



**SHINING 3D**



# **FreeScan Trak Pro2**

**V2.1.0.3**

**User Manual**

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# Overview

## Welcome

### Symbol Conventions

Symbol	Description
	<b>Note:</b> This symbol is used to inform you of the additional information of the product.
	<b>Caution:</b> 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.
	<b>Warning:</b> This symbol is used to inform you of the potential risks that may result in serious personal injury and other safety incidents.

### About the User Manual

- This document is related to your safety, lawful rights, and responsibilities. Read it carefully before installing and using the product. It is recommended that trained professionals or technicians shall operate and/or use relevant Products.
- SHINING 3D Tech Co., Ltd. (hereinafter referred to as "the Company") owns complete intellectual property rights for the contents of this document and, without the written consent of the Company, it is not allowed to copy, transmit, publish, reedit, compile or translate any contents of this document for any purpose or in any form.
- The document is a guidance for installing, operating, and maintaining the product. The document does not serve as the quality guaranty for the product. While the Company makes all efforts to ensure the applicability of the content of the document, it reserves the right to interpret and modify the content of the document and possible errors and omissions therein. The contents of the document are subject to changes without further notice.
- Images and diagrams in the document are presented to provide convenience to readers. In the event that any images or diagrams are inconsistent with the physical product, the later shall prevail.
- The Company shall not be held responsible for any damages and/or losses caused by negligence, environmental factors, improper maintenance and use, or any other factors other than due to the quality of the Product.
- Disputes arising from the document and related Products thereof shall be governed by the laws of the People's Republic of China.

- In the event of any ambiguity and/or any advice on the contents of the document, contact us by the contact information in this document.

## Getting Started

The following is an overview guide to the hardware and software of the device, making it easy for you to quickly locate the corresponding content.

### About Hardware

Here you can learn about the hardware-related information of the device, including device introduction, device appearance and other content.

- [Introduction to the parts](#)
- [How to connect the device?](#)
- [Introduction to the device appearance and indicators](#)

### About Software

Here you can learn about software-related information of the device, including software installation, device activation, and other content.

- [How to install software?](#)
- [How to activate the device?](#)
- [How to upgrade the firmware / software?](#)
- [How to run the software and do basic settings?](#)

**After successfully installing the software and activating the device, you can follow the steps below to operate the device.**

#### **1** Calibration

Calibration is mainly used to re-adjust parameters of the device, which can ensure its accuracy and improve the quality of scanning.

If you are using the device for the first time, please do calibration. After that, the software will automatically skip this step when you run it again.

- [Preparation before calibrating](#)
- [How to calibrate the device?](#)

#### **2** Project Group

Before scanning, you need to choose the storage path for the files and create a project group.

- [How to create / open a project group?](#)

→ [How to operate on a single project within the created / opened project group?](#)

### **3 Set Scan Parameters**

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After creating a project group, you can set the scan parameters for the project group before scanning to get better scanning effect.

→ [How to set scan parameters?](#)

### **4 Scan**

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Scan the object and obtain the data.

→ [Introduction to the scan interface](#)

→ [Preparation before scanning](#)

→ [Which scan modes can I choose for scanning?](#)

### **5 Edit scanned data**

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You can edit the scanned data to reduce noise and obtain accurate data after pausing the scan or after the scan is completed.

→ [Introduction to the edit toolbar](#)

→ [Introduction to shortcut key](#)

→ [Introduction to the right-click menu](#)

→ [Introduction to the cutting plane tool](#)

### **6 Save and Export Data**

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You can save the scanned data for future import or export.

→ [How to save data?](#)

→ [How to share data?](#)

→ [To which third-party software can I import the data?](#)

### **7 Post-processing and Measurement**

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You can process or measure the scanned data.

→ [What operations can I perform in post-processing?](#)

→ [How to use the FreeProbe?](#)

→ [How to create features in the measurement interface?](#)

→ [How to align scanned data in the measurement interface?](#)

→ [How to measure scanned data in the measurement interface?](#)

# Introduction

Based on the dynamic referencing technology, FreeScan Trak Pro2 is capable of capturing the spatial position of the scanner tip in real time to acquire an accurate and complete 3D data of large or middle-sized objects. The scanner does not require marker placement, thereby simplifying the procedures and reducing the influences on the scanned object to a minimum. The innovative scanning method offers a portable, efficient and reliable solution to scanning large and complex objects. It is mainly applied in aerospace or manufacturing industries, and other scenarios unsuitable for markers attachment.

For more product features and specifications, please refer to [Optical 3D Measuring and Dynamic Tracking System - FreeScan Trak Pro2](#)<sup>2</sup>.

## Appearance

This product consists of FreeScan TE25 (a laser 3D scanner), FreeTrak I - G1 (an optical tracker) and FreeProbe<sup>1</sup>.

### FreeScan TE25

The scanner is easy for consumers to use and offers high scanning efficiency.

#### Indicator Status

The indicator turns bluish after the device is powered on and goes out when the device is on standby.

During scanning, different light colors indicate different scanning distances.

- Blue: The device is too far from the scanned object.
- Light blue: The device is far from the scanned object.
- Green: The distance between the scanner and the scanned object is proper.
- Yellow: The device is close to the scanned object.
- Red: The device is too close to the scanned object.

#### Buttons

- Press and hold the up button: To turn on/off the **Local Enlarged View** function.
- Press and hold the down button: To turn on/off the **View Lock** function.
- Press and hold the left button: To switch the scan mode between **Scan Global Markers / Photogrammetry** and **Scan Mesh**.
- Press and hold the right button: To switch the scan object between normal and reflective.



## FreeTrak I - G1

With FreeTrak I - G1, you can scan large and complex objects without markers, thereby saving much time and enhancing scanning efficiency greatly.

### Indicator Status

- Cyan: The device is power on.
- Red: The device is unconnected to the network.
- Blue: The device is unconnected to the software.
- Green: The device is connected to the network and the software.



FreeTrak I - G1

## FreeProbe

This instrument can obtain the 3D coordinate of points by touching the surface of an object to achieve different detection targets.

## Indicator Status

- Cyan: The device is power on.
- Blue: The device has successfully connected to the computer hotspot.
- Green (steady): The device is successfully connected to third-party software or tools.
- Green (flashing): Each successful point marking will cause the green indicator light to flash once.
- Green (flashing continuously): Low battery alert.
- Red (steady): The device has disconnected from the third-party software or tool.
- Red (flashing): Each failed point marking will cause the red indicator light to flash once.

### Note

When the indicator light is blue and the probe is not successfully connected to the software, you can long press the right rhombic button to switch the color of the indicator light to cyan.



## Buttons

- Left rhombic button: Short press for power on; press and hold for 5 seconds for power off.
- In the state of steady green indicator light:
  - ① The left and right rhombic buttons as well as the middle and down keys on the directional pad serve as the point marking keys.
  - ② The left key is used to undo a single point that has been marked.
  - ③ The right key is used to confirm fitting.

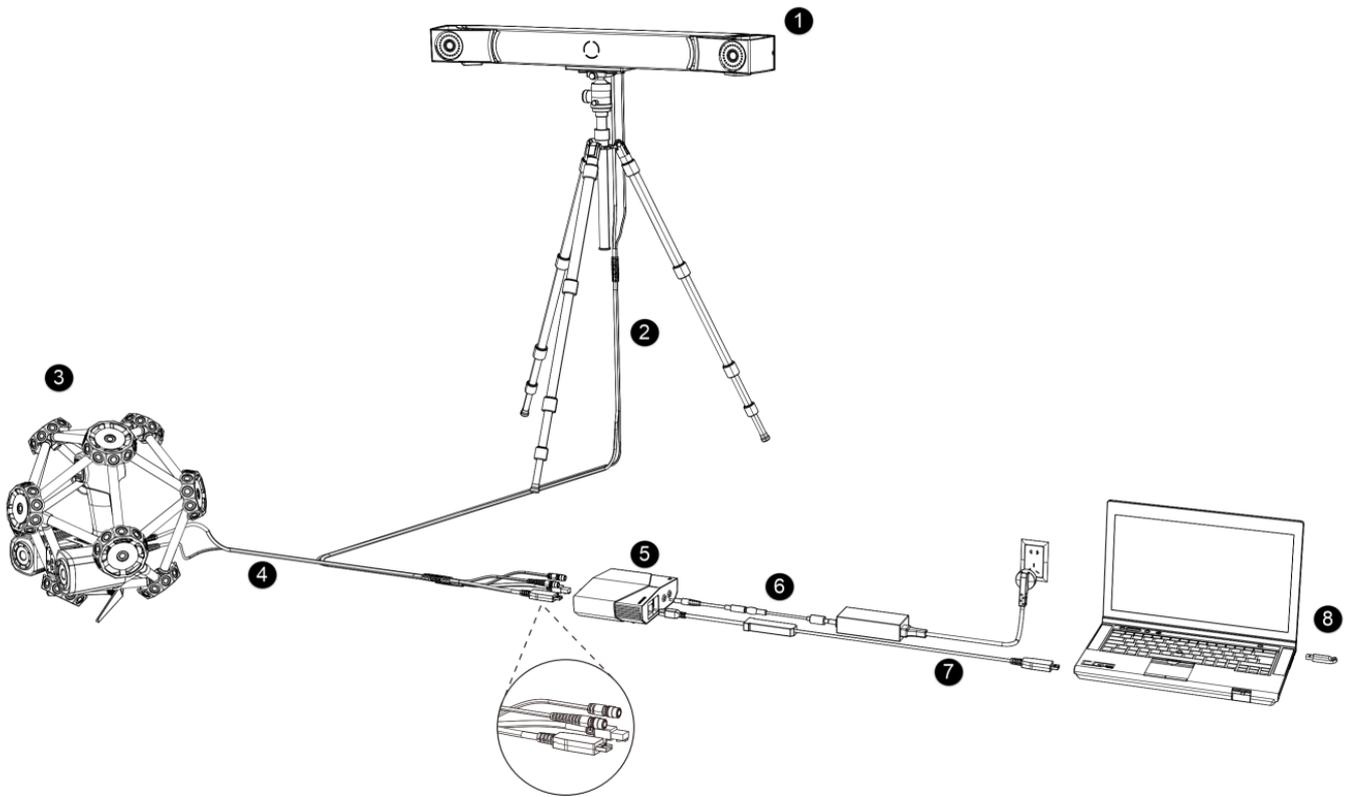
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1. An optional device. ←|

## Connection

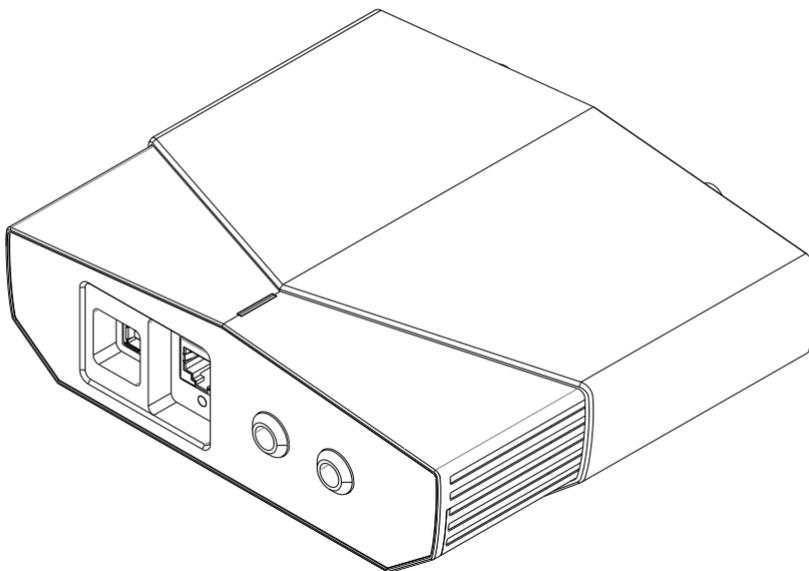
Please connect all parts as the following steps.

## Introduction to the Parts

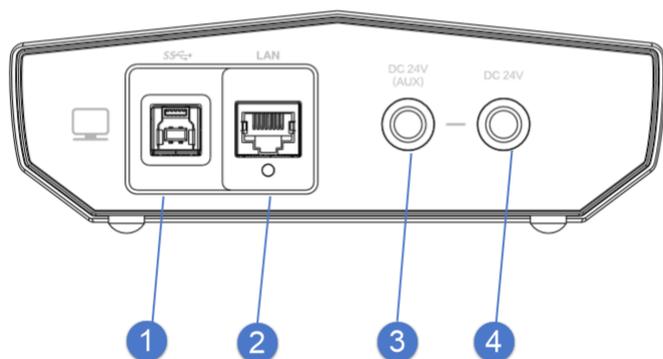


No.	Name	Description
1	Optical Tracker	To be installed on a tripod.
2	Tracker Cable	<ul style="list-style-type: none"> <li>• One end for the tracker and the other end for the hub.</li> <li>• At the tracker end: One port for power supply, and the other port for network connection.</li> </ul>
3	Laser Scanner	/
4	Scanner Cable	<ul style="list-style-type: none"> <li>• One end for the scanner and the other end for the hub.</li> <li>• At the scanner end: One port for power supply, and the other port for data transmission.</li> </ul>
5	Hub	To connect the tracker, the scanner and the computer.
6	Hub Power Cable	To connect the hub to the power supply.
7	Data Cable	To connect the hub with the computer.
8	Dongle	To authorize the use of the software.

## Introduction to the Hub

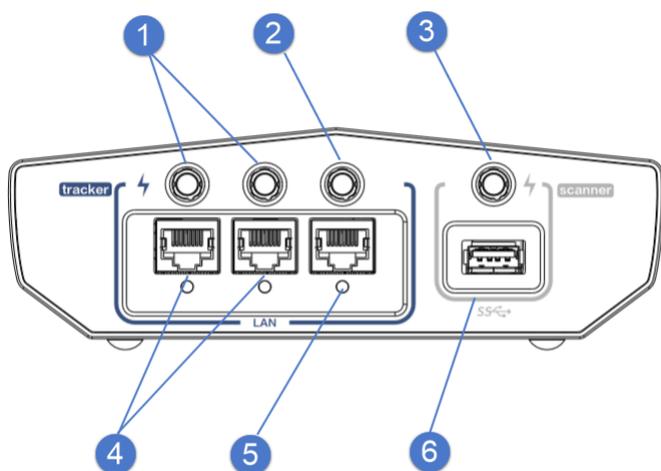


## Front Ports



No.	Name	Description
1	USB Port	To connect the tracker, the scanner and the computer to transmit data.
2	Network Port	To connect the computer or the switch to test
3	Auxillary Power Input	To connect the power adapter (24 V, 3.75 A). It is only available when an extended tracker is used.
4	System Power Input	To connect the power adapter (24 V, 3.75 A). It is a main power input of the system

## Back Ports



No.	Name	Description
1	Power Output	To power on the extended tracker
2	Power Output	To power on the tracker
3	Power Output	To power on the scanner
4	Network Port	To transmit data of the extended tracker
5	Network Port	To transmit data of the tracker
6	USB Port	To transmit data of the scanner

## Connection

1. Install the tracker on the tripod and tighten the bolts.



2. Connect one end of the tracker cable with the tracker.



3. Connect the other end of the tracker cable with the hub.

4. Connect one end of the scanner cable with the scanner.



5. Connect the other end of the scanner cable with the hub.



6. Connect the hub and the power supply with the hub power cable.

7. Connect the hub and the computer with the data cable.



8. Power on the device.

 **Warning**

Please do not access too many hubs in the same USB port, otherwise it will affect the normal operation of the software.

# Software

## Installation

Please install the software before using the scanner.

### Steps

1. Insert the dongle.
2. Copy the installation file to the PC and double-click to run it.
3. Install the software by following the guidance.

## Environmental Requirements

Recommendation	
Operating System	Windows 11 Professional 22H2 (64-bit)
Processor	13th Gen Intel® Core™ i7-13700H or above
Graphics Card	NVIDIA GeForce RTX 4060 Laptop GPU or above
VRAM	8 GB or above
RAM	64 GB or above, DDR5 dual-channel
Interface	USB 3.0

## GPU

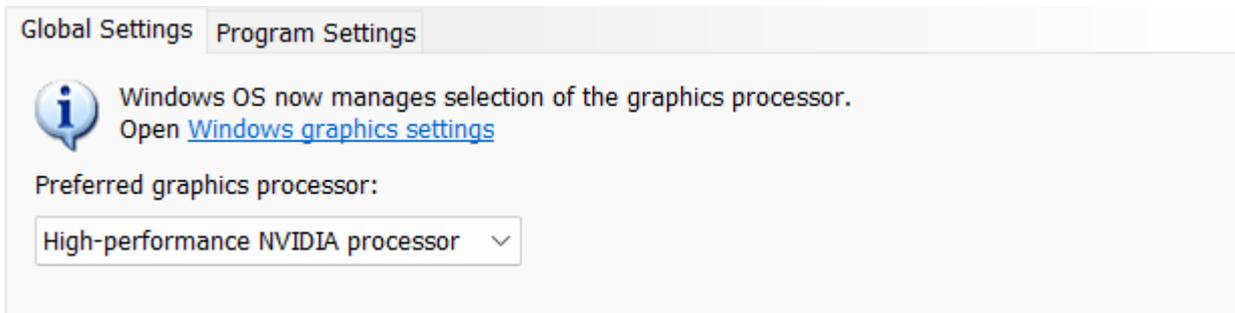
Please use a NVIDIA discrete graphics card for better scanning performance.

### Use a discrete graphics card on desktop

- Connect your monitor to the port of discrete graphics card on the back of your computer. OS will use the discrete graphics card automatically.

## Use a discrete graphics card on laptop

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



### Caution

- Administrator privileges are required for software installation.
- The initial installation process may take some time, please be patient.
- Do not install the software in **C:\Program Files** or **C:\Program Files (x86)** directories to prevent startup issues.
- If driver abnormalities occurs, please open Device Manager, uninstall the current driver, and reinstall it. If reinstalling the driver does not resolve the issue, please contact [technical support](#) promptly.

## Activation

If you are using the device for the first time, please start the software after installation and log in with your SHINING 3D user account to activate the device.

### Note

- Please insert the dongle before running the software.
- Please run the software after the device indicator light is on.

# Register

For a new user, create a SHINING 3D user account first.

- Sign up via the software  
Click **Register** and fill in the account information in the registration pop-up.
- Sign up via the website  
Click **Register a new account** in our SHINING 3D User Account website: [passport.shining3d.com/login](https://passport.shining3d.com/login)

## Create an account

+86 China 中国

State/region do not support modification after submission, please choose cautiously

Enter phone number or email

 Click the button to start verification

Please enter the verification code [Get Code](#)

Please enter your name

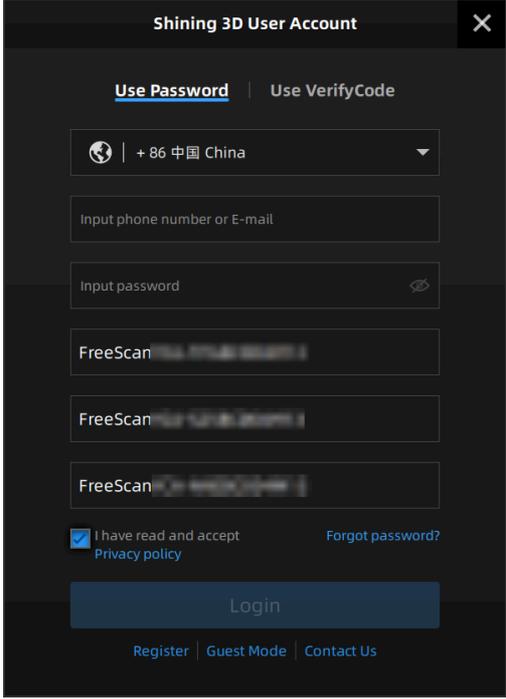
Enter at least 6 characters password

Please enter the password again

Read and agree our [Privacy policy](#) [Terms of use](#)

Sign Up

# Log-in



Shining 3D User Account

[Use Password](#) | [Use VerifyCode](#)

+86 中国 China

Input phone number or E-mail

Input password

FreeScan

FreeScan

FreeScan

I have read and accept [Privacy policy](#) [Forgot password?](#)

Login

[Register](#) | [Guest Mode](#) | [Contact Us](#)

Log in with your account or verification code.

# Device Activation

## Online Activation

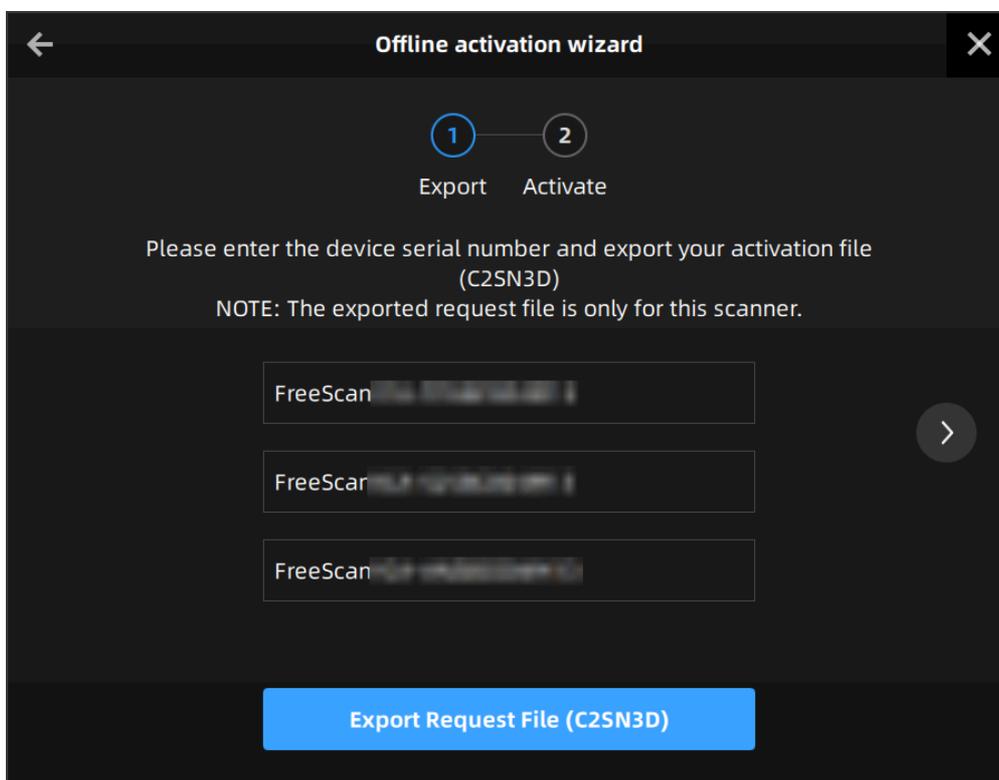
The activation will be completed automatically after logging in successfully on the networked computer.

## Offline Activation

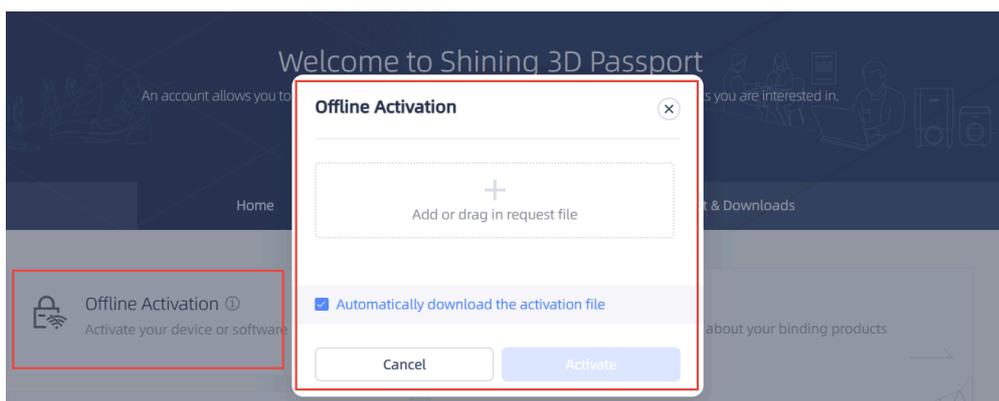
If the PC cannot be networked, activate the scanner offline.

## Steps

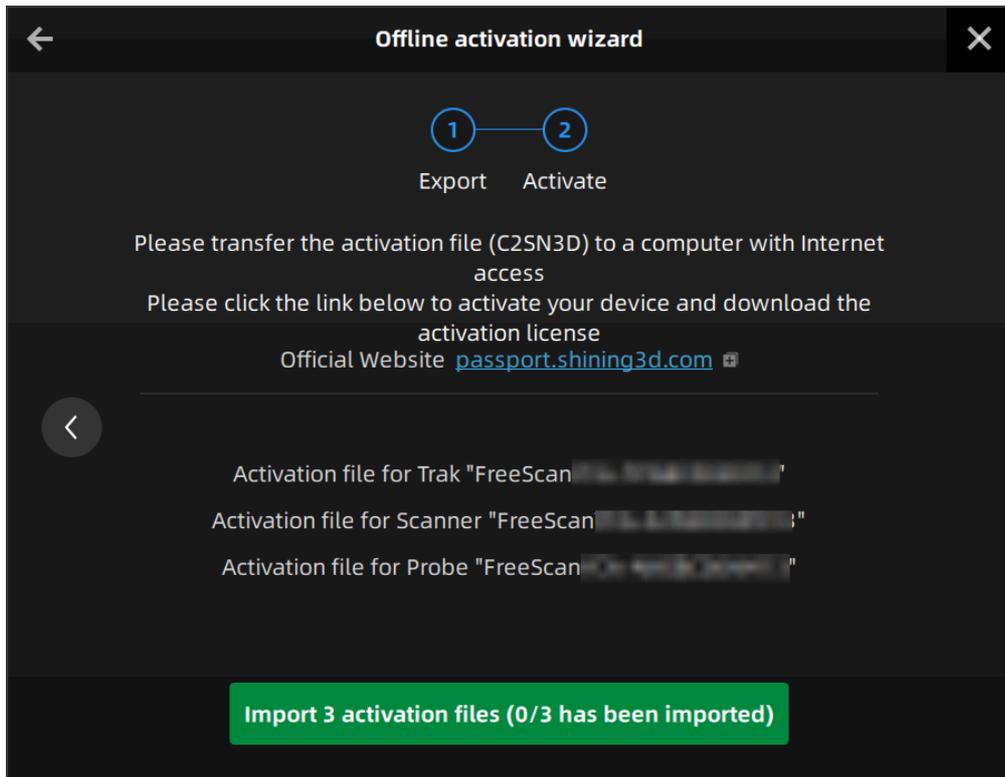
1. Connect scanner to the computer with no Internet, then export C2SN3D file.



2. Log in to [passport.shining3d.com](https://passport.shining3d.com) on the computer with Internet connection, upload the C2SN3D file and fill in the relevant information on the Offline Activation page. Wait a moment to download the spawned SN3D2C file.



3. Copy the SN3D2C file to the computer without Internet connection, then import the file into the software for offline activation.



4. Start to use the device after the successful activation.

#### Note

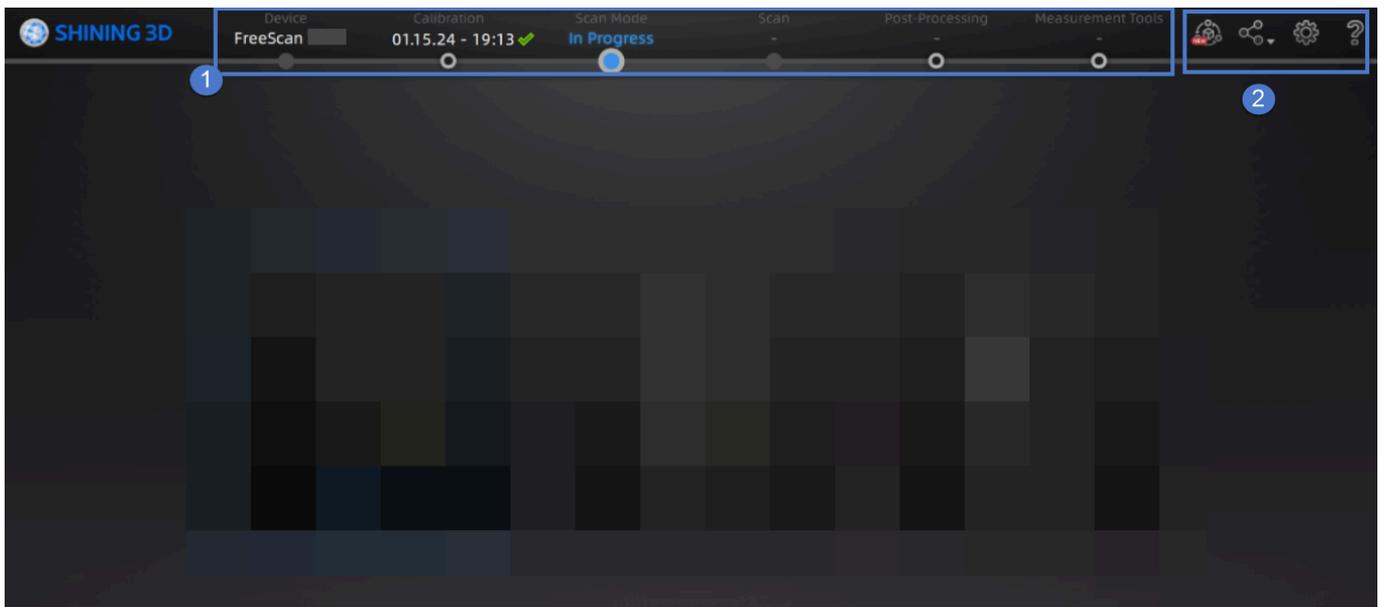
If you fail to activate the device in neither way, please contact your supplier or our [technical support](#).

## Run the Software

If you are using the device for the first time, after logging in and launching the software, it will automatically go to the calibration interface. You need to complete the [calibration](#) before using the device properly. Once the calibration is done, the next time you enter the software, it will skip this step and go to the [scan mode](#) interface. You can choose the appropriate mode for scanning based on your actual application scenario.

#### Note

If the software takes a long time to start after running, you can open **Windows Security Center > App and Browser Control** after closing the software, disable **SmartScreen for apps and files**, and then restart the software.



 **Caution**

Check the device connection status by  in the upper left corner. If the device is not connected or connected abnormally, check the [device connection](#) and then click  to reconnect the device.

## ① Navigation Bar

Button	Description
Device	To display the device status: Online / Offline. Device online: To show the device name. Device offline: Click  to reconnect the device.
Calibration	Click  on the corresponding position in the navigation bar to start <a href="#">calibration</a> .
Scan Mode	Click  on the corresponding position in the navigation bar to switch to the <a href="#">scan mode</a> interface. There are different modes you can select.
Scan	Click  on the corresponding position in the navigation bar to start <a href="#">scanning</a> .
Post Processing	Click  or  after scanning, it will go into the post-process interface where you can do <a href="#">mesh</a> and <a href="#">mesh editing</a> . You can also click  on the corresponding position in the navigation bar to switch to the post-process interface.
Measurement	Click  on the corresponding position in the navigation bar to switch to the measure interface where you can <a href="#">measure</a> your model.

## ② Settings and Feedback



Reverse Engineering Service: By sending us the scanned project files and specific information, we can assist you with reverse engineering.



Option	Description
<b>Official Website</b>	Open the official website of SHINING 3D to learn about the company's products and information.
<b>Fackbook</b>	Check the Fackbook account of SHINING 3D and get latest information.

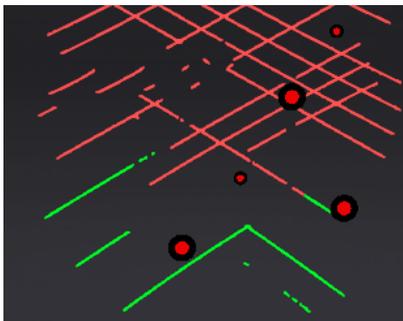


## General Settings

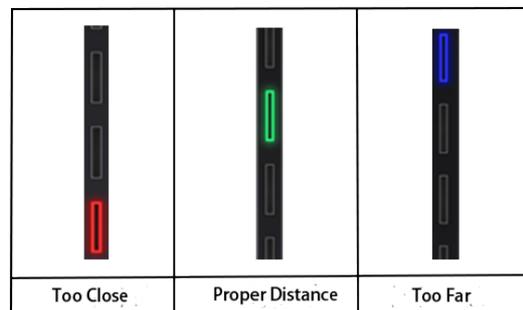
- Preview: To preview the scanning effect before scanning when enabled.
- Global Marker Mode: You can select real-time scanning or still photography in scan markers mode. For specific scanning operations, please refer to [Scan Markers](#).
- Shape Detection Optimization: To improve the accuracy of sphere diameter at the cost of some details of the scanned data.
- Scanner Tone: To turn on / off the scanner's beep.
- Accurate Calibration: When enabled, you can switch to accurate calibration in the trak calibration interface.

## Laser Scan Settings

- Scanning Distance Indication Method: There are two methods to indicate the scanning distance. During scanning, you can adjust the scanning distance according to the color indication.  
Blue: The scanning distance is too far.  
Green: The scanning distance is proper.  
Red: The scanning distance is too close.



Laser Line Indicator



Scanning Distance Indicator

- The Laser Line Closes Intelligently: Not to project laser lines without a recognition of data when enabled.

## Probe Setting

Select or switch to a third-party software for using the probe<sup>1</sup>.

## Factory Default

Click **Recover** to restore the software to its factory settings.



- About: To view related scanner information, software version, etc.

- System Diagnose: To check if the computer meets the operating conditions. If all items show  , it means that the configuration meets the operation requirements. If not, please resolve the problem according to the prompts in the interface. Click **Refresh** to diagnose the system again.
- Support: You can open the user manual, get remote assistance and check contact information of technical support here.

1. The probe is an optional accessory and needs to be purchased separately. [←](#)

## Upgrade

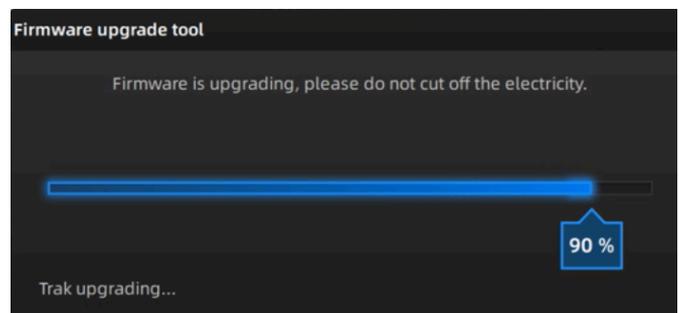
When a new version of the software is released or a higher firmware version is available, you will be prompted when launching the software.

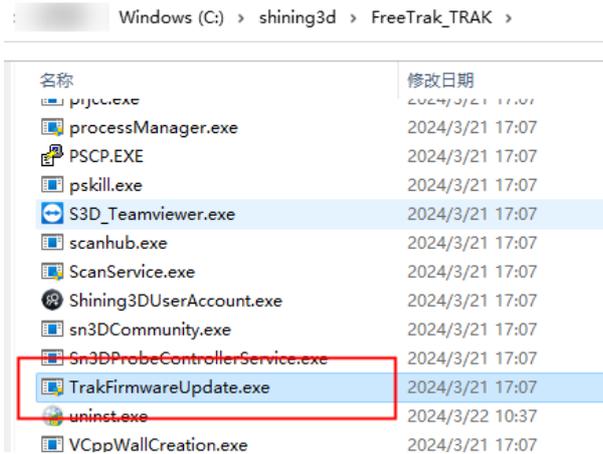
### Caution

If you need to perform the firmware / software upgrade, please ensure that all your devices are online simultaneously.

## Firmware Upgrade

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





When you need to upgrade the firmware of the freeprobe, please first confirm that the probe is connected to the computer hotspot, and then start **TrakFirmwareUpdate.exe** in the software root directory.

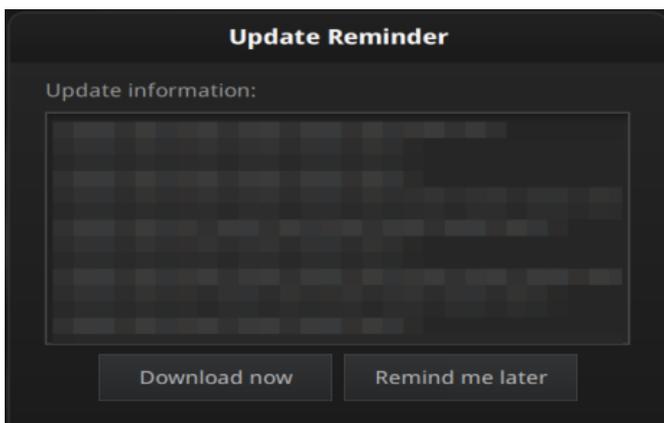
### ⚠ Caution

- If the upgrade fails, please power off the device and reconnect it to try it again.
- 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 and scanners, because this may affect the scanning effect. If in doubt, please contact your supplier or [technical support](#).

## 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.

### ⚠ Caution

The software will be closed during upgrading. Please save your projects properly before upgrading.

# Calibration

## Calibration Preparation

You can re-adjust parameters of the device through calibration, which not only ensures the accuracy of the device, but also the scanning quality.

### Note

**Calibration** is required under the following conditions:

- The scanner was severely shaken or vibrated during transportation.
- The scanner is used for the first time or it is not in use for a long period of time (1-2 weeks).
- The accuracy drops during scanning, such as frequent alignment failures or the inability to recognize markers.
- Incomplete data is acquired or the quality of scanned data drops during scanning.

### Caution

- Do not wipe the calibration board with chemical liquids.
- Do not put heavy objects or sundries on the calibration board.
- After using the calibration board, put it in the flannel bag.
- The calibration board can only be used for the calibration of the device.
- Keep the calibration board away from corrosives, metals and sharp objects to avoid corrosion or damage.
- Make sure that the markers on the calibration board aren't damaged or stained, and that the front side of the calibration board is clean and free of scratches.
- Make sure both the scanner and tracker are online before or during calibration.
- After powering on the device, please heat it to a proper temperature (about 35°C) before the calibration to ensure accuracy and precision.

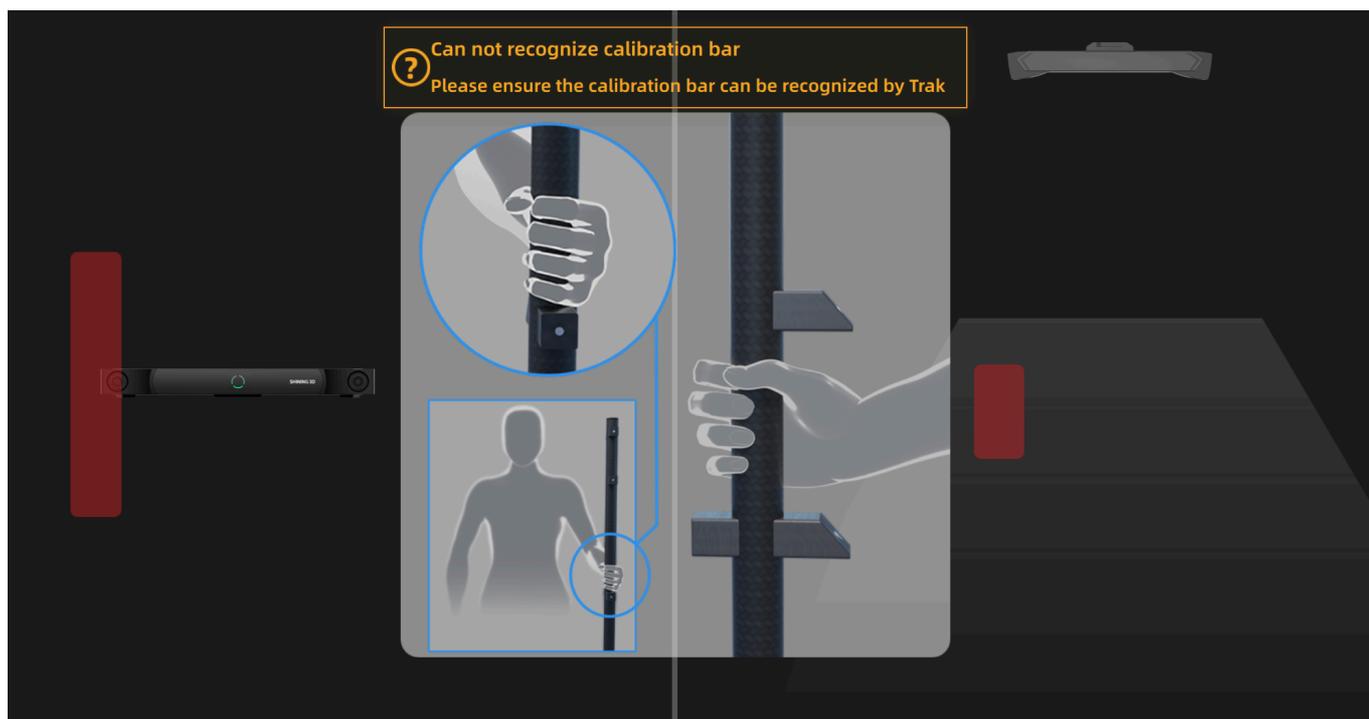
## Calibration

Please follow the guidance to start the calibration.

### Note

To enlarge the calibration interface, press  for the full-screen display. While in full-screen mode, press  or  to exit the full-screen display.

## Trak Calibration

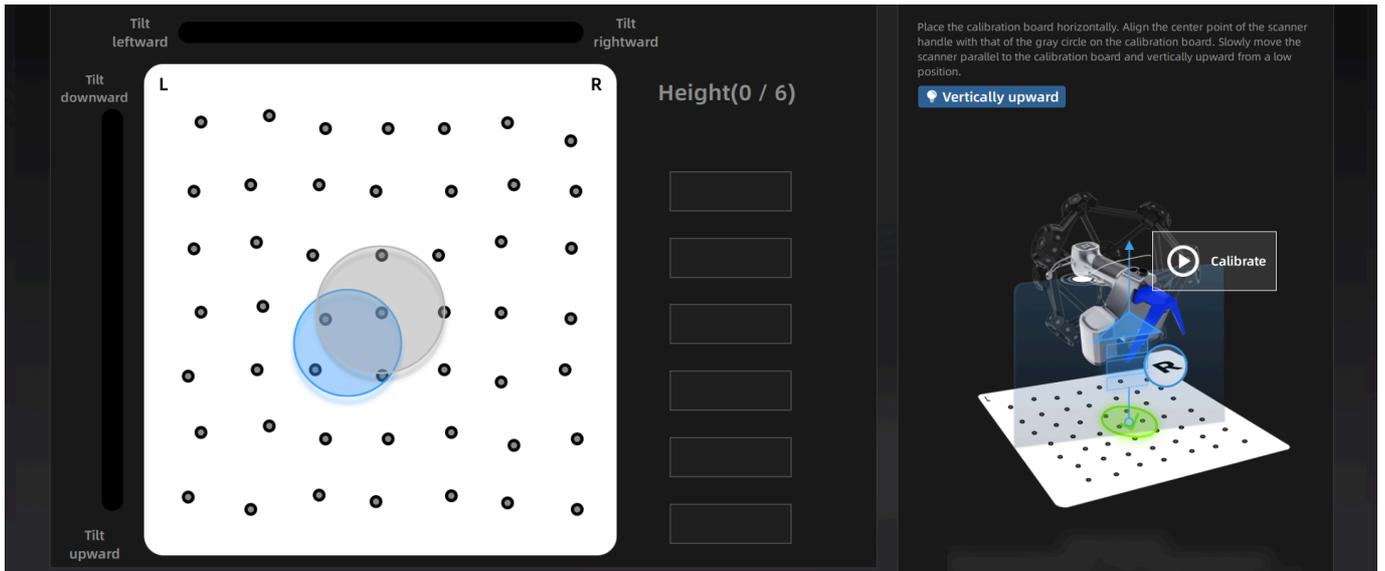


1. Stand in the visual field of the tracker with a calibration bar.
2. Move the bar to a correct position and the calibration will start.
3. Change its direction.

### Note

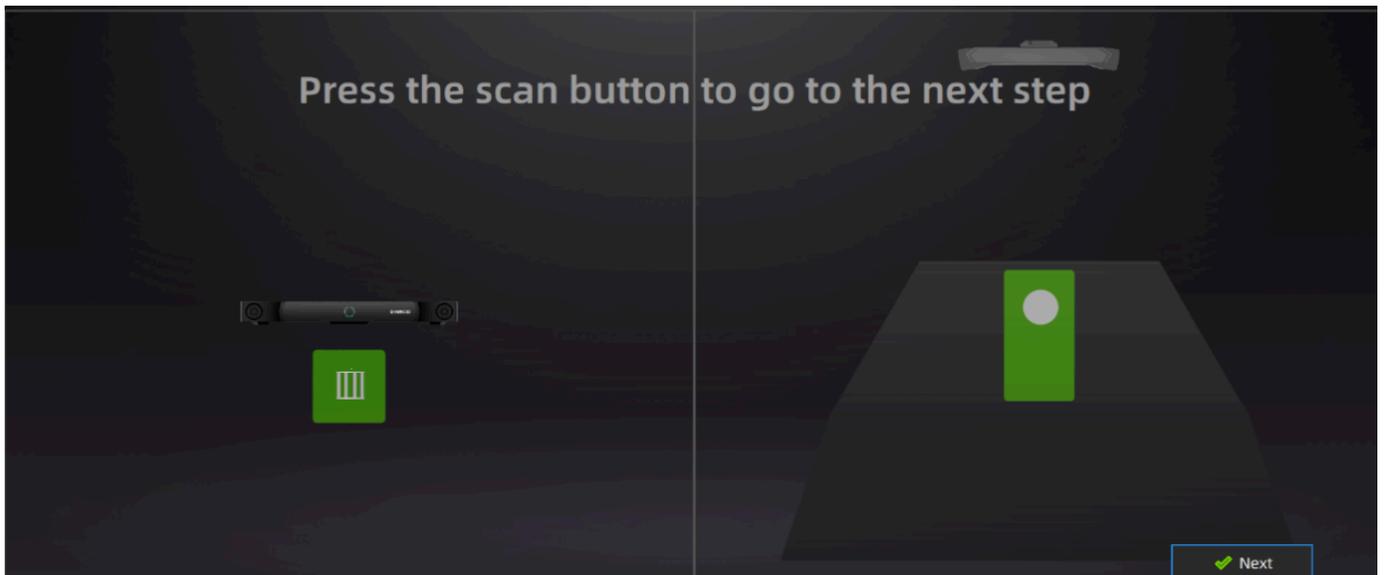
- Do not cover or damage the markers on the calibration bar.
- If the tracker fails to recognize the calibration bar, please follow the guidance and adjust the direction of the bar to make sure it is at a right position in the front view and the top view.

## Scanner Calibration



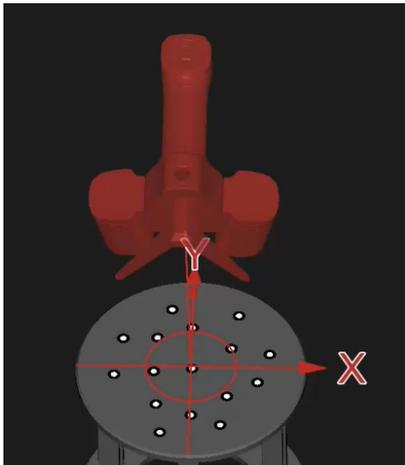
1. Place the calibration board horizontally.
2. Adjust the distance between the scanner and the calibration board according to the height box.
3. Place the scanner in the same direction as shown in the figure and align the center point of the scanner handle with that of the gray circle on the calibration board.
4. Press the scan button on the scanner to start.
5. Move the device upward slowly until all height boxes turn green.

## System Calibration

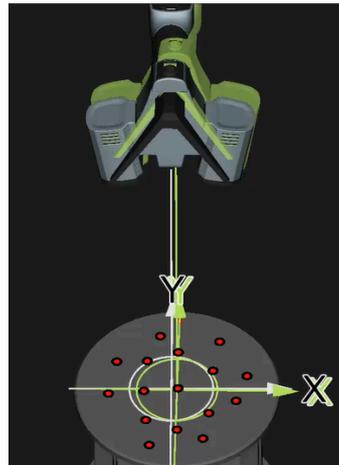


1. Place the system calibrator in the visual field of the tracker, and move it to a right position in the front view and the top view.
2. Click **Next** to do system calibration.

3. Align the three-dimensional graphics and coordinates of the device with the diagrams on the interface one by one, and complete the calibration of all positions.



The orientation guide diagram for the current calibration position



Adjust the position of the device to align the three-dimensional graphics with the orientation guide diagram.

### Probe Calibration

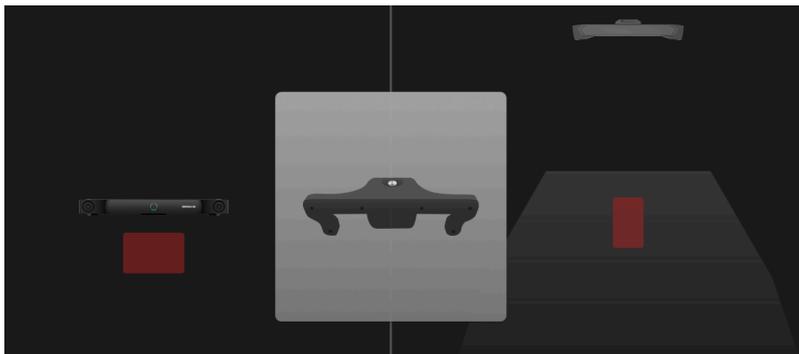
1. Please enter the diameter of the probe. You can enter a value between 0.3 (inclusive) and 6 (inclusive), with a maximum of one decimal place (unit: mm).

#### Note

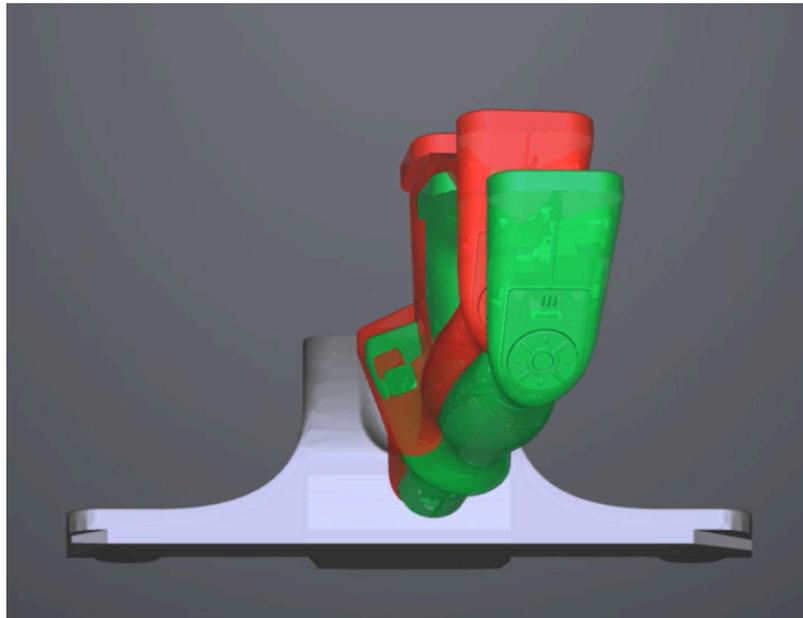
- The probe comes with 3 mm and 5 mm ruby measuring tips. You can replace the tip according to your needs, as shown in the diagram, and enter the corresponding diameter before calibrating the probe. After calibration, [you can use the probe for measurement](#).
- If you need to replace the ruby measuring tip, please recalibrate it after replacement to ensure measurement accuracy.
- If you need measuring tips of other diameters, please prepare them yourself.



2. Move the calibrator of FreeProbe into the position according to the guidance.



- Place the tip of the probe at the specified position according to the interface diagram, and adjust the position of the probe to align with the red indicator diagram multiple times until the entire probe calibration is completed.



The navigation bar on the top of the interface will display  when the calibration was completed successfully. If no calibration is performed within 7 days since,  will appear and prompt you to calibrate the device again to ensure scanning accuracy.

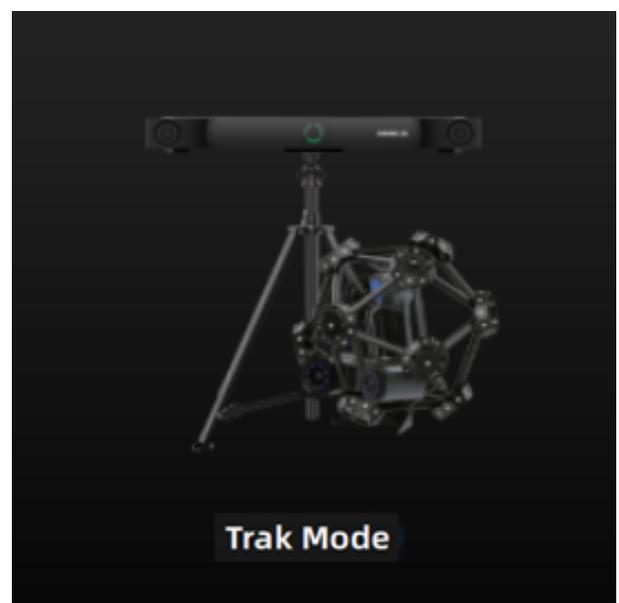
#### Note

When hovering the cursor over , you can see the exact time when all devices are calibrated. You may need to calibrate the device when the corresponding time is yellow, and not to do when it is green.

## Scan Mode

### Track Mode

This mode requires both the tracker and scanner to be online. Once selected, you can quickly obtain scanning data without placing markers on the object in **Scan Mesh**. It is suitable for medium to large-scale 3D scanning of static / dynamic scenes in manufacturing industries such as aerospace, automotive, rail transportation, energy, etc.





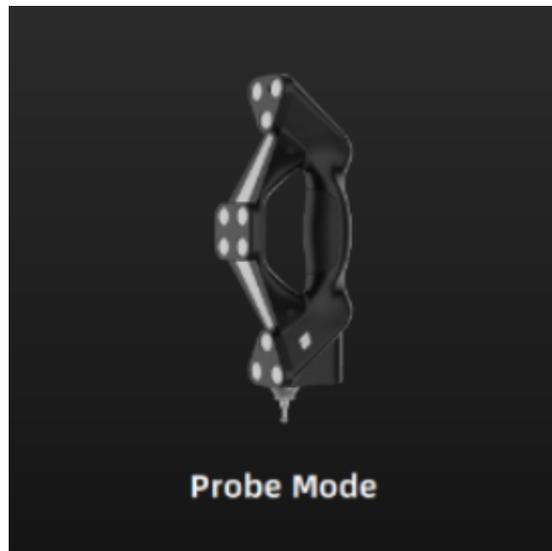
### **Laser Mode**

This mode requires both the tracker and scanner to be online. Once selected, markers need to be placed on the object in **Scan Mesh** to obtain data.

---

### **Probe Mode**

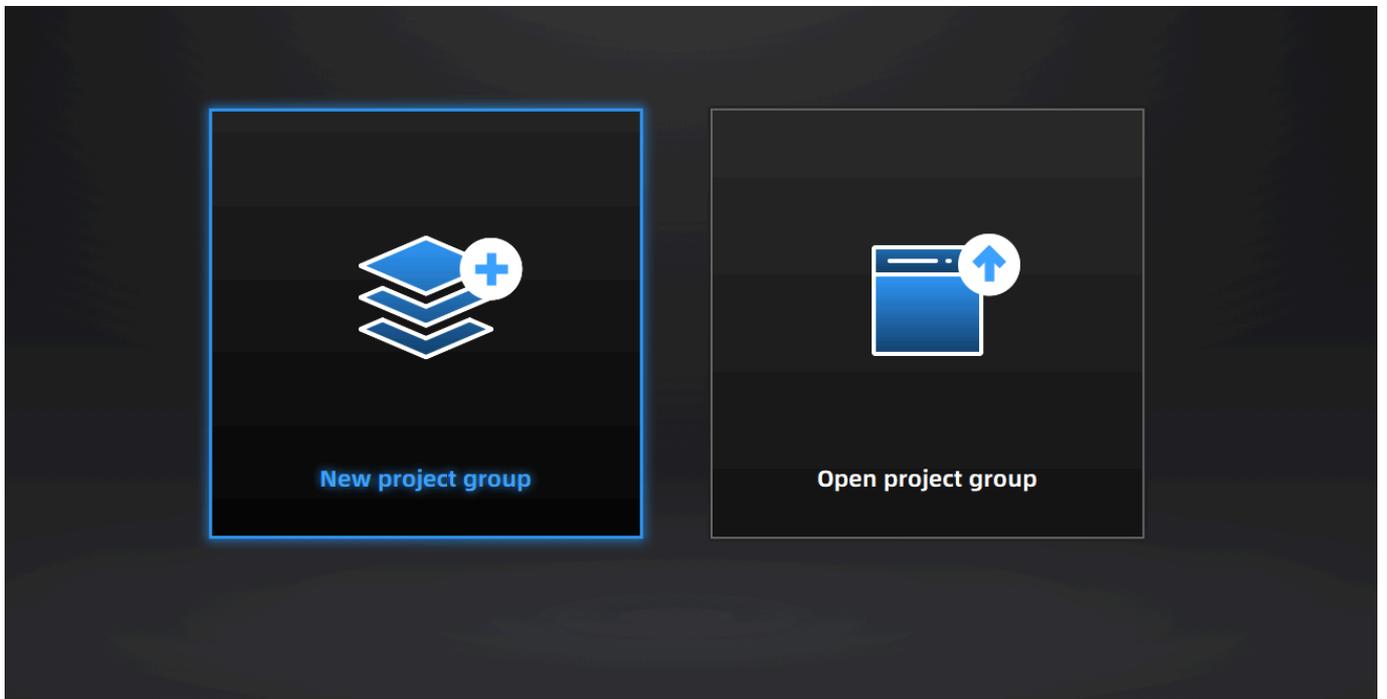
When you need to perform measurements on your scanned model by the probe, you can choose this mode. For specific connection methods and operating instructions, please refer to [FreeProbe Operation](#).



# Scan

## Project Settings

After calibration, please create a project group before scanning, or you can import the existing project group file.



## Create a Project Group

To create a project group, please refer to two ways as follows:

- After selecting the scan mode, the project group interface will automatically appear. At this point, select **New project group**. In the file dialog that appears, enter the name and path for the project group, then click **Confirm**. All data related to this project group will be saved to the specified path.
- In the scan interface, click  in the right sidebar. In the pop-up window, click **New project group**. The following steps are the same as mentioned above.

## Open a Project Group

To open a project group, please refer to two ways as follows:

- After selecting the scan mode, the project group interface will automatically appear. At this point, select **Open project group**. In the file dialog that appears, choose the specified project group or search for it, then click **Open**.
- In the scan interface, click  in the right sidebar. In the pop-up window, click **Open project group**. The following steps are the same as mentioned above.

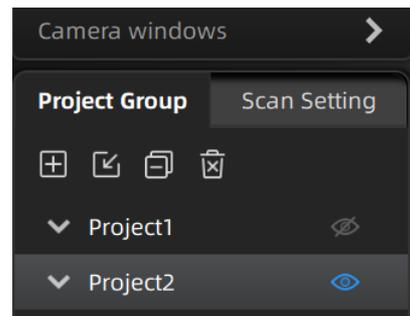
### Note

- The current project group (if there is) will be saved automatically when you choose to open another project group.
- If you need to perform additional scans on imported project, please use the same device that scanned the data of the imported project.

## Project Management

You can create, import, remove and/or delete projects in one project group.

In the scan interface, click **Project Group** in the upper left and you will see the panel.



Icon	Function	Description
	Create a new project	Click to create a new project.
	Open a project	Click to import a project. You can right-click one in the list to rename it.
	Remove a project	Click to remove the project from the list, which still exists in the folder and you can add it in the list by opening it.
	Delete a project	Click to delete the project, which can not be recovered.
	Visible / Invisible	Click to show / hide the data or markers.

## Scanning Preparation

### Caution

- Ensure the lens is free of scratches or damages.
- Ensure the device is connected and powered on.
- Ensure a secure joint of the scanner with the tripod and make them stable.
- Do not touch the lens with your fingers lest fingerprints be left to affect data acquisition.

### Note

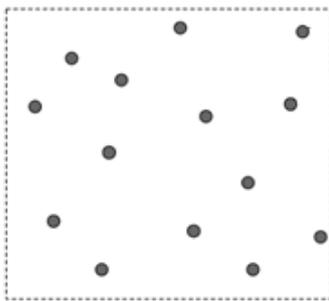
#### When **Scanning Mesh in Trak Scan Mode:**

- No need to place markers on the objects.
- Make sure the object to be scanned is in the visual field of the tracker.
- Do not **cover, touch or damage** the balls on the scanner when it is working.
- Do not **move** the object and the tracker during scanning.

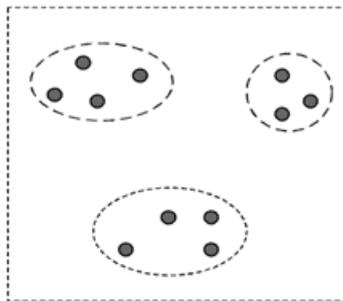
## Note

When **Scanning Markers in Trak Scan Mode** or in **Laser Scan Mode**:

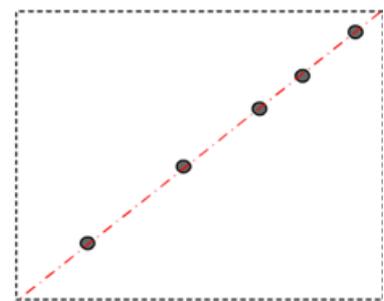
- Need to place markers on the objects.
- Place the markers evenly and randomly.
- Do not use damaged or incomplete markers.
- Do not use greasy, dusty, or dirty markers.
- Do not attach the markers to a surface with high curvature.
- If the device fails to capture markers, it will not emit laser lines.
- Four markers are required for the alignment of common areas.
- Ensure that the device's camera can scan at least 3 markers within the normal scanning range.
- Please attach markers, whose diameter is smaller than 6mm, to the edges and/or small areas of the model.
- Ensure that the distance between markers is about **0.5m** when scanning markers in trak scan and the distance between markers is about **20mm - 100mm** when scanning in laser scan mode.



Markers are attached correctly



Artificial grouping of markers

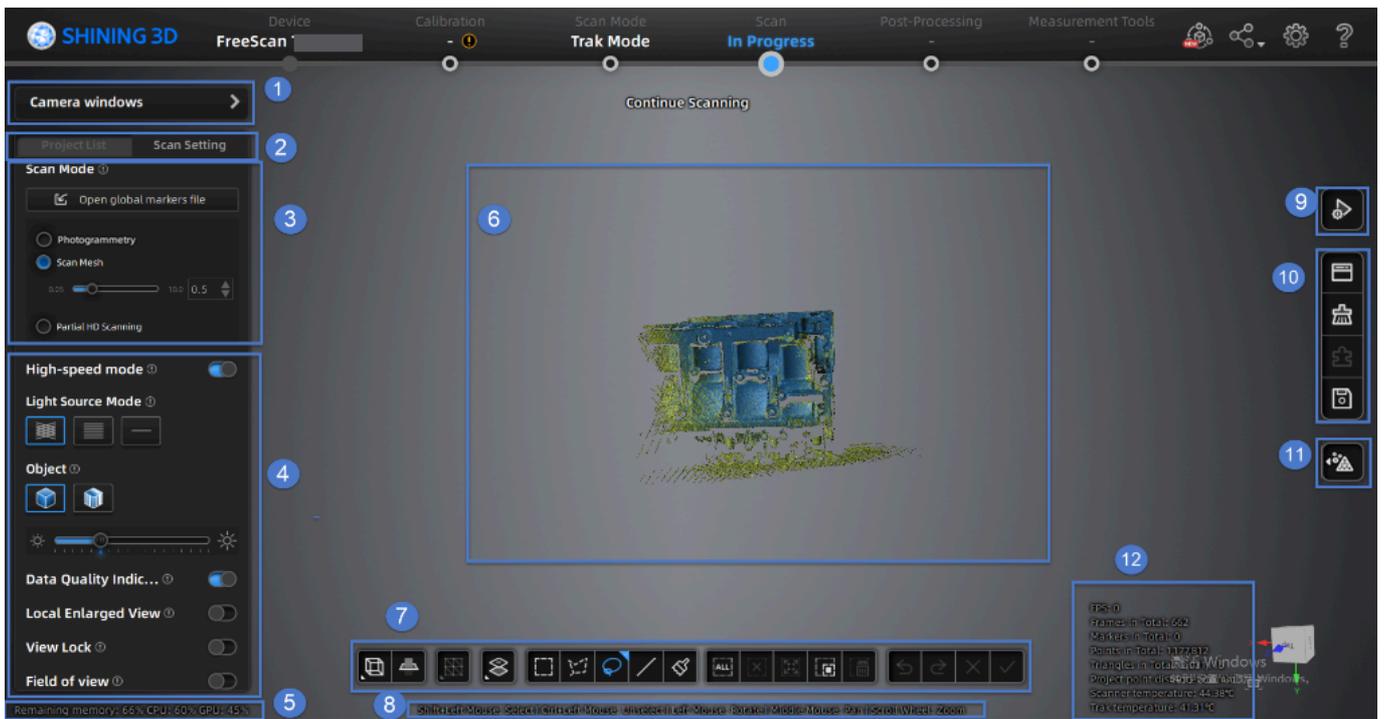


Attach markers only in one line



## Scan Interface

## Function Preview



## ① Camera Window

To display the actual scanning scenarios so that the user can set scanning parameters.

## ② Project Group and Scan Setting

To manage your [project group](#) and set [scanning parameters](#).

## ③ Scan Mode

To switch among [Scan Mesh](#), [Partial HD Scanning](#) and [Scan Markers](#).

## ④ Parameter Settings

See more details in [Parameter Settings](#).

## ⑤ Remaining Memory, CPU Usage and GPU Usage

- Remaining Memory: To display the percentage of remaining memory.
- CPU Usage: To display the CPU Usage of the computer in real time. You may need to close other unrelated software if it is too high.
- GPU Usage: To display the GPU Usage of the computer in real time.

## ⑥ Preview / Scanning Window

To preview the model and check the scanned model.

## ⑦ Data Editing

To edit data after scanning. See more details in [Data Editing](#).

## ⑧ Keyboard Shortcuts

To change the perspectives and move the model by the composition of keys.

## ⑨ Buttons

Click  to preview the scanning; click  to start scanning; click  to pause scanning.

## ⑩ Function

To import the project file and to align, delete and save the model data.

## ⑪ Model Mesh

See more details in [Mesh Processing](#).

## ⑫ Others

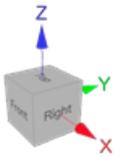
Display FPS, frame amount, point amount of the project and other information.



Fit view:



Click  to center the model and adjust the view size to fit the screen automatically.

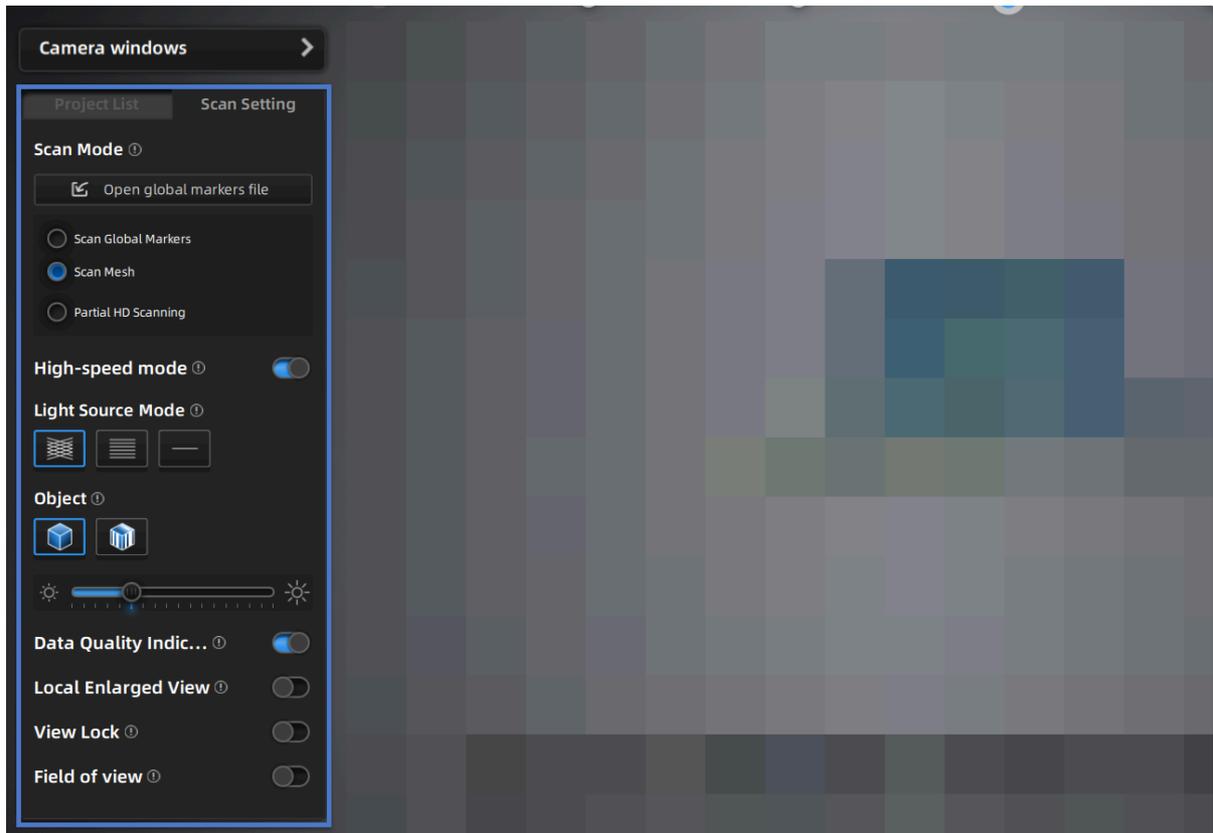


View controller:

- When adjusting the model, a coordinate system reference is provided.
- You can quickly adjust the model view by clicking on different faces of the view controller.

# Parameter Settings

You can adjust scan settings during pre-scanning or scanning, including the mode, light source, object, brightness and so on, to achieve an ideal result.



## Scan Mode

You can select [Scan Mesh](#), [Partial HD Scanning](#) or [Scan Markers](#).

### Note

When the scanner is in **Scan Mesh** mode and there is only one project within the project group, you can adjust the point distance in real time.

## High-Speed Mode

You can improve the scanning speed when it is enabled.

## Light Source Mode

FreeScan TE25	
50 Lines	50 crossed lines are ready to scan a large object.
7 Lines	7 parallel lines are ready to scan fine details.
1 Line	A single laser line is ready to scan deep holes and pocket area.

## Object

Select the mode according to the material of the object you are ready to scan.

## Brightness

Drag the slider and adjust the brightness until the scanned data or the markers are clearly visible and complete. Too high brightness may result in much noises in the scanned data.

## Data Quality Indicator

Quality of the scanned data can be displayed by different colors: blue represents a high quality and yellow represents an insufficient scanned data, which needs further scanning. Insufficiently scanned data may disappear or become anomalous after editing.

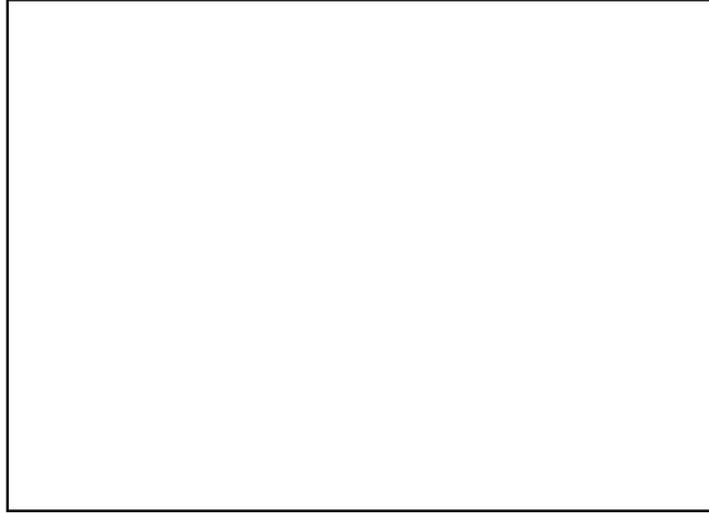
### Note

This function is not available for scanning in scan markers mode.



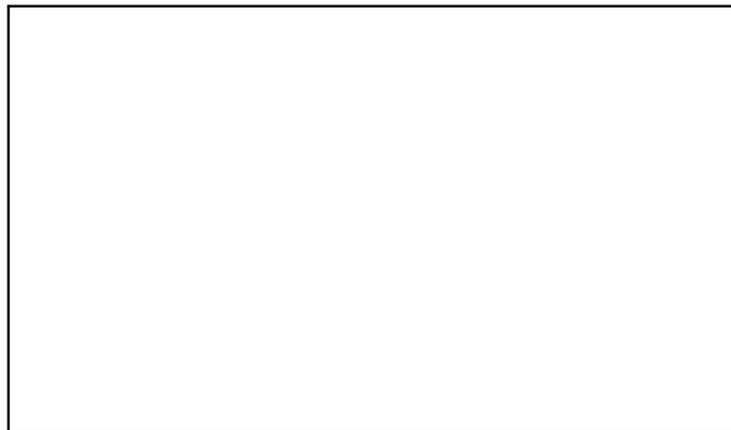
## Local Enlarged View

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



## View Lock

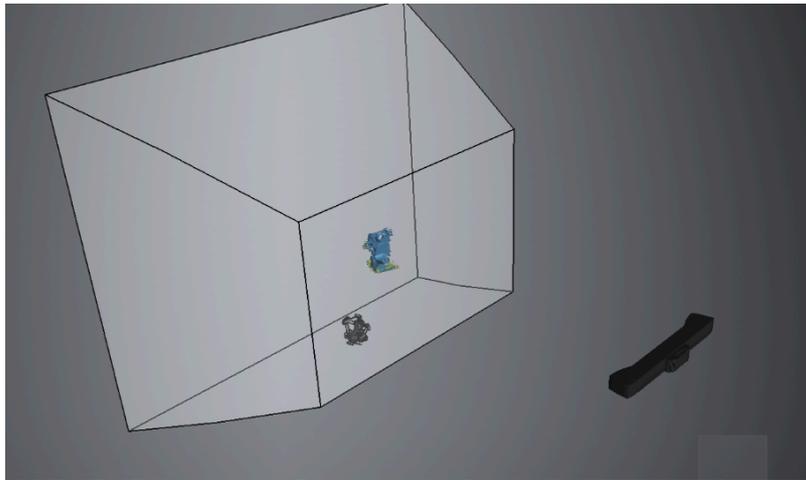
The view in the scanning interface will not vary with the movement of the scanner when the function is enabled.



## Field of View

When the scanner is outside the view field of the tracker, the scanner may not be able to scan data or the quality of the scanned data may be poor. In such a situation, you can enable this function. Once enabled, the view field of the tracker will be visualized in the 3D scene, allowing you to see the relative positions of the tracker, scanner, and the object being scanned.

During scanning, you can use this function to adjust the position of the tracker to ensure that the object being scanned and the scanner are within the view field of the tracker.



### **Caution**

If you move the tracker in a real-world scene, the model position of the tracker in the 3D scene will not change, but the relative position of the scanned object in the 3D scene will change in real-time.

## Intelligent Resolution

After enabling **Intelligent Resolution**, the software automatically adjusts the mesh resolution based on the curvature of the scanned object. Multiple scans are required during the scanning process to achieve high-quality data and make the features of the scanned object more clear. After selecting **High Intelligent Resolution** / **Standard Intelligent Resolution** and generating mesh data, click **Apply** in the **Mesh Processing** interface to view the intelligent resolution effect: areas with high curvature will have higher data density.

### **Note**

- Enabling **High Intelligent Resolution** requires a point distance in the project greater than 0.4 mm.
- Enabling **Standard Intelligent Resolution** requires a point distance in the project greater than 0.2 mm.
- Intelligent resolution is only available for **Scan Mesh** in the **Track Mode** and the **Laser Mode**.
- Intelligent resolution only applies to individual project files. Different project files within a project group can have different intelligent resolutions.

# Scan Mode

## Scan

Laser scan can quickly and accurately acquire 3D data of the scanned object. Featured in contact-free measurement, high sampling rate of data, active emission of scanning light source, low requirements for use, and strong environmental adaptability, laser scan can be used in complex environments, and acquire complete 3D data of large and complex objects into the computer, thereby reconstructing the corresponding 3D model as well as various geometric data concerning the points, lines, surfaces, and solids.

## Scan Mode

Mode	Description
<a href="#">Scan Mesh</a>	<p>Directly scan to generate mesh data. This mode is suitable for most scanning scenarios.</p> <p> <b>Note:</b> When the global markers are not fully scanned, you can click <a href="#">Add new global markers</a> to scan new global markers in the <b>Scan Mesh</b> mode.</p>
<a href="#">Partial HD Scanning</a>	<p>This mode is suitable for:</p> <ul style="list-style-type: none"><li>• There are missing data in a specific area after scanning an object in the <b>Scan Mesh</b> mode.</li><li>• There are missing data in a specific area of the imported project, requiring you to delete the data in that area and rescan it.</li></ul> <p>You can both save scanning time and get an ideal scanned data by this way.</p>
<a href="#">Photogrammetry</a>	<p>This mode is only supported in <b>Trak Mode</b>.</p> <p>This mode is suitable for:</p> <ul style="list-style-type: none"><li>• Need to scan large objects.</li><li>• Need to move the model and scan it from different angles.</li><li>• The external environment during scanning is unstable.</li></ul> <p>The scanner does not project laser lines during the scanning process.</p> <p>You can import the global markers file and scan for adding new global markers.</p> <p>After completing the scan, you can save the data or switch to the <b>Scan Mesh</b> mode to continue scanning.</p> <p>You can place a calibration bar in the scanning scene to ensure the accuracy.</p>
<a href="#">Scan Global Markers</a>	<p>This mode is only supported in <b>Laser Mode</b>.</p> <p>By scanning the surface of an object with markers, you can quickly obtain the global markers data.</p> <p>The scanner does not project laser lines during the scanning process.</p> <p>You can import the global markers file and scan for adding new global markers.</p> <p>After completing the scan, you can save the data or switch to the <b>Scan Mesh</b> mode to continue scanning.</p>

### Note

Click  **Open global markers file** to import the global markers file.

## Scan Operation

Press the scan button on the scanner or click the icons in the interface to switch among **Preview**, **Scan**, and **Pause**(also in this order).

Function	Icon	Description
Preview		To preview the scanned data and adjust <a href="#">scan parameters</a> for better scanning effects. The scanned data won't be saved.
Scan		To start scanning. During scanning, keep the scanner right toward the object to be scanned at a proper distance according to the prompt in the interface. You can adjust the brightness of the scanner according to the brightness and color of the object during scanning. The scanned data will be saved.
Pause		To pause scanning. And you can <a href="#">edit the scanned data</a> .

## Scan Mesh

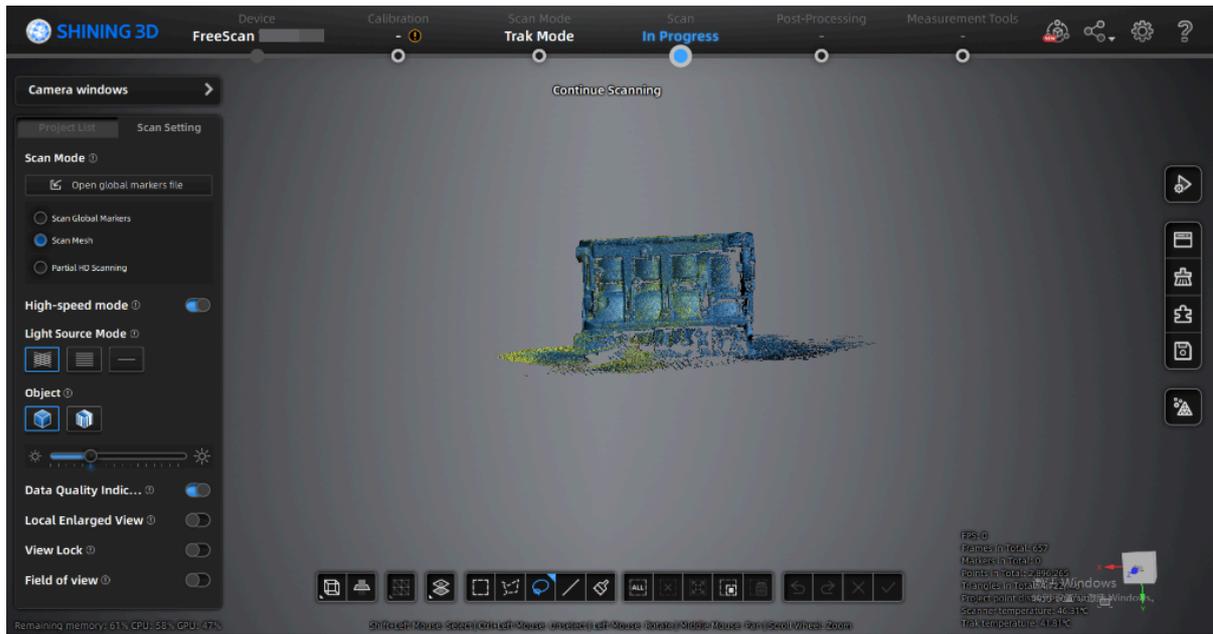
You can directly scan the object and the software will generate mesh data.

### Caution

- No need to place markers on the objects in trak mode.
- The data will be deleted if you switch to the scan markers mode or import a file of global markers.

### Steps

1. After completing the pre-scanning, click  or press the scan button on the device to start scanning.
2. Click  or press the scan button to pause scanning; click  again or press the scan button again to resume scanning.



3. Click  to save the data.

## Add New Global Markers

When the markers are not fully scanned in scan global markers mode, you can choose **Add New Global Markers** to scan new global markers.

### Caution

- Preview scanning is not available when scanning new global markers.
- **Add New Global Markers** is only available during mesh scanning in the **Track Mode** (real-time scanning) and the **Laser Mode**.
- **Add New Global Markers** is only available when there is global markers data for the current project within the scanning process.

### Steps

1. Click **Add new global markers** to scan new global markers.
2. Click  or press the scan button to pause scanning; click  again or press the scan button again to resume scanning.
3. After scanning, click  to optimize global markers.

### Note

After completing the scan for adding new global markers, you can either click  on the right side or press the scan button on the device to scan mesh data.

# Partial HD Scanning

## Steps

1. Switch to **Partial HD Scanning** mode after acquiring the data in the **Scan Mesh** mode.

### Note

The light source mode will be automatically switched to **parallel lines** in Partial HD Scanning. You can switch it to **cross lines** or **single line** according to the actual situation.

2. Review the scanned data to identify areas that need to be rescanned.

### Note

Click  to view the data from different angles. You can also rotate it by holding down the left mouse button or move it by holding down the middle mouse button to confirm the area that needs to be scanned in detail.

3. Select the identified areas and rescan them.

① Select ,  or  in the editing bar.

② Press and hold  +  and then move the cursor to select an area on the scanned object. The selected area will be displayed in red.

4. Set the point distance.

① Drag the slider  or adjust the point distance by the up and down arrows .

② Click **Confirm** and a second window will pop up for confirmation.

5. Click **Confirm** and the selected data will be deleted.

6. (Optional) Click  or press the scan button on the device to preview the model and adjust [scan parameters](#) for better scanning effects.

7. After completing the pre-scanning, click  or press the scan button on the device to start scanning.

8. After scanning, click  to save the data.

## Scan Global Markers

Scanning global markers refers to the collection the markers. By collecting such markers, the markers data of an object can be quickly obtained.

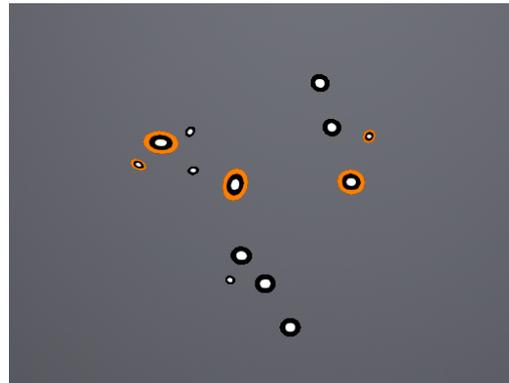
### Note

- In this mode, no laser lines are emitted during scanning.
- Continual scanning or rescanning can be done after importing the global markers generated by a third party.
- After the markers are scanned, users can switch to the **Scan Mesh** mode to continue scanning.

### Note

In laser mode, after obtaining the global markers, you may notice additional colors outside the global markers.

- If there is an orange color outside the markers, it indicates that the quality of the scanned markers is low.
- If there are no additional colors outside the markers, it means that the quality of the scanned markers is normal.
- Markers with an orange color circle may disappear or be displayed abnormally after data processing.
- Once the markers are optimized, the color indication disappears.
- There is no color outside the newly added global markers in scan mesh mode.



## Steps

1. Select **Laser Mode > Scan Markers**.
2. (Optional) Click  on the right of the panel or press the scan button on the device to enter preview scanning to adjust parameters.
3. Start scanning. Click  on the right or press the scan button on the scanner to start scanning.
4. After scanning, click  to stop scan.
5. Click  on the right to optimize the markers.
6. Click  to save data, or choose [Scan Mesh](#) to continue.

## Photogrammetry

### Note

In the **Track Mode** (real-time scanning), after scanning the global markers, you may notice additional colors outside the global markers.

- If there is an orange color outside the markers, it indicates that the quality of the scanned markers is low.
- If there is no additional color outside the markers, it means that the quality of the scanned markers is normal.
- Markers with an orange color circle may disappear or be displayed abnormally after data processing.
- Once the markers are optimized, the color indication disappears.
- There is no color outside the newly added global markers in the **Scan Mesh** mode.



### Steps

1. Place the calibration bar near the object to be scanned.
2. Select **Track Mode > Photogrammetry**.
3. (Optional) Click  on the right of the panel or press the scan button on the device to preview scanning. The user can check the scanning performance and adjust parameters.
4. Click  on the right and the tracker starts to scan the markers.

### Note

If the calibration bar is placed, only scan the markers on one side of the bar.

5. Change the scanning perspective (move the tracker or the scanned object) and click  to start scanning other markers. The software will automatically align the new markers with the former ones.
6. Click  to stop scanning.
7. Click  to optimize the markers.

 **Note**

After optimization, recognized markers on one side of the bar will disappear.

8. After finishing global markers scanning, click  to save data, or you can choose **Scan Mesh** to continue.

 **Note**

After completing the scan, you can remove the calibration bar and then switch to the Scan Mesh mode to scan mesh data.

 **Caution**

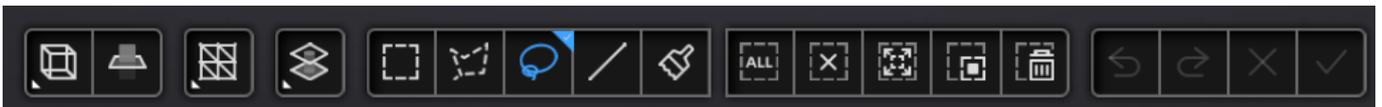
The global markers of imported files can not be optimized by the calibration bar.

## Data Editing

A variety of tools are provided to process the 3D data. Users can use these tools to reduce image noises and obtain accurate 3D data.

### Bottom Panel

After pausing or completing the scanning, you can use the following tools to edit the data.



Icon	Function	Description
	Multi view	To view the scanned data from 6 different angles.
	Cutting plane	To create a plane to do quick cutting. See more details in <a href="#">Cutting Plane</a> .

Icon	Function	Description
	Data editing	To edit the selected data. Click it again and you can switch the mode.
	Edit markers	To edit the markers. Click it again and you can switch the mode.

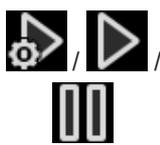
Icon	Function	Description
	Select visible	To select the outer data.
	Select through	To select the inner and outer data.

Icon	Function	Description
	Rectangular	To select a rectangular area by holding down shift and left mouse button, which will then turn red.
	Polygon	To select a polygonal area by holding down shift and left mouse button, which will then turn red.
	Lasso	To select an area at will by holding down shift and left mouse button, which will then turn red..
	Line	Hold down <code>↑ Shift</code> + <code>Left Button</code> and move the cursor to draw a straight line to select/deselect the area.
	Paint brush	To brush an area with red solid circle, which will then turn red. Press <code>↑ Shift</code> / <code>^ Ctrl</code> and roll the wheel to zoom in/out the circle.
	Select all	To select all data.
	Unselect	To cancel all selection.
	Connected domain	To select the area connected to the chosen part.
	Invert	To revert the selection.
	Delete Selected Data	Click it or press <code>delete</code> to delete the selected data.
	Undo	To undo the last deletion.
	Redo	To redo the last operation.
	Cancel edit	To cancel all edits and quit the editing mode.
	Apply edit	To apply all edits and quit the editing mode.

 **Caution**

Once the edit are applied, the data can not be recovered only if you re-load the file.

## Right Panel

Icon	Function	Description
	Preview / Scan / Pause	To preview the scanned data / To start scan / To stop scan.
	Global markers optimization	To optimize the global markers.
	Project group	To create / open a project group. About the project group, please refer to <a href="#">Project Settings</a> .
	Delete your scan	To clean the current data to redo scan.
	Alignment	To align the data as you need, please refer to <a href="#">Alignment</a> .
	Save your scan	To save the scanned data in the specified format locally.
	Mesh optimization	To do mesh optimization and <a href="#">mesh processing</a> . This function is recommended if you scan the mesh data without scanning global markers first. This process will improve the overall accuracy of the mesh data, but may take a longer time.
	Mesh processing	To do <a href="#">mesh processing</a> . This function is recommended if you scan the mesh data with scanning global markers first.

## Keyboard Shortcuts

Shortcut	Function
Hold down left mouse button and move the cursor	To rotate the data
Hold down wheel button and move the cursor	To move the data
	To select an area
	To cancel the selection
Scroll Wheel	To zoom in/out the data
	To apply all edits
	To delete the selected data

## Menu of the Right Nouse Button

Function	Description
Select all / Invert / Deselect / Delete selected data	The same as edit tools. You can use these functions by shortcuts.
Fitting view	To display the data at the center appropriately.
Connected domain / Select through / Select visible	The same as editing tools.
Switching the display type	To display the data in point, line, plane and line-plane.
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.

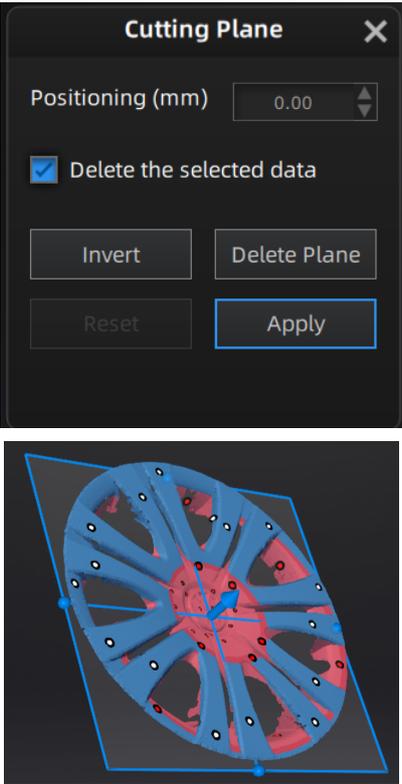
## Creation

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

Method	Instruction
Scan data fitting	The plane that the selected data are in will be the cutting plane.
Creating straight line	The plane that the straight line cuts through will be the cutting plane.
Markers	The plane that the markers (at least three) are in will be the cutting plane.

3. Click **Create Plane**.

## Setting

Illustration	Instruction
 <p>The illustration shows a software interface for creating a cutting plane. The top part is a dark-themed dialog box titled 'Cutting Plane' with a close button (X). It features a 'Positioning (mm)' input field with a value of '0.00' and a dropdown arrow. Below this is a checked checkbox labeled 'Delete the selected data'. At the bottom of the dialog are four buttons: 'Invert', 'Delete Plane', 'Reset', and 'Apply'. The bottom part of the illustration shows a 3D model of a blue wheel with a red cutting plane. A green arrow points to the normal vector of the plane, and a red ball is shown on the plane's surface.</p>	<ul style="list-style-type: none"><li>• Delete selected data / markers: Check the box and the data/markers to be deleted will turn red. Click <b>Apply</b> and the data/markers will be deleted.</li><li>• You can not delete all data.</li><li>• Please keep at least 3 or more markers on the front of the cutting plane.</li><li>• Invert: To revert the selection.</li><li>• Delete Plane: To delete the cutting plane and go back to Create cutting plane.</li><li>• Reset: To reset all operations after creating the cutting plane.</li><li>• Apply: To apply all edits.</li><li>• Positioning: After creating the plane, fill in a number in the positioning box or drag the cutting plane normal arrow  to translate the cutting plane.</li><li>• Rotate the cutting plane: Cutting plane can be rotated around an axis by dragging either ball .</li></ul>

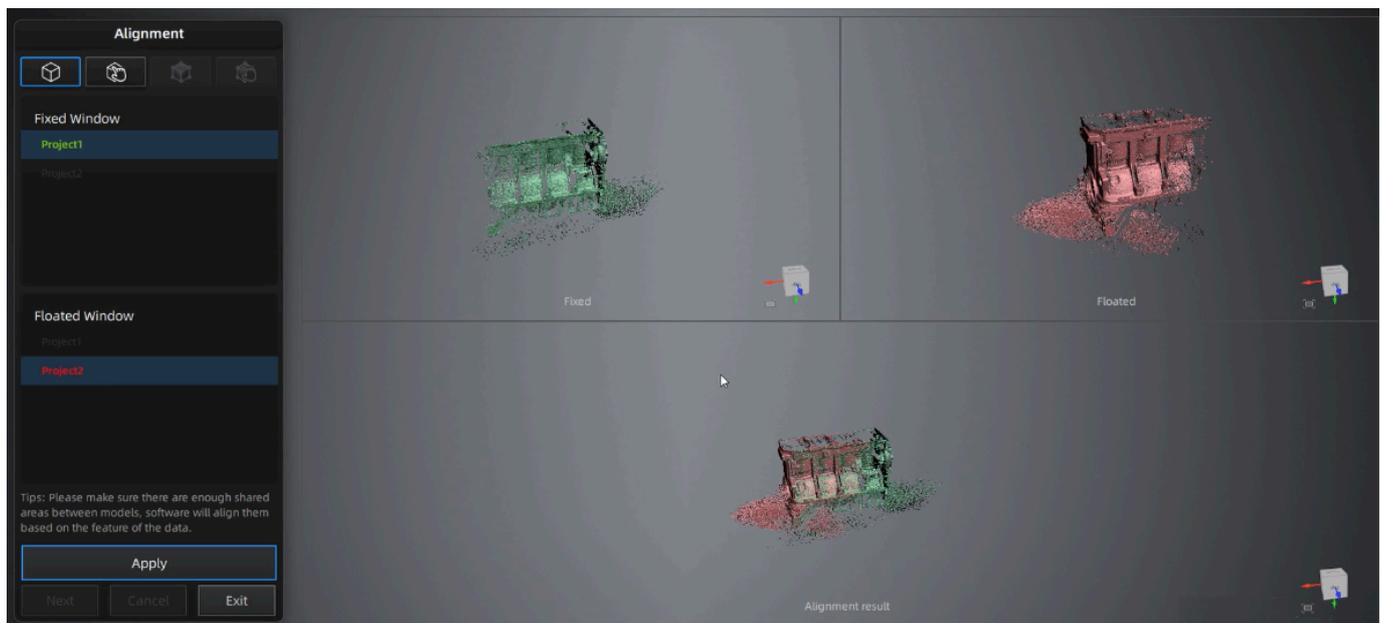
# Alignment

Through alignment, multiple scanned data are combined into a larger mesh, thereby effectively solving the problem of incomplete data collection at one time.

## Caution

When more than two project files with scanned data are present in the project list, these projects can be aligned.

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



Mode	Description	Note
 <p><b>Auto Feature Alignment</b></p>	<ol style="list-style-type: none"> <li>1. Choose <b>Auto Feature Alignment</b>.</li> <li>2. Select the project to be aligned in the fixed window and the floated window.</li> <li>3. Click <b>Apply</b> to align them.</li> </ol>	<p>Objects with repeated features, like a round or a ring, or that with small size are not suitable for this mode.</p>
 <p><b>Manual Feature Alignment</b></p>	<ol style="list-style-type: none"> <li>1. Choose <b>Manual Feature Alignment</b>.</li> <li>2. Manually choose at least 3 common feature points on the data in the fixed window and the floated window respectively.</li> <li>3. Click <b>Apply</b> to align them.</li> </ol>	<p>The chosen points should not be in a line.</p>
 <p><b>By Markers</b></p>	<ol style="list-style-type: none"> <li>1. Choose <b>By Markers</b>.</li> <li>2. Select the project to be aligned in the fixed window and the floated window.</li> <li>3. Click <b>Apply</b> to align them.</li> </ol>	<p>The two projects should have at least 3 markers in common.</p>
 <p><b>Manual Markers Alignment</b></p>	<ol style="list-style-type: none"> <li>1. Choose <b>Manual Markers Alignment</b>.</li> <li>2. Select the project to be aligned in the fixed window and the floated window.</li> <li>3. Manually choose at least 3 common markers on the data in the fixed window and the floated window respectively.</li> <li>4. Click <b>Apply</b> to align them.</li> </ol>	<p>The chosen markers should not be in a line.</p>

 **Note**

Manual alignment serves as an alternative method of auto alignment. You can choose it when auto alignment fails.

## FreeProbe Operation

### Installation

1. Insert the battery into the slot at the bottom of the device.
2. Press the button on the left rhombic button to turn on. The indicator will turn cyan after powering on. For more button operations, please refer to FreeProbe's [appearance](#).

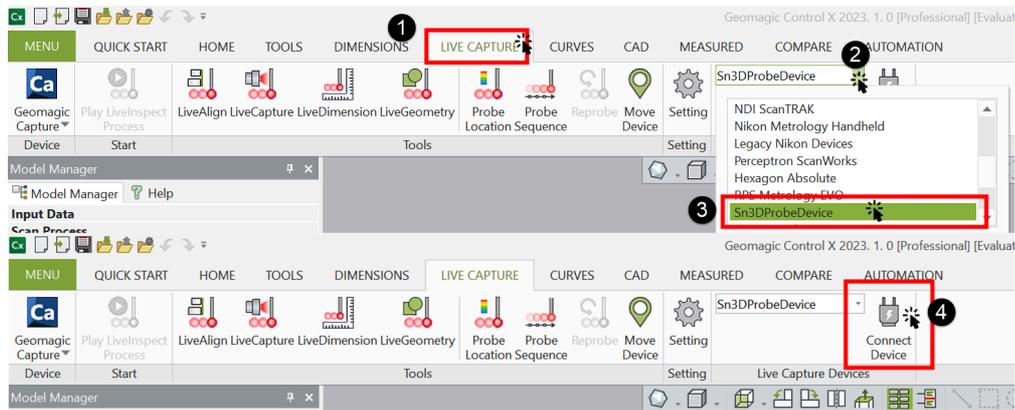
# Connection

1. Power on the probe and wait for its indicator to become cyan.
2. Run the FreeScan Trak software.
3. Select **Probe Mode** to open the third-party software.

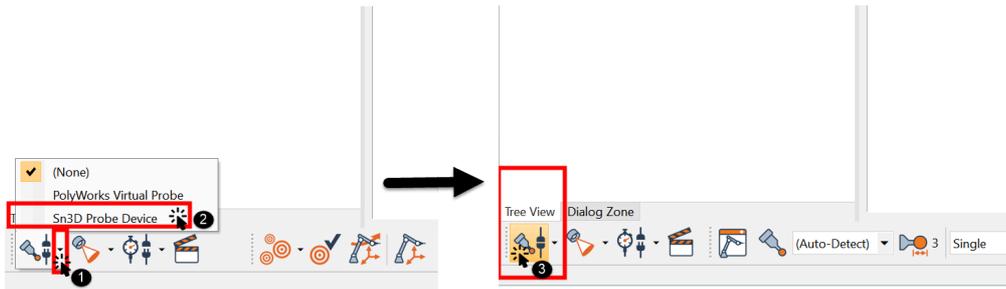
**Note**

- After selecting the probe mode, the third-party software opened in the software defaults to Polyworks Metrology Suite. If you need to change the opened third-party software, you can change it through the settings on the upper right side of the software.
- The third-party software currently supported by the probe mode of this software is Polyworks Metrology Suite (2023) and Geomagic Control X (2023.1).

4. Connect to the probe in the third-party software and wait for the probe's indicator to become green.



How to connect the probe in Geomagic Control X



How to connect the probe in Polyworks Metrology Suite

#### Note

- If the probe cannot connect successfully, please open **Network & Internet > Mobile Hotspot** and set the network band to 2.4 GHz.
- If you are using a desktop computer, you can turn on the mobile hotspot by inserting a wireless network card. If the mobile hotspot cannot be turned on after inserting the wireless network card, please contact technical support.

## Calibration

When the probe has not been used for a long time or its accuracy has decreased, please perform [Probe Calibration](#) before use.

## Add Points & Measurement

### Steps

1. Select **Trak Mode** to scan and finish mesh optimization.
2. Select the third-party software to be opened in  > Probe Setting, and the scanned model files will be automatically imported into the opened third-party software.
3. Now you can use the probe to add feature points and do measurement in the opened third-party software.

#### Note

- Please exit the third-party software before continuing to use the FreeScan Trak software.
- You can directly input the existing model to Polyworks to add feature points and measure.
- To add feature points with the Probe, ensure its tip is within the range of the FreeTrak's camera and in the same plane as the camera. Gently poke at the object to be measured, and click the [functional buttons](#).

## Battery Specifications

- Battery type: Rechargeable lithium-ion battery
- Battery model: 14500 battery (AA size)
- Nominal voltage: 3.7 V

#### Note

The device only comes with a probe charging case. Please prepare the batteries for the probe yourself according to the specifications mentioned above.

## Cautions

Before using the battery and the probe charging case, please read the following safety precautions to prevent dangerous situations such as battery explosions.

### Caution

- Do not charge the battery for a long time.
- Do not reverse the positive (+) and negative (-) terminals.
- Do not directly solder the battery terminals.
- Do not disassemble the battery and the charging case at will.
- Do not put the battery into a fire or apply direct heat to it.
- Do not place the battery in a microwave oven or pressurized container.
- Do not use or store the battery near any source of heat such as a fire or heater.
- Do not short-circuit the battery by connecting wires or other metal objects to the positive (+) and negative (-) terminals.
- Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
- Replace the damaged battery shell to prevent leak or fire accident.
- Do not put any objects on the charging case when it's charging the battery, in order to keep good ventilation and heat dissipation.
- Do not connect the charging case with power for a long time. Cut off the power after using the charging case to avoid safety hazards.
- Store the battery and the charging case in an environment that is clean, dry, and free of inflammable materials like powder, liquid, and metal scraps.
- Do not use the battery if it gives off an odor, generates heat, becomes discolored or deformed, or appears abnormal in any way. If such batteries are in use or being recharged, remove them from the device or charger immediately and discontinue use.

## Post Processing

### Mesh Processing

After the scan is completed, click  or  to enter the **Post-processing > Mesh processing** interface where you can optimize the scanned data.

Item	Description	Note
Optimization	To optimize the data and reduce noises. A filter with high level may cause the data to lose some details.	<ul style="list-style-type: none"> <li>• None: No optimization.</li> <li>• Standard: To optimize data slightly and preserves data characteristics.</li> <li>• Med: To reduce the noise on the surface of the scanned data.</li> <li>• High: To reduce the noise on the surface of the scanned data and make the data smoother.</li> </ul>
Smooth	To denoise the data and make it smooth to improve the quality.	When the optimization is set to <b>None</b> , this function is not available.
Remove small floating parts	To remove small floating parts unrelated to the model.	Drag the slider or click the arrows to adjust the ratio of removing small floating parts. 0 means not to remove them.
Max triangles	To set a max plate number as an upper limit to simplify the data.	Input an appropriate number.
Fill small hole	To auto fill the small hole according to its perimeter.	The default perimeter equals to or is less than 10 mm. You can adjust it according to your requirements.
Remove spike	To remove spikes and unfold the single spike in the polygonal mesh.	/
Marker hole filling	To fill in holes in the surface of the object that are covered by markers and therefore are not scanned.	/
Recommended parameters	To use recommended optimized data when enabled.	/

Button	Description
Preview	<ul style="list-style-type: none"> <li>• Click <b>Preview</b> to preview the effects after applying the settings.</li> <li>• If adjustments are needed, click  to discard the current operation and reconfigure the parameters.</li> </ul>
Confirm	Click on <b>Confirm</b> for final confirmation.

# Mesh Optimization

After the model data is meshed, the software automatically switches to the **Post-processing** interface.

Alternatively, users can directly click the navigation bar to enter the post-processing interface. Click  to select the file for post-processing; or directly drag the file in STL, OBJ, PLY format into the post-processing interface.

# Mesh Optimization

Item	Description	Note
Simplification	To simplify the data by reducing the number of triangles. Drag the slider or click the arrows to adjust the ratio. The default is 0.	The simplification will not be iterated.
Mesh Optimization	To optimize the quality of the data. Drag the slider or click the arrows to adjust the ratio. The default is 0.	/
Smooth	To denoise the data and make it smooth to improve the quality. Drag the slider or click the arrows to adjust the ratio. The default is 0.	/
Remove Small Floating Parts	To remove small floating parts in the scanned data. Drag the slider or click the arrows to adjust the ratio. 0 means no removal.	The removal will not be iterated.
Auto Hole Filling	To auto fill holes whose perimeter is less than the input value after the selection of type.	<p>Types:</p> <p>The diagram illustrates three methods for filling a hole in a mesh. At the top, a 'Hole' is shown as a blue mesh with a red circular opening. Three arrows point downwards to three different filling methods: 'Curvature' (the hole is filled with a smooth, curved surface), 'Tangent' (the hole is filled with a flat surface that is tangent to the hole's edge), and 'Flat' (the hole is filled with a flat surface).</p>
Manual Hole Filling	To fill the hole manually by clicking the edge of the hole after the selection of type. The edge of the hole to be filled is displayed green, and that of the chosen hole is displayed red.	/
Cutting Plane Tool	To adjustment the coordinate of the data with a custom plane as the bottom.	/

### Caution

After post-processed, the data will not be saved automatically. Please save your data in time.

## Bottom Panel



See more details in [Data Editing](#).

## Right Panel

Icon	Name	Description
	Open File	To open a file (in STL, OBJ, PLY format) for post-processing.
	Save Your Scan	To save the scanned data in a specified format to a specified location.
	Share You Scan	To share the model with your <a href="#">Sketchfab</a> account.
	Third-party Software	To save the data and open it with <a href="#">third-party software</a> .

# Measurement

## Measurement

When you complete the mesh optimization, it will automatically enter the measurement interface, or you can directly click  on the corresponding position in the navigation bar to switch to the measurement interface to import data. Then you can perform operations such as [creating features](#), [alignment](#), and [measurements](#) here.

### Note

- On the **Measurement** interface, you can use [multi view](#).
- On the **Measurement** interface, you can operate by [right mouse button](#) and [shortcuts](#).

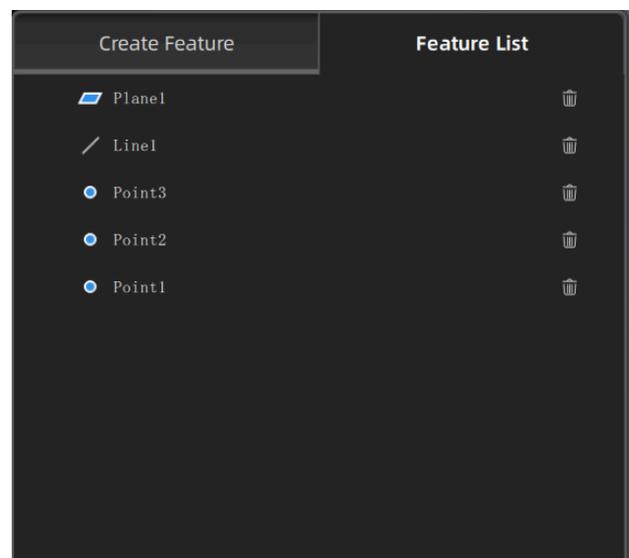
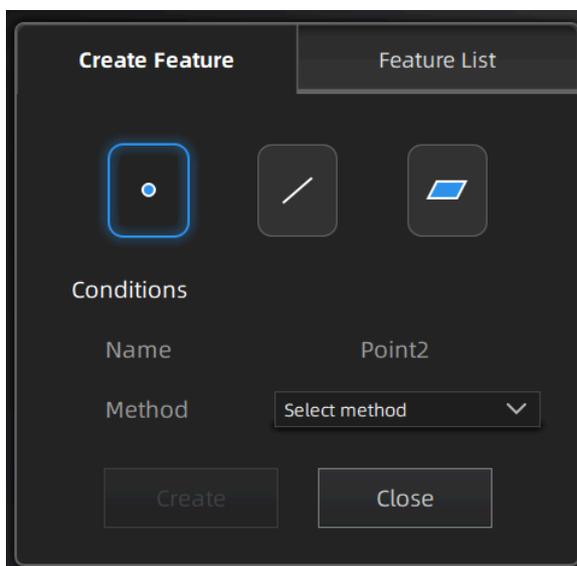
Additionally, it also supports clicking  in the right-side function bar to import models (including third-party 3D models).

 **Note**

- Support opening files in the type of STL, OBJ and PLY.
- Support dragging the model file into the software interface.

## Create Features

Click  and a **Create Feature** window will pop up on the left.



 **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	<ol style="list-style-type: none"><li>1. Click on the data to select a point.</li><li>2. Click <b>Create</b> to create a point.</li></ol>	/
Line-Plane Intersection	<ol style="list-style-type: none"><li>1. Click the existing feature lines or choose lines in the drop-down list.</li><li>2. Click the existing feature planes or choose planes in the drop-down list.</li><li>3. Click <b>Create</b> to create a feature point which is the intersection between the non-parallel line and plane.</li></ol>	<ul style="list-style-type: none"><li>• The feature line can't be in the feature plane.</li><li>• The feature line can't be parallel with the feature plane.</li></ul>

## Line

Creation Method	Description	Note
Point-Point	<ol style="list-style-type: none"><li>1. Click the data or existing feature points to select the point. You can tick the checkbox before <b>From</b> or <b>To</b> and re-select the feature points.</li><li>2. Click <b>Create</b> to create a line.</li></ol>	/
Plane-Plane Intersection	<ol style="list-style-type: none"><li>1. Click existing feature planes or choose planes in the drop-down list.</li><li>2. After selecting two planes, click <b>Create</b> to create an intersection of two non-parallel planes.</li></ol>	<ul style="list-style-type: none"><li>• Create two feature planes in advance.</li><li>• The feature planes can't be parallel to each other.</li></ul>

## Plane

Creation Method	Description	Note
3 Points Fit	<ul style="list-style-type: none"><li>Click the data or existing feature points to select the point and click <b>Create</b> to create a plane.</li><li>Tick the checkbox before the three points and re-select the point. Click <b>Create</b> to create a plane.</li></ul>	The three points can't be in a line.
Point-Line Fit	<ul style="list-style-type: none"><li>Click existing feature lines or choose lines in the drop-down list and click <b>Create</b> to create a plane.</li><li>Click the data or existing feature points to select the point and click <b>Create</b> to create a plane.</li></ul>	The point can't be in the line.
Best Fit	<p>When there are selected data, click <b>Create</b> to create a plane that has the smallest deviation from the selected area.</p> <p> <b>Note</b></p> <p>You can use <a href="#">editing tools</a> or <a href="#">shortcuts</a> to select the data.</p>	/

## Align

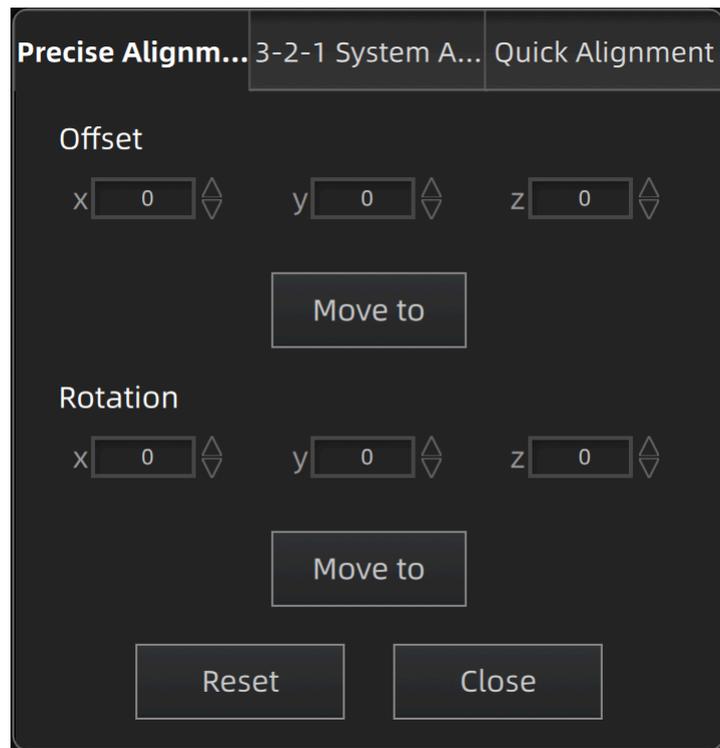
Use this mode to modify the alignment of the data to the global coordinate. This action is useful for post processing or reverse engineering.

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

### **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.

## 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.

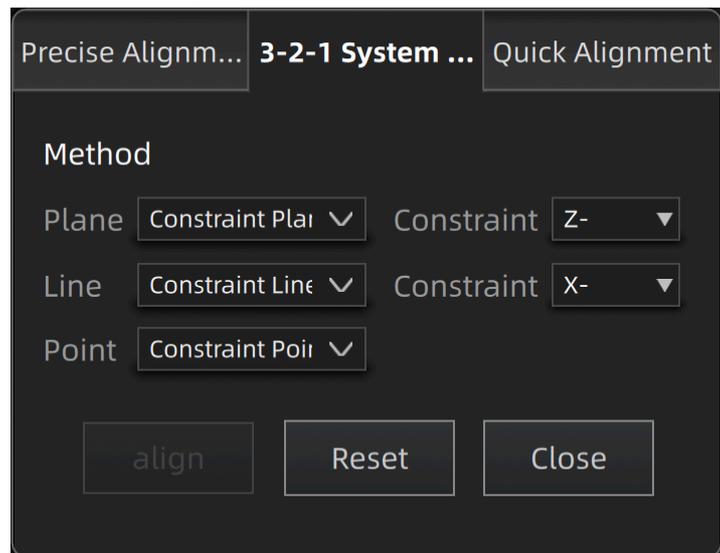
Click **Reset** to cancel all the transformation in the exact alignment interface.

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).

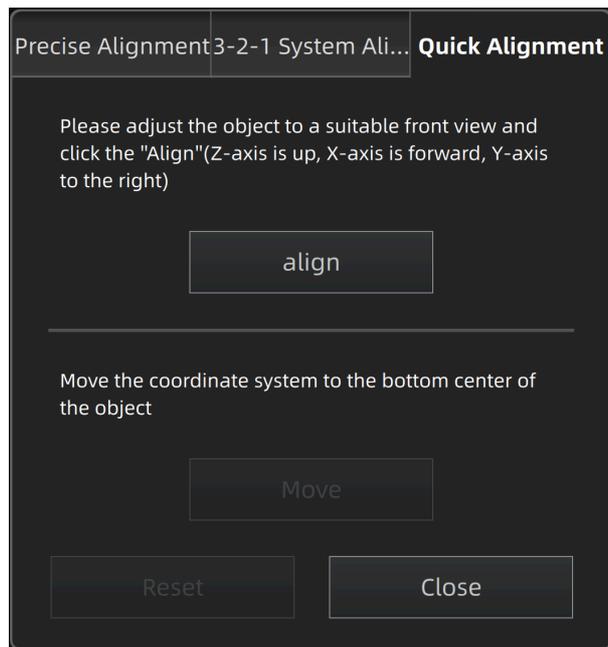
Click **Align** to start the coordinates transformation. When the lines are perpendicular to the plane, the transformation fails, so the alignment fails.

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 Tools

Three kind of measurements can be done in the software: **Distance**, **Surface area** and **Volume**.

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. <ul style="list-style-type: none"> <li>• <b>Total</b> is the 3D distance.</li> <li>• <b>X, Y</b> and <b>Z</b> are the projection of the segment to the respective planes.</li> </ul>	Click on the surface of the model to pick two points, the calculation will be done automatically.
Surface Area	Calculate the surface area value.	You can use <a href="#">editing tools</a> or <a href="#">shortcuts</a> to select data.
Volume	Calculate the volume of the <b>watertight data</b> .	It shows the volume in mm <sup>3</sup> and the coordinates of the bounding box.  <b>Note:</b> Only available for <b>watertight mesh</b> .

## Save and Export

### Save Data

You can save the scanned data.

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

Format	Data Type	Saved as	Application
ASC (whole scan)	Optimized cloud points	Scan.asc	<ul style="list-style-type: none"> <li>Data checking.</li> <li>Quick export and no need for post-operation.</li> <li>Use other software to post-process the data.</li> </ul>
STL	Mesh data	Scan.stl	<ul style="list-style-type: none"> <li>3D printing.</li> <li>Reverse engineering.</li> <li>Compatible with most post-processing software.</li> </ul>
PLY	Mesh data	Scan.ply	<ul style="list-style-type: none"> <li>Compact size.</li> <li>Easy for editing.</li> </ul>
OBJ	Mesh data	Scan.obj Scan.jpg Scan.mtl	Compatible with most post-processing software.
3MF	Mesh data	Scan.3mf	<ul style="list-style-type: none"> <li>Compact size.</li> <li>Compatible with Microsoft 3D printing software</li> </ul>
P3	Global markers	Scan.p3	<ul style="list-style-type: none"> <li>Reuse the markers' position.</li> <li>Can also contain the cutting plane.</li> </ul>
ASC (global markers)	Global markers	Scan_markers_project.asc	<ul style="list-style-type: none"> <li>Reuse the markers' position.</li> <li>Can also contain the cutting plane.</li> </ul>
TXT	Global markers	Scan.txt	<ul style="list-style-type: none"> <li>Reuse the markers' position.</li> <li>Can also contain the cutting plane.</li> </ul>

## Data Sharing

You can upload the meshed data to Sketchfab.

Click  to upload the meshed 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.

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 metrology. If the GeomagicControl X software has been installed, clicking this button will open the GeomagicControl X software and import the mesh data. The probe mode is compatible with Geomagic Control X (2023.1) and earlier versions.
	Export data to Geomagic Design X	Mainly used for reverse engineering 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	Mainly used for mesh editing. If the GeomagicEssentials has been installed, clicking this button will open the GeomagicEssentials and import the mesh data.
	Export data to Polyworks Metrology Suite (2023)	Mainly used for metrology. If Polyworks Metrology Suite has been installed, clicking this button will open it and import the mesh data into Polyworks Metrology Suite.

## Contact Us

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