SHINING 3D

OptimScan 5M Plus
User Manual

V1.0.0

SHINING 3D

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Overview

Disclaimer

Safety Instructions

Signal	Meaning
	Additional information for particular situation.
	Improper actions or conditions that may damage the product, and consequently void your warranty or service contract or lose the customer data or system data.
	The safety instructions that you must precisely follow to avoid injury. Failure to observe can cause damages to your product, or result in personal injuries.

About the Document

This document is related to your safety, lawful rights and responsibilities. Read it carefully before installing and using the product.

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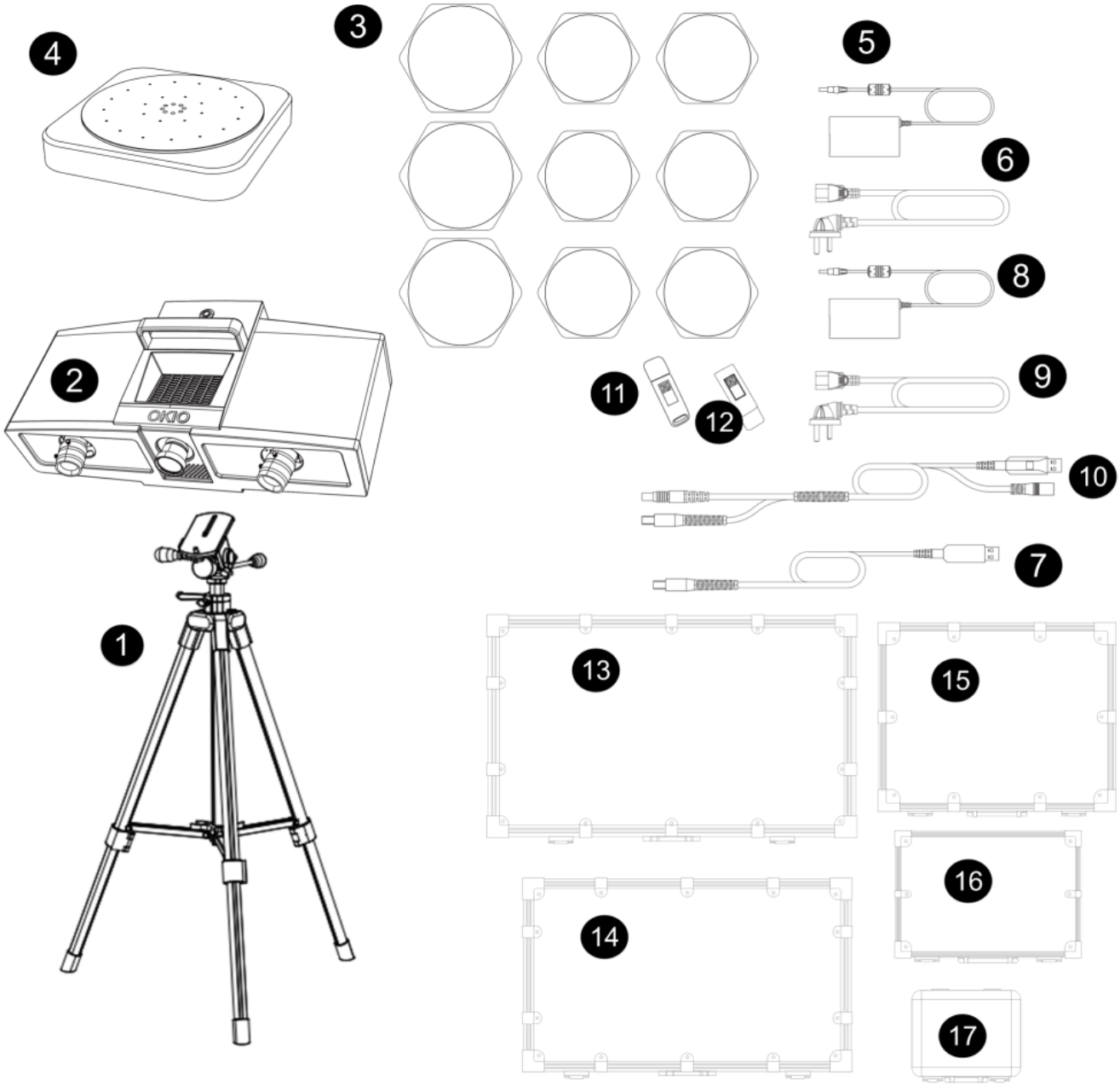
Device

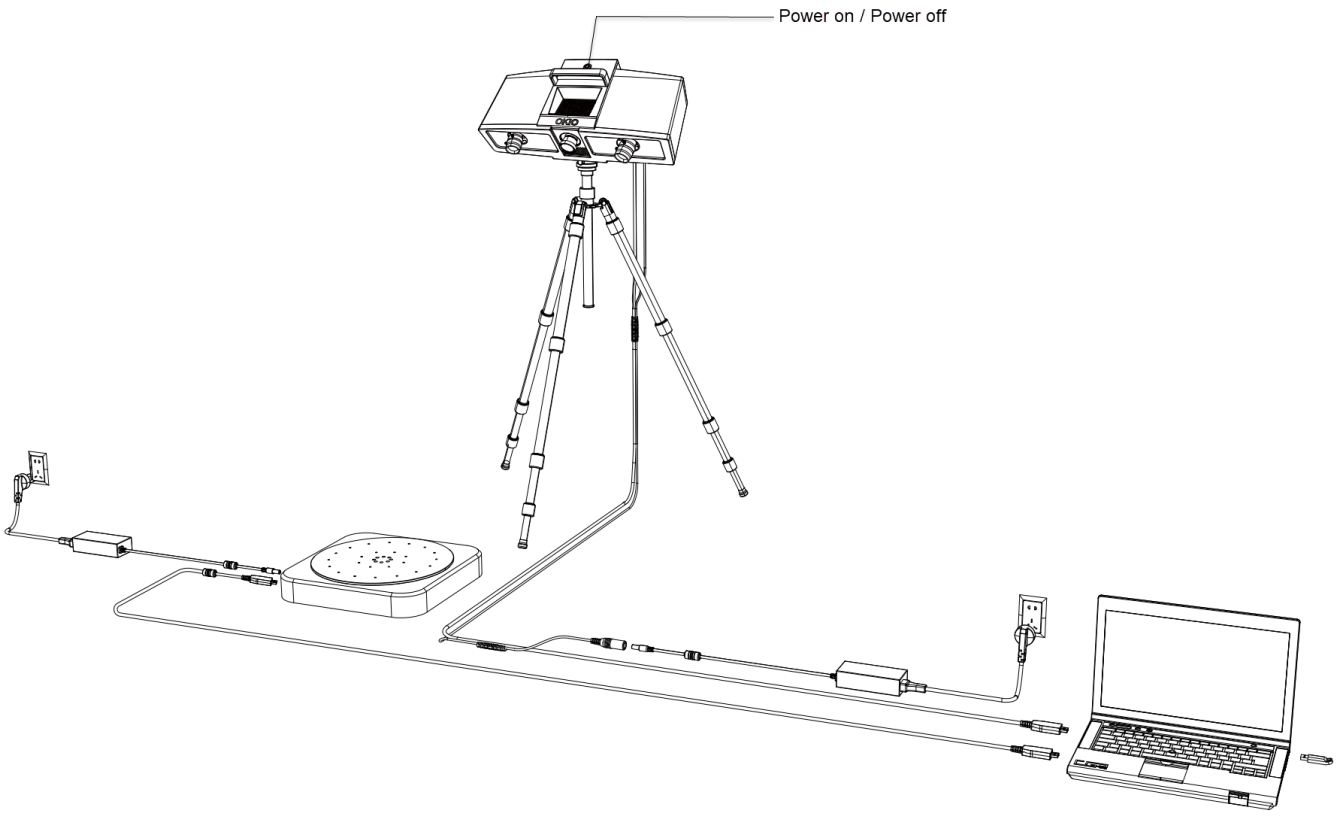
OptimScan 5M Plus adopts narrow-band blue light source and high-resolution industrial lens to ensure fine scanning effect and smooth data quality. The scanner provides three sets of high-resolution industrial lenses, which can be replaced according to different models, with stable precision and easy operation.

Appearance

Parts



No.	Part
1	Tripod
2	Scanner head and lens
3	lens(400mm、200mm、100mm)
4	Turntable(optional)
5	Power Adapter (Turntable)
6	Power Cord (Turntable)
7	Data Cable (Turntable)
8	Power Adapter
9	Power Cord
10	Data cable and power interface cable
11	Dongle
12	USB Flash Drive
13	Carrying Case(Tripod)
14	Carrying Case(Scanner Head)
15	Calibration Board(400mm)
16	Calibration Board(200mm)
17	Calibration Board(100mm)



Steps

1 Take the scanner head out and install the lens.

2 Open the tripod and place it on the ground. The tripods can be retracted and fixed after adjusting the height.

3 Install the cradle head on the tripod.

4 Install the scanning head on the cradle head, adjust the direction, and tighten the bolts to fix it.

5 Adjust the height of the device as needed, and tighten the lock after the adjustment is complete.

6 Connect the data cable between the scanner and the computer.

7 After connecting the power cord and adapter, turn on the power.

8 Use the device power on/off key to start or shut down the device.

Caution

- Make sure you are using the correct power adapter (24V/2.5A).
- If you use a turntable, you need to connect the turntable power and data cables separately. The power adapter is 12V/5A.

Installation

To use the scanner, you need to install the **OptimScan** software first (hereinafter referred to as the "software").

Recommended PC Configuration

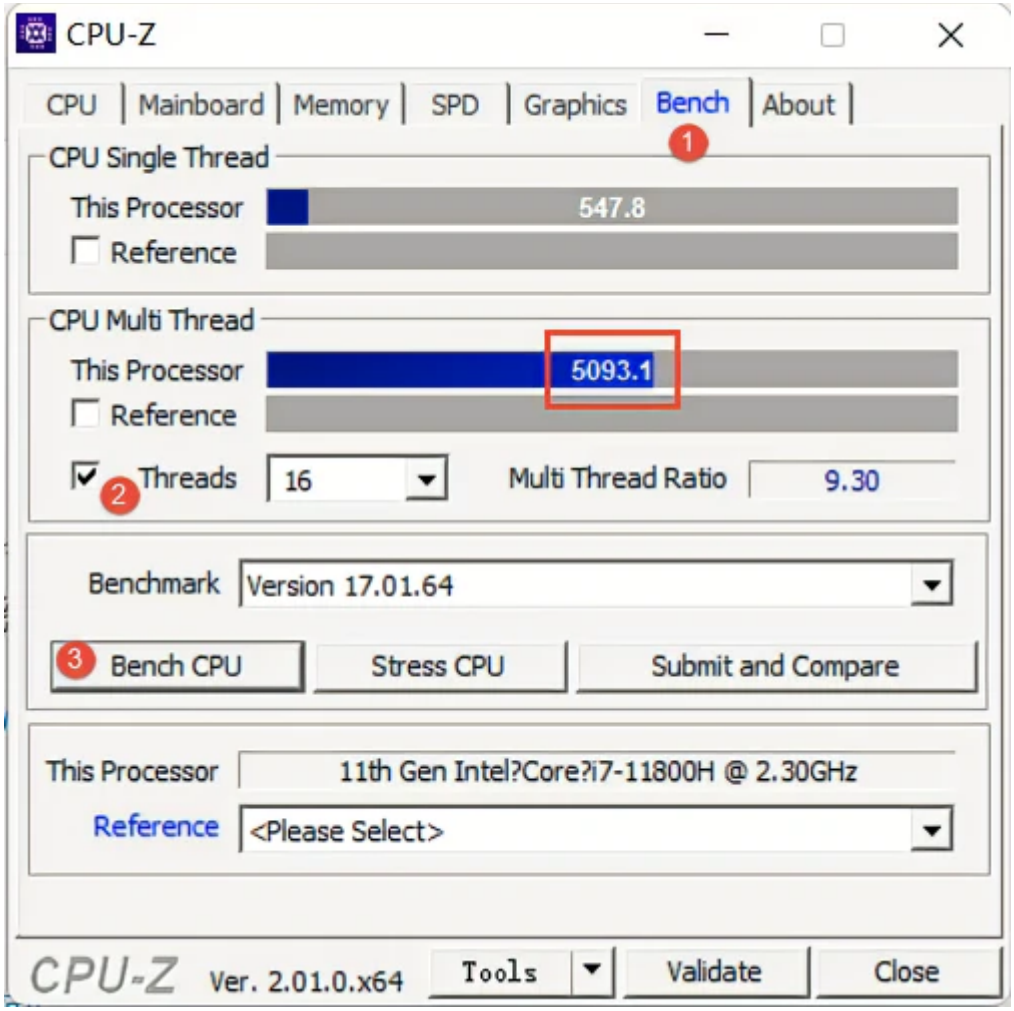
Configuration	Recommendation
CPU	Intel® Core™ i7-11700 or above
Graphics Card	NVIDIA RTX 3060 or above
VRAM	6GB or above
RAM	32GB or above
USB	USB3.0
Operation System	Windows 10(64-bit) and Windows 11 Pro(64-bit)

CPU

Improper computer configuration or hardware issues will cause CPU performance degradation and affect the user experience, it is recommended to use the CPU-Z tool to check CPU performance before starting scanning.

CPU-Z: https://www.cpuid.com/softwares/cpu-z.html (https://www.cpuid.com/softwares/cpu-z.html)

Install and launch CPU-Z, follow the steps in below figure to get a CPU multi thread performance score. A score of **4000** or more is required.



GPU

Highly recommend to use a NVIDIA[1] discrete graphics card for the scanner.

The NVIDIA discrete graphics card should support **CUDA10.2** or above.

Use **NVIDIA Control Panel** to get the CUDA version with follow steps.

- Launch **NVIDIA Control Panel**
- Go to **Help**>>**System information**>>**Components**.

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**.

Installation Package

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.

> ⚠ **Caution**
>
> ● 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.

---

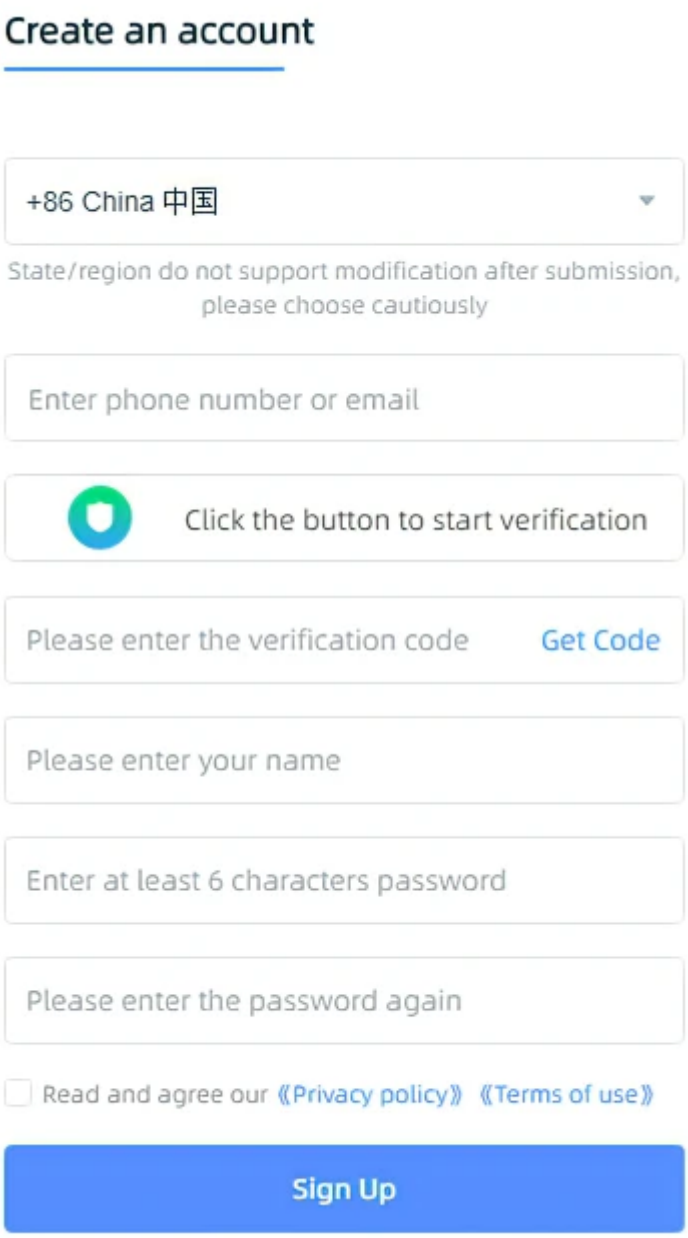
1. We use CUDA from NVIDIA to get high scanning experience. ↩

Activation

You need a Shining 3D User Account before activating the device.

Register

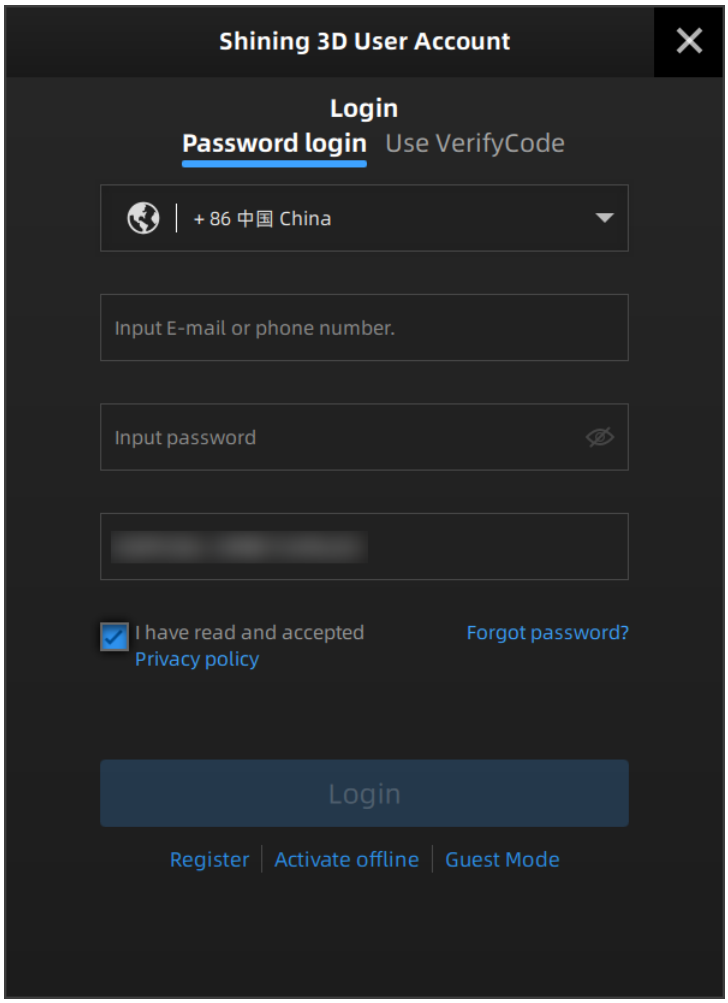
For new users, you need to register a Shining 3D User Account first, click **Register** in the pop-up window when launching the software, or click **Sign Up** in our Shining 3D User Account website: https://passport.shining3d.com/ (https://passport.shining3d.com/login?redirect=%2F)



> **Note**
>
> - You need to enter valid email or phone number to get verify code for registration.
> - Please enter correct user information for better service.
> - Please read and then check **Privacy Policy** and **Terms of use**.

Log in

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



Activate the device

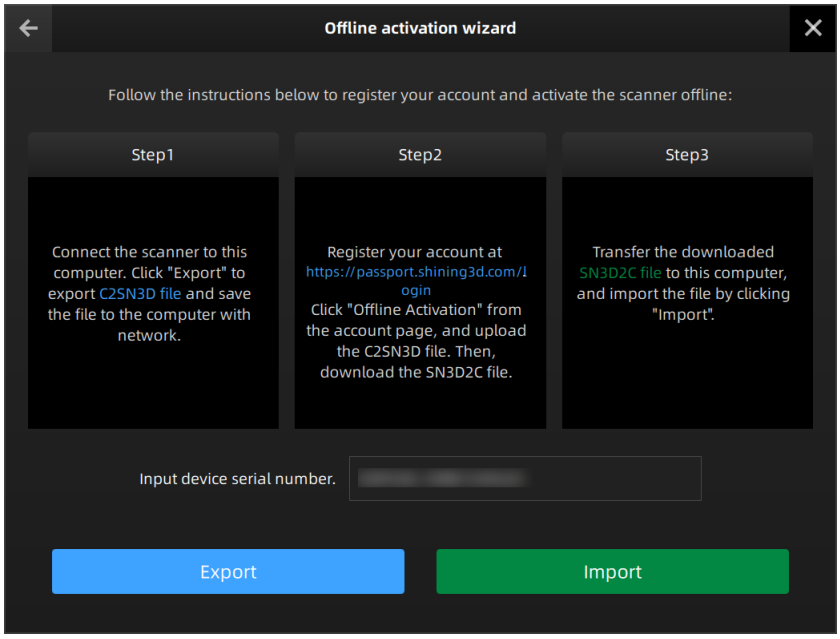
Online Activation

If the computer is connected to the Internet, the activation will be processed automatically after you login Shining 3D User Account.

Offline Activation

You need another computer which is connected to Internet to help you finish the offline activation.

1.Connect scanner to the computer without network and export C2SN3D file.



2.Copy the C2SN3D file to the other computer connected to Internet.

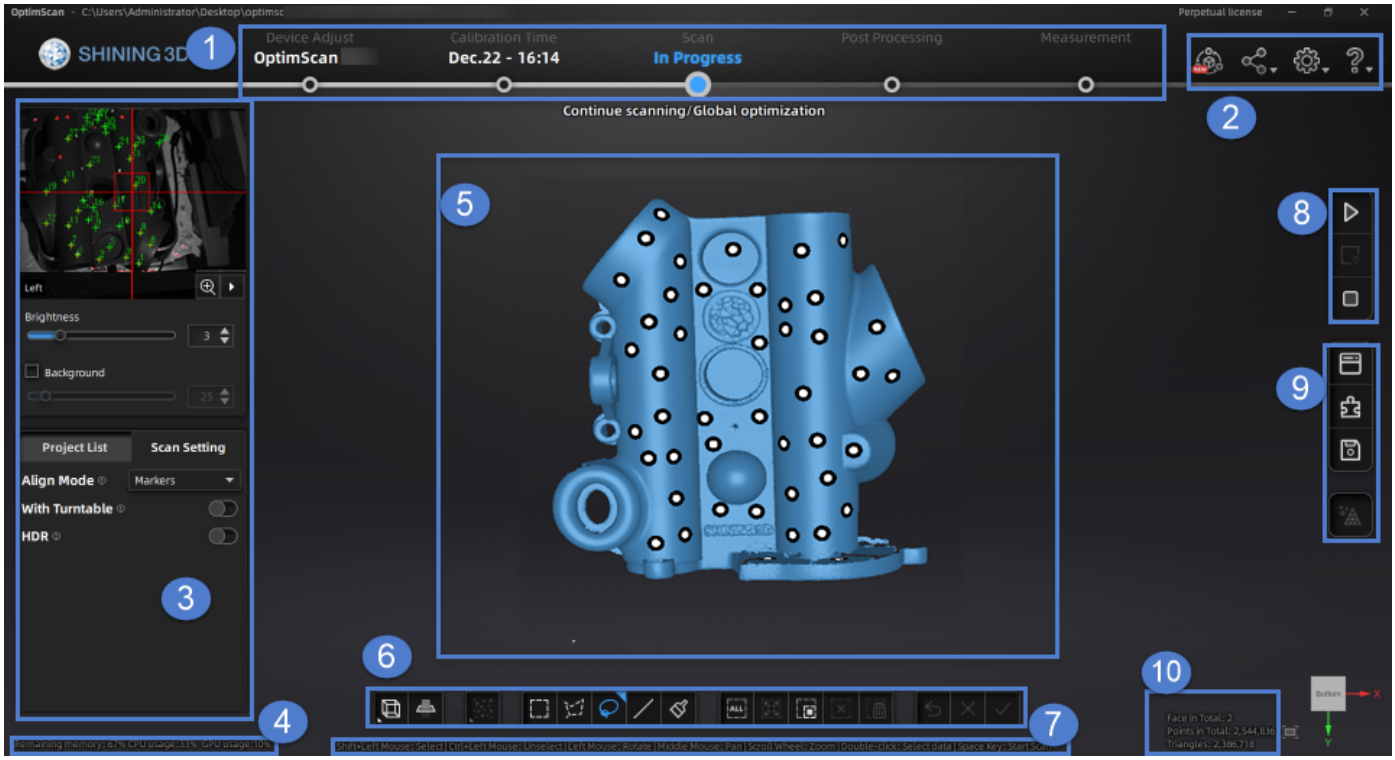
3.Log in https://passport.shining3d.com/ (https://passport.shining3d.com/login?redirect=%2F) , upload your C2SN3D file in **offline activation** page and complete the information of activation, you can then download the SN3D2C file.

4.Copy the SN3D2C file to the computer without no network and import the file into the software.

Note

If you fail to activate the device in neither way, please contact your supplier or our support team.

UI



No.	Function	Description
1	Navigation Bar	●Device Adjust: Display the device status and do device adjustments. Click to reconnect when the device is offline. Click the button on the navigation bar to switch to the process. ●Calibration Time: Display the calibration time and click the button to switch to calibrate. ●Scan Mode: Choose the scan mode. ●Scan: Go into scan process. ●Post Processing: Go into the post processing, which includes mesh and mesh editing. ●Measurement: To measure your model.

No.	Function	Description
2	Settings and Feedback	●Reverse Engineering Service ●Link - Official Website: Open the official website (https://www.shining3d.com/) 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. ●Settings - User Experience: To help us improve the user experience. We hope to be allowed to collect usage experience information and we will . - Advanced Mode: choose to open some functions, such as laser, the edit function and so on. - Factory Default: All settings can be restored to the initial settings, and the software will restart automatically. - Language: To set the language displayed in the software. - About: View related software release information, contact information, etc. ●Help - User Manual: Open the user manual. - Teamviewer: The quick access to remote assistance. Please send the ID and password in the pop-up window to the technical supporters for remote assistance.
3	Scanning Settings	●Camera Window: 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.

No.	Function	Description
4	Memory/CPU/GPU	●Remaining memory. ●CPU usage: If the running program occupies a large proportion, it is recommended to close other software. ●GPU usage.
5	Scanning Window	Window for viewing the model.
6	Edit Toolbar	For more, see Data Edit.
7	Shortcuts	Quickly move the model or adjust the angle through shortcut keys.
8	Start Scan、Stop & Delete、Global Optimization	For more, see Scanning.
9	Side Toolbar	For more, see functions.
10	Other Information	To show information about face in total, points in total and triangles.

Quick Guide

1. Device Adjust.
2. Calibration.
3. Create or open a project group.
4. Set scan parameters
5. Scan and do global optimization.
6. Mesh.
7. Save the scan data.

Calibration

Device Adjust

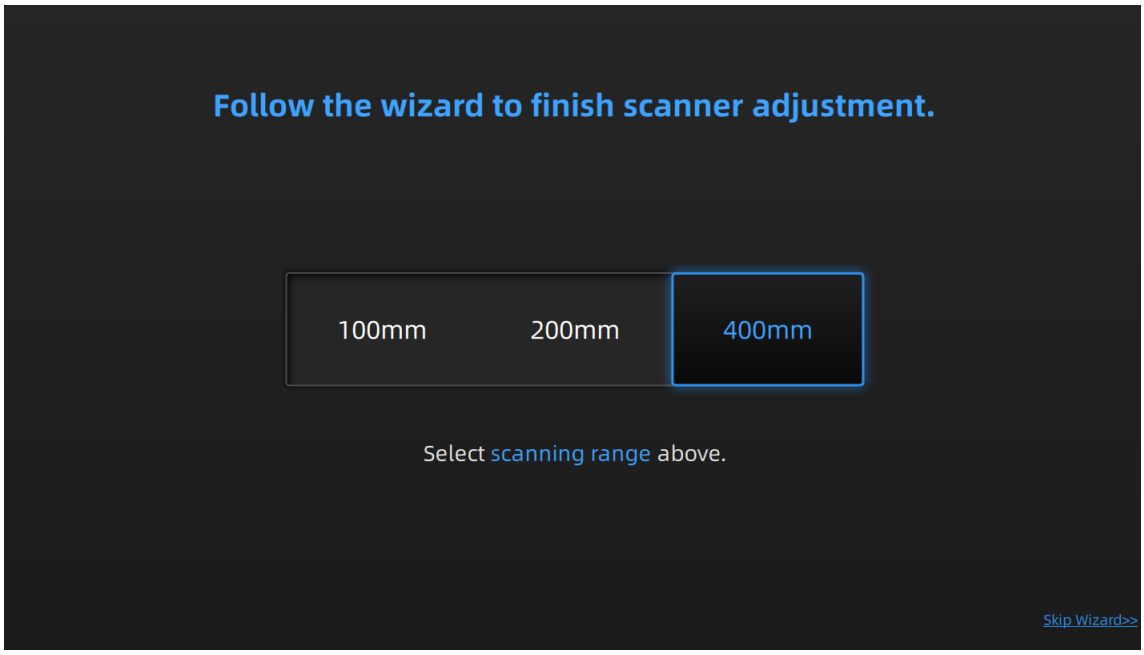
Device adjustments are required before using the scanner.

Caution

If the device is not connected or connected abnormally, click to reconnect.

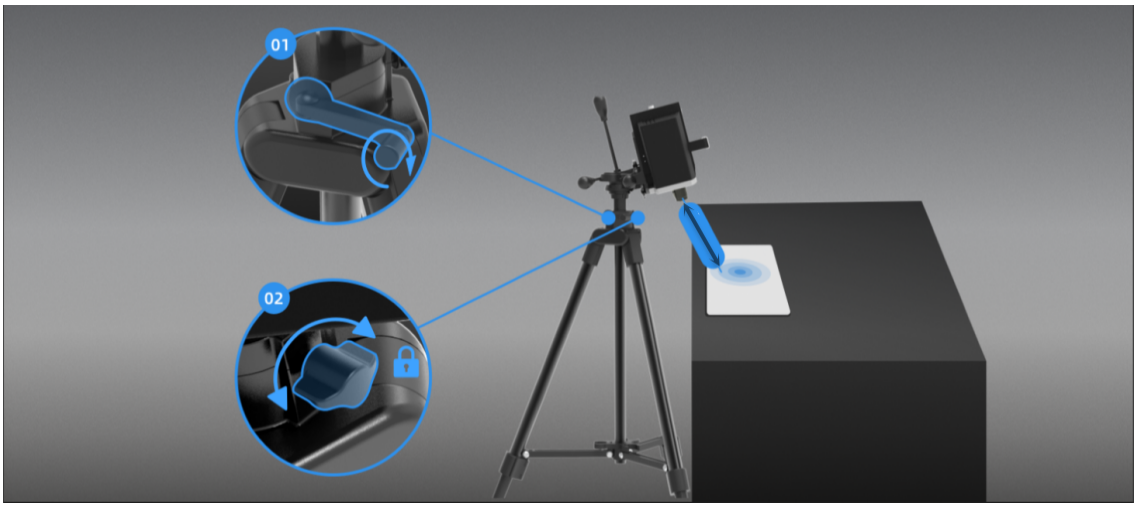
Steps

1.Select the scan range that matches the calibration board.



2.Loosen the screws at the bottom of the scanner with the hexagonal screws, take out the front cover of the scanner, and install the corresponding set of lens and optical-mechanical lenses to the corresponding holes according to the interface prompts.

3.Follow the interface prompts to adjust the aperture value to the corresponding value.
4.Place the calibration board at a suitable position according to the interface guide, and ensure that the scanning light covers the calibration board.
5.Adjust the scanning head to the appropriate distance and height by adjusting the rod, so that the laser spots coincide.



6.Follow the interface guide to adjust the focal length and aperture of the camera and optical machine.

Calibration

With **calibration**, the scanner parameters are recalculated, which not only ensures the accuracy of the scanner, but also improve the quality of scanning.

Note

Calibration is required under the following conditions:

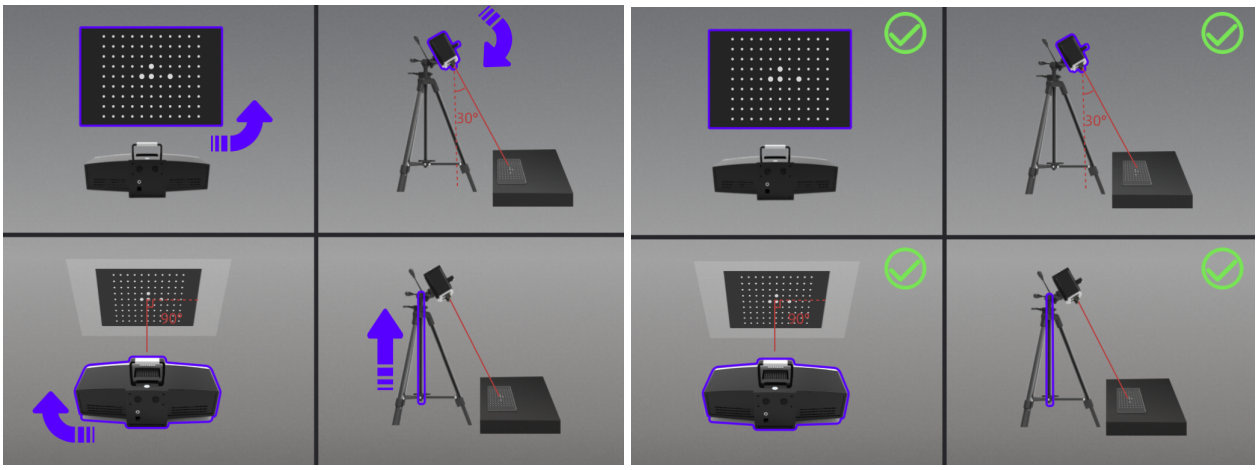
- When the scanner is used for the first time.
- The scanner was severely shaken or shocked, such as shocked during transportation.
- Severe accuracy reduction, such as frequent errors in alignment or unrecognized markers.
- Incomplete data is acquired during the scanning or serious deterioration of the quality of scanned data.

Warning

- The calibration board is matched to the device. Doing the calibration with an incorrect calibration board will fail to generate good scan data or optimum accuracy.
- 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. When cleaning the board becomes very necessary, 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 safely in a box or flannel bag.

Steps

1.You can check the information about the calibration board and scanning range before starting to calibrate. enter the calibration interface, and you can check the calibration board model and scanning range and other information.
2.Spread the attached black cloth flat, and place the calibration board stably according to the interface guide.
3.According to the interface guide, adjust the position of the calibration board, the angle and height of the scanner until all four position diagrams on the left side of the interface are checked with green mark.



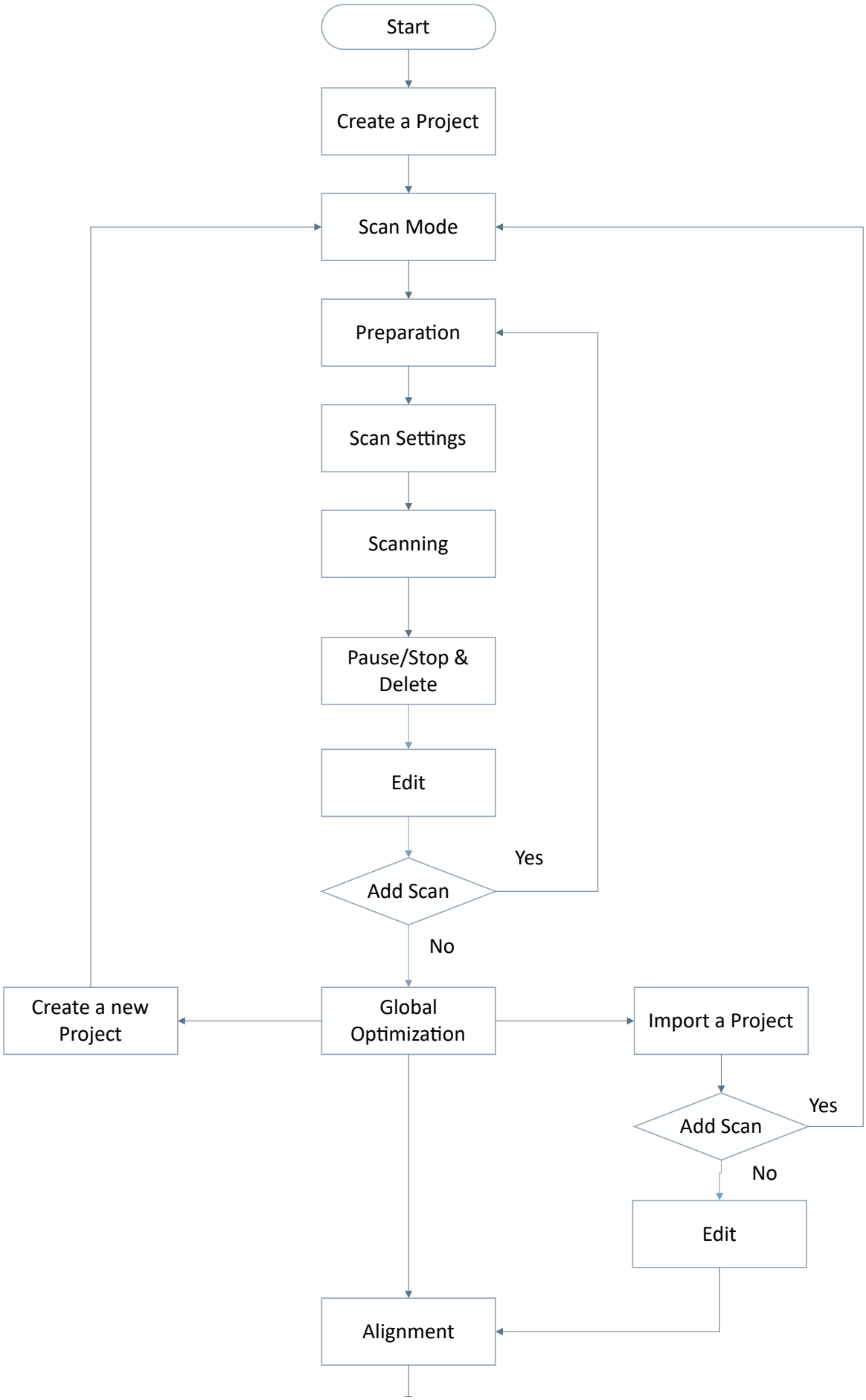
4.Click **Capture** to collect data and proceed to the next step; click **Previous step** to go back to the previous step and collect again.
5.Repeat step 3-4 above to complete calibration in other directions.
6.Check the calibration result.

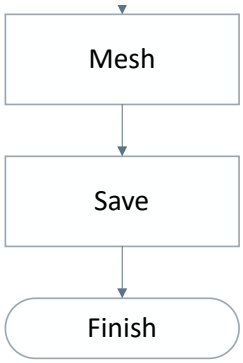
Note

- If the calibration fails, please try it again from step1.
- If you cannot get the pass result anyway, please contact your supplier or our support team.

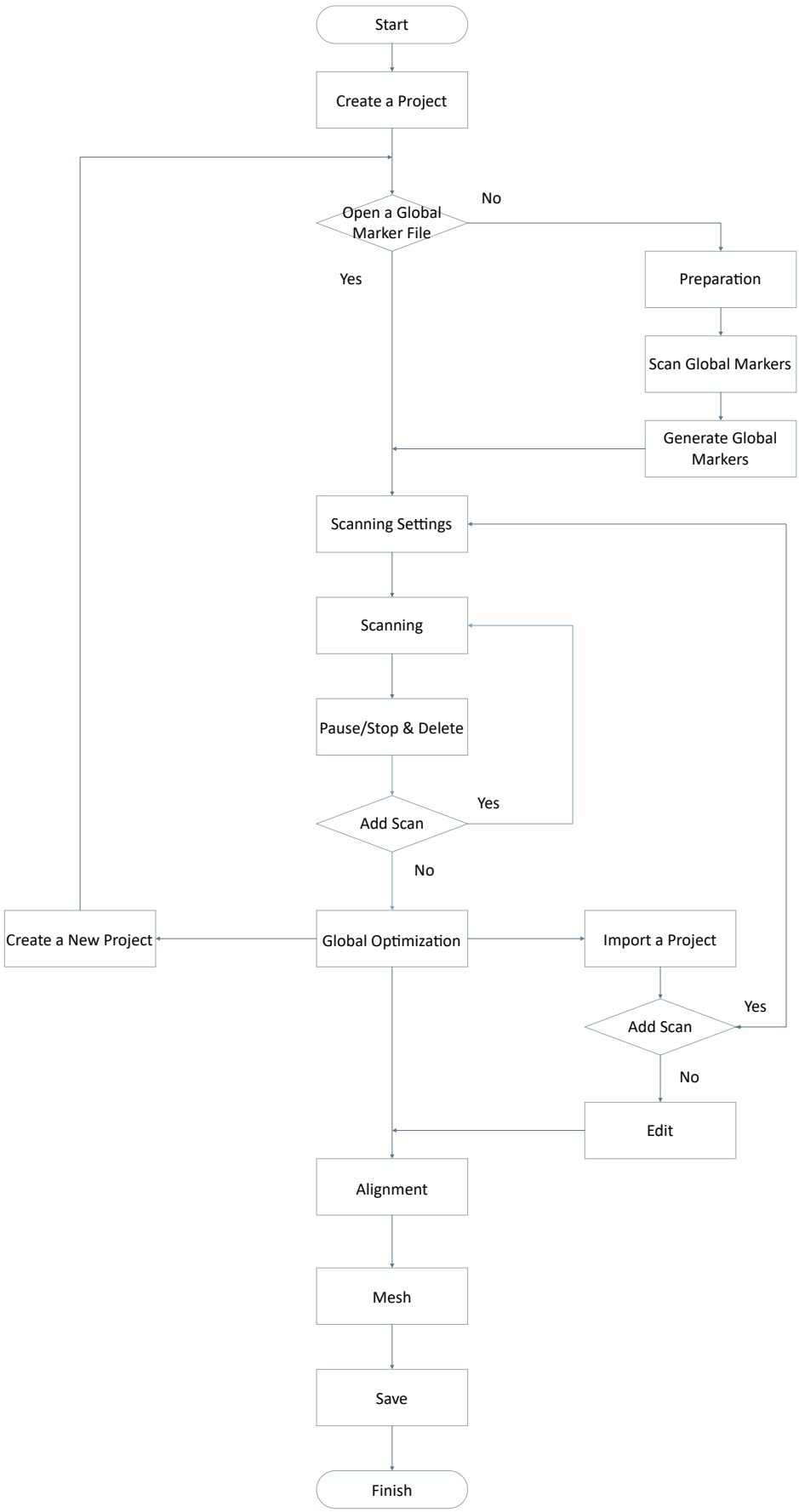
Scan

Basic Scanning Workflow




Mesh
Save
Finish

Global Markers Scanning Workflow



Preparation

Some preparatory work is required to scan easily and fast with good quality.

> **Note**
>
> Not recommend to scan following objects:
>
> - Moving or vibrating objects, which cause the shape of object changed during scanning process.
> - Soft material object.
> - Lattice structures with many small deep holes.

Marker

If the features of the scanned object are not rich enough, markers can be pasted on the object for scanning alignment. Please pay attention to the following details when pasting the markers:

● 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 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.

Scanning Range	Marker Size
400mm	6mm、4mm
200mm	4mm、2mm
100mm	2mm、1mm

Other Objects

Object	Preparation	Notes while scanning
Transparent, shiny, reflective surface objects	Use washable or vanishing scanning spray	Scan as normal
Thin wall objects	Place markers on and around the objects	Choose global marker alignment

Scan

Click the button on the navigation bar to switch to the **Scan Process** and then create a new project group or open a project group.

Project and Project Group

Create or open a project group before scanning.

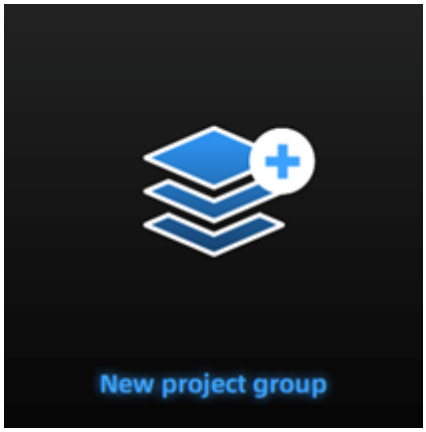
Project Group

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 mutiple 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, mutiple 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:



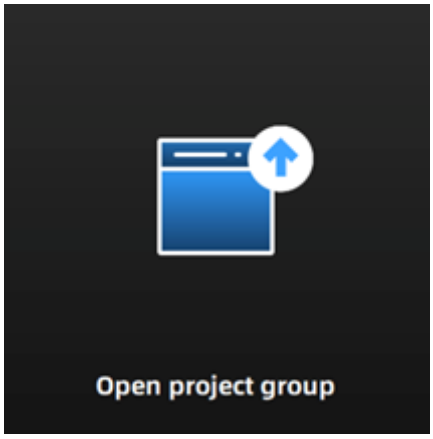
1. Before scanning, select **scan**, then click **new project group** in prompt.
2. In **scan** window, click **project group** in side bar, then click **new project group** in prompt.

In the prompt window, name the project group and **new** to the path you choose, all the scan data will be saved to the folder with the name you just set.

Open a Project Group

> **Note**
>
> Current project group will be saved automatically.

Two ways to open a project group:

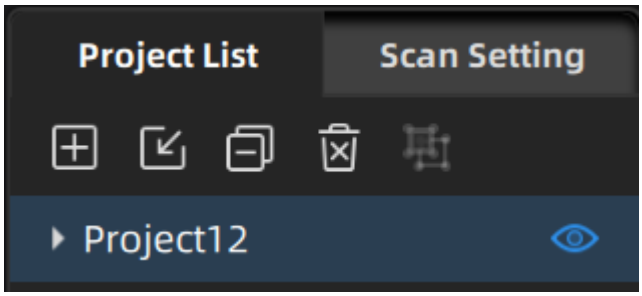


1. Before scanning, select **scan mode**, then click **open project group** in prompt.
2. In **scan** window, click **project group** in side bar, then click **open project group** in prompt.

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

Project

Consider each **project** as a part of the **project group**. All operations of project can be done by the following buttons.



icon	function	instruction	note & warning
	Create new project	Two ways to create a project: 1. A project will be created automatically when you create a project group. 2. In scan window, click to create a new project.	Only can create project when scanner connected.
	Open project	Two ways to open project: 1. When opening a project group, all project(s) of this group will be loaded to the software. 2. Click to open the project of one project group.	Cannot open project with different resolution or texture setting.
	Remove project	Click to remove selected project from the project tree.	The data will not be deleted, you can open the project when needed.
	Delete project	Click to delete the project from the project tree, and delete all the data of this project.	This operation will delete the scan data from the computer permanently.
	Create/split group	Click to create a group in the project.	/
/	Visible/Invisible	To display or hide the scanned data.	/
Project4_scan_8 Dev.:0.04	Alignment deviation	To display the average alignment deviation between the single piece data and the existed markers/global markers in the project.	/

Scanning

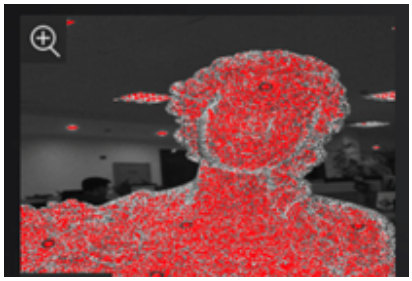
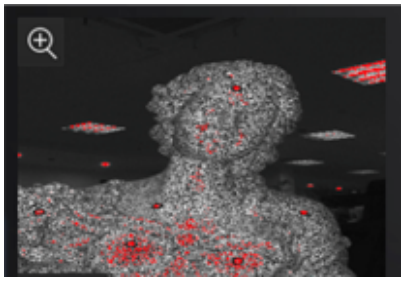
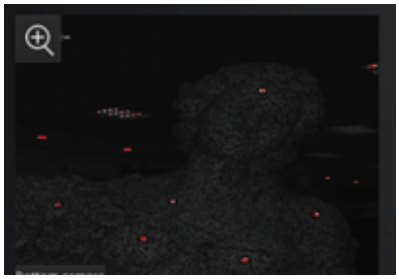
Scan Setting

Following parameters can be set when scanning.

Camera Window

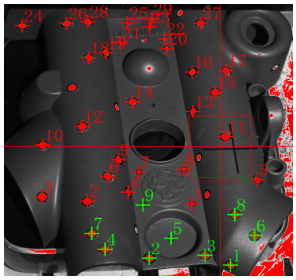
Brightness

Adjust the brightness for different material / color of the object to get better scan data.

Too high	Proper	Too low
		

Real-time Recognition

If you enable real-time recognition of markers in the advanced settings, you can view the number of recognized markers in the camera window. By adjusting the brightness, the recognition effect can be enhanced and more markers can be recognized. This function is not supported when the turntable is turned on.

Fig.	Description
	The markers scanned last time/the markers recognized by the left and right cameras in the first frame are displayed as green numbers, starting from "+1" and increasing by 1 in turn; This time (starting from the second frame), the markers newly recognized by the left and right cameras are displayed as red numbers, starting from "+1" and increasing by 1 in sequence; Markers that are only recognized by the camera on one side or whose errors are too large do not display numbers.

Working Distance

Before starting to scan, make sure that the scanned object is placed in a proper position.
Method One： Check whether the two laser dots projected by the lens are coincident. The coincidence of the laser dots indicates that the distance is appropriate.

Method Two： Check the black cross projected on the object in the camera viewport, and adjust the position of the object until the cross is inside the red rectangle in the camera viewport. If the cross is on the left side of the red rectangle in the viewport, it means the distance is too far; otherwise, the distance is too close.

Background

When this function is turned on, the background of the scanned object will be automatically shielded. The larger the value is set, the larger the shielding range.

Align Mode

Select the suitable scan mode for different scanned objects.

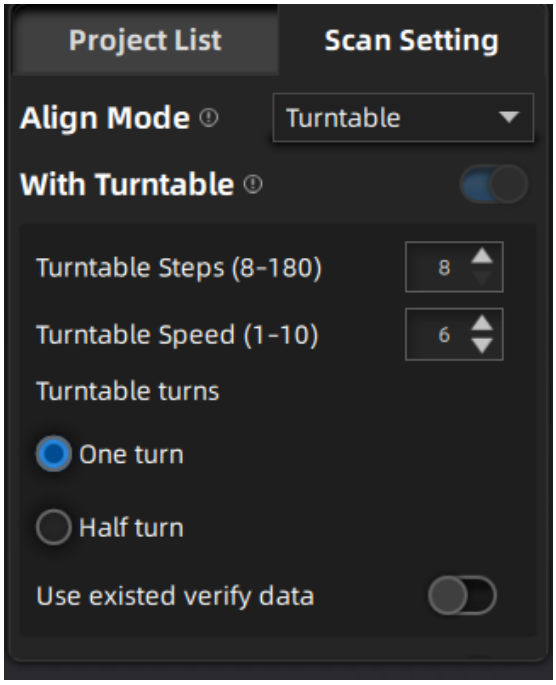
Align Mode	Description
Markers	Markers need to be pasted on the object before scanning. This mode is used for scanning objects with high precision requirements.
Features	Automatically complete the alignment by the surface geometric features of the scanned object. This mode is used for objects that cannot paste markers and have rich surface features.
Global Markers	● Markers：Only scan the markers data on the surface of the object. By collecting the markers, the global markers data of the object can be quickly obtained. ● Point Cloud：Scan point cloud data directly and it supports loading global markers data（.p3、.txt、.asc）. ⚠**Caution** The scanning method cannot be switched after scanning the point cloud data. If you need to scan global markers, please use the markers mode first.
Turntable	After connecting the turntable, you can set the turntable steps, speed, and number of turns of the turntable.

HDR

It is recommended to enable this function when scanning black and white objects. After it is turned on, the software scans with the preset brightness, and the scanning brightness cannot be manually adjusted at this time.

With Turntable(optional)

When turned on, the turntable can be used for scanning.
After using the turntable, you need to choose a align method. The method can be reselected after the turntable scans one circle.

Fig.	Settings
	● Turntable Steps: Before scanning, you can set the number of times (8-180) for one circle of the turntable through this item, and the default value is 8. ● Turntable Speed: Before scanning, you can set the turntable speed (1-10) through this item, and the default value is 6. ● Turntable Turns: You can set the one turn or a half turn of the turntable before scanning. ● Use Existing Verify Data: Use existing axis calibration data. After enabling it, the existing axis data will be used for stitching directly. If not enabled, recalibration is required before scanning and stitching. If the scanning object or turntable is not moved, this function can be turned on. If the scanning object or turntable has been moved, please turn off this function and recalibrate the data.

Scanning

Start Scan / Pause Scan / Stop & Delete

You can switch the scanning status by clicking the button in the software.

Function	Icon	Description
Scan		Scanned data will be stored. When scanning, please ensure that the laser covers the object to be scanned. Click this button or press the space bar on the keyboard to start scanning.
Pause		In the turntable mode, click this button to pause the scanning and then you can edit the scan data or change the view angle.
Stop & Delete		In the turntable mode, click this button to end the current scanning and delete the scanned data.

Note

If the data cannot be collected in the markers align mode with the turntable:
1.Please check whether the number of markers in each scanning area is not less than 4;
2.Change the align mode.

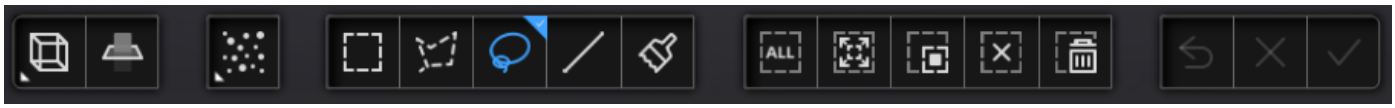
Global Optimization

When you finish the scan, you can do **Global Optimization** to optimize and align the data.

Data Edit

To edit the scanned data when you pause or complete the scanning.

Edit 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 Scan Data Edit.

Icon	Function	Instruction
	Point Cloud Edit	Edit the selected data area in the point cloud edit mode.
	Markers Edit	Click Point cloud Edit again to switch to Markers Edit. Select the data area and the mark points in this area will be shown in red. The red mark points can be deleted at this 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 and left mouse button(LMB)** and move the cursor to draw a straight line to select/deselect the area.
	Brush	Hold down both **Shift and left mouse button(LMB)** 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 of 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.
	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 mouse button and move the cursor	Rotate the data
Press and hold the middle mouse button and move the cursor	Translate the data
Hold down **Shift + Left mouse button**	Select the area of data
Hold down**Ctrl + Left mouse button**	Deselect the area of data
Scroll Wheel	Zoom in/Zoom out the data
Spacebar	Apply the edit
Delete	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.
Sampling Display	For data with a large number of point clouds, this function can be used to display the data according to the selected scale.
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.

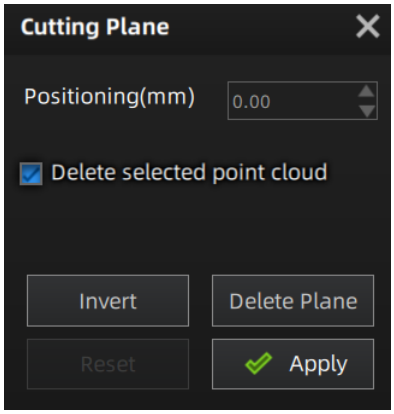
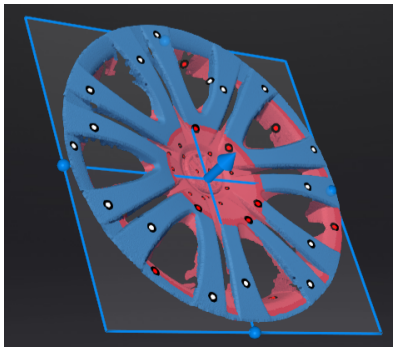
Create a Cutting Plane

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

Method	Instruction
Fitting Point Cloud	Press Shift + LMB 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 + LMB to draw a line, and generate the cutting plane according to the line.
By Markers	Press Shift + LMB to select markers. **Note** 3 markers or more are required to generate the cutting plane.

3.Click **Create Plane**.

Set the Cutting Plane

Illusration	Instruction
 	●Delete selected point cloud/markers: Data/Makers in the reverse direction will be shown in red afetr checking the box. The red data will be deleted after clicking **Apply**. **Note** 1) You can not delete all point cloud data. 2) Please keep at least 4 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.

Other Functions

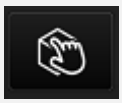
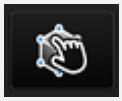
Before or after scanning, you can access the other scan functions through the sidebar function buttons.

Icon	Function	Instruction
	Project Group	Create / open a project group. About project group, please refer to Project Group.
	Align	Align the data as you need, please refer to Align.
	Save Data	Save scan data.
	Mesh	Will move to next step "Post Processing" to mesh.

Alignment

This is how you align multiple projects in one project group.

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

Mode	Description	Note
By Feature	1.Choose **By Feature**. 2.Select the project which needs alignment in the fixed window and the floated window. 3.Click **Apply** to align.	Regular shaped objects (circular objects and square objects included) or small sized objects are not suitable for this mode.
 **By Manual**	1.Choose **By Manual**. 2.Manually choose at least 3 common points on the data in the fixed window and the floated window respectively. 3.Click **Apply** to align.	●The chosen points should not in a line. ●Manual alignment is a supplement to feature alignment, which can solve the problem of feature alignment failures such as some areas with few common areas or extremely similar areas.
By Markers	If the currently selected project is a marker project, the marker alignment can be performed. The software will automatically align according to the mark points.	The two projects have no less than 3 common markers each other.
 **By Manual Markers**	Manually choose at least 3 common markers on the data in the fixed window and the floated window respectively and click **Apply** to align.	The chosen markers should not in a line.

Post processing

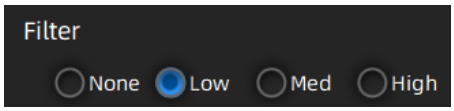
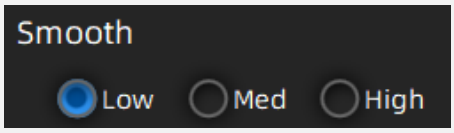
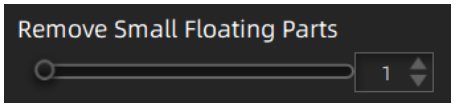
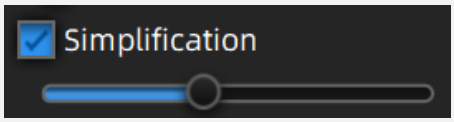
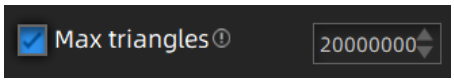
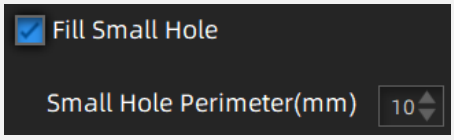
Mesh Model

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.

Mesh type

Icon	Function	Instruction
	Unwatertight	Unclosed model stays the way it is scanned. Processing time is quicker than Watertight.
	Watertight	All holes will be filled automatically. The data can directly be 3D printed. Only watertight mesh can set model quality.

Mesh Optimization

Optimization	Instruction	Note
Filter	Optimize the data and improve the clarity of the data. The higher the level, the less the small details .  	- None: No optimization - Low: 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.
Smooth	Smooth the possible noise on the surface of the scan data.  	
Remove small floating parts	Remove small floating parts on the model.  	
Simplification	Select to reduce the polygon numbers, file size and detail of data while meshing.  	- Resolution <= 0.5mm, simplification will be selected by default. - Resolution > 0.5mm, simplification will be deselected by default.
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 when mesh.  	Default value 10mm, for objects with holes (smaller than 10 mm), please set the function parameter value to a smaller one.

Optimization	Instruction	Note
Remove spike	Remove spike-like data on the image edge.	
Marker hole fill	Fill in the surface of the object that is not scanned to the pasting marker.	
Recommended Parameters	When turning on, it will automatically use the recommended parameters for meshing.	

Operation

Click **Apply** to confirm the settings and start meshing.

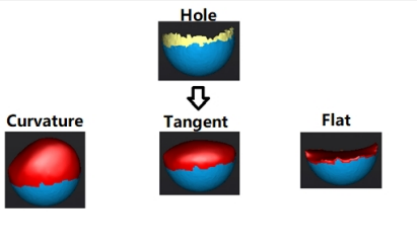
Click to restore.

Click **Confirm** to confirm the mesh result.

Mesh Edit

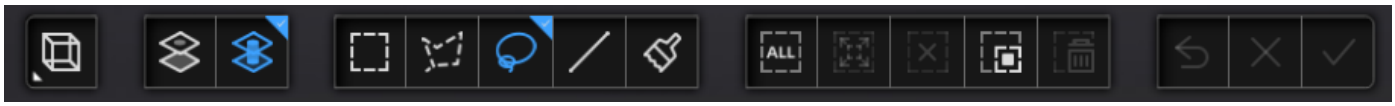
Left Panel

Click **+** to open each function.

Function	Instruction	Note
Texture	**Brightness** and **Contrast** can be adjusted.	**Confirm** to apply, **Cancel** to restore
Simplification	After simplification, the polygon numbers, file size and detail of data will be reduced universally.	High level may cause detail loss. Set the ratio from 1 to 100, the default is 0.
Mesh Optimization	Mesh optimization can optimize the quality of the data by adding more triangles to curvature regions.	
Smooth	Smooth the possible noise on the surface of the scan data.	It might remove some small details or smooth some sharp edges at the same time. Set the ratio from 1 to 100, the default is 0.
Remove small floating parts	Remove small floating parts in the scan data.	From 0 to 100% where 100% is the size of the largest mesh island. Smaller islands will be removed. 0 means no operation, 100 is the maximum. The maximum value is the square of the diagonal length of the floating part/10, MAX=$(L/10)^2$.
Auto Hole Filling	Auto fill every hole with a smaller perimeter than the number input. 	Choose Curvature, Tangent or Flat before filling hole. - **FLAT**: calculates the solution for the hole filling considering the point position on the boundary. - **TANGENT**: calculates the solution considering the point position and the normal of the last row of triangles forming the boundary. - **CURVATURE**: calculates the solution considering the point position and the normal of the 2 last rows of triangles forming the boundary.
Manual Hole Filling	The hole edges are displayed green and get red after picking. The number of the holes and the number of holes filled will be displayed on the interface.	Choose Curvature, Tangent or Flat before picking a hole.

Function	Instruction	Note
Flip Normal	To redefine the front direction of the scanned data in reversal design.	Texture mapping will be unavailable after flip Normal
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.	
Mirror	Mirror the mesh through a plane defined by a straight line.	After mirroring, texture remapping cannot be performed.

Bottom Panel



Icon	Function	Instruction
	Select Visible	To select data on the front view only.
	Select through	To select data all through.

Note

The other editing functions are the same as point cloud editing

Right Panel

Icon	Function	Instruction
	Open file	Open a file (STL, OBJ, PLY) for post processing.
	Save Data	Save scan data.
	Sketchfab Upload	Use your Sketchfab (http://sketchfab.com) account to share the model.
	Third-party software	Save the data and open with third-party software.

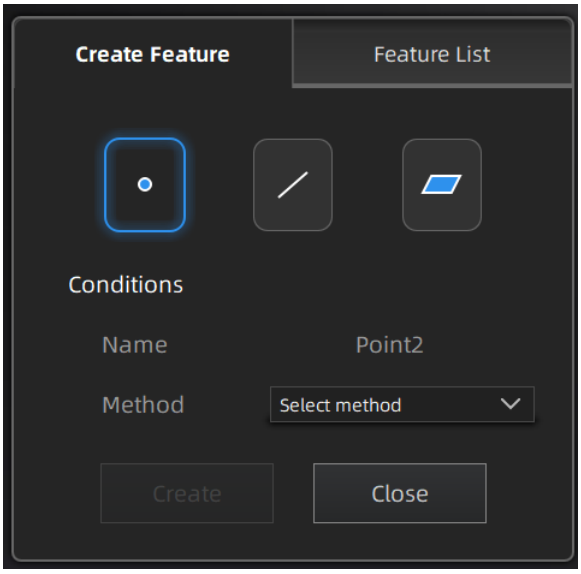
Measurement

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

Click to 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**.



Point

Creation Method	Description	Note
Selected Points	● Click on the data to select a point. ● Click **Create** to create a point.	-
Line-Plane Intersection	● Click on the created line, or select it on the dropdown. ● Click on the created plane, or select it on the dropdown. ● The point generated is the intersection between the non-parallel line and plane.	Line and Plane should be created in advanced. The line should not be parallel to the plane.

Line

Creation Method	Description	Note
Point-Point	● Pick 2 points. ● Click on the data to select a point or click on a feature point previously created. ● In the Choice list select one of the points to redo it. ● The line generated is define as point from to point to point.	-
Plane-Plane Intersection	● Click on the plane previously created, or select it on the dropdown, repeat for the second plane. ● The created line is the intersection between the 2 non-parallel planes.	2 planes should be created in advanced. The planes should not be parallel to each other.

Plane

Creation Method	Description	Note
3 Points Fit	● The plane is generated by 3 points not co-linear. ● Click on the data to select one point or click on a previous created feature point. ● In the Choice list select one of the points to reselect it. **Feature creation failed! Error code 6**: the points selected are co-linear.	The 3 points can't be on the same line.
Point-Line Fit	● The plane generated includes the point and the line (The line should be created in advanced). ● Click on the line previously created or select it from the drop-down. ● Click on the data to select a point or click on a feature point previously created. Feature creation failed! Error code 6: the point selected belongs to the line.	Line should be created in advanced
Best Fit	● The plane generated is the position with the smallest deviation from the selected area. **Note** ●Press **Shift+ LMB** to select an area. Press **Ctrl+ LMB** to deselect. Press **Ctrl + C** to deselect all data.	-

Movement

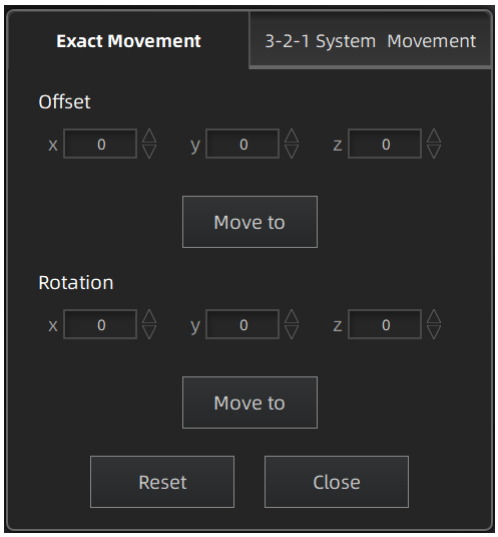
Use this mode to modify the alignment of the data to the global coordinate. This action is useful for post processing or reverse engineering.

⚠ **Caution**

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

Click the button to enter the movement interface. Click it again to exit.

Exact Movement



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

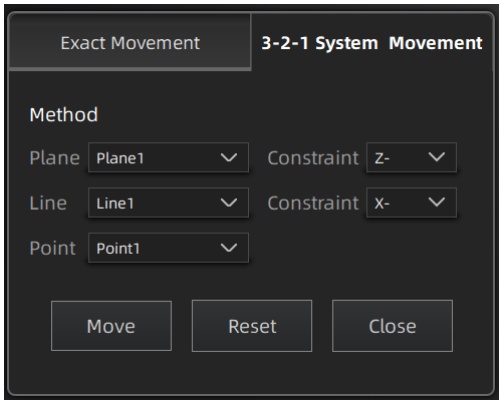
The coordinate system displayed on the interface is the global coordinate system, in which the direction of the red line is the positive direction of X-axis, green is the positive direction of Y-axis and blue is the positive direction of Z-axis.

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

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

3-2-1 System Movement

3-2-1 system movement aligns data by selecting the point, line and plane. Before movement, 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).

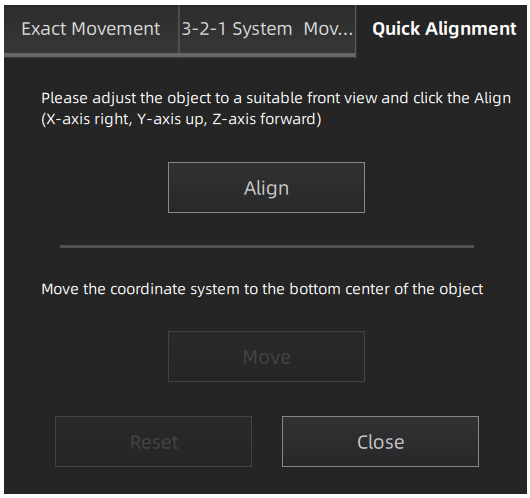
Click **Movement** to start the coordinates transformation. When the lines are perpendicular to the plane, the transformation fails, so the movement fails.

Click **Reset** to cancel all the transformation in the 3-2-1 system movement 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 X axis is parallel to the screen and faces to the right, the Y axis is parallel to the screen and faces upward, and the Z axis is perpendicular to the screen.
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 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 mouse button(LMB)** and move the cursor to select an area ● Press **Ctrl + left mouse button(LMB)** 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**.

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	1. Check the data; 2. Quick export and no need for post-operation. 3. Use other software to post-possess the data.
STL	Mesh Data	scan.stl	1. 3D printing; 2. Reverse designing; 3. Compatible with most post-processing software.
PLY	Mesh Data	scan.ply	1. Small file; 2. Easy for texture editing.
OBJ	Mesh Data	scan.obj scan.jpg scan.mtl	1. Used for artworks 2. 3D rendering 3. Compatible with most post-processing software.
3MF	Mesh Data	scan.3mf	1. Small fire; 2. Compatible with Microsoft 3D printing software

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 (http://sketchfab.com) 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	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	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	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	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	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.

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