SHINING 3D

EinScan Pro 2X V2 (2X 2020)

V4.0.0.9

User Manual

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Overview

About the User Manual

This user manual (hereinafter referred to as "the Manual") introduces the hardware configuration, software installation and software usage process of the EinScan Pro 2X V2 / EinScan Pro 2X 2020 Handheld 3D Scanner (hereinafter referred to as "the Scanner").

Symbol Convention

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.

Legal Disclaimer

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

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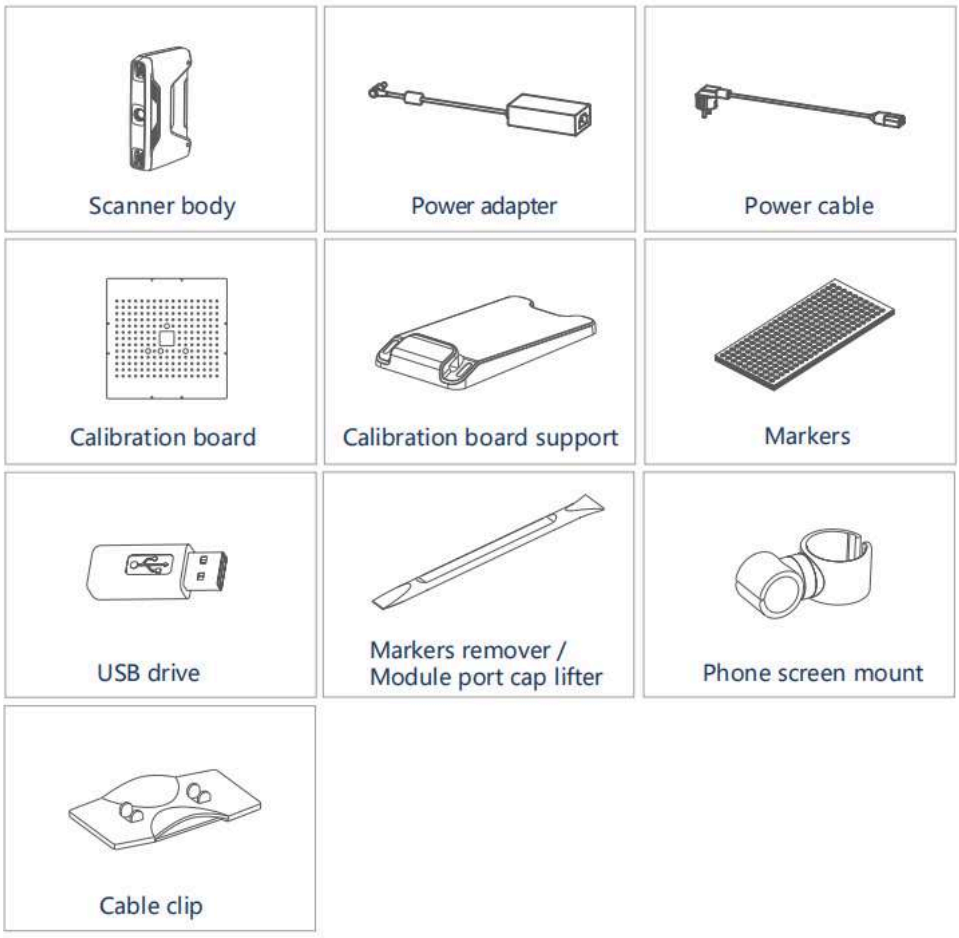
Device Introduction

EinScan Pro 2X V2 / EinScan Pro 2X 2020 builds upon the excellent performance of EinScan Pro 2X and focuses on handheld 3D scanning functionality. With two handheld modes, it meets the 3D scanning and modeling needs of small to medium-sized objects with various details and precision requirements. It balances detail and efficiency and is accompanied by user-friendly software, making it an ideal choice for handheld scanning users.

Appearance

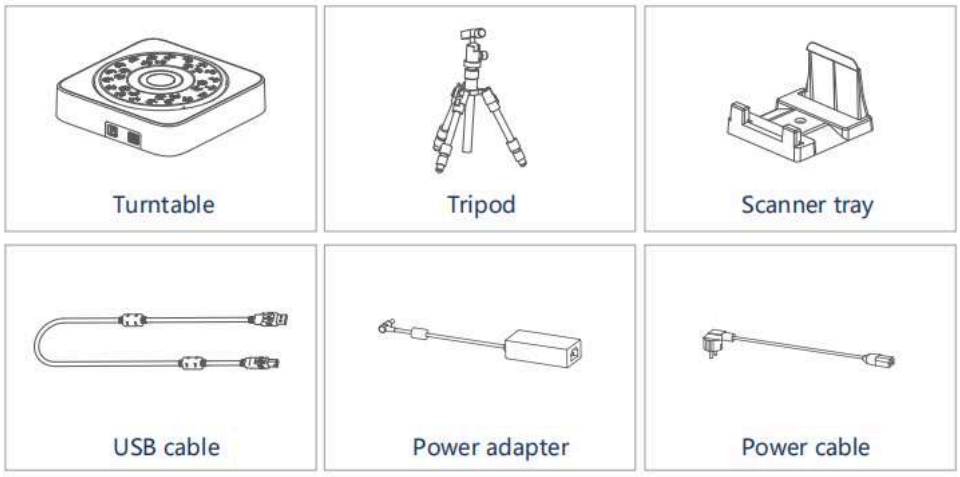
Parts

Standard Pack



> **Caution**
>
> Please only use water to clean the calibration board, avoid touching any corrosive liquid.

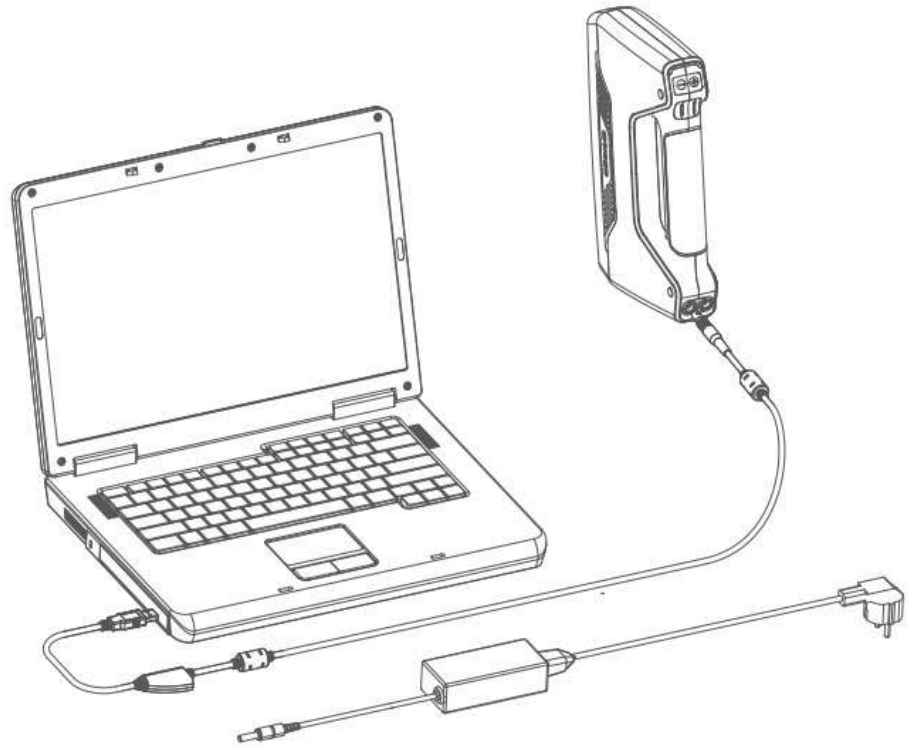
Industrial Pack (optional)



Color Pack (optional)

Connection

Turn on the device and connect it to the computer through USB 3.0 port.



> **Warning**
>
> - Make sure you are using the correct power adapter.
> - If you use a turntable, you need to connect the turntable power and data cables separately.

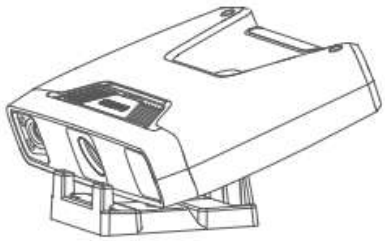
Add-ons

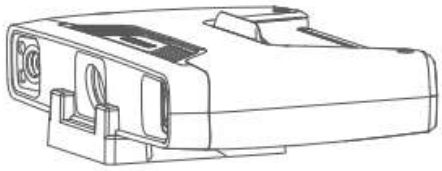
Industrial pack and color pack are available for purchase， suitable for series of scenarios：

- Compatible with multiple scanning modes, including **Fixed Scan**, **Handheld HD Scan** and **Handheld Rapid Scan**.
- Compatible with multiple align modes, including **Features**, **Markers**, **Texture alignment** (with the color pack applied) and **Hybrid alignment** modes.

Industrial Pack Installation

1. Remove the quick release plate from the tripod, fasten it onto the scanner tray, and fasten the scanner tray onto the tripod, then place the scanner on the tray.

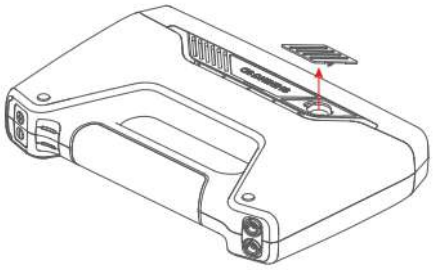




2. Plug the USB cable into the USB port of the turntable and connect it to the computer. Connect the power cable to the turntable.

Color Pack Installation

1. Hold the device upright and remove the USB port cover. The cover is located near the logo on the right side of the device.



2. Insert the Color Pack and lock it with a rotary lever.

Software Installation

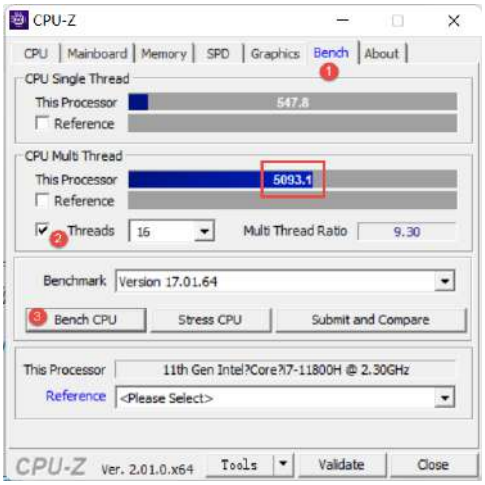
To use the scanner, you need to install the **EXScan Pro** software first (hereinafter referred to as "the Software").

Recommended PC configuration

Configuration	Recommendation
Operation System	Window 10 (64-bit) and Window 11 Pro (64-bit).
CPU	Intel® Core™ i7-11700 or above. **Note** Improper computer configuration or hardware issues will cause CPU performance degradation and affect the user experience, and it is recommended to use the CPU-Z tool to check CPU performance before starting scanning, for more see CPU.
Graphics Card	NVIDIA RTX 3060 or above, for more see GPU.
VRAM	8 GB or above.
RAM	32 GB or above.
USB	USB 3.0.
Resolution	1920 x 1080 100% 125% 3840 x 2160 100% 200% 3840 x 1080 100% 125% 150% 2560 x 1080 100% 125% 150%

CPU

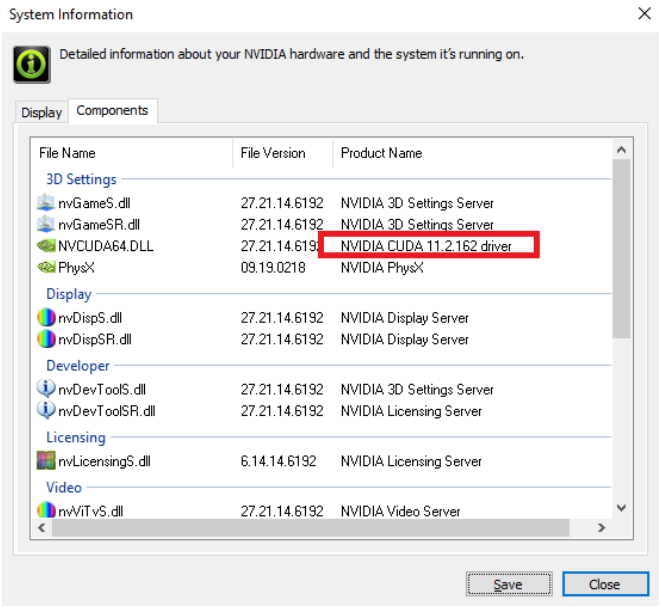
To install and launch CPU-Z, follow the steps in below figure to get a CPU multi thread performance score. A score of **4000** or more is required. The specific operational steps are shown in the image on the right.



GPU

It is necessary to use a NVIDIA[1] discrete graphics card for the scanner.

> **Note**
>
> The NVIDIA discrete graphics card should support **CUDA10.2** or above; you can use **NVIDIA Control Panel** > **Help** > **System information** > **Components** to get the CUDA version with follow steps.



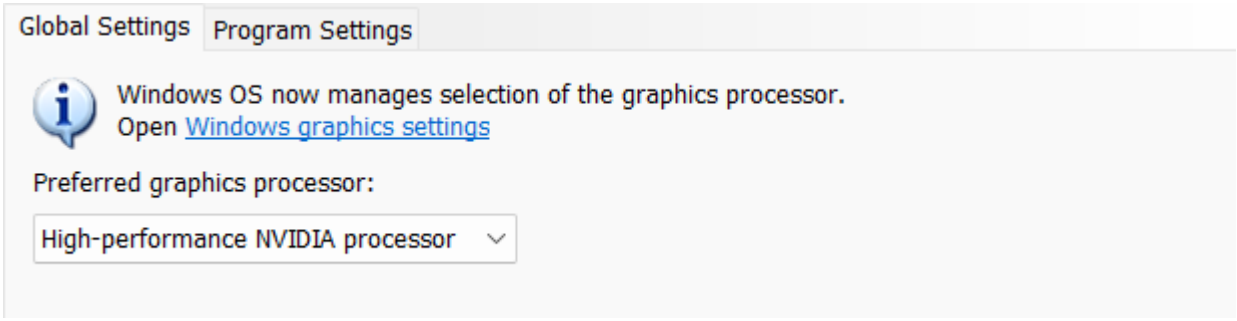
Use a discrete graphics card on desktop

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

Use a discrete graphics card on laptop

1. Launch **NVIDIA Control Panel** on your laptop.

2. In **3D Settings** > **Manage 3D Settings** > **Global Settings**, select **High-performance NVIDIA processor** and **Apply**.



Software Installation

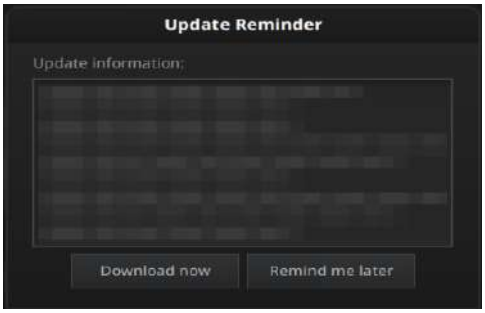
Please log in, select **Download Zone** > **Software Download**, choose the corresponding device for software download. You can also use the software from the USB drive included in the device's packaging for installation.

> ⚠ **Warning**
>
> - 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. ↩

Software Upgrade

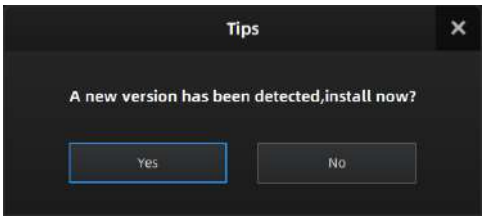
The software will be iterated in a timely manner, typically including the release of new features, issue fixes, or performance optimizations. It will release a new software version and provide a pop-up **Upgrade reminder** when you next start the software.



Note

It is highly recommended that you use the latest version of software, or a reminder will pop up immediately when you launch the software.

Click **Download now** will download the new installation package in the background, and once it finishes, it will provide a pop-up window, as shown in the right.
Click **Yes** to start the installation of the new version.



Caution

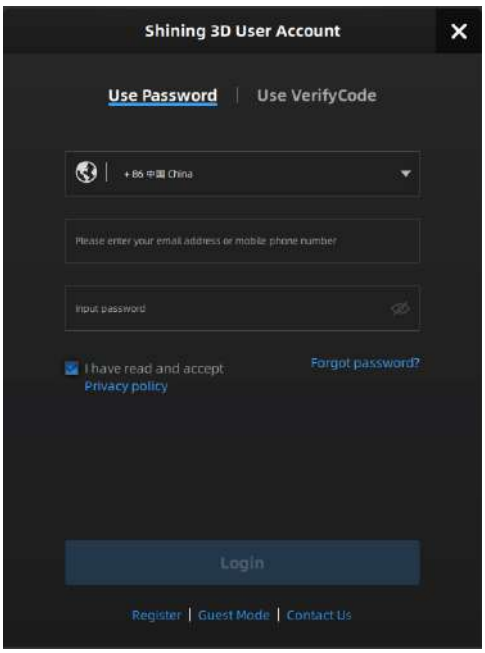
- During the download process, you can continue using the software, but **please do not close the software before the download has finished**.
- The software will be closed during the process of installation, **please save your projects properly before upgrading**.

Device Activation

Before using the device, please activate it first, and you can choose online activation or offline activation.

Online Activation

If your computer is currently connected to the internet, please enter your account information in the **Shining 3D Passport** pop-up window that appears when you start the software, and click **Login**. The device will then automatically complete the activation process.



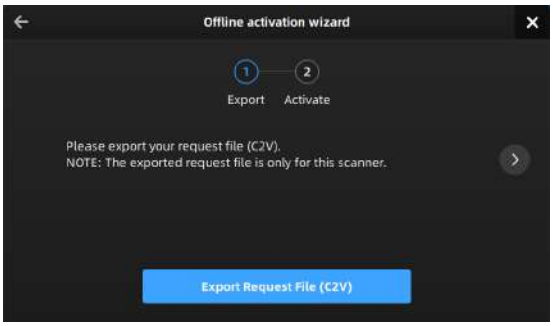
Note

- 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 Passport official website.
- Please read and then check **Privacy Policy** and **Terms of use**.

Offline Activation

If your computer is unable to connect to the internet, please select the offline activation method.

1.Connect scanner to the computer without network and export C2V file.



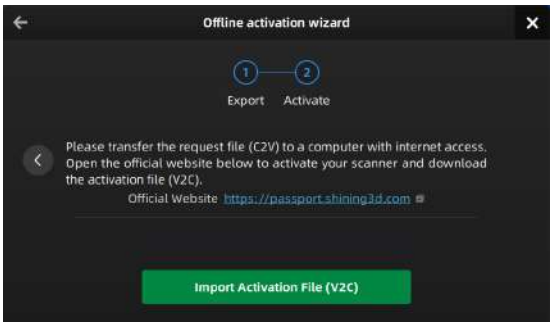
2.Copy the C2V file to the other computer connected to Internet.

3.Log in Shining 3D Passport official website, upload your C2V file in **offline activation** page and complete the information of activation, you can then download the V2C file.

Note

If you are a new user, please register a Shining 3D Passport account first.

4.Copy the V2C file to the computer without no network and import the file into the software.



Note

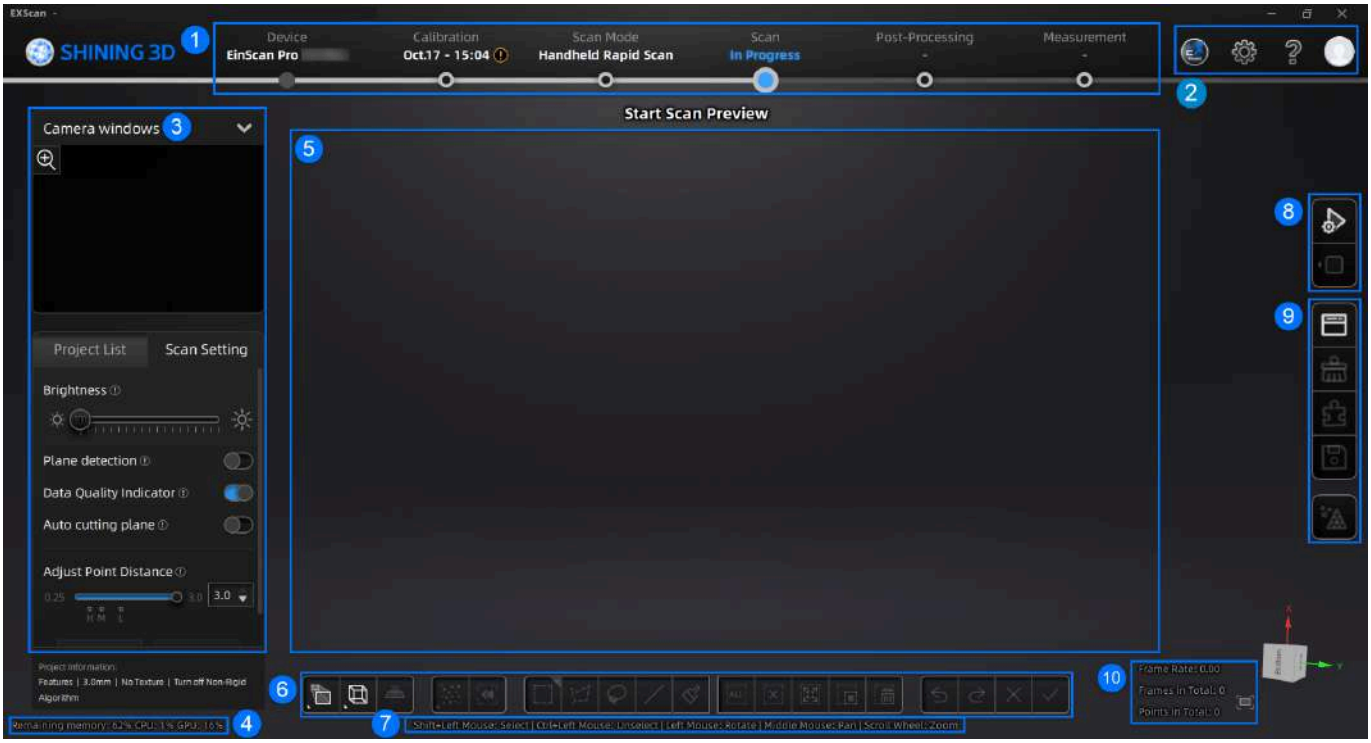
If you fail to activate the device in neither way, please contact your supplier or our support team.

Software Interface

After installing, opening the software, and start scanning, you can see the software interface as shown in the following figure.

Note

If an error occurs during the software usage, it is recommended to troubleshoot based on the error code information. You can also contact technical support and provide the error code for assistance.



Serial Number	Function	Description
1	Navigation Bar	• **Device**: display the device name when it is online, or you can click to reconnect when it is offline. • **Calibration**: display the calibration time and click to enter the **Calibration** step. • Scan Mode: choose the **scan mode**. • **Scan**: Enter the scan process. • **Post-Processing**: enter the Post-Processing procedure after generating point clouds, including mesh model and mesh editing. • **Measurement**: measure your model in the software.

Serial Number	Function	Description

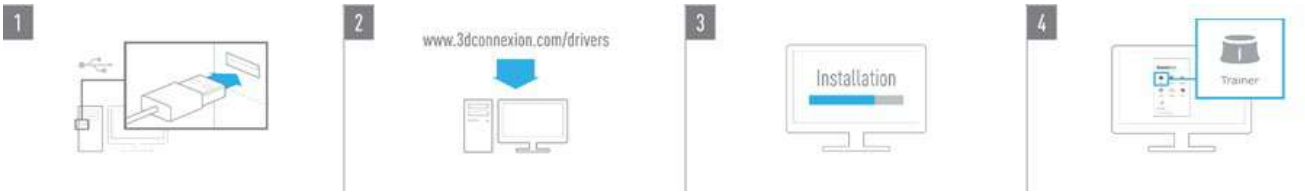
2	Settings and Feedback	**EXModel** (**Only supported for the software version of V4.0.0.8 or above**)
		• If you have not installed the EXModel, click this button to view the relevant information and our technical support contact.
		• If you have installed the EXModel, click this button to directly start up the software.
		
		Settings
		• General Settings:
		  • Compatible with 3D mouse: Open (default) to support connect and use of 3D mouse and related functions, including rotation axis and shortcuts.
		  • Mapping Assistant: Open (default) to show the entrance to the Texture Mapper software.
		• Fixed Scan Settings:
		  • Real-time recognition: Open (as default) to display the real time marker recognition by the camera window.
		  • Data editing after scanning: Open (default) to automatically enter the editing interface after each scan.
		• Factory Default: Click **Recover** to recover all settings to its original status and the software will restart itself.
		
		Help
		• About: display device and software information.
		• System Diagnose: switch to this tab to automatically detect **Memory**, **Graphics card**, **Remaining disk space**, etc.; click **Refresh** to trigger detection again.
		• Support: provide the entrance to check user manuals and start up the Teamviewer (for remote assistance), and contact information for technical support.
		
		Shining 3D Passport: provide the entrance to login/logout, **My Shining 3D account**, Official Website, Shining 3D Digital Cloud and official Facebook account page.

Serial Number	Function	Description
3	Scanning Settings	• Camera Window: accurately adjust the parameters by previewing the actual scene through the camera window in the scanning process. • Project Group: project group management module, refer to **Project and Project Group for more information.** • **Scanning parameters: set scanning parameters, refer to Scanning Settings for more information.**
4	Remaining Memory/CPU/GPU	• **Remaining memory**: display the remaining memory space. • **CPU**: the software program provides a prompt message indicating the amount of computer memory it occupies during runtime. If the program's memory usage is excessively high, it is recommended to close other non-scanner software and wait patiently. • **GPU**： Graphics card usage.
5	Previewing/Scanning Window	Window for viewing the pre-scan results and the scanned model effects in this window.
6	Data Editing Toolbar	Please refer to **Data Editing**.
7	Shortcuts	Quickly move the model, adjust the angle and select scanning data through shortcut keys.
8	Scanning&Generating Point Clouds	Please refer to **Scan**.
9	Side Toolbar	Please refer to right function panel.
10	Other Information	Display the **Frame Rate**, **Frame in Total** and **Points in Total** of the current project.

3D Mouse

This software is compatible with the 3DConnexion CadMouse. You can use the 3Dconnexion CadMouse to quickly rotate, pan, zoom, and perform other shortcut operations on the model in a 3D scene. Please refer to 3Dconnexion user manual for more information.

Mouse Connection



Steps:

1. Take out the 3Dconnexion CadMouse from its packaging and insert the connecting cable into a USB port on your computer.
2. Open the official website for downloading the software.
3. Download and install the latest version of the 3Dconnexion software.
4. Run the software and click **Trainer** for quick training and guide.

Software Interface

Icon	Description
	Click to open the 3Dconnexion quick training and guide.
	Click to view the 3Dconnexion product user manual.
	Click to open the settings panel and customize the button functions.
	Use 3Dconnexion Viewer to view 3D models. Supports STP, STEP, IGS, IGES, OBJ, STL, PLY, JT, and GLTF formats.
	Create high-resolution image collages using 3Dconnexion Collage with SpaceMouse.
	Practice using this software and mouse operations with sample models.
	Register your product after installing the software to enjoy 3Dconnexion's services.
	Watch instructional videos.
	Provide feedback to 3Dconnexion.

Button Description

Main Panel


Color Display
3Dconnexion Keys
CustomView Buttons
Control Cap
Rotation Toggle Button
Keyboard Modifiers
QuickView Buttons
Menu Button
Fit Button

Button	Description
Color Display Screen	/
Number Buttons	12 additional programmable function buttons. You can customize their functions using the 3Dconnexion settings. Refer to **Number Buttons** for specific operations.
Custom View Button	In this scanning software, long press to save the current view of the model (angle, position, zoom, etc.), or single click to switch to the saved view.
Control Buttons	Used to manipulate the 3D model through actions like pushing, pulling, and twisting. Refer to **Control Buttons** for specific operations.
Rotation Toggle Button	Press once to lock rotation around all axes.
Keyboard Modifiers	Eight keyboard modifier buttons that function similar to their counterparts on a regular keyboard.
Quick View Buttons	Five quick view buttons that help you switch the drawing or 3D model to desired views. These buttons also have secondary functions that can be accessed by long press. You can customize the long press and short press functions in the 3Dconnexion settings.
Menu Button	Quickly brings up the menu for customizing button functions.
Fit Button	Automatically fits the 3D model to the center of the screen.

Number Buttons

Icon	Shortcut	Function
1	^ Ctrl + M	Toggle selection of markers/point clouds (only works in **Scan**).
2	^ Ctrl + G	Toggle selection of penetration/non-penetration (only works in **Post-processing**).
3	^ Ctrl + T	Toggle selection mode for data. For more selection modes, please refer to **Data Editing**.
4	^ Ctrl + A	Select all data.
5	^ Ctrl + C	Cancel selection.
6	^ Ctrl + R	Connected components.
7	^ Ctrl + I	Invert selection.
8	⌦ Del	Delete selection.
9	^ Ctrl + Z	Undo.
10	^ Ctrl + ⇧ Shift + Z	Cancel editing.
11	Enter ⏎	Confirm editing.
12	/	/

Control Buttons

Icon	Description
	Tilt left or right button to adjust the model on the Z-axis.
	Rotate button to adjust the model on the Y-axis.
	Tilt forward or backward button to adjust the model on the X-axis.
	Push forward or pull backward button to zoom in or out the model.
	Push up or push down button to move the model up or down.
	Push left or push right button to move the model left or right.

Calibration

Device Calibration

With **calibration**, the scanner parameters are recalculated, which not only ensures the accuracy of the scanner, but also improves the quality of scanning. Thus, it is recommended to calibrate the device before each use.

Calibration is required under the following conditions:

- When the scanner is used for the first time or there are more than 7 days since last calibration.
- 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.

Note

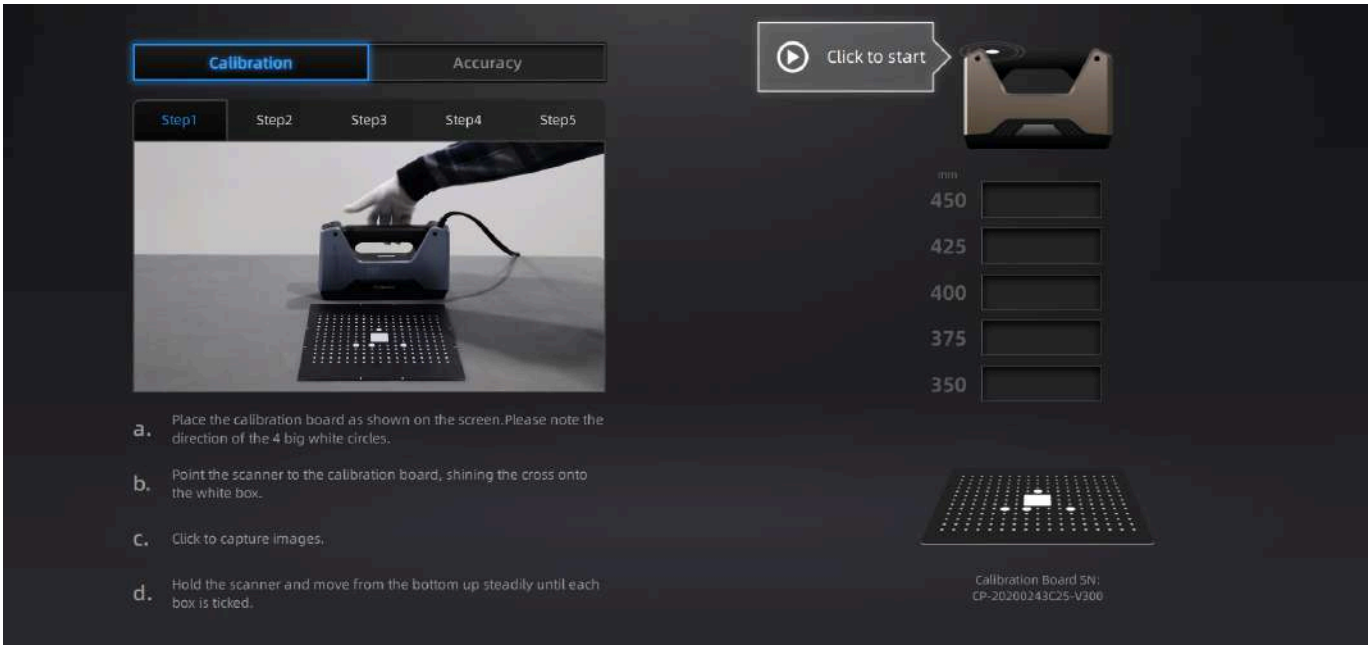
If the current device has not been calibrated for more than 14 days, a yellow exclamation mark will appear next to the calibration step button in the navigation bar. If it has been more than 20 days without calibration, a pop-up window will appear on this interface with the option to **Calibrate now** or set a reminder for **7 days later**.

Warning

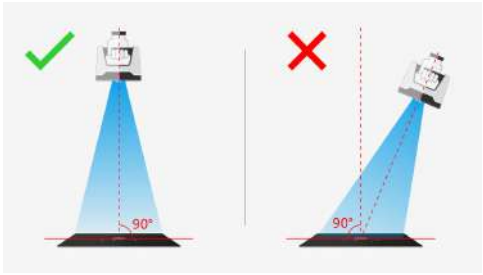
- The calibration board is matched to the device. Doing the calibration with an incorrect calibration board will fail to generate good scan data or optimum accuracy.
- Always make sure that both sides of the calibration board are clean and free of scratches.
- Do not place heavy objects or sundries on 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.

Specific calibration steps are shown as follows:

During the calibration process, please follow the software guide to place the calibration board in five different orientations and capture five images at different heights of the device.



1.Place the calibration board with the front side (black background with white dots) facing up, flat on the table, and align it in the same orientation as shown in the diagram.



2.After picking up the scanner, move it above the calibration board. The scanner should be positioned vertically, facing directly towards the table, in the same direction as shown in the diagram. Ensure that the crosshair projected by the scanner is positioned within the white square at the center of the calibration board.

3.Click **Click to start** or press button on the scanner to start calibration.

4.During the data collection process, you need to move the scanner up and down (ensuring that the crosshair remains within the white square) until the distance indicator on the software interface shows all green. Once the data collection is complete, the software will automatically exit the data collection mode, proceed to the next stage, and emit a beep sound as a notification.

> **Note**
>
> Lift the scanner up when the interface shows **too close**; move the scanner down when the interface shows **too far**.

5.Please continue to follow the instructions provided by the software to complete the subsequent steps.

> **Warning**
>
> - For positions 2 to 5, you will need to use the calibration board stand.
> - You need to click button again to start capturing images for the new position.
> - The scanner should not rotate with the calibration board, and it should remain in a vertical position throughout the scanning process.

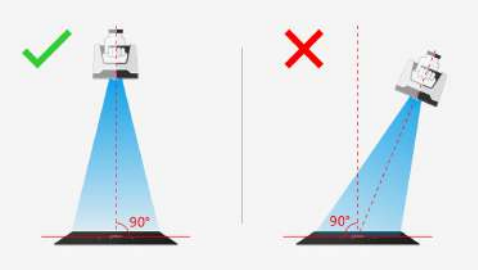
> **Note**
>
> - If the calibration fails, please click **recalculate**.
> - If you cannot get the pass result anyway, please contact your supplier or our support team.

Accuracy Evaluation

When encountering issues such as failure to recognize markers, frequent prompts of tracking loss, or spelling errors during the scanning process, it is recommended to perform an accuracy evaluation to determine if there is excessive error.

> **Note**
>
> If the detected error is greater than 0.05 mm, it is recommended to perform a recalibration.

1.Place the calibration board with the front side (black background with white dots) facing up, flat on the table, and align it in the same orientation as shown in the diagram.



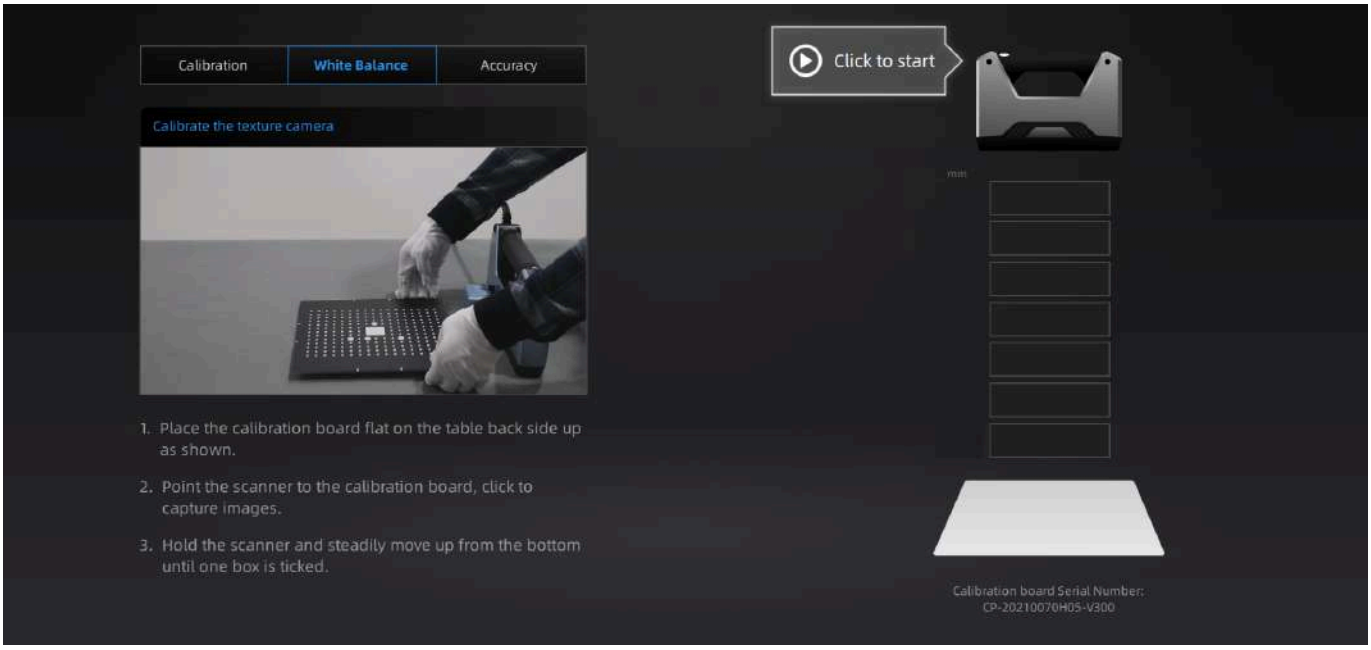
2.After picking up the scanner, move it above the calibration board. The scanner should be positioned vertically, facing directly towards the table, in the same direction as shown in the diagram. Ensure that the crosshair projected by the scanner is positioned within the white square at the center of the calibration board.

3.Click **Click to start** or press button on the scanner to start calibration.

4.During the data collection process, you need to move the scanner up and down (ensuring that the crosshair remains within the white square) until the distance indicator on the software interface shows all green.

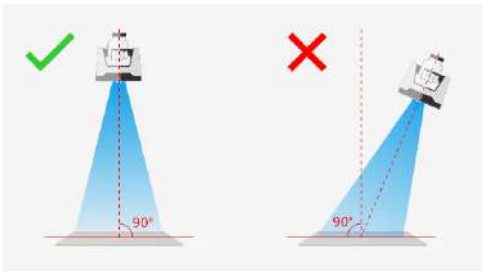
White Balance

If the color pack is applied, you need to calibrate white balance, in order to calibrate the texture camera for the first use; when the texture scanning effect is not satisfactory in the subsequent scan, it is recommended to calibrate again.



Specific white balance calibration steps are shown as follows:

1.Place the calibration board with the white side facing up, flat on the table, and align it in the same orientation as shown in the diagram.



2.Point the scanner to the calibration board, and click **Click to start** or press button on the scanner to start calibration.

3.Hold the scanner and steadily move up from the bottom until one box is ticked.

Scanning

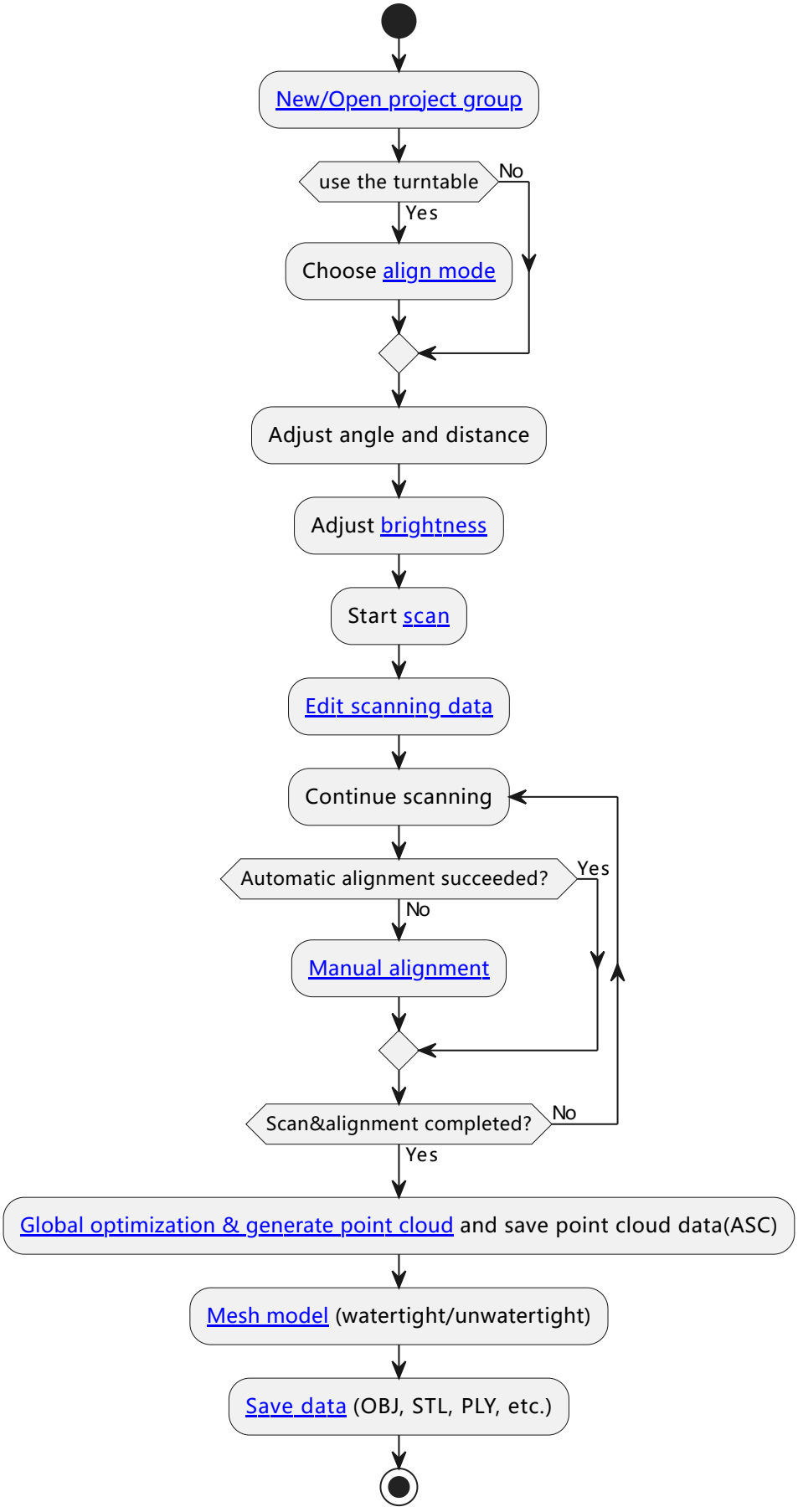
Scanning Procedure

Three scan modes are supported: **Fixed Scan**、**Handheld HD Scan** and **Handheld Rapid Scan**.

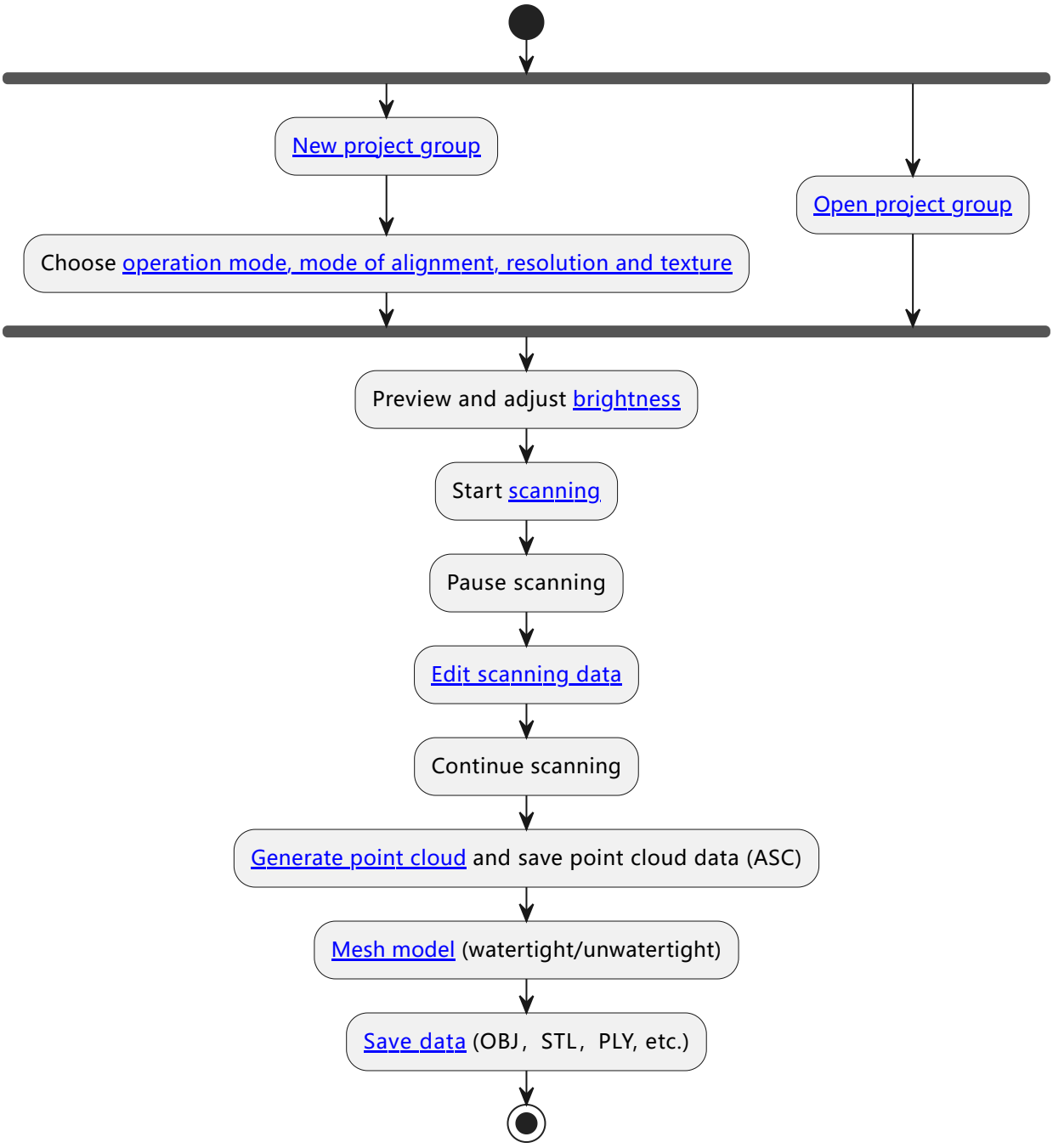
> **Note**
>
> Please refer to official website for more information about scanning modes.

Basic scan&alignment procedure is shown as follows.

Fixed Scan


New/Open project group
use the turntable
No
Yes
Choose align mode
Adjust angle and distance
Adjust brightness
Start scan
Edit scanning data
Continue scanning
Automatic alignment succeeded?
Yes
No
Manual alignment
Scan&alignment completed?
No
Yes
Global optimization & generate point cloud and save point cloud data(ASC)
Mesh model (watertight/unwatertight)
Save data (OBJ, STL, PLY, etc.)

Handheld HD Scan / Handheld Rapid Scan



Preparation

Before conducting a scan, there are some preparations that need to be done in order to achieve a better scanning experience.

Note

Objects that are **not recommended** for scanning include:

- (In the **Fixed Scan** mode) Moving or vibrating objects, which cause the shape of object changed during scanning process.
- Soft material object that cannot be hung.
- Lattice structures with many small deep holes.

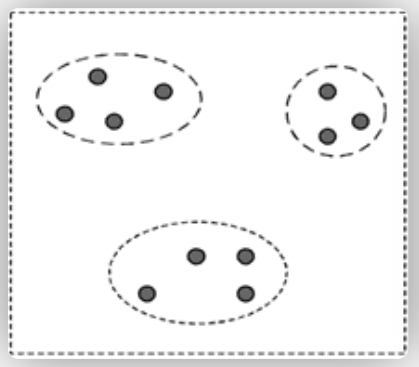
For Markers

If the features of the scanned object are not rich enough, markers (3 mm) can be pasted on the object for scanning alignment.

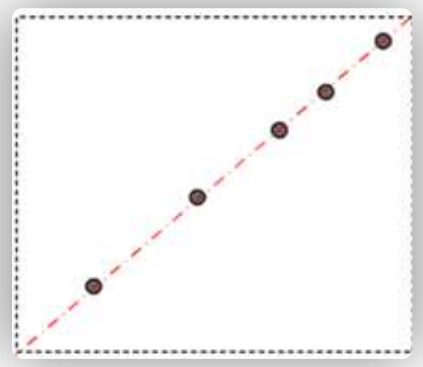
Please pay attention to the following details when pasting the markers:

- 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.
- 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.

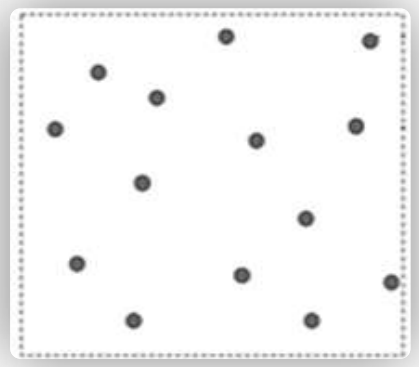
Examples of pasting markers are as follows:



Wrong example 1: manual grouping markers



Wrong example 2: markers are placed in line



Correct example

For other special objects

Object	Preparation	Notes while scanning
Transparent, shiny, reflective or black objects	Use washable or vanishing scanning spray.	Scan as normal after spraying.
Thin wall objects	Place markers on and around the objects and select **Markers** mode.	Scan as normal after preparations.

Project and Project Group

Project Group

Create or open a **project group** before scanning.

> **Note**
>
> Project group is the standard file structure of the software. It contains one project or more. Each project contains the scan data of its own.

Project group is mainly used in the following scenarios:

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

> **Note**
>
> The "Scenario" mentioned above refers to the situation where all scanned objects are located within the same environment or setting.

New Project Group

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

- In the navigation bar, enter the **Scan Mode** step and select the scan mode. In the pop-up window, click on **New project group**. In the file dialog that appears, enter the **name** and **path** for the project group, then click **Confirm**. All data related to this project group will be saved to the specified path.
- In the **Scan** step interface, click the  **Project Group** button in the right sidebar. In the pop-up window, click **New project group**. The following steps are the same as mentioned above.

> **Note**
>
> - The default name for the project group is the content entered during the last creation of the project group, followed by a number (if it is the first time, the default name is ProjectGroup_X). The default save path is the path selected during the last creation of the project group (if it is the first time, it will be saved to the desktop by default).
> - If the remaining disk space in the selected path is less than 50GB, it is recommended to switch to another save path to avoid potential issues during subsequent scans.

Additionally, you can also **create an individual project within a project group**:

In the **Scan** step interface, click the  **New Project** button in the left **Project List** panel. In the pop-up **New Project** window, configure the project settings and click **Confirm**. All data related to this project will be saved in the current project group's path.

Open Project Group

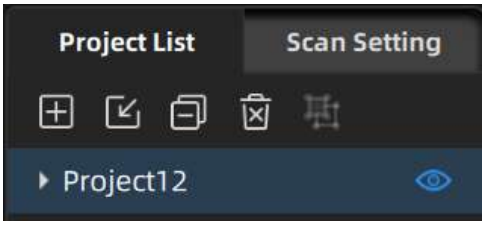
> **Note**
>
> The current project group (if there is) will be saved automatically.

- In the navigation bar, enter the **Scan Mode** step and select the scan mode. In the pop-up window, click on **Open project group**. In the file dialog that appears, choose the specified project group or search for it, then click **Open**.

- In the **Scan** step interface, click the **Project Group** button in the right sidebar. In the pop-up window, click **Open project group**. The following steps are the same as mentioned above.

Project

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



Icon	Function	Description	Notes
	Create new project	Click this button will create a new project within the current project group.	You can only create a new project when a device is connected. The last project in the project list is the current project, and only the current project can continue scanning.
	Open project	Click this button will open the selected project within the current project groups.	/
	Remove project	Click this button will remove the selected project from the current project group.	This operation will keep the data of the selected project and you can still open it again.
	Delete project	Click this button will delete the selected project and its data.	This operation will permanently delete the data of the selected project from your computer and cannot be recovered.
/	Project visibility	Click this button will hide/show the point cloud or markers of the current project. In the handheld scan mode, you can also double-click on different projects to switch their visibility.	/

Project Settings

After creating a new project group, please configure the project group.
Different scanning modes have different settings, including operation mode, alignment mode, resolution, texture, and rigid alignment.

Fixed Scan

Fixed scan is suitable for capturing high-detail and high-accuracy data of small to medium-sized objects.
In this mode, both industrial pack and color pack are available.

Texture Scan

Texture	Icon	Description
Texture Scan		During the scanning process, you can simultaneously capture texture information to assign color to the data. **Note** If you want to choose the **texture scan**, please ensure that a color pack is installed.
Non-texture Scan		Get the texture without color.

Note

Refer to **Scan Settings** for more related settings, including **alignment mode**, **turntable**, etc.

Handheld HD Scan

Handheld HD scanning is suitable for capturing high-detail and high-accuracy data.
In this mode, color pack is available.

Operation Mode

Operation mode	Description
Normal	The scan speed is 10 fps.
ROI (Region of Interest)	The scan speed is also 10 fps, but the details are finer than the **Normal** mode. The scan range of this mode is around half of that of the **Normal** mode. The scan speed is also relatively slower. This mode is suitable for scanning relatively small objects with rich features on the surface (not suitable for size over 1 meter). And it is not suggested to use markers under this mode, as the density of the markers may be high, which will result in lots of markers holes on the scan result.

Select Mode of Alignment

Align mode	Description
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.
Texture alignment	Texture alignment is a technique that utilizes the surface texture features of the scanned object to automatically complete the alignment and merging process. It is suitable for objects with rich surface patterns but lacking intricate and varied geometric features. **Note** If you want to choose the **texture scan**, please ensure that a color pack is installed.
Markers	Automatic stitching can be achieved by using markers attached to the surface of the scanned object, suitable for objects with limited geometric features or for scenarios that require high accuracy.
Hybrid alignment	The software can automatically switch between feature-based stitching and marker-based stitching (using the global markers file) during the scanning process based on whether markers are attached to the scanned object. For areas where features are prone to misalignment, markers can be attached (minimum of 4) for stitching purposes. This method is suitable for objects with localized features that are prone to misalignment.

Select Resolution

Resolution	Description
High	0.2 mm
Medium	0.5 mm
Low	2.0 mm

Texture Scan

If you want to choose the **texture scan**, please ensure that a color pack is installed, and it can not be disabled under the texture alignment mode.

Handheld Rapid Scan

Handheld rapid scanning offers a faster scanning speed. It is suitable for scanning large-sized objects. But the tradeoff is lower detail and accuracy.
In this mode, color pack is available.

Select Mode of Alignment

Align mode	Description
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.
Texture alignment	Texture alignment is a technique that utilizes the surface texture features of the scanned object to automatically complete the alignment and merging process. It is suitable for objects with rich surface patterns but lacking intricate and varied geometric features. **Note** If you want to choose the **texture scan**, please ensure that a color pack is installed.
Markers	Automatic stitching can be achieved by using markers attached to the surface of the scanned object, suitable for objects with limited geometric features or for scenarios that require high accuracy.
Hybrid alignment	The software can automatically switch between feature-based stitching and marker-based stitching (using the global markers file) during the scanning process based on whether markers are attached to the scanned object. For areas where features are prone to misalignment, markers can be attached (minimum of 4) for stitching purposes. This method is suitable for objects with localized features that are prone to misalignment.

Select Resolution

Resolution	Description
High	0.5 mm
Medium	1.0 mm
Low	1.5 mm

Texture Scan

If you want to choose the **texture scan**, please ensure that a color pack is installed, and it can not be disabled under the texture alignment mode.

Non-rigid algorithm

Support scanning people or objects that will slightly change shape during the scanning process, which helps improve the scanning smoothness.

> **Note**
>
> - Under static object scanning scenarios, it is not recommended to enable this feature.
> - Not applicable with **Marker** or **Hybrid Alignment** mode.

Start Scanning

Scanning Settings

After entering the **Scan** step interface, you can perform scan settings on the left side of the interface.

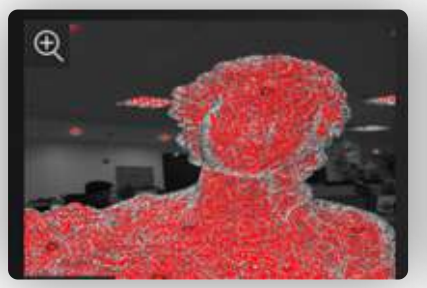
Fixed Scan

- Camera Window

  Preview the real-time image captured by the scanner camera. Previewing the effect through the camera window can assist in scanning data.

- Brightness

  Drag the slider to adjust the brightness for different material or color of the object to get better scanning data. Please ensure that the object is clearly visible within the camera window and that there is no excessive red color displayed on the object.



Brightness is too high

Brightness is too low

Brightness is normal

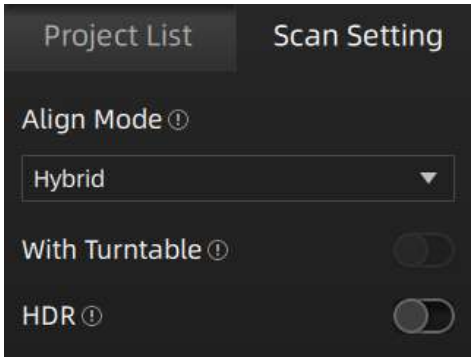
- Align Mode

  Support **Hybrid** (as default), **Turntable Alignment**, **Turntable Coded Targets**, **Markers** and **Global Markers** (you can open a global markers file or directly scan markers) modes.

> **Note**
>
> Under the **Global Markers** mode, please **Scan Markers** first and proceed with **Global Optimization**, and then switch to **Scan Point Clouds**. After scanning the point cloud, you can not switch to scanning global markers.

- With Turntable (optional)

  With this feature being enabled, the turntable can be used to help scanning.



  - Please select Align Mode (**Hybrid** is not supported) first before choosing to use the turntable. After scanning a full circle, you can reselect the stitching mode.
  - Number of rotations: Before scanning, you can set the number of rotations for the turntable (8 ~ 180), with a default value of 8.
  - Use existed verify data (only supported in the **Turntable Alignment** mode): when enabled, the previous axis data will be used directly for alignment. If not enabled, recalibration is required before scanning and alignment. If there is no movement of the scanned object or turntable, you can enable this feature. However, if there is movement of the scanned object or turntable, please disable this feature and recalibrate the data.

- HDR

  With this feature being enabled, the scanning will be performed with a preset brightness level, and manual adjustment of the scanning brightness will not be possible. This mode is suitable for scanning objects that have a distinct contrast between black and white.

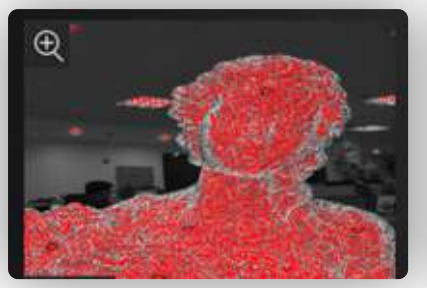
Handheld HD Scan / Handheld Rapid Scan

- Camera Window

  Preview the real-time image captured by the scanner camera. Previewing the effect through the camera window can assist in scanning data.

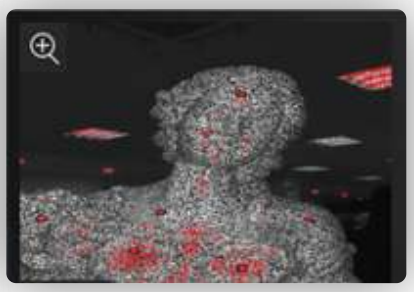
- Brightness

  Drag the slider to adjust the brightness for different material or color of the object to get better scanning data. Please ensure that the object is clearly visible within the camera window and that there is no excessive red color displayed on the object.



Brightness is too high

Brightness is too low



Brightness is normal

- Plane Detection

  With this feature being enabled, the software will automatically detect and erase the plane where the object is located. This helps reduce the chances of misaligning planes or objects with distinct features.

  > **Note**
  >
  > - If you need to scan objects that are flat or have few features, it is recommended to paste markers for helping alignment.
  > - If the plane where the object is located can be scanned and affect the alignment effect, it is recommended to use the **Auto Cutting Plane** feature.

- Data Quality Indicator

  With this feature being enabled, the scanning data will be displayed in the form of quality chromatography.

  - Green indicates high-quality scanning data at that location.
  - Orange indicates low-quality scanning data at that location, indicating insufficient scanning. Further scanning is needed. Otherwise, insufficiently scanned data may disappear or display abnormally after data processing.

  > **Note**
  >
  > By default, this feature is disabled for texture scanning, while it is enabled for other scanning modes.

- Auto Cutting Plane

  With this feature being enabled, during the scanning preview, the software will intelligently and in real-time identify the largest plane and mark it with a blue-green grid. The data below the marked plane will not be shown.

> **Note**
>
> - The unique plane marked during the scanning preview can change in real-time. The plane marked as the last one at the end of the scanning preview will be considered.
> - This feature is disabled by default, and plane detection is enabled by default.
> - If the **Cutting Plane** feature is used, this feature cannot be used.

- Adjust Point Distance

  To modify the point distance for the current single project, you can drag the slider or click the up/down arrow buttons: the default value is set to the point distance when creating a project group. The point distance range for both Handheld HD Scan and Handheld Rapid Scan is 0.2 mm to 3.0 mm.

> **Note**
>
> - If the number of projects in the current project group is greater than 1, this feature is not available.
> - If the point distance is too small, it may result in insufficient memory for generating the mesh model or point cloud. It is recommended to modify the point distance based on the prompts in the pop-up window.

Scanning

After adjusting scanning settings, you can proceed with scanning the objects.

> **Note**
>
> - In the **Fixed Scan** mode, before starting the scanning process, please place the object to be scanned in the appropriate position: check the black cross projected onto the object in the camera viewport, adjust the position of the object until the cross is within the red rectangular frame in the camera viewport; if the cross is to the left of the red rectangular frame, it indicates that the object is too far away, or the object is too close.
> - The scanning data in the **Scan** step can be directly imported in the **Measurement** step for create feature, alignment or measurement.

Switch Scanning Status

You can switch the scanning status by clicking the buttons in the right side bar.

Function	Icon	Description
	Preview	Preview scanning effect. **Note** In this mode, the scanning data will not be saved and scan parameters can be adjusted according to the scanning effect.
	Start Scan	Scan the objects. **Note** • In this mode, the scanning data will be saved. • In the **Fixed Scan** mode, you can press `Space` to start scanning.
	Pause Scan	After starting scanning, click this button to pause scanning.
	Delete Your Scan	After start scanning, click this button to clear all point cloud data.
	Stop & Delete	In the process of turntable scanning, click this button to end this scan and delete the data.

Note

In the **Marker Alignment** mode, if the data cannot be collected, please check whether the number of markers in each scanning area is not less than 4 or change the align mode.

Generate Point Cloud

After finishing the scan, you can edit the data or click **Optimizing and Generating Point Cloud**, or hover the cursor over the left expand button and click **Generate Point Cloud** in the expand bar.

Note

- The time it takes to generate point cloud depends on the data size of your project and the hardware configuration of your PC.
- If it prompts that the running memory is less than 2 GB, please close other softwares first.

Data Editing

When you start Scanning, you can conduct Data Editing in **Scan** to generate accurate point clouds. You can also use other functions.

Bottom Panel

You can use following tools to edit data after the scanning paused or the point cloud is generated.

Icon	Function	Instruction
	Perspective View	The object appears larger when closer, and smaller when farther away.
	Orthogonal View	The object does not appear larger when closer, and smaller when farther away.
	Multi View	Observe the data from 6 different views.
	Cutting Plane	Create a Cutting Plane to do quick cut.
	Point Cloud Edit	In this mode, a point cloud is chosen. Click it again and you can switch to the **Edit Markers** mode.(This mode is enabled by default if there is a point cloud.) **Note** • After switching to this mode, the selected markers data (if any) will be retained to facilitate synchronized deletion and other editing operations. • Point cloud data under the cutting plane cannot be edited. • Multiple undo or redo operations are supported.
	Edit Markers	In this mode, the selection tool is used to only select markers data. Clicking this button again will switch to the **Point Cloud Edit** mode (assuming there is point cloud data available), and by default, this button is in **Point Cloud Edit** mode. **Note** • In the **Markers** or **Hybrid Alignment** mode, this function can be used. • After switching to this mode, the selected point cloud data (if any) will be retained to facilitate synchronized deletion and other editing operations. • In the **Handheld Scan** mode, it is necessary to retain at least 4 markers. In fixed scanning mode, at least 3 markers need to be retained. • Markers data under the cutting plane cannot be edited. • Multiple undo or redo operations are supported.

Icon	Function	Instruction
	Rewind	To select (highlighted in red) the scanning data corresponding to a specific frame, drag the progress bar and click **Confirm** to delete the corresponding data; click **Exit** to exit rewind (**only supported for the software version of V4.0.0.8 or above**). **Note** • This function can not be used in the **Fixed Scan** mode. • Up to 200 frames of data can be rewound.
	Rectangular	Select/Deselect a rectangular area. The selected area is displayed in red.
	Polygon	Select/Deselect a polygon area.
	Lasso	Select/Deselect the area by using the Lasso tool.
	Straight line	Move the cursor to draw a straight line to select/deselect the area.
	Brush	Hold down `⇧ Shift` or `Left Button` and a red circle will appear. At this time, roll the mouse wheel will zoom in and out of the circle. Move the red circle to select/deselect the area to be edited.
	Select All	Select all 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.

Icon	Function	Instruction
	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.

Right Panel

You can use more functions on the right panel in Scanning.

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.
 (**for the software version of V4.0.0.8 or above**) or 	Export Data	Export the scan data.
	Mesh	Will move to next step **Post-processing** to mesh model.

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.
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.

Shortcut

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

Cutting Plane

If you need to remove the object's base data during the scanning process, the **Cutting Plane** can be a very effective tool.

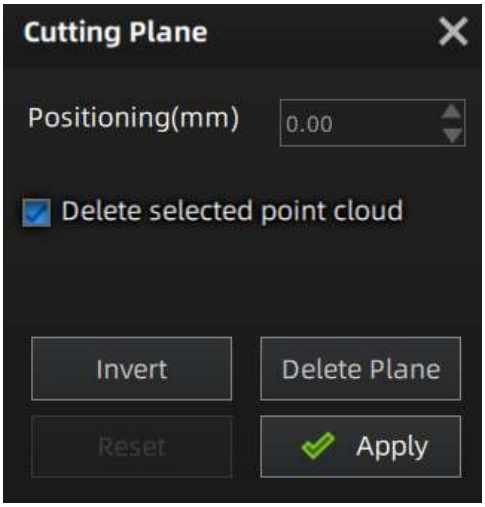
By setting up a cutting plane, the data below the plane will not be captured.

Create a Cutting Plane

- **Fitting Point Cloud**: please hold `⇧ Shift` + `Left Button` to select the point cloud data, and click **Create Plane**.
- **Creating Straight Line**: please hold `⇧ Shift` + `Left Button` to draw a line, and click **Create Plane**.
- **Markers**: please hold `⇧ Shift` + `Left Button` to select at least three markers, and click **Create Plane**.

Edit the Cutting Plane

- **Delete the selected point cloud data or markers**: When checked, the selected point cloud data or markers will be highlighted in red. **Apply** the edit to delete the highlighted point cloud data or markers.
- **Invert**: Use this button to reverse the selection of data by flipping the cutting plane.
- **Delete plane**: clicking this button will delete the current cutting plane and return to the interface for creating a new cutting plane.
- **Reset**: reset all the operations performed after creating the cutting plane.
- **Apply**: apply all the edits made.

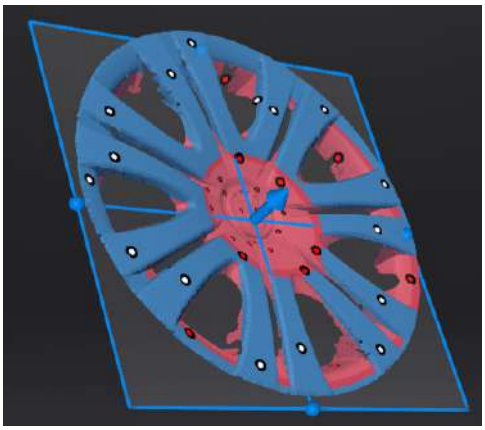


Note

- It is not supported to deleted all point cloud data.
- At least four markers should be remained at the front appearance of the cutting plane.

- **Translate the cutting plane**: after generating the plane, you can enter numbers or drag the arrow of the cutting plane's normal  in the editing box to translate the cutting plane.

- **Rotate the cutting plane**：you can drag any of the four small balls on the edges of the cutting plane  to rotate the cutting plane along a certain direction.



Alignment

If there are multiple projects in a project file, you need to align the data after Scanning.

Click  on the right panel of the **Scan** step interface and start project alignment.

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 the data.	Objects that have repeatable features (like rounds or rings) or small objects are not suitable for this mode.
 **By Manual**	Manually choose at least 3 common features on the data in the fixed window and the floated window respectively and click **Apply** to align the data.	The chosen features should not be in a line.
 **By Markers**	1. Choose **By Markers**. 2. Select the project which needs alignment in the fixed window and the floated window. 3. Click **Apply** and align the data.	The two projects should have at least 3 markers in common.
 **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 data.	The chosen markers should not be in a line.

Note

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

Post Processing

Mesh Model

After generating point cloud, it is allowed to convert the point cloud into a triangular mesh surface through meshing.

Click  in the right sidebar of **Scan** interface to enter **Post processing**.

Note

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.
	Half-watertight	Some holes will be filled.
	Watertight (default)	All holes will be filled automatically. The data can directly be 3D printed. Only watertight mesh can set **model quality**: **High**, **Med**（default）, **Low**.

Mesh Optimization

Filter

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

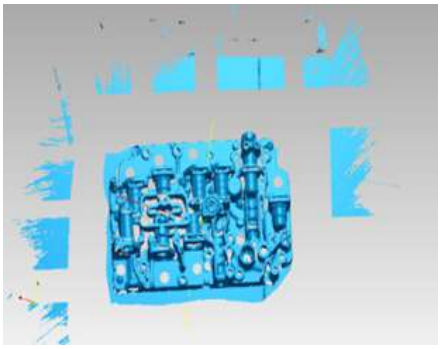
- **None**: No optimization.
- **Standard** (default): Optimizes data slightly and preserves data characteristics.
- **Med**: Reduce the noise on the surface of the scan data.
- **High**: Reduce the noise on the surface of the scan data and sharpen it powerfully.

Smooth

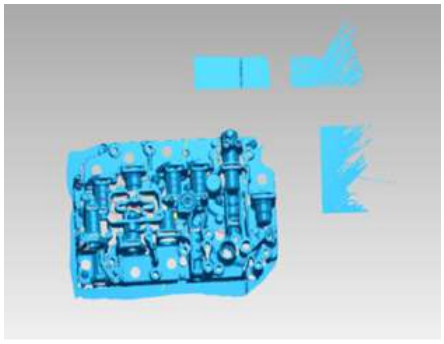
Smooth the possible noise on the surface of the scan data.
Three optimization options are available: **Standard** (default), **Med**, **High**.

Remove small floating parts

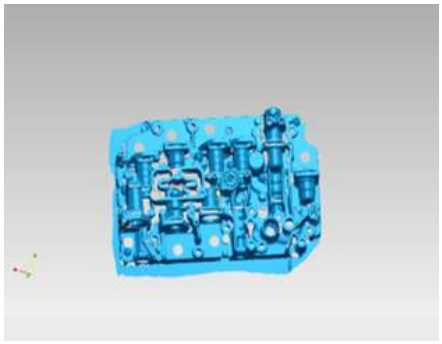
Remove small floating parts isolated from the the main data.
Set the isolated data ratio by dragging the slider or clicking the up/down arrow. Default value is 1, with a range of 0 to 100. The value 0 indicates not removing isolated data.
For a specific illustration of the effect, refer to the following images:



Original data



Set value as 50



Set value as 100

Simplification

Set the triangle number (disenabled by default. If enabled, the default value is 20 with a range of 0 to 99).

> **Note**
>
> When the simplification is greater than the maximum triangles, prioritize the simplification.

Maximum triangles

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

> **Note**
>
> - Please input the value reasonably, avoiding entering too small values, as excessive simplification may result in lower data quality.
> - Under the constraint of simplification, if the input number of triangles is too small, the data will not be simplified to the extent of the input value.

Remove spike

Enabled by default. Remove spike-like data on the image edge, and detect and flatten single-point peaks on a polygon mesh.

Marker hole fill

Fill in the surface of the object that is not scanned to the pasting marker.

> **Note**
>
> In the **Markers** mode, this function is enabled as default for unwatertight or half-watertight models, and can not be disabled for watertight models; otherwise, this function can not be enabled.

Texture remapping

(**Only supported for the software of V4.0.0.8 version or above**) When meshing the project with scanned texture, this function can be enabled (by default) to remap the texture; if this function is disabled, you can still remap the texture when editing the mesh.

> **Note**
>
> This function can not be applied to the project without scanned texture.

Recommended Parameters

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

Operation

1. Click **Preview** to confirm the settings and start meshing.

   > **Note**
   >
   > If there exist texture model files that exceed the resolution limit in the project, the model will be displayed in a lower resolution after clicking **Preview**. When saving the model, you can choose to reduce the resolution (the default is the resolution value after software processing) or keep it unchanged.

2. After the mesh, click **Confirm** to confirm and save the mesh result.

   > **Note**
   >
   > Click  to restore and regenerate the mesh.

Mesh Editing

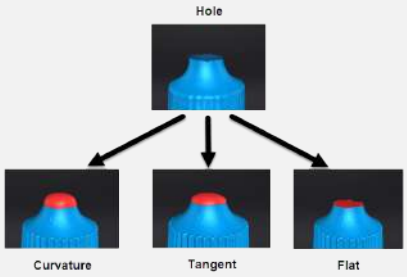
After meshing model, you can perform mesh editing， data editingand use some other functions.

Mesh Editing

In the **Mesh Editing** window on the left side of the interface, click **+** to unfold the function panel.

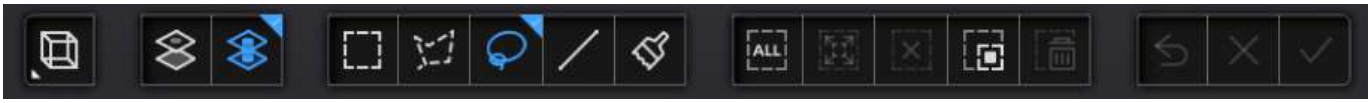
> **Note**
>
> If the software version is V4.0.0.8 or above, you can click **Preview** to preview; or you can click **Apply** to preview.

Optimization options	Description	Instructions
Texture	**Brightness** and **Contrast** can be adjusted.	Only project files that exclusively contain textures are accessible to this function.
Simplification	Simplify the model data as the triangular mesh generated from the scan is in a large size. Drag the slider or click the page up/down arrow to set the ratio from 1 to 99. The default is 0, indicating no simplification.	• Over-simplification will result in the loss of data details. • Click **Preview** to preview. • Click **Confirm** to confirm and save. This action is irreversible. • Click **Cancel** to restore and exit.
Mesh Optimization	Restructure the mesh topology based on the mesh curvature and sharpen the surface features of scan data. Drag the slider or click the page up/down arrow to set the ratio from 1 to 100. The default is 0, indicating no optimization.	• The optimization duration varies depending on the amount of data. • Click **Preview** to preview. • Click **Confirm** to confirm and save. This action is irreversible. • Click **Cancel** to restore and exit.
Smooth	Smooth the possible noise on the surface of the scan data. Drag the slider or click the page up/down arrow to set the ratio from 1 to 100. The default is 0, indicating no smooth.	• Click **Preview** to preview. • Click **Confirm** to confirm and save. This action is irreversible. • Click **Cancel** to restore and exit.

Optimization options	Description	Instructions
Remove small floating parts	Remove small floating parts in the scan data. Drag the slider or click the page up/down arrow to set the ratio from 1 to 100. The default is 0, indicating no removal.	• Click **Preview** to preview. • Click **Confirm** to confirm and save. This action is irreversible. • Click **Cancel** to restore and exit.
Auto Hole Filling	After selecting the hole filling type, enter the perimeter. Holes within the specified perimeter will be filled automatically.	Hole filling types: 
Manual Hole Filling	After entering the manual hole filling mode, 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.	Select filling types before picking a hole and then click the edges to perform filling actions. Manually save the post-processing data.
Flip Normal	To redefine the front direction of the scanned data in reversal design. Hold `⇧ Shift` + `left mouse button` to select areas to be flipped.	• Texture remapping should be performed first as it is not accessible after flip normal. • Default is to flip the entire dataset if no flip areas is selected.
Cutting Plane Tool	Define a plane to re-adjust the coordinate system of the scanned data. Hold `⇧ Shift` + `left mouse button` to select a plane by drawing a straight line and then activate **Delete selection and close intersection** or **Delete selection**.	• Click **Preview** or **Orient Based On Plane** to preview. • Click **Confirm** to confirm and save. This action is irreversible. • Click **Cancel** to save and exit.

Optimization options	Description	Instructions
Mirror	Take the front view plane of scan data as the working plane. Draw a straight line as the central axis and perform a symmetrical copy. Hold `⇧ Shift` + `left mouse button` to draw a straight line as the central axis and then click **Keep the initial mesh**.	• Click **Preview** to preview. • Click **Confirm** to confirm and save. This action is irreversible. • Click **Cancel** to save and exit. • Texture remapping should be performed first as it is not accessible after mirror.
Zoom	Adjust the scaling ratio of the model. Enter a value to set the ratio. The default is 100, indicating no zoom.	• Click **Preview** to preview. • Click **Confirm** confirm and save. This action is irreversible. • Click **Cancel** save and exit. • Texture remapping or Texture Mapper is not accessible after performing zoom.

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.
 (**V4.0.0.8 version or above**) or 	Export Your Scan	**If the software version is V4.0.0.8 or above:**  : Save the scanned data in the specified format (ASC, STL, OBJ, PLY, 3MF) locally.  : If you have installed the EXModel software and you are in the post-processing or measurement interface with mesh data, click this button to start up the software and import the data into it. **If the software is in other version:** Click  to save the scanned data in the specified format.
	Sketchfab Upload	Use your Sketchfab account to share the model.
	Third-party software	Save the data and open with third-party software.
	Shining3D Digital Cloud	Upload the model file to the cloud associated with the current account. Support data files in OBJ, STL, PLY format.
	Texture Mapper	Merge HD texture images with the model file to enhance the overall texture quality of the scanned data.
	Model Display	After enabling the model display by clicking the icon or pressing F12, the model will rotate at a specified speed (Click  to rotate clockwise; press F12 or Esc again to exit).  **Note** The model will only rotate and display from the current view after entering the model display interface. Exit and adjust the angles in the post-processing interface if other views are in need.

Right Menu

Function	Instruction
Select all/Unselect/Invert/Delete selected data	See in data editing and perform by using shortcuts.
Fitting view	Display the data in the center according to the appropriate size.
Select visible, select through	See in data editing.
Switching the display type	You can select different display types(triangles, wireframe, point cloud data as well as triangles and wireframes) and the data display mode of the 3D scene will change synchronously after switching. **Note** Only accessible after apply meshing.
Set rotate center	The rotation center can be set on the data by the left mouse button, and click `⎋ Esc` to exit setting.
Reset rotate center	After reset, the center of rotation is at the data center.

Shortcuts

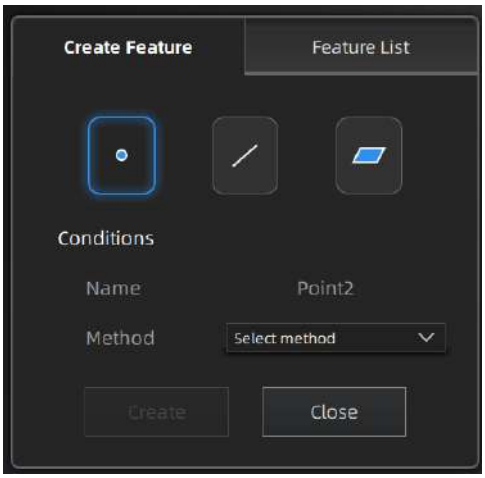
Shortcuts	Function
Hold `left mouse button` and move the cursor.	Rotate the model.
Hold `middle mouse button` and move the cursor.	Move the model freely.
Hold `⇧ Shift` + `left mouse button`	Select desired data.
Hold `^ Ctrl` + `left mouse button`	Deselect the selected data.
Scroll mouse wheel	Zoom in/out.
`⌦ Del`	Remove the selected data.

Measurement

Create Feature

After scanning some data, you can click **Measurement** on the navigation bar, import the data, and select the data to **Create Feature** and so on.

On the right panel of **measurement**, click and a **Create Feature** window will pop up on the left.



Note

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

Feature Point

Creation Method	Description	Note
Select Points	• Click the data or existing feature points to select the point. • Click **Create** and create a feature point.	/
Select Markers	• Click existing markers to select the point. • Click **Create** and create a feature point.	You can select Markers to create feature points for model data that only have markers and are not meshed yet.
Line-Plane Intersection	• Click the existing feature lines or choose lines in the drop-down list. • Click the existing feature planes or choose planes in the drop-down list. • Click **Create** and create feature points.	• The feature line can't be in the feature plane. • The feature line can't be parallel with the feature plane.

 **Feature Line**

Creation Method	Description	Note
2 points	• Click the data or existing feature points to select the point. • You can tick the checkbox before **From** or **to** and re-select the feature points. Click **Create** and create a line.	/
Markers	• Click existing markers and select feature points. • You can tick the checkbox before **From** or **to** and re-select the feature points. Click **Create** and create a line.	You can select Markers to create a feature line for model data that only have markers and are not meshed yet.
Planes Intersection	• Click existing feature planes or choose planes in the drop-down list. • After selecting two planes, click **Create** and create an intersection of two non-parallel planes.	• Create two feature planes in advance. • The feature planes can't be parallel to each other.

Feature Plane

Creation Method	Description	Note
3 Points	• Click the data or existing feature points to select the point. • Tick the checkbox before the three points and re-select the point. Click **Create** and create a plane.	The three points can't be in a line.
Point-Line Fitting	• Click existing feature lines or choose lines in the drop-down list. • Click the data or existing feature points to select the point.	The point can't be in the line.
Best Fitting	When there are selected data, click **Create** and create a plane that has the smallest deviation from the selected area. **Note** You can use editing tools or shortcuts to select the data.	/
Three Markers	• Click the data or existing feature points to select the point. • Tick the checkbox before the three points and re-select the point. Click **Create** and create a plane.	• You can select Three Markers to create a feature plane for model data that only have markers and are not meshed yet. • The three markers can't be in a line.
Marker Point-Line Fitting	• Click existing feature lines or choose lines in the drop-down list. • Click the data or existing feature points to select the point. **Note** You can use editing tools or shortcuts to select the data.	• You can select Marker Point-Line Fitting to create a feature plane for model data that only have markers and are not meshed yet. • The feature point can't be in the feature line.
Marker Best Fitting	When there are selected data, click **Create** and create a plane that has the smallest deviation from the selected area. **Note** You can use editing tools or shortcuts to select the data.	You can select Marker Best Fitting to create a feature plane for model data that only have markers and are not meshed yet.

Align

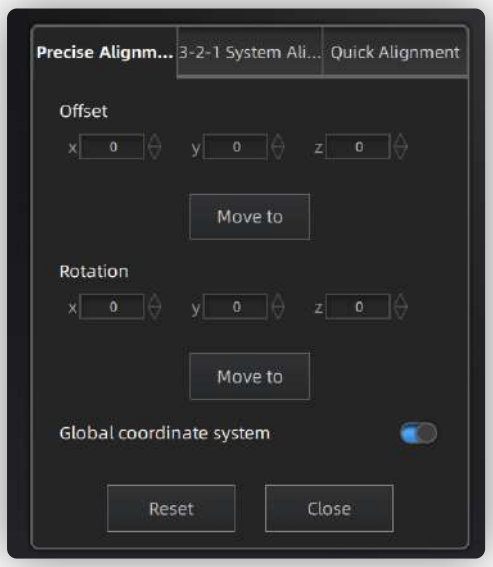
After scanning some data, you can click **Measurement** on the navigation bar, import the data, and select the data to carry out **Align** and so on.

On the right panel of **Measurement**, Click and a **Align** window will pop up on the left.

> **Note**
>
> You can import the un-meshed data in **Measurement**, align the data and return to scan to update data changes.

> **Caution**
>
> - Alignment will not affect the shape or accuracy of the data.
> - Once you align the model to a new position and quit the alignment, you have to reload the file to restore previous position.

Exact Alignment



Input value and adjust coordinates

Input values in **Offset** or **Rotation**, and click **Move to** to align model center with input coordinates and axis direction with rotation value.

Note

Global coordinate system (disabled by default and need to be enabled manually) is the coordinate system on the right， in which red points to positive X-axis, green points to positive Y-axis and blue points to positive Z-axis; if the global coordinate system does not appear on the interface, roll the mouse wheel to zoom out the model.

Adjust coordinates by the object mover tool

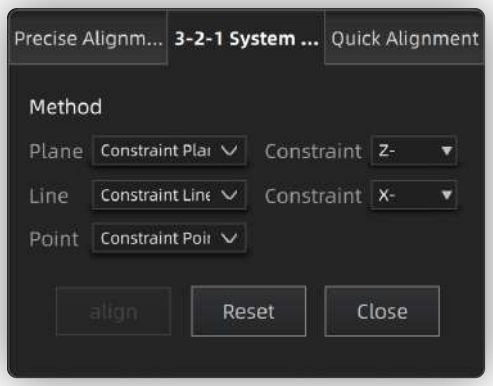
Hover the cursor on object mover tool. Once the object mover tool shines，long press Left Mouse Button or Middle Mouse Button to adjust the position and angle of model.

Click **Reset** to cancel all movements in Exact Alignment.

Click **Close** to save the movement and quit the alignment.

3-2-1 Coordinate System Alignment

3-2-1 Coordinate System Alignment (Plane-Line-Point Alignment) align data by choosing line and plane constraints. Before alignment, you need to create feature points, lines, and planes, in which the feature line is not perpendicular to the plane.



- **Plane**：Select a feature surface in the drop-down list, and select an axis in corresponding constraint drop-down list. 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.
- **Line**：Select a feature line in the drop-down list, and select an axis in corresponding constraint drop-down list. The arrow of the line indicates the positive direction of the line, and the direction of the selected axis will be consistent with that of the projection of the line on the selected plane.
- **Point**：Select a point in the drop-down list, of which the position is （0，0，0）.

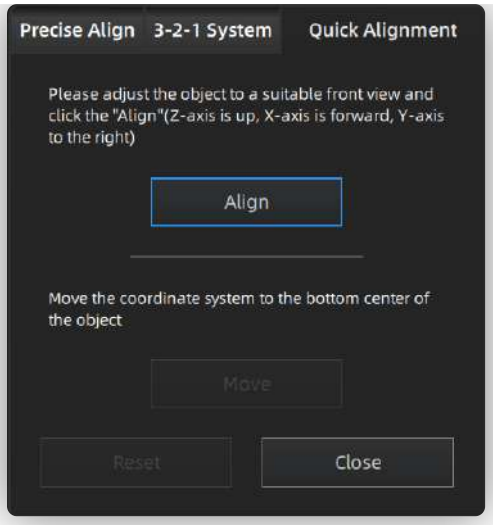
Note

Global coordinate system (disabled by default and need to be enabled manually) is the coordinate system on the right，in which red points to positive X-axis, green points to positive Y-axis and blue points to positive Z-axis; if the global coordinate system does not appear on the interface, roll the mouse wheel to zoom out the model.

Click **Align** to move coordinate axes. When the feature line is perpendicular to the plane, the movement fails and a window pops up prompting failure.
Click **Reset** to cancel all movements.
Click **Close** to save the movement and quit the alignment.

Quick Alignment

You can rotate the model to a wanted posture and a coordinate frame will show up.



- Click **Align** and move the coordinate frame to the center of the object, with its X-axis perpendicular to the screen, Y-axis parallel to the screen and pointing rightward, and Z-axis parallel to the screen and pointing upward. The object remains its position.
- Click **Move** and move the coordinate frame to the bottom center of the object.
- Click **Reset** and restore the frame to its original state(before alignment).
- Click **Close** to save the model frame and close the dialog box.

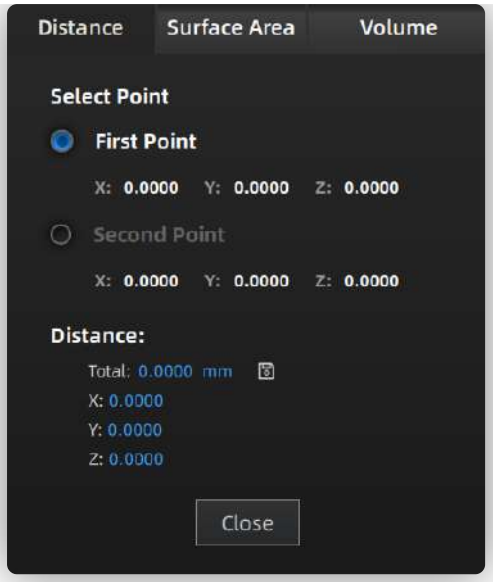
> **Note**
>
> You can re-adjust the posture and align the model again if the alignment is not satisfactory.

Measurement Tool

After scanning some data, you can click **Measurement** on the navigation bar, import the data, and select the data to carry out **Measurement** and so on. You can calculate surface distance between data, surface area of selected area, and the volume of watertight model.

On the right panel of **Measurement**, click and a **Measurement** window will pop up on the left.

Distance



Calculate the distance between two points or markers on the surface of the scanned model.

When you select two points of the model, the distance will show itself at once.

Note

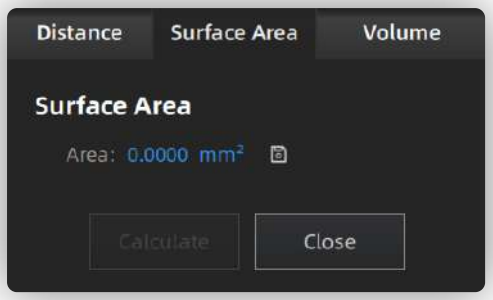
● You can tick the checkbox before **First Point** or **Second Point** and re-select the point.

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

● You can select marker measurement for model data that only have markers and are not meshed yet.

Click **Close** to close the front window.

Surface Area



Calculate selected area of the scanned model.

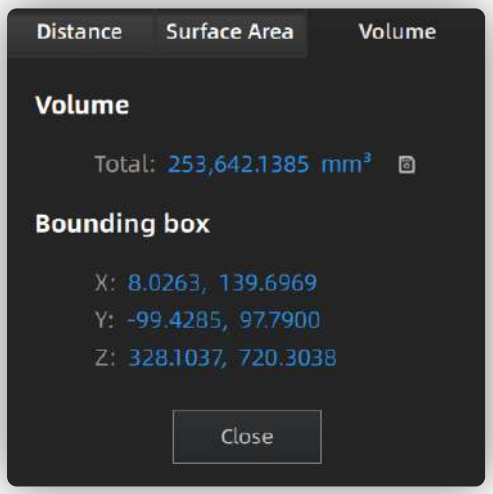
You can use edition tools, right panel, or shortcuts on the bottom panel to select the area. Click **Calculate** and the area will show itself with a unit of mm².

Click **Close** and close the front window.

Note

This function is only available for meshed models.

Volume



Calculate the volume of **Meshed data** with a unit of mm³. When you switch to **Volume**, the volume of the scanned model and the coordinates of corresponding bounding box will show themselves.

Note

This function is only available for **meshed** models.

Click  and import the measurement result to local.

Note

- You can save the file as TXT or CSV or both.
- The storage path defaults to where you open the file last time, or to desktop if you have not set the path.

Save

Save Data

You can save the scan data.

For the version of V4.0.0.8 or above:

In the **Scan** interface, click  in the right-side function bar, select the save path and the file format, enter the file name as well.

In the **Post-processing**, or **Measurement** interface, click  or  >  in the right-side function bar, select the save path and the file format, enter the file name as well.

For other version:

In the **Scan**, **Post-processing**, or **Measurement** interface, click  in the right-side function bar, select the save path and the file format, enter the file name as well.

Format	Data Type	Saved as	Application
ASC (whole piece)	Optimized cloud points	Scan.asc	• Check the data; • Quick export and no need for post-operation. • Use other software to post-process the data.
STL	Mesh Data	Scan.stl	• 3D printing and reverse designing; • Compatible with most post-processing software.
PLY	Mesh Data	Scan.ply	• Compact file; • Easy for texture editing.
OBJ	Mesh Data	Scan.obj Scan.jpg Scan.mtl	• Used for artworks; • 3D rendering. **Note** Compatible with most post-processing software.
3MF	Mesh Data	Scan.3mf	• Compact file; • Compatible with Microsoft 3D printing software.
P3	Global markers	Scan.p3	• Reuse the markers' position. • Can also contain the cutting plane.

Share Data

You can upload the encapsulated data to Sketchfab or Shining3D Digital Cloud after mesh.

In the **Post-processing** or **Measurement** interface, click  to upload the encapsulated data to Sketchfab, where the title, username and password are required to be provided. You can register an account on the Sketchfab to view the shared models.

> **Note**
>
> The files uploaded should be in the format of STL, PLY or OBJ.

Third-party Softwares

After the mesh, you can import scanned mesh data into the third-party software.

(**Only supported for the software of V4.0.0.8 version or above**) In the **Post-processing** or **Measurement** interface, click > to export the meshed data to EXModel:

- If you have not installed the EXModel, click this button and choose the corresponding version on the pop-up window to get it.
- If you have installed the EXModel, click this button to start up this software; and if you are in the post-processing or measurement interface with meshed data (STL, OBJ or PLY format), click in the upper right corner to import the data into it.

> **Note**
>
> - EXModel software can also be used by clicking in the upper right corner on the interface.
> - Click here to download and learn how to activate EXModel.
> - Click here to learn how can I get access to EXModel.

Or click to select desired third-party software:

For the version of V4.0.0.8 or above:

Icon	Name	Main Application Scenario
Cx	Export data to Geomagic Control X	Metrology
Dx	Export data to Geomagic Design X	Reverse Engineering
Ge	Export data to Geomagic Essentials	Mesh Editing

For other version:

Icon	Name	Main Application Scenario
	Export data to Geomagic Control X	Metrology
	Verisurf（2020）	Metrology
	Einsense Q (1.3.2.3)	Metrology
	Export data to Geomagic Design X	Reverse Engineering
	Export data to Geomagic Essentials	Mesh Editing
	Solid Edge SHINING 3D Edition（2021）	Reverse Engineering
	QUICKSURFACE	Reverse Engineering

Note

The third-party software will automatically launch and import the mesh data if it is installed already. Otherwise, it will prompt "Failed to load the data to XX. Please confirm XX is installed in your computer."

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