SHINING 3D®

Transcan C

User Manual

V1.4.1

SHINING 3D®

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1. Specification and System Requirements

1.1. System Requirements

Preparing a suitable computer will improve your scanning experience.

One important notice for PC configuration is the **graphic card**. It has to be **Nvidia card** since certain function from Nvidia is needed for scanning. **RTX series card** is the best for scanning while Quadro series CAD card also works but you need a more expensive model comparing to the GTX series to get a good scan experience.

For your PC with EXScan C software, don't enable power saving mode when scanning objects to avoid image scanning failure.

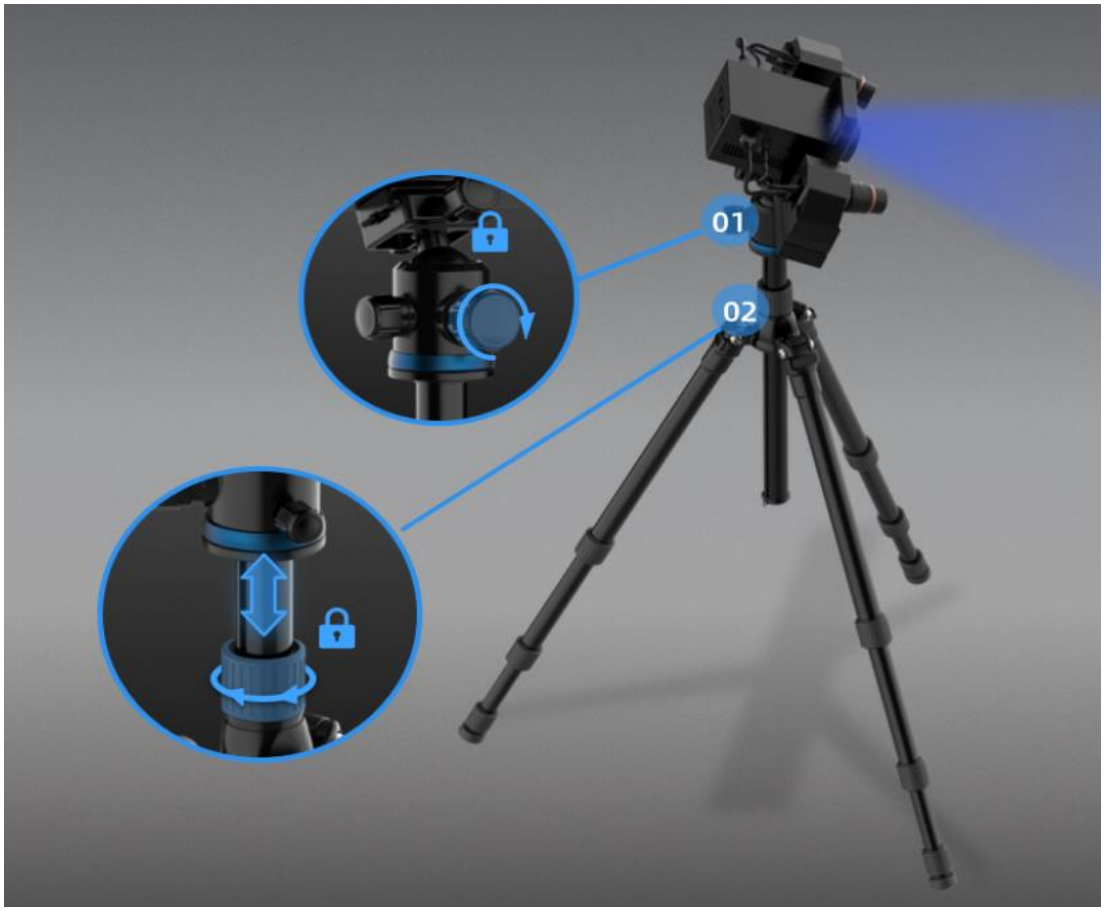
Item	Recommended
Graphics card	NVIDIA GTX1080 or higher
USB port	At least one USB 3.0 port
OS	Win10 64 bits
Video memory	8 GB
RAM	≥ 32 GB
CPU	i7-8700 or higher
Screen resolution	1920*1080 DPI: 100%; 125% 3840*2106 DPI: 100%; 125%; 150%

1.2. Hardware Installation

Unpack and set up your scanner before getting started with scanning.

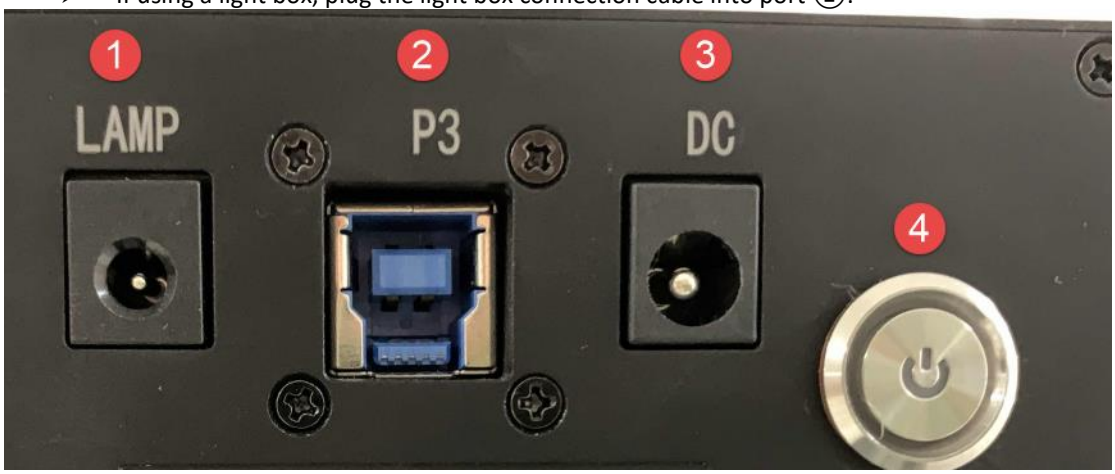
1.2.1. Assemble Scanner

1) Open the tripod and place it on the ground. Adjust the tripod's three feet.
2) If the height is still too high or too low, the lock ② can be unscrewed to adjust and fasten vertical slide rod to an appropriate height, and the lock ② can be screwed after the adjustment.
3) Insert the scan head assembly into the top groove of the tripod, tighten the screws. See ① to see if the scanner is placed horizontally.
4) Based on the need, shake the rocker to adjust the device height. Then tighten the latch.



5) Connect the power cord and cables.

- Confirm that power switch ④ is not pressed.
- Connect the power cord port ⑦ and the adapter port ⑥ first.
- Inserted adapter socket ⑤ into the device ③ port.
- Insert the power cord triangular plug into the plug or socket.
- Connect the computer USB 3.0 port and device socket ② with the device connection cable.
- If using a light box, plug the light box connection cable into port ①.



USB interface next to the labeled SS is the USB3.0 interface

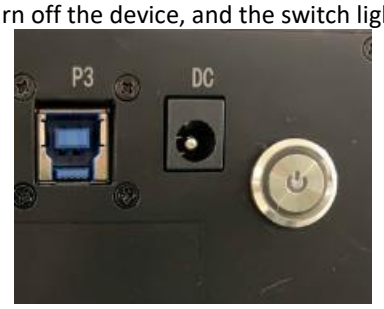
6) Turntable connection

- Insert the turntable connection cable ⑤ into the turntable port ①.
- Insert turntable connection cable ④ into computer USB port.
- Insert the turntable power cable ③ into the turntable port ②.

1.2.2. Turn on/off the Scanner

1) Press power button to turn on the device, and the switch light will be on.

2) Press power button again to turn off the device, and the switch light turns off.



After installing the software, connect the device to the computer and start it up, the following devices are displayed in the Device Manager.

Scanner in Device Manager

If the scanner driver is not installed properly, or the device is connected and keeps prompting "Device offline":

- Check power connection status.
- Check if USB 3.0 is connected (if a device with a question mark or exclamation point is found in the Device Manager).
- Install the camera driver manually.
- After the device is powered off, unplug the USB cable; then re-power and plug in the USB cable.

2. Set Software

2.1. Download the Software

Step 1: Go to https://www.einscan.com/support/download/.

Step 2: Select your scanner model.

Step 3: Download the software to your operating computer.

Note: You are required to register before downloading.

2.2. Install the Software

Note before installation: Administrator rights are required for the installation of the software.

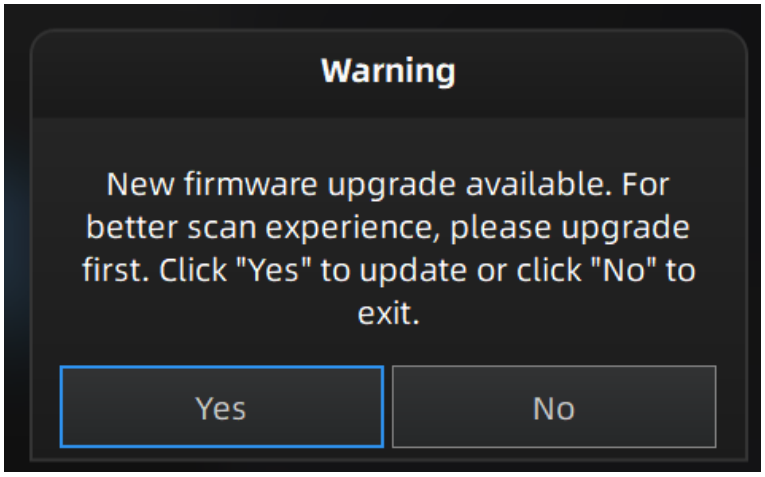
1. Double click installation package, accept the modification on your computer.
2. Follow the instructions to complete the software installation.
3. After the software is installed, a shortcut  will be created on your desktop. Double-click to open the software.

2.3. Firmware Update

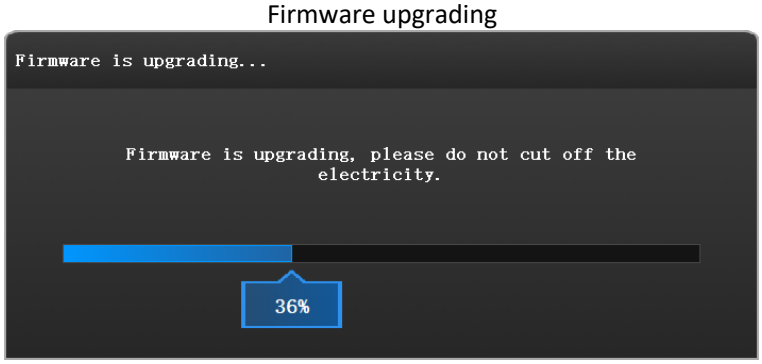
When the scanner firmware is incompatible, a message will appear when software is open. Click Upgrade and follow the instruction to update the device firmware.

- Firmware updating will take around 3 mins.
- Power off the device after upgrading successfully.
- Reconnect the device, and open the software again, the device is running under the latest firmware.

Firmware doesn’t match



Firmware upgrading



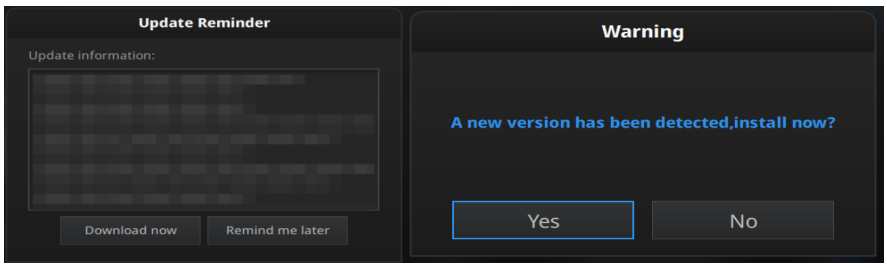
Note:

- Do not disconnect the scanner, or unplug the power during the upgrade.
- Recovery will start from a failed upgrade. You can restart the firmware update after successful recovery.
- If recovery fails, turn off the power of the scanner and reconnect the scanner to restart the software for upgrading.

2.4. Update the Software

When a new version is available, a pop-up will show when you start the software to remind you update your software to the latest version.
Note:
After clicking **Download Now**, the software will be downloaded (do not close the software).

➢ Click **Yes** to update.



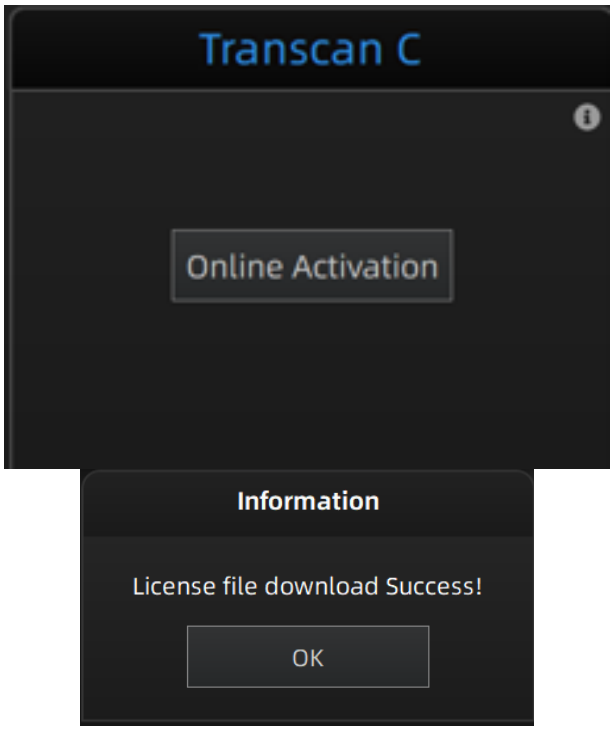
Update Reminder

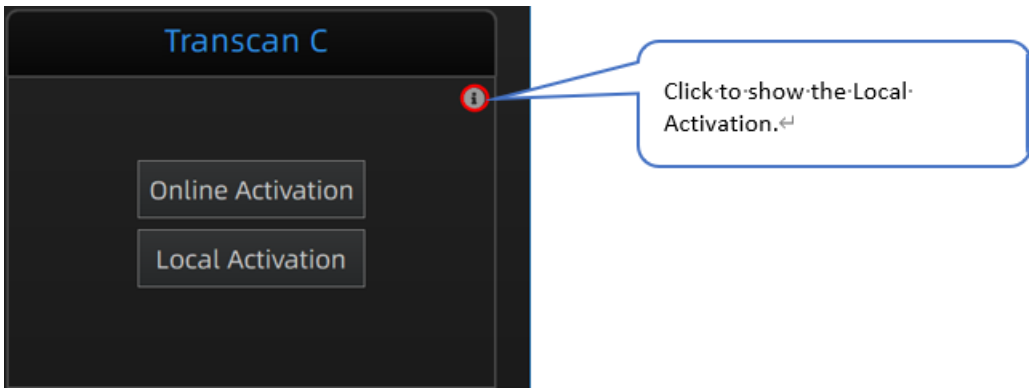
2.5. Activate the Scanner

Device activation is required in your initial use. There are 2 ways:

1. **Online activation** is recommended if your computer is connected to the internet.
2. If there is an issue with network connection, choose **Local activation** to save the .ple license file on your computer, under the activation menu. (.ple file can be found in the USB drive.)

Note:
If the activation fails, send a request for activation file to technical support staff with your serial number.

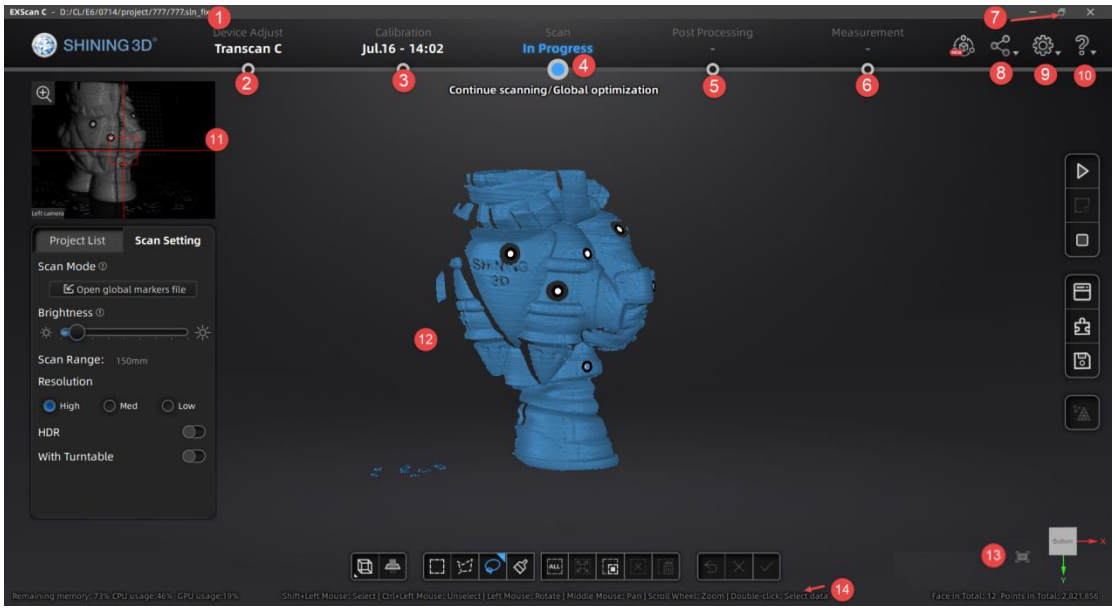




Local activation

2.6. Interface and Parameters

2.6.1. Navigate

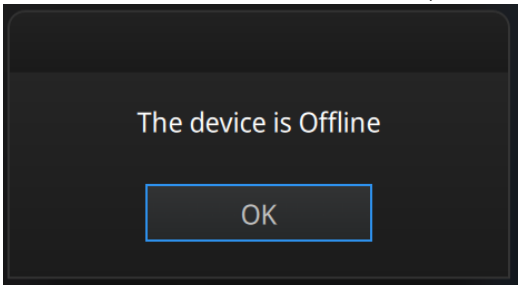


Interface navigation

Function description
①Project file path ②Device adjustment ③Calibration ④Scanning
⑤Post-processing ⑥Measurement ⑦Maximize/Minimize ⑧Community
⑨Settings ⑩Help ⑪Camera Device ⑫Scan Data ⑬Fit to view ⑭Mouse operation prompts

2.6.2. Reconnect the Scanner

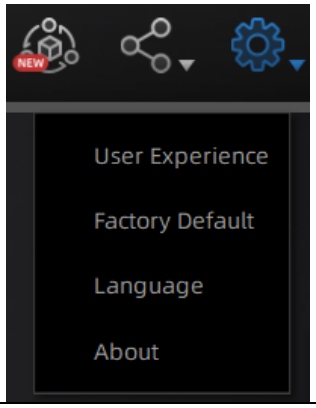
When the device is offline, meaning the scanner is not connected to PC. Check the connection and click the refresh icon  to reconnect. If this still doesn't work, restart the software.



Device offline or connection loose

2.6.3. Settings

	Click the settings logo from the upper right to open the drop-down menu.



Drop-down menu

User Experience Enhancement Program

To help us improve the quality and user experience of Transcan, we hope to be allowed to collect usage experience information. This information will not contain your personal information or scanned data, and will not be accessible to any third party. This checkbox is selected by default, and we strongly recommend you keep it checked. As a reward, the User Experience Enhancement Program will continuously keep you informed with the newest software update information, to assure you get free software updates and enjoy the latest improvements based on your collective feedback. If you close the User Experience Enhancement Program, you might not be informed with software updates automatically.

Factory Default

All settings modifications will go back to the original settings. The software will restart automatically.

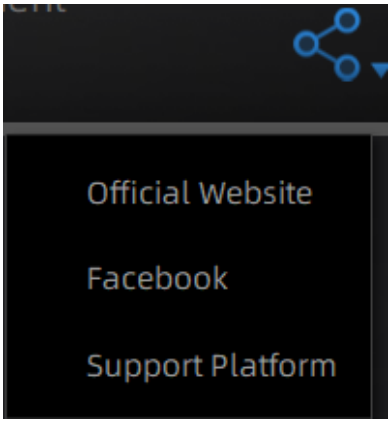
Language

Select the language for the interface, click apply to change, restarting the software is not needed.

About

For version information and support, email einscan_support@shining3d.com.

2.6.4. EinScan Community



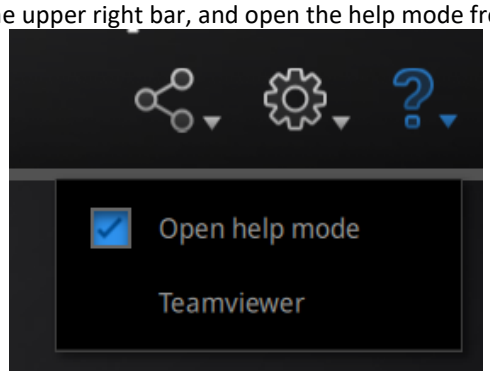
Community drop-down menu

- **Official Website** (http://www.einscan.com/) refers to SHINING3D's official website for EinScan product and information.
- **Facebook** (EinScan) refers to facebook "EinScan Expert" for users to discuss and share the ideas, achievements and experience.
- **Support Platform** refers to the platform for users to validate the warranty and submit support ticket when necessary. Service like software updates, manual, video download can be accessed in support platform. Register your scanner at support.shining3d.com.

2.6.5. Help Mode

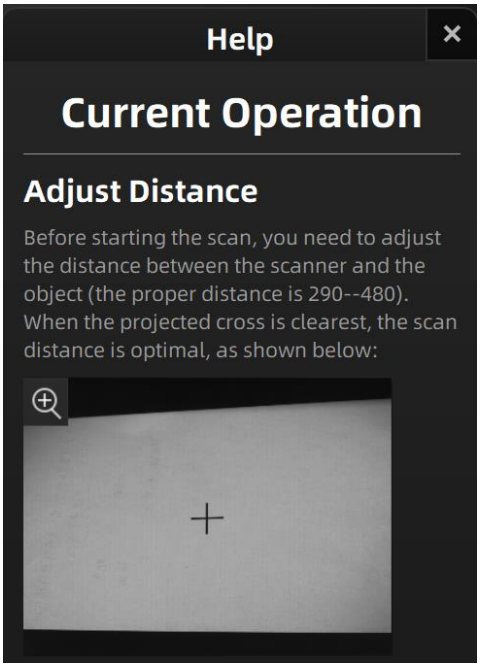
Open Help Mode

Click the question mark in the upper right bar, and open the help mode from the drop-down menu.



Drop down menu

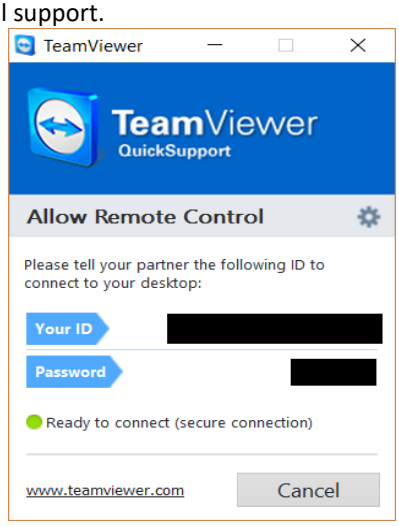
Display the help tool related to the current interface.



Help window

TeamViewer

It opens S3D_teamviewer.exe, for online customer support access or display to other screens or portable screens. Share your ID and password to allow our technicians to remote control of your computer during online technical support.



Share the Your ID and password to allow access

2.6.6. Alerts

A pop-up alert will notify the user of a hardware or configuration issue. Check and restart the software. If the error persists, please contact support by emailing einscan_support@shining3d.com.

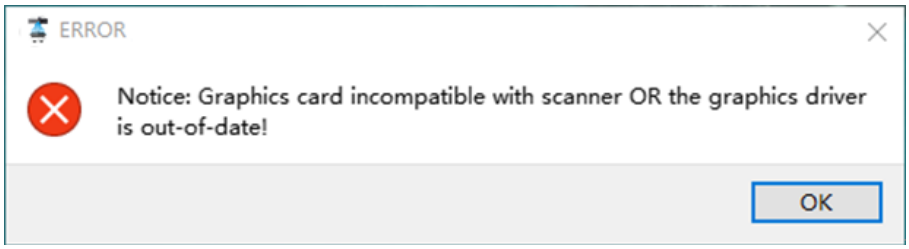
Fail to activate

For activation failure, ensure that the selected license file matches the device. Redo the activation.

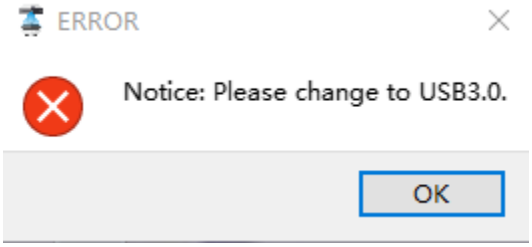
Device fails to activate

Incorrect configuration

Try another USB port and update your graphics card drivers and restart the software.
A message is displayed indicating that the graphics card is inconsistent. Check whether the graphics card type meets the requirements. If yes, try updating the graphics card driver and restart the software.

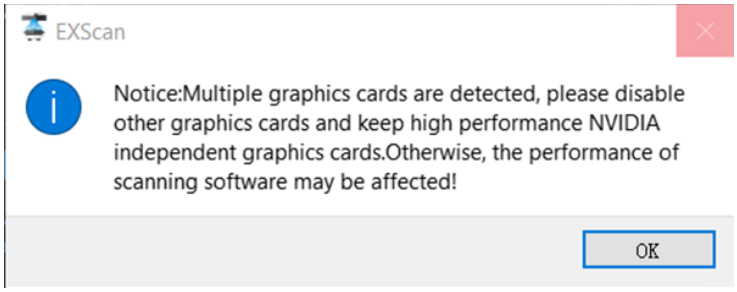


Graphics card incompatible

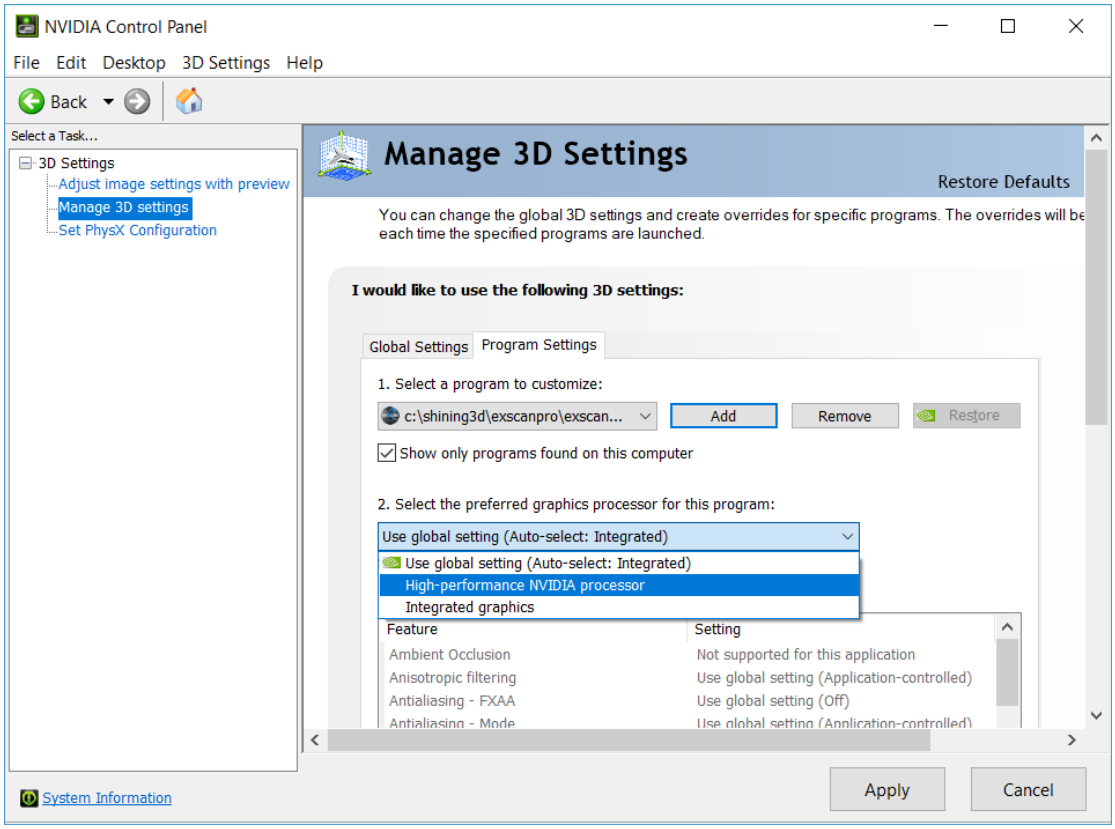


USB not 3.0

If the computer has multiple graphic cards, access to the NVIDIA Control Panel (right click on the desktop). In Manage 3D Settings > Program Settings, Add Transcan C software. Then change the preferred graphic processor for this program. Select NVIDIA processor. Click Apply to save the settings.



Multiple graphic cards detected



Change graphic card preferences for Transcan C

3. Equipment Regulation

Before adjusting the scanner, place the calibration pad, calibration board and calibration bracket at the appropriate position to be scanned.

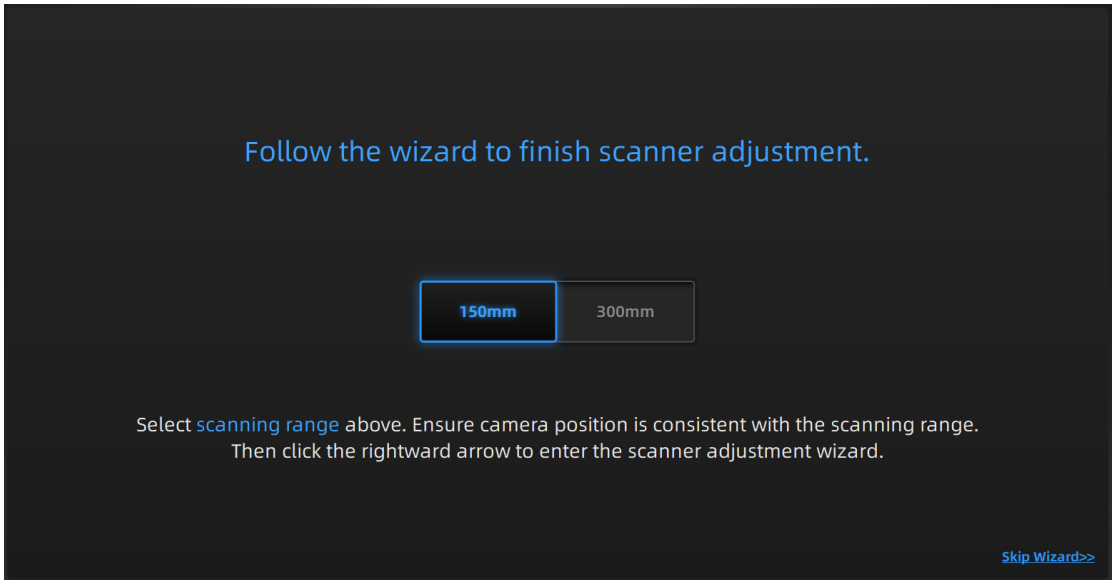
3.1. Position Adjustment

Open the software and click the device adjustment button in the navigation bar to enter the device adjustment interface.

The scanner has two scanning ranges, 150mm and 300mm, which can be selected depending on the size of the object.

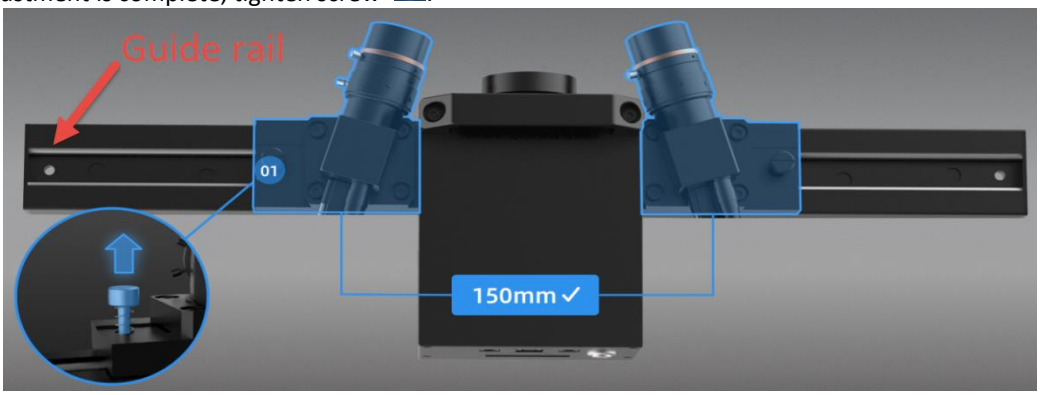
Note:

Follow the interface prompt to adjust the distance between the optical machine and the calibration board until the light projected by the machine falls on the proper position on the calibration board.



3.1.1. Scanner Adjustment 150 mm

Rotate the screw 01 (as shown in the images below) next to the left and right camera to move the camera position. Place the "position" of the camera within the 150 mm scanning range. After the adjustment is complete, tighten screw 01.



Note:

For top view of the scanner shown by the image above, hexagonal screwdrivers are hidden under the guide rail.

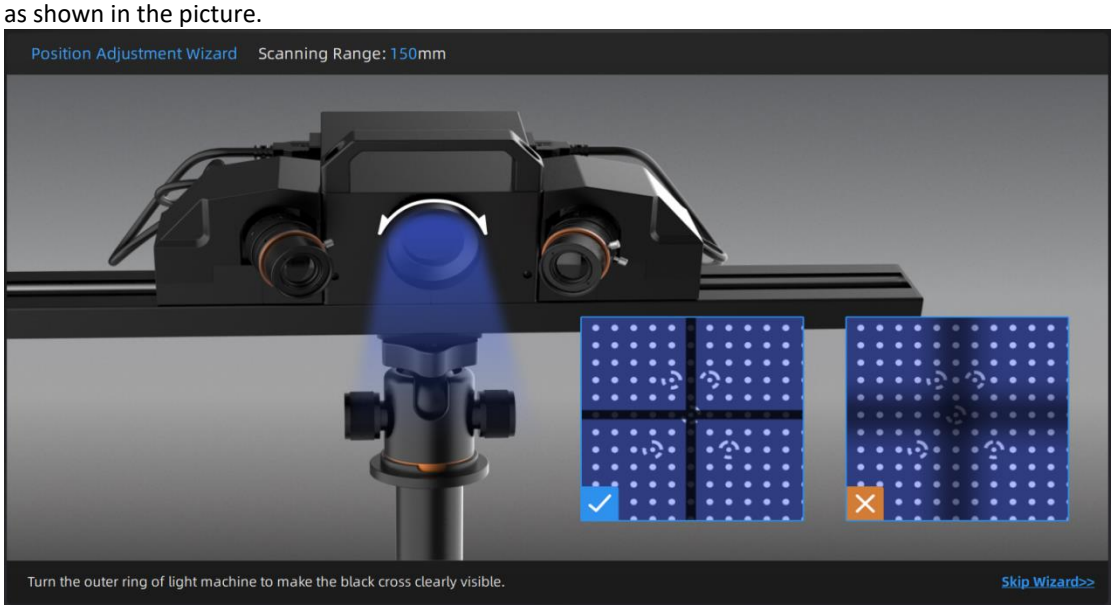
Place devices according to the following figure.

Shake the rocker 02, roughly adjust the height of the equipment, make the light projected on the calibration board, and tighten the lock.

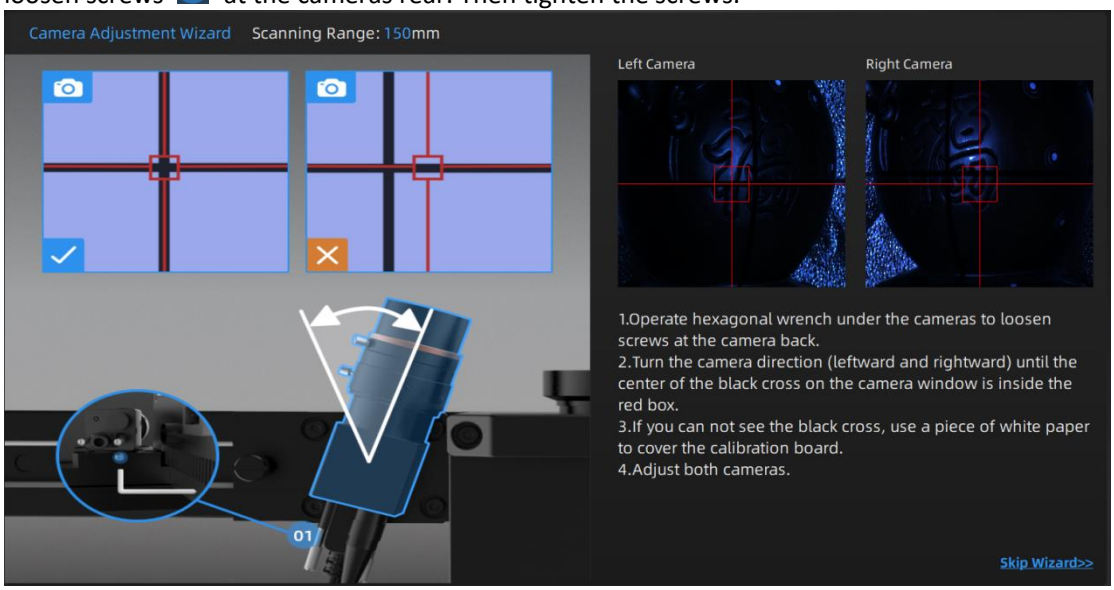
Adjust the distance between the device and the calibration board so that the distance between the front end of the device and the calibration board is about 260 mm. The scanning head where cameras are located should be kept level, and the calibration bracket should be kept in the third slot of the calibration board (count from front to back when you face the calibration board).

Rotate the screw shown in figure 01 to adjust the scanner angle to ensure that the optical projector covers the entire calibration board and that the black cross is aligned with the center of the calibration board. After the adjustment, tighten the screw.

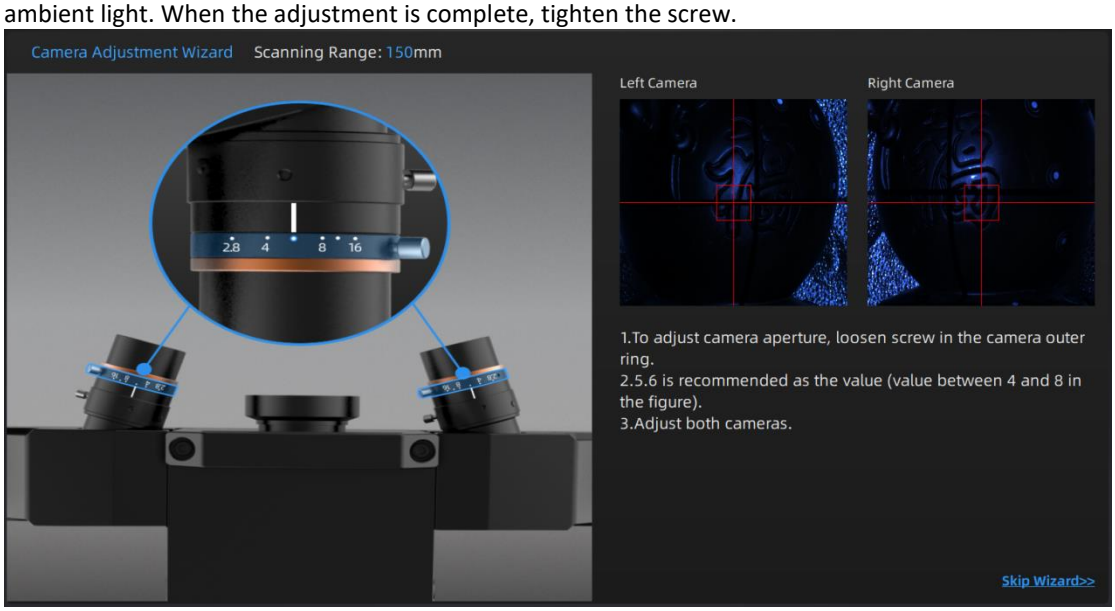
Turn the outer ring of the optical machine to adjust the black cross to a clear and optimal state, as shown in the picture.



Use the hexagonal screwdriver under the guide rail (see first image in chapter 3.1.1) to loosen screws 01 at the cameras rear. Then tighten the screws.



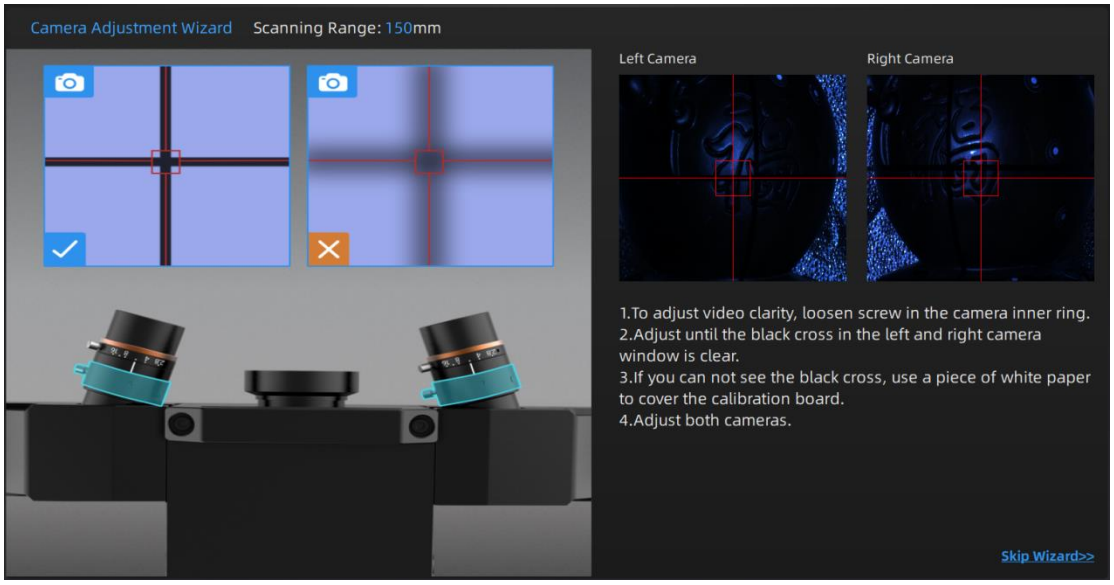
Adjust the camera aperture according to the steps shown in the following figure. Unscrew the screw on the aperture and turn the aperture to adjust the brightness of the left and right camera windows so that the white spots on the calibration board inside the viewport can be clearly seen. The recommended value is 5.6. The brightness of the camera windows is different depending on the ambient light. When the adjustment is complete, tighten the screw.



Adjust the camera clarity by following the steps in the following figure. A piece of paper with text can be placed on the calibration board to help observe clarity. Adjust to clear writing in the video stream of the left and right cameras. Double-click the left and right camera windows to zoom in and view clarity. After the adjustment is completed, tighten the screw to prevent loosening to limit the scanning effect.

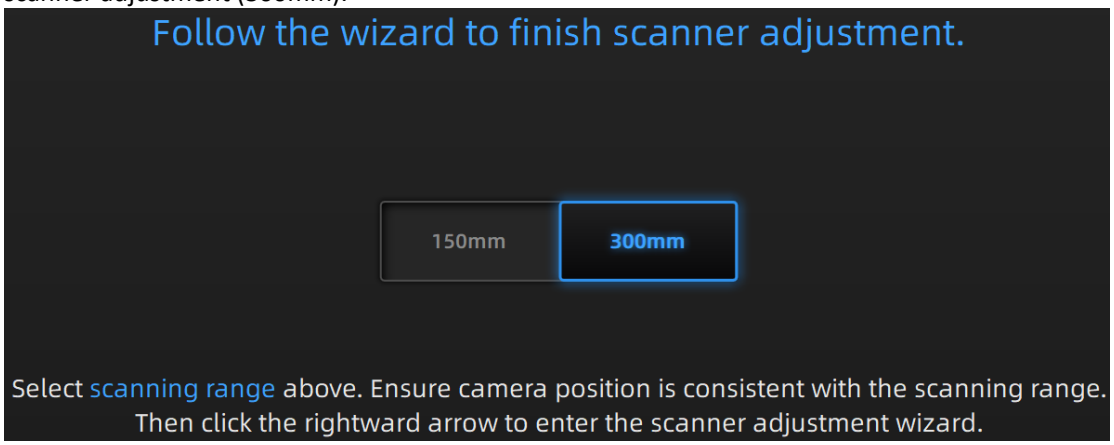
Note:

Use a piece of paper with text to help cameras get clear image.



3.1.2. Scanner Adjustment 300mm

The scanner adjustment method for the scanning range of 300mm is the same as 150mm. Refer to "3.1.1 Scanner Adjustment 150 mm" and follow the interface prompt to implement scanner adjustment (300mm).



4. Calibrate the Scanner

4.1. Precautions and Use

Calibration is the process to ensure the device will scan with the optimal accuracy and scan quality.

This customer calibration is not required daily often. Only when the first time after scanner and software are installed. Or, when you are in the following situations, you should calibrate the device:

- When the scanner is used for the first time or after long time without using.
- When there is strong vibration during the transportation.
- When alignment mistake or failure frequent appear during the scanning.
- When scanning data is incomplete and quality is much worse during the scanning.

Note:

1. After usage, put away the calibration board in time and put it in a velvet bag.
2. Make sure to protect the calibration board and keep it clean, no scratches or stains on the black surface with white circles.
3. The calibration board is matched to the Device with same Serial Number. Doing the calibration with an incorrect calibration board will fail to generate good scan data or optimum accuracy.
4. Clean with clear water only, do not use alcohol or chemical liquid to clean the calibration board.
5. To prevent damage to the calibration board, do not drop the board, and do not place heavy objects or irrelevant objects on the board.

4.2. Operation

After installation, when you open the software for the first time, choose device type and it will enter the calibration interface automatically. If there is no calibration data, click “quit”, the software will prompt “No calibration data, please calibrate”.

Different calibration boards are used for scanning ranges of 300mm and 150mm. Select the corresponding calibration board as shown in the calibration interface.

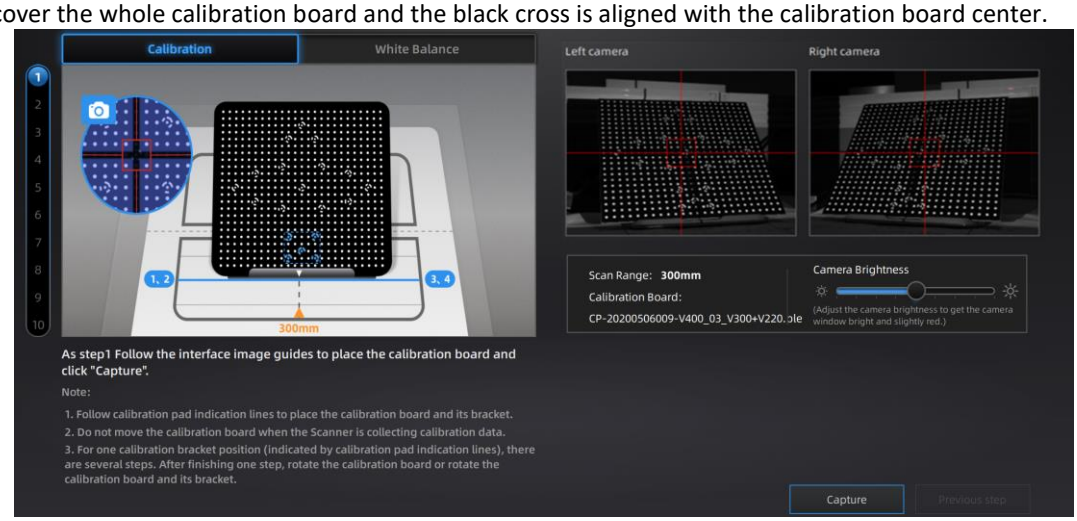
Functional description.
1: Left and right camera windows.
2: Location and placement of calibration board.
3: Operation prompts.
4: Scanning range. Select 150mm or 300mm on the device adjustment interface.

4.2.1. Camera Calibration

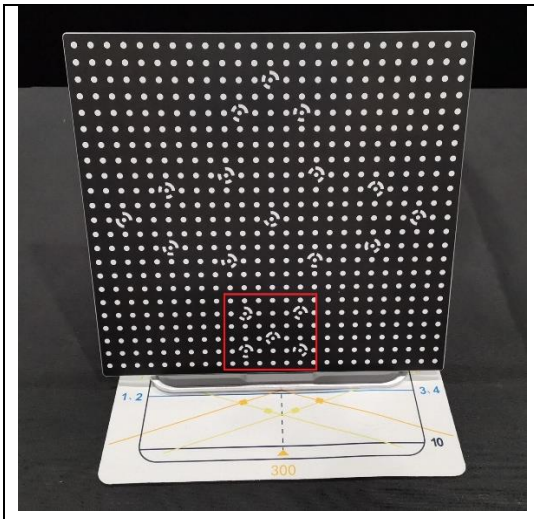
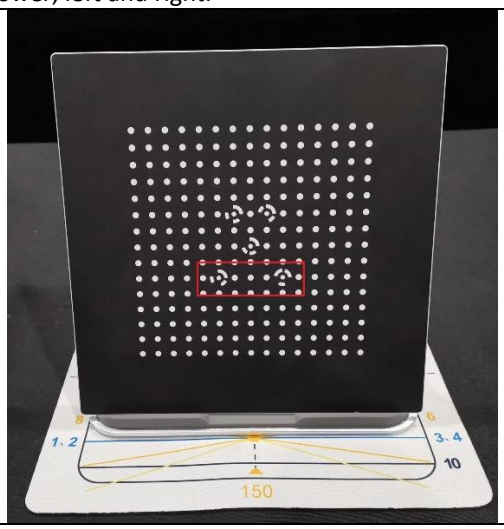
The calibration board needs to be placed in ten positions during camera calibration, and the positions are operated according to the software wizard.

Click on the camera brightness scale and adjust until the camera windows turn slightly red.

Follow the interface image guides to place the Scanner. Ensure the Scanner projected lights cover the whole calibration board and the black cross is aligned with the calibration board center.



The calibration board can be divided into upper, lower, left and right.

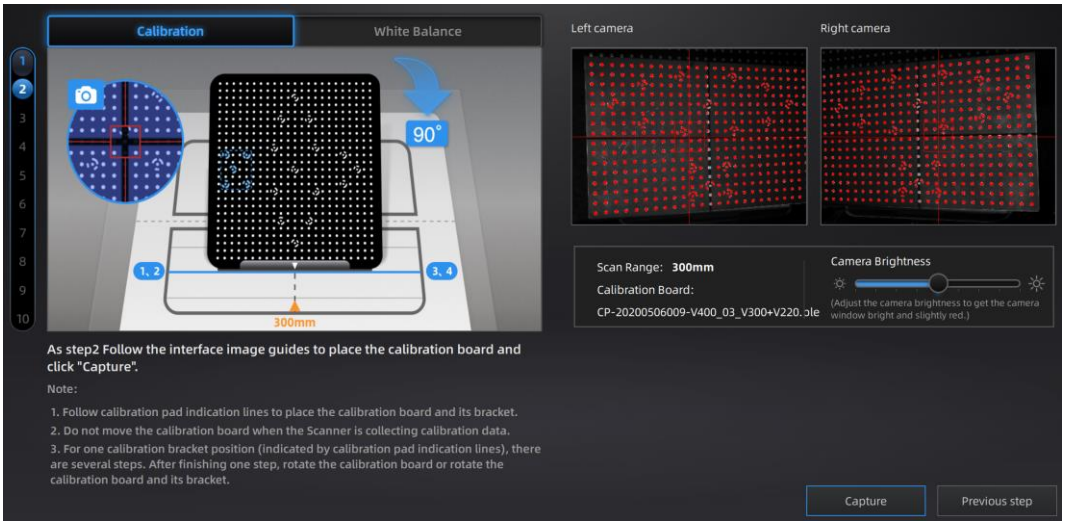
	
300mm	150mm
Ensure the five encoded points are at the bottom.	Ensure the two encoded points of the further distance are at the bottom.

Ensure that the calibration board is placed smoothly and facing the cameras. Click **Capture**. Do not move the calibration board during the collection process.

After the collection is completed, the software interface displays for the second step calibration.

As shown in the figure below, remove the calibration board from the calibration board bracket, rotate the calibration board 90° clockwise, and put it on the calibration board bracket.

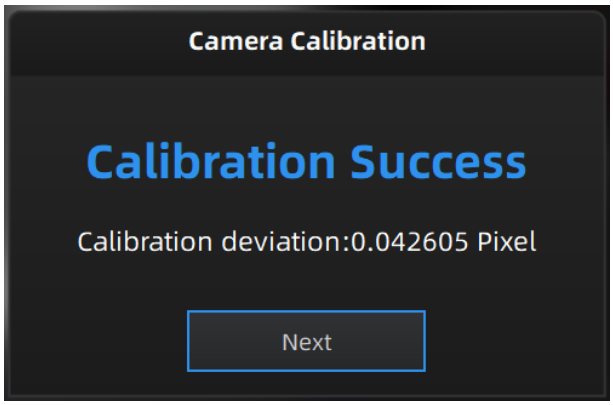
Click **Previous Step** to go back to the previous step to capture again.



For Step 3 to Step 10, collect data according to the prompts.

After the acquisition is completed, carry out calibration calculation:

The camera calibration results are as follows:



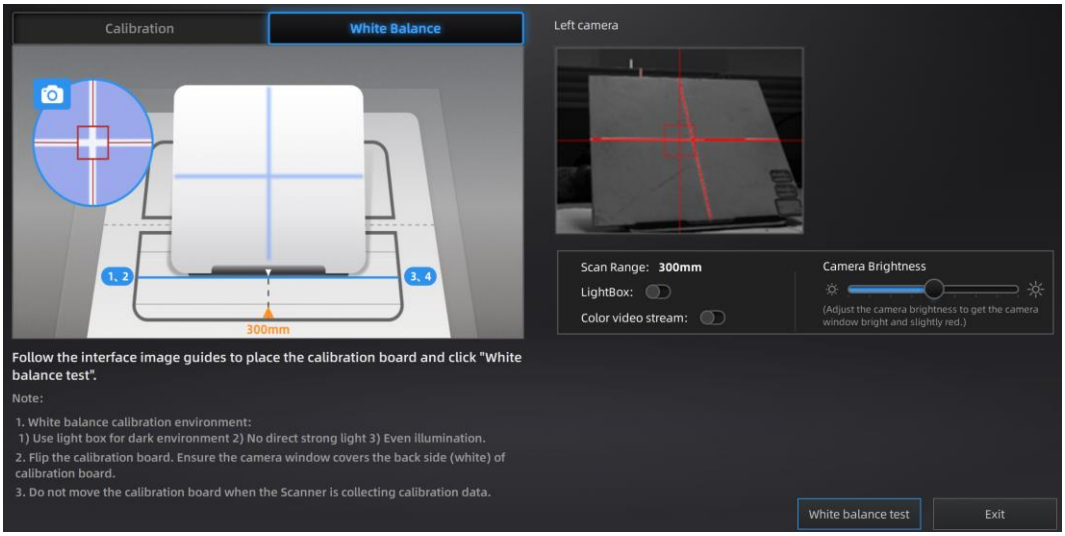
If the calibration fails, click the "Recalibrate" button and repeat the steps above to recalibrate.

After successful calibration, click **Next** to enter the white balance calibration.

4.2.2. White Balance Calibration

To ensure that accurate texture data is obtained, it is recommended that a white balance calibration be performed each time the ambient brightness changes. White balance calibration environment:

- Use light box (power: 60W; input voltage: 110V-240V) for dark environment. White illumination environment suggested. Yellow light might cause large color deviation.
- No direct strong light
- Even illumination



White balance calibration interface

During white balance calibration, the back of the calibration board is placed on the calibration board bracket, and the bracket is moved to the initial position to ensure that the calibration board is placed smoothly and the back is facing the probe.

Click the camera brightness bar on the white balance interface to adjust the brightness of the windows. Adjust the brightness until the back of the calibration board in the window is slightly red. If the brightness is insufficient or too bright, adjust the ambient light or light box brightness.

Click **White balance test**. The white balance verification is complete when the white balance calibration is successful.

In order to obtain good texture effect, it is necessary to ensure that the back of the calibration board is clean.

If you are not satisfied with the texture effect, you can change the ambient brightness or redo white balance calibration.

Click **Complete** on the calibration screen to enter the scan for a new project.

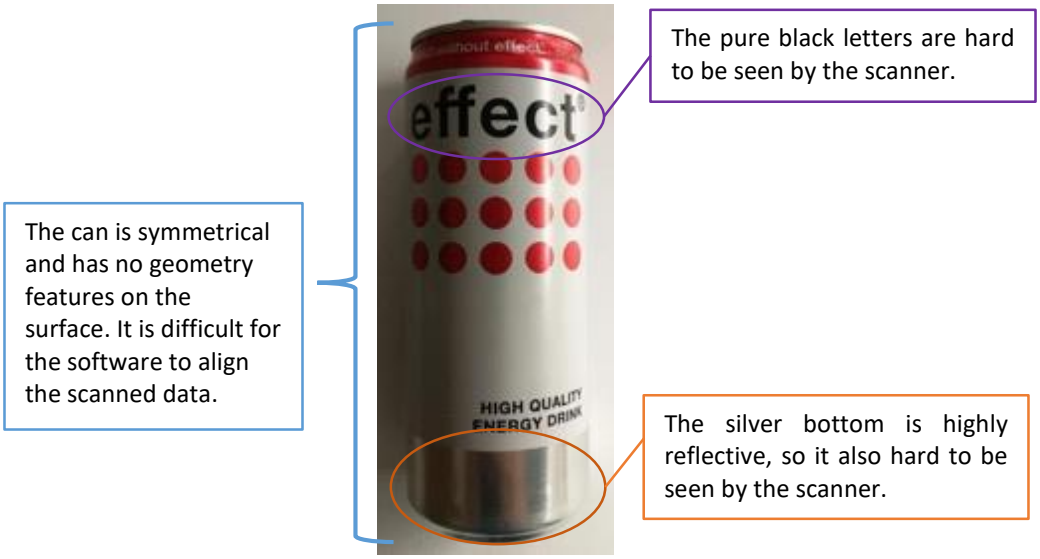
After the white balance is finished, enable **View real-time color effect** to check whether the colors in the white balance effect are consistent with the left camera viewport.
If it is not the same, you need to disable **View real-time color effect**, re-adjust the brightness and click **White balance test**; if it is the same, you can click **Complete** to exit the calibration interface.

Click **Complete** on the calibration interface to enter the scan new project.

5. Before Scanning

5.1. Object

During scanning the shape of the object needs to be maintained without any changes.



Example of object that is difficult to scan

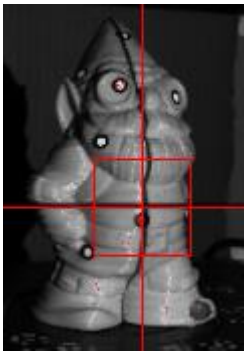
Before scanning black, transparent or reflective objects, spray them with powder.

5.2. Preparation

To align data if geometry features are not sufficient, you need to stick markers or pieces of clay on the surface of scanned objects to create extra “features”.

When you stick markers on the surface of the object, you need to follow the following rules:

- Make sure sticking at least 4 markers in each frame (one scanning field of view). Control the number of markers seen on the camera view.
- Stick markers in a random, non-linear pattern (see example below). Four markers are required for public area alignment.
- Markers should be stuck on the flat surface area and keep the marker surface flat.
- Use the markers provided with the device only. Other markers can result bad accuracy or not to be seen.



Object with markers

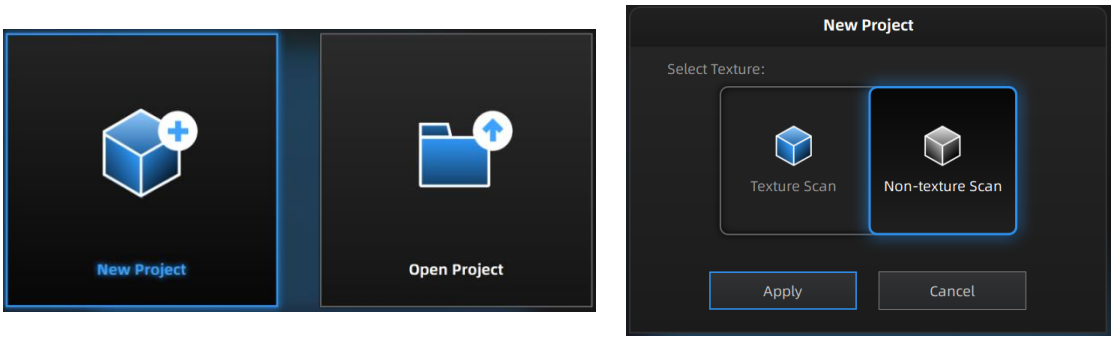
Before scanning transparent, highly reflective and black objects, you should spray white powder on the surface.

6. Scan

6.1. Before Scanning

6.1.1. Create a Project

Enter the interface of New Project and Open Project. The initial default work save location is on the desktop unless the user opts to change this.
Click “New Project”, enter the work name to select texture.
Texture scan is only available after white balance calibration. Using texture scan, the data is scanned with color, and the process is the same for texture and non-texture scan.



Create or open a project

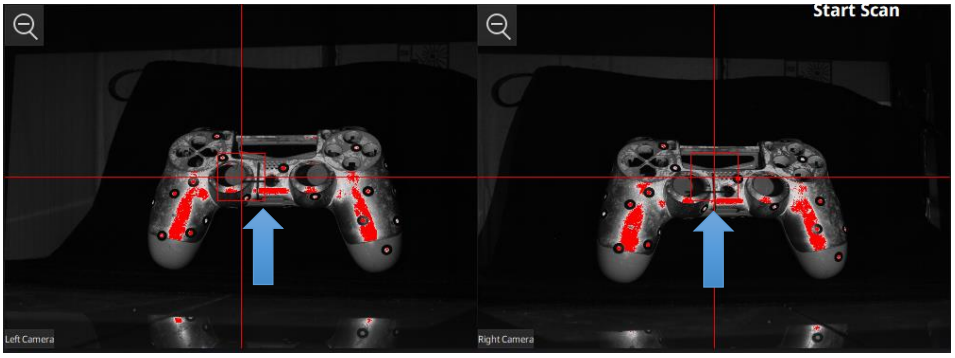
Note:

- Under texture scan, if you do not use light box, ensure the illumination and brightness casted on the scanned object are even.
- Under texture scan, do not use colored light source such as colored light in indoor environment.

6.1.2. Working Distance

Before starting scanning, make sure that the scanned object is placed properly, check the black cross projected on the object in the camera viewport, and adjust the position of the object until the cross is within the red rectangle in the camera viewport. Make sure the scanner will not move during the scanning.

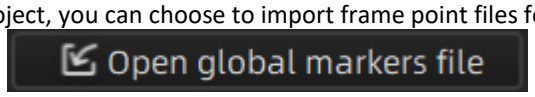
If the cross is to the left of the red rectangle in the left camera window, it is too far away; if not, it is too close.



When the distance is right, the cross is inside the red rectangle

6.1.3. Global Markers Scanning

After creating a new project, you can choose to import frame point files for scanning, as follows.



Scan Mode

Objects with markers can be scanned in the scanning interface and saved as global marker files in p3 format after scanning is completed.

You can also import frame marker files generated by third parties. The supported frame point file formats are p3, txt or asc.

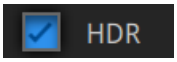
After importing, the imported frame markers will be displayed on the interface, and only the objects corresponding to this global marker file can be scanned, at this time, only the single piece mark and the rotary table global marker scanning mode, global markers can be edited.

6.1.4. Adjust Brightness

Click and drag the button to adjust the brightness. The correct brightness setting will depend on the lighting in the environment and the texture of the object.

Drag to adjust the brightness setting

To scan an object with high contrast texture, such as something white and black, use HDR. Each single scan will take longer to capture.



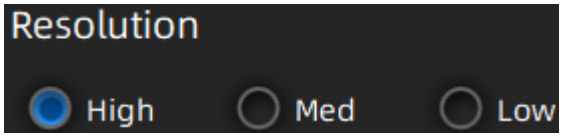
Turn HDR ON to scan contrasting textures

6.1.5. Scanning Range

Scanning Range

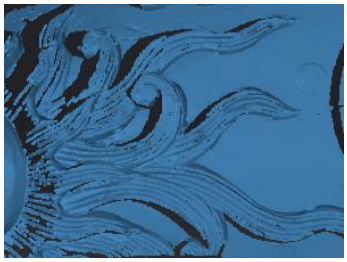
Displays the current scanning range, selectable in the device adjustment interface: 150mm and 300mm.

6.1.6. Resolution



Resolution

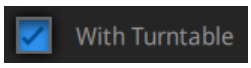
The higher the resolution, the better the detail and the greater the amount of data.

		
High Resolution	*Medium Resolution*	*Low Resolution*

6.2. Turntable

6.2.1. With/Without Turntable

Create or import a project.
Check "With Turntable" on the left side of the scan settings, and check the box to cancel the use of turntable after each scan.



Use turntable

6.2.2. Turntable Steps

Turntable step

Before scanning, set the turntable steps from 8 to 180. The number shows how many times the turntable will stop in one turn, and the data will get captured at each stop. The default setting, 8 steps, is recommended. You can change the number of steps according to the features of the objects.

Note: Using more turntable steps will help scan more complete data in some angles, but NOT more accurate.

6.2.3. Turntable Speed

Turntable speed

Set to adjust turntable speed. "6" is set by default. Higher value is with higher speed.

6.2.4. Alignment Mode

Select an alignment mode condition for the turntable scan.

Turntable Alignment

If you do not want to stick marker points on the object you want to scan, and it is too big and covers the coded targets on the turntable, you could choose turntable align.
Working Principle: Align the data with the assistance of turntable.

Note: Need to keep the distance between turntable and scanner the same as it is during calibration; Objects in regular shapes such as sphere and square are not suitable for this mode.

Marker Alignment

The surface of the object requires markers. When the scan starts the markers are required, otherwise “Track lost” will be displayed.

At least 4 markers captured previously need to be seen by the scanner in each current scanning frame to be aligned. If not, “Track Lost” will be displayed.

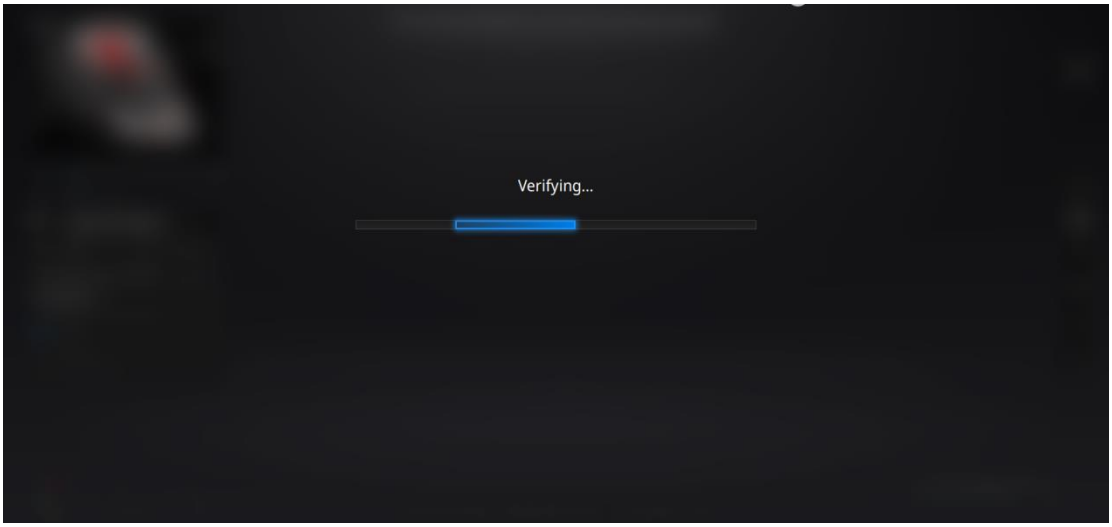
When scanning a large object, Marker Alignment is the best mode at mitigating the cumulative errors caused by large amounts of data. This results in a higher global accuracy of the complete scanned data and is the reason we recommend this alignment mode for large objects.

Feature Alignment

When the distance between turntable and scanner is inconsistent with it is during calibration, feature alignment will be helpful.

Working principle: With feature alignment, after starting scanning, software will capture four data to calibrate. The scans are matched by knowing the center and angle of rotation between successive captures.

Note: Objects in regular shapes such as sphere and square are not suitable for this mode. With feature align, need to make sure the object will not move when turntable rotates. And the objects need to have enough features for the software to recognize.



During the "verifying" steps, the software calculates the position of the turntable

Global Markers Alignment

When there is an object global marker file and the position (where global markers are located on the object) is not changed, global markers can be used for alignment.
How it works: Align by imported global marker files and markers stuck on the object. At least four markers are required.

Ensure global markers size is consistent with object size.

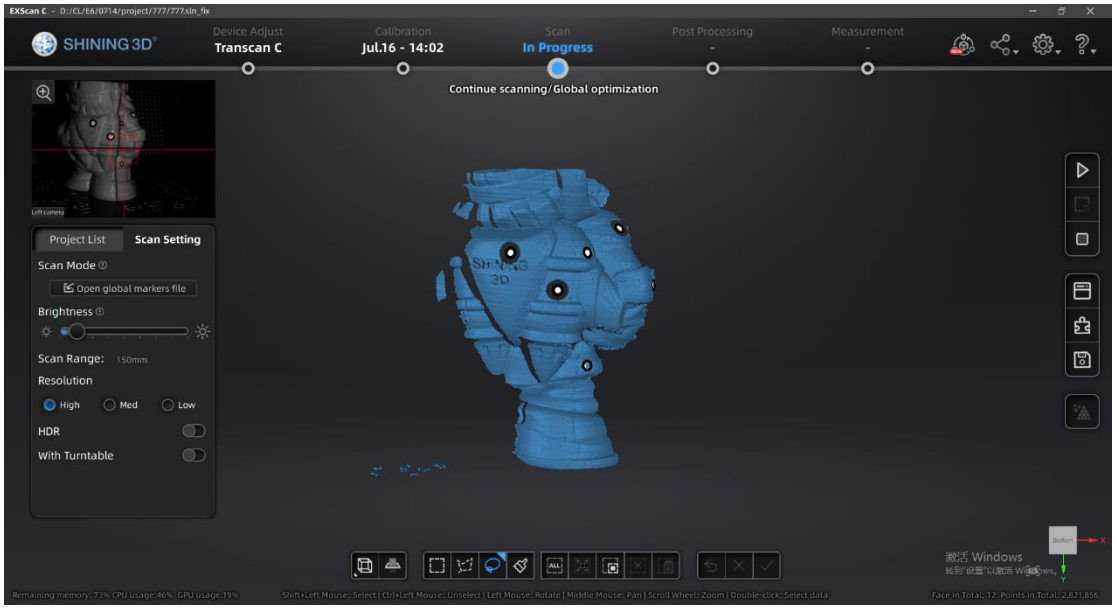
6.3. Scan

6.3.1. Start Scanning

	Click the button or press Space key to start scanning.
	Click the pause button, and the scanning will pause; Click again to resume scanning.

When the scan is completed, the data is automatically saved in the project file. Make sure the relative position does not change during the scan.

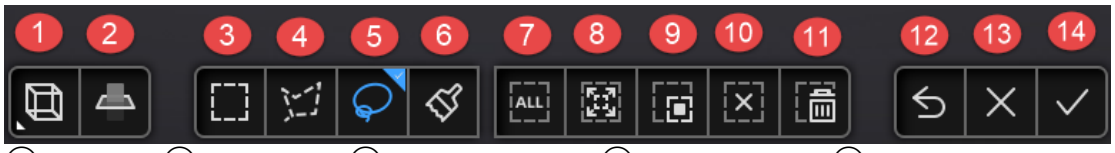
	When auto scan mode is scanning, you can click the button to stop the current scan. The current data will be deleted directly.



Scan interface

6.3.2. Edit Scanning Data

SHIFT + Left mouse: Select unwanted points, the selected points will turn red, as shown below.
Ctrl + Left mouse: Deselect selected data.

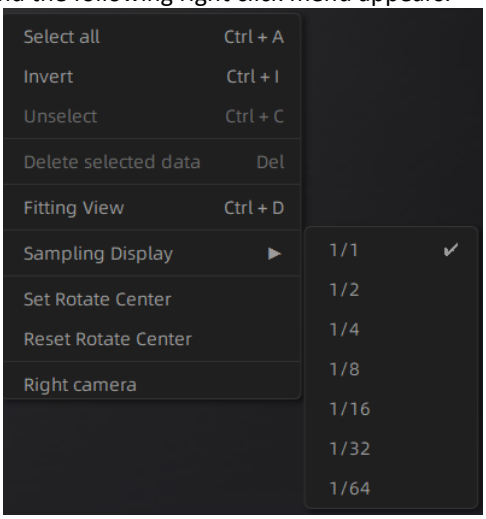


①Multi-view ②Cutting plane ③Rectangle selection ④Polygon selection ⑤Lasso selection
⑥Brush ⑦Select all ⑧Connected field ⑨Inverse selection ⑩All unselected
⑪ Delete selected ⑫ Undo deletion ⑬ Cancel editing ⑭ Apply editing

	**Brushes** After selecting a brush, you can change the brush size with the mouse wheel while holding down the CTRL key on the keyboard.
	**Connected field** After selecting the data, clicking the button to select all the data connected to that piece of data.
	**Delete selected data** Click the button or press Delete key to delete selected data.
	**Undo** You can only undo the most recent deleted data.
	Click the button or press Space key to save data and exit editing. The edited data is saved in the project file.
	Cancel editions on the data.

6.3.3. Right-Click Menu

Right click on the interface and the following right click menu appears.



Function	Description
Select all, deselect, deselect, delete selected	Same functions as editing, can be operated by shortcut keys.
Suitable view	Data is centered on the interface and sized appropriately.
Set the center of rotation	The center of rotation can be set on the data with the left mouse button, and the setting can be exited with the ESC key.
Reset the center of rotation	After reset, the center of rotation is in the data center.
Displaying sampling data	For data with a large number of point clouds, you can use this function to display the data at the selected scale.
Hide cutting plane	After clicking this item, the cut surface on the interface is hidden.
Right camera	After clicking this item, the corresponding camera viewport is displayed in the upper left corner of the interface.

6.3.4. Cutting Plane

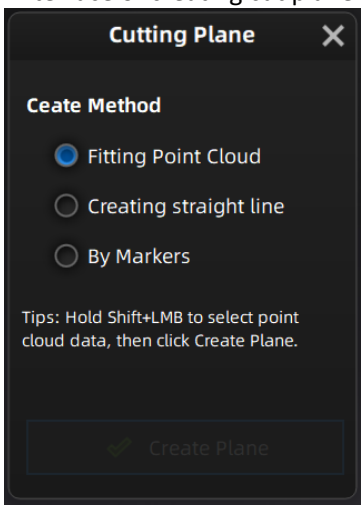
Cutting plane is very useful when a base need to be removed during scanning. You can orient the plane around X,Y, Z axes. The plane can be rotated, zoom, move.

After setting cut plane, there will be no more data scanned below the cut plane during the scanning process, preventing irrelevant data getting scanned.

- **Create Cut Plane**

	**Cut Plane** Click this button to enter the cut plane mode.

Interface of creating cut plane



Fitting Point cloud: Press Shift + left-click to select data, then click the button "Generate plane". The cut plane will be created by point cloud fitting. The direction of the plane will be calculated by the software according to the direction of point cloud.

Creating straight line: Press Shift + left-click to draw a line, and generate the cut plane according to the line.

By Marker: Press Shift + left-click to select markers. 3 markers or more are required to generate the cut plane.

- **Cut Plane setting**

Rotation axis: Cut plane can be rotated around the axis by operating the active bar, editing the text box or placing the cursor on the edge of the cut plane and dragging.

Translation increment: Translate the cut plane by operating the active bar, editing the text box or placing the cursor in the center of the cut plane and dragging. After translation, the increment value will be reset to 0.

Delete: click this option, data in the reverse direction will be shown in red. Apply this, and the red data will be deleted.

Reverse: Reverse the normal direction of the cut plane.
Delete plane: Delete the created cut plane.

- **Other operation**

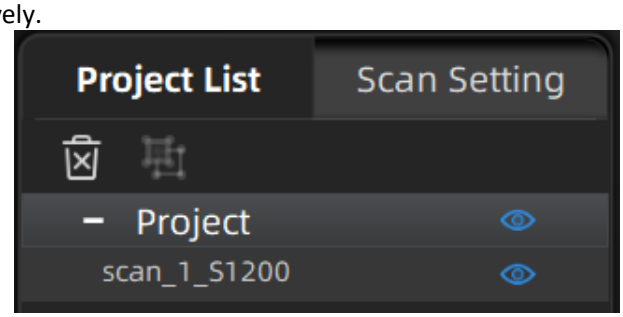
Mouse operation: Double-click the cut pane to enter the cut plane setting after quitting the cut plane interface.

Hide/Show cut plane: After creating the cut plane, hide or show the cut plane by right click.
Notes:

- Editing markers is not available for cutting plane.
- When cutting plane is present, the data below the normal direction of the cutting plane cannot be scanned, except for the markers.

7. Project Group

You are able to edit, manually align, rename, or save the scan project in the project group list. The single-plate data names displayed in the project list are different when selecting data scanned at different resolutions. s1200, s300 and s130 correspond to high, medium and low resolutions respectively.



Project tree

7.1. Create/Import Projects

When the scan data is saved, you can create new projects with more scans, or import the saved projects and manage all projects on the project tree.

	Click the Project button to create or open a project.

Click on the project tree or on the **project button** create a new project or import a project into the work.

Imported data will be copied in the work folder and appear on the project tree.
New project will create a new entry in the project tree and a new project file in the work folder.

7.2. Rename a Project

Right click on the project on the tree to rename it. The new name will be updated in the work folder.

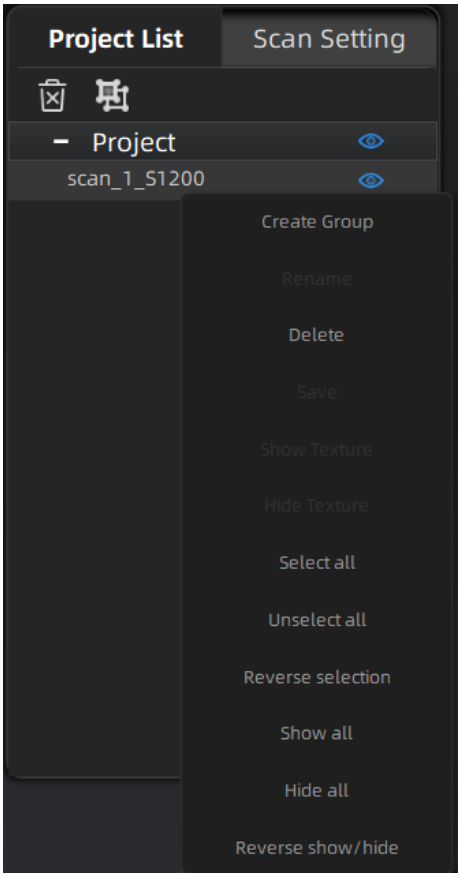
7.3. Delete

	Delete the selected data, group(s) or project(s)

Click **Delete** or right click and delete to delete the selected data, group(s) or project(s) from the project tree and the work folder.
If you delete the current project the last project will reload and become the new current project.

Note: Delete only affects the data in the work. If the project is imported from other work, only the created copy is deleted.

7.4. Create/Split a Group



Left mouse: Select data in the data list or on the scanned model.
Shift/Ctrl + Left mouse: Multi-select in the data list.

	Create or split group.
	Hide or display data.

After creating the group, all the selected data belong to it. Right-click the group or data to view drop-down menu.

⚠ **Note:**
The data captured by turntable scan mode will belong to one group by default. You could left-click the scan model to select data after hiding texture.

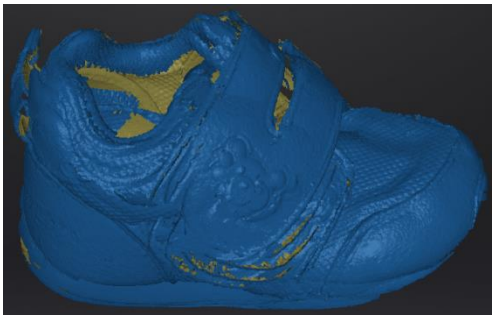
7.5. Edit Data

Double click on a project, group or a scan, to enter the edition mode. The edition is applied to the selected data only. Modifications will not affect the rest of the data.

Shift + left mouse: Select data on the 3d view, and enter the edition mode. the edition is applied on the visible data only.

7.6. Global Optimization

When data is available on the scan screen, you can click Global Optimization to optimize the data stitching.

	
No global optimization data	Globally optimized data

7.7. Alignment

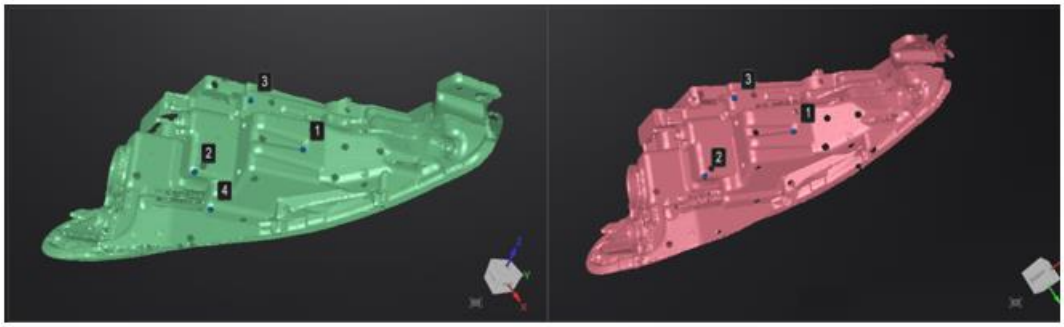
Within a project, if you use markers, the data of a project will automatically align with the marker positions. If not, an automatic alignment will be calculated with a best-fit of the single scan to the previous scans of the project according to the geometric features. If the object is not with enough geometric features, you can use manual alignment.

	Click the button to open the Manual Alignment interface.

- **Feature alignment**
  Select feature align, click “apply” button, software will align the scans based on the features automatically.

- **Align manually**

SHIFT + click left mouse button to select at least 3 non-collinear corresponding points in the fixed or floating windows for Manual Alignment, as shown below.
Ctrl + Z: Cancel last point picked.

	
Fixed	Floating

How it works: The software calculates the best fit alignment from the picked points, and refine the alignment by best fit of all the points of the floating to the points of the fixed.

- **Marker Alignment**

You could choose marker alignment if the projectors are with markers. There shall be at least 3 common markers in two projects, otherwise the alignment will fail. Software will align the projects according to the positions of those markers automatically.
Click "**Apply**" to align.
Click "**Next**", the aligned projects will merge to a group, you could continue further alignment.
Click "**Cancel**" to recall the alignment.
Click "**Exit**" to exit project alignment interface.

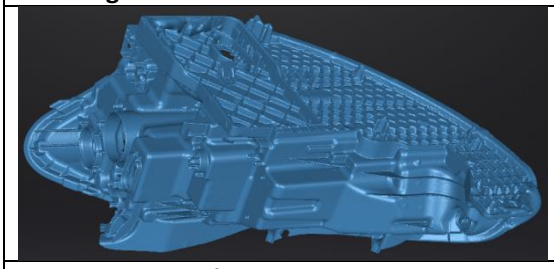
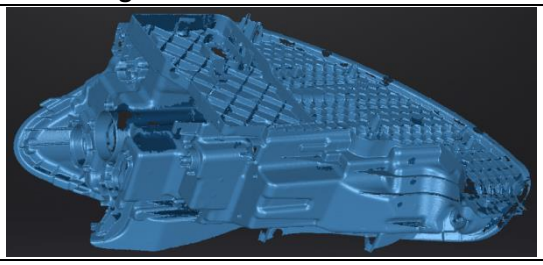
8. Mesh

8.1. Create Mesh (Watertight/Unwater tight)

When scanning and editing are completed, click  to create mesh.

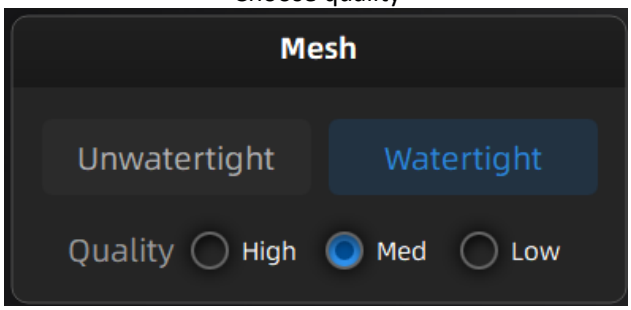
8.1.1. Mesh

There are 2 types of mesh are available: Watertight and Unwater tight.

Watertight	**Unwater tight**
	
All holes will be filled automatically. The data can directly be 3D printed.	Unclosed model stays the way it is scanned. Processing time is quicker than Watertight.

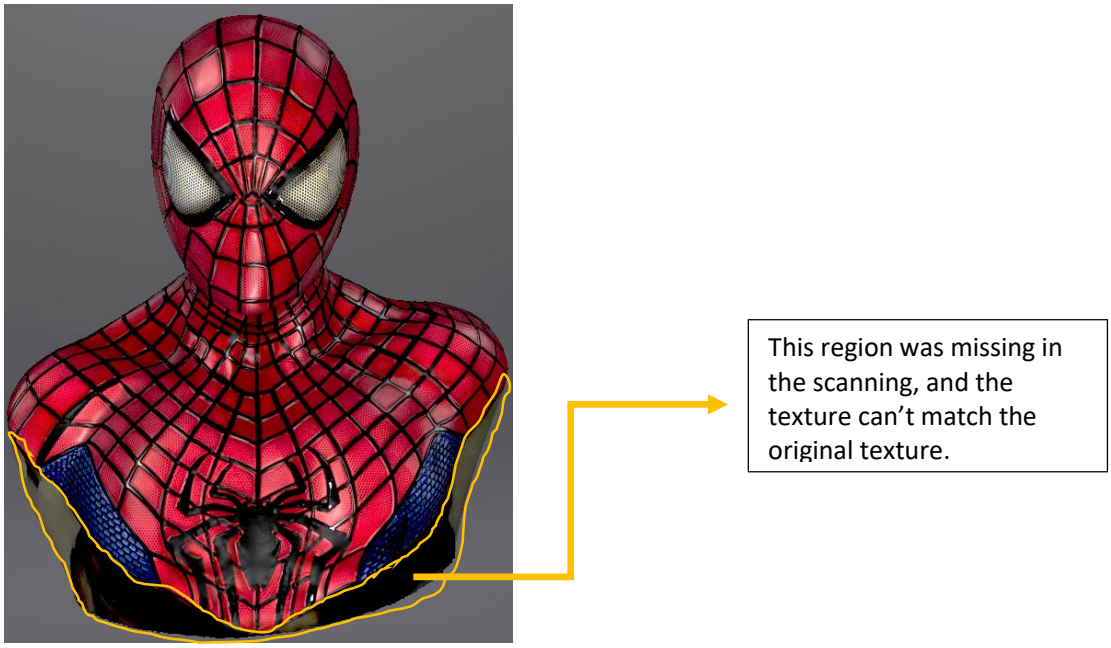
Watertight quality:

Choose quality



TEXTURE WATERTIGHT

The texture capture is separate from the 3d data capture. If the texture has been captured, it will still be displayed on areas where holes are filled in the mesh processing. If the texture is missing, the corresponding mesh data will be in black.

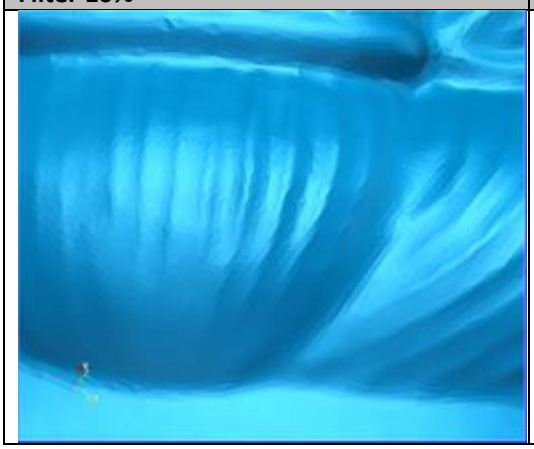


8.1.2. Mesh Optimization

Through the toolbar on the left, you can simplify, optimize, remove small floating parts, remove spike and marker hole filling.

Use recommended parameters: To get EXScan C help you optimize a specific model, enable the function. To customize parameters, disable the function.

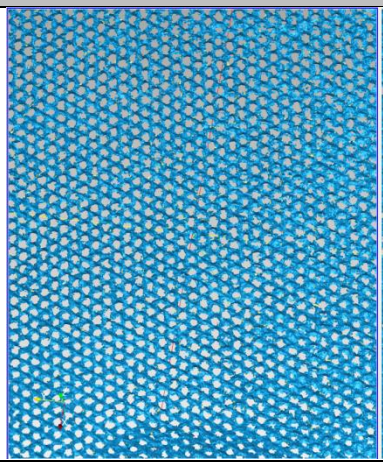
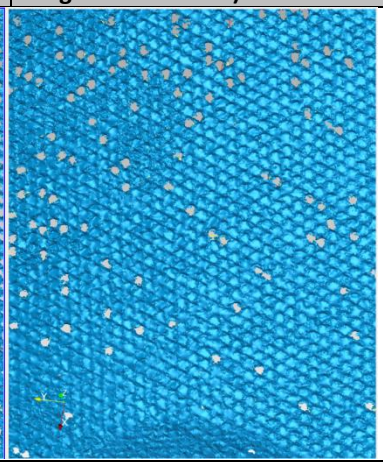
Filter: Optimize data.

Filter 10%	Filter 60%
	

Remove small floating parts: See "8.2 Mesh Editing"—"8.10 Texture Remapping."

Max triangles: Set max. plate number to get mesh model’s triangle plate number is within configured plate number.

Fill small hole: For objects with tiny holes (larger than 10 mm), use the function to fill tiny hole to make the scanned image look better. For objects with holes (smaller than 10 mm), you are not recommended to use the function or you can set the function parameter value to a smaller one.

Situation when You Don’t Fill Holes	Situation when You Fill Holes (for Holes Larger Than 10mm)
	

Remove spikes: Remove spike-like data on the image edge.

Marker hole filling:

Without markers fill	With markers fill
	

8.2. Mesh Editing

The mesh can be edited: Select/delete, Hole filling, Sharpen, Smooth, Simplification, Multiview.

MESH SELECT/DELETE

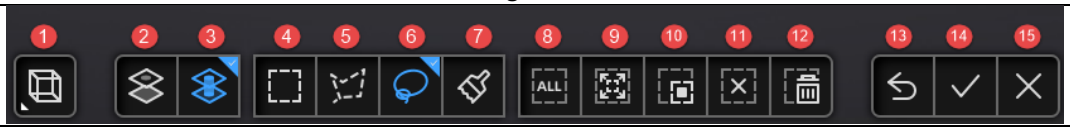
Press **Shift + Left mouse** to select data and enter the selection menu.

CTRL+ Left mouse: Deselect a selected region.

CLOUDS SELECT/DELETE

SHIFT + Left mouse: Select unwanted data, the selected section will be displayed in red, as shown below.

CTRL+ Left mouse: Deselect a selected region.



Edit buttons:

①Multi view ②Select visible ③Select through ④Rectangular ⑤Polygon

⑥Lasso ⑦Paint brush ⑧Select all ⑨Connected domain

⑩**Invert**	⑪**Unselect**	⑫**Delete selected data**
⑬**Undo**	⑭**Apply edit**	⑮**Cancel edit**

	**Select visible** To select data on the front view only.
	**Select through** To select data all though**.**
	**Paint brush** Mouse scrolling wheel to adjust the paint brush size.
	**Connected domain** Click the button after select the data, all connected region to the selected data will be picked.
	**Delete selected data** Click the button or “DELETE” on the keyboard to delete selected data.
	**Undo** You can only undo the most recently deleted data.
	**Apply edit** Click the button or space bar to apply the edition, and exit edit mode.
	**Cancel edit** Undo all editors, and exit edit mode.

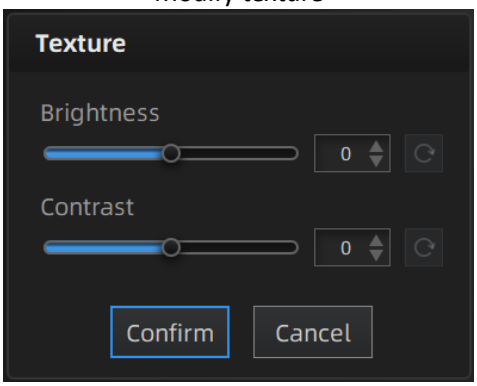
8.3. Texture Adjustment

When the mesh model has been generated, use the cursors to change the Brightness and/or contrast of the texture from -100 to +100. The default value is 0 for both.

- Brightness (-100-100): indicates the brightness of the picture. The larger the value is, the higher the brightness is.
- Contrast (-100-100): indicates the degree of contrast between colors. The larger the value is, the more obvious the color difference is.

 : Click Reset to return to 0.

Modify texture



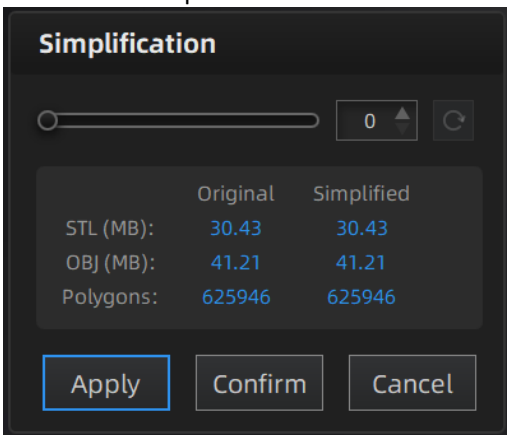
This modification is not saved in the project file. Export the data to save the texture editing.

8.4. Simplification

After simplification, the polygon numbers, file size and level of detail of data will be reduced accordingly. Set the ratio from 1 to 100, the default is 0.

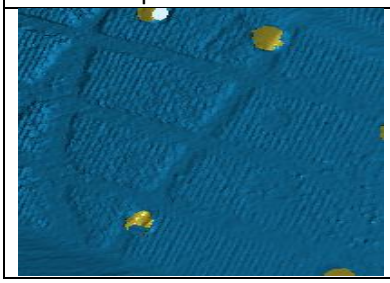
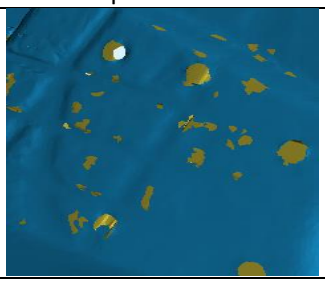
The comparison of detail between before simplification and after simplification (at 70% simplify proportion).

Simplification menu



Click "**Apply**" button to simplify data, preview the result of current setting.
Click "**Confirm**" button to apply the "Simplification" setting.
Click "**Cancel**" button to quit, and go back to the original data.

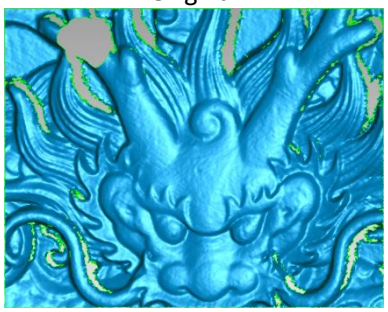
Multiple operations on "Simplification", the result will not be added. It will always operate on the original data.

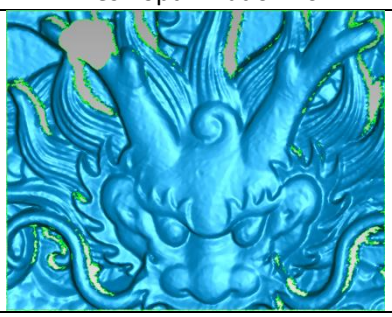
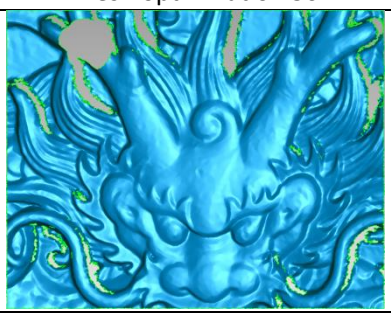
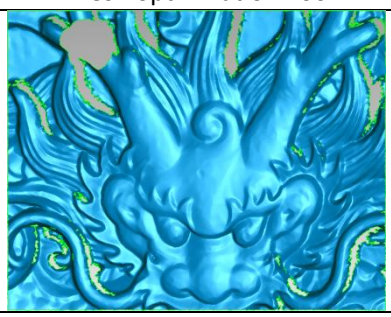
Before simplification	After simplification
	

8.5. Mesh Optimization

Mesh optimization can optimize the quality of the data. There are 3 ratio options of mesh optimization. Processing time will be different. Below shows the result of 3 different ratios.

Original



Mesh optimization 10	Mesh optimization 50	Mesh optimization 100
		

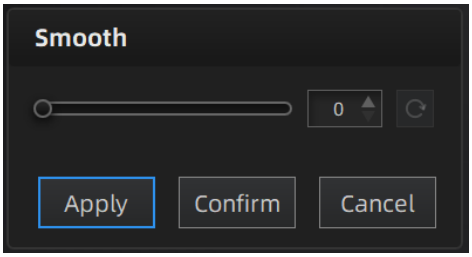
Click “**Apply**” button to optimize data, preview the result of current setting.
Click “**Confirm**” button to apply the “Mesh Optimization” setting.
Click “**Cancel**” button to quit, and go back to the original data.

Multiple operations on “Mesh Optimization”, the result will not be added. It will always operate on the original data.

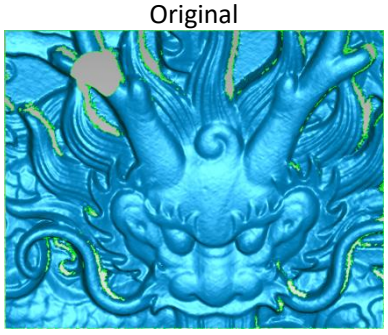
8.6. Smooth

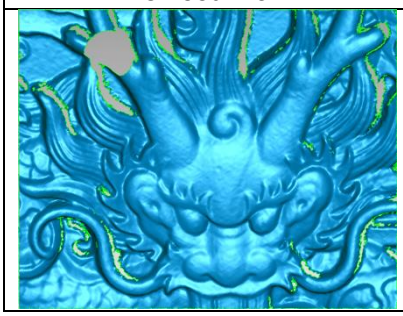
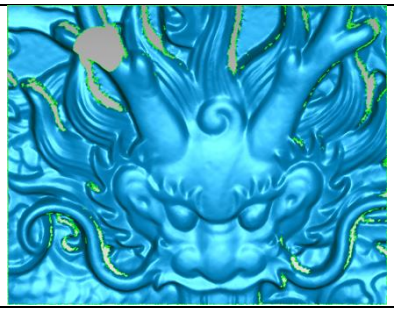
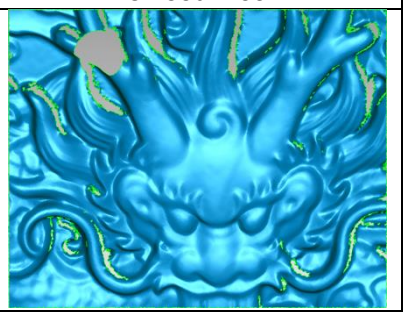
Smooth the possible noise on the surface of the scan data. It might remove some small details or smooth some sharp edges at the same time. The example of before and after smoothing is shown below. Run 2 times, data will be smoothed twice.

Smooth menu



Original



Smooth 10	Smooth 50	Smooth 100
		

Click “**Apply**” button to smooth data, preview the result of current setting.

Click “**Confirm**” button to apply the “Smooth” setting.

Click “**Cancel**” button to quit, and go back to the original data.

Multiple operations on “Smooth”, the result will not be added. It will always operate on the original data.

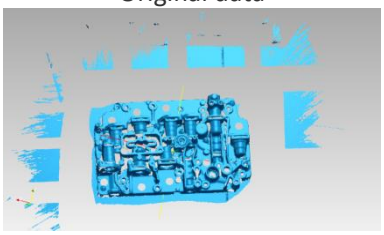
8.7. Remove Small Floating Parts

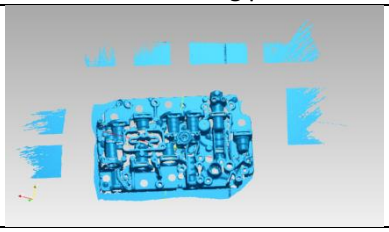
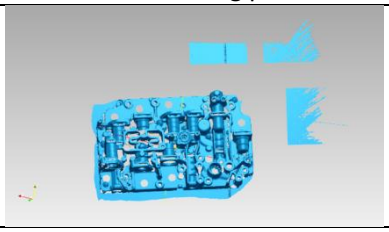
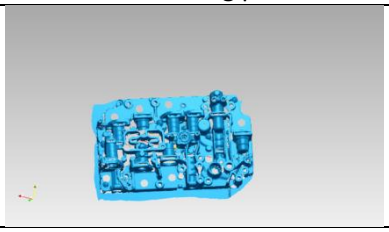
Remove small floating parts in the scan data.

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.

Diagram of removing floating parts shows as below:

Original data



Remove floating part-10	Remove floating part-50	Remove floating part-100
		

Click “**Apply**” button to remove floating part, preview the result of current settings.

Click “**Confirm**” button to apply the “remove floating part” setting.

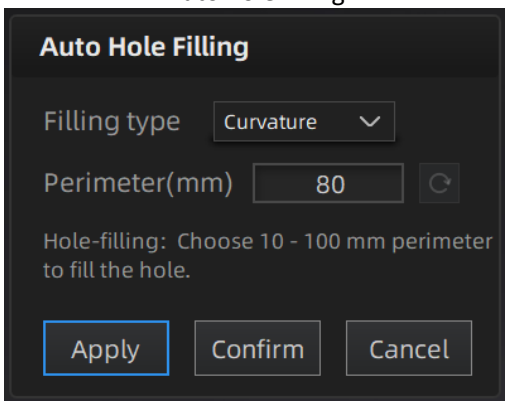
Click “**Cancel**” button to quit, and go back to the original data.

Multiple operations on “Remove floating part”, the result will not be added. It will always operate on the original data.

8.8. Auto Hole Filling

Input the perimeter of the biggest hole to be filled. Less than 100mm is recommended. This function will fill every hole with a smaller perimeter than the number input.

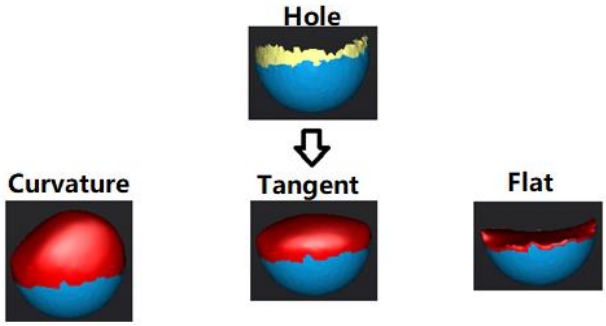
Auto hole filling



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.

Effect of Curvature, Tangent or Flat

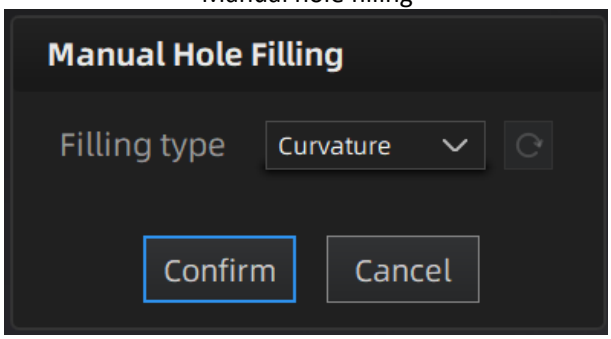


Click "**Apply**" button to auto fill hole, preview the result of current setting.
Click "**Confirm**" button to apply the "Auto hole filling" setting.
Click "**Cancel**" button to quit, and go back to the original data.

8.9. 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.

Manual hole filling



Click the edge of the hole to fill it.

Click  , according to the order of filling holes, from the last hole to cancel hole filling. Ctrl + Z can also cancel hole filling.

Click "**Confirm**" button to apply current setting and exit the manual hole filling.

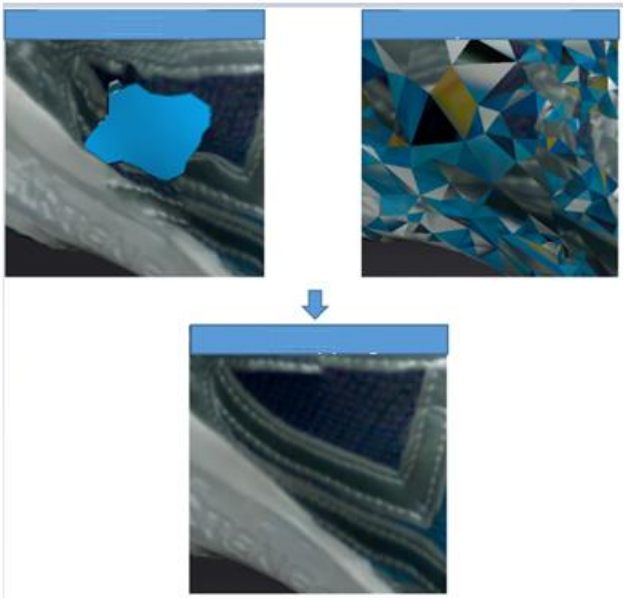
Click "**Cancel**" button to quit, and go back to the original data.

8.10. Texture Remapping

Remap texture only after meshing data. Directly imported color texture data cannot be processed.

Click  Texture Remapping to display the Texture menu.

Mesh edition of simplification, hole filling on texture scanned data will affect the texture render. By doing the texture remapping, the texture information will be reapplied on the mesh.



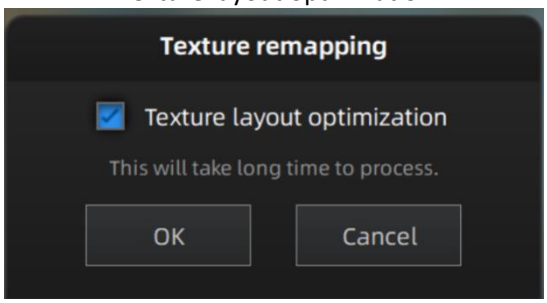
If post-processing operations have been performed, it is recommended to perform texture remapping before saving data.

8.11. Texture Layout Optimization

Choose "**Texture Layout Optimization**" (TLO) to create an optimized arrangement for the texture file. It will make the texture manual editing much more convenient if you are going to process the texture in a 3rd party software.

This option has no effect on the texture itself.

Texture layout optimization



No Texture layout optimization	Texture layout optimization
	

Note:

- TLO requires a longer time to compute.
- TLO is used only with OBJ output.
- Same effect in fixed scan for single plate data whether texture expansion is optimized or not.

8.12. Return to Scanning Mode

To continue scanning, edit data or mesh again, you need to exit the post-processing mode and click Scan on the navigation bar to return to the scanning mode interface, and the mesh data in the post-processing interface will be cleared.

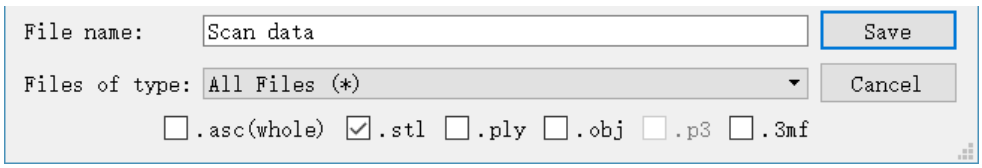
Note:

Mesh data in the post-processing interface will not be automatically saved.

9. Export Data

9.1. Data Formats

Click  to export the data. Navigate to choose a save folder. And input the file name. Select one of the formats below. By default, the saving path is the project folder, the file name is “Scan data”, and the format is .stl.



save folder

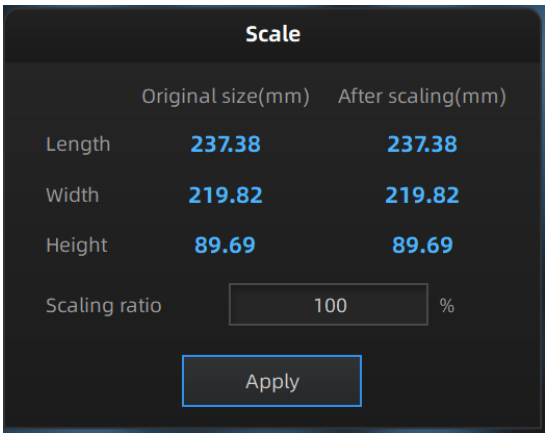
Format	Texture	Data type	Saves as	Recommended for
ASC (separated) (scan mode only)	No	Separated point-clouds, with calculated alignment	scan_0.asc scan_1.asc scan_2.asc etc…	◆ Inspection ◆ Fast export (no post-processing needed) ◆ Complex data to post process in another software
ASC (whole)	No	optimized point-cloud	scan.asc	◆ Inspection ◆ Fast export (no post-processing needed in hand-held mode) ◆ Large data to post process in another software ◆ Complex data to post process in another software
STL	No	Mesh	scan.stl	◆ 3D printing (watertight mesh data) ◆ Reverse Engineering ◆ Compatibility with most mesh editing software
OBJ	Yes (separated)	Mesh, Texture & Matching file	scan.obj scan.jpg scan.mtl	◆ Artistic applications ◆ 3D rendering ◆ Compatibility with most mesh editing software
PLY	Yes	Mesh	scan.ply	◆ Low storage ◆ Easy texture editing
3MF	Yes	Mesh	scan.3mf	◆ Low storage ◆ Compatibility with Microsoft paint3d
P3	No	Marker position	scan.p3	◆ Global Marker File in ◆ EXScan C software ◆ Measurement of the marker position

9.2. Scale Data

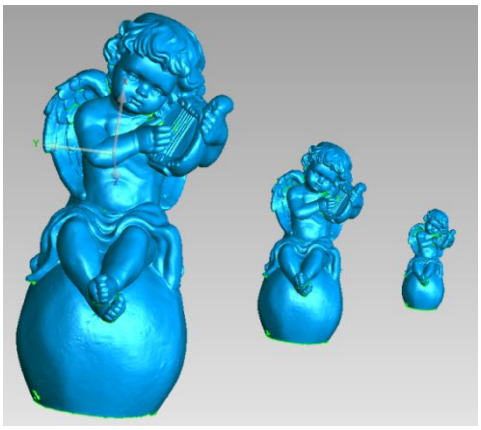
Scaling the volume of scanned data, while the number of triangles, the level of detail of the scan and size of data will not be actually changed.

By default, the scale is 100% and will be exported with millimeters for reference.

The value display represents the dimensions of the smallest box containing the data oriented to the reference axis.



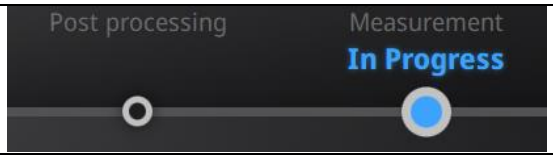
Scale window



Scale result

9.3. Measurement

After meshing, the Measurement menu will be available on the top. Or click Measurement on the navigation bar, and import data.

	Go to Measurement.

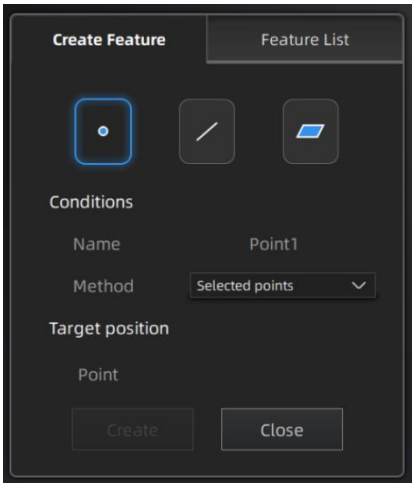
	Open file.

Click **Open file**, a STL or OBJ file can be imported to edit.

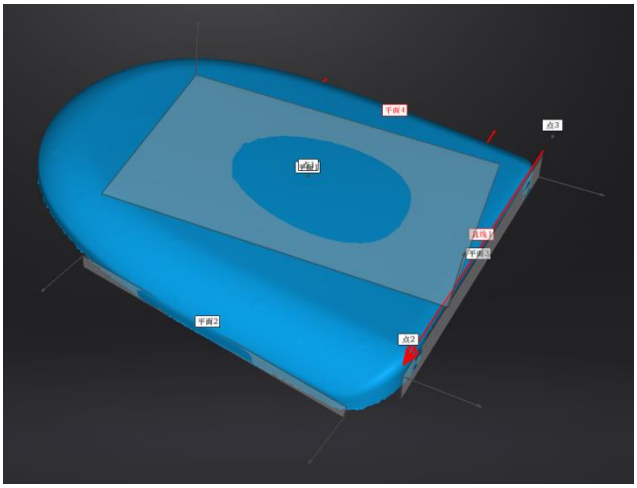
9.3.1. Create Feature

	Enter/Exit the Feature menu.

Click the Feature button to display the menu, click again to close the menu.



Feature menu



Display of Features

Click on the corresponding icon to create points, lines, planes.
Then select the creation method and follow the instructions, click “Create” to generate, or “Close” to cancel and close the window.

The features created displaying in gray, the selected features are in red. In the feature list, click “delete button” to remove (Delete action cannot undo).

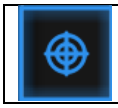
Feature	Creation method	Requirement	Description
Point 	Selected Points		● Click on the data to select a point ● Click create to create a point
	Line-Plane Interface	Line and Plane should be created in advanced	● Click on the created line, or select it on the drop-down list. ● Click on the created plane, or select it on the drop-down list. The point generated is the intersection between the non-parallel line and plane **Feature creation failed! Error code 9**: the line is parallel to the plane
Line 	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	2 Planes should be created in advanced	● Click on the plane previously created, or select it on the drop-down list, repeat for the second plane. ● The created line is the intersection between the 2 non-parallel planes **Feature creation failed! Error code 1**: the planes are parallel
Plane 	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
	Point-Line Fit	Line should be created in advanced	● 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 ● In the Choice list select one of the elements to reselect it **Feature creation failed! Error code 6=** the point selected belongs to the line
	Best Fit		● Press Shift+ LMB to select an area, press ctrl + LMB to unselect. ● The plane generated is the position with the smallest deviation from the selected area **Recommend method to create plane**

9.3.2. Align

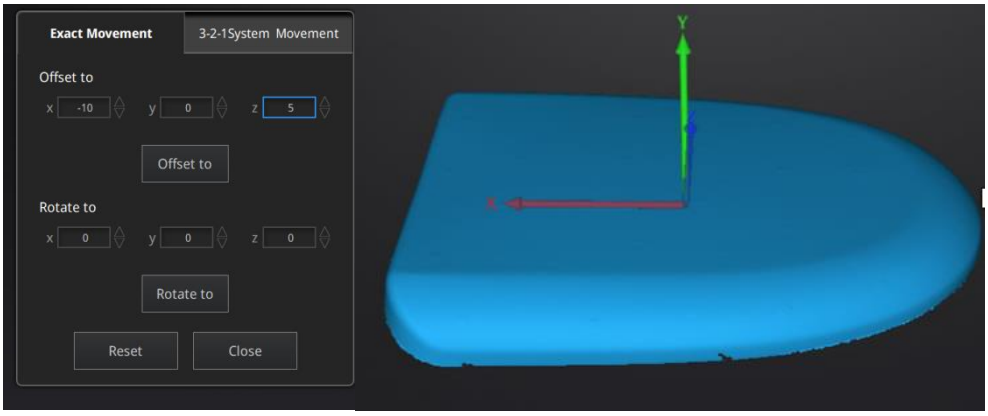
Use this mode to modify the alignment of the data to the global coordinate. This action is useful for post processing or reverse engineering.

The transformations do not affect the shape and size. Once you align to the new position and exit the alignment interface, the previous position can only be restored by reloading the file.

	Enter/Exit the Movement menu.

Click the Movement button to display the menu, click again to close the menu.

Exact movement



Exact Movement Menu

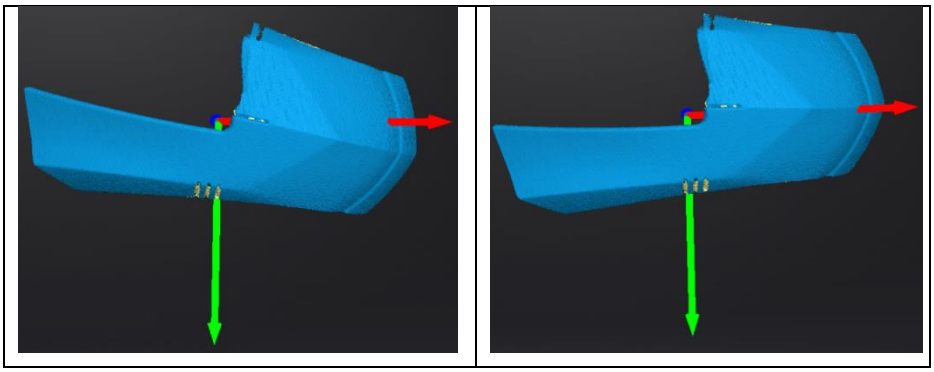
Enter the value in mm and degrees, click **Apply** to match the data origin to the input coordinate and orientation
The arrows represent the global coordinate system, Red=X+, Green=Y+, Blue=Z+

Click **Reset** to cancel the transformation to original position

Click **OK** to confirm the transformation.

Tips:

- Start from data reposition (offset to 0,0,0)
- Edit rotations prior to transformation
- Change the view normal to a reference plane to change the corresponding angle

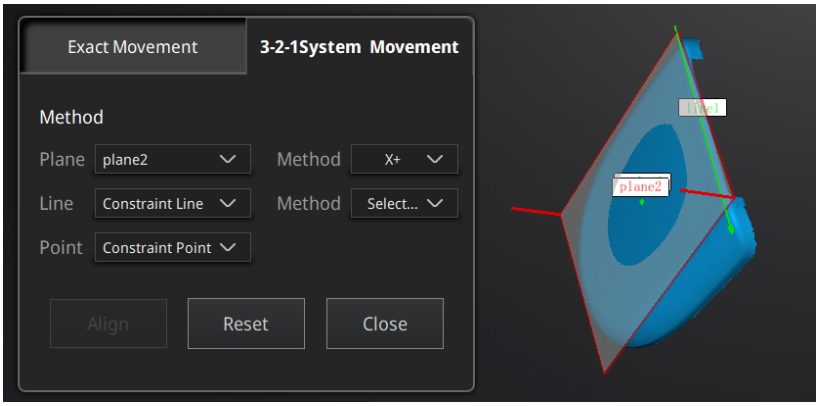


3-2-1 Movement

Prior to 3-2-1 movement, the creation of a plane, line not normal to the plane and point are required.

3-2-1 movement (plane-line-point alignment) aligns the data by deletion of the Degrees of Freedom.

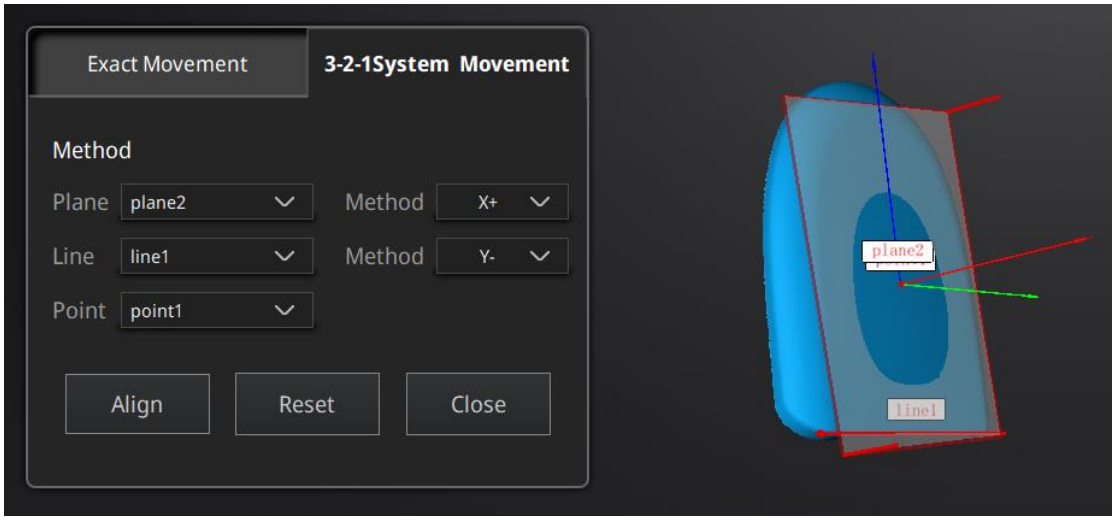
The arrows represent the global coordinate system, Red=X+, Green=Y+, Blue=Z+



3-2-1 Movement menu

- Select a Plane in the drop-down menu, match it to the first axis in the Method drop-down. The arrows on the corners of the plane represent the plane positive direction. The normal vector of the plane will match the axis direction.
- Select a Line in the drop-down menu, match it to the first axis in the Method drop-down. Beware the direction of the line to match it to the + or - axis. The projection of the line to the first plane will be parallel to the corresponding axis
- Select a Point in the drop-down menu. The data will be translated to match the point with the origin point (coordinate 0,0,0)

Click **Align** to perform the transformation.



Data after 3-2-1 movement

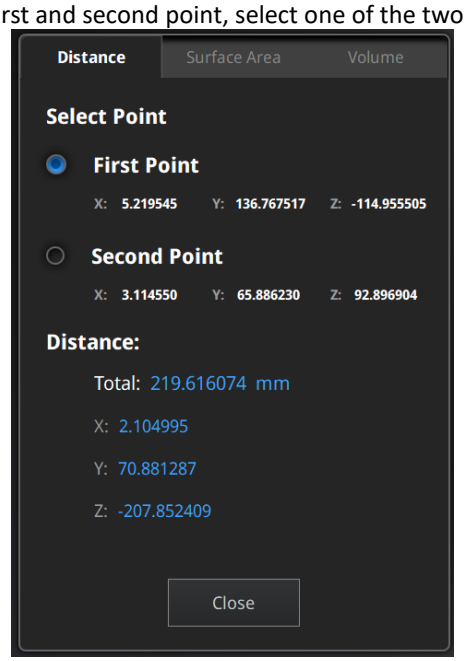
Click **Reset** to cancel.
Click **Apply** to confirm the transformation.

9.3.3. Measurement

Click  to display the menu, click again to close the menu.

DISTANCE

This tool calculates the distance between two points belonging to the surface of the data
Click on the data to pick the first and second point, select one of the two points to redo it.

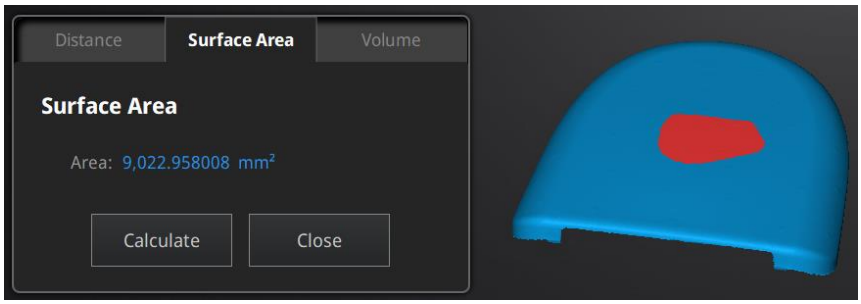


Distance menu

Total is the 3D distance, X, Y and Z are the projection of the segment to the respective planes.

SURFACE AREA

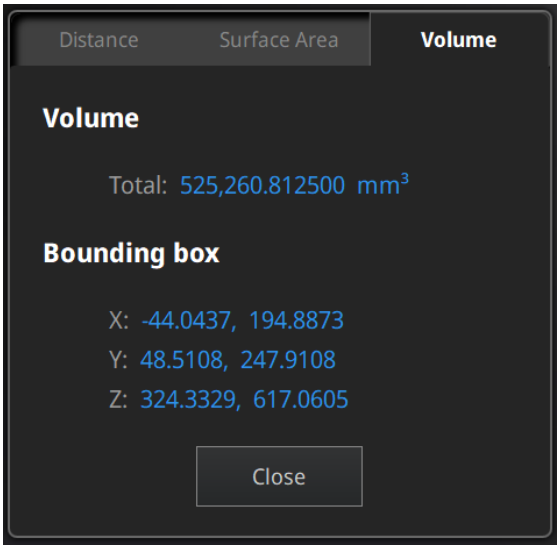
Press **Shift + LMB** to select an area, press **Ctrl + LMB** to unselect.
Ctrl + A to select all.
Click **Calculate** to display the Area value of the selected data in mm^2
Redo the selection and click calculate again to update



Surface Area menu

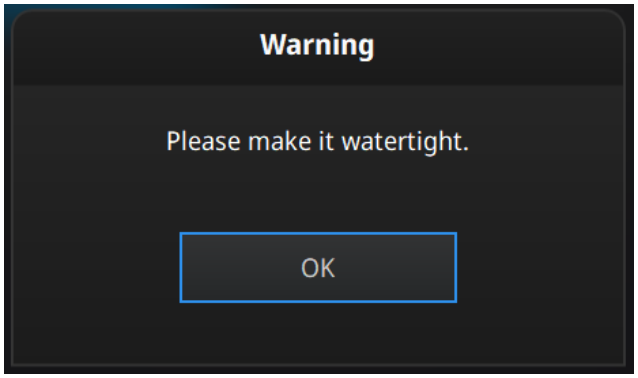
VOLUME

This tool calculates the volume contains in a watertight mesh.
It returns the volume in mm^3 and the coordinates of the smallest box, parallel to the global coordinates, containing all the data.



Volume menu

Prior to the calculation make sure the file is watertight (no holes).



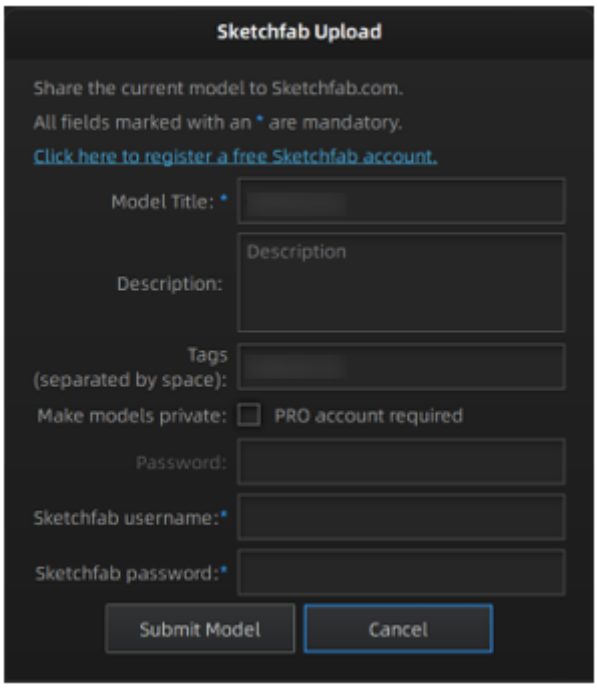
File not watertight alert

10. Share Data

Click  after mesh to share data to Sketchfab, it will show the dialog as below. A model title, username and user password are required. Register and view the shared model at http://sketchfab.com.

Notes:

1. Sketchfab basic plan accounts can only upload data less than 50M, while Pro plan account can share with a maximum of 200M.
2. Data is saved as .STL does NOT contain texture



11. Third-party Software

Install a third-party software— Geomagic Control X (V2020.0.3), Verisurf (Verisurf 2020, V20.1.11), Einsense Q (V1.3.2.3), Geomagic Design X (V2020.0.3), Geomagic Essentials (V1.0.0.34) and Solid Edge SHINING 3D Edition (2021 version) first. Get a license to activate it. Then after meshing data, click  to export data to the third-party software.

Note:

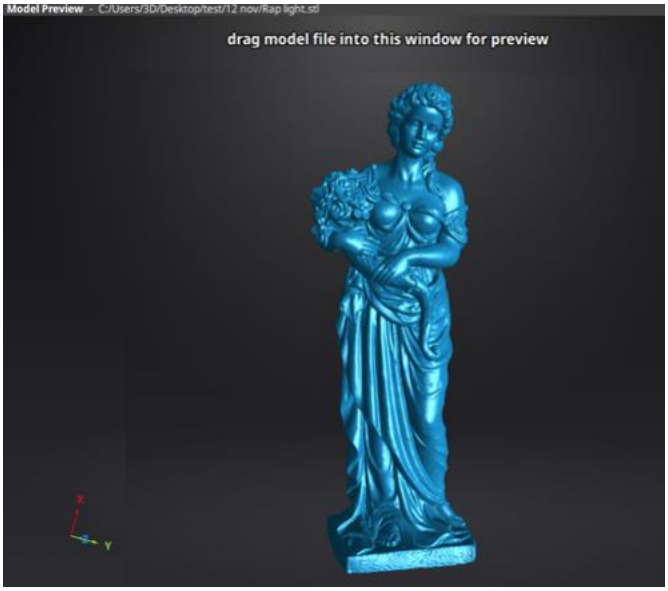
Generally we don't provide a third-party software together with the Scanner. To get one, contact us to buy it.

Geomagic Control X	Process stl data, create feature and measure feature data.
Verisurf	A 3D measurement platform for manufacturing inspection, tool building and reverse engineering.
Einsense Q	Perform deviation chromatography analysis, multi-layer cross-sectional deviation analysis based on stl data, provide intuitive cloud maps of deviation and chromatography accurate mapping distribution, and output formatted custom examining reports.
Geomagic Design X	Obtain stl data. Create facets or surfaces to finish reverse engineering.
Geomagic Essentials	Extract the feature you want, and create solid models and complex profiles to your CAD design environment.
Solid Edge SHINING 3D Edition	Provide reverse engineering, generative design (optional modular), and simulation (optional modular) with CAD functions in one platform.

12. Preview Model

Double click the short-cut 

on the desktop. Drag files into the window for preview. Manipulate the data with the same control as EXScan C software.



Model Preview

STL, OBJ, PLY, ASC, or 3MF can be loaded, files from 3rd party software might fail to be loaded. In this case we recommend Meshlab, a free mesh software editor, or upload to sketchfab.

Notes:
To load a OBJ textured file make sure to have the MTL and JPG files with the same name and in the same folder than the OBJ

13. Others

13.1. FAQ

1. What if no scan data when the turntable has rotated one circle?
Solution: Please make sure that the object won't block the mark points on the turntable. Or there will be no fringe pattern, while turntable will be still rotating. If the align mode is mark point, please make sure that the marks on the turntable are covered, so as not to affect the scanning. Make sure that in each single scan area has at least 4 points.

2. What if the alignment fails without markers when the turntable has rotated several circles?
Solution: Try to make sure there are at least 1/3 overlap between the current scan area and the previous scan area and the object surface should be featured. For objects which are symmetric and without rich features, using mark points or manual merger is recommended.

3. How to scan objects in transparent, semi-transparent or black?
Solution: Scan before spraying on the surface.

4. If the turntable is not moving, but with a humming sound, how to solve?
Solution: Disconnect power line and connect again in few seconds.

13.2. Safety Precautions

- Keep well-ventilation. Environment temperature shall below 40 Celsius degrees, and do not use the device under an environment with flammable or corrosive gases or another similar environment.
- Please grab and place gently in the proper position, and do not squeeze it. Prepare precautions like sunscreen, rain-proof, shock-proof and etc. No matter on sunny or rainy days.
- If the device could not function correctly, fixing the device by opening it by yourself is not allowed. The device shall be repaired by professional technicians or under their instruction.
- You should send the device to facilities with qualification for recycling it instead of dropping into the household garbage when it is scrapped.

14. Contact Us

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