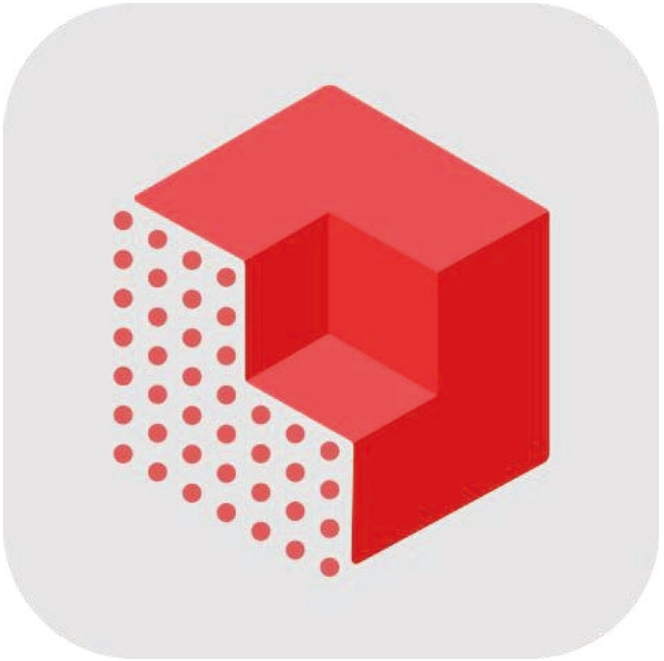
Revo Scan 5 (PC)

User Manual



REVOPOINT

Welcome to Revo Scan 5!

Revo Scan 5 is your essential scanning and editing companion for all Revopoint 3D scanners. In Revo Scan 5, you can do a 3D scan to create point clouds, then process and edit the data into 3D models or processed point clouds that are ready to be exported for use elsewhere in your workflow.

This manual covers every setting and function in Revo Scan 5 and teaches you how to get your first 3D scan.

Read Before Using

- This manual covers Revo Scan 5 (PC) operations for Windows and macOS devices. To learn more about Revo Scan 5 (Mobile), please check their respective manuals in the iOS or Android Revo Scan apps.
- If you're entirely new to 3D scanning, to get the most out of this guide, it's recommended to first refer to the **glossary** and familiarize yourself with any new terms.
- Keep your version of Revo Scan up-to-date for the best user experience.
- Software updates may alter Revo Scan's UI. Please refer to the actual layout in Revo Scan. While we'll try our best to keep this manual up to date, some things may slip through. If it isn't in the manual, please ask in our forums.

Contents

1. Installing Revo Scan

1.1 Recommended System Requirements

To use a Revopoint 3D scanner, you need a computer that meets the recommended requirements.

System	Minimum	Recommended
	**Windows:** Win 10/11 (64-bit) RAM: ≥ 16GB CPU: Intel i7 12th gen or better	**Windows:** Win 10/11 (64-bit) RAM: ≥ 32GB CPU: Intel i9 11th gen or better
	**Mac:** macOS 11.0 or later RAM: ≥ 8GB CPU: M1 Pro or better	**Mac:** macOS 11.0 or later RAM: ≥ 8GB CPU: M3 or better

1.2 Installation Process

For **Windows** and **macOS**, visit Revopoint's website revopoint3d.com/pages/support-download to download your system's latest version of Revo Scan 5.

1.2.1 Windows

Double-click the downloaded file and follow the installation wizard to install Revo Scan 5. Once finished, double-click the Revo Scan 5 icon to open it.

1.2.2 macOS

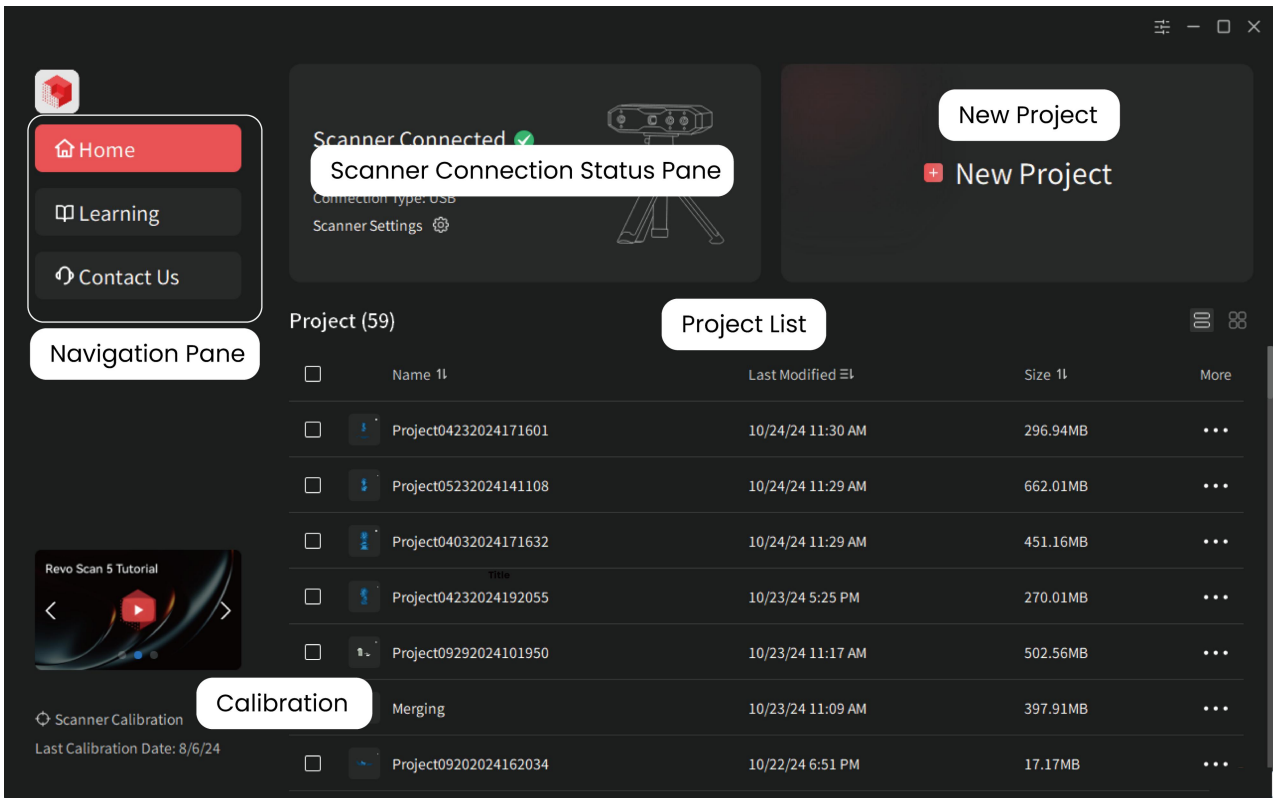
In Finder on your Mac, locate the download of Revo Scan, right-click it, go to Open With, and click Installer, then follow the installation wizard. Once finished, double-click the Revo Scan 5 icon to open it.

Note: You may need to enable your Mac to install non-App store software.

Go to the **Apple menu > System Settings**, click **Privacy & Security** in the sidebar, then go to **Security** on the right. (You may need to scroll down.) Change the security setting to "**App Store and identified developers**".

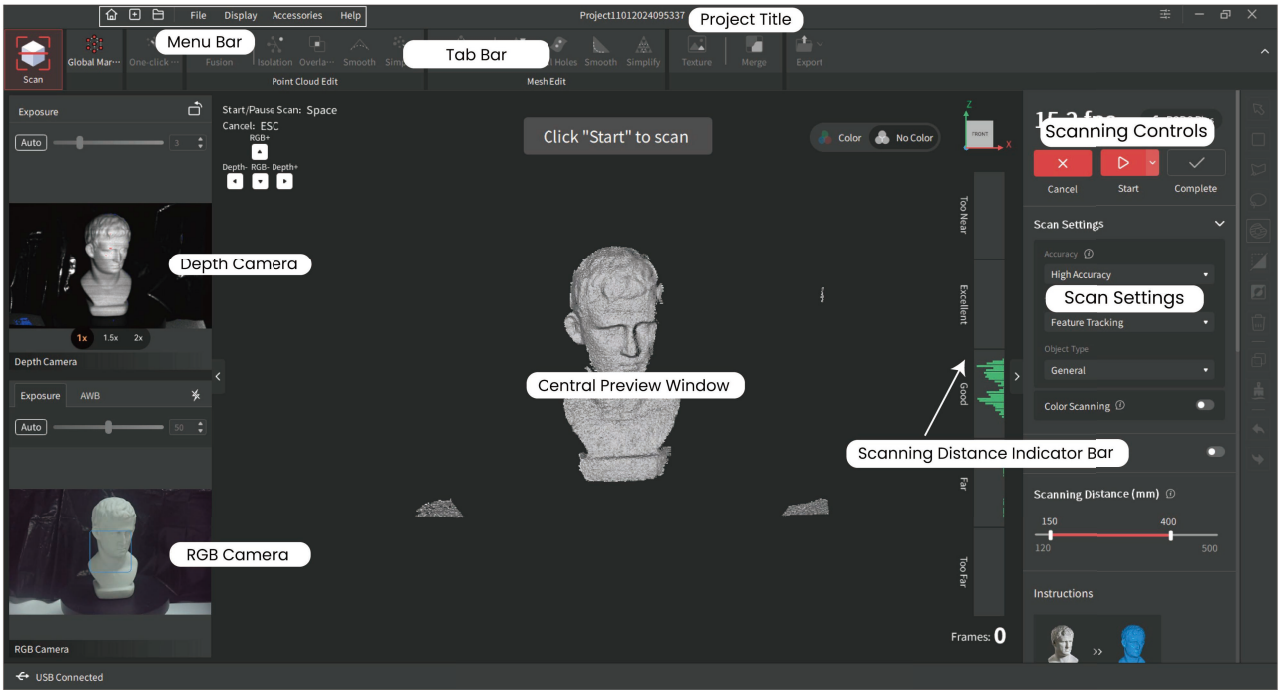
2. Interface Overview

2.1 Home Page



*The software's user interface is frequently updated and varies depending on the connected 3D scanner. Please refer to the actual layout in Revo Scan.

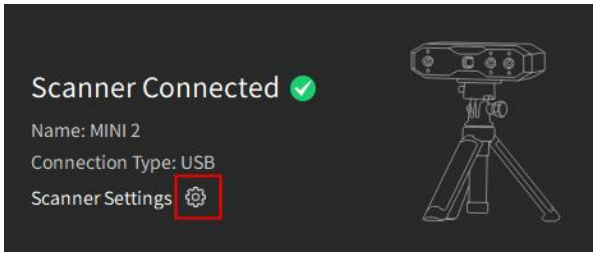
2.2 Project Interface



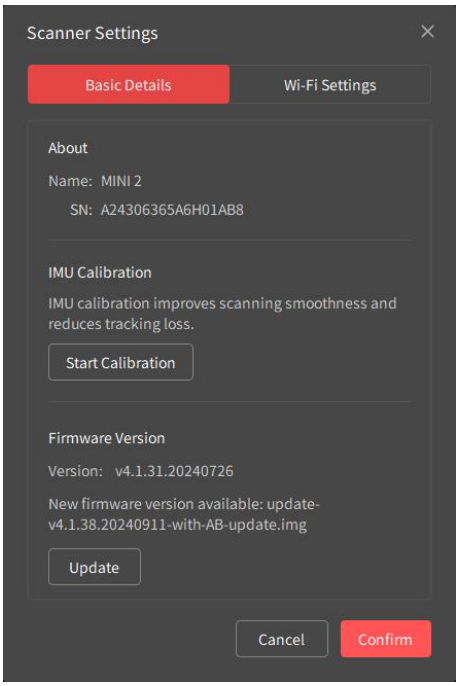
3. Settings

3.1 Scanner Settings

When a scanner is connected, click the settings icon on the Homepage scanner pane to access the scanner's settings.



3.1.1 Basic Details



- **Scanner Info**

See the scanner's type and serial number.

- **IMU Calibration**

The IMU sensor measures the scanner's acceleration, rotation, and orientation. Calibrating the IMU ensures the scanner tracks its movement data accurately, resulting in better frame stitching and scanning accuracy.

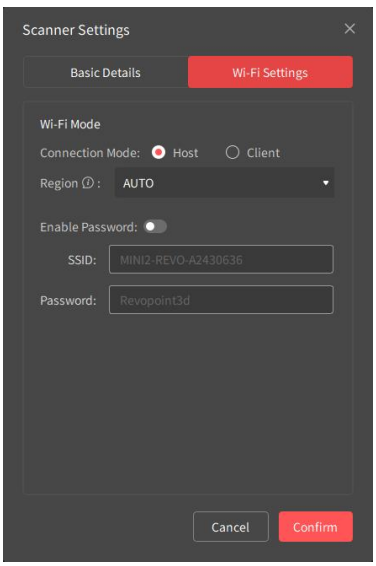
Click the "Start Calibration" button and follow the onscreen instructions to complete the calibration process. IMU calibration only needs to be done when prompted by Revo Scan 5.

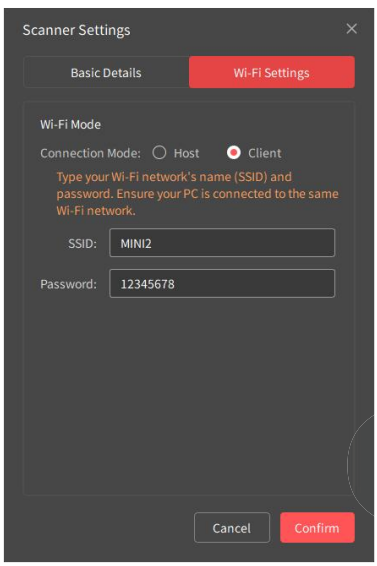
Note: This option will only appear if the connected scanner has an IMU.

- **Firmware Version**

An "Update" button will be displayed when a new firmware version is available. Tap the button and follow the instructions to update.

3.1.2 Wi-Fi Settings

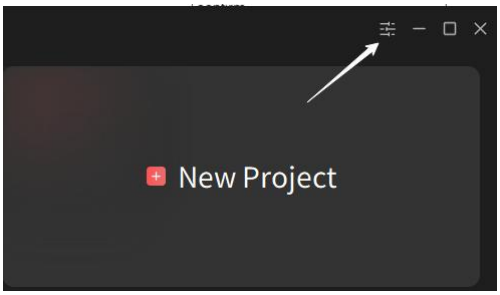


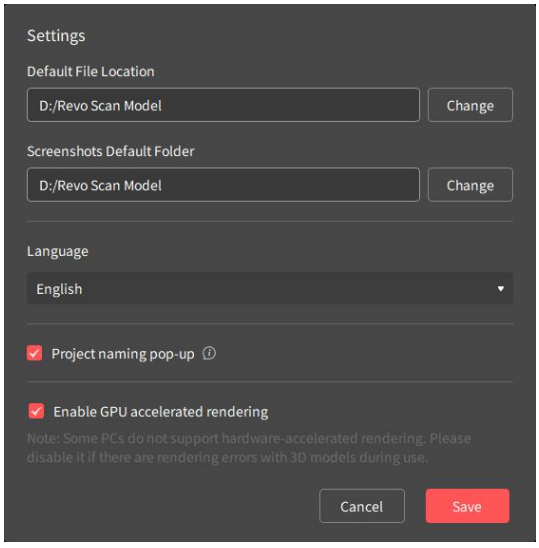


	Host	Client
What's the difference?	Connect a scanner to a PC via the scanner's Wi-Fi. The PC will lose internet access via Wi-Fi.	Connect a scanner to a PC via a Wi-Fi network. Keeps your PC connected to the internet.
How to connect?	Find the "Scanner Name-REVO X" Wi-Fi network and connect to it in your PC's Wi-Fi settings. Open Revo Scan, and the scanner should connect after a while.	Enter your Wi-Fi network's name (SSID) and password, then click confirm. Ensure the PC is on the same network, open Revo Scan and the scanner should connect after a while.
Notes	1. You can change the scanner's SSID name and set a password. If the scanner fails to connect over Wi-Fi, check that its region matches your country. 2. Remember to memorize the password if you enable it, or this will prevent you from using Wi-Fi.	Client mode is only recommended if you have a stable 5GHz network. For best performance, ensure the scanner, PC, and Wi-Fi router are all close to each other.

3.2 Revo Scan Settings

Access Revo Scan's settings by clicking the setting icon on the Homepage in the top right corner.





Default File Location: Select the default file location to store projects and models.

Screenshots Default Folder: Select the default file location to store screenshots.

Language: Select your preferred language.

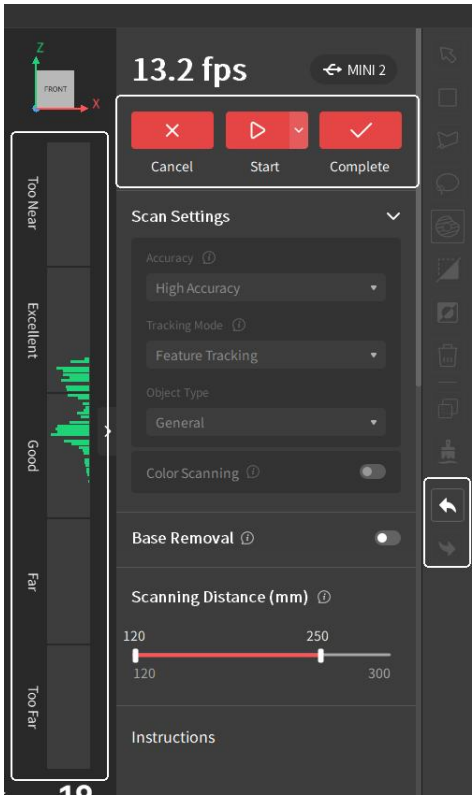
Project naming pop-up: Untick the box to turn off the naming projects pop-up when creating a new project.

GPU-accelerated rendering: Enable/disable GPU-accelerated rendering. (If your PC doesn't have a GPU, it's recommended that you disable it for a more stable experience.)

4. Software Functions

4.1 Scanning

4.1.1 Scanning Controls



Cancel button: Click it to delete all captured data.

Start/Pause button: Click it to start or pause the scan.

Complete button: Click it when the scan is finished to move on to the editing process.

Scanning Distance Indicator Bar: This shows if the distance between the scanner and the object is optimal for the best-point cloud capturing results. The indicator bar will show green when an optimal distance is reached.

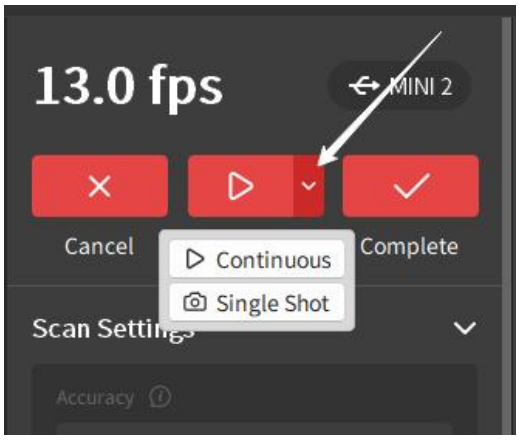
Undo/Redo buttons: While paused, the Redo and Undo buttons can remove or add back scan data. This can be done repeatedly.

4.1.2 Scan Settings

Before starting a scan, selecting the correct settings for the object being scanned is essential for the best results.

Capture Modes

Change capture modes by clicking the drop-down menu on the Start/Pause button.



- **Continuous**

• The scanner captures multiple frames per second (fps) in continuous mode. Use Continuous mode to capture objects quickly.

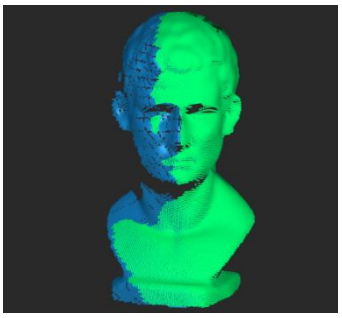
Note: Maximum fps is determined by the scanner's model.

- **Single-shot**

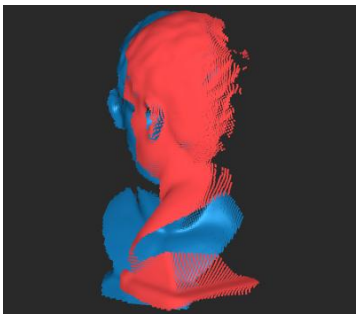
• In single-shot mode, the scanner captures one point cloud frame each time the button is pressed in Revo Scan or on the scanner.

• This mode is useful when capturing objects with sharply contrasting color surfaces or in hard-to-maneuver spaces.

• Each frame needs at least 50% overlap to successfully align into the model in single-shot mode.

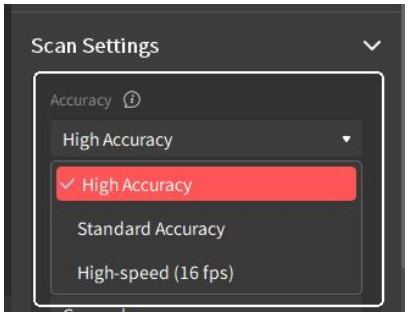


Correct overlap



Wrong overlap

Accuracy



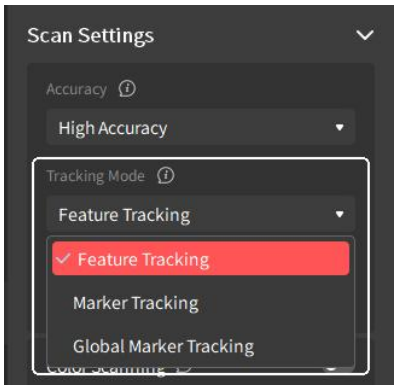
• **Standard Accuracy:** For capturing simple objects that don't have complex and detailed surfaces.

• **High Accuracy:** For capturing highly detailed objects.

• **High-speed:** For capturing larger objects or people/body parts quickly with faster frame rates and smooth frame stitching.

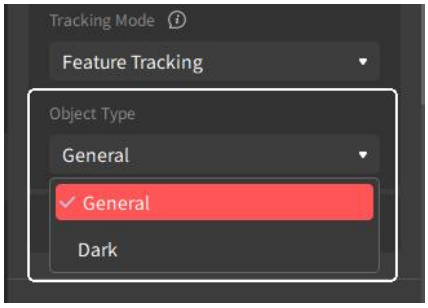
Note: Accuracy settings available, scanner speed, and size of the object capable of being captured are dependent on the scanner's model.

Tracking Mode



- **Feature Tracking:** For objects with distinct surface features and no repeating patterns.
- **Marker Tracking:** For capturing large flat surfaces that don't have distinct details. It must be used with marker points for tracking aids.
- **Global Marker Tracking:** For capturing larger featureless objects. There are two steps: First, capture the markers to generate a global marker file. Second, scan the point cloud based on the global marker file.

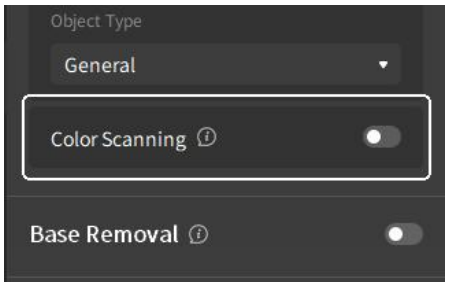
Object Type



- **General:** This is the standard object type. Pick this type if the object doesn't match the other options below.
- **Dark:** Scan objects with dark surfaces, such as black or dark gray clothes. Some dark items, such as black leather or metal surfaces, which will absorb or reflect light, may still need to be treated with scanning spray to make them scannable.
- **Face:** Scan people's faces.
- **Body:** Scan people.
- **Large:** Scan larger objects quickly. Only available for certain scanners in High-speed accuracy mode.

Note: Available object types and the captured object's size depend on the scanner's model.

Color Scanning

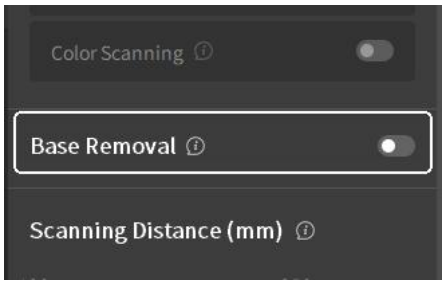


Enable it to capture color data using the scanner's RGB camera.

When performing a color scan, ensure the object is evenly lit with soft light for optimal color capture results.

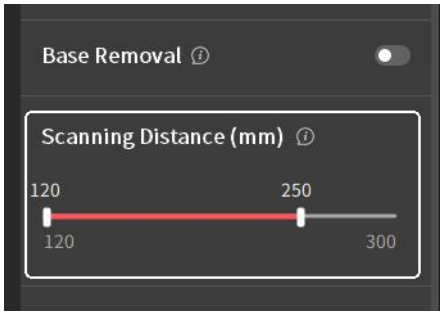
Note: Texture mapping can be applied only when Color Scanning is enabled.

Base Removal

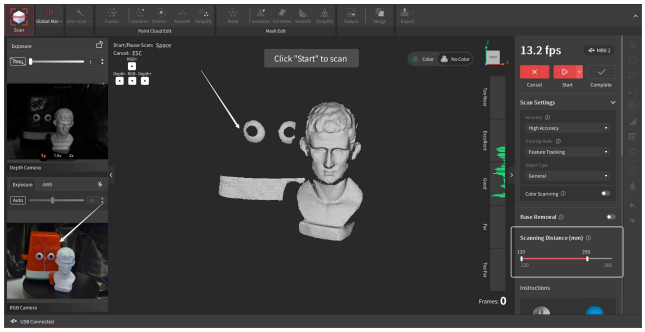


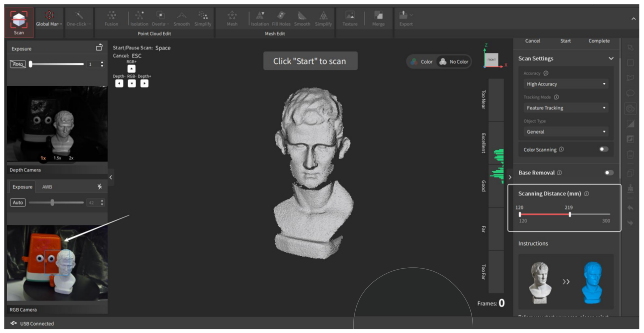
Toggle it on to enable automatic deletion of any unwanted flat surfaces detected (e.g., a table or floor). If scanning an object with many flat surfaces, turn this off to avoid deleting any of the object's surfaces.

Scanning Distance



Use the slider to adjust the Depth Cameras' working distance to ignore unwanted background or foreground objects. Both a minimum and maximum distance can be set.

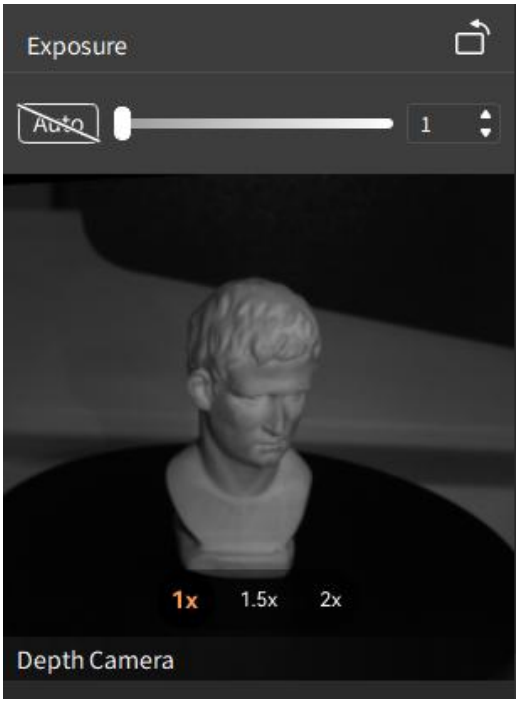




Note: Within the same project, if the distance is set for the first scan, it will be automatically saved for subsequent scans.

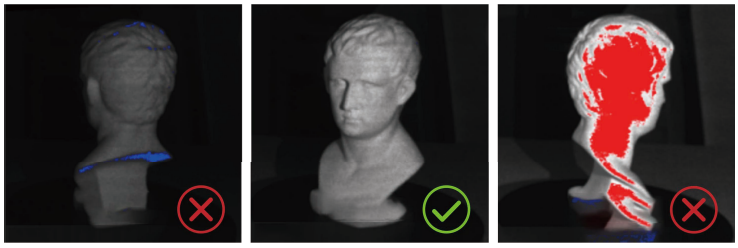
Depth Cameras

Adjusting the depth cameras' exposure before starting a scan is crucial to getting a good 3D model.



• Adjusting Exposure

The depth cameras' exposure can either be set to auto-exposure or manually adjusted. Adjust the exposure slider until there are as few blue and red patches on the object as possible in the Depth Camera window.

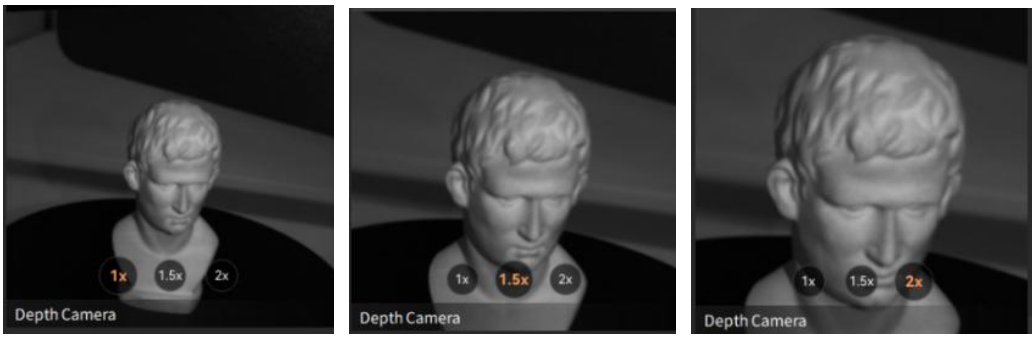


Underexposed Correct Exposure Overexposed

The exposure may need to be adjusted mid-scan depending on the properties of the surface being captured.

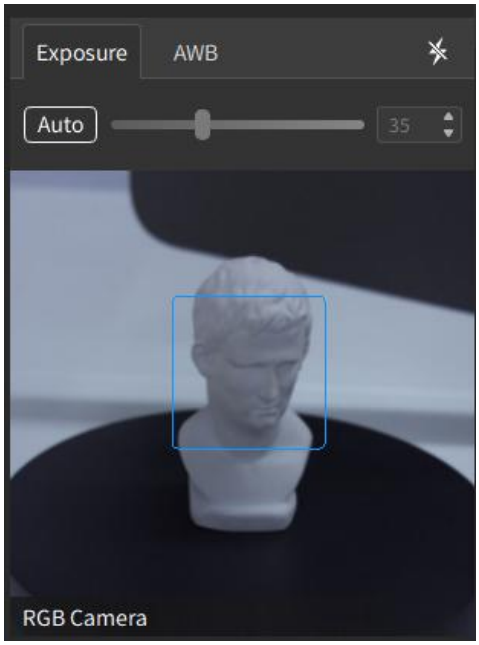
• Digital Zoom

When capturing smaller objects, the Depth Cameras' up to x2 digital zoom makes it easier to focus the scanner so it only captures the object's surface data.



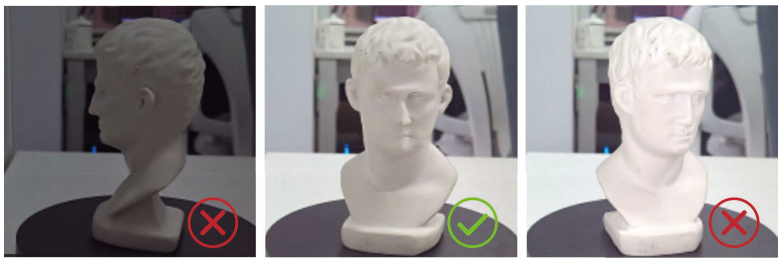
RBG Camera

To capture an object's color accurately during a scan, please ensure it is evenly lit with soft light, and the RGB camera's exposure and white balance have been adjusted.



- **Adjusting Exposure**

Adjust the exposure until the colors look accurate in the RGB camera preview window, or set it to auto.



Underexposed Correct Exposure Overexposed

- **White Balance**

Either set the white balance to auto or adjust it till the colors look accurate.

- **Flash LEDs**

Toggle On/Off the RGB Camera's Flash LEDs to enhance color scans or help to make marker points more visible while performing a scan using Marker Tracking. (Only for scanners with Flash LEDs)

Scan settings can be saved and imported when performing another scan.

Saving Scanning Settings

Set the scan's settings **›** In the File menu, click Save Scan Settings **›** Name the setting and choose a location to save it.

Importing Scanning Settings

In the File menu, click Import Scan Settings **›** Select the file containing the wanted setting and click open.

Note: Only the scanning settings for the currently connected scanner can be imported.

4.2 Model Editing

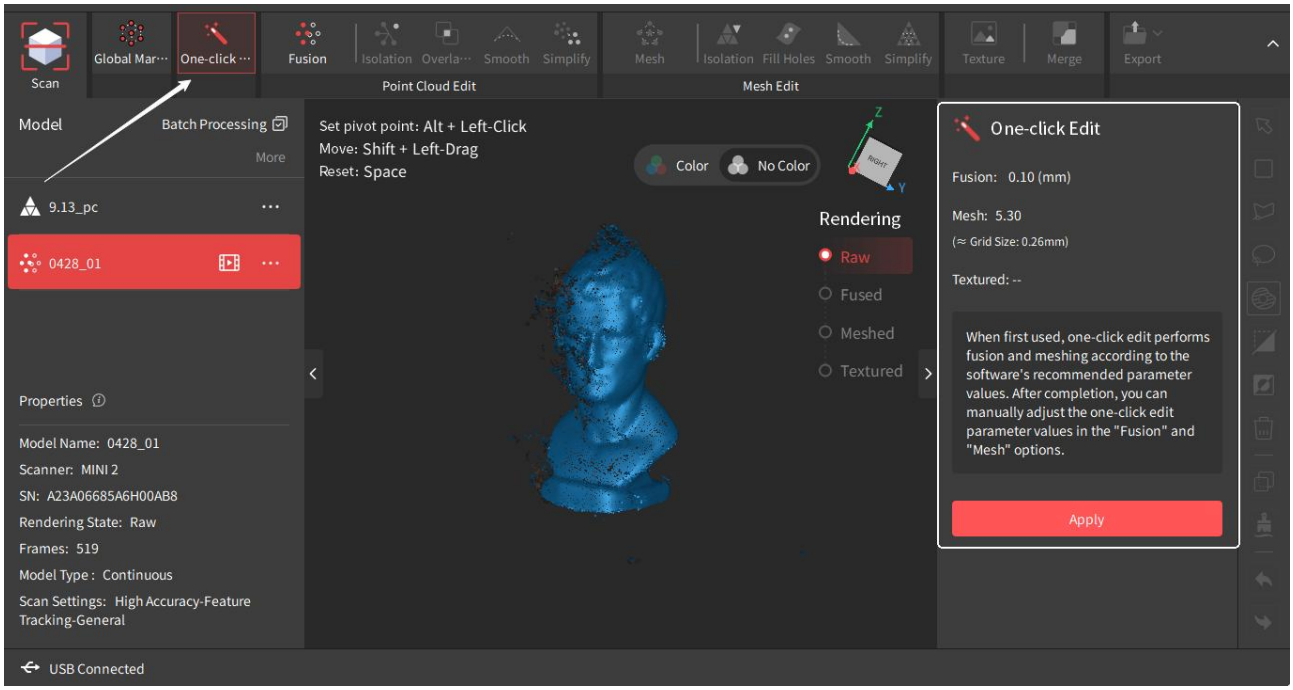
The initial unprocessed raw point cloud from the scan is a collection of individual data sets or frames. It must be fused, meshed and textured (optional) to make it a high-quality 3D model. This can be done by using either One-click Edit or manually editing the raw data.

4.2.1 One-click Edit

Revo Scan 5 has a powerful one-click processing feature that automatically performs fusion, meshing, and texturing (if a color scan was done) based on the best detected setting for the point cloud.

Note: For new users, the “One-Click Edit” function is recommended for the first few scans.

Tap the “Apply” button to perform the “One-Click Edit” function. Click the “Cancel” button to cancel the process.



After the model is post-processed, you can manually edit it further if needed.

4.2.2 Manual Edit

In Manual editing, you can fully edit your raw point cloud data during every step of the process or edit imported 3D models from other sources.

4.2.2.1 Point Cloud Fusion

Fusion is fusing the raw scan data captured by the scanner into a unified point cloud model. There are two fusion methods:

- **Standard Fusion**

It processes data fast and is better for processing large data scans with many frames.

- **Advanced Fusion**

It produces a high-quality point cloud but spends more time. It is suitable for scans with high detail requirement.

Point Distance

Point Distance is the average distance between adjacent points in a fused point cloud. Revo Scan will suggest an optimal point distance for each scan to optimize details and file size, but different values can be specified depending on your requirements.

Note: Despite having a higher minimum point distance than Standard Fusion, Advanced Fusion will produce a more detailed model due to more advanced algorithms.

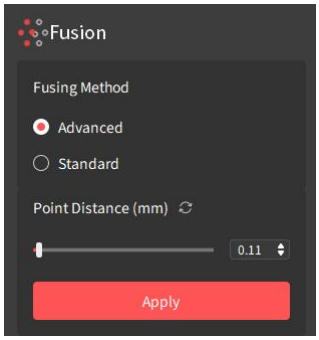
Suggested Settings

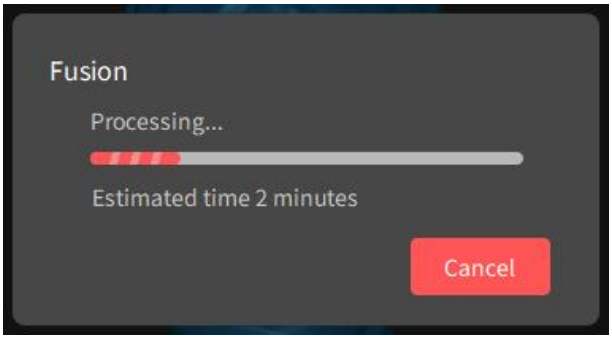
• Set a lower point distance for objects that have a lot of detail.

• Set a higher point distance for objects with many flat featureless surfaces.

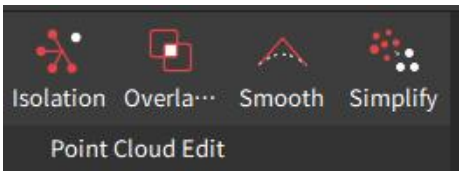
Note: To merge two point clouds successfully, set the two models' point distance as close as possible. See the merging section of this manual for more details.

Tap the "Apply" button to perform the "Fusion" function. Click the "Cancel" button to cancel the process.





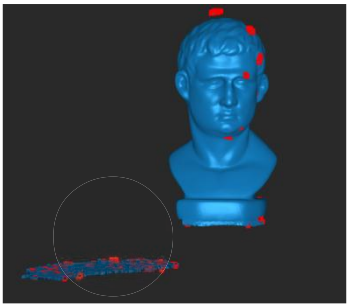
4.2.2.2 Point Cloud Editing Tools



Use these tools to remove unwanted data and refine your point cloud before either exporting or meshing the data. The Undo/Redo buttons can undo or redo multiple processing steps.

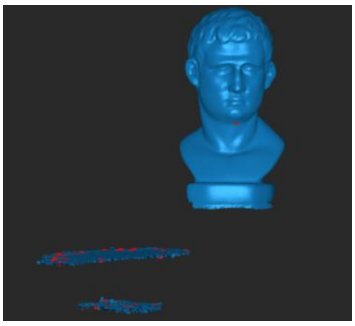
- **Isolation**

Detects and removes the isolated point cloud data disconnected from the main point cloud model (see the red area in the figure).



The isolation rate: The percentage of points within isolated point clouds relative to the total number of points. Setting higher isolation rates results in more isolated point clouds being detected.

- **Overlap Detection**



Identifies and deletes overlapping data in the point cloud for a more consistent model. It can be used repeatedly to simplify point cloud data.

Vertical Distance: The distance between the overlapped point cloud noise and the captured surface area. If it's less than the set value, it's considered noise and removed. If it exceeds the set value, it's not removed.

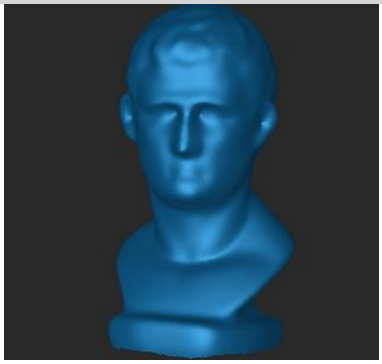
- **Smooth**

Removes noise from the oint cloud to make it smoother.

To use it, select its strength and the number of times it applies smoothing consecutively.

Note: For feature-rich models, excessive smoothing may result in loss of details (see the figure below).

Before



After

- **Simplify**

Reduces the density of the point cloud and the amount of data for more manageable processing, storage and sharing. There are two different downsampling methods:

• **Uniform**

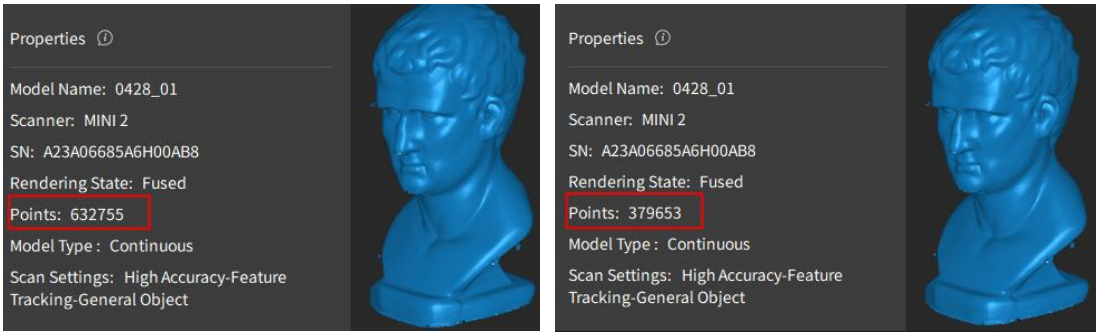
Removes the set percentage of points across the model evenly.

• **Geometric**

Intelligently identifies flat or plain surfaces in the point cloud and will remove the set percentage of points from these areas while leaving more complex areas alone to maintain the details.

Ratio: The percentage of simplified point cloud data to the total amount of data. Setting a higher ratio will delete more point cloud data from the model.

Note: Selecting a ratio that is too large may impact the model's quality.



Unsimplified Simplified

4.2.2.3 Meshing

Mesh is created by constructing triangles from the points in the point cloud to create a solid surface. Before being used in most 3D modeling or slicing software, the point cloud must be meshed.

- **Quailty**

The mesh model's density and level of detail. Settings a higher value results in a denser and more detailed mesh model but spends more time.

- **Suggested Settings**

Set a higher mesh quality if the object has a lot of fine details.

Set a lower mesh quality for objects with many flat, featureless surfaces.

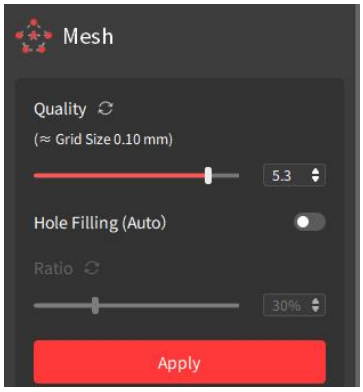
- **Hole Filling (Auto) Tool**

Revo Scan automatically identifies and fills all the holes on the mesh model.

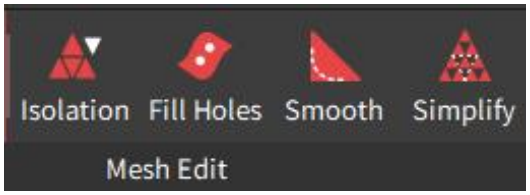
Ratio: The percentage of the hole diameter to the overall mesh size. The holes smaller than this ratio will be filled.

Note: Trying to fill large holes may result in a distorted surface. Use the **Fill Holes** tool in the mesh editing tab to fill larger holes.

Tap the "Apply" button to perform the "Mesh" function.

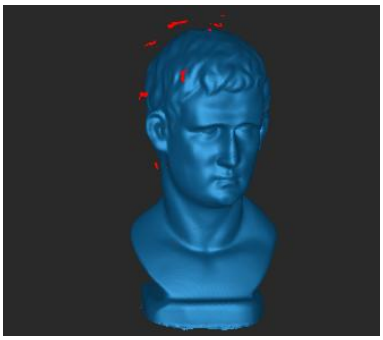


4.2.2.4 Mesh Editing Tools



- **Isolation**

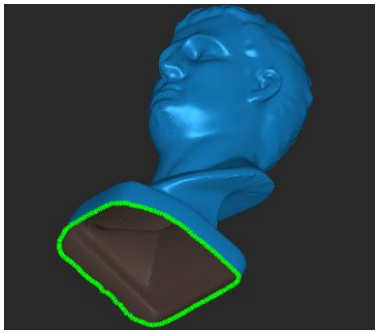
Detects and removes the isolated mesh data disconnected from the main mesh (see the red area in the figure).



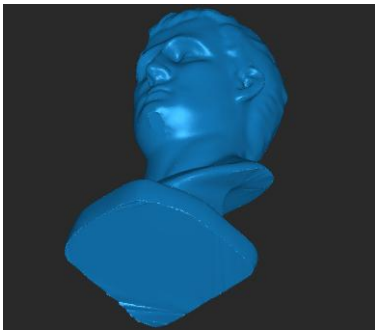
Isolation Rate: The percentage of an isolated mesh relative to the total number of meshes. Setting a higher value will detect more isolated mesh data.

- **Fill Holes**

Detects all holes on the model's surface. Select the holes and fill them with a plane or curved surface. If needed, use Ctrl + A to select all the holes quickly.



Before (Hole Filling)



After (Hole Filling)

- **Smooth**

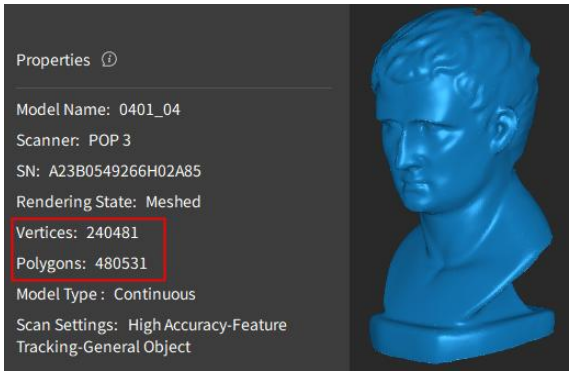
Removes noise from the mesh model to make it smoother.

To use it, select its strength and the number of times it applies smoothing consecutively.

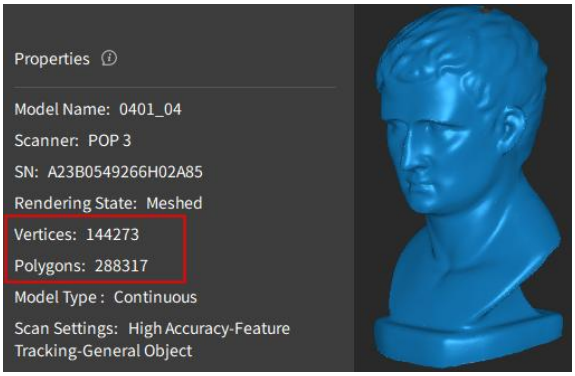
- **Simplify**

Reduces the amount of mesh data in the model for more manageable processing, storage and sharing.

Ratio: The percentage of simplified mesh data to the total data volum. Setting a higher ratio will remove more details, resulting in a smaller file size.



Unsimplified



simplified

4.2.2.5 Texture

Texture is applying the color data captured by the RGB camera to the mesh to create a high-quality colored 3D model. There are two texturing methods:

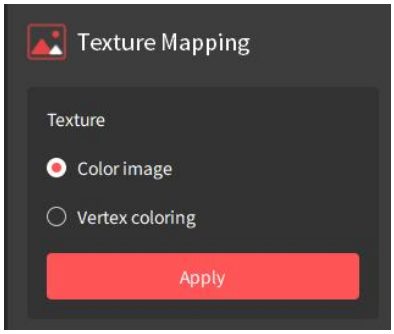
- **Color Image**

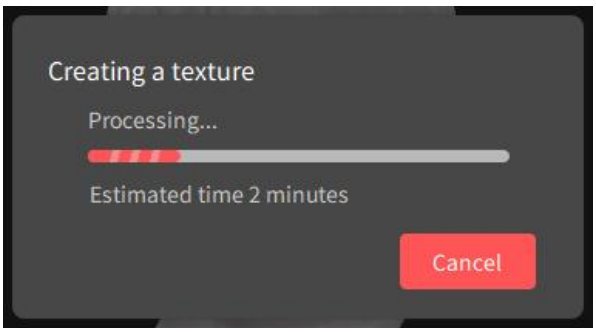
This method maps the image data captured by the scanner's RGB Camera on the mesh's surface to create a colored model.

- **Vertex Coloring**

This method generates textures from the mesh's vertices color.

Tap the "Apply" button to perform the "Texture" function. Click the "Cancel" button to cancel the process.





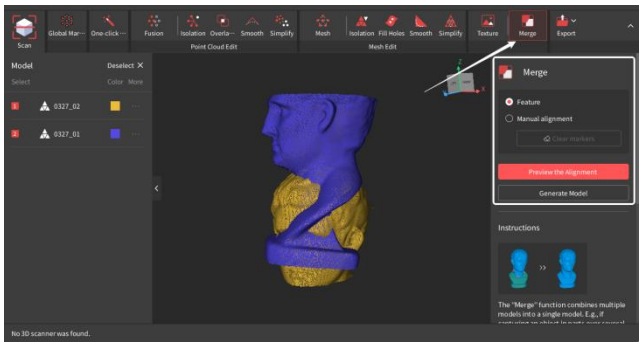
4.2.2.6 Model Merging

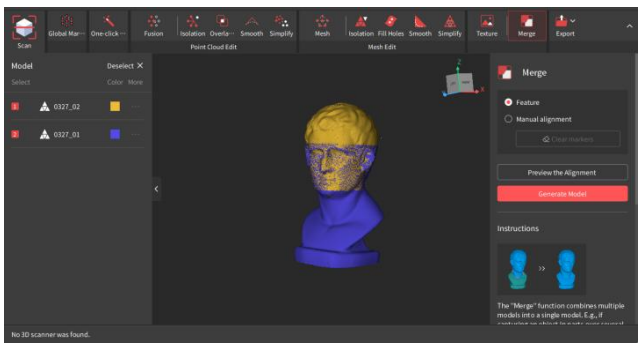
The merging function supports the alignment of multiple scans in a project into a new model. Please note that the scans can only be merged after they are fused. There are two alignment methods: Feature and Manual.

- **Feature Alignment**

Select the models, and Revo Scan will automatically merge them by identifying and aligning the overlapping features in multiple models.

The overlapping area between any two models should be more than 10% (for best results, 40% to 50% is recommended). Up to 9 fused models can be selected and merged simultaneously.

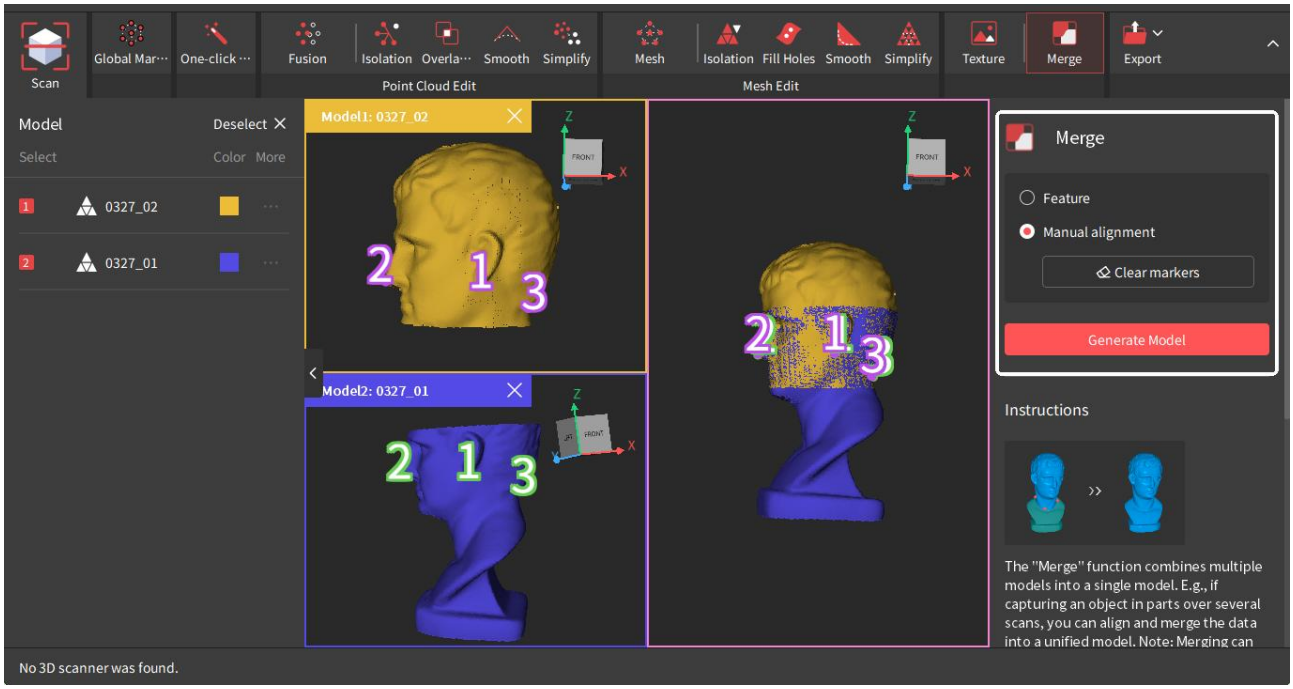




- **Manual Alignment**

At least 3 reference points must be manually placed in matching locations on each model. Then, Revo Scan merge the two models by identifying and aligning the reference points. Only 2 models can be merged at a time.

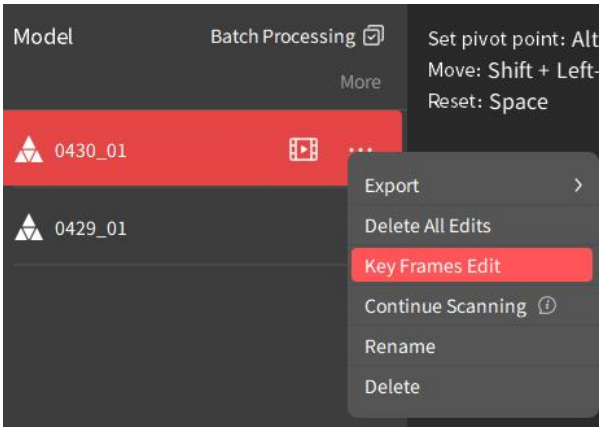
- The number of corresponding reference points on both models must be the same.
- Avoid grouping the markers together in a small area.
- Zoom in on the features of each model to place the marker points carefully.



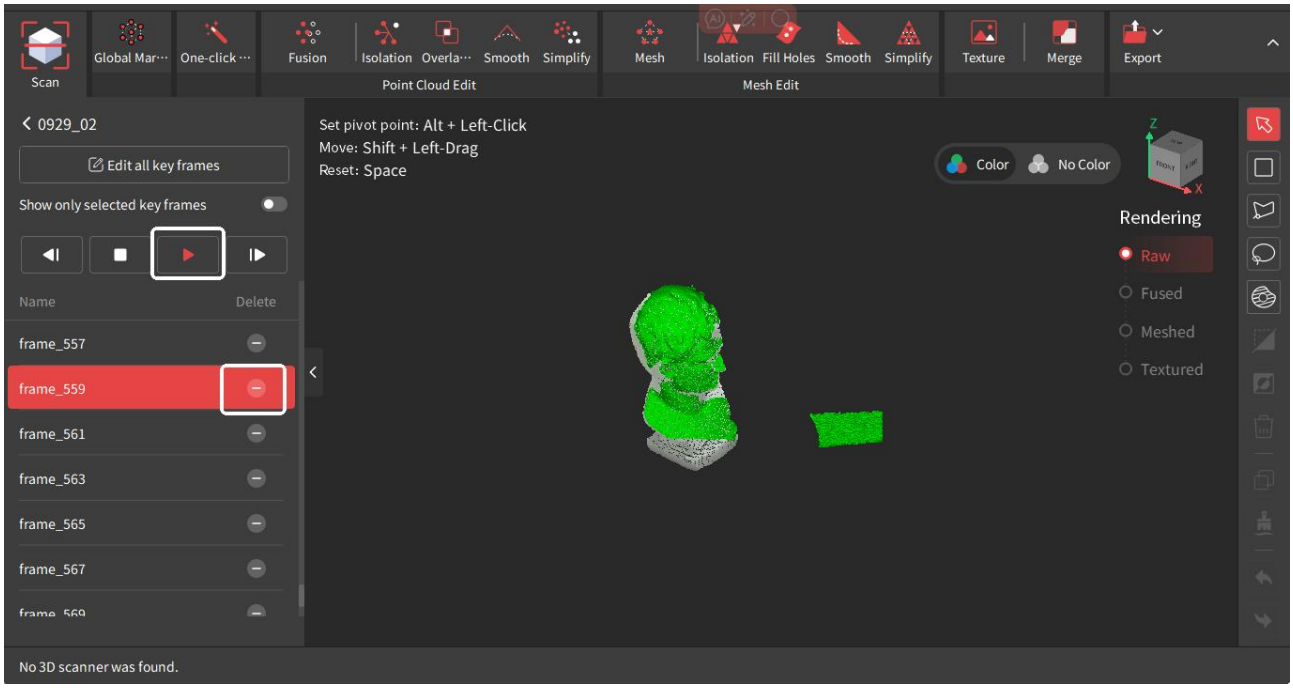
4.2.3 Key Frames Editing

Use it to edit or delete the raw data before fusion. This tool can be used to go through captured point cloud data frame-by-frame and quickly find the misaligned or faulty frame for deletion.

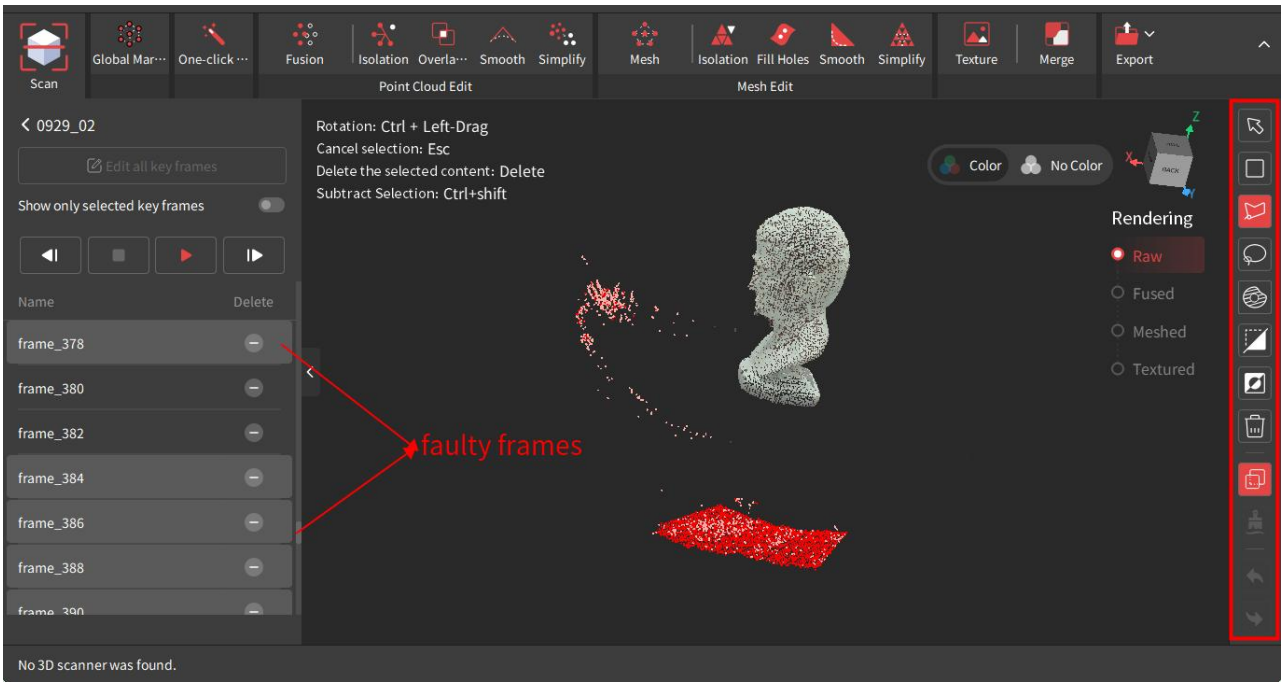
Go to the project panel and click the icon or click the ••• icon > **Key Frames Edit** to enter the Key Frames Edit interface. There are two methods to edit the key frames:



1) Click the button to autoplay through the frames individually. Then, select any unwanted frames and click the − button next to each frame's name.



2) Enter the Key Frames Edit interface, use any selection tool in the Tool Bar to select the unwanted data. The corresponding frames will be automatically identified and selected. Click the − button or the 🗑 button to delete all the faulty frames.



4.2.4 Toolbar

The Tool Bar provides multiple tools that enable users to select unwanted local data for detailed editing or deletion manually.

Note: The Tool Bar can't be used for raw data or textured models.

Orbit

Rotate the view in any direction. Clicking it will also de-select any previously selected areas.

Rectangular Selection

Click and hold the left mouse button to draw a rectangle around any point on the model to select that area.

Polygon Selection

Left-click to create anchor points to select a mesh's polygons (faces). The Polygon tool creates a straight line between each Anchor Point. Click on any edge of the area to be selected and release the mouse pointer to make an Anchor Point.

Lasso Selection

Click and hold the left mouse button, then draw a shape around an area to select it. Release the mouse button, and the selection will be closed by connecting the current pointer location to the start location with a line.

Select Connection

Left-click on a data area, and the tool will automatically select the adjacent or connected points or areas.

Clip

Position the cursor, click and hold the left mouse button, and drag. The clipping plane will appear as a line. The portion of the model in the direction of the line's arrow will be selected. Press <Delete> to apply the change, <Esc> to cancel.

Invert Selection

Use the invert selection button to change the selected area from the currently selected area to anything that wasn't selected.

Delete

Click to remove the selected data. Alternatively, use your keyboard's delete button.

Select Through

Enable it to select data right through the model.

Smooth Brush

Place the cursor over a rough area (e.g., marker holes), then left-click or left-click and drag to smooth.

Undo/Redo

Use to roll back or re-add changes made to the model.

4.3 Model & Project Management

4.3.1 Display Options

Display options can be accessed in the Display section in the menu bar.

Zoom to Fit

Click to reset the zoom to its original position so the 3D model is fully visible on the screen.

Default Position

Shows the 3D model from a viewpoint determined by the first few frames captured.

Perspective View

The camera is positioned at a fixed point in space, so the model has a sense of depth and distance. This is the default view.

Orthogonal View

All objects appear at the same scale, and all three dimensions (width, height, and depth) are projected onto a 2D plane to preserve their relative sizes and positions.

Show Bounding Box

Displays or hides the bounding box around the current model. The bounding box is a rectangular box that is wrapped as tightly as possible around the object.

Show Rotation Ball

Displays the XYZ rotation axis to show the model's orientation in 3D space.

Show Grid

Displays or hides a virtual 3D grid in the editing interface. The grid is a structure of horizontal and vertical lines that help to position and align objects.

Show Scanning Location

Displays location references for color scans captured in Single-shot mode. Use it to see if any color data needs to be reshot. Click on any reference to view a single frame captured at the current position; double-click on a reference to view the model image captured at the current position.

Show Reverse Point

Shows or hides the surface across from the current one in another color (brown or transparent).

Mesh Model Display

- **Solid:** Turn the model’s surface on or off.
- **Wireframe:** Shows the model’s wireframe.
- **Wireframe Overlay:** Shows the model’s wireframe overlay.

Model Properties

Click Model Properties to change the model's color and surface properties.

Enable Select Through

Enable it to select data right through the model.

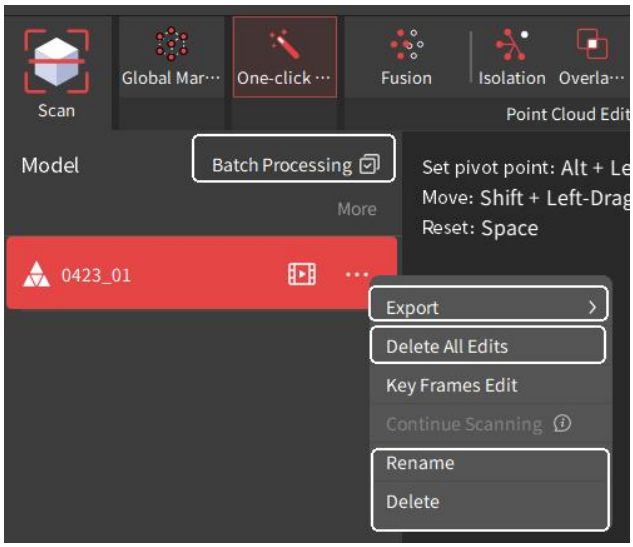
Screenshots

- **Full Screen:** Capture the entire screen
- **Model Only:** Only captures an image of the 3D model.

Light Source

Drag the icon to adjust the Light Source's position. Double-click the icon to reset to the default location. Click off the icon to close.

4.3.2 Model Management



Batch Processing

If you've created a project with multiple scans, batch processing can perform the Fusion or Meshing processes with the same settings on multiple models.

Click the batch process button. Select the models to be processed. Select a setting for Fusion or Mesh and click Apply.

Exporting Models

There are two methods of exporting models:

- Open a Project › On the Project Management panel, click the More icon next to the model's name › Click Export and select the state to export › Select the file destination and format.
- Open a Project › On the Project Management panel, click on a Model › In the Tab Bar, Click Export and select the state › Select the file destination and format.

Note: Selectable file formats depend on the model state being exported.

Delete All Edits

It deletes all the edits and resets the model to being unprocessed raw data.

Renaming/Deleting Models

Double-click the model on the Project Pane to rename it. Or click the More icon next to the model's name and select Rename or Delete.

Importing Models

Open a project or create a new project **›** In the File Menu, go to Import **›** Select the model and click Open.

4.3.3 Project Management

Creating New Projects

There are three methods of creating new projects:

- On the Homepage (connected scanner) **›** Click the New Project pane or Scanner Connection Status pane.
- Click the ⊞ button between the Home and Open Project buttons in the Menu Bar.
- In the project interface > In the File Menu, go to New Project and Click.

Opening a Project

There are two methods of opening a project:

- On the Homepages' Project list **›** Double-click a project.
- In the project interface, go to Menu Bar, and click **File** > **Open a Project** or **Open Recent Projects**.

Opening the folder

In the project interface, go to the Menu Bar and click **File** > **Open Folder** to open the folder where the current model is located.

Saving Projects

When a project is open **›** In the File Menu, click Save.

Renaming Projects

On the Homepages' Project section **›** Click the More icon on the project's thumbnail **›** Click Rename.

Deleting Projects

• Deleting Individual Projects

On the Homepages' Project section **›** Click the More icon on the project's thumbnail **›** Click Delete.

• Deleting Multiple Projects

On the Homepages' Project section **›** Click the tick box next to one or more project thumbnails **›** Click Delete.

Importing Projects

• Revo Scan (Mobile) to Revo Scan (PC)

1) Ensure the phone and PC are connected to the same Wi-Fi network.

2) Open Revo Scan (PC) and click the **New Project** button on the Homepage.
3) Click the **Import from Phone** option in Revo Scan (PC)'s File menu.
4) Pick either the PIN code or the QR code transfer method.
5) Open Revo Scan (Mobile) and find the project to be transferred.
6) Tap the More button **›**Share icon in Revo Scan (Mobile).
7) Enter the PIN code or scan the QR code.
8) Start the file transfer.

Note: Don't minimize the app or turn off the phone's display during transfer, or it'll fail.

• **MIRACO to Revo Scan (PC)**

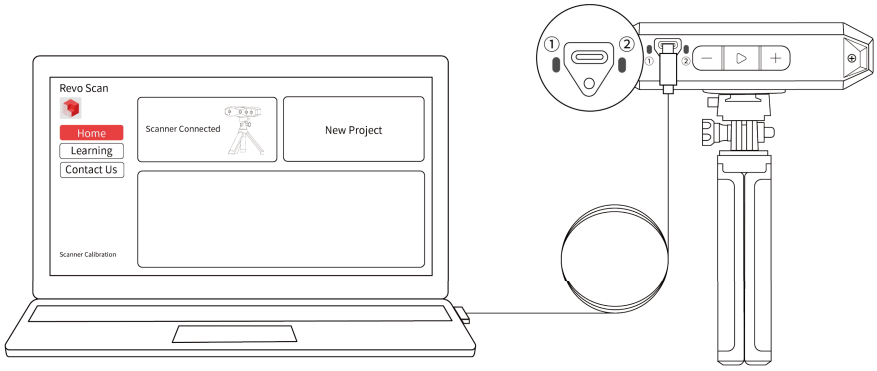
Transferring via Wi-Fi	Transferring via USB
1) Ensure MIRACO and PC are connected to the same Wi-fi network.	1) Connect MIRACO to a PC using the USB Type-C to C cable..
2) Open Revo Scan (PC) and click **Import from MIRACO** › **Wi-Fi** in Revo Scan (PC)'s File menu. Pick either the PIN code or the QR code transfer method.	2) Tap the Data Transfer button on the popup window on MIRACO.
3) On MIRACO, tap the More button next to the required files and tap the **Share Model** icon.	3) Open Revo Scan (PC), wait for a moment, and the project list in MIRACO will appear.
4) Enter the PIN code or scan the QR code shown in Revo Scan (PC) to start the file transfer.	4) Select the required files and export to your PC.
Note: Don't leave the transfer interface or turn off the MIRACO's display during transfer, or it'll fail.	

5. First Scan

Let's do a scan with the small bust (not included with the RANGE series) that came with your Revopoint 3D scanner.

5.1 Preparation

5.1.1 Connecting the Scanner (PC-USB)

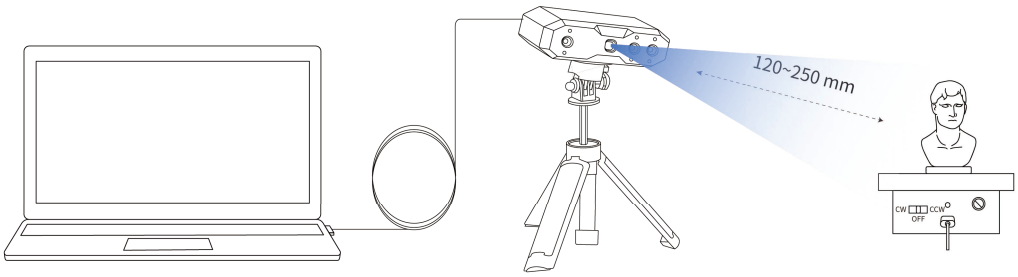


1. Connect the scanner to a PC via the USB Type A to Type-C cable.

   Plug the USB Type-C end into the back of the scanner and tighten the screw. Plug the USB Type-A end (or use the USB Type-C to Type-A Adapter) into a PC.

2. Open Revo Scan on the PC and wait for the scanner to appear.

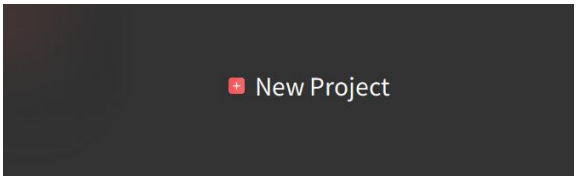
5.1.2 Preparing the Scanning Environment



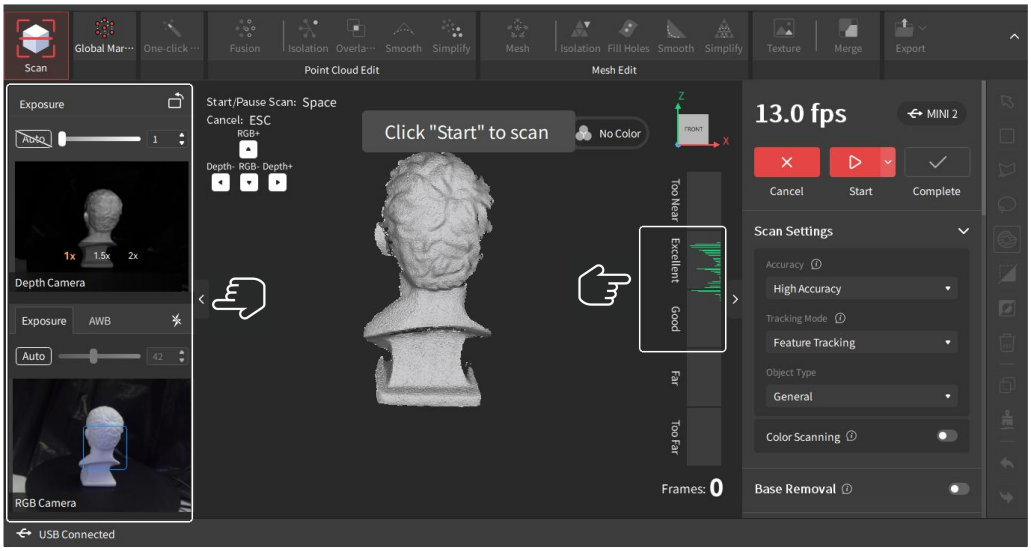
1. Clear the work area of any clutter and unnecessary items.
2. Place and power on the Mini turntable by connecting it to a plug or USB port on a PC.
3. Place the bust in the center of the turntable and ensure the bust is evenly lit but not in direct sunlight.
4. Adjust the scanner to aim at the object by setting a suitable height and angle.

5.2 Scanning Process

5.2.1 Creating a New Project

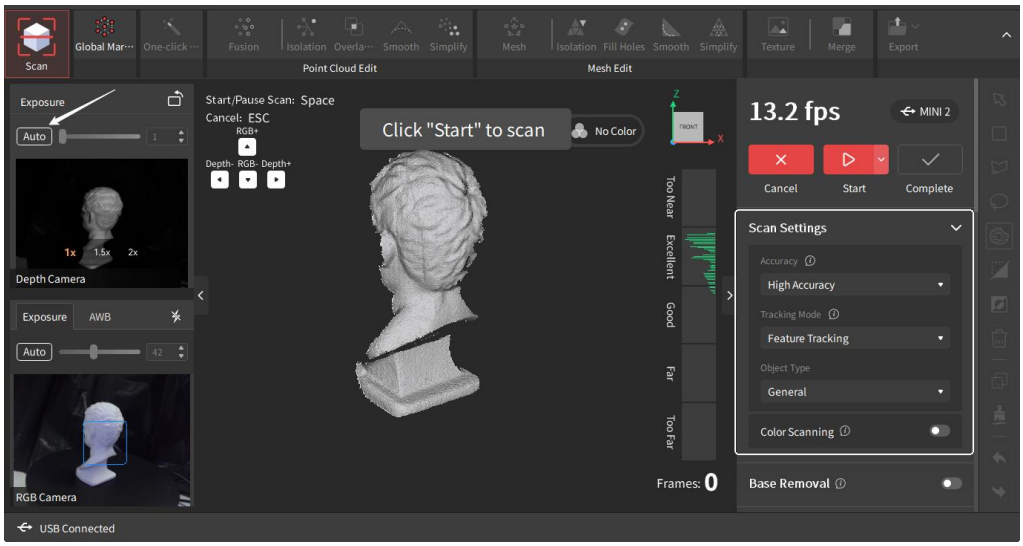


1. Click the New Project.
2. Name the project, select a file location (or use the default one), and then click New to enter the Project Interface.



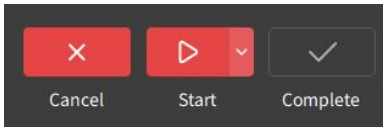
3. Center the bust in the depth camera preview window.
4. Adjust the distance between the scanner and the object until the Scanning Distance Indicator in Revo Scan shows an excellent distance.

5.2.2 Selecting Scan Setting



1. Select High Accuracy, Feature, General, and toggle Color off in the scan settings.
2. Adjust the Depth Cameras' exposure or set it to auto.

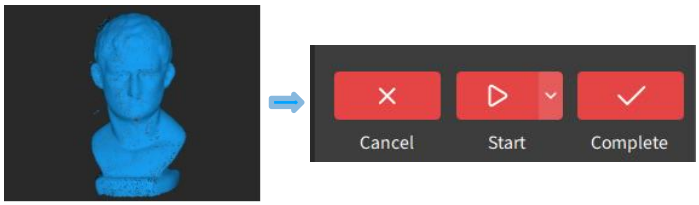
5.2.3 Starting the Scan



1. Click the Start button to Start the scan.

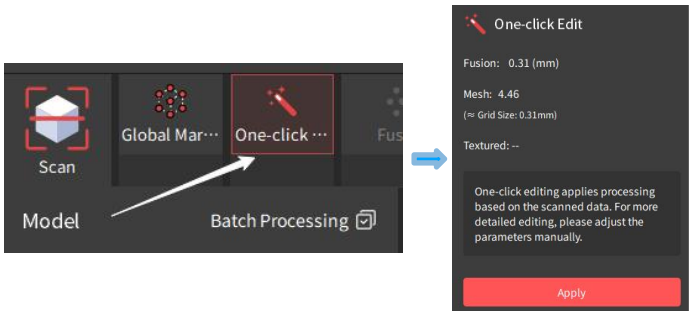
2. Once the turntable has done one full rotation scan, pause it to check the model.
   If the model is incomplete, click the Start button to continue the scan.

5.3 Finishing the Scan



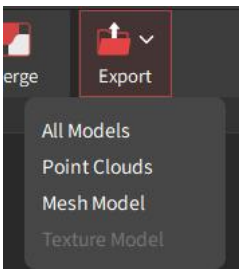
Check the model and click the Complete button if it's ok.

5.4 Model Editing



Click on the One-click-editing button to process the point cloud.

5.5 Model Exporting



Click the Export button and Select the state › Select the file destination and format.

6. Help and Feedback

6.1 Scanning Tips

1) Scanning Different Object Types

- **Scanning Feature-Rich Objects**

Feature-rich objects are usually straightforward to capture as their detailed surfaces have many distinct features for the scanner to track.

① Select **Feature Tracking** mode.

② Scan the object.

- **Scanning Featureless Objects**

Successfully capturing symmetrical or flat featureless objects requires preparation as they lack distinct features for the scanner to track. This can be dealt with in several ways:

• **Place Marker Points**

① Place marker points on the object's surface irregularly.

② Select **Marker Tracking** or **Global Marker Tracking** in the Tracking Mode.

③ Scan the object.

For different markers and scanners, follow the guidelines below:

Large markers (10 mm outer diameter) - for POP series, INSPIRE, RANGE series, MIRACO (Far Mode)

Place markers at a distance of 3-4 cm | 5 or more markers per frame. If using the RANGE series or MIRACO (Far Mode), place markers at a distance of 6 - 8 cm | 5 or more markers per frame.

Small markers (6 mm outer diameter) - For MINI series, MIRACO (Near Mode)

Place markers at a distance of 1-2 cm | 5 or more markers per frame.

Note: If using scanning spray and markers, it's better to apply the scanning spray first and then place the markers. This makes it slightly easier to remove the markers when it's done.

- **Magic Mat**

The Magic Mat can be placed underneath some objects for a fast sticker-free marker point solution.

- **Turntable Topper**

Place the Turntable Topper on top of the turntable to provide pre-placed marker points for objects with a surface area too small to place enough marker points.

- **Reference Objects**

Place feature-rich objects (like the small statue included with most Revopoint 3D scanners) around the object to be scanned. When setting up the scan, select **Feature Tracking** Mode. The scanner will capture these along with the object being scanned, and they can easily be removed in post-processing.

- **Black, Transparent, Metal or Shiny Surfaces**

Surfaces with these properties can be challenging to scan as the surfaces will absorb the light, reflect nothing, or reflect too much for the scanner to see what's there.

These kinds of surfaces need to be made matte to deal with it. This can be done in several ways:

① Use scanning spray to lightly and evenly coat the object's surface.

② Use a fine powder like baby or makeup powder to lightly coat the object's surface.

2）Outdoor Scanning

Direct sunlight should be avoided when scanning outdoors, as it can interfere with the scanner's depth cameras. Try scanning on an extremely overcast day or 2 hours before sunrise or after sunset for best results.

3）Regaining Tracking After Tracking Loss

If the tracking loss warning pops up, pause the scan. There are three possible solutions:

① Check for any miss scanned frames and click undo to remove them.

Aim the scanner at a previously captured area and unpause the scan. Once the scanner has regained tracking, continue the scan.

② If you're trying to scan a flat, featureless area, markers may need to be placed on the surface.

③ Tracking may also be lost if the object's surface has sharp, contrasting color differences. To fix this, pause the scan and then adjust the Depth Cameras' exposure until the surfaces can be detected clearly.

4）Over Scanning

Repeated scanning of the same area will create more noise in the 3D model and reduce its quality.

Once a surface area has been captured, immediately move on to the next area to be captured to avoid over-scanning an area.

5）Scanning Small Objects' Hard-to-reach Areas

When performing a standard scan (horizontally), there may be some very angled areas on objects that the scanner fails to capture.

To negate this, first scan your object normally (horizontally), then turn your scanner 90° so it's vertical and perform the scan again. Once the second scan is finished, merge both scans.

6）Scanning Sharp Angles and Edges

Place more markers than usually required along the edge to accurately capture sharp angles and edges so it's easier for the scanner to track.

7）Scanning Thin Objects

Scanning thin objects is easy if you place reference objects around them for tracking purposes.

① Stand the thin object up vertically with some glue tack or a vice. Place at least two reference objects, like the bust, around the object.

② Select **Feature Tracking** mode and perform the scan.

③ Finally, use the Clip tool to cut out the unneeded reference parts of the scanned model.

8）Scanning People

① Notes to the scanned person:

- Avoid wearing dark or black clothing.
- Avoid wearing accessories such as watches, eyeglasses, necklaces, etc, that are reflective or cause facial occlusion.
- The person must remain stable when standing and avoid shaking or breathing heavily.
- It is recommended that people with long hair tie their hair up to simply the scan.

② Open Revo Scan, select **Feature Tracking** mode, then High-accuracy Scan, and Body for the Scan mode. Once you're in the scanning interface, adjust the camera's gain until there are as few red and blue patches as possible in the preview window.

③ The easiest way to start the scan is from the top center of the head. Slowly but steadily, move in a spiral around the model, progressively descending as you go. Ensure that you overlap the previously scanned areas as you go, as this will help prevent tracking loss and misalignment.

④ Once you've finished the spiral, pause your scan, check it for missing parts, and fill those in if needed. Also, don't worry about slight misalignments, as they'll generally be fixed automatically in Revo Scan when you fuse the model.

9）Face Scanning

When scanning faces, remove any reflective jewelry like lip or nose studs. The person being scanned must keep their face still during the scan, so it's

recommended that they keep their eyes closed and not smile. During the scan, avoid scanning in the same area repeatedly. Move the scanner along a fixed path (from top to bottom or left to right) at a constant speed. And try to complete the scan in one go.

For more tips, please visit youtube.com/@Revopoint3D.

6.2 Using Accessories

Some of Revopoint's accessories, like the Dual-axis Turntable or Handheld Stabilizer, can be connected and controlled via Bluetooth in Revo Scan.

• Open Revo Scan and go to the Project Interface.

• In the menu, select Accessories, then find your accessory and click Connection.

• Find your accessory in the Bluetooth list and click connect.

For more detailed instructions, please visit revopoint3d.com/pages/support-download and scroll down to the "Documents" section to get the accessory's Quick Start Guide.

6.3 Feedback

If you have any question during using the software, go to the Menu Bar, and click Help > Feedback to submit your feedback.

6.4 Software Updates

Revo Scan is frequently updated with new features and improvements. You should keep Revo Scan up to date to ensure an optimal scanning experience.

Click the update button on the notification pop-up in Revo Scan to automatically download the update.

6.5 Customer Service

If you need any assistance with your scanner, please don't hesitate to contact us at customer@revopoint3d.com or drop us a line at +1 (888) 807-3339 or chat with one of our customer service agents online on our website at revopoint3d.com. Click the speech bubble on the bottom right corner of the screen to access our live chat.

7. Appendix

7.1 Troubleshooting

1. The Scanner Doesn't Connect to a PC (Windows)

Scanner connection failure may happen for a variety of reasons. We recommend you try the following solutions:

1) Check the connection: Make sure you use the correct cable (USB Type-A to Type-C cable or using the USB Type-C adapter) to connect the scanner to the computer.
2) Swap to a different USB port: Try connecting the scanner to a different USB 3.0 or better port to troubleshoot if it's a faulty port or cable.
3) Right-click on the Windows icon to enter Device Manager. Find "Camera" and double-click it to see if the depth and RGB camera serial numbers are displayed correctly. If the serial numbers are displayed correctly, go to Settings **›** Privacy and Security, find Firewall, and allow Revo Scan access through the Firewall.

2. The Scanner Doesn't Connect to a PC (Mac)

1) Check the connection: Make sure you use the correct cable (USB Type-A to Type-C cable using the USB Type-C adapter) to connect the scanner to the computer.
2) Swap to a different Thunderbolt port: Try connecting the scanner to a different Thunderbolt port to troubleshoot if it's a faulty port or cable.
3) check if your Mac has recognized the USB cable by clicking the Apple logo **›** About This Mac **›** More Information **›** System Report **›** Hardware **›** USB.
4) Check if you have installed one of the following apps on your Mac. If you have, ensure they are fully closed and not running in the background.
   - Google drive
   - Dropbox
   - Preview app on macOS Ventura
   - SmartSwitch
   - Garmin Express
   - OneDrive

3. Texture is not accessible in Revo Scan

1) The texture feature won't be accessible if Color Scans was not enabled in the scan settings.
2) If it is a merged model, denoted by the default name Aligned_*** or Merged_***, the Texture feature won't be accessible.

4. No Point Cloud or Image in the Preview Window

When there is no point cloud or image in the Preview Window, try the following solutions:

1) Check the connection: Make sure the scanner is connected. When it's connected, the Depth Camera Preview Window will display an image.
2) Exposure settings: Ensure you have adjusted the depth camera's exposure settings correctly. Try adjusting the exposure setting until there is a clear point cloud.
3) Scanning distance: Ensure the scanning distance between the scanner and the object is good or excellent. the point cloud may not be captured correctly if the distance is too far or too close.
4) Ambient Light: The intensity of the ambient light also affects the display of the point cloud. Ensure the scanning environment is moderately lit to avoid interference from too strong or too weak light.
5) Click the "Settings" button at the top right corner, toggle on or off the "Enable GPU accelerated rendering" option, click "Save," and then restart Revo Scan to see if the issue is fixed.
6) If the problem remains, update your graphic card's firmware.

5. Scanning process interrupted or stuck

Stuttering or scanning interruption while scanning may be caused by the lack of computer performance to handle a large amount of data or by a lower software version with some bugs. You can try the following solutions:

1) Check software: Close and restart Revo Scan. If the problem remains, update Revo Scan to the latest version to avoid bugs caused by lower versions.
2) Upgrade computer hardware configuration, including upgrading the processor to improve data processing capability, expanding the computer's memory capacity, and installing solid-state drives (SSDs) instead of traditional mechanical hard disks to improve data reading and writing speeds.

6. Scanner Overheating Warning

A scanner overheating warning can be caused by long operation times or high environmental temperature. If you see it, take the following actions:

1) Immediately pause and save your scan. Disconnect your 3D scanner from the power supply and let it cool down for 30 minutes.
2) When using the scanner, ensure it has good ventilation. Revopoint scanners' operating environment temperature range is 0°C to 40°C (32°F to 104°F). Please operate the product appropriately and only in situations limited to this temperature range.

If you're having any problems with Revo Scan or your Revopoint 3D scanner that are not listed above, please check our website's troubleshooting section support.revopoint3d.com/hc/en-us/sections/22024165823643-Revo-Scan-Troubleshooting.

7.2 Glossary

Accuracy	How closely a 3D model's dimensions match the object's.
Alignment Modes	How 3D scanners keep track of an object as they scan. See Feature and Marker for more details.
Ambient Light	The light that comes from the surrounding environment.
Calibration Board	A board with irregularly placed dots to check or recalibrate a 3D scanner's accuracy.
Capture Range	The area that a 3D scanner can capture in a single frame.
Class 1 Light	Light that is completely eye-safe for people and animals.
Depth Camera	Depth cameras capture the distance and depth information of the surrounding environment in a three-dimensional space. They do this by measuring the light spread time or reflection in a scene from infrared lights or other technologies. It works out the distance information of each point in the scene to construct the 3D model of the scene.
Feature Tracking	A tracking alignment mode where 3D scanners use an object's features to keep track as it scans. It's used for objects with many distinct details and surface features.
Field of View (FOV)	The angular extent the cameras on a 3D scanner can see.
Fuse	The process of merging multiple raw 3D data sets (aka frames) created during the scan into one complete Point Cloud that's ready for meshing or editing.
Frame	The area that a 3D scanner can see and capture.
Frames	3D surfaces captured during a scanning session, collectively constituting a scan. The scan rate varies with scanner type.
Frames per Second (FPS)	The number of frames a 3D scanner can capture in one second.

File Format	In a computer, a file format, also called a file extension, is the layout of a file -- in terms of how the data within the file is organized. Revopoint products' output file formats are as follows: Point cloud models can be exported in PLY, OBJ and ASC formats. Mesh models can be exported in PLY, OBJ, STL, FBX, GLTF and 3MF formats. Texture models can be exported in PLY, OBJ, FBX and GLTF formats. For details of each file format, refer to the "File Formats" section.
Marker Tracking	A tracking mode where the 3D scanner tracks marker stickers placed on or around.
Marker Points	Small round stickers that are usually placed on or around flat featureless surfaces so a 3D scanner can use them as reference points to keep track.
Merge	The process of combining separate, partial 3D scans of an object to create a complete 3D model.
Meshing	The process of converting a Point Cloud into a 3D model.
Meshes	The surface geometry of a 3D model comprises a series of Vertices, Edges, and Faces.
Model	The 3D object that results from the fusion operation (in Revo Scan) or another modeling process in a different software package.
Noise	Noise is the random variation of surface points that do not represent the true geometry of the scanned object.
Point	A single point in space that has been measured and recorded as part of a 3D point cloud.
Point Cloud	A cloud of tiny points plotted in a 3D space. Each point represents an area of an object’s surface captured by a 3D scanner.
Point Distance	The distance between the points in a Point Cloud. The smaller the space between the points, the higher the resolution of the point cloud.

Polygons	Flat geometric shapes with at least three internal angles (i.e., a triangle). Polygons are the building blocks for most 3D models.
Precision	A 3D scanner's ability, over repeated scans, to provide measurements close to one another. Usually specified as the nominal or maximum possible difference between two measurements of the same item.
Project	An album including the scanning configuration, raw data, processed data, and operation history.
RGB Camera	A conventional color camera that captures and saves image information by recording the red, green, and blue colors of the light reflected or transmitted by the surface of an object.
Resolution	The level of detail or precision in capturing and representing the surface geometry of a 3D object. It is a measure of how finely the scanner can distinguish and capture small features, textures, and intricate details on the scanned object.
Scan	A sequence of frames captured in a single continuous scanner movement around an object or scene.
Scanning Speed	Typically listed as frames per second (fps) or points per second, this is how fast a scanner can collect data per second during a scan.
Scanning Spray	An aerosol used to lightly coat the surface of dark, shiny, or transparent objects to help 3D scanners see them. It can be purchased or made from everyday materials.
Single-frame	Also referred to as a frame. It’s the area that a scanner can see and capture in one frame.
Structured Light	A high-resolution, patterned light that deforms when hitting an object's surface and allows 3D scanners to capture surface information through its depth cameras.
Tracking	Synchronizing frames of scanning data so they are mapped to a location in 3D space that is consistent with previous frames.

Texturing	Applying color data captured during a 3D scan that is aligned with the mesh and applied to the model, usually as a photographic image.
Vertices	X, Y, and Z coordinates indicate a single point in a 3D space.
White Balance	White balance is a camera setting that defines the color of white. It's also called color balance or illuminant correction. White balance adjusts images so that white subjects appear white in the final product. It establishes a baseline from which all other colors are measured.
Working Distance	The minimum and maximum distance a 3D scanner will capture data when scanning an object.

7.3 File Formats

File Format	Description	Applications
OBJ	A commonly used 3D model format for storing the shapes and textures of a 3D model.	**3D Modeling and Rendering:** Commonly used for modeling software and rendering engines such as Maya, Blender, and 3DS Max to create or edit 3D models. **Game Development:** Commonly used in game engines such as Unity and Unreal Engine to import and export static 3D models. **Movie Effects:** Used to import and export complex 3D scene and character models in movie and animation production.
PLY	A format for saving 3D scan data, especially suitable for saving point cloud data (point data generated by 3D scanning).	**3D Scanning Data Processing:** Mostly used for storing and processing the point cloud data acquired from 3D scanners, especially in academic research and computer vision. **Scientific Research:** Commonly used to save and share 3D data in research, such as the 3D models in geology, archaeology, and biomedical fields.
STL	A format primarily used for 3D printing that records information about the triangular faces of a model.	**3D Printing:** Widely used in 3D printing and rapid prototyping for manufacturing parts, prototypes, and models. **Industrial Design:** used in the product design and development phase to produce physical models for testing and validation.
ASC	A text format for saving point cloud data generated by 3D scanning.	**Laser Scanning Data Processing:** Commonly used for storing and exchanging point cloud data captured by laser scanners, widely used in topographic mapping, building scanning, and reverse engineering. **Photogrammetry:** Used to store the 3D point cloud data generated from images in photogrammetry for easy data processing and analysis.
3MF	A modern 3D printing format that saves more	**Modern 3D Printing:** Provides a modern 3D printing solution that supports colors, materials, and textures, suitable for prints

	information about the model, such as colors, materials, and textures.	requiring accuracy and details. **Multi-Material Printing:** Supports multi-material and multi-color printing, suitable for creating complex 3D printing objects.
GLTF	A format designed for web delivery and 3D model display, which is efficient and supports animation.	**WebGL and Web Applications:** Designed for web delivery and 3D model display, suitable for WebGL applications, virtual reality, and augmented reality projects. **Online Presentation:** Used for displaying interactive 3D content on web pages, such as 3D models of products in e-commerce stores.
FBX	A powerful 3D modeling format that supports complex animation and material information, it is commonly used in film, television, and game development.	**Film and TV Production:** Widely used in movie and TV special effects production, especially for scenes that require complex animation and skeletal systems. **Game Development:** Used to import and export 3D models containing animation and skeletal data in game development, compatible with various game engines and development tools. **Virtual Reality:** For virtual reality and augmented reality applications, supporting complex animation and interactive content.

Model State	File Format	Included Files	File Types	Description	Notes
All States	OBJ	xxx_mesh	OBJ File	Mesh data stored in OBJ format, containing a 3D model's geometric data such as vertex coordinates, normals and faces.	
		xxx_pc	OBJ File	Point cloud data stored in OBJ format, representing the point clouds in 3D space.	

		xxx_tex	JPG File	Stores the texture images applied to a 3D model's surface to make the model visually real.	Are used together to load and render 3D models properly
		xxx_tex	MTL File	The material file defines the path to the JPG file so that it can be applied to the model surface.	
		xxx_tex	OBJ File	Contains a model's texture coordinates and other geometric data.	
	PLY	xxx_mesh	PLY File	Mesh data stored in PLY format, containing a 3D model's geometric data such as vertex coordinates, normals and faces.	
		xxx_pc	PLY File	Point cloud data stored in PLY format, representing the point clouds in 3D space.	
		xxx_tex	JPG File	Stores the texture images applied to a 3D model's surface to make the model visually real.	Are used together to load and render 3D models properly
		xxx_tex	PLY File	Contains a model's texture coordinates and other geometric data.	
Point Clouds	ASC	xxx_pc.asc	ASC File	Point cloud data stored in ASCII format.	
	OBJ	xxx_pc	OBJ File	Point cloud data stored in OBJ format.	

	PLY	xxx_pc	PLY File	Point cloud data stored in PLY format.	
Mesh Models	3MF	xxx_mesh.3mf	3MF File	Mesh data stored in 3MF format, containing a 3D model's geometry, color, and other data. It's a file format used for 3D printing.	
	FBX	xxx_mesh	FBX File	Mesh data stored in FBX format, containing a 3D model's geometry, color, and other data. It's a file format used for 3D modeling, animation, and visual effects.	
	GLTF	xxx_mesh.bin	BIN File	Stores the binary data related to a model, such as vertex coordinates, normals, etc.	Are used together to load and render 3D models properly
		xxx_mesh.gltf	GLTF File	Describes the structure and properties of a model, as well as reading and opening BIN files. It's a file format used to transfer and load 3D models.	
	OBJ	xxx_mesh	OBJ File	Mesh data stored in OBJ format.	
	PLY	xxx_mesh	PLY File	Mesh data stored in PLY format.	
	STL	xxx_mesh	STL File	Mesh data stored in STL format.	

Texture Models	FBX	xxx_tex	FBX File	Contains a 3D model's geometry and texture data, a file format used for 3D modeling, animation and visual effects.	Are used together to load and render 3D models properly
		xxx_tex	JPG File	Stores the texture images applied to a 3D model's surface to make the model visually real.	
	GLTF	xxx_tex.gltf	GLTF File	Describes the structure and properties of a model, as well as reading and opening BIN files. It's a file format used to transfer and load 3D models.	Are used together to load and render 3D models properly
		xxx_tex.bin	BIN File	Stores the binary data related to a model, such as vertex coordinates, normals, texture coordinates, etc.	
		xxx_tex	JPG File	Stores the texture images applied to a 3D model's surface to make the model visually real.	
	OBJ	xxx_tex	OBJ File	Contains a model's texture coordinates and other geometric data.	Are used together to load and render 3D models properly
		xxx_tex	MTL File	The material file defines the path to the JPG file so that it can be applied to the model surface.	

<table>
<tr><td rowspan="3"></td><td></td><td>xxx_tex</td><td>JPG File</td><td>Stores the texture images applied to a 3D model's surface to make the model visually real.</td><td></td></tr>
<tr><td rowspan="2">PLY</td><td>xxx_tex</td><td>PLY File</td><td>Contains a model’s texture coordinates and other geometric data.</td><td rowspan="2">Are used together to load and render 3D models properly</td></tr>
<tr><td>xxx_tex</td><td>JPG File</td><td>Stores the texture images applied to a 3D model's surface to make the model visually real.</td></tr>
<tr><td>Notes</td><td colspan="5">1. In each included file, "mesh" means a mesh model, "pc" means a point cloud model, and "tex" means a texture model.
2. The material properties data contained in the MTL file is not available in the current version of Revo Scan.
3. Please avoid saving multiple files in different formats to the same directory.</td></tr>
</table>

7.4 Keyboard Shortcuts

Function	Windows Shortcut	macOS Shortcut
Back to Orbit (exit selection mode)	V	V
Rectangular Selection	M	M
Polygon Selection	L	L
Lasso Selection	U	U
Clip	C	C
Select All	Ctrl+A	Command+A
Invert Selection	Ctrl+Shift+I	Command+Shift+I
Delete	Backspace	Backspace
Undo	Ctrl+Z	Command+Z
Redo	Ctrl+Y	Command+Y
New Project	Ctrl+N	Command+N
Open Project	Ctrl+O	Command+O
Save	Ctrl+S	Command+S
Import	Ctrl+I	Command+I
Set Pivot Point	Alt+Left-click	Option+Left-click
Zoom In/Out	Mouse Scroll Wheel or Two Fingered Pinch In & Out	Mouse Scroll Wheel or Two Fingered Pinch In & Out
Move	Shift+Left-click	Shift+Left-click
Rotate in Selection Mode	Ctrl+Left-click	Command+Left-click
Zoom to Fit	Ctrl+D	Command+D
Default View	Space	Space
Select Through	Ctrl+Shift+T	Command+Shift+T
Select Connection	B	B
Reduce Selection	Ctrl+Shift+Selction	Command+Shift+Selection
Full Screenshot	Ctrl+Shift+A	Command+Shift+A
Model Only Screenshot	Ctrl+Shift+M	Command+Shift+M
Light Source	Ctrl+L	Command+L

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