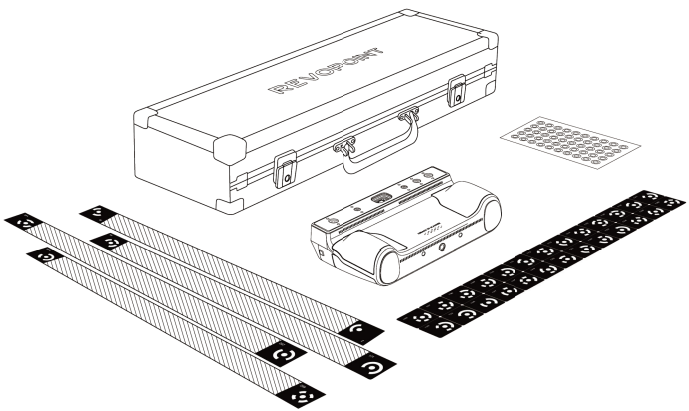
# Photogrammetric Metrology Kit

## Quick Start Guide

**V1.2**



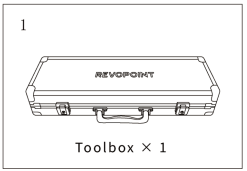

REVOPOINT

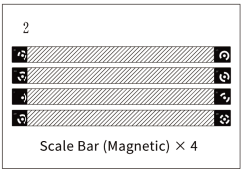
# Contents

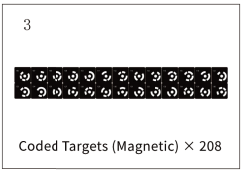
# 1. Product Overview

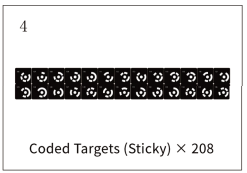
The Photogrammetric Metrology Kit is a brand-new 3D measurement tool developed by Revopoint. Powered by multi-viewpoint stereo vision technology, the kit, the MIRACO Plus 3D scanner's high-resolution RGB camera, and powerful algorithms accurately measure the 3D coordinates of coded targets on an object's surface, outputting more accurate models.

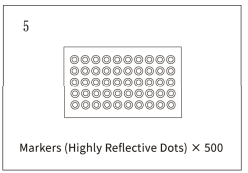
# 2. What's in the Box?




# 3. Read Before Use

1) The Photogrammetric Metrology Kit should be used with a MIRACO Plus 3D scanner.
**Note:** Use Revo Scan 5 (PC) version 5.4.12 or later.
2) The scale bars have been professionally calibrated at the factory. Do not hit or bump them, as this may affect their accuracy.
3) To avoid duplicate coded target numbers, don't mix the magnetic and sticky coded targets from the same kit. Also, don't combine coded target sets from different kits.
4) Coded targets can be used together with markers to ensure full coverage of an object's surface.
5) To avoid accuracy errors, the object or scene's surfaces should be rigid and not deform or be displaced during the process.
6) The kit's magnetic accessories are suitable for surfaces with strong magnetic properties, such as steel, iron, and stainless steel.

# 4. How to Use

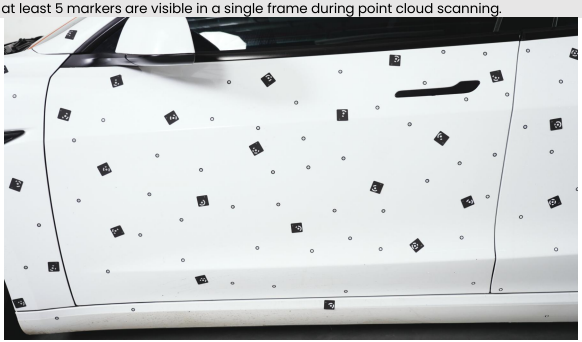
## 4.1 Set up the Environment

① Stick the coded targets and markers
Stick the coded targets and markers on or around the object randomly, avoiding the feature-rich areas on its surface.

For example, when capturing at a distance of 1 m from the object, the distance between the

coded targets should be about 20 cm, and the distance between the markers should be about 10 cm.

**Note:** Affix the coded targets and markers according to the guidelines below to ensure smooth photogrammetry and point cloud scanning.
Ensure at least 8 coded targets are visible in a single frame during photogrammetry.
Ensure at least 5 markers are visible in a single frame during point cloud scanning.



② Place Scale Bars

- Place the scale bars against the object's surface or around it. Ensure the scale bars are not parallel but angular to each other.
- Place the scale bars in a blank area. Avoid covering the coded targets or markers. At least two scale bars are needed.


**Note:** Do not move the scale bars, coded targets, and markers when shooting for photogrammetry.
The scale bars can be removed during point cloud scanning but do not change the location of the coded targets and markers.

③ Check the Environment

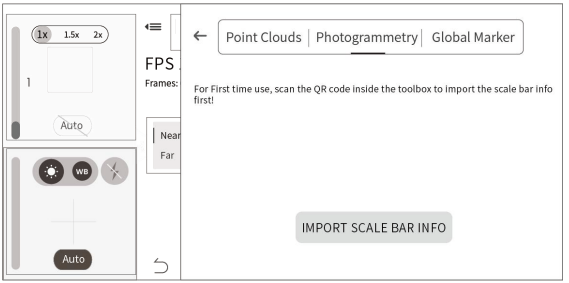
- Only shoot indoors. Ensure the ambient light is even and soft. It is recommended to shoot under natural light.
- Ensure the shooting area is tidy.
- Ensure the object being captured remains still and free from bright spots or shadows on its surface.

# 4.2 Operating Instruction

## 4.2.1 Import the Scale Bars' Info

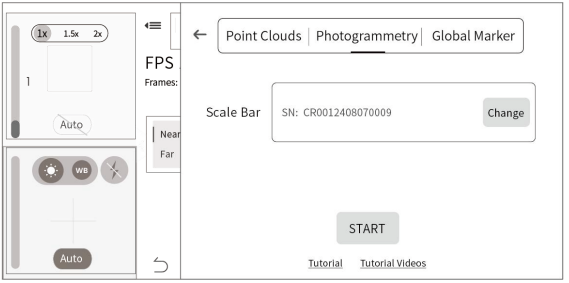
Before using the photogrammetry function, import the scale bars' information first. You can skip this step if it's not your first time using it.

Tap the button and select "photogrammetry". Then tap the "IMPORT SCALE BAR INFO" button and scan the QR code located underneath the scale bars in the box to import the scale bars' information.



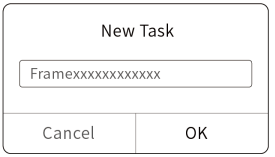

* Software is updated frequently. Please refer to the current layout in Revo Scan.

Once imported, the serial numbers of the scale bars will be shown. Tap the "START" button.




## 4.2.2 Create a New Task

Create and rename a new task and tap "OK" to enter the shooting interface.

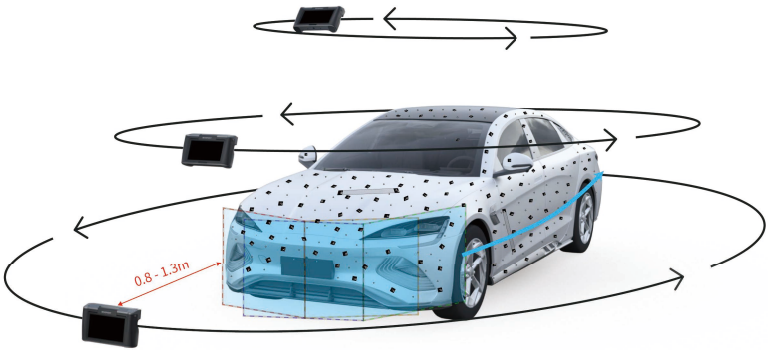


### 4.2.3 Start Shooting

Position the scanner at the recommended distance between 0.8-1.3 m until the coded targets are clearly visible. Tap the button to start shooting. Please keep the scanner stable.

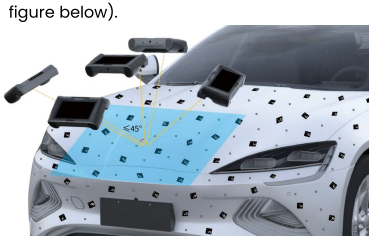
- **Shooting path strategies:**

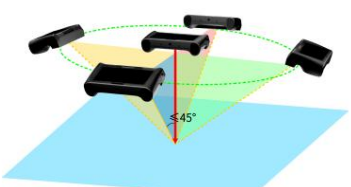
• Divide the whole object's surface/scene into multiple continuous shooting areas. Ensure the coded targets in every two consecutive photos overlap at least 50%. Ensure that the shooting areas completely cover the entire surface of the object/scene from all sides.




*For shooting path reference only. Please take as many photos as possible.

• Shoot each localized area from at least five directions, including up, down, left, right, and center. Start by shooting the middle, by centering the MIRACO Plus scanner perpendicular to the object's surface. Then, to capture the 4 surrounding areas, angle the scanner to around ⩽45° when capturing the areas to the sides, above, and below the center point (see the figure below).




- **Notices:**

• Shoot within the correct distance. If the photos don't meet the standard, follow the prompts on the screen.

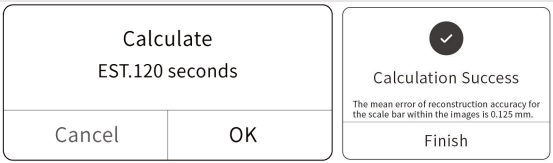
• Ensure at least 8 coded targets are visible in a single frame during shooting.

• The total number of photos needed depends on the object's size or your scene's complexity. Shoot at least 30 photos. More photos are required for large object or complex scenes.

### 4.2.4 Calculate the Markers' Coordinates

When you finish shooting, tap the button to calculate the markers' coordinates. After calculation, the mean error from reconstructing the captured scale bar's coded targets is displayed. If the calculation fails, please follow the on-screen prompts to add photos or retake photos.

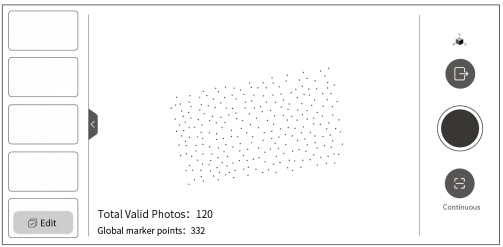
**Note:** The calculation will need to be redone if any photos are added or deleted.




When the calculation is complete, you can save the Global Markers file and export it to Revo Scan 5 (PC) for further operations (see the "**Export the Global Markers**" section in this guide) or follow the steps below to capture point cloud data.

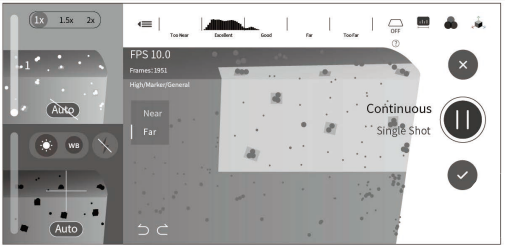
### 4.2.5 Scan Point Cloud (Optional)

① Tap the "Continuous" button to capture the point cloud.

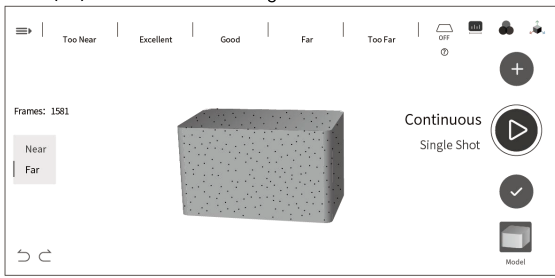



② Move the scanner slowly and steadily. Tap the button after all the point clouds are captured.

**Note:** The point cloud scanning flow based on the photogrammetry function is similar to marker scanning, you can refer to marker scanning tutorials. During point cloud scanning, ensure at least 5 markers are visible in a single frame.



③ Tap the "Model" button to enter the post-processing interface to edit the model or transfer it to Revo Scan 5 (PC) for more details editing.




## 4.3 Export the Global Markers

### 4.3.1 Export via USB Cable

① Connect MIRACO Plus to a PC using the USB Type-C to C cable.
② Tap the **Data Transfer** button on the popup window on MIRACO Plus.
③ Open Revo Scan (PC), wait for a moment, and the project list in MIRACO Plus will appear.
④ Select "Photogrammetry", select the required global markers files and click **Save As**.
⑤ Go to the project interface, click "**Global Marker Library**" > "**Import**" to import the global markers file.


### 4.3.2 Export via Wi-Fi

① Ensure MIRACO Plus and PC are connected to the same Wi-fi network.
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.
③ On MIRACO Plus, tap the ••• button next to the required global markers files and tap the **Share Model** button.

④ Enter the PIN code or scan the QR code shown in Revo Scan (PC) to start the file transfer.

⑤ Go to the Global Marker Library, you'll see the imported global markers files.

**Note:** Don't leave the transfer interface or turn off the MIRACO Plus's display during transfer, or it'll fail.

Visit Revopoint's website, www.revopoint3d.com, for more details and MIRACO Plus scanning tips.

This content is subject to change.

**Follow us:**

**Contact us:**

Scan the QR code with your phone and contact us for help.