SHINING 3D

EinScan-Pro

Multi-Functional Handheld 3D Scanner

User Manual

Catalog

Catalog

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Device List and Specification

Device List and Specification

1.1. Device list

Item		Quantity	Unit
Basic Version	Scan head	1	set
	Adapter	1	pc
	Power line	1	pc
	Aviation plug	1	pc
	Calibration board	1	pc
	Mark points	1	set
	Installation Guide	1	pc
Industrial Pack （add-on module）	Turntable	1	pc
	Tripod	1	pc
	Scan head tray	1	pc
	USB line	1	pc
	Power adapter	1	set
	Power line	1	pc
Color pack （add-on module）	Texture camera	1	pc

1.2. Specification parameter

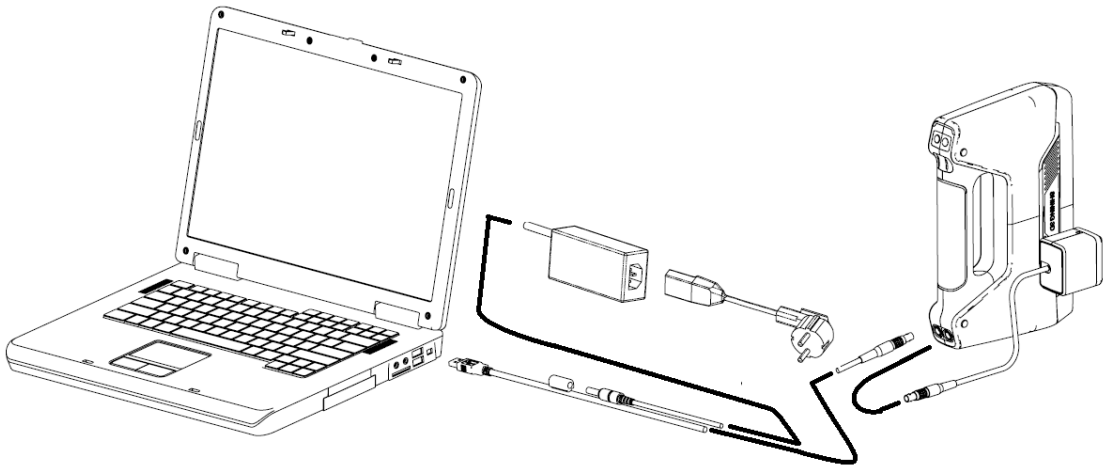
Model	**EinScan-Pro**			
Scan Mode	Handheld HD Scan	Handheld Rapid Scan	Auto Scan	Free Scan
Accuracy	0.1mm	0.3mm	Single Scan Accuracy: 0.05mm	Single Scan Accuracy: 0.05mm
Scan speed	15 frames/sec	10 frames/sec	Single Scan: <2sec	Single Scan: <2sec
Point distance	0.2mm~3.0mm	0.5mm~3.0mm	0.16mm	
Single Scan Range	210*150mm			
Light source	White light LED			
Part Size Range (Recommend)	0.03m~4m	0.15m~4m	0.03m~0.15m	0.03m~4m
Align Mode	Markers Align	Feature Align Markers (shall be bought)	Feature Align; Turntable coded targets; Markers	Compatible: Mark Point Align Feature Align Turntable Align
Texture Scan	No	Yes (texture scan camera and software module shall be bought)		
Outdoor Operation	No (affected by strong light)			
Special Scan Object	--	Rich Surface Feature needed	--	--
	For transparent, reflective and dark object, please spray powder first before scanning			
Printable Data Output	Yes			
Data Format	OBJ, STL, ASC,PLY,3MF			
Scan Head Weight	0.8KG			
System Support	Win7/Win8/Win10 64bit			
Computer Requirements	CPU: I5 or Higher; Display card：NVIDIA GTX660 or higher; Display memory：>2G; Memory Storage： 8G or more			

Installation Introductions

1.1. Hardware installation

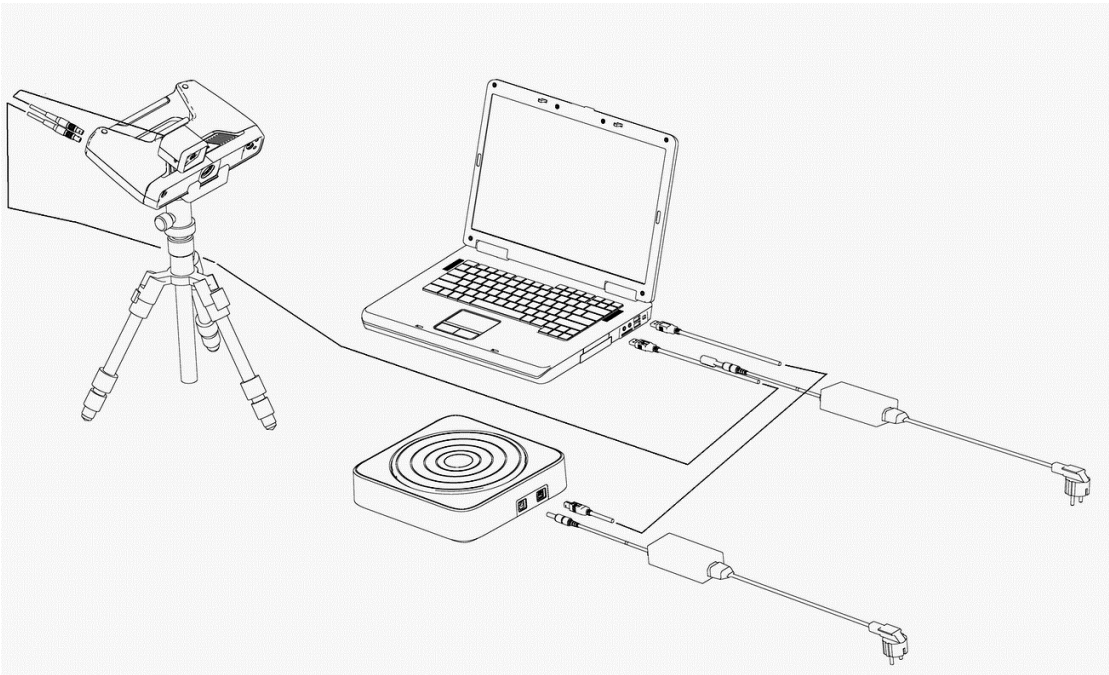
Basci Module

Connect one end of the line to the scanner, the other end to power line and USB on the computer as shown in the picture. Connect to USB2.0 or USB3.0. (This installation mode is suitable for Handheld Scan.)



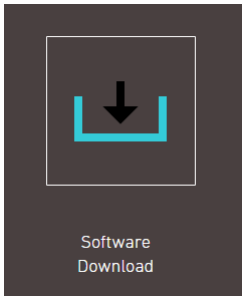
Industrial module installation

Put the basic module on the tripod when the installation finishes. Connect the long-opening end of USB line to the computer, the square-opening end to the turntable. Then connect the power adapter to the turntable and adjust the position of scan head and turntable. (This installation mode is suitable for Fixed Scan.)

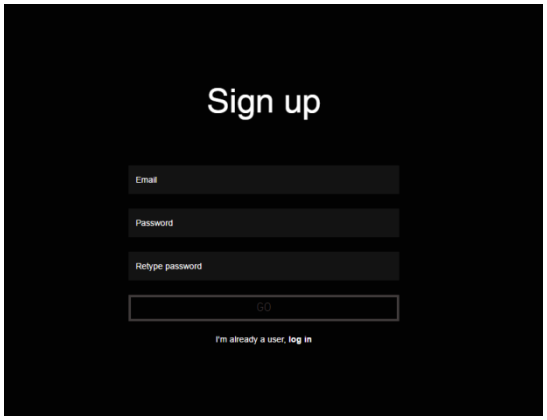


1.2. Software download

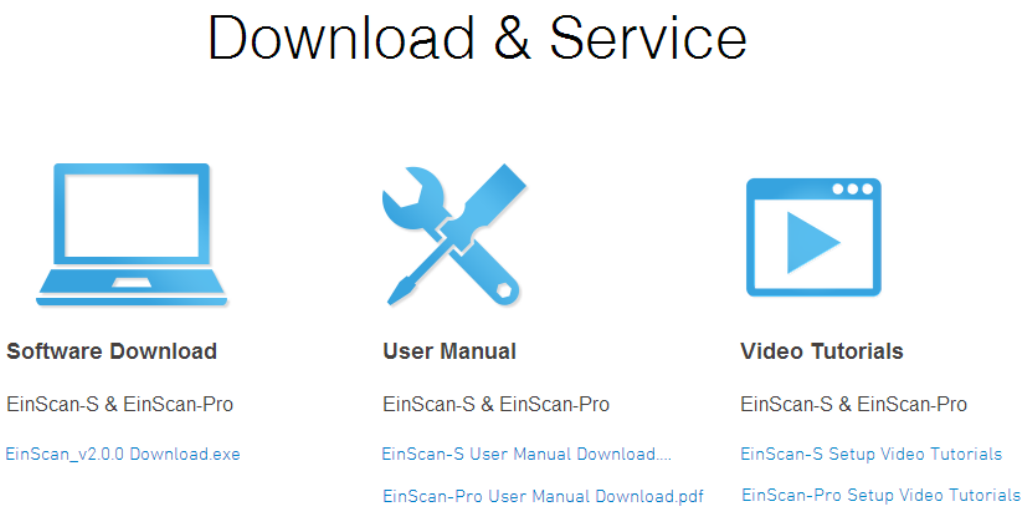
Firstly, enter the Support page: http://www.einscan.com/support. Click “Software download”, as shown below:



Secondly, please complete the registration, if registered, click log in.



After take the survey, it will enter the page http://www.einscan.com/software-download

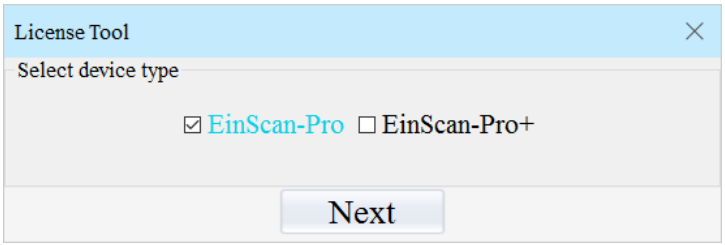


Finally, click the icon to jump to the page of any file to download the software.

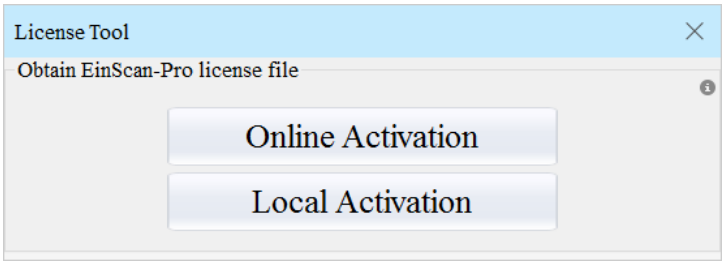
1.3. Software installation

Software Installation

Double click installation package, Follow the instructions as the window pops up. Users can either choose the default installation path or click the Browse button to select the installation path. Default installation is suggested.



When the acquired activated file window pop-ups, you can choose multiple device types, then click “Next”.



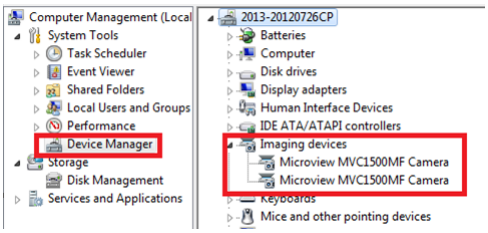
Please confirm there is only one device connected. Choose the mode to get activated file: Online activation and local activation. After activating a device, y ou can unplug the device and plug in other device to continue activating. When finishing click “Next”.

> Note:
> If you want use both Pro and Pro+, you should activate the two device type separately.

When installation is finished, there will be a shortcut of the software 

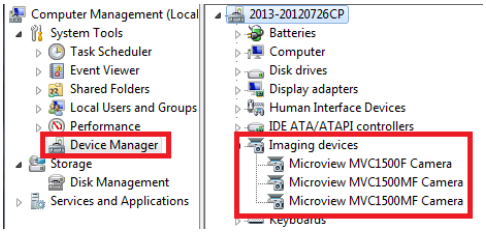
and TeamViewer 

on the desktop.



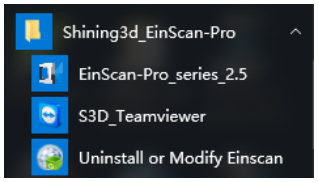
In the next step, we need to check whether the camera driver installation is successful, right click “Computer”, choose “Computer Management”-“Device Management”-“Imaging devices” to check if the two cameras display normally (two cameras will be found when there is no color module).

When there is color module, check if there are three cameras, as shown below.



Software Uninstall

Open the start menu, choose Shining3d_EinSca-Pro----Click “Uninstall or Modify Einscan”, as shown below.



3

Software Introduction

The software provides fixed scan (without turntable), Turntable Auto Scan, Handheld HD Scan and Handheld Rapid Scan, and taking into account the portability and high-precision.

1.1. Scan Preparation

Mode selection

- **Fixed Mode**

(1) Auto Scan: This mode is recommended for objects within the size of 200*200*200mm. For example, small workpieces.

(2) Fixed Scan (without turntable): This mode is recommended for objects over the size of 200*200*200mm, while high details and resolution, as well as a comparative stable environment (without obvious vibration) are required. For example, industrial parts which require high details and resolution.

- **Handheld Mode**

(1) Handheld HD Mode： When the size of the object is over 30*30*30mm, environment is not stable or with vibration, sticking mark points on the object is allowed, high resolution and details are required, this mode is recommended. For example: Industrial part, sculpture, or art works with rich details.

(2) Handheld Rapid Scan： When the size of the object is over 150*150*150mm, environment is not stable or with vibration, surface is not with much detail pattern, this mode is recommended. For example: Human body (the whole body, face, chest, hand, foot and other parts), sculpture that doesn't require high detail.

Mark points stick

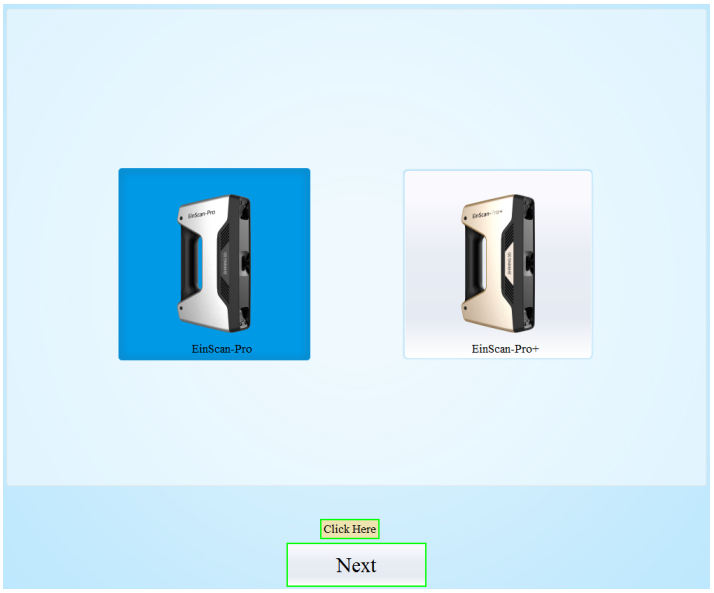
Stick mark points on the object in random, avoiding sticking in one line. The single scan range is 300mm X 170mm, public areas alignment require at least four mark points. While placing the points, uniformly stick the mark points on the object, and make sure that in each single scan area has at least 4 points.

Special objects

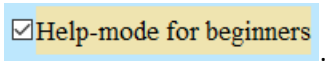
Before scan objects in transparent, semi-transparent or black shall spray on the surface.

1.2. First Scan

Choose the device “EinScan-Pro”, as shown below.



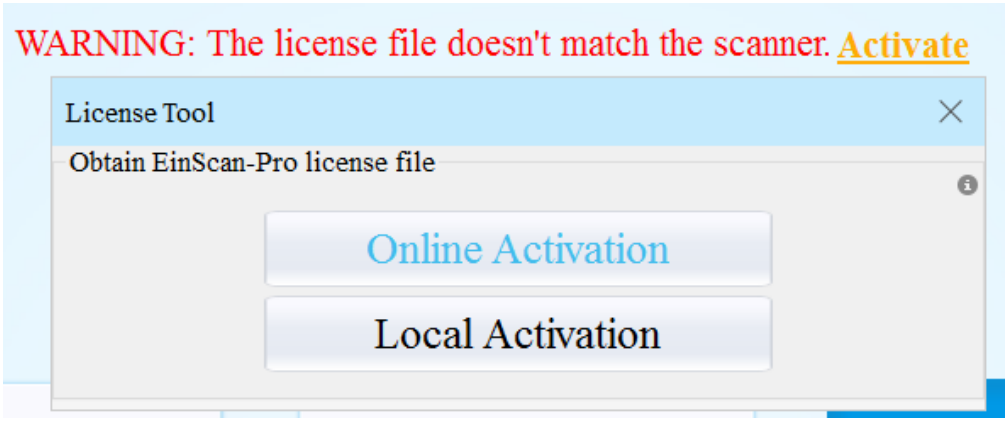
1.2.1. Help Mode for Beginners

Close Help Mode for Beginner by clicking the top right corner 

. To open Help Mode for Beginner, go to Menu -> User Setting ->Help Mode for Beginner

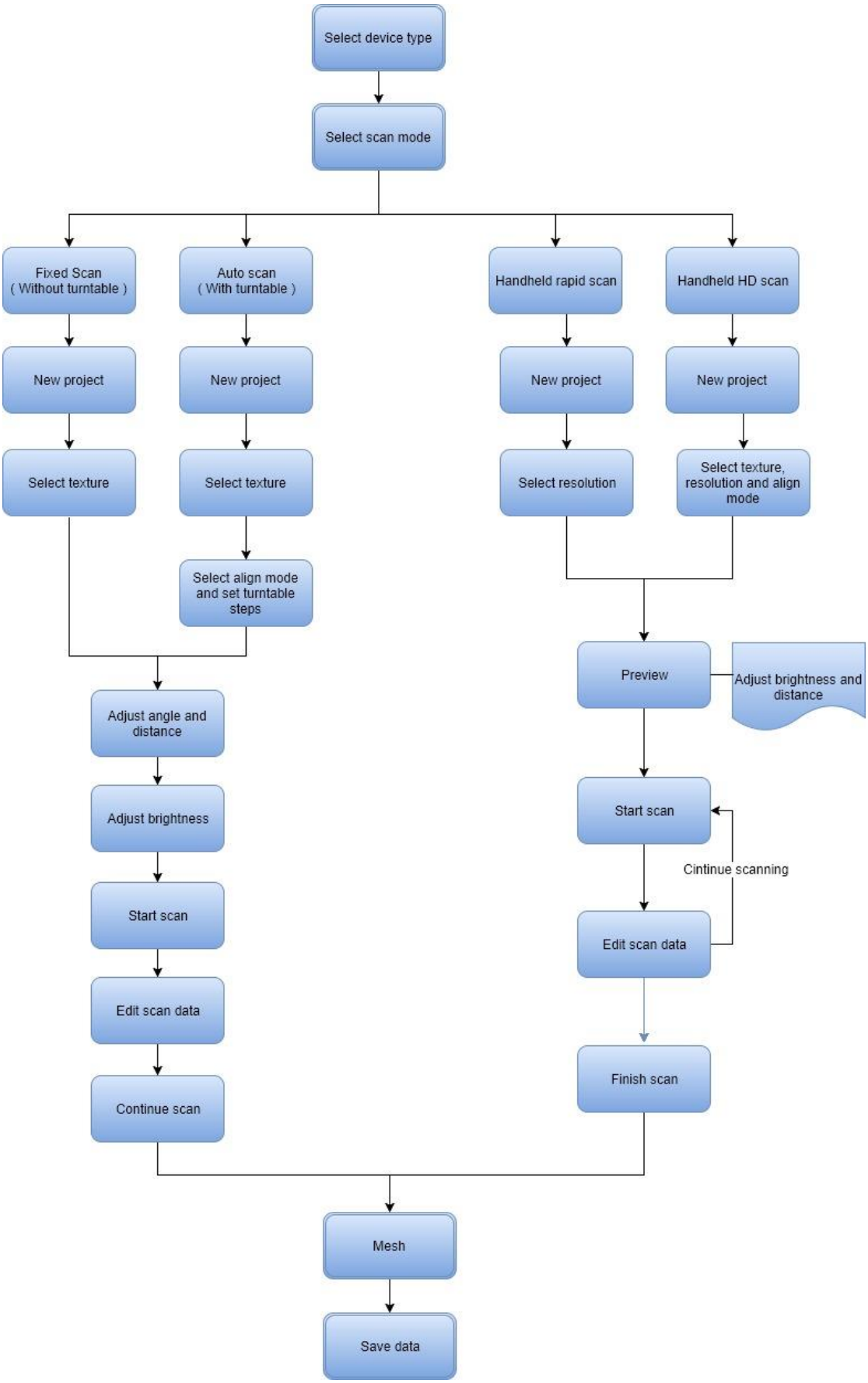
1.2.2. Obtain License File

When a warning of license file doesn’t match the scanner pops up when entering scanning mode, the license file can be acquired by clicking “ Activate”



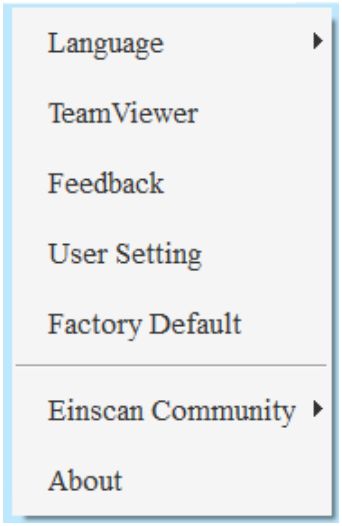
1.2.3. Operation Procedure

First Scan


Select device type
Select scan mode
Fixed Scan
(Without turntable)
Auto scan
(With turntable)
Handheld rapid scan
Handheld HD scan
New project
New project
New project
New project
Select texture
Select texture
Select resolution
Select texture, resolution and align mode
Select align mode and set turntable steps
Preview
Adjust brightness and distance
Adjust angle and distance
Adjust brightness
Start scan
Cintinue scanning
Start scan
Edit scan data
Edit scan data
Finish scan
Continue scan
Mesh
Save data

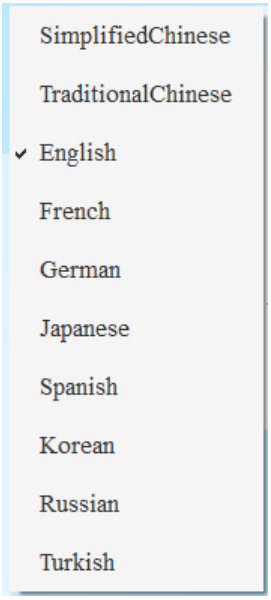
1.3. Drop down Menu

Click  from the upper right to open drop down menu.



1.3.1. Language

This software version is including Simplified Chinese, Chinese, English, German, Japanese, Spanish, French, Korean, Russian and Turkish. Language can be switched in the choose device type and choose scan mode interface.

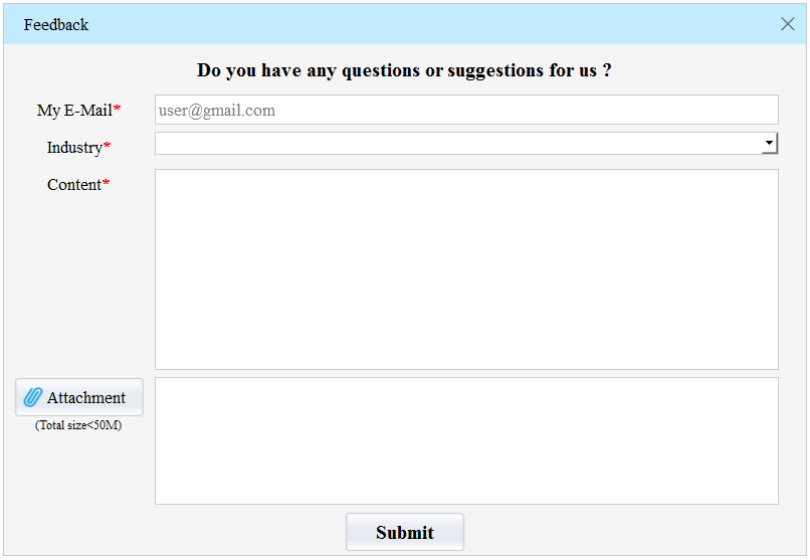


1.3.2. TeamViewer

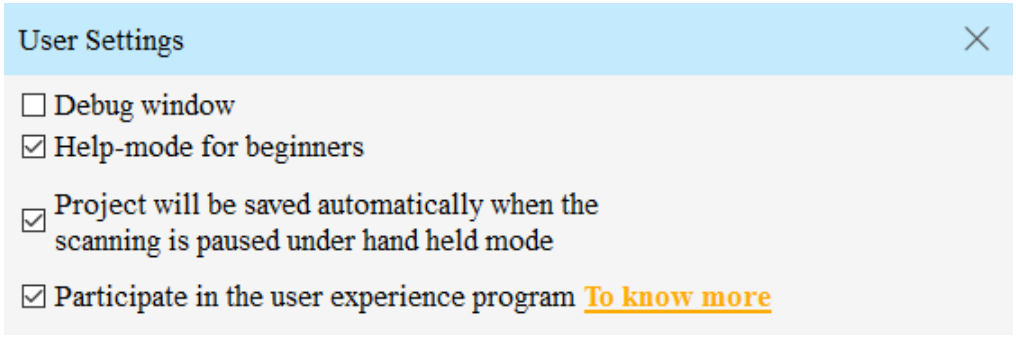
By clicking TeamViewer, you can go to the TeamViewer interface directly without installation.

1.3.3. Feedback

If you have any questions, or suggestions, please share with us by clicking “Feedback”. Leave your email in “ My E-mail”



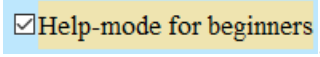
1.3.4. User Setting



Debug window

Tick the checkbox to open debug window; if you want to close it, unselect it.

Help Mode for Beginners

Help Mode for Beginner is the default selection, which is to guide the new users make a scan completely step by step. Close Help Mode for Beginner by clicking the top right corner 

. To open Help Mode for Beginner, go to Menu -> User Setting ->Help Mode for Beginner

Handheld mode saved project automatically

Tick the checkbox of “Project will be saved automatically when the scanning is paused under handheld mode”, when pause scan, project will be saved automatically under handheld HD mode and handheld rapid mode .

User Experience Program

To help us improve the quality and user experience of Einscan, we hope to be allowed to collect usage information to Einscan Team. This information will not identify you and does not include your project data. By default, this checkbox is selected, and we strongly recommend you to select it.

1.3.5. Factory Default

System setting (brightness, turntable steps), calibration data will restore to the factory default settings. Language will be changed into English as default. Factory Default will require software restart.

1.3.6. Einscan Community

Official Website (http://www.einscan.com/) refers to SHINING3D official website for product and information.
Community (http://www.einscan.com/einscan-experts-forum) refers to SHINING3D forum for all EinScan users to discuss and share the experience.
Facebook (https://www.facebook.com/groups/einscan) refer to facebook for Einscan users to discuss and share the experience.

1.3.7. About

Software version information, and technical support mail can be found here.

4

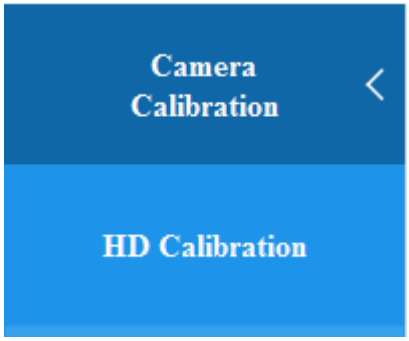
Calibration

Scanning cannot be entered if calibration is not done after installing the software. There is a WARNING: No calibration data, please calibrate first.

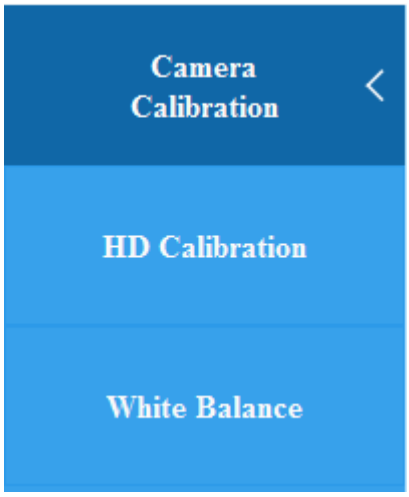
Calibration

After software installed, in the choose device type interface choose “Pro”, click “Next”, the software will enter the calibration mode.

It will show the below picture if the device only has two cameras. (Texture camera is not attached). The left side guide bar include camera calibration and HD calibration.



It will show the below picture if the device has three cameras. (With texture camera). The left side guide bar include camera calibration , HD calibration and white balance calibration.



There are two calibration steps if the device without texture camera:

①camera calibration ②HD calibration;

There are three calibration steps if the device with texture camera:

①camera calibration ②HD calibration ③White balance calibration.

Note:

Calibration board SN is under the camera viewport, you should choose the corresponding calibration board.

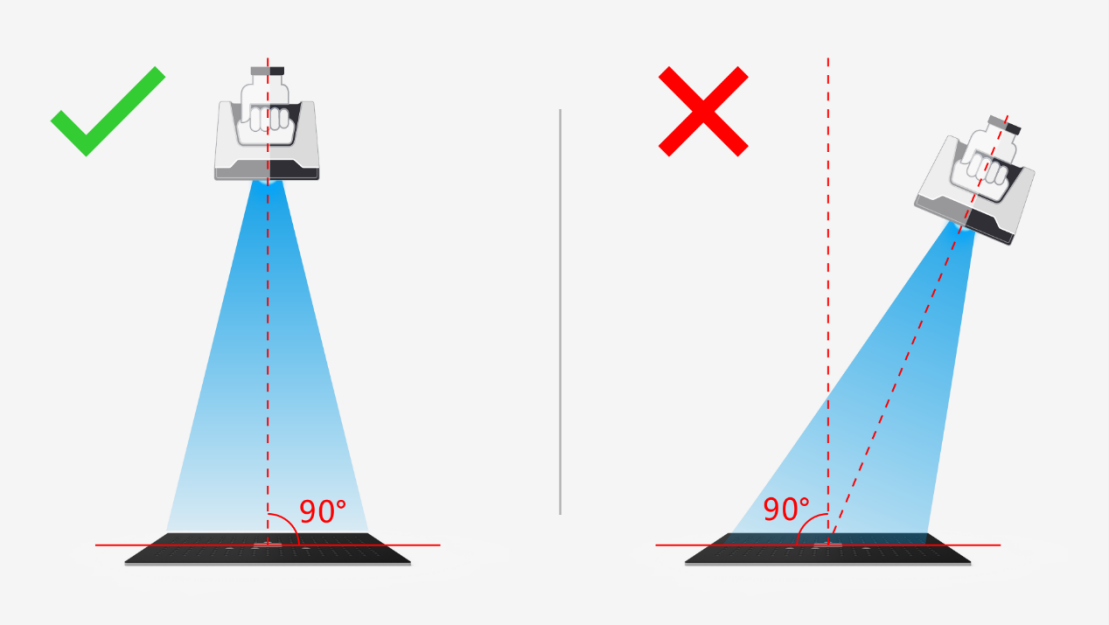
Take the scanner with texture camera as an example (without texture camera, it only takes the first two steps).

1.1. Camera Calibration

The left side of camera calibration interface is guide bar, right side is calibration video.

Calibration board need to be placed in five positions during calibration, each captures five pictures. Place the board according to software guide.

First, adjust the distance between projector and calibration board (350mm-450mm) according to software guide. Step 1, place the calibration board flatly in accordance with the direction in the picture, keep the cross pattern projected by the scanner in the white frame on the calibration board.
Note: During calibration, keep the scanner perpendicular to the plane which places the calibration board, as shown below.



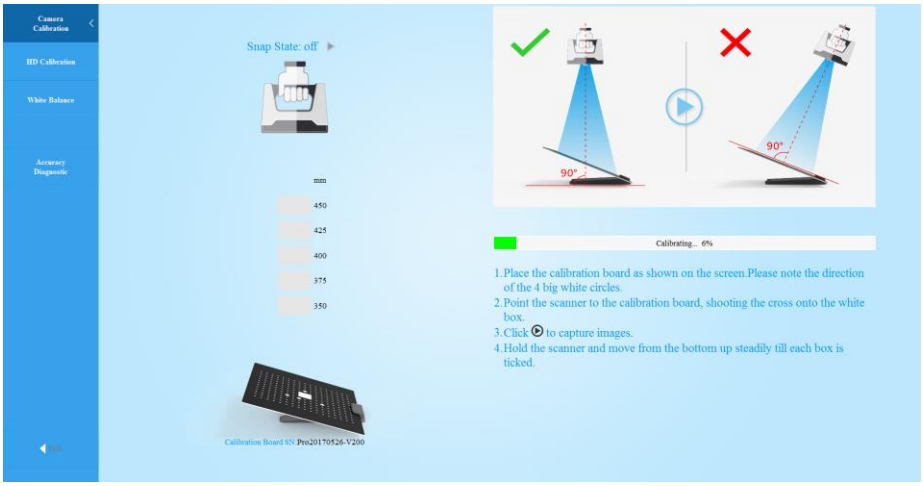
Click  in the software or  on the scanner to capture snaps automatically. During capture process, software picture shows the scanner projecting light. Move the scanner from top to bottom or from bottom to top, until the rangefinder is filled in green, which means Step 1 capture is finished, with software giving a beep sign. During capture, lift the scanner up when software shows “too close”; move the scanner down when software shows “too far”.

Note:
1. When the distance bar is ticked, it means pictures of this position are collected. Blue means the current position.
2. Keep the cross in the white square area when moving the calibration.
3. During calibration, keep the scanner perpendicular to the plane which places the calibration board

When pictures of one position are well collected, the software will turn to the next position with

buzzer as below:

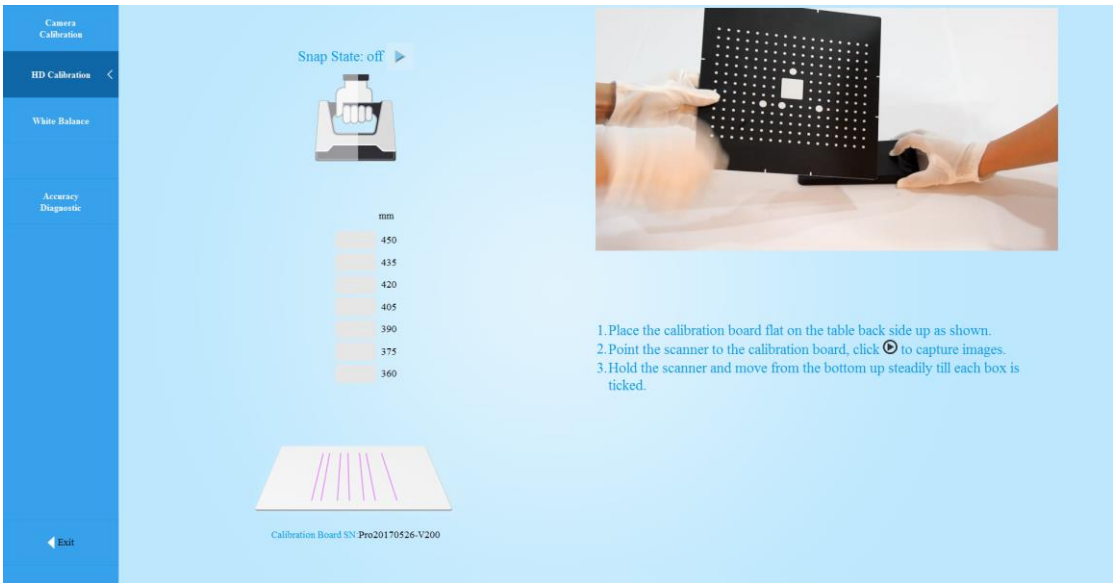
Put the calibration board on the support according to the instruction. The collection is same as above. When all five positions photos are captured, the software will calibrate the camera automatically. You will see the progress bar as below.



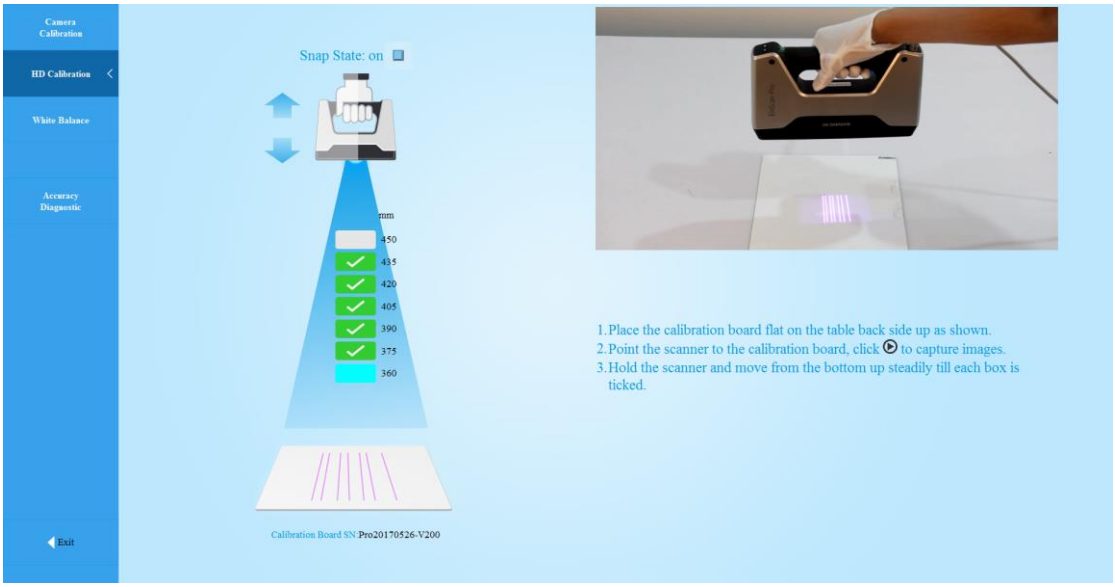
The camera calibration may keep for a long time in 52%, please be patient. When IT is finished, you'll see "Camera calibration success". The software will enter Color camera white balance mode automatically.

1.2. HD calibration

The software will enter HD calibration mode automatically after camera calibration.



Put the calibration board according to the video, with the line plane facing the white smooth area at the back of the calibration board. Click  or  , move the scanner up and down, the software will collect the pictures until the distance bar is ticked.



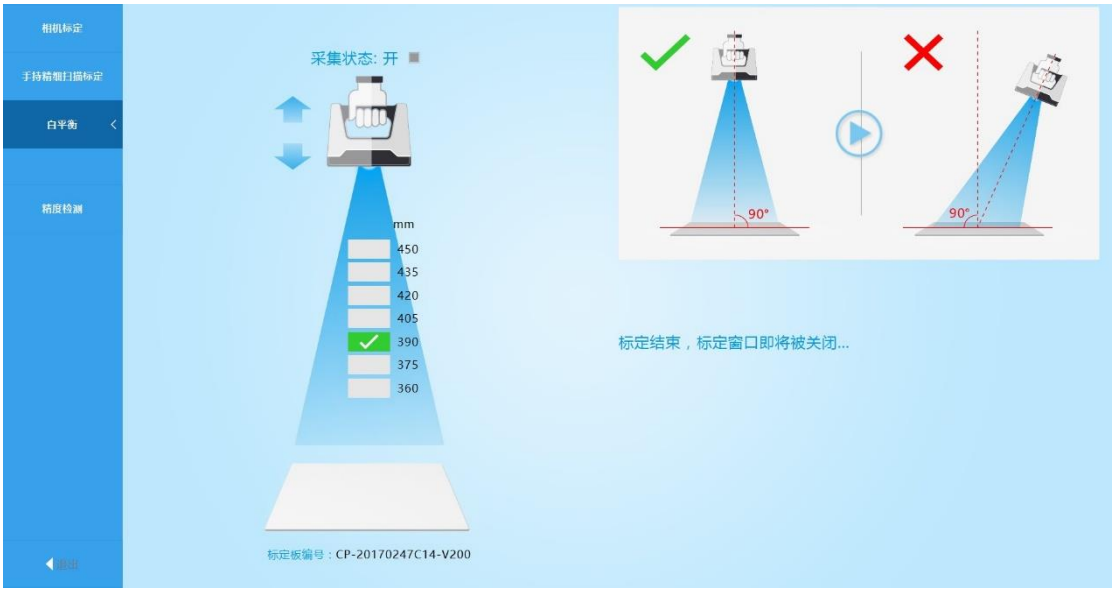
When the distance bar all ticked, the software starts to calibrate automatically. It will show “HD calibration success” when calibration is finished. If there is no color camera, click “Exit” to exit the calibration page, enter the scan mode selection page.

Camera calibration

1.3. White balance calibration

During the texture calibration, just place texture camera towards white area of the reverse side of calibration board, click  or  on the hardware, and move the scanner up and down, until one box is ticked, and the white balance test is completed. The picture below will show up when the calibration is successful.

When calibration is finished, the software will close the calibration window automatically and enter the scan mode selection page.



1.4. Calibration Precautions

You must finish all the calibration steps according to the instruction when you calibrate at the first time. If resolution is lost under HD Mode, or environment light changes and influences the scanning, you can do line calibration or white balance calibration solely.

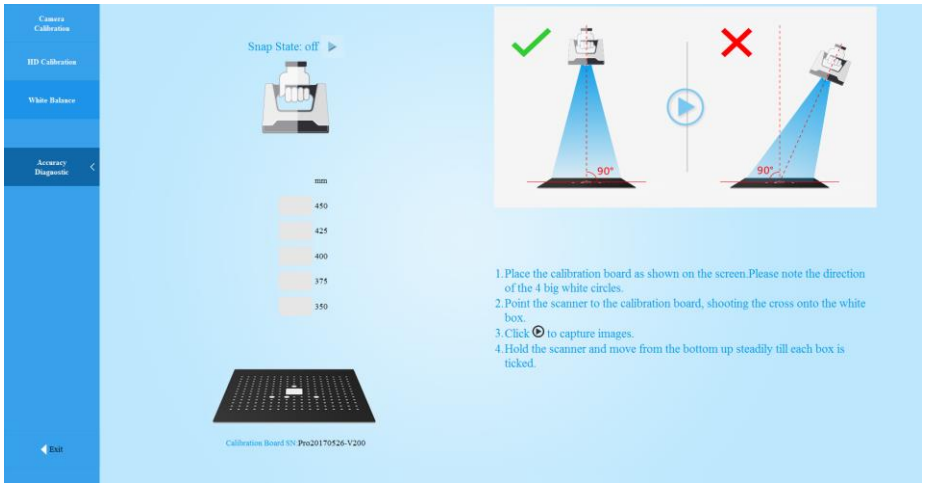
Situations as below need do calibration again:

① When the scanner is used for the first time or after long time without using.
② When there is strong vibration during the transportation.
③ When alignment mistake or failure frequent appear during the scanning.
④ When environment light changes under Color Scan, white balance calibration is needed.
⑤ When scanning data is incomplete and quality is much worse during the scanning.
Note: Make sure to keep the calibration board still and then click “Snap” to collect during calibration.

1.5. Accuracy Diagnostic

If markers can't be recognized, tracking lost or misalignment happens often, you can do Accuracy Diagnostic. If the result of the tolerance is big, please recalibrate.

Choose Accuracy Diagnostic from the calibration tool bar in the right, the way is same as camera calibration. Place the calibration board flatly, point the scanner cross on the middle white frame up and down slowly till all boxes getting green ticks.



The result of the accuracy tolerance will be shown. Go back to scan mode selection page by clicking "quit" at the left bottom.

Note: Recalibration is recommended when result is above 0.1mm.

5

Fixed Scan

Fixed Scan has two scan modes： fixed scan (without turntable) and Auto Scan.

1.1. Help Mode for Beginner

Choose Fixed Scan, click 'Next' to enter the interface of two scan modes selection. Choose Auto Scan, as shown below, click "Next".

Help Mode for Beginner is the default selection, which is to guide the new users make a scan completely step by step. Close Help Mode for Beginner by clicking the top right corner ☑Help-mode for beginners. To open Help Mode for Beginner, go to Menu -> User Setting ->Help Mode for Beginner

Under the Help Mode for Beginner, following the guidance step by step, you will finish a scan following: **New Project -> Texture/Non-texture ->adjust brightness -> start scanning -> Edit -> ->Continue Scan/Mesh -> Mesh type: Watertight/ Un-watertight -> Post Processing -> Save data**

1.2. Auto Scan

Enter the interface of New Project and Open Project, the default project save location is the desktop, then it will remember where the user last created a new project. Click “New Project”, enter the project name, then click ‘Save’ to enter the interface of Non-texture Scan and Texture Scan selection. Texture scan is only active when the scanner is with texture camera.

In the new project interface, select 

, can import three formats as asc, txt and p3. Note： the use of global markers file, the only point in the framework can scan. Global markers point can be deleted.

Enter the interface of auto scan.

1.2.1. Before Scanning

Camera viewport

Tick 

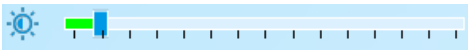
to display the right camera viewport and texture camera viewport. The left camera viewport always display.

Click  in the lower right corner of the camera viewport to zoom the camera viewport

Work distance

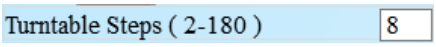
Adjust the distance between the object and device (suitable working distance is 350 ~ 450mm), until the cross is clearly to be seen on the object.

Adjust Brightness



Drag the button to adjust the brightness. The brightness is appropriate at the right scan distance: equipment against objects, the cross is clearly in the brightness viewing window.

Turntable Steps



Before scanning, you can set the scan times per round under turntable scan. The default setting is 8 times.

Align Mode

The default is turntable coded targets align mode， you can also choose markers or feature align mode. Align mode can be re-selected after the turntable has rotated one circle.

If you import global markers point file when creating a new project, the align mode is global mark point, and the project cannot change to other align mode. In the new project interface, select

, can import three formats as asc, txt and p3. Import global mark point. Note： The use of global markers point, the only point in the framework can scan.

⚠ Note:

1、 Choose turntable coded targets align mode, Please make sure that the object won't block the coded targets on the turntable. Or, there will be no fringe pattern, while turntable will be still rotating. If the scanned object is too high and will block the coded target on turntable, you can stick mark points on it (if allowed) to continue auto scan. At this time, please make sure that the coded target 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. Refer to Scan Preparation.

2、 Feature align, when scan it will verifying and scan 3 piece of data.

HDR

Enable HDR brightness can scan bright and dark objects.

1.2.2. Scanning

Start Scan

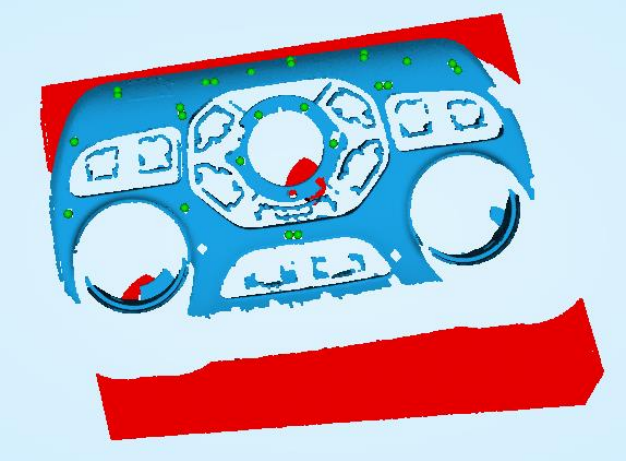
Click the button to start scanning. After the turntable has rotated one circle， you can change turntable steps and align mode.

Edit Tool

Edit buttons: ①Deselect ②Revert ③Delete ④Undo ⑤Show/Hide Stripe ⑥Shift + Left mouse: choose data ⑦Ctrl + Left mouse: deselect selected data

You can edit the current part data after each scan. You can do the below edition if the data has excess parts, both data and mark points can be edited.

SHIFT+Left mouse： Select excess parts, the selected section is displayed in red, as shown below.



Ctrl + Left mouse: deselect selected data

Delete selected data

Click the button or “DELETE” in the keyboard to delete selected data.

Undo

You can only undo the last deleted data.

Show/Hide Stripes

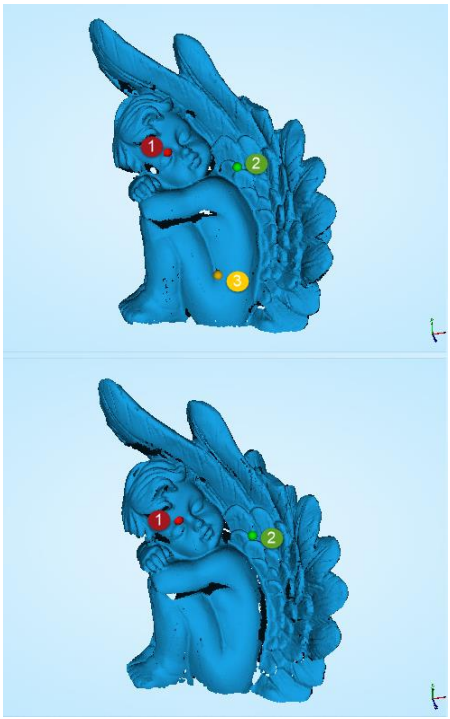
Click the button to switch the texture display and hide. Non-texture scan, there is no such button.

End single-piece edit

 Click  to save data and exit the single-piece edition; Click , delete the current scan dat.

After end the single-piece edit, the right toolbar will display, and now can edit the whole scan data.

The specific operation is the same as the single-piece edit.



Manual Align

If automatic alignment failed during scanning, you can use manual align. Click the button to open Manual Align view port on the left side of the software. Keep SHIFT down, and click left mouse button to select at least 3 non-collinear corresponding points in the 3D preview windows for Manual align, as shown on the right.

Delete Current Data

If you are not satisfied with current scanning data, or there is not enough overlapping region for registration, click the button to delete current data and then change the position of the scanner or the object to scan again.

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

When import project, click the button and it will remove the single data.

Pause

Click the button, scanning will pause; Click again to resume scanning.

1.2.3. After Scanning

Mesh

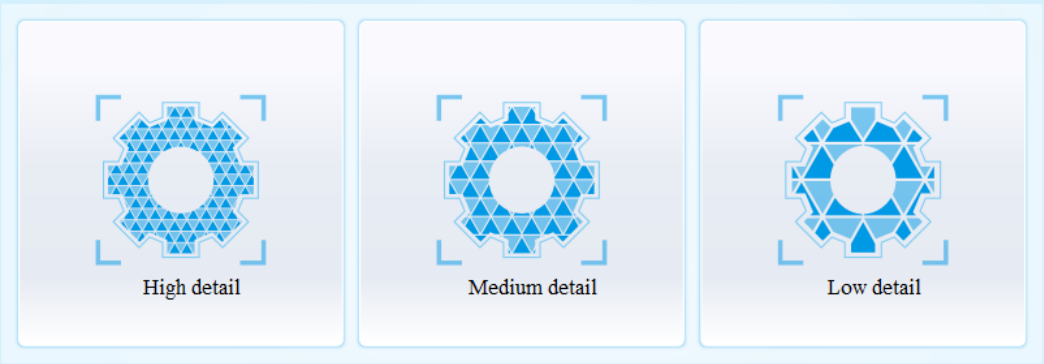
When the scan is completed, click the botton, proceed to post-processing. You will see two modes after clicking the button: Watertight and Unwatertight. Watertight usually slower than unwatertigt. Texture scan mode will take more time compared to Non-Texture scan mode.

Watertight

Closed model can be printed directly. After choose this mode, you should select the object details.

Select High for objects with fine texture, select Med or Low for objects in smooth surface or with less detail. The time for data processing is in relation to the detail setting. The higher the level of details is, the longer time the processing takes. It may keep for a long time in 95%, please be patient.

Select the object details：



Unwatertight

Unclosed model. The following picture is the watertight and unwatertight model.

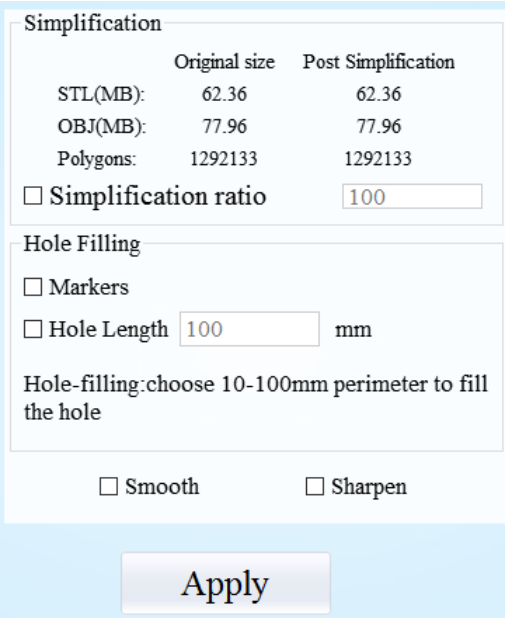
Watertight

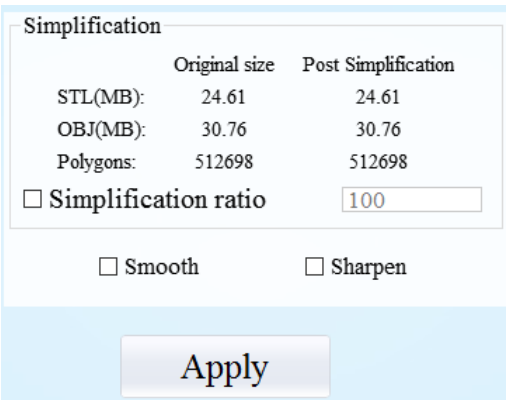
Unwatertight

Texture watertight results:

Data Post Processing

After meshing, the following dialogue box of data post processing will appear. You can simplify the data per your request, do fill holes, sharpening or smoothing operations. Unwatertight and watertight, the post processing of the interface as shown below.

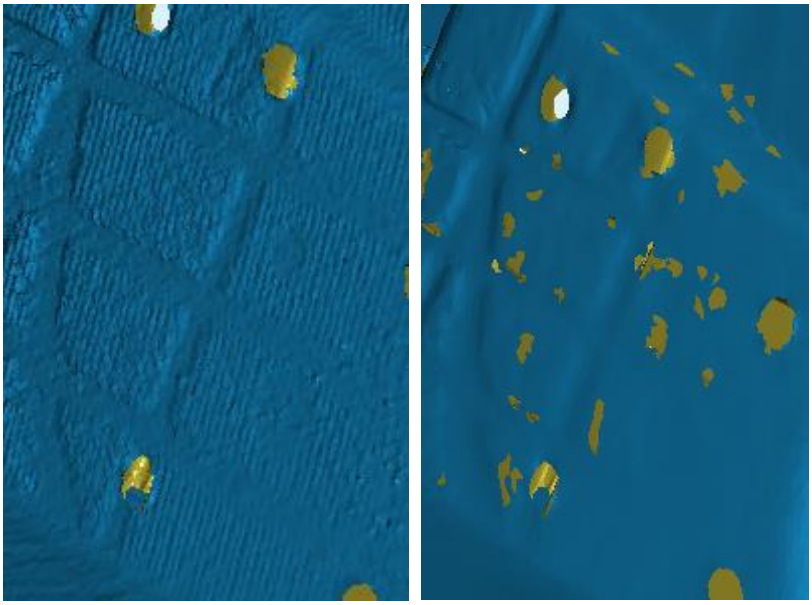




Data simplification

After simplification, the polygon numbers, size and surface detail of data will be reduced accordingly. Check the simplify check box and set the ratio, the default is 100%.

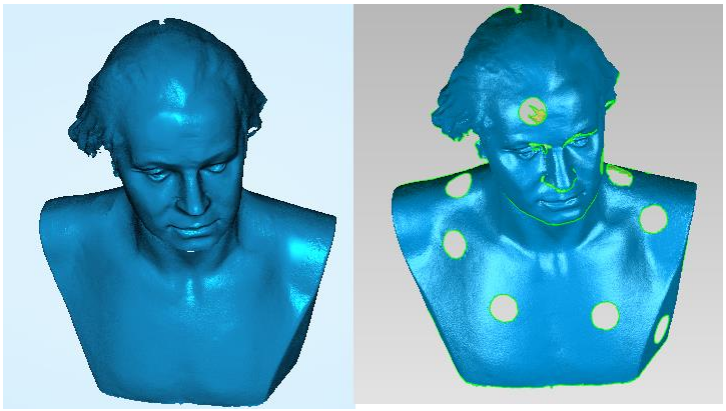
The comparison of detail between before simplification and after simplification (at 30% simplify proportion).



Before simplification After simplification

Fill holes

The default does not check the mark point and fill hole, check the fill hole you need set perimeter, choose 10-100mm perimeter to fill the hole, less than the perimeter of the hole will be filled. Mark point fill hole as an example.



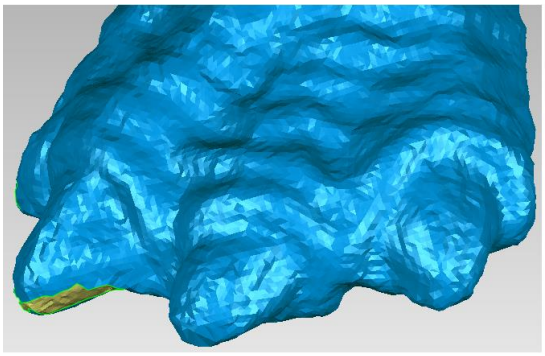
After Before

⚠ **Note:**

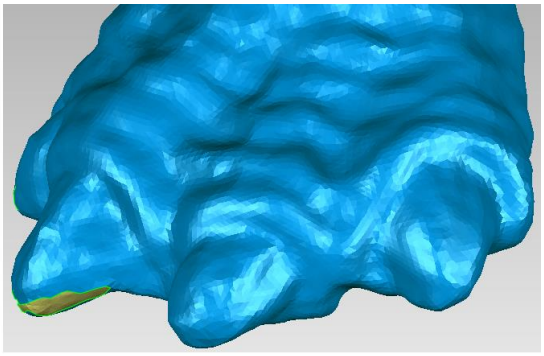
1. If the edge of the hole is not smooth may cause the effect is not good, not recommended to fill hole.
2. Hole-filling: choose 10-100mm perimeter to fill the hole;

Smooth

The data to denoise processing, improve data quality, the figure before and after smoothing:



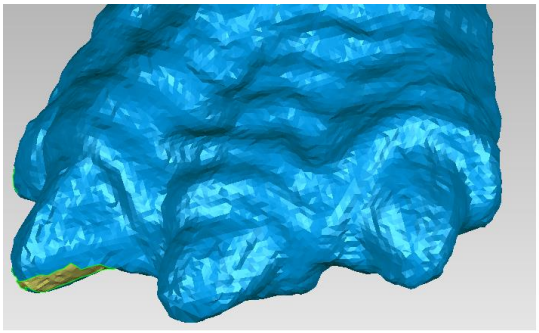
Before smooth



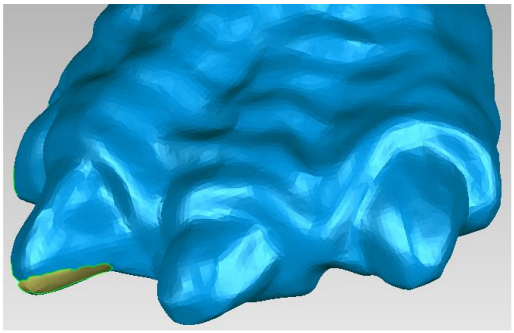
After smooth

Sharpen

Improve the overall clarity of the data, the figure below before and after sharpening:



Before sharpen



After sharpen

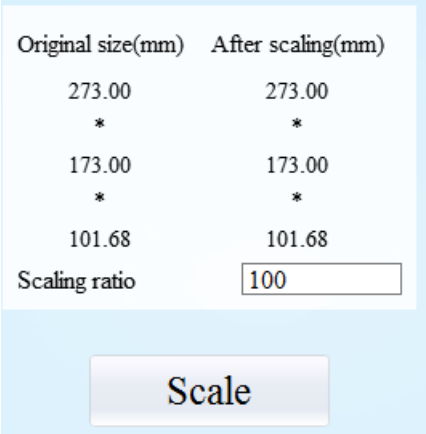
Save Your Data

Before merging can save data as asc single. After merging, it can be saved as asc, stl, ply,3mf and obj.

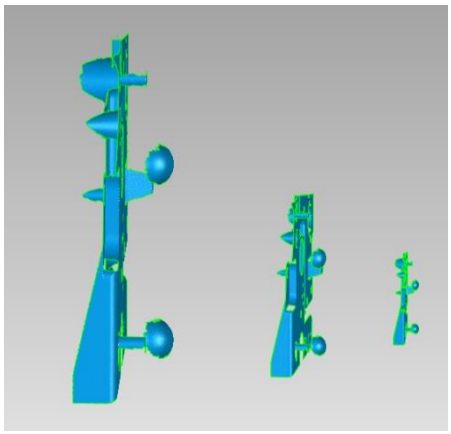
Scale

Scaling the volume of scanning data, while the quantity of triangular facets and size of data will not be changed.

Scaling result as reference: From left to right shows double size, original size and half size respectively.



Scale window



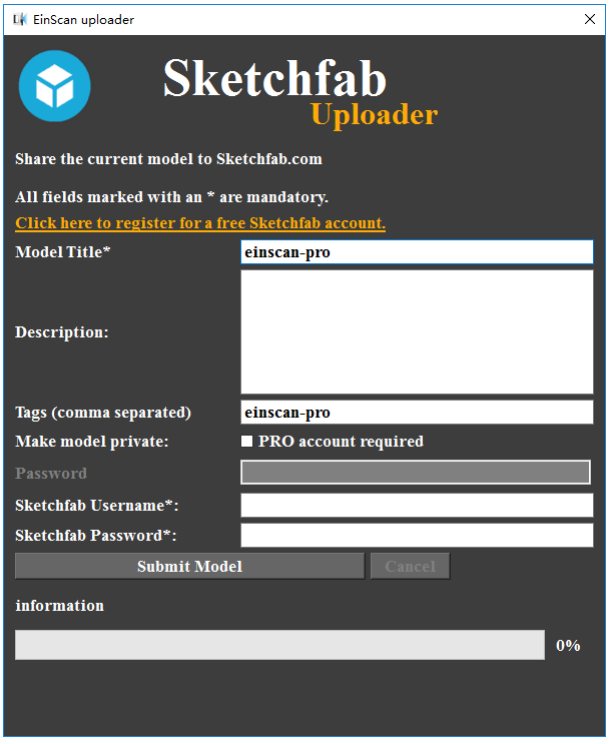
Scale result

Share Your Data

Click the button after merging to share data, it will show the dialog as below.

You can share your model to Sketchfab, while model title, username and user password are required. Register an account and look at the shared model at http://sketchfab.com.

> **Note:**
> Sketchfab Normal account can only upload data maximum 50M, while Professional account can share maximum 200M, and set model as private.



Project

You can new or open projects. The default project location is the desktop, then it will remember where the user last created a new project.

Note:

1. The scanning projects created by different scan modes (Industry fixed scan, handheld HD scan and handheld rapid scan) cannot be reciprocally imported. The projects created by auto scan and fixed scan (without turntable) can be reciprocally imported.
2. After importing the project, direct access to scan, choose the scan mode based on whether the imported project is texture. The texture project cannot be continued to scan if the scanner is without color texture camera.

Back to Home

If you want to change the scan modes, click the button to go back to the homepage to select the scan mode.

1.2.4. Others

Mouse Operation Prompts

Lower left corner of the interface is the mouse operation prompts:

- **Hold down the left mouse button**: Rotate the object;
- **Hold down the middle mouse button**: pan the object;
- **Hold down the mouse wheel**: Scroll up and down to the object; scroll down to enlarge the object;
- **Hold down the Shift + left mouse button**: select the area on the object;
- **Hold down the Ctrl + left mouse button:** deselect selected data;
- **Delete**: Delete the selected area.
- **Press and hold shift + left mouse click**: Select point to start manual align

Points and Triangle

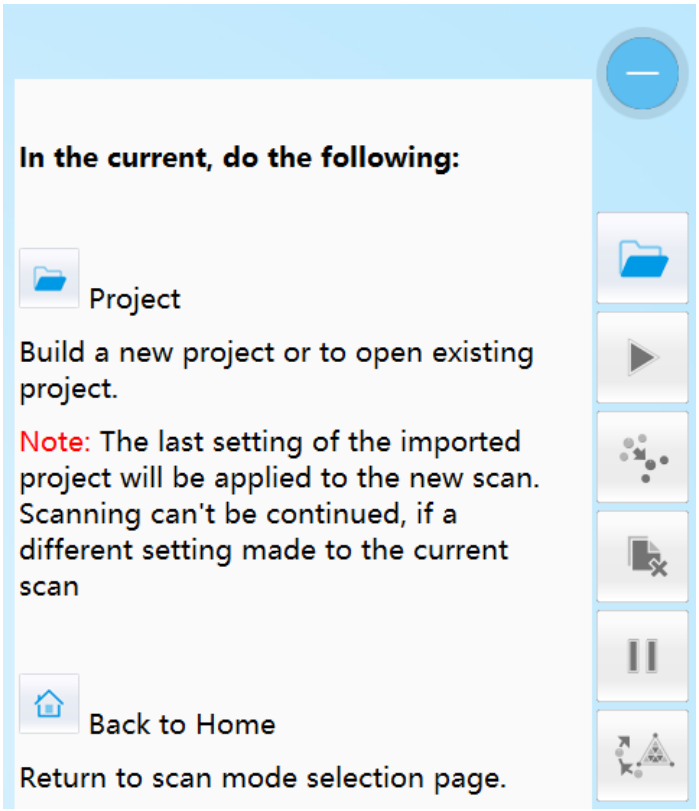
Points	649634
Triangles	1292133

When scanning it will show the current points and current triangles in the lower right corner. When you edit the scan data, the current points and the current triangles change in real time.

Help

Click this button to get the operation manual and notes in more detail under the current step.

The following picture shows the help information of new project.



Model Viewer

Einscan software can be a 3d viewer for ASC, OBJ, STL format file. Drag the 3d model to Einscan software under scanning mode interface.

Click  on the 3d viewer window will close the model view. The scanning window will be not affected.

1.3. Fixed Scan (without turntable)

Choose the fixed scan (without turntable) mode, as shown below, enter the scan interface, refer to Auto Scan to new project and select texture.

After new a project, the scan interface is as shown below:

Fixed Scan (with turntable)

Adjust the distance between the object and device (350 ~ 450mm), adjust brightness, refer to Auto Scan.

Click  to start scanning. When the scan is completed, change the position of object or scanner for next scan. If use feature align, make sure the overlap area of currently scan area and the last scanned data is more than 1/3. If use mark point aligns, the common points should more than 3. Then click scan button, the data will automatically align, until the whole scanning completed.

> ⚠ Note：
> You can use markers align, feature align. Mark point will be recognized to align automatically when there are mark points on the object.

Edit, manual align, delete current data, mesh, save data and share refer to Auto Scan.

6

Handheld Scan

1.1. Scan head key function

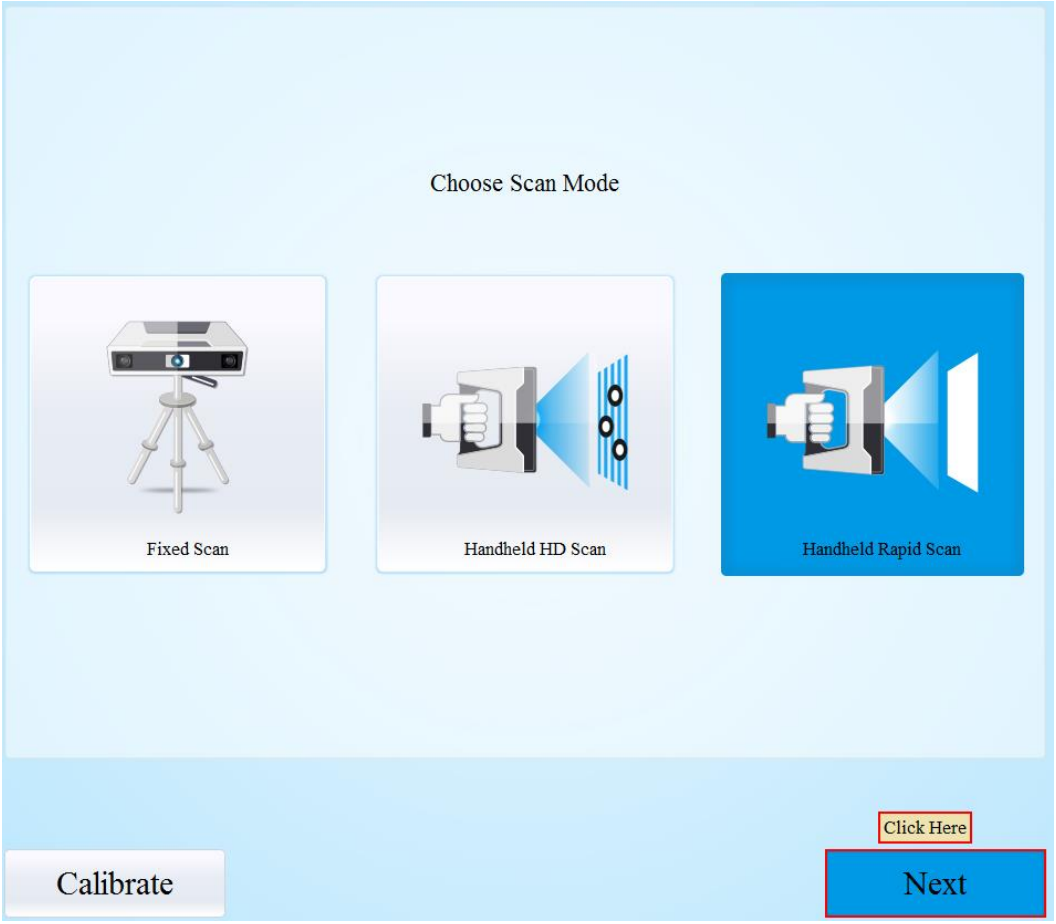
Scanning distance indicator: Green for best distance; blue for too far, red for too close. The color is same as the distance bar in operation interface.

“ - ” “ + ”： During the scanning, zoom in and out in view of data under exposure window， “-” “+” can adjust the

Scan/pause button: click the button to pause or start scanning.
Double click to activate exposure adjustment window.

1.2. Help Mode for Beginner

Choose Handheld Rapid Scan, click “Next”, as shown below:

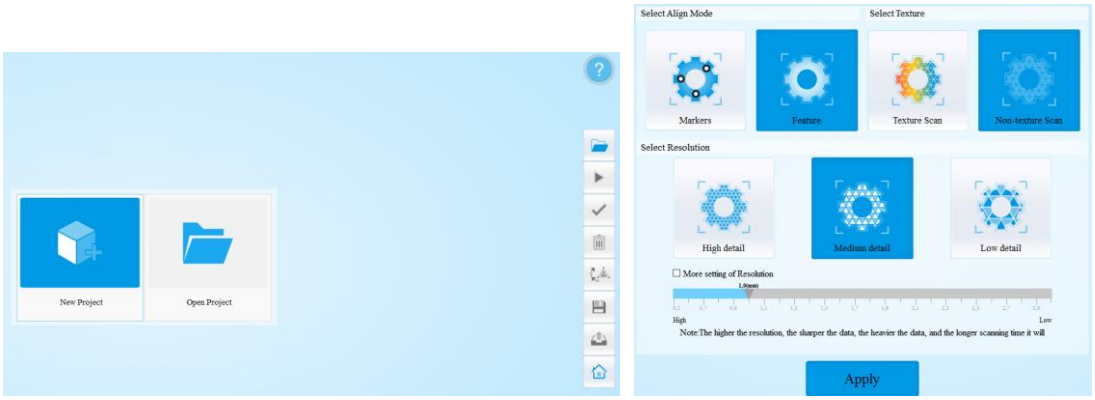


Help Mode for Beginner is the default selection, which is to guide the new users make a scan completely step by step. Close Help Mode for Beginner by clicking the top right corner ☑Help-mode for beginners. To open Help Mode for Beginner, go to Menu -> User Setting ->Help Mode for Beginner

Under the Help Mode for Beginner, following the guidance step by step, you will finish a scan following: **New Project -> Texture/Non-texture, Resolution -> Preview-> Adjust brightness->start scanning ->Pause scanning -> Edit -> complete -> Continue scan/Mesh -> Mesh type: Watertight/ Un-watertight -> Post Processing -> Save data**

1.3. Handheld Rapid Scan

Enter the interface of new project, as shown below, click “New Project”, type the project name, then will pop-up the interface of texture scan and resolution selection. Texture scan is only active when the scanner is with texture camera. The process of Non-texture Scan and Texture Scan are same.



Select Resolution

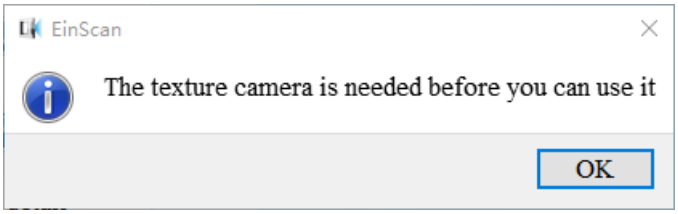
The higher the resolution, the better the details. If select the “More setting of Resolution”, you can drag the sliding block to other locations, flexible choice of point distance.

Handheld Rapid Scan point distance range: 0.5mm—3.0mm, high 0.5mm, medium 1.0mm, low 1.5mm.

> ⚠ Note:
> 1.Higher resolution takes more time to scan and consumes more memory of graphic card，and size of the object to be scanned will be limited. Theoretically, the maximum size of scan = point distance*8192/mm. In actual process, the size of the object can be scanned depending on computer graphic card.
> 2. Choose high resolution, the data output is slow, please be patient.
> 3. When import project, and continue the scan, the scanning will be in accordance with the imported project resolution and align mode.

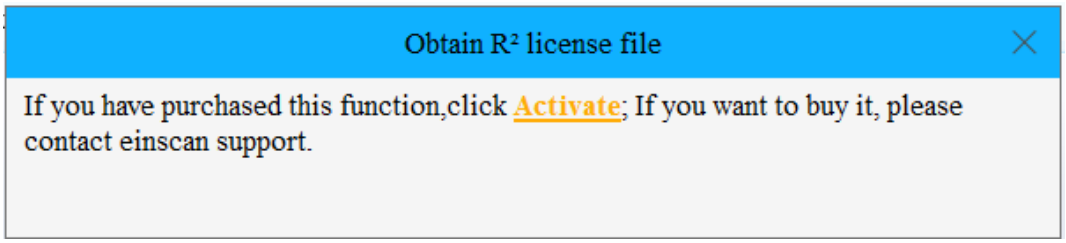
Select Texture

If texture camera is not attached, when you select texture,it will pop-up a dialog as shown below:



Select Align Mode

When select markers align mode,if you have purchased R2,click “Active” and import the encode file; If you want to buy this function, please contact support（einscan_support@shining3d.com）.



Markers align mode relies on reflective mark points to align. Stick mark points on the object in random, avoiding sticking in one line, refer to scan preparation.

When select markers align mode, you can tick

, can import three formats as asc, txt and p3. Note：the use of global markers file, the only point in the framework can scan. Global markers point can be deleted.

Note:

Mark point align: good for objects are without any features, or with symmetry features.

Features align: good for objects are with detail features, or those are now allowed for reference points sticking.

If there is no limitation about surface points sticking, and there is enough features, both align methods can be selected.

The interface of Handheld Rapid Scan:

1.3.1. Preview

Camera viewport

Tick 

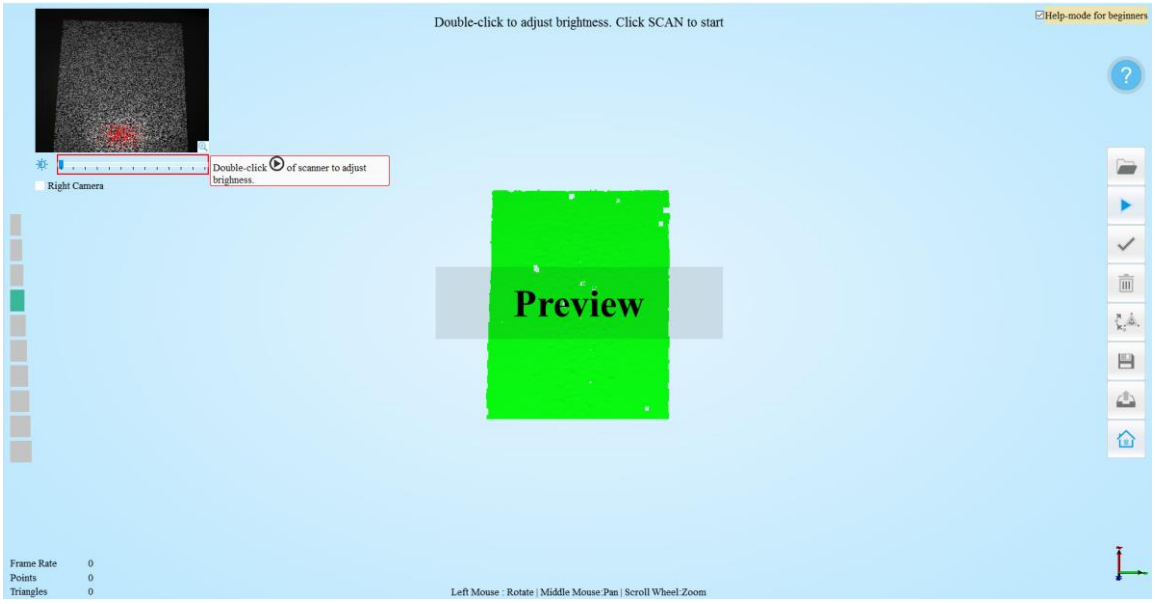
to display the right camera viewport and texture camera viewport. The left camera viewport always display.

Click  in the lower right corner of the camera viewport to zoom the camera viewport

Preview

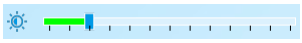
 Point the scanner to the object, then click  on software or press  on scanner to run into PREVIEW mode. In this mode, it will start to capture data, but not recorded. In this mode, you can:

1. Check working distance, and field of view for scanning;
2. Adjust a proper brightness before scanning.

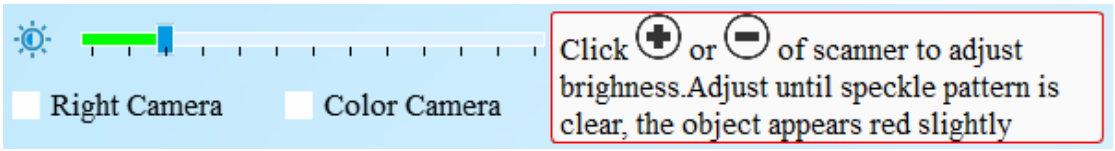


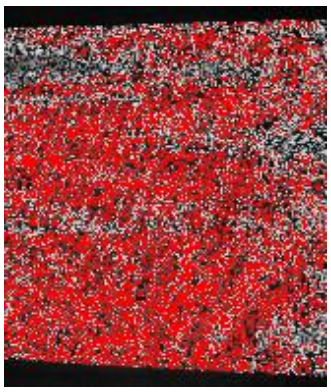
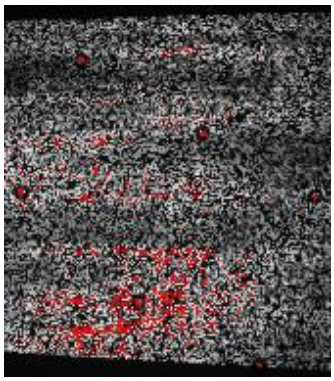
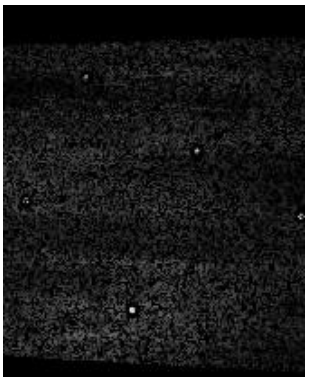
Adjust Brightness

1. When scanning distance is adjusted properly, double click  , and adjust the brightness by pressing “+, -“ button on the scanner. Double click  to exit the brightness adjustment.

2. Brightness can be also adjusted via the brightness slider under the camera window  on the left side.

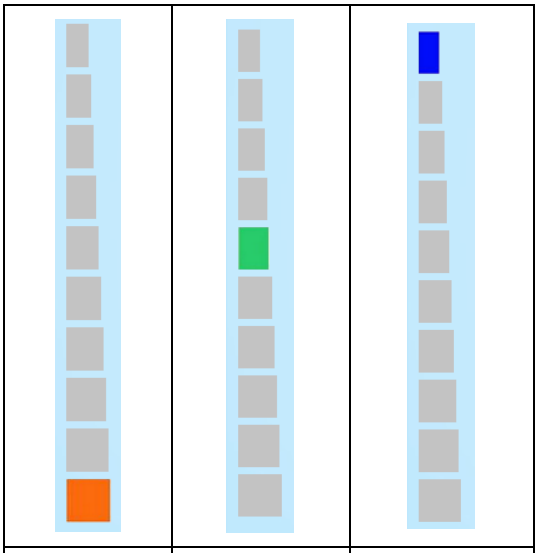
3. Brightness can be adjusted during scanning.



		
To bright(X)	Good(√)	To dark(X)

Rangefinder

Rangefinder is on the left side. It reveals different colors based on the distance between the scanner and the object. At the correct distance, it will show green. If it is too close it will show red and if it is too far it will show blue. Please adjust the scanner position until the rangefinder color turns green.



Too Close	Good	Too Far

When brightness adjustment is over, click  **on the scanner or**  **in the software to start scan recording.**

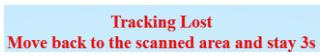
> ⚠ Note:
> 1. Preview mode is needed every time for brightness adjustment when a new project is built or an existing project is imported for continues scanning.
> 2. When open project, if click  , preview mode is no longer available.

1.3.2. Scanning

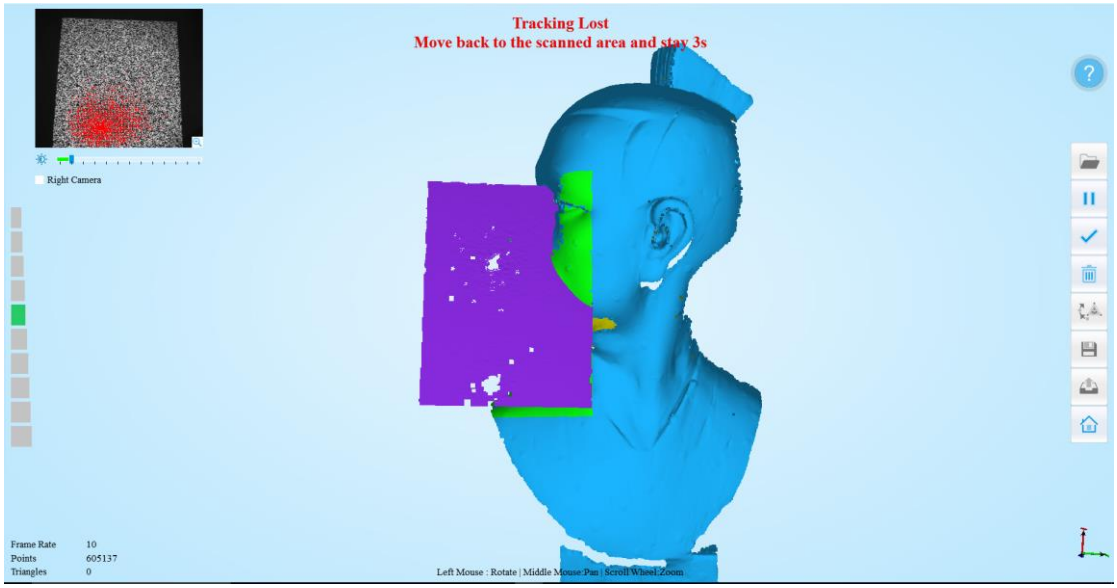
Start scan

 Click the button or the button  on the hardware to start scanning.

When start scanning, keep the scanner opposite to the object for 3 seconds, and start to move when scan data shows. To improve the scan efficiency, the movement should be continuous and uniform.

Feature Align: If the scanning presents purple color and 

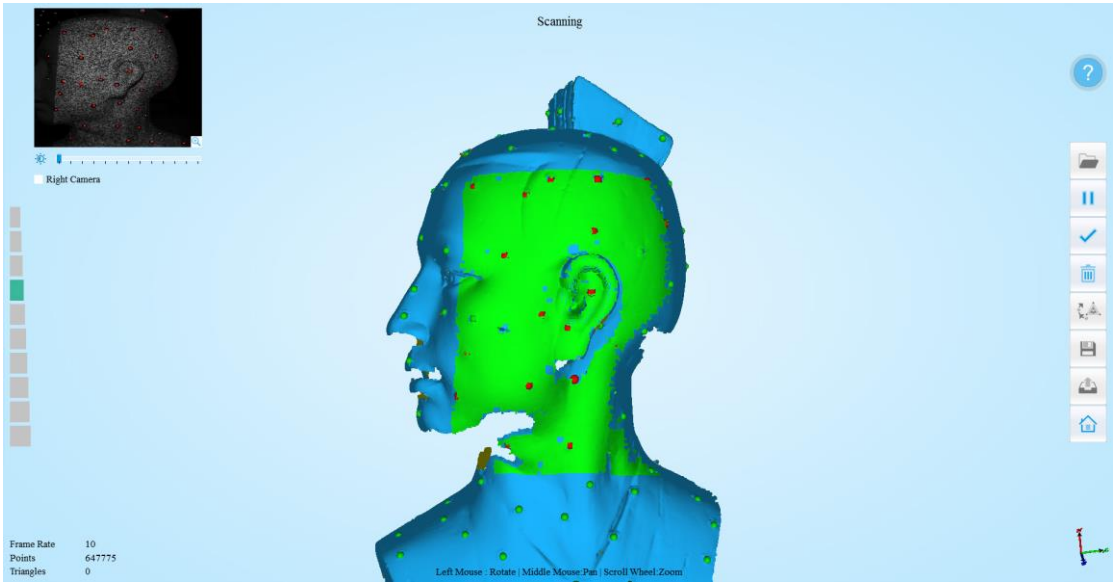
appears, and buzz, it indicates that the position tracking fails. You need to go back to the previous scan area and wait for about 3 seconds and adopt merging features for about several seconds, and then try to scan normally.



> Note:
> When the scanned data quality is not good, please check the distance, and if the brightness is proper in good distance condition. Check brightness through exposure whether the light frame is clearly shooting on the object.

Mark point align: before scanning should stick mark points on the object in random, refer to scan preparation, avoiding sticking in one line. The green area is the current scan, as shown below .

When the position tracking fails, it will appear **Tracking Lost** , You need to go back to the previous markers to get to be tracked again to continue scan.



Pause

Click the button or press the button  on the scanner to suspend scanning and check with it. Click Scan and continue from where have been already scanned.

Edit Tool

Edit buttons: ①Deselect ②Revert ③Delete ④Undo ⑤Show/Hide Stripe ⑥Shift + Left mouse: choose data ⑦Ctrl + Left mouse: deselect selected data

You can edit the current part data after each scan. You can do the below edition if the data has excess parts, both data and mark points can be edited.

SHIFT+Left mouse： Select excess parts, the selected section is displayed in red, as shown below.

Ctrl + Left mouse: deselect selected data

Delete selected data

Click the button or “DELETE” in the keyboard to delete selected data.

Undo

You can only undo the last deleted data.

> **Note：**
> Handheld scan mode does not support the deletion of mark points. Handheld rapid scan, feature align, use the edit button to delete all the data, continue scanning will restore the last deleted data.

Show/Hide Stripes

Click the button to switch the texture display and hide. Non-texture scan, there is no such button.

Finish Scan

Click the button when scanning data is complete to save the data.

Note：

1. When new project choose the high resolution, the slow it saves, please be patient.
2. After click ” Finish Scan”， if you continue to close the program Data loss may occur. Please wait.

Delete Your Data

Click the button to delete the whole data and restart scanning.

1.3.3. After Scanning

Mesh

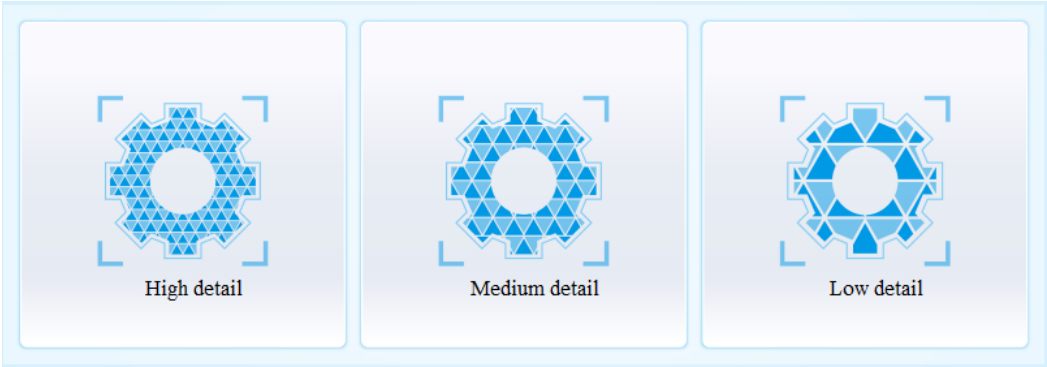
When the scan is completed, click the botton, proceed to post-processing. You will see two modes after clicking the button: Watertight and Unwatertight. Watertight usually slower than unwatertigt. Texture scan mode will take more time compared to Non-Texture scan mode.

Watertight

Closed model can be printed directly. After choose this mode, you should select the object details.

Select High for objects with fine texture, select Med or Low for objects in smooth surface or with less detail. The time for data processing is in relation to the detail setting. The higher the level of details is, the longer time the processing takes. It may keep for a long time in 95%, please be patient.

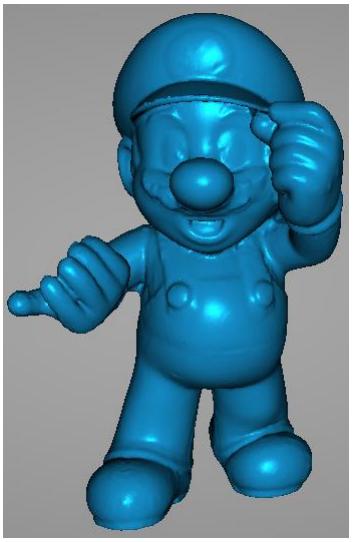
Select the object details：



> ⚠ Note：
>
> 1. Select High for objects with fine texture, select Med or Low for objects in smooth surface or with less detail. The time for data processing is in relation to the detail setting. The higher the level of details is, the longer time the processing takes.
> 2. Watertight usually slower than unwatertigh, high resolution takes more time, it may keep for a long time in 95%, please be patient.

Unwatertight

Unclosed model. The following picture is the watertight and unwatertight model.



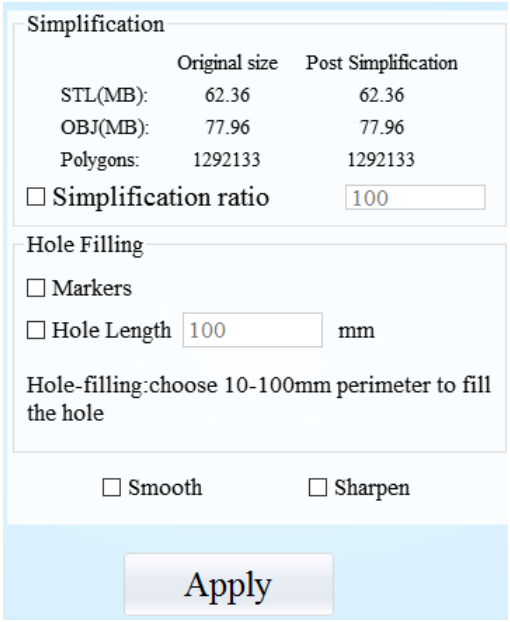
Watertight

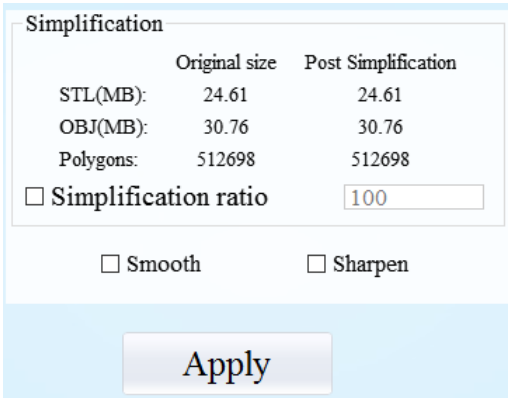
Unwatertight

Texture watertight results are shown in the picture:

Data Post Processing

After meshing, the following dialogue box of data post processing will appear. You can simplify the data per your request, do fill holes, sharpening or smoothing operations. Unwatertight and watertight, the post processing of the interface as shown below.

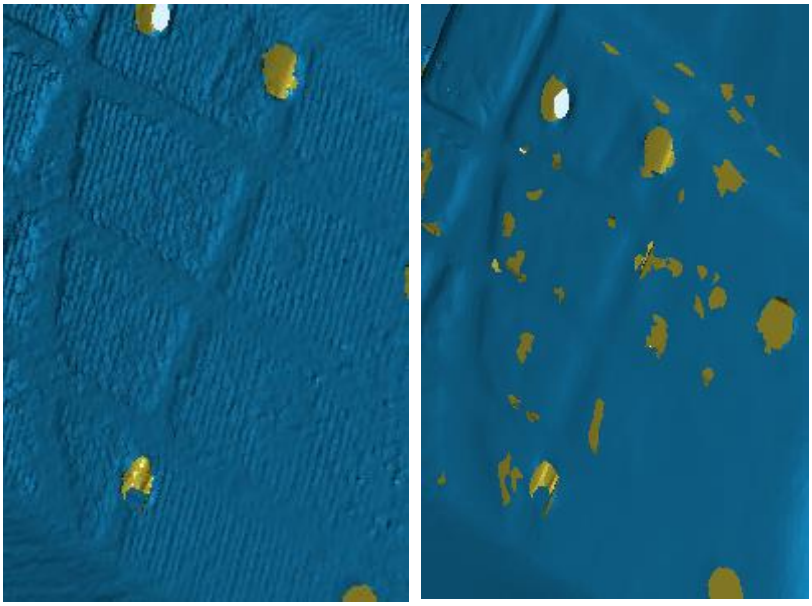




Data simplification

After simplification, the polygon numbers, size and surface detail of data will be reduced accordingly. Check the simplify check box and set the ratio, the default is 100%.

The comparison of detail between before simplification and after simplification (at 30% simplify proportion).

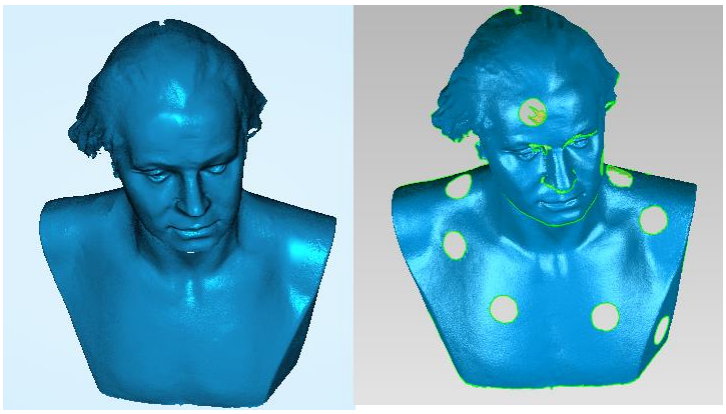


Before simplification After simplification

Fill holes

The default does not check the mark point and fill hole, check the fill hole you need set

perimeter, choose 10-100mm perimeter to fill the hole, less than the perimeter of the hole will be filled. Mark point fill hole as an example.



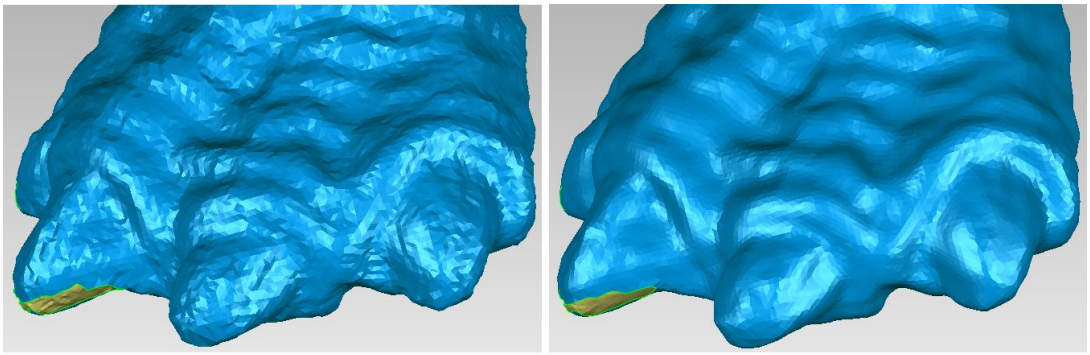
After Before

Note:

3. If the edge of the hole is not smooth may cause the effect is not good, not recommended to fill hole.
4. Hole-filling: choose 10-100mm perimeter to fill the hole;

Smooth

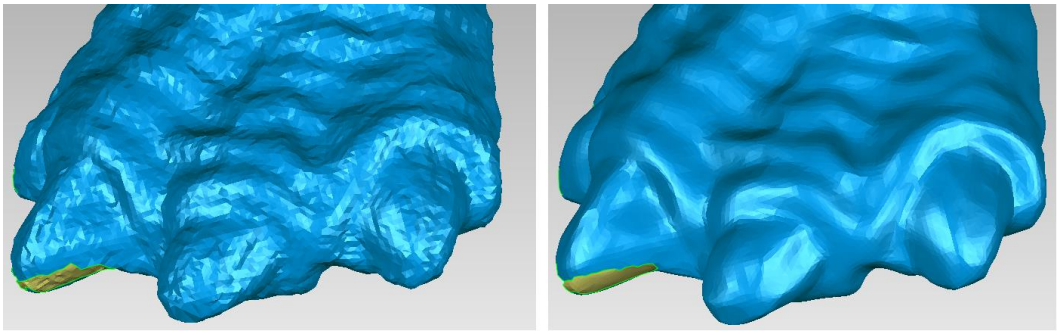
The data to denoise processing, improve data quality, the figure before and after smoothing:



Before smooth After smooth

Sharpen

Improve the overall clarity of the data, the figure below before and after sharpening:



Before sharpen After sharpen

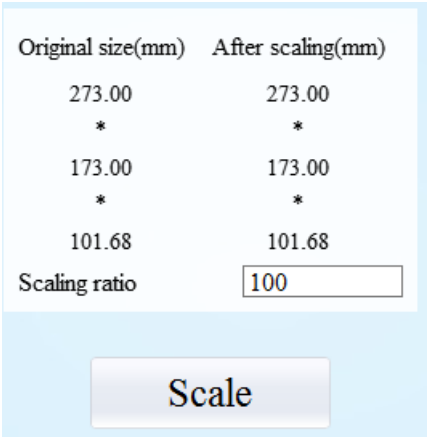
Save Your Data

Before merging can save data as asc . After merging, it can be saved as asc, stl, ply,3mf and obj.

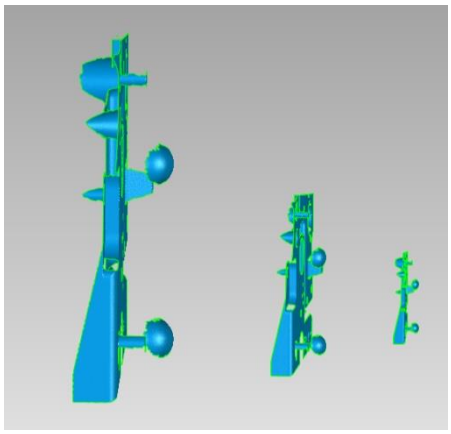
Scale

Scaling the volume of scanning data, while the quantity of triangular facets and size of data will not be changed.

Scaling result as reference: From left to right shows double size, original size and half size respectively.



Scale window



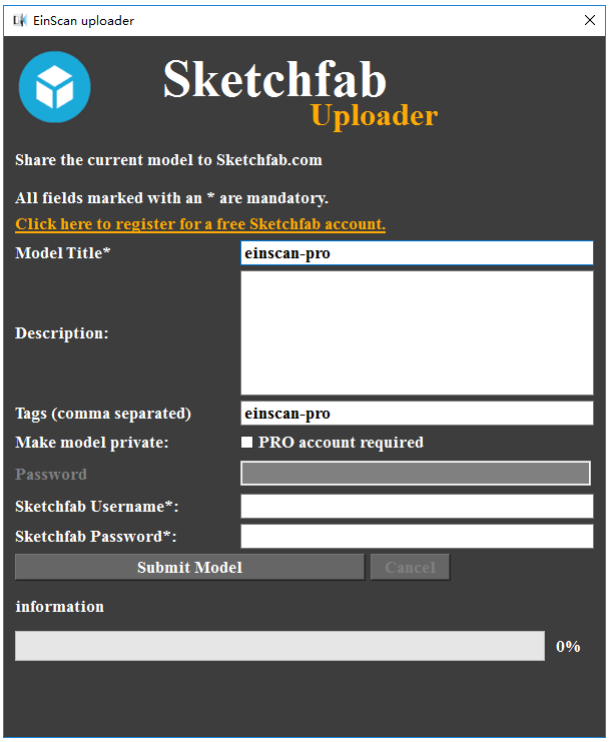
Scale result

Share Your Data

Click the button after merging to share data, it will show the dialog as below.

You can share your model to Sketchfab, while model title, username and user password are required. Register an account and look at the shared model at http://sketchfab.com.

> **Note:**
> Sketchfab Normal account can only upload data maximum 50M, while Professional account can share maximum 200M, and set model as private.



Project

You can new or open projects. The default project location is the desktop, then it will remember where the user last created a new project.

> **Note:**
> 1. Handheld rapid scan will follow whether the imported project is mark point align or feature align. If imports a mark point align project or global mark point project when there is no such function, you can't do further scan but only edit or merge the project.
> 2. Handheld scan mode: When import project, and continue the scan, the scanning will be in accordance with the imported project resolution.

Back to Home

If you want to change the scan modes, click the button to go back to the homepage to select the scan mode.

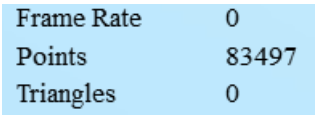
1.3.4. Others

Mouse Operation Prompts

Lower left corner of the interface is the mouse operation prompts:

- **Hold down the left mouse button**: Rotate the object;
- **Hold down the middle mouse button**: pan the object;
- **Hold down the mouse wheel**: Scroll up and down to the object; scroll down to enlarge the object;
- **Hold down the Shift + left mouse button**: select the area on the object;
- **Hold down the Ctrl + left mouse button:** deselect selected data;
- **Delete**: Delete the selected area.

Frame rate, Points, Triangle

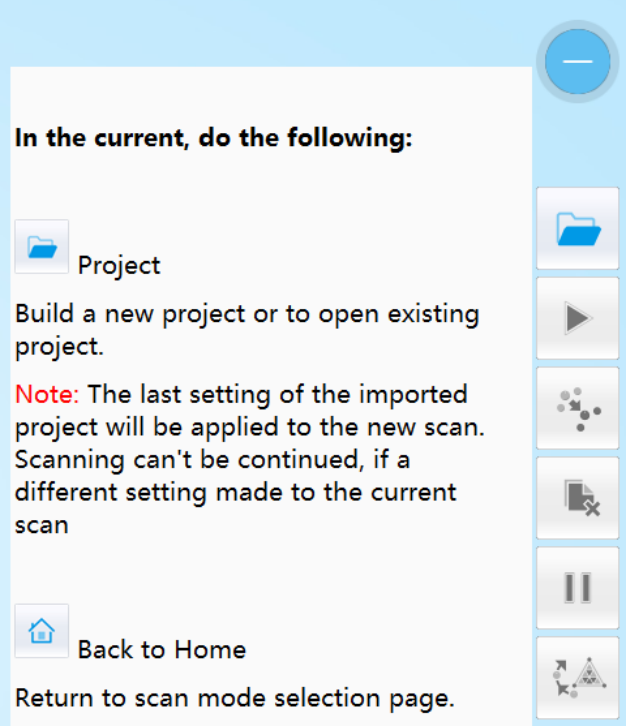


When scanning it will show the Frame rate, current points. After merging, it will show current triangles in the lower right corner. Handheld Rapid Scan's scan speed is 10 frames/sec. When you edit the scan data, the current points and the current triangles change in real time.

Help

Click this button to get the operation manual and notes in more detail under the current step.

The following picture shows the help information of new project.



Model Viewer

Einscan software can be a 3d viewer for ASC, OBJ, STL format file. Drag the 3d model to Einscan software under scanning mode interface.

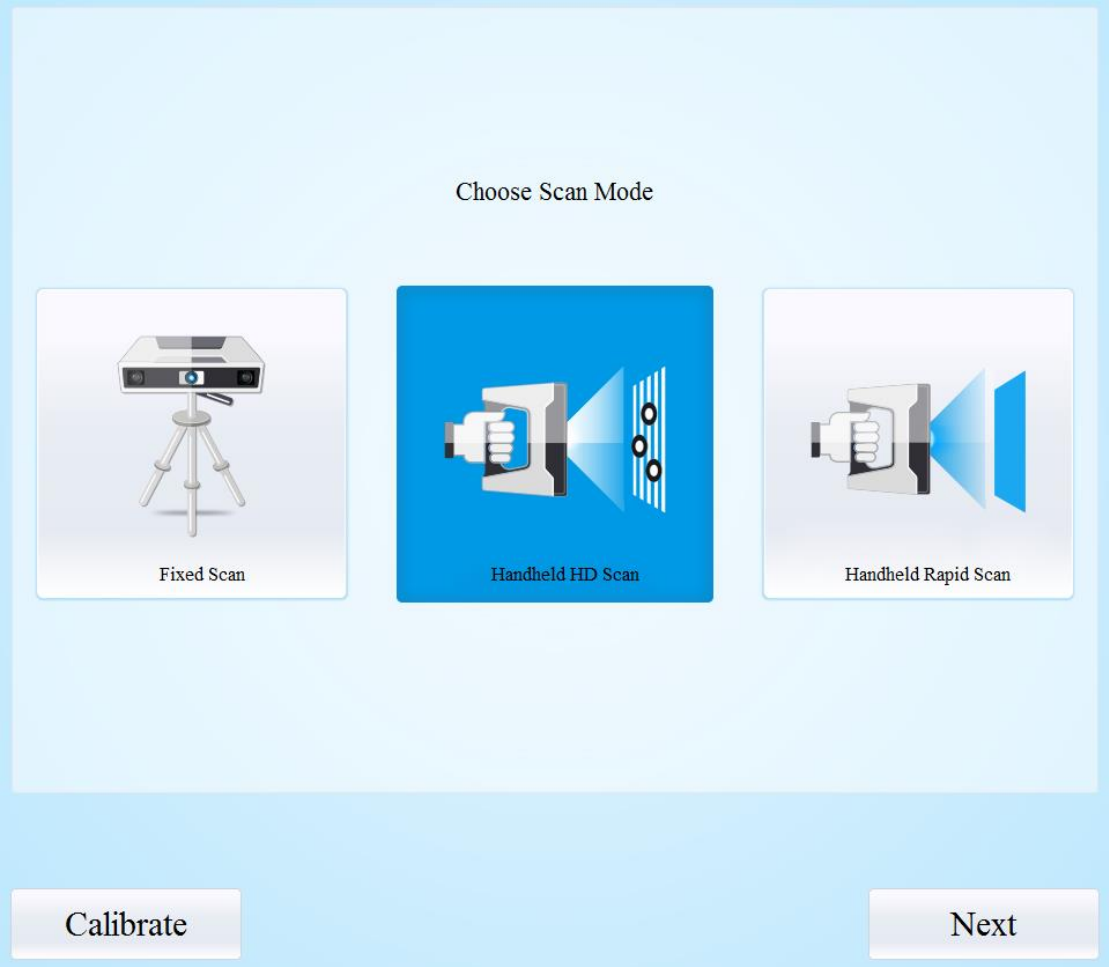
Click  on the 3d viewer window will close the model view. The scanning window will be not affected.

1.4. Handheld HD Scan

HD scan relies on reflective mark points to align. Stick mark points on the object in random, avoiding sticking in one line.

> **Note:**
> The single scan range is 210mm X 150mm, public areas alignment require at least four mark points. While placing the points, uniformly stick the mark points on the object, and make sure that in each single scan area has at least 4 points.

Choose Handheld HD Scan mode, click"Next".



After new project, select resolution. The higher the resolution, the better the details. If select the "others", you can drag the sliding block to other locations, flexible choice of point distance.

Select resolution

Handheld HD Scan point distance range: 0.2mm—3.0mm, high 0.2mm, medium 0.5mm, low 1.0mm.

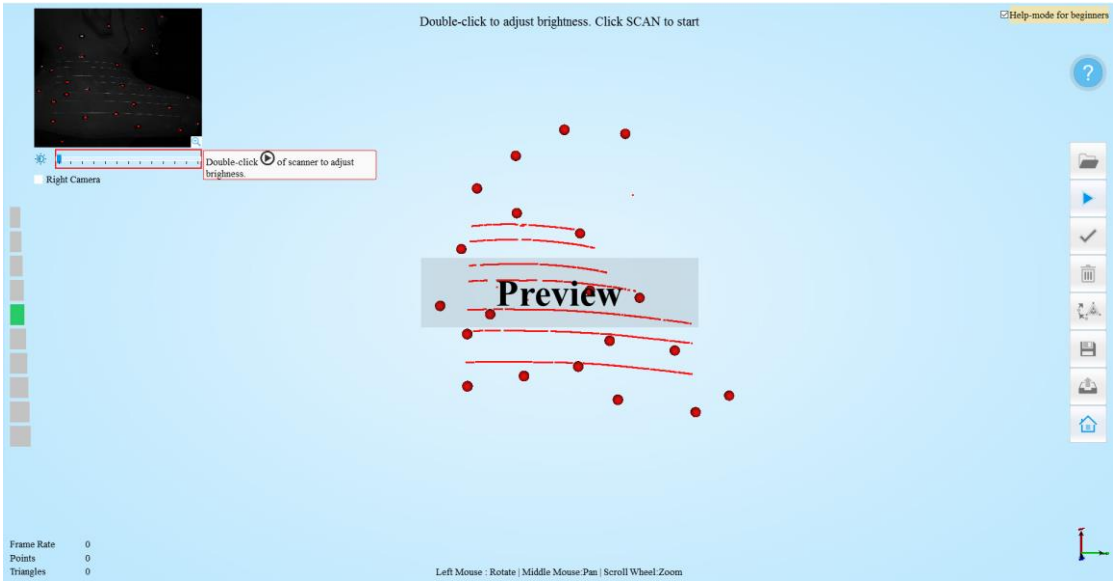
1.4.1. Preview

Preview

 Point the scanner to the object, then click  on software or press  on scanner to run into PREVIEW mode. In this mode, it will start to capture data, but not recorded. In this mode, you can:

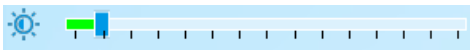
3. Check working distance, and field of view for scanning;
4. Adjust a proper brightness before scanning.

Note: You need to preview objects with markers.

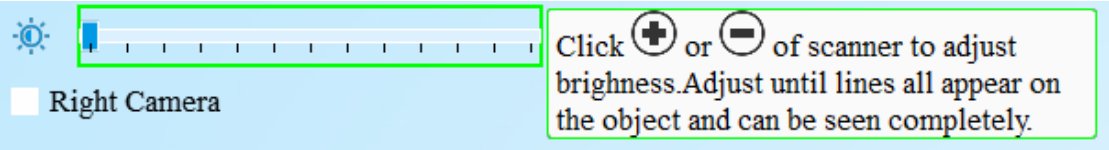


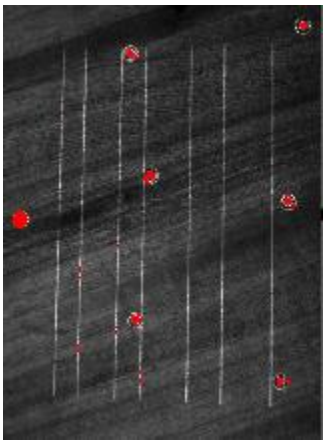
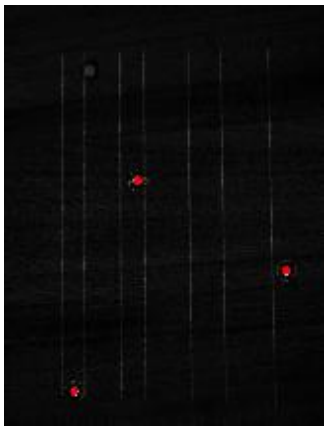
Adjust Brightness

1. When scanning distance is adjusted properly, double click  , and adjust the brightness by pressing “+, -“ button on the scanner. Double click  to exit the brightness adjustment.

2. Brightness can be also adjusted via the brightness slider under the camera window on the left  side.

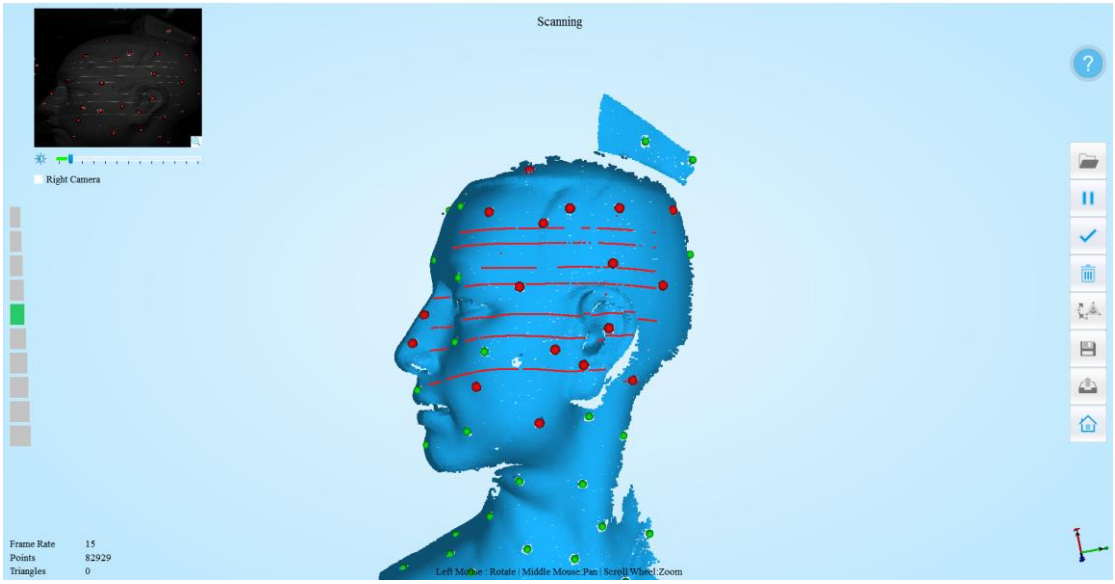
3. Brightness can be adjusted during scanning.



		
To bright(X)	Good(√)	Too dark(X)

When brightness adjustment is over, click  **on the scanner or**  **in the software to start scan recording.**

Handheld HD scanning interface as follows:



Edit, finish scan, delete data, mesh, save data and share refer to Handheld rapid Scan.

7

FAQ

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 merging fails without mark points when the turntable has rotated several circles or when it is under fixed scan (without turntable) mode?

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. Under handheld HD mode and handheld rapid mode, what if there are straggling points?

Solution：（1）Adjust the brightness, until the reflected graph and mark points are clear to be seen.（2）Try to make sure the background environment is single, for example, to use a black cloth or 500mm away from other objects.（3）Do not scan opposite to the computer screen.

5. Under Handheld HD mode, what if only the mark points could be identified while there is very less data captured?

Solution：Please do the HD scan calibration again，and during the calibration and capturing graph, please make sure the calibration board and scan head are still.

6. Under handheld rapid mode, how to continue scanning when the merging fails?

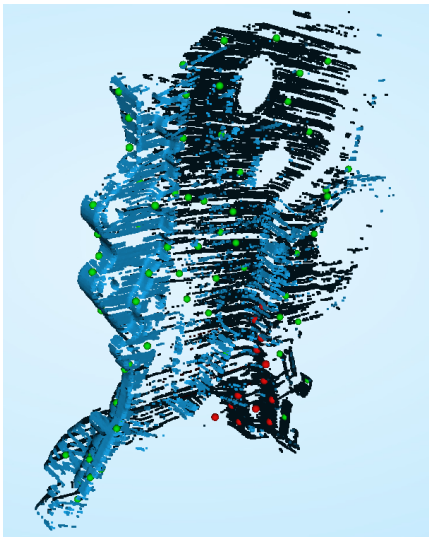
Solution：Please move back to the scanned part (unreformed) for 3 seconds where there are features and details, start to scan again when it is followed to scan.

7. How to scan thin-walled workpiece?

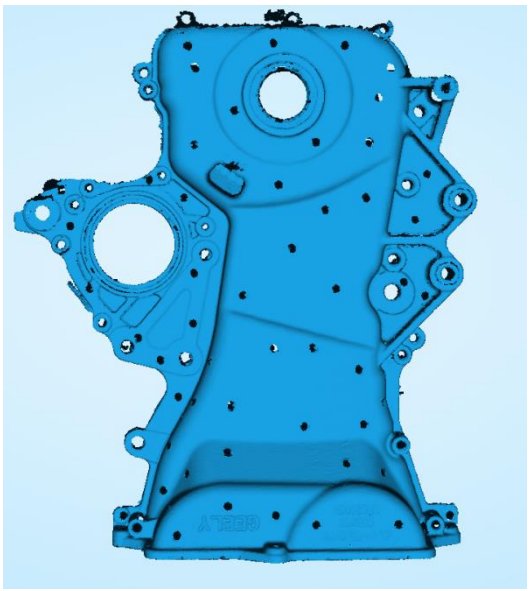
Solution：First, scan thin-walled parts should have transition zone which can stick with markers to guarantee scanning can be transited from one side to another. Then follow the following steps.

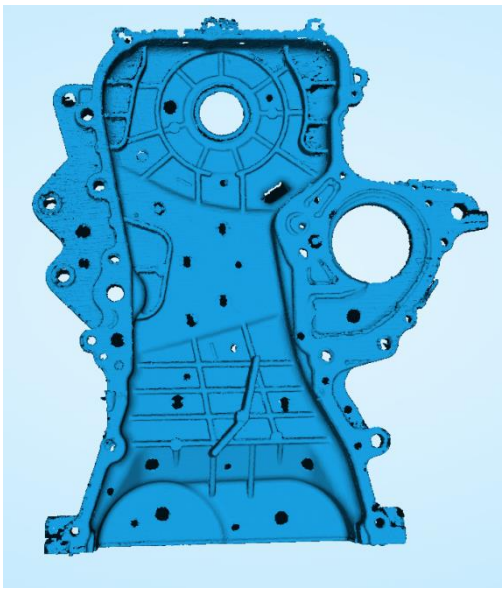
(1) Stick markers on the transition zone. Make sure from the camera viewport, there are no less than 4 mark points evenly distributed and not in one line.


(2) Scan markers on the workpiece rapidly. Do spiral rotating via transition zone. Scan as many mark points as possible on both sides and transition zone to build frame. The faster, the better.



(3) After building frame, scan the surface of workpiece slowly and carefully to finish the whole scan.





8. Under auto scan mode, if the turntable is not moving, but with a humming sound, how to solve?

Solution：Disconnect power line and connect again in few seconds.

9． How to solve if after scan there is no data?

8. Solution：Open control panel→Region, then click “Additional settings”, decimal symbol choose “.”

8

Contact Us

Contact Us

Contact us

Email: einscan_support@shining3d.com

More scanning information

More scanning information can refer to http://www.einscan.com ---Support