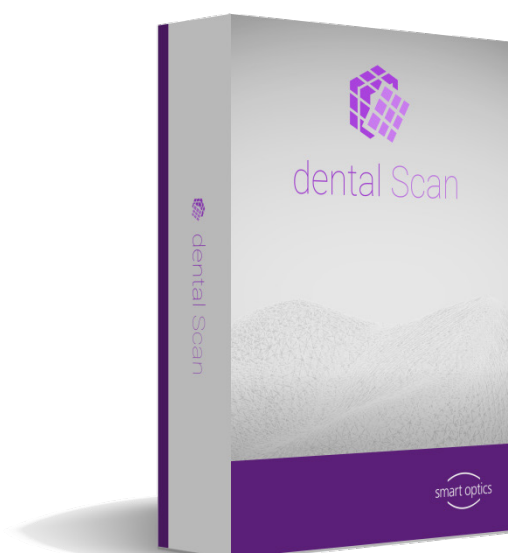




SETUP INSTRUCTIONS

SOFTWARE 3.4



DENTAL SCAN

A product from smart optics Sensortechnik GmbH



Legal notice

FIRST-LEVEL SUPPORT FOR SMART OPTICS PRODUCTS

Find a reseller online in your region: List of resellers <https://www.smartoptics.de/en/dental/reseller-locator/>
or via the contact form <https://www.smartoptics.de/en/contact/>

CHANGES

smart optics reserves the right to make changes in the products and this documentation.
Current documentation: www.smartoptics.de (download sections)

BRANDS AND TRADEMARKS

Adesso Split, Artist/arTO	K. Baumann, DE-75210 Keltern
Artex	Amann Girrnbach AG, AT-6842 Koblach
Baltic Denture System	Merz Dental GmbH, DE-24321 Lütjenburg
Denar	Whip Mix Corporation, Louisville, KY 40209, USA
exocad	exocad GmbH, DE-64293 Darmstadt
FlyCapture, UpdatorGUI	Point Grey Research, Inc.
Gamma	Gamma medizinisch-wissenschaftliche Fortbildungs-GmbH, A-3400-Klosterneuburg
Twin Tray	Klasse 4 Dental GmbH, DE-86159 Augsburg, DE
OnyxCeph3™	Image Instruments GmbH, DE-09125 Chemnitz
PROTAR	KaVo Dental GmbH, DE-88400 Biberach/Riß
SAM	SAM Präzisionstechnik GmbH, DE-82131 Gauting
SILADENT, SilaPart®	SILADENT Dr. Böhme & Schöps GmbH, DE-38644 Goslar
Triple Tray	Premier Dental, Plymouth Meeting, PA 19462, US
Windows, .NET Framework, Visual C++	Microsoft Corporation

Royalty-free icons and illustrations from the Flaticon.com, Fotolia.com, Freepik.com and Pixabay.com image agencies were used in this Operating Manual.

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1 About this manual

Please keep this operating manual, in a safe place and pass it on with the product.

Types of manuals



Operating manual

Device components, general safety instructions, technical data, commissioning, handling.



Installation manual

First-time software installation, upgrades.



User manual

Basics, operating procedures, settings, optional modules.

Graphic symbols and highlighting of important information

▷ Single operational step.

1. Step-by-step instructions.

✓ Result of an action/step-by-step instructions.



NN Cross reference to pages (with hyperlink).



www.smartoptics.de
University | dental Scan | Subject

Hyperlink to the video on the subject in the smart optics University.



More Related subjects (with hyperlink)

NN

After the hyperlink, back to the starting point:

Use the page navigation of the PDF reader ("Previous View" and "Back").



Function or module that may be ordered additionally.



Mouse operation: the button to be pressed is highlighted.



TIP

Tip, helpful advice.



NOTICE

▷ Information on possible data loss or device damage with instructions on how to avoid it.

Illustrations

The device and software images may differ from the actual systems. Screenshots show sample data.

Units of measurement and numbers

Units of measurement Units legally in force in Germany
 International System of Units (SI)

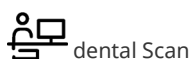
Numbers Decimal system with decimal places

Measurement	Unit	Abbreviation
Mass/weight	Kilogram	kg
	Gram	g
Length	Metre	m
	Centimetre	cm
	Millimetre	mm
	Micrometre	μ
Angle	Degree	°
Time	Hour	h
	Minute	m
	Second	s
Electrical power	Watt	W
Electrical voltage	Volt	V
	Alternating current	AC
Electrical frequency	Hertz	Hz
	Gigahertz	Ghz
Electrical current	Ampere	A
Protection class	International Protection	IP
		1 st digit: solids protection, 2 nd digit: fluids protection
Temperature	Degree Celsius	°
Memory (PC)	Random Access Memory	RAM
Data volume	Megabyte	MB
	Gigabyte	GB
CAD data format	Polygon file format	PLY
	Standard Triangulation Language	STL
	American Standard Code for Information Interchange	ASCII
	Mesh	MSH
	Point Cloud Measurement	PCM
Picture element	Pixel	Px (monitor), dpi (print)
	Megapixel	Mpx

2 About dental Scan

dental Scan is a software for smart optics 3D dental scanners.

dental Scan scans jaw models and impressions according to dental specifications, orthodontic models and multiCase projects. Objects the size of the scanner's measuring field can be scanned by dental Scan in the universal mode, which is industry independent.



Current version and manuals:

www.smartoptics.de

The following can upgrade to version 3.4:

- Vinyl series (Vinyl, Vinyl Open Air, Vinyl High Resolution),
- scanBox

2.1 System requirements

	Operating System	Processor (CPU)	Memory (RAM)	Free hard drive space	Graphics card (RAM)	USB ports
scanBox	Windows 10 64-Bit	i3 with 4 × 3.6 GHz i7 with 6 × 4.7 GHz	16 GB 32 GB	Approx. 40 – 100 GB HDD Approx. 100 – 250 GB SSD	1 GB 6 GB	USB 2.0 USB 3.0
Vinyl Open Air	Windows 10 64-Bit	i3 with 4 × 3.6 GHz i7 with 6 × 4.7 GHz	16 GB 32 GB	Approx. 40 – 100 GB HDD Approx. 100 – 250 GB SSD	1 GB 6 GB	USB 2.0 USB 3.0
Vinyl	Windows 10 64-Bit	i3 with 4 × 3.6 GHz i7 with 6 × 4.7 GHz	16 GB 32 GB	Approx. 40 – 100 GB HDD Approx. 100 – 250 GB SSD	1 GB 6 GB	USB 2.0 USB 3.0
Vinyl High Resolution	Windows 10 64-Bit	i5 with 4 × 3.8 GHz i7 with 6 × 4.7 GHz	32 GB	Approx. 100 – 250 GB SSD	6 GB	USB 3.0

1st entry: required; 2nd entry: recommended

2.2 Interfaces

You can link dental Scan to exocad® DentalCAD and OnyxCeph3™. All interfaces are available at no additional cost for all scanners. The PC must comply with the system requirements of the third-party systems. In case of different specifications, the highest requirements apply.

System requirements

exocad® DentalCAD (dental CAD system)*	wiki.exocad.com "Introduction"
OnyxCeph3™ (prosthetics software)	www.onyxceph.de "> Home OnyxCeph3™ About System Requirements"
Baltic Denture System®	www.baltic-denture-system.de Dental Lab > Requirements
SilaPart® CAD	www.siladent.de/silapart-software/Windows

* smart optics is a sales partner of exocad GmbH. If you are interested in exocad® DentalCAD, please contact your smart optics reseller.

2.3 Modules and hardware based functions

- Depending on the scanner, dental Scan modules are part of the scope of delivery or can be purchased additionally.
- 17 Additional modules must be activated.

Vinyl series, scanBox
Scope of delivery, accessories

Hardware dependency

Some functions require accessories or specific scanner hardware features.

Availability of modules and functions

- KEY
- ✓ Scope of delivery
 - 🔑 Chargeable
 - Not available
 - 🔒 Restricted use

	scanBox	Vinyl Open Air	Vinyl	Vinyl High Resolution
Projects				
Patient	✓	✓	✓	✓
Orthodontics	✓	✓	✓	✓
multiCase	🔑	🔑	✓	✓
Universal	✓	🔑	✓	✓




KEY	scanBox	Vinyl Open Air	Vinyl	Vinyl High Resolution
✓ Scope of delivery				
🔑 Chargeable				
— Not available				
🔒 Restricted use				
Isolation modes				
Complete Jaw	✓	✓	✓	✓
singleDie	✓	✓	✓	✓
secondDie	✓	✓	✓	✓
multiDie	🔑	🔑	✓	✓
Vestibular scans				
Simple	✓	✓	✓	✓
Articulator	—	✓	✓	✓
Auto-articulation	🔒	✓	✓	✓
Twin Tray	—	🔑	✓	✓
Texture scans				
Monochrome	✓	✓	✓	✓
Color	—	✓	✓	✓
Impression scans				
Triple Tray®	🔑	🔑	✓	✓
Full impressions	🔑	🔑	✓	✓
BD Key®*	🔑	🔑	🔑	🔑
High resolution scans				
HR Mode	—	—	—	✓
Scan height				
Automatic Z-axis	—	✓	✓	✓
Visual Z-axis control	—	✓	✓	✓


KEY	scanBox	Vinyl Open Air	Vinyl	Vinyl High Resolution
✓ Scope of delivery				
🔑 Chargeable				
— Not available				
🔒 Restricted use				
Cutting				
Manual	✓	✓	✓	✓
Filter	✓	✓	✓	✓
Automatic	✓	✓	✓	✓
Other				
Calibration	✓	✓	✓	✓
Rescan	✓	✓	✓	✓
Correction scan	✓	✓	✓	✓
Additional scan	✓	✓	✓	✓

* BD Key® – Set for dental processes within the Baltic Denture System®, www.baltic-denture-system.de

3 Initial installation

-  17, 23 If your system (PC and scanner) is preinstalled, you can use this guide to find out more about:
- calibration data,
 - upgrades,
 - changing a scanner,
 - saving locations.

3.1 Prerequisites

-  6
- Does the PC meet the system requirements?
 - Have all important Windows updates been installed?
 - Is the computer free of viruses?
 - Is the Windows user allowed to execute setups and apps?



3.2 Setup execution



Connect the scanner



TIP

Connect the scanner:

- optionally before or after the software installation,
- necessary before loading the calibration data.

Procedure

1. Insert the data carrier and wait until its contents are displayed or open the drive in Windows Explorer.



2. Double click on the setup file `dental Scan.exe`.

3. Follow the instructions of the setup wizard.

The setup steps are:

- allow changes to the device (user account control),
- language in which the setup is displayed,
- folder in which dental Scan will be installed (target folder),
- adding dental Scan to the Start Menu, creating a shortcut,
- option to create a desktop shortcut to dental Scan,
- time at which the computer will be restarted (immediately after installation or later).

Recommendation

▷ Accept the default values. This will simplify:

- support,
- installing interfaces.



dental Scan

Result

- The software files are installed.
- A shortcut in the Start menu and possibly a desktop icon are available.



TIP

The language of the software can be changed in dental Scan.



Language



3.3 Calibration data

Calibration data are a prerequisite:

- to start dental Scan,
- to obtain correctly calculated measurements.

Every scanner requires individually adjusted calibration data. The calibration data are not transferable to a different scanner.

3.3.1 Data check

▷ Check the data carrier with the setup files:

Have you received the correct calibration data for your scanner?

3D Sensor Serial No. SO-20254.00-17-022
--

**Calibration data folder =
Sensor number (type plate/sticker on the scanner).**

You will need to order calibration data from smart optics/your reseller if:

- folder name and sensor number do not match;
- the data is defective or missing.



TIP

Calibration data folder names begin with SO-202 [...].

3.3.2 Copy the calibration data



Connect the scanner



1. Connect the scanner to the PC and the power source.
2. Start dental Scan.
- ✓ dental Scan will indicate the target folder for the calibration data:
C:\ProgramData\3D-Scanner\DeviceCharacteristics\Sensors
3. Select the folder to be copied, with **...**.
4. Switch on the scanner and start dental Scan.
- ✓ When the software starts, it will check whether the copied calibration data are for this specific scanner.

Message “Searched and found sensor ID do not match”


1. Make a note of:
 - the required sensor ID,
 - the wrong sensor ID.

2. Delete the calibration path:
C:\ProgramData\3D-Scanner\DeviceCharacteristics\Sensors\SO-202 [...]
3. Repeat the data check.
4. Repeat the copying process.
5. Start dental Scan.



If dental Scan does not start after complete installation and with the correct calibration data, contact your support.

3.4 Calibration

 www.smartoptics.de
University | dental Scan |
Calibration



Calibration is a prerequisite for performing correct measurements. Calibration is mandatory after installation or an upgrade.

Recommended repetitions:

- Once a month (with automatic reminder) with:
constant, normal operating temperatures,
normal production volumes.
- Once daily with:
changing or high operating temperatures,
high production volumes,
- after transporting the scanner.



Inserting the
Calibration Model

You need:

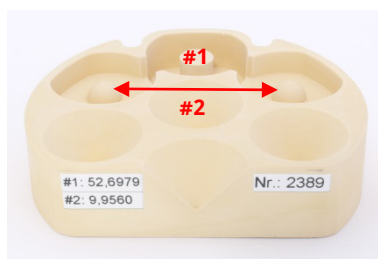
- A 3D calibration model,
- the object holder recommended for your scanner.

The principle of calibration

Every 3D calibration model is measured on a 3D coordinate measuring machine. This is why the reference values are very accurate.

Reference values in millimetres

- #1: Cylinder height (51.45 – 53.55)
- #2: Distance between the hemispheres (9.8 – 10.2)



dental Scan compares the values:

Measured values — Reference values = Correction values

The calibration is successful if the new measurement matches the reference values.

Procedure



NOTICE

▷ A calibration results in inaccurate measurements if the entered values do not belong to the 3D calibration model. Enter the digits as on the label, with commas and decimal places.



1. Confirm the binding request for calibration or select **Calibration**.
 - ✓ The **Calibration** dialog shows the last entered values and when the last calibration was performed.
2. Enter the values indicated on the label of the 3D calibration model into fields #1 and #2:
3. Click on **Start**.
 - ✓ dental Scan will check whether the entered values are permissible.
4. Wait for the process to finish.
 - ✓ You will be advised of its completion. If successful, you can start scanning.

✓ Start

Error message

Possible cause

3D calibration failed.

- The calibration was interrupted.
- There is no 3D calibration model inside the scanner.
- Incorrect values were entered.
- The axes were not in the service position.

What to do after a failed calibration

- ▷ Inaccurate measurement results are likely. Therefore, you should only scan for testing purposes.
- ▷ Restart dental Scan and the scanner and perform the calibration again.
- ▷ If it fails again: Have the scanner checked by a smart optics sales partner.

3.5 Information on use

 www.smartoptics.de
University | dental Scan

Explanatory videos

<https://www.smartoptics.de/en/dental/university/>

Subjects:

- dental Scan – The basics
- Step-by-step instructions
- Real-time scans

Instructions for dental Scan and scanners (PDF files)



- Copying from the installation data carrier;
- Downloading from www.smartoptics.de (download sections).



4 Upgrades

All versions of dental Scan can be used indefinitely. Upgrades (new versions) include:

- new functions;
- improvements;
- bug fixes.

4.1 Observe the upgrade information



▷ Before installing, read the release notes for information about:

- the release of the version for smart optics scanner models,
- system requirements,
- the content of the new version.

download.smartoptics.de/software/dental/Changelog-dentalScan.pdf

smart optics recommends using only approved, compatible versions.



TIP

Upgrades were:

- chargeable up to version 3.4.2 (12 months after purchase of the scanner or the upgrade),
- available for Activity scanners:
 - Activity 885 and 885 Mark 2 up to version 3.2.4,
 - Activity 855 up to version 3.0.5,
 - Activity 300 up to version 3.0.4.

If you are looking for an older upgrade, please contact your reseller indicating:


- scanner model,
 - serial and sensor number,
 - software version used.
-



4.2 Installation of an upgrade

Prerequisites

- Your scanner is supported by the new version.
- Your PC meets the system requirements.

 19 In principle, an upgrade can directly replace an installed version. It is also possible to uninstall before an upgrade.

Procedure



1. Copy the setup file to the PC connected to the scanner:
downloads.smartoptics.de/LatestVersions/Dental/dental%20Scan.exe



2. Follow the setup instructions in the same way as for the initial installation.

The default values are suggested, not the values from the initial installation.

- ✓ You have to confirm the installation in the existing target folder. Calibration data and settings from the previous version continue being valid.



TIP

You can install an upgrade in a test folder for testing purposes, in parallel to the previous version.

Upgrade at the turn of the year

An upgrade at the turn of the year allows you to save projects separately by year if:

- you are using dental Scan as a standalone version and
- you save scans in the default work folder.

A folder for the new year:

- is created automatically during installation;
- must be set as the new work folder.

Without changing the settings, projects will continue to be saved in the old work folder (the one of the previous year).

Default work folder:

C:\Users\[Username]\Documents\3D-Scanner\Work\[YYYY].



Settings > Export >
Work Folder



5 Configuration

5.1 Changing a scanner

If you replace a scanner with another smart optics scanner, you will also have to change the calibration data.

1. Open Windows Explorer
2. Under **View**, activate the checkbox **Hidden Elements**.
3. Open the folder:
`C:\ProgramData\3D-Scanner\DeviceCharacteristics\Sensors.`
4. Change the name of the folder `SO-202...` (old calibration data) with some extra characters, e.g.: `XX_SO-202...`



▶ Copy the new calibration data folder into the target folder

`C:\ProgramData\3D-Scanner\DeviceCharacteristics\Sensors.`

5.2 Adding an activation code



In addition to standard functions, dental Scan includes optional modules which can be activated:



- Virtual articulator (for the articulator scan),
- multiCase/multiDie,
- secondDie,
- Full Impression,
- Twin Tray Fastmode.

You can see the already activated modules or those included in the scope of delivery of your dental Scan version in the info dialog.

An activation code consists of figures and letters, e.g.:

ABCD-EFG12-34H5

Each code applies individually to a specific module and a specific scanner. Activation codes are saved as part of the calibration data, in the file `Scanner.xml`.

Module activation

You will receive the activation code from your smart optics sales partner.



1. Start dental Scan.
 2. Select **Extras | Add Activation Code**.
 3. Enter the code.
 4. Restart dental Scan.
- ✓ The module will be available for use.

Error message	Possible cause
---------------	----------------

The module is not available.	<ul style="list-style-type: none"> — Wrong code entered. — Software restart omitted. — The code is not valid for the scanner's sensor number*.
------------------------------	---

OK not active after the code has been entered.	— More activation codes entered than allowed*.
---	--

* Please contact your smart optics sales partner with the following information: dental Scan version number, sensor number and version number of the scanner.

5.3 Restore default settings

dental Scan saves:

- the default settings in the installation folder,
- a work copy in the local user folder:
C:\Users\[Username]\AppData\Local\3D-Scanner.

The file `UserSettings.xml`:

- contains the user settings (**Settings** dialog).
- It must be deleted to restore the default settings.



TIP

Make a backup copy of the file `UserSettings.xml` so that you can restore your old personal settings if necessary.

1. Exit dental Scan.
2. Open Windows Explorer

3. Under **View**, activate the checkbox **Hidden Elements**.
 4. Open the folder:
`C:\Users\[Username]\AppData\Local\3D-Scanner.`
 5. Delete the file `UserSettings.xml`.
 6. Start dental Scan.
- ✓ The default settings apply again. Personal settings are saved in a new `UserSettings.xml` file.

6 Uninstalling

Uninstalling (complete removal from the computer) makes sense:

- to avoid conflicts between the old and the new version;
- if dental Scan is no longer used.

Steps to follow for uninstalling

- Uninstalling the software,
- Deleting scanner data,
- Deleting user data.

The following applies to all steps:

1. Open Windows Explorer
2. Under **View**, activate the checkbox **Hidden Items**.

Uninstalling the software

smart optics recommends using only the dental Scan uninstall tool.

1. Open the target folder of the dental Scan installation, by default:
`C:\Program Files\3D-Scanner\dental Scan.`
 2. Double-click the file `unins000.exe`.
 3. Follow the instructions.
- ✓ The files in the target folder: `C:\Program Files\3D-Scanner` will be deleted.



Deleting the scanner data

The folders with the calibration data and service files must be deleted manually.

1. Open the folder `C:\ProgramData`
 2. Delete the sub-folder `\3D-Scanner`.
- ✓ Calibration data and service data will be removed.

Deleting local user data

User settings and session logs must be deleted manually.

1. Open the folder `C:\Users\[Username]\AppData\Local`.
 2. Delete the sub-folder `\3D-Scanner`.
- ✓ User settings and log files will be deleted. The data cannot be recovered.
- ✓ dental Scan is fully uninstalled.



7 Checklists

7.1 Initial installation

Check the PC for:

- System requirements
- Viruses
- current Windows update
- USB cable connection to the scanner

dental Scan installation

- Execute setup
- Reboot the PC
- Start dental Scan and load the calibration data:
SO folder = SO sensor number
- Optional: Module activation
- Optional: Set up the interface, e.g. exocad® DentalCAD
(start parameters)

7.2 Upgrade

- Download the current version and the release notes:
www.smartoptics.de/en/dental/dental-scan/
- Check the scanner's compatibility (→ Release Notes)
- Installation
- Optional: Module activation
- Optional: Check the new settings
- Optional: Test the interfaces, e.g. exocad® DentalCAD
(initial parameters)



8 Directories

8.1 Glossary

Definition of important terms

Activation Code	Code to activate: <ul style="list-style-type: none">— a chargeable module— a free upgrade period (up to 3.4.2).
Work Folder	Folder in which scan projects are saved.
Export data	3D data generated from the scan data. Basis for the CAD software, open file format (PLY, optionally STL) for many applications.
Calibration data	Individual data set for a specific scanner, clearly assigned to the sensor number, e.g. SO-20242.01-13-062. You can find the SO number in the following places: <ul style="list-style-type: none">— label or type plate with the indication "Sensor"— name of the folder in which the calibration data are saved.
Calibration	A metrological term: <ul style="list-style-type: none">— alignment of the scanner to the values of an industrially calibrated model.— alignment of the motion axes based on the individual calibration data.

8.2 File paths

How to find protected Windows folders using a placeholder

▷ Replace unknown parts of a path with %.

The search terms are independent of the Windows language:

%appdata%	→ C:\Users\[Username]\AppData\Roaming
%programfiles%	→ C:\Program Files
%programdata%	→ C:\ProgramData

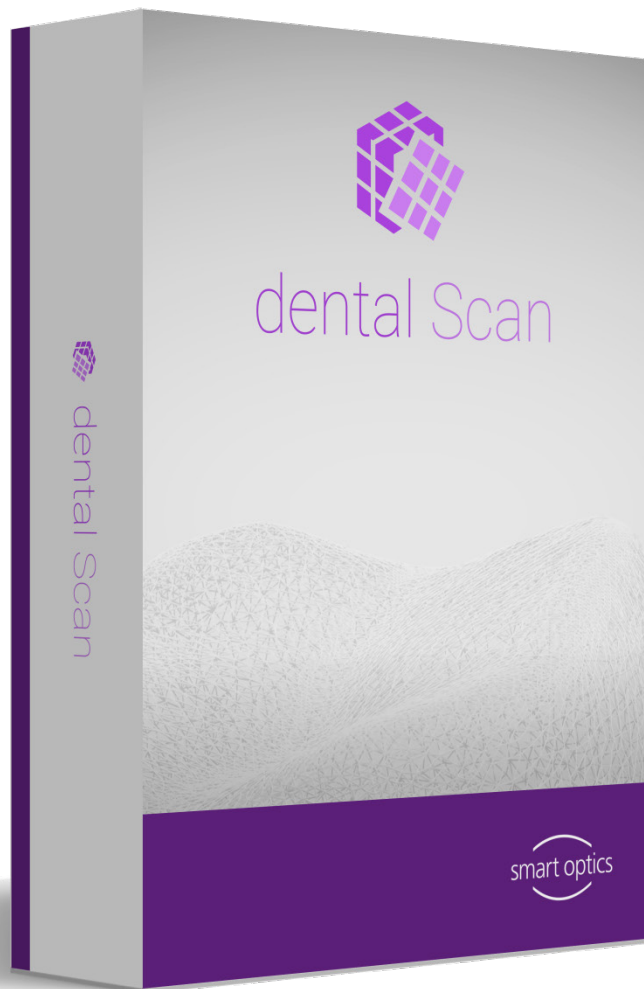
Default file paths

Folder	Path
Target folder (Setup)	C:\Program Files\3D-Scanner\dental Scan
Work folder (Stand-alone)	C:\Users\[Username]\Documents\3D-Scanner\Work\[YYYY]
Work folder (with exocad® v.2.3 Matera or higher)	C:\CAD-Data
Calibration data	C:\ProgramData\3D-Scanner\DeviceCharacteristics\Sensors
User settings, log files	C:\Users\[Username]\AppData\Local\3D-Scanner



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ID: SO-90059-INST-005-EN



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