CREAFORM peel 3 Portable 3D Scanner and Scanning Solutions User Manual

Contents [hide

CREAFORM

CREAFORM peel 3 Portable 3D Scanner and Scanning Solutions

About the peel 3 Scanner
The peel 3 scanner is a handheld 3D scanning device that has been designed to scan objects without the need for a complex setup. The scanner comes with an EPP case, power supply, power adapter, USB cable, calibration plate, and boxes of targets.

product Hardware and Components

The hardware and components of the peel 3 scanner include:

- Scanner
- Power supply
- Power adapter
- USB 3.0 cable – 4m
- Calibration plate
- Boxes of targets

product Specifications and Technical Characteristics

The specifications and technical characteristics of the peel 3 scanner are:

- Texture cameras (flashing pattern)

- Touch screen interface
- Calibration plate for accurate scans
- Compatible with online services
- Dimensions: 120 x 120 x 270 mm
- Weight: 900 g
- Scan volume: 60-500 mm
- Accuracy: Up to 0.1 mm
- Resolution: Up to 0.1 mm

Usage Instructions

Installation and Connection

To use the peel 3 scanner, you need to install the software and connect the scanner to your computer. Follow these steps:

1. Install the software: Insert the CD into your computer and follow the on-screen instructions to install the software.
2. Connect to online services: Connect your computer to the internet and open the software. Follow the on-screen instructions to connect to online services.
3. Connect the scanner: Connect the scanner to your computer using the USB cable provided.
4. Disconnect the scanner: To disconnect the scanner, safely remove the USB cable from your computer.

product Using the Scanner

Here are some important things to keep in mind when using the peel 3 scanner:

- Touch screen interface: Use the touch screen interface to operate the scanner.
- Calibration: Before using the scanner, calibrate it using the calibration plate provided.
- Object preparation: Make sure the object you want to scan is clean and free of any debris or dust.
- Acquisition rules: Follow the acquisition rules provided in the user manual for best results.
- Workflow: Follow the typical workflow provided in the user manual for best results.

product Cleaning

To clean the peel 3 scanner, use a soft cloth and a mild soap solution. Do not use any abrasive or corrosive materials on the scanner.

product Service and Maintenance

If there is any damage requiring service, do not attempt to repair the scanner yourself. Contact customer support for assistance. If the scanner needs to be shipped back for repairs, keep the foam and packaging after opening as it may be needed for shipping.

product Troubleshooting

If you encounter any issues with the peel 3 scanner, refer to the troubleshooting section in the user manual for solutions.

Product Warranty and Liability

The peel 3 scanner comes with a warranty. Refer to the warranty section in the user manual for details. Any modification of the product by the user is not recommended and any consequences will not be covered by customer support services or a product warranty.

Copyright Notice

- peel 3 User Manual version p3-2302-002 Last modified in February 2023

About this Manual

Thank you for purchasing a peel 3 scanner! The peel 3 scanner is a handheld 3D scanning device. It has been designed to scan objects without the need for a complex setup.

CAUTION:
Before using the scanner, it is important to carefully read this document and any other documents mentioned in reference to its usage and maintenance of its accessories. Users are required to familiarize themselves with the device in addition to following the information provided in the manual. Make sure to retain this User Manual for future reference.

- In this manual, the words “scanner” or “device” refer to the peel 3 scanner.
- Other marks are the property of their respective owners. Refer to the relevant user manual for information about equipment provided by suppliers other than Creaform.

Safety symbols
Throughout this manual, when necessary, safety symbols are used to inform of potential hazards, how to remain safe and/or the possible consequences if not avoided.

- **CAUTION:** Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
- **WARNING:** Indicates a hazard with a medium level of risk, if not avoided, could result in moderate or serious injury.
- **DANGER:** Indicates a hazard with a high level of risk which, if not avoided, will result in severe injury or death.

Information symbol
Some information given is important and must be closely followed.

- Provides information or recommendations on how to use the device correctly.

Important Safety Information

Product

- **VOLTAGE:** The power adapter should be operated only from the type of power source indicated on the marking label.

WARNING:

- Use the product in accordance with all safety rules and operating instructions.
- This product is not indented to be used by children or persons with disabilities otherwise properly trained.
- Do not use the product under the influence of drugs, alcohol, medication or while fatigued.
- Do not use the product if the start button is defective or if the electrical components show signs of a defect. If so, contact the Customer Support immediately.
- Shut down the product immediately if you feel any discomfort.
- Do not place on an unstable surface; the product may fall, causing serious injury to a child or adult, as well as being damaged.

Modification of the product

CAUTION:

- Any alteration or modification of the product may pose a danger to the user and is therefore prohibited.
- Do not introduce foreign objects into the device.
- Only use the device with the original power supply provided.
- Any modification of the product by the user is not recommended and any consequences will not be covered by Customer Support services or product warranty.

Hardware and Components

peel 3

Package contents

- 1 x EPP (expanded polypropylene) case 1 x scanner
- 1 x power supply
- 1 x power adapter
- 1 x USB 3.0 cable – 4 m
- 1 x calibration plate
- 2 x boxes of targets

DANGER: Choking hazard
Plastic bags can be dangerous. To avoid danger of suffocation, keep bags away from babies and children.
Positioning targets and small pieces must be kept out of reach of children.

- Keep foam and packaging after opening. If necessary, it will be needed to ship the scanner and/or accessories back for repairs.

Optional Accessories and Parts

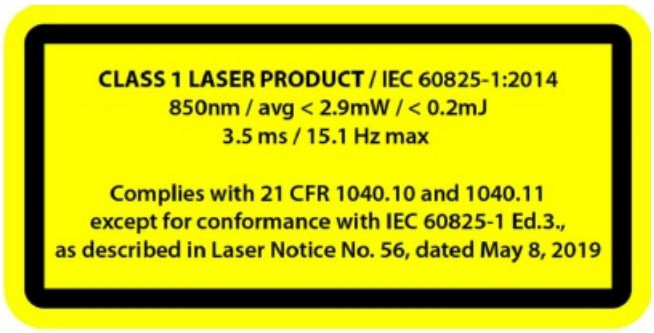
- Only use recommended accessories provided by Creaform.
- To order accessories or parts, visit the e-store on the Customer Portal.

Specifications and Technical Characteristics

peel 3 scanner

Infrared	IR-A
Projector wavelength	850 nm
Ring light geometry wavelength	820-880 nm
Ring light texture wavelength	400-700 nm
Weight	950 g
Power supply	Input 100-240 V ~ 50-60 Hz 1.5 A
Operating temperature	5 to 40 °C
Storage temperature	5 to 55 °C
Operating relative humidity	10 to 90 % non-condensing relative humidity
Compliance	CE, FCC, CFR, IP50, WEEE
Dimensions	79mm X 304mm X 150mm

Laser label



The laser label reads:
CLASS 1 LASER PRODUCT / IEC 60825-1:2014 850nm / avg ˂ 2.9mW / ˂ 0.2mJ – 3.5 ms / 15.1 Hz max
Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 6082 5-1 Ed.3., as described in Laser Notice No. 56, dated May 8, 2019

Computer

	Minimum requirements	Recommended specifications
Processor (1)	Intel Core i7 (6 cores) – 2.5 GHz or more	Intel Core i7 (8 cores) – 2.5 GHz or more
Operating system (2)	Windows 10 (64 bit) (3)(4)	
Graphics card (5)(6)	6 GB, openGL 4.5 and higher	NVIDIA RTX 3070 (8GB) or better, OpenGL 4.5 and higher
Memory	16 GB	32 GB
Hard Drive	Solid-State Drive (SSD) with at least 200 GB of free space	512 GB SSD
Display	1920 x 1080	
USB 3.0 ports	1 X USB 3.0+	2 X USB 3.0+

1. Processor must support AVX2 instructions.
2. 32-bit OS are not supported.
3. Windows 10 version 1909 or higher.
4. NET Microsoft Framework version: 4.7.2
5. GPU memory requirements are proportional to the amount of data collected in a single-scan session. Scanning large parts with higher resolution may exceed the recommended specs and require merging scans.
6. Only NVIDIA graphic cards with CUDA compute capabilities 6.1 or higher are supported. For more information, visit **https://developer.nvidia.com/cuda-gpus**.

- Large scans with high resolution will require more RAM and GPU.

Important Usage Information

To use the scanner, no particular knowledge about 3D measuring systems is required.

Scanner usage

- Always use the device in a clean and dry environment.
- Avoid direct lighting on the optical parts.
- Always store the devices following these conditions:
  - Storage temperature: 5 to 55 °C
  - Operation temperature: 5 to 40 °C
  - Humidity: 10 to 90 % non-condensing relative humidity

Avoid magnetic or electric fields: they can cause permanent damage to the scanner. If you do not intend to use the scanner for a long time, place it in its case following the storage conditions.

Scanning using the texture cameras (flashing pattern)

DANGER: Risk of seizures
Some people may experience seizures when exposed to certain visual images, including flashing lights or patterns. These seizures may include symptoms such as lightheadedness, altered vision, eye or face twitching, jerking or shaking of arms or legs, disorientation, confusion, or momentary loss of awareness. Immediately stop using the scanner and consult a doctor if you experience any of these symptoms while using this device.

Cleaning

CAUTION: Risk of injury
Never tamper with any product of Creaform. Always refer to qualified personnel at Customer Support.

1. Unplug the scanner from the wall outlet before cleaning.
2. To clean the device's non-optical surfaces, use a soft cotton cloth with a small amount of water or a soapy solution. Do not use solvent to clean the device. Do not use soap or solvent on the optical parts of the device (lenses, lights).
3. Spray dry air to remove any particles that may scratch before cleaning the camera lenses and lights with a damp cloth such as a non-abrasive optical towel or a microfiber cloth.

- Never use chemically treated cloths, moistened disposable wipes or volatile solvents such as paint thinner. Do not use liquid or spray aerosol cleaners.
- Opening or modifying the scanner will result in loss of warranty.

Installation and Connection

To install the software
The software can be installed on a computer with the specifications required by Creaform.

1. Download the software installation file from the Customer Portal (cp.creaform3d.com).
2. Double-click the .exe file.
3. Click Next and Install to install all available features.
4. Click Finish when the software installation is completed.

To connect to Online Services

1. Click  in the upper right corner of the screen.
2. Click Connect.
3. Enter the relevant information in the Options dialog box.
4. Click OK.

- The scanner must be connected according to the following procedure to guarantee its physical integrity and to avoid any damage.

To connect the scanner
VOLTAGE:

- Handle the scanner’s power cord with care.
- Do not disconnect the scanner by pulling on the wire, and do not carry the scanner by the cord.
- Keep the cord away from materials or tools that could damage it (e.g., chemical products, cutting tools, heat, etc.).
- Do not allow the electrical wire to be pinched or twisted.
- Always disconnect the scanner before storing or when it is not in use or under supervision.
- Please follow the safety maintenance recommendations from the manufacturer.

DANGER:
Electric shock hazard
Do not use the products near water, in a moist environment or in rain, snow, etc.

- Do not immerse the products.
- Any alterations or modifications of the products may pose a danger to the user and are therefore prohibited.
- The power cord is equipped with a polarized, 2-prong plug. For safety, it fits into the power outlet one way. Never circumvent this safety feature.

1. Plug the power supply cable into an electric source.
2. Connect the power supply cable to the USB 3.0 cable.
3. Connect the USB 3.0 cable to the computer.
4. Connect the other extremity of the USB 3.0 cable to the scanner.
5. Connect the power cable to the scanner.

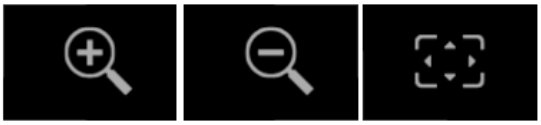
To disconnect the scanner

1. Unplug the power and the USB cables from the scanner.
2. Disconnect remaining cables as desired afterwards.

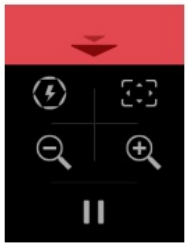
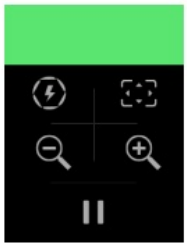
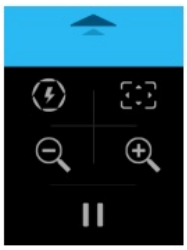
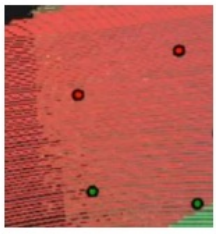
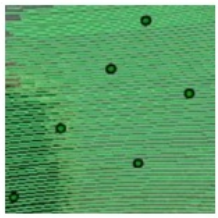
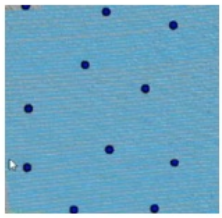
Using peel 3

- Before using the peel 3 scanner, make sure to read the entire User Manual paying special attention to the Important Safety Information and Important Usage Information sections. Used with the scanner, the peel.OS software provides powerful tools and features to finalize scans and speed workflows.

Touch screen
The scanner has a touch screen that allows users to interact with the scanner’s functions with their fingertips.

Button	Description
	Automatic/Dark/Light (Shutter time)[1]
	Zoom in/Zoom out/Reset zoom
	Start/Pause (Scan)
	Scanner position lost

1. The shutter significantly influences the scanner's ability to acquire data. Visibility of the scanner's infrared pattern can also be greatly influenced by the part's color or material.

LED color chart		
		
Scanner position: too close **Action**: move back	**Scanner position**: correct	**Scanner position**: too far **Action**: move forward
		

Operating principles
An infrared pattern is projected by the scanner on the part. The scanner then reads the deformation of that pattern to infer the object's shape. The information collected is used to build the surface with real-time positioning. Hybrid positioning (targets + geometry) must always be used for scans with resolutions set to 0.5 mm and finer (.25mm-.50mm).

Target-based

Targets are required to reach the highest level of accuracy. They compensate for the lack of positioning information. When targets are required, a minimum of 4 targets need to be seen by the scanner at all times, although we recommend a minimum of 6 targets seen at all times by the scanner. This feature is automatically turned ON when resolution is set finer than 0.5 mm. If experiencing trouble with positioning, it is possible to stop the scan any time and add additional targets to help with tracking. It is important to continue the scan at a known location (area already scanned) and work your way through the newly added targets.

Geometry-based
The scanner projects the infrared pattern on the object and uses the different variations in geometry to position itself. It is not possible to scan a flat table only with geometry positioning as there is not enough variations in geometry for the scanner to determine where it is in space. The use of targets is strongly recommended for this example and other parts that lack geometric features.

Texture-based
The scanner acquires and detects the object's texture with its digital color camera. It uses the differences in texture to be able to position itself in space. To enable this option, color must be activated at the Parameters step.

- It is recommended to keep the laptop plugged into an external power source rather than relying on the laptop's internal battery because of the intense power requirements of the scanner and high-processing workload.

Calibration
The calibration process is self-guided. To calibrate the scanner, follow the steps indicated at the calibration step in the software.

- Always calibrate before a new project for the day. It is also recommended to calibrate in the environment where the scanner will be used.

Calibration plate usage

1. Open the case cover.
2. Lay the calibration plate in the case, as shown in the video embedded in the software.
3. Calibrate following instructions carefully.
4. Replace the calibration plate in the case cover to prevent any damage.

- The calibration plate is a crucial part of the system. A damaged plate may prevent the calibration optimization and affect the scan results.

Object preparation
In order to provide better scan results, the object to scan must be prepared following some simple steps. The scanner self-positions itself based on the object geometry. No positioning targets are required for objects featuring sufficient geometric information. In the case of flat or shiny surfaces, positioning targets will provide better scan results. Here are other examples of potential problematic shapes:

- Long cylindrical sections
- Spherical shapes
- Repetitive patterns
- Symmetrical shapes

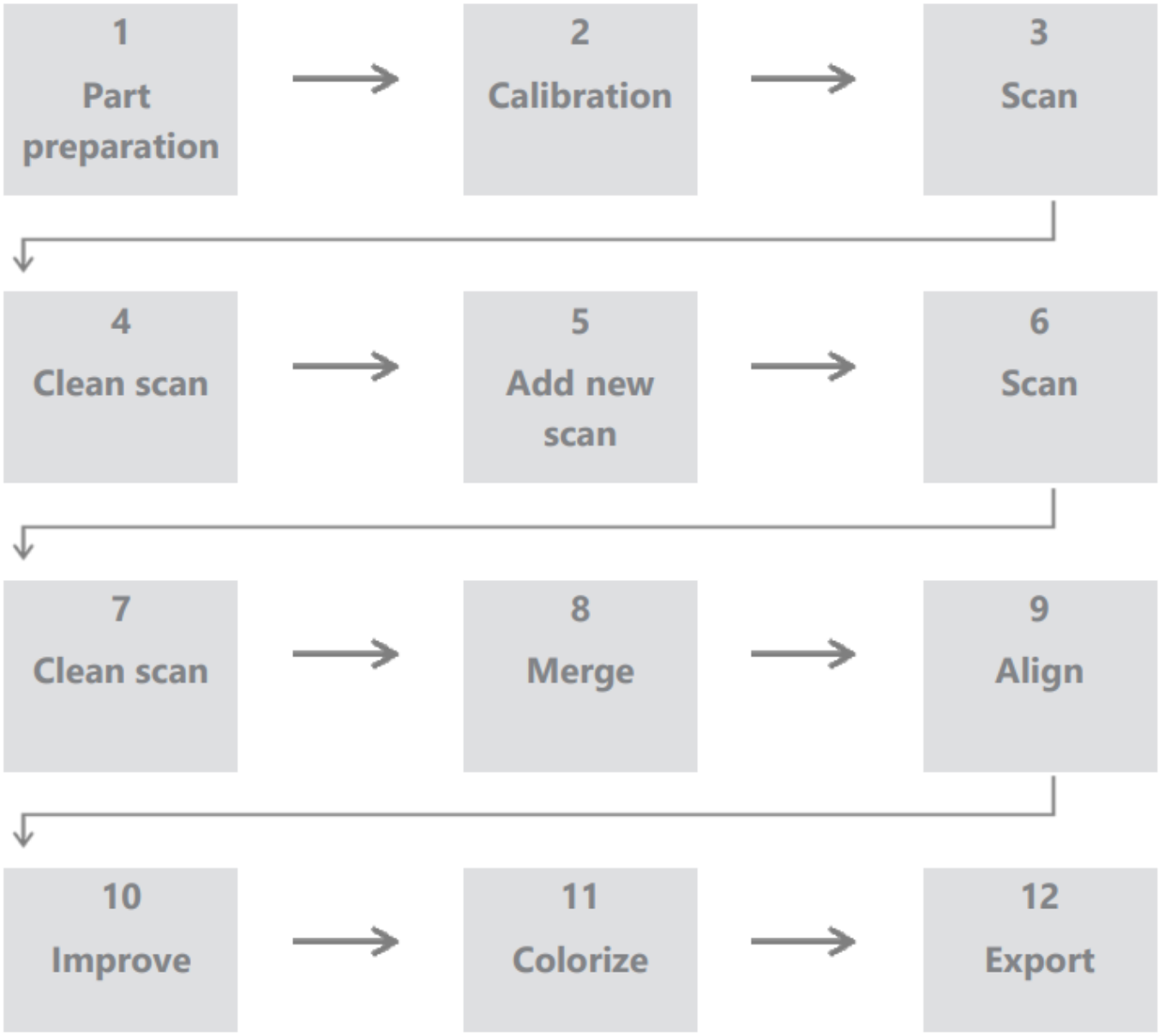
It is always possible to add positioning targets even if the scan has already started. Add positioning targets to

problematic areas and, when continuing the scan, start on an area that has already been acquired and that does not include the newly added targets.
Positioning targets can be added on the part or on the background, or both. However, there are some simple rules to follow:

- Positioning targets cannot move in relation to each other.
- Positioning targets cannot be placed on high curvature surfaces (bending the target).
- Positioning targets cannot be added too close to edges/details (< 3-4 mm).
- Do not use damaged, incomplete, greasy or dusty positioning targets

Acquisition rules
The field of view is the image scope that the scanner can acquire during the scanning process. Any data out of the scanner's field of view will not be acquired. For better surface results and to ensure optimal field of view, a certain stand-off distance must be respected. The software will guide you through the scan process. In addition to the scanner screen LED color chart, the projected pattern in the software will change color in relation to the stand-off distance.

Typical workflow
Here is a typical sequence of tasks to complete a full project.



Step 1 – Part preparation

What is the goal of the project? Will the scan be used for reverse engineering? Then, what areas are important? What features need to be present on the scan? If the goal of the project is to 3D print the scan, then resolution might not be as important. Will the scan be used for quality control? What areas and/or features will be inspected? By answering these questions, the user will be able to determine the next steps. Do you need to have a complete scan of the part? Where should you put the targets? On the background, on the part, or both? Will the targets be used for the merging process? What is the desired level of detail (resolution)? Do you want to activate the color function of the scanner? Answers to these questions will help to choose the required options in the Parameters step.

Step 2 – Calibration
Calibrate before starting your new project. This will optimize the accuracy of the scanner. See Calibration section.

Step 3 – Scan
Make sure to acquire all the desired surface while staying at the right distance with the scanner. This is shown by the red/green/blue lines in the software while scanning, green being optimal. See LED color chart.

Step 4 – Clean scan
At the Clean step, the software will automatically select the background. It is possible to cancel this if the selected background is not correct. Delete all unwanted data. This will especially be important with multiple scans, and using the Merge step.

- Once multiple scans have been merged, it is not possible to go back and clean individual scans.

Step 5 – Add new scan (optional)
At the Clean step, click +(on the right side) to add a new scan. Before doing this, make sure your first scan is cleaned thoroughly.

Step 6 – Scan
A scan in a different orientation should be done at this step. It is important remember how you will be merging your scans together, either by common targets or common surfaces.

Step 7 – Clean scan
At the Clean step, the software will automatically select the background. It is possible to cancel this if the selected background is not correct. Delete all unwanted data. This will especially be important if you do multiple scans and use the Merge step. Once multiple scans have been merged, it is not possible to go back and clean individual scan.

Step 8 – Merge
The software will automatically prompt a target best-fit. This will align common targets together from the first and second scan. If the result is not correct, it is possible to use the point pair pre-alignment. This will ask the user to select 3 points on the first scan and 3 points on the second scan which are approximately at the same location. Once all 6 points are selected, the software will align the scans using a surface best-fit. Steps 5 through 8 can be iterated many times to merge multiple scans together. It is also possible to skip these steps and go from step 4 to step 9 directly.

Step 9 – Align

- This step sets the origin of the model.
- The origin is automatically placed at the center of mass of the part.
- It is possible to use the main axis and planes to lock different degrees of freedom.

Step 10 – Improve
Removing spikes, smoothing the mesh and filling holes are typical functions used at this step. Many other options

are available to enhance the shape and result of the mesh.

Step 11 – Colorize
If Color option was selected in the Parameters section, this is where it will be applied. The application of color during the scan is a time consuming function. If it is not needed, not enabling it will significantly reduce processing time. Some adjustments can be made such as controlling the brightness and contrast before heading to the next step.

Step 12 – Export
It is at this step that the work will be saved. Make sure to save the scanning session (*.p3d); it can be done automatically by toggling the option. Export your mesh for 3D printing, processing in another software, etc. Export directly into peel.CAD software. If this action is selected without saving the *.p3d file, it will not be possible to return to the scanning session from peel.CAD to peel.OS software.

Service and Maintenance

Damage requiring service
Disconnect the scanner from the wall outlet and computer. Refer to Creaform Customer Support under the following conditions:

- The power cord or the plug is damaged.
- Liquid has been spilled on the scanner.
- The scanner has been exposed to rain or water.
- The scanner has been dropped and is damaged or does not work properly.
- Any other circumstance that may require the intervention of qualified personnel for maintenance or repair.

See Resources for contact information.

Safe disposal

- Dispose of the products (scanner, targets, accessories) and packaging appropriately in accordance with local laws and regulations. Contact your local authorities for any product specific treatment and waste management information.

Troubleshooting

Power

Problem	Solutions
The scanner will not turn on.	Connect the scanner by following the connection steps. Once it is connected, the fan and the touch screen will t urn on.

Scanning

Problem	Solutions
No surface acquisition.	Make sure the object has sufficient geometric features to allow tracking and/or add positioning targets.
	Perform a new scanner calibration.
	Adjust the shutter settings.
Poor tracking or surface quality.	Perform a new scanner calibration.
	Add positioning targets.
	Adjust the shutter settings.

Other

Problem	Solutions
Unable to install the software.	Make sure you have Administrator permission on the computer.
	Try installing the software again.
	Uninstall the software, delete the installation folder and reinstall the software.
	Restart the computer and try again.
	Deactivate the anti-virus (if possible), re- download the installer and reinstall the software.
	Make sure Windows is up-to-date.

Software does not open or crashes while opening.	Do the following steps: 1. Right-click the software executable and select Run as administrator. 2. Make sure your graphics card drivers are up-to-date. 3. Uninstall the software, delete the installation folder and reinstall the software. 4. Temporarily disable any anti-virus and anti-malware. 5. Restart your computer. 6. Apply any pending Windows Updates.
Error message displayed: The minimum system requirements are not met.	Refer to the computer recommended specifications.

If you encounter a problem and need assistance, contact Customer Support.

Warranty and Liability

Before returning the device, make sure to open a case with the Customer Support to get a RMA (Return Merchandise Authorization) number.

- For all authorized returns, use the original packaging of the product, otherwise, make sure to package the product in an appropriate packaging.

For more information on warranty and liability, please consult the “Terms and Conditions of Sale” document.

Resources

Use these resources to access support information.

Knowledge Base Articles	Access to the knowledge base articles.	**Customer Portal**
Customer Support	Find help with videos, tutorials, troubleshooting information, product notification updates and get access to the contact form.	**Customer Portal**
After Sales Support	Order from the e-store.	**Customer Portal**
Worldwide Offices	Locate Creaform worldwide offices.	**Creaform Offices**

Equipment from manufacturers other than Creaform

- Refer to the relevant user manual for information or any question about equipment provided by suppliers other than Creaform.

Documentation feedback
Your comments help us provide quality documentation. If you have any suggestions on how to improve our content, write to Creaform Technical Writing.

Documents / Resources

	CREAFORM peel 3 Portable 3D Scanner and Scanning Solutions [pdf] User Manual peel 3, peel 3 Portable 3D Scanner and Scanning Solutions, Portable 3D Scanner and Scanning Solutions, 3D Scanner and Scanning Solutions, Scanning Solutions

References

- cp.creaform3d.com
- cp.creaform3d.com/
- cp.creaform3d.com/
- CUDA GPUs - Compute Capability | NVIDIA Developer
- 3D Laser Scanner, Portable Optical CMM, Optical CMM Scanner | Creaform
- Creaform Worldwide Offices and Head Quarter Coordinates