Lasso	Select/Deselect the area bu using the Lasso tool.
	Straight line	Hold down `⇧ Shift` + `Left Button` and move the cursor to draw a straight line to select/deselect the area.
	Brush	Hold down `⇧ Shift` + `Left Button` and a red circle will appear. At this time, roll the mouse wheel will zoom in and out of the circle. Move the red circle to select/deselect the area to be edited.
	Select All	Select all the data.
	Unselect	Cancel all selected areas.
	Connected Domain	Click the button after selecting a patch of data and all connected region to the selected data will be picked.
	Invert	Revert the selection.
	Delete Selected Data	Delete selected data.
	Undo	The last deletion will be undone. You can click multiple times to undo multiple deleted data.
	Redo	Redo the previous action. You can click multiple times to redo multiple actions.
	Cancel Edit	Undo all edits, and exit the edit mode.

	Apply Edit	Click the button or space bar to apply the edit, and exit the edit mode.

> ⚠ **Caution**
>
> Once the edit has been applied, the original state cannot be restored, but only by reloading the file.

Shortcut

Shortcut	Function
Press and hold the `Left Button` and move the cursor	Rotate the data
Press and hold the `Middle Button` and move the cursor	Translate the data
Hold down `⇧ Shift` + `Left Button`	Select the area of data
Hold down `^ Ctrl` + `Left Button`	Deselect the area of data
Scroll Wheel	Zoom in/Zoom out the data
`Space`	Apply the edit
`⌦ Del`	Delete the selected data

Menu of the right mouse button

Function	Description
Select all/Invert/Unselect/Delete selected data	The function is the same as the function on editing bar, and can be operated by shortcut keys.
Fitting View	The data on the interface is displayed in the center according to the appropriate size.
Connected domain/Select through/Select visible	For more, see Edit scanned data.
Switching the display type	You can select different display types(triangles, wireframe, point cloud data as well as triangles and wireframes) and the data display mode of the 3D scene will change synchronously after switching.
Set Rotate Center	The rotation center can be set on the data by the left mouse button.
Reset Rotate Center	After reset, the center of rotation is at the data center.

Cutting plane

Remove the base data from the whole scanned data by creating a cutting plane.

Create cutting plane

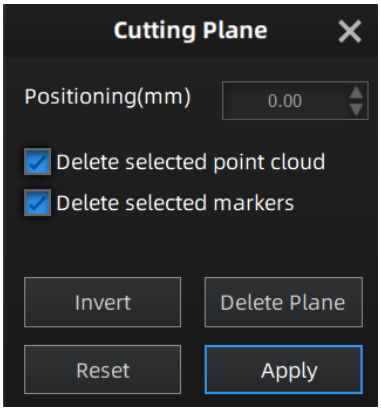
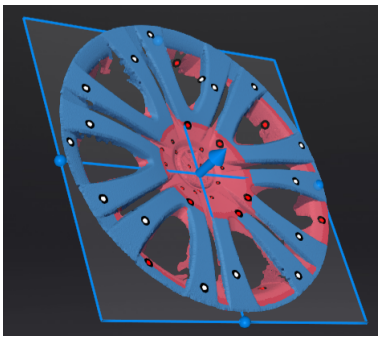
1. Click .
2. Select the creation method and follow the interface prompts to create the cutting plane.

Method	Instruction
Fitting Point Cloud	Press `⇧ Shift` + `Left Button` to select data, and then click **Generate Plane**. The direction of the plane will be calculated by the software according to the direction of point cloud.
Creating Straight Line	Press `⇧ Shift` + `Left Button` to draw a line, and generate the cutting plane according to the line.
By Markers	Press `⇧ Shift` + `Left Button` to select markers. 3 markers or more are required to generate the cutting plane.

3.Click **Create Plane**.

Set cutting plane

Illustration	Instruction


 
	• Delete selected point cloud/markers：Data/Makers in the reverse direction will be shown in red after checking the box. The red data will be deleted after clicking **Apply**.
	  • You can not delete all point cloud data.
	  • Please keep at least 3 or more markers on the front of the cutting plane.
	• Invert：Inverse the normal direction of the cutting plane.
	• Delete Plane：Delete the created cutting plane.
	• Reset：Reset all operations after creating the cutting plane.
	• Apply：Apply all edits.
	• Positioning：After generating the plane, fill in a number in the positioning box or drag the cutting plane normal arrow to translate the cutting plane.
	• Rotate the cutting plane：Cutting plane can be rotated around the axis by dragging the blue ball .

Functions

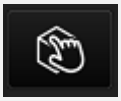
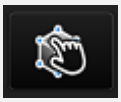
You can use the functions of the sidebar both before and after scanning.

Icon	Function	Instruction
	Project Group	Create / Open a project group. About project group, please refer to Project Group.
	Delete Your Scan	Delete the current point cloud data to rescan.
	Align	Align the data as you need. For more, see Align.
	Save Your Scan	Save the scanned data.
	Mesh optimization (Laser mode)	To do mesh optimization and mesh processing. This process will improve the overall accuracy of the mesh data, but may take a longer time.This function is recommended if you scan the mesh data without scanning global markers first.
	Mesh processing	To do mesh processing. This function is recommended if you scan the mesh data with scanning global markers first.

Alignment

This part introduces how you can align multiple projects in one project group.

Click on the right side of the interface to enter the project alignment interface.

Mode	Description	Note
Auto Feature Alignment	1. Choose **Auto Feature Alignment**. 2. Select the project to be aligned in the fixed window and the floated window. 3. Click **Apply** to align them.	Objects with repeated features, like a round or a ring, or that with small size are not suitable for this mode.
 **Manual Feature Alignment**	1. Choose **Manual Feature Alignment**. 2. Manually choose at least 3 common feature points on the data in the fixed window and the floated window respectively. 3. Click **Apply** to align them.	• The chosen points should not be in a line. • Manual feature alignment is a supplement to auto feature alignment, and can be used when it fails.
By Markers	1. Choose **By Markers**. 2. Select the project to be aligned in the fixed window and the floated window. 3. Click **Apply** to align them.	The two projects should have at least 3 markers in common.
 **Manual Markers Alignment**	1. Choose **Manual Markers Alignment**. 2. Select the project to be aligned in the fixed window and the floated window. 3. Manually choose at least 3 common markers on the data in the fixed window and the floated window respectively. 4. Click **Apply** to align them.	The chosen markers should not be in a line.

Post Processing

Mesh editing

Meshing is to convert the point cloud into a triangular mesh surface. The data after mesh can be directly used for rendering, measurement or printing.

◊ Filter

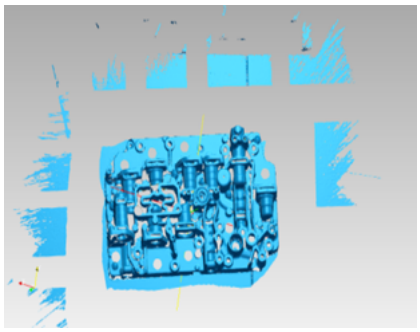
Optimize the data and improve the clarity of the data. The higher the level, the less the small details.

- None: No optimization.
- Standard: Optimizes data slightly and preserves data characteristics.

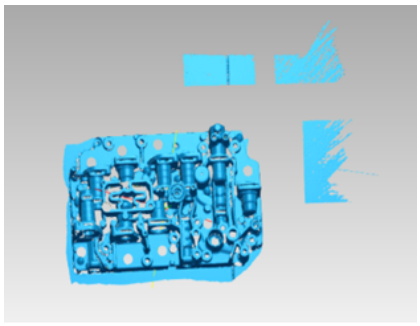
- Med: Reduce the noise on the surface of the scan data.
- High: Reduce the noise on the surface of the scan data and sharpen it powerfully.

◊ Remove small floating parts

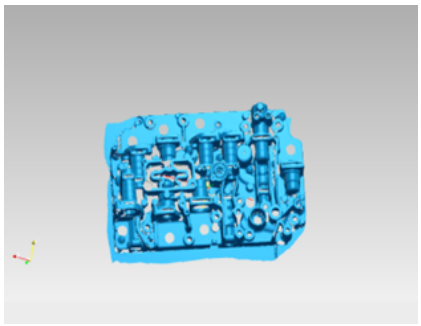
Remove small floating parts on the model.



Original data



Remove 50



Remove 100

◊ Max triangles

Set max plate number to get mesh model's triangle plate number is within configured plate number.

◊ Fill small hole

Auto fill the small hole with a perimeter less than or equal to 10 mm (by default). You can set the hole-filling perimeter.

◊ Remove spike

Remove spike-like data on the image edge.

◊ Markers hole filling

Fill the surface holes on an object that were not scanned due to being occluded by markers.

♢ **Recommended parameters**

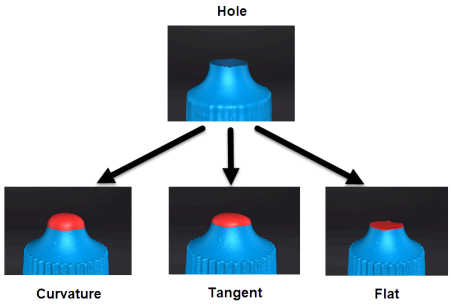
When turning on, it will automatically use the recommended parameters for meshing.

Mesh optimization

After the model data is meshed, the software automatically switches to the post-processing interface. Alternatively, users can directly click on the navigation bar to enter the post-processing interface and import the data.

Left panel

Click **+** to check the function.

Function	Instruction	Note
Simplifiction	After simplification, the polygon numbers, file size and detail of data will be reduced universally. Set the ratio from 0 to 99 and the default is 0.	The result will not be added by multiple operations on **Simplification**.
Mesh Editing	It can optimize the quality of the data by adding more triangles to curvature regions. Set the ratio from 0 to 100 and the default is 0.	/
Smooth	Smooth the possible noise on the surface of the scan data. Set the ratio from 0 to 100 and the default is 0.	It might remove some small details or smooth some sharp edges at the same time.
Remove Small Floating Parts	Remove small floating parts which are not connected to the main data. The maximum value is the square of the diagonal length of the floating part/10, MAX=$(L/10)^2$. Set the ratio from 0 to 100 and the default is 0.	The result will not be added by multiple operations on **Remove Small Floating Parts**.
Auto Hole Filling	Automatically fill all holes with a smaller perimeter than the number input.	Filling type: 
Manual Hole Filling	Choose the filling type and click the holes to be filled. The hole edges are shown in green and the holes get red after filling.	/
Cutting Plane Tool	Define a plane by drawing a straight line. Delete the selection and close the mesh at the intersection. Use the cutting plane to align the mesh to the CSYS.	/

Buttom panel

For more details, please refer to Data editing.

Right panel

Icon	Function	Description
	Open File	Open a file (STL, OBJ, PLY) for post-processing.
	Export Your Scan	: Save the scanned data in the specified format (ASC, STL, OBJ, PLY, 3MF) to the specified location. : If you have installed the EXModel and you are in the post-processing or measurement interface with mesh data, click to switch to the EXModel and import the data into it.
	Share You Scan	Use your Sketchfab account to share the model.
	Third-party Software	Save the data and open it with third-party software.

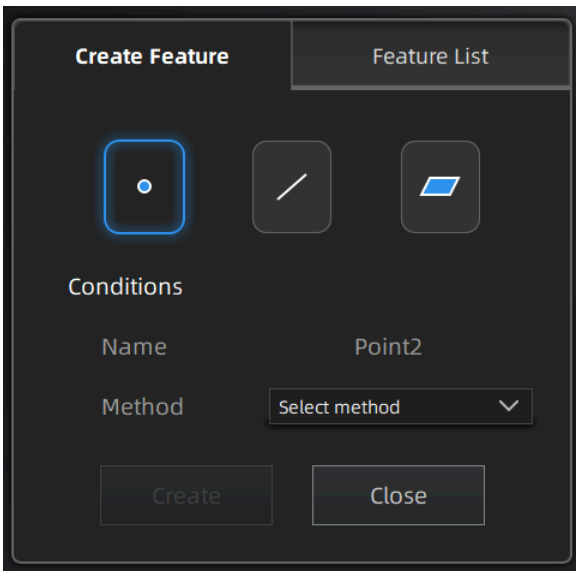
Measurement Tools

You can measure on the model you just scanned, or you can open a model file to do the measurement.

Select the file to be measured or directly drag the file (STL, OBJ, PLY) to the measurement interface.

Create features

Click to display the menu of creating features. To close the menu, please click the icon again, or click **Close**.



Note

You can switch to **Feature List** to check the created features; You can also click to delete features.

Point

Creation Method	Description	Note
Selected Points	1. Click the data to select the point. 2. Click **Create** to create a feature point.	/
Line-Plane Intersection	1. Click the existing feature lines or choose lines in the drop-down list. 2. Click the existing feature planes or choose planes in the drop-down list. 3. Click **Create** and create feature points.	• The feature line can't be in the feature plane. • The feature line can't be parallel with the feature plane.

Line

Creation Method	Description	Note
Point-Point	• Click the data or existing feature points to select the point. • You can tick the checkbox before **From** or **to** and re-select the feature points. Click **Create** and create a line.	/
Plane-Plane Intersection	1. Click existing feature planes or choose planes in the drop-down list. 2. After selecting two planes, click **Create** and create an intersection of two non-parallel planes.	• Create two feature planes in advance. • The feature planes can't be parallel to each other.

Plane

Creation Method	Description	Note
3 Points Fit	• Click the data or existing feature points to select the point. • Tick the checkbox before the three points and re-select the point. Click **Create** and create a plane.	The three points can't be in a line.
Point-Line Fit	• Click existing feature lines or choose lines in the drop-down list. • Click the data or existing feature points to select the point.	The point can't be in the line.
Best Fit	• The plane generated is the position with the smallest deviation from the selected area.	

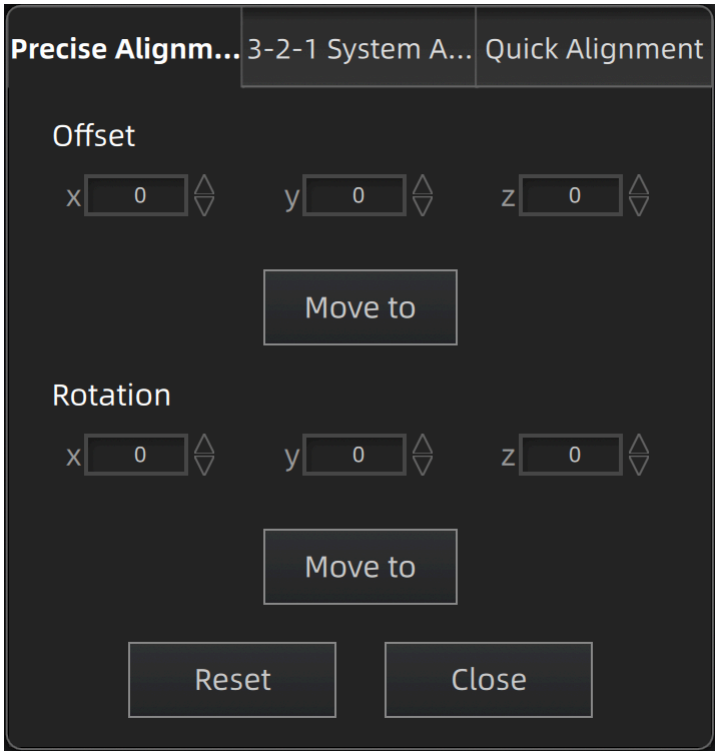
Align

Use this mode to modify the alignment of the data to the global coordinate. This action is useful for post processing or reverse engineering.

> **Caution**
>
> - The shape and accuracy of the model will not be changed by the alignment.
> - After the alignment and exiting, the changes are irreversible so you can only reset the model by reloading the original file.

Click to enter the alignment interface. Click it again to exit.

Precise Alignment



Click **Move to** to align the model center with the input coordinates, and the axis direction is adjusted to match the input rotation angle.

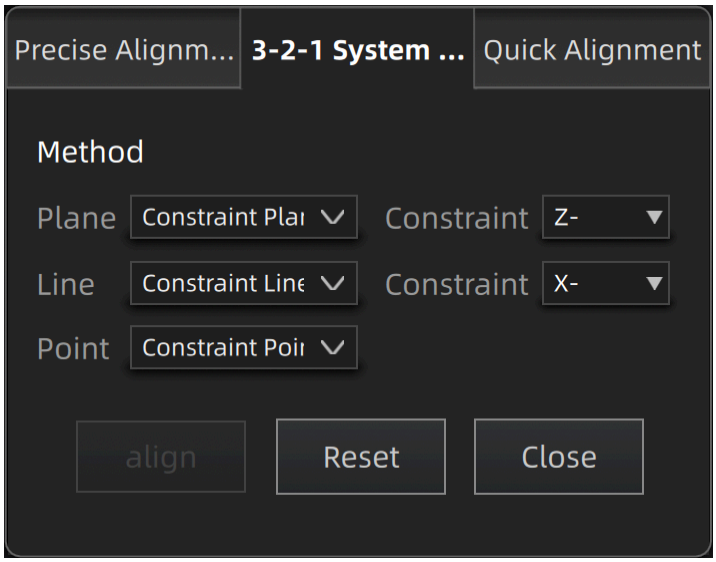
The coordinate system displayed on the interface is the global coordinate system, in which the direction of the red line is the positive direction of X-axis, green is the positive direction of Y-axis and blue is the positive direction of Z-axis.

Click **Reset** to cancel all the transformation in the exact alignment interface.

Click **Close** to save the results and exit.

3-2-1 System Alignment

3-2-1 system alignment aligns data by selecting the point, line and plane. Before alignment, create feature points, lines and planes. The feature lines created are not perpendicular to the plane.
The coordinate system on the interface represents the global coordinate system: Red=X+, Green=Y+, Blue=Z+.



- Select a feature surface in the plane drop-down menu, and select an axis in the corresponding constraint drop-down menu of the plane. The arrow on the plane corner indicates the positive direction of the plane, and the selected axis direction will be consistent with the plane direction.
- Select a feature line in the drop-down menu of the line, and select an axis in the drop-down menu of the line. The arrow of the line indicates the positive direction of the line, and the direction of the selected axis will be consistent with the direction of the projection of the line on the selected plane.
- Click the drop-down menu to select a point, the position of this point is the origin of the coordinates (0, 0, 0).

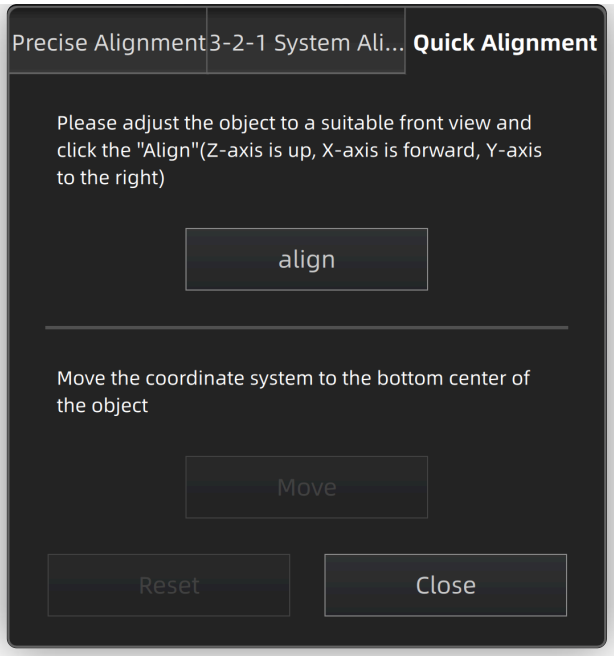
Click **Align** to start the coordinates transformation. When the lines are perpendicular to the plane, the transformation fails, so the alignment fails.

Click **Reset** to cancel all the transformation in the 3-2-1 system alignment interface.

Click **Close** to save the results and exit.

Quick Alignment

The coordinate frame is displayed on the model when the model is rotated to the expected angle.



Click **Align** to move the coordinate frame to the center of the object, and the position of the coordinate frame is that the Z axis is parallel to the screen and faces upward, the X axis is perpendicular to the screen and the Y axis is parallel to the screen and faces to the right.
Click **Move** to move the coordinate frame to the center of the bottom of the object.
Click **Reset** to restore the coordinate frame to its original state (before opening the function).
Click **Close** to apply the adjusted coordinate frame and exit.

> **Note**
>
> If you are not satisfied with the alignment result this time, you can re-adjust the model and perform it again.

Measurement

Click to enter the measurement interface and the menu is displayed. Click it again to exit.

Measurement	Description	Steps
Distance	Calculate the straight-line distance between two points on the surface of the model. • **Total** is the 3D distance. • **X**, **Y** and **Z** are the projection of the segment to the respective planes.	Click on the surface of the model to pick two points, the calculation will be done automatically.
Surface Area	Calculate the surface area value.	• Press `⇧ Shift` + `Left Button` and move the cursor to select an area • Press `^ Ctrl` + `Left Button` and move the cursor to unselect. • `^ Ctrl` + `A` to select all. • Press `^ Ctrl` + `C` to deselect all the date.
Volume	Calculate the volume of the **watertight data**.	It returns the volume in mm^3 and the coordinates of the bounding box. **Note:** Only available for **watertight mesh**.

Once the measurement is completed, click to export the measurement result[1] and save it to your computer.

---

1. By default, the exported file will be in text file (txt) format. You can also save it as a comma-separated values (csv) file. ↩

Save

Save data

You can save the scanned data.

Click to select the save path and the file format, enter the file name as well.

Format	Data Type	Saved as	Application
ASC (whole piece)	Optimized cloud points	Scan.asc	• Check the data; • Quick export and no need for post-operation. • Use other software to post-possess the data.
STL	Mesh data	Scan.stl	• 3D printing; • Reverse designing; • Compatible with most post-processing software.
PLY	Mesh data	Scan.ply	• Small file; • Easy for editing.
OBJ	Mesh data	Scan.obj Scan.jpg Scan.mtl	• Used for artworks • 3D rendering • Compatible with most post-processing software.
3MF	Mesh data	Scan.3mf	• Small fire; • Compatible with Microsoft 3D printing software
P3	Global markers	Scan.p3	Global markers files including the cutting plane that can be quickly imported in the scanning interface.

Date Sharing

You can upload the encapsulated data to Sketchfab.

Click to upload the encapsulated data to Sketchfab, where the title, username and password are required to be provided. You can register an account on the Sketchfab to view the shared models.

> **Caution**
>
> The files uploaded are in STL format.

Third-party Software

You can import scanned mesh data into the third-party software.

Icon	Name	Description
	Export data to Geomagic Control X (2023)	Mainly used for 3D test. If the GeomagicControl X software has been installed, clicking this button will open the GeomagicControl X software and import the mesh data.
	Export data to Verisurf (2020)	Mainly used for 3D test. If the Design with Verisurf software has been installed, clicking this button will open the Design with Verisurf and import the encapsulated stl data into Design with Verisurf.
	Export data to Geomagic Design X (2023)	Mainly used for reverse design of mesh data. If the GeomagicDesign X has been installed, clicking this button will open the GeomagicDesign X and import the mesh data.
	Export data to Geomagic Essentials (2.0.1.3000)	Mainly used for reverse design of mesh data. If the GeomagicEssentials has been installed, clicking this button will open the GeomagicEssentials and import the mesh data.
	Export data to Solid Edge SHINING 3D Edition (2021)	Mainly used for reverse design of mesh data. If Solid Edge has been installed, clicking this button will open the Solid Edge and import the encapsulated stl data into Solid Edge.
	Export data to Polyworks Metrology Suite (2022)	Mainly used for 3D measurement. If Polyworks Metrology Suite has been installed, clicking this button will open it and import the encapsulated stl data into Polyworks Metrology Suite.

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