✳ polyga

Quick Start Manual
ScanReference Photogrammetry
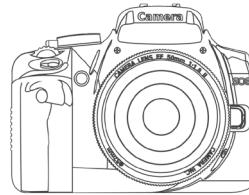
Getting started with the ScanReference

When scanning large objects, 3D scanning alignment errors accumulate over a certain distance. Using ScanReference photogrammetry with your preferred 3D scanner (not included) can help reduce alignment errors and improve scanning accuracy.

This quick-start guide provides you with the resources to get started on the ScanReference photogrammetry system.

THE COMPLETE PROCEDURE REQUIREMENTS:

3D scanner hardware for capturing scan

☐ Preferred 3D scanner with accessories (Not included)
☐ Calibration board (Not included)

ScanReference Hardware set

☐ High resolution camera with accessories
☐ T-shaped scale cross bars
☐ Coded photogrammetry targets
☐ Uncoded 5mm photogrammetry targets

ScanReference software for processing reference targets map

☐ USB drive with installer file
☐ ScanReference license dongle
☐ SD card with reader for data transfer

FlexScan3D software for scanning and obtaining the final mesh

☐ FlexScan 3D software version 3.5.5.2 or above (Not included)
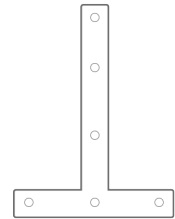
WHATS INCLUDED

x 1
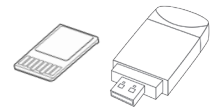High resolution camera with accessories

x 1
T-shaped scale cross bar

x 1
Coded and Uncoded Photogrammetry Targets

x 1
SD Card and SD Card Reader

x 1
Long USB Drive with Installer File

x 1
Short ScanReference License USB Dongle

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1 STEP 1: INSTALL SCANREFENCE

☐ Plug Long USB drive with Installer file into computer. Follow prompts to install ScanReference.

☐ Plug Short ScanReference License USB Dongle into the computer and open ScanReference file.

☐ Create new project follow prompts to Reference Data screen

Step 1 of 5

Project information
Project name:
Customer:
Operator:

Remarks

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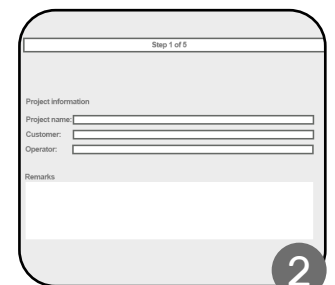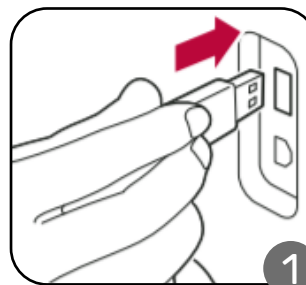
2 STEP 2: PLACE SCALE CROSS

☐ Assemble and place the scale cross close to the scan object.

☐ Make sure all measuring points on the scale bar are clearly visible and not blocked.

❗ The scale cross and the target pieces must not move until the final mesh is obtained.
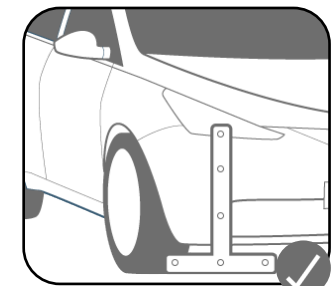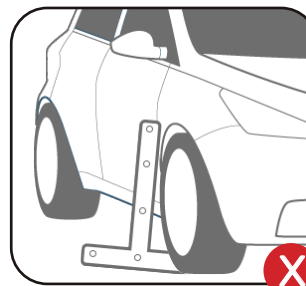
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STEP 3: PLACE SCAN TARGETS

☐ Place a mix of coded and uncoded targets randomly on top of scan object and surrounding area. While placing make sure to not keep in a straight line.

❗ Must have minimum target density of 4 to 7 photogrammetry targets in a shot.

❗ To ensure all targets can be picked up by the software, they should be placed on a relatively flat part of the surface and cannot be bent or partially hidden.
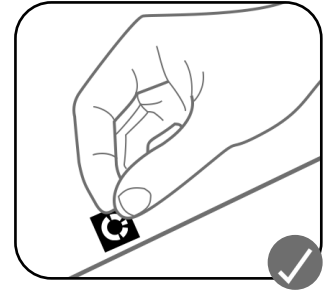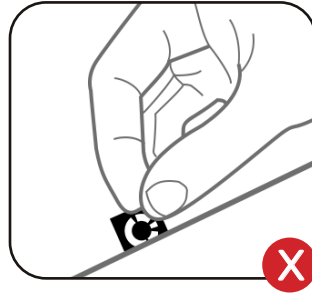
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STEP 4: CAMERA SET UP

☐ Turn Mode Dial to M (preset) and turn on power button. Install and power on optional flash if required.

☐ Focus camera on target to check camera settings.

☐ Refer to figure 3 to check camera settings. Shown values are optimized for object distance of approximately 1.5m or 5 Feet.

❗ For brighter or darker images increase or decrease ISO.

❗ DO NOT change Camera function settings below.
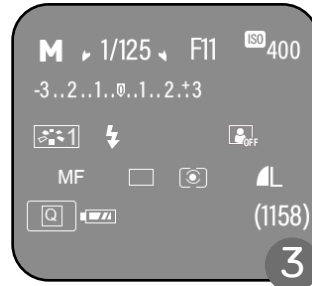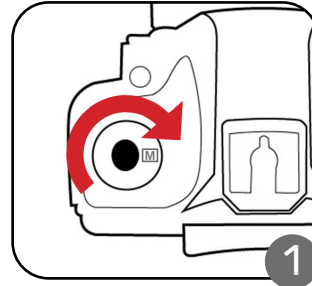
System menu RED	
FUNCTION	SETTING
Image quality	jpg / fine / large
Peripheral Illumin. Correct.	deactivated
Auto Lighting Optimizer	OFF
Color space	sRGB
Picture style	**User Def. 1** (monochrom)
System menu YELLOW	
FUNCTION	SETTING
Auto rotate	OFF

❗ For more information, please refer to the ScanReference Manual. The file can be found in the Hexagon Flash Drive folder which comes with the system.

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STEP 5: TAKE IMAGES

☐ The pre-configured settings of the camera are optimal for indoor environments with controlled lighting. Flash settings must be kept as originally shipped.

☐ The scale cross and the target pieces must not move until the final mesh is obtained.

☐ Scan each section with a minimum of 3 to 5 different scan angles.

❗ Make sure to include a some overlap of scan targets or take images with larger target coverage.
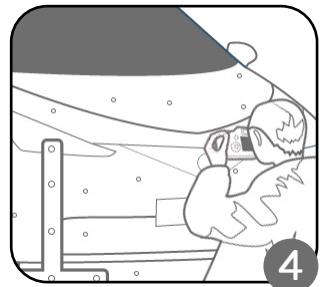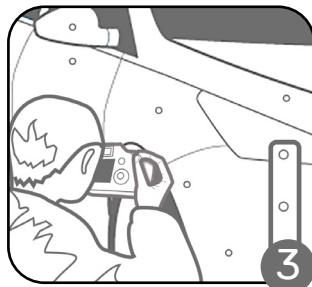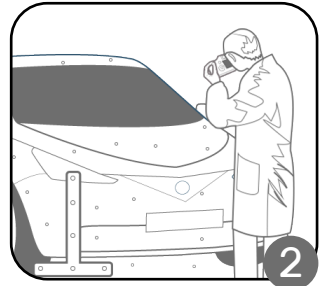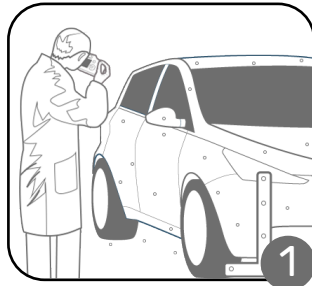
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STEP 6: TRANSFER SCAN DATA

☐ Insert SD card from camera into computer. The card and the images are automatically detected. The images are auto-matically copied to the hard disk and deleted from the card. This ensures that you will never mix up images from different measurements.

☐ When the green progress bar has reached 100 %, all images have been copied and you can remove the memory card.

waiting for response...

Memory card detected: ✓
Measurement images detected: ✓

Image transfer
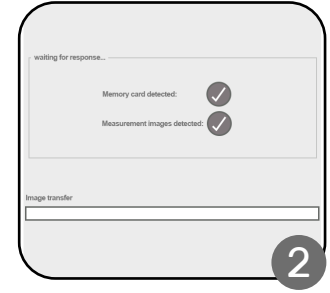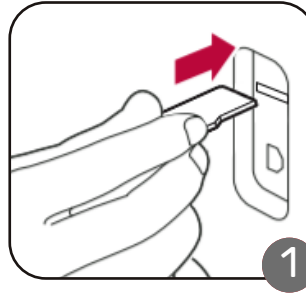
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STEP 7: ADD REFERENCE DATA

☐ At Reference Data screen enter Distance information from sticker on back of scale cross and optional alignment Information.

❗ Enter optional alignment information for custom orientation.

Step 3 of 5

Scale Bars:

	Point A	Point B	Distance [mm]	Deviation [mm]	Active
1	505	508	7090.2900	0.0100	✓
2	501	504	7090.2900	0.0100	✓
3					

✓ **Alignment:**

Origin:
Axis:
Nr: 505   x: 0.0000   y: 0.0000
Type: X(+) / Y(+) ▼
Nr: 508   x: ...   y: 0.0

S/N: ASN000000

Strecke 501 - 504 = 358,76mm
Distance 505 - 508 = 709,29mm

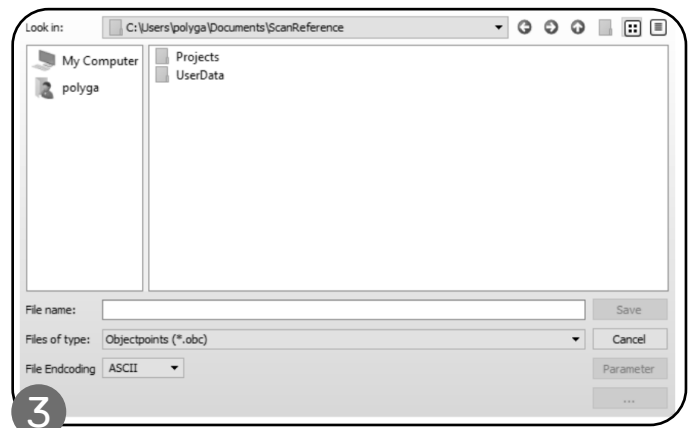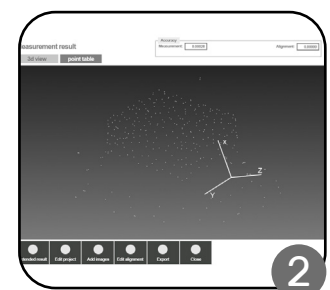www.polyga.com   Made in Germany

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STEP 8: IMAGE PROCESSING

☐ The calculation of the 3D model is started when you click on NEXT. The calculation of the 3D model will take approx. 5 minutes

☐ The calculation will start once proceeding to the next step. A 3D points map will be presented upon finishing.

| Process of the measurement	
0%	
Measurement running...	
47%	
Details >>	OK	Cancel
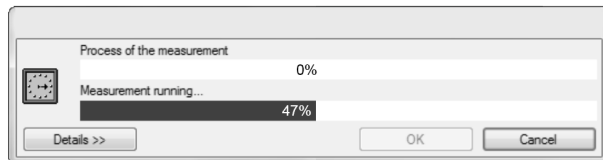
☐ With the calculation successfully being completed, a 3D model of the measuring object is represented as the result on the screen under the tab 3D VIEW.

❗ Adding more images or manually editing the alignment is always possible, until the result is satisfactory.

☐ When result is satisfactory, export the point map in .obc format onto desktop for use in FlexScan3D.

Step 4 of 5

Upload images from memory card.

waiting for images...

Memory card detected: ✓
Measurement images detected: ✓

Image transfer
100%

Remove memory card

Click next to continue

measurement result

3D view | point table

Look in: C:\Users\polyga\Documents\ScanReference

My Computer
polyga

Projects
UserData

File name: Save
Files of type: Objectpoints (*.obc)   Cancel
File Endcoding ASCII ▼   Parameter
                                               ...

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STEP 9: IMPORT TO FLEXSCAN 3D

☐ Open FlexScan3D and create a new folder.

☐ Import ScanReference points file.

❗ The 3D points will be mapped out in green dots in the render-ing space.

Markers
Repeat
Undo
Combine   Uncombine   Finalize   Import
Combine   Markers
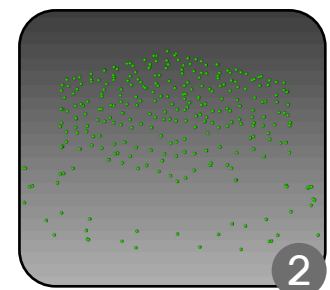
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STEP 10: 3D SCANNER SETUP

☐ Set up preferred 3D scanner. Refer to documentation included with 3D scanner for more detailed instructions.

☐ Optional depending on scanner used: Calibrate the 3D scanner with a calibration board. Note board size for input later.

❗ See 3D scanner documentation for full set-up and calibration instructions or visit website for more information.
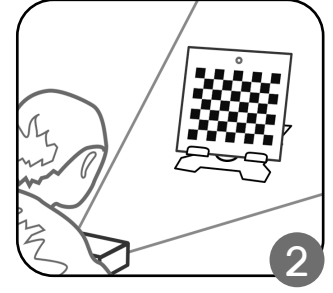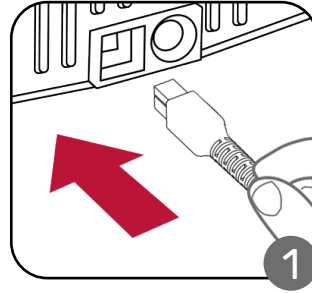

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STEP 11: TAKE 3D SCANS

☐ With 3D scanner connected. Set the Alignment option to Markers, and Enable Marker Detection option checked.

☐ Take scans using the 3D scanner. Scans must contain at least 4 photogrammetry dots in each frame. No overlap between individual scans is required.

❗ For more about setting up the scanner and FlexScan3D, please refer to supplied documentation.
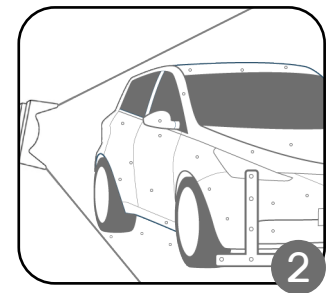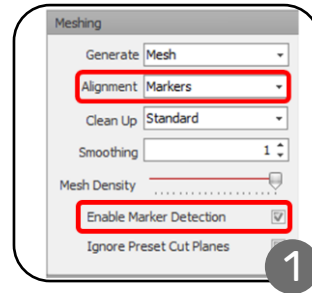
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STEP 12: COMBINE SCAN MESH & DATA

☐ Once scan is complete. The scan data will be mapped out in the rendering space aligned with the ScanReference points data.

❗ If auto-alignment was not done correctly or there were scans taken before importing the points map; a manual alignment can be done by selecting both Mesh and Points map then slecting Markers button.

☐ To combine scans, select all the scans you want to combine. The Combine button will become available for selection.

☐ Under the combine button click the "v". By clicking on this region you will have access to advanced settings.

☐ Within the advanced settings box, the Fine Alignment option (small offsets) should be selected by default. Uncheck this option as we don't want to influence the alignment generated by photogrammetry points.

☐ Finally run the Combine command and wait for the result.
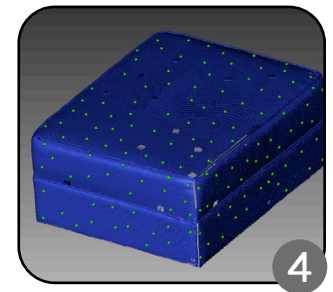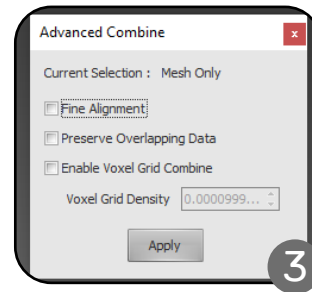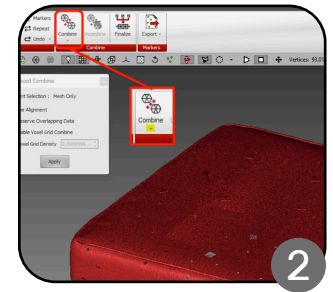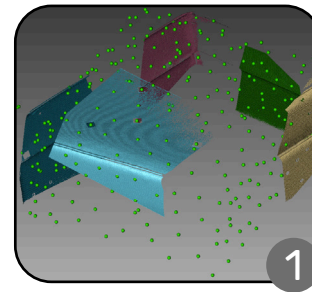
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STEP 13: FINAL PROCESSING

☐ We are close to obtaining the final result. The Finalize command provides two post processing options for the final mesh.
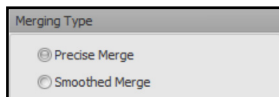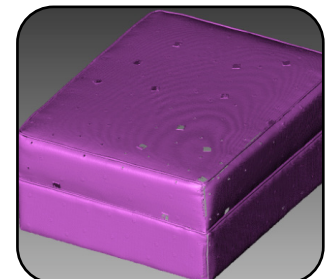
☐ Precise merge is typically the ideal method as it preserves original mesh data and has faster processing compared to smooth merge.

❗ By choosing delete source scans, the size of the final project decreases significantly with loss of original mesh data.

Result With Precise Merge
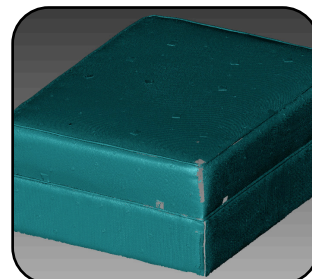
Result With Smoothed Merge

The final resulting mesh can be used for further inspections or exported for many other applications.