



Operating manual

Prosthetic scanner



Vinyl

A product from smart optics Sensortechnik GmbH



Legal Notice

Dear Customer,

Thank you for choosing a product from smart optics!

The Vinyl is a scanner for ambitious users. The Vinyl convinces with precision, speed, durability and an enormous spectrum of functions such as multiDie and Triple Tray®. Outstanding features include the fully automated z-axis and the 180 degree opening which allows open scanning.

The articulators of all major manufacturers can be positioned on the large system plate of the scanner. Condyle-related scanning of articulated jaw models is assured with the use of selected products. Articulators from other manufacturers are scanned with average values.

In the dental field, our trained specialist dealers are responsible for providing first level support. If you require additional information or if you have any questions about the software, therefore please contact your smart optics specialist dealer.

We hope you enjoy working with your Vinyl!

Your smart optics team

CHANGES AND SERVICE

We reserve the right to implement product changes as part of continuous improvement and technical progress and to make changes to this documentation. You can find the current version of this documentation in the download-center on our homepage: www.smartoptics.de.

Please note that the current version of this documentation may contain information which does not apply to older devices.

On request we are also glad to send you a printed paper version of the documentation. If you require a copy, please send an e-mail to communications@smartoptics.de.

If you are looking for a specialist dealer in your area, please use the contact form for Sales on our homepage www.smartoptics.de.

BRANDS AND TRADEMARKS

Windows, .NET Framework and Visual C++ are registered trademarks of Microsoft Corporation.

FlyCapture and UpdatorGUI are registered trademarks of Point Grey Research, Inc.

exocad is a registered trademark of exocad GmbH, D-64293 Darmstadt.

Adesso Split and Artist/arTO are registered trademarks of K. Baumann, D-75210 Keltern.

SAM is a registered trademark of SAM Präzisionstechnik GmbH, D-82131 Gauting.

Artex is a registered trademark of Amann Girrnbach AG, A-6842 Koblach.

Gamma is a registered trademark of Gamma medizinisch-wissenschaftliche Fortbildungs-GmbH, A-3400-Klosterneuburg.

PROTAR is a registered trademark of KaVo Dental GmbH, D-88400 Biberach/Riß.

Denar is a registered trademark of Whip Mix Corporation, Louisville, KY 40209, USA.

Triple Tray is a registered trademark of Premier Dental, Plymouth Meeting, PA 19462 U.S.A.

Where products belonging to other owners are referenced, we wish to point out that these are brands of the relevant owners that are protected by copyright laws.

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

Table of Contents

1. About this manual	5
2. For your safety	10
2.1. Proper use:	10
2.2. General safety instructions	11
2.3. Symbols on the device	21
3. Scope of delivery	22
4. Components of the device	25
4.1. Front view	25
4.2. Internal view	27
4.3. Views of accessories (standard scope of delivery)	29
4.4. Rear view and connections	31
5. Setting up of scanner and commissioning	32
5.1. Choose workstation	32
5.2. Unpacking of scanner	33
5.3. Connecting the scanner	36
5.4. Opening and closing the scanner	37
6. The object holder system	39
6.1. Overview	39
7. Positioning of individual jaw model	41
7.1. Inserting jaw model with Multisplit mounting plate	41
7.2. Inserting jaw model with adapter plate	43
7.3. Inserting the jaw model with the object holder	46
7.4. Mounting gingiva, squeeze bite, scanbody or wax-up	49
8. Positioning of non-articulated occlusion model	50
8.1. Mounting occlusion model with a rubber band	50
8.2. Mounting occlusion model with the occlusion clip	52

9. Positioning articulated occlusion models	54
9.1. Positioning occlusion model with an articulator	54
10. Positioning tooth stump models with the multiDie adapter	57
11. Positioning of Triple Tray® impression	60
12. Positioning the calibration model	63
13. Operating principle of the scanner	66
13.1. Operation per touch screen	67
14. Device maintenance	69
15. Faults and repairs	70
16. Environmentally friendly disposal	71
16.1. Disposal of packaging	71
16.2. Disposal of the device	71
17. Technical data	72
18. Declaration of CE Conformity	74
19. Checklists	75
20. Glossary	77
21. Index	79



1. About this manual

Please read through this Operating manual carefully. Keep the Operating manual in a safe place. If you pass on the device to somebody else, please make sure that you hand them this Operating manual as well.

smart optics accepts no liability for damages due to failure to comply with the Operating manual.

Which operating manuals are there?

Generally there are several manuals for the smart optics scanners:



Operating manual

This manual contains the description of the device components, the general notes on safety and the technical data. They will tell you how to operate the scanner and how to handle the accessories.



Installation manual

Here you will find out how to install the dental Scan scanner software for the first time and how to receive and install updates at a later date.



User manual dental Scan

All scanning methods and the use of optional modules are described in this manual.

Graphic symbols and highlighting of important information

In this manual, graphic symbols and text highlights are used to present the information more clearly. In this way you may understand the instructions better.

- ▶ A triangle on the left indicates a step involving an action.
- ✓ A tick on the left tells you what the outcome should be if you have followed one or more steps correctly.

1. An element in a sorted list

— An element in an unsorted list

Important statements are highlighted in bold type.

Important **KEYWORDS** are highlighted with capital letters in bold type.



Cross-references within a manual are highlighted with a book icon. Cross-references act as hyperlinks in the electronic version. Click on the number to follow the link.



Cross-references to other manuals are highlighted with a symbol for the type of manual: a scanner for the operating manual, a software package for the installation manual and a user on the PC for the dental Scan user manual.



The signpost shows a selection of topics related to your current issue.



This icon points towards functions or modules that are not included in the standard scope of delivery and that can be purchased separately.



Variants in operation and functionality which do not apply to this scanner type are marked with this symbol.



Standard settings specified by the manufacturer are indicated with a steering wheel.



TIP

The word "Tip" and the information icon are used to highlight tips on operation and information that require your special attention.



The manufacturer of the product is indicated by the factory symbol.

Figures

Figures showing equipment and screenshots from the software are used for illustration purposes.

The images shown in this manual may differ from the appearance of your actual device or from the software supplied with your device. The screenshots show realistic examples but they do not contain actual data.

Software controls

The software controls are highlighted as follows:

OK Names of buttons in the software are shown with a colored background.

Name Names of fields in the software are highlighted in bold type.

File | New Names of menus and menu options are separated by a vertical line.

Name .txt File and path names are shown in Courier font.

Units of measurement and numbers

In this manual the numbers are given according to the decimal system with decimal places.

Units of measurement comply with the legal units in Germany as well as the international system of units (SI).

Further information as well as measurement converters can be found on the Internet.

Measurement	Unit	Abbreviation
Measurements/weight	Kilogram	kg
	Gram	g
Length	Meter	m
	Centimeter	cm
	Millimeter	mm
	Micrometer	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

Measurement	Unit	Abbreviation
Electrical current	Ampere	A
Protection class	International Protection	IP 1. digit: solids protection, 2. digit: fluids protection
Temperature	Degree Celsius	°
Memory (PC)	Random Access Memory	RAM
Data volume	Megabyte Gigabyte	MB GB
CAD data format	Polygon file format Standard Triangulation Language American Standard Code for Information Interchange Mesh PixelCloudMeasurement	PLY STL ASCII MSH PCM
Picture element	Pixel Megapixel	px (monitor) dpi (print) Mpx

Warnings

Warnings provide information on how damage to objects and injury to persons can occur and give instructions on how to avoid risks. Warnings are categorized into four levels depending on the severity of the possible consequences.



NOTE

This combination of signal word and symbol warns you about possible *material damage* that might occur if the instructions are not followed correctly.



CAUTION

This combination of signal word and symbol warns you about possible *minor injuries* that might occur if the instructions are not followed correctly.



WARNING

This combination of signal word and symbol warns you about *severe to lethal injuries* that might occur if the instructions are not followed correctly.



DANGER

This combination of signal word and symbol warns you of dangerous situations which could lead directly to death or severe injuries.



2. For your safety

2.1. Proper use:

The correct use of the "smart optics Vinyl" scanner consists in the optical, three-dimensional measurement of human jaw models. The scanner can be used in orthodontics and prosthetics for all types of reconstructions as well as for archiving.

Jaw models in occlusal relation can be scanned in terms of skull position, the same as dental registers (bite registers) and dental models (wax-up) as well as reference bodies (scanbodies) screw-retained in the model.

Material characteristics

The Vinyl scans materials with a dry, opaque surface in the colors white, saffron, gold, blue, beige, yellow and pink. Reflecting or dark surfaces can be scanned by treating with 3D-Scan-Spray.

Improper use

The Vinyl is not designed for scanning other models or objects, models made of transparent material or living organisms.

The Vinyl is not suited for operation in an environment which is strongly contaminated with emissions (e.g. dust or varnishes).

smart optics strongly discourages any use other than the intended use. smart optics shall not accept liability for damages which occur because the user has not used the scanner as intended and/or not observed the safety notes in this operating manual.



2.2. General safety instructions

Qualification of the user

Users setting up, operating or commissioning a scanner from smart optics require specific knowledge for the safe operation of the scanner. You can obtain this knowledge via the following measures:

1.

Read and follow this operating manual, in particular the notes on setting up, commissioning and cleaning the scanner.

2.

Participate in an instruction or training.

3.

Observe the local laws, ordinances, regulations on occupational safety and accident prevention relating to your scanner workplace.

4.

Ensure that devices and cables pass the prescribed regular safety tests for electrical equipment. Replace damaged equipment and cables immediately.

Constructive protection measures

The scanner has been developed and manufactured in accordance with the applicable safety standards and with the greatest possible care to ensure safe operation and to protect the user against injuries.

A fuse is integrated in the scanner to protect the device against overvoltage.

Protection against injuries

Despite protective design measures, some residual risks which can lead to injuries cannot be excluded. In this section you can find out with which measures you can protect yourself and others.

Electrical shock and short circuit



WARNING

Risk of injury due to electrical shock

Risk of fire due to short circuit

A technical fault of the cables or of an individual component could cause an electric shock or short circuit. This can result in a fire.

- ▶ Ensure that electrical equipment does not come into contact with water/moisture. However, should this happen, immediately disconnect the mains plug. Dry the parts affected with a soft microfiber cloth.
- ▶ Under no circumstances work with faulty equipment or cables.
- ▶ Only operate electrical equipment at the recommended operating temperatures.
- ▶ Use the supplied cables or original spare parts exclusively.
- ▶ If electrical equipment is not used for a longer period, e.g. overnight, switch these off and disconnect the plug of the mains socket.

Magnetic fields



WARNING

Health hazards due to magnetic fields

The scanner and the accessories contain magnetic components. Magnetic fields can be hazardous to health.

- ▶ Persons with implants, in particular cardiac pacemakers, may only operate the scanner and the accessories with the express permission of a physician.

Stripe light



WARNING

Health hazards due to stripe light

The scanner operates with stripe light. Permanent visual contact with stripe light can trigger epileptic seizures, migraine or similar.

- ▶ Persons with the appropriate health disposition should close or cover the scanner during operation.



Falls

**CAUTION****Fall hazard due to packaging materials**

The scanner is packaged extensively as protection against damage during transport. Packaging can present an obstacle during setting up and lead to a fall.

- ▶ Do not leave packaging materials lying on the floor.
- ▶ Remove obstacles before a transport.

Carrying

**CAUTION****Risk of injury due to incorrect carrying**

Due to the dimensions and weight, we recommend to use two persons to unpack and set up the scanner. Smaller persons in particular, can injure themselves by lifting or carrying the scanner by themselves.

- ▶ Lift the scanner from the packaging with two persons.
- ▶ Carry the scanner with two persons.
- ▶ Carry the scanner with the lid closed.
- ▶ For transport, hold the scanner at the bottom corners, never by the lid.

Crushing

**CAUTION****Risk of injury by the lid or the mechanics of the scanner**

The lid or the mechanics of the scanner can crush your hands.

- ▶ Always use the handle on the lid for opening and closing. If you reach in from the side and move the lid, you will crush your fingers between the lid and the housing.
- ▶ Do not open the lid with panache. Otherwise the lid will fall down again as the closing mechanics are not fitted with a stop.
- ▶ Always open the lid all the way.
- ▶ Only reach into the scanner when all the axes are at a standstill. Should the axes not stop at the end of a scanning run, switch off the scanner and disconnect the mains plug.

Entanglement

**CAUTION****Injuries due to clothes, jewelry or hair getting caught**

Loose clothing, jewelry or long hair can get caught in the lid or the mechanics of the scanner. Objects or hair can be entangled through movement in the scanner. This can lead to injuries.

- ▶ Do not wear loose clothing such as scarves or ties, or jewelry such as long necklaces at the scanner workstation.
- ▶ Tie your long hair in a bun for example.
- ▶ However, should an item of clothing, hair, etc. get caught in the moving parts, switch off the scanner immediately.
Disconnect the mains plug before extracting clothing, jewelry or long hair.

Protection against material damage

Despite protective design measures, some residual risks which can lead to material damages (loss of data or damage to equipment) cannot be excluded. In this section you can find out with which measures you can prevent material damage.

Optics/electronics

**NOTE****Damage to optics and electronics through touching, moisture, dirt and cleaning**

The optics and electronic components in the interior of the scanner are highly sensitive. Every contact as well as dirt, moisture and cleaning agents can damage these.

- ▶ Do not touch the optics and the electronic components.
- ▶ Protect the optics and electronic components against soiling by closing the lid or covering the scanner.
- ▶ Never use the 3D scan spray in the interior of the scanner.
- ▶ If the optics or electronic components require cleaning, do not clean these yourself. Please contact your specialist dealer.



Carrying



NOTE

Damaging the lid through incorrect carrying (not for Vinyl open air)

The lid is not suited as a carrying handle. If you carry the scanner by the lid, this may tear off, the scanner could drop and be damaged.

- ▶ Carry the scanner with the lid closed.
- ▶ For transport, hold the scanner at the bottom corners, never by the lid.
- ▶ Stick a protective foil over the lid during transport so that the lid cannot open.

Cleaning agents



NOTE

Damage to the surfaces due to unsuitable cleaning agents

Paper towels, coarse cotton cloths, cleaning agents, polishing pastes and the like leave scratches on the sensitive surfaces.

- ▶ Only use the recommended materials for cleaning.

Moisture



NOTE

Material damage due to moisture

Continuous contact with moisture can damage sensitive materials.

- ▶ Only operate your scanner at a dry workstation.
- ▶ Avoid contact with water/moisture. However, should this happen, immediately disconnect the mains plug. Immediately wipe the water/moisture with a soft microfiber cloth.



Climate

**NOTE****Measuring error due to unsuitable climatic conditions**

The scanner is intended exclusively for use in dry, closed rooms. The scanner will only achieve accurate measuring results under suitable climatic conditions. Excessive heat causes measuring errors as well as overheating of the scanner. Overheating can cause permanent damage to the scanner.

- ▶ Only operate the scanner at temperatures between 18°C - 30°C.
- ▶ Only operate the scanner at low humidity.
- ▶ Avoid direct sunlight at the workstation.
- ▶ Reduce cold, heat and high humidity, for example, by using air-conditioning or sun protection.

Reflections

**NOTE****Measurement errors due to reflections on the measured object**

Bright ambient light results in unwanted reflections on the measured object. This affects the precision of the measurements.

- ▶ Choose a workstation that faces away from windows or excessively bright artificial lighting.
- ▶ If no other workstation is available, then scan with the lid closed. If you are using Vinyl open air, cover the opening during scanning, for example with light-proof foil.

Vibrations

**NOTE****Measurement errors due to vibrations**

The table or the workbench on which the scanner stands must not vibrate. Vibrations cause inaccurate measurements.

- ▶ Place the scanner on a stable, firm base, which can support at least twice the weight of the scanner, in other words 2x 23 kg.
- ▶ Stabilize the base with a braced frame or by fixing to a stable wall.



Calibration

**NOTE****Inaccurate measurements due to neglected calibration or calibration with damaged calibration model**

The measuring precision of the scanner is only assured if the scanner is calibrated. For this process you require a calibration model and the corresponding predefined values.

The calibration model can be damaged mechanically. This can only be tolerated in the border areas.

- ▶ Perform calibration after commissioning and then during operation every time the software asks you to do so.
- ▶ Only start calibration if the values entered in the software correspond with the values of the calibration model.
- ▶ Check whether the calibration is damaged at any central position.
- ▶ Only use the calibration model in perfect condition.

Mounting models

**NOTE****Damage to scanner or models through missing or incorrect mounting**

Due to the movement of the axes in the scanner, unsecured or incorrectly secured models will fall down during scanning.

- ▶ Do not place any objects on the scanner or its interior.
- ▶ Never place models in the scanner unsecured.
- ▶ Only use a supplied object holder or approved accessories for mounting the models.
- ▶ If you fixate occlusion models with rubber bands, only use robust, new rubber bands. Thin or porous rubber bands can snap.
- ▶ Always fixate the models on the flexible object holder and the multiDie adapter with adhesive putty pads.
- ▶ Only insert tooth stump models into the multiDie adapter which have been prepared with metal pins.
- ▶ Should a model still fall down, switch the scanner off immediately. Then remove the model and all broken pieces from the interior.



Adhesive material

**NOTE****Damage to models through unsuitable adhesive materials**

Mounting models with sticky tape, instant adhesives or the like, contaminates or may even damage the models, the object holders and the scanner.

- ▶ Mount models exclusively with adhesive putty pads, which does not stick, stain or harden.

Articulators

**NOTE****Damage to scanner and models due to incorrectly positioned articulators**

Articulators are not fixated in the scanner. This is possible as articulators are scanned with reduced axis movement.

- ▶ Only place an articulator in the scanner when the software asks you to do so.
- ▶ Always place an articulator in the scanner with the front facing forwards.
- ▶ Always place an articulator on the system plate with all legs.
- ▶ Remove the articulator immediately when the software asks you to do so.
- ▶ Should an articulator still fall down, switch the scanner off immediately. Then remove the articulator and all broken pieces from the interior.

USB cable

**NOTE****Data loss due to the USB cable being too long**

Data transfer between the scanner and the PC is affected by the length of the USB cable.

- ▶ Use the supplied USB cable or an original spare part with the appropriate length (maximum 2 meters).

Magnetic fields



NOTE

Loss of data due to magnetic fields

The scanner and the accessories contain magnetic components. Metal-containing technical devices and data carriers, for example, credit cards, can be disrupted in their function or even damaged permanently through contact with magnets.

- ▶ Make sure to keep a sufficient distance between metal-containing technical devices and data carriers to the magnets.



Response in case of a defect

You must not work with a defective system. Damage to the scanner, its accessories or a faulty function have occurred with high probability if:

- Parts have been visibly damaged
- if one or more of the moving axes continue to rotate or rotate uncontrolled
- calibration fails
- measuring errors occur despite performing all work steps
- the software displays an error message.

▶ Follow the instruction in an error message.

 Section 5.3

▶ Check the connections. If applicable, replace the USB slots.
▶ End the software, switch off the scanner and the PC and restart the system.



Installation dental Scan

▶ Check whether the software is installed correctly.
▶ Check the calibration data.

 Section 14

▶ Follow the instructions for device maintenance.
▶ Update your system. Check whether all important Windows updates have been installed.
▶ Ensure that your computer is free of viruses and malware.
▶ Permit the execution of dental Scan in your virus protection program.

 Section 15

▶ If none of these measures solve the problem, repeat with another computer to exclude a computer fault.
▶ If the problem also occurs with the other computer, refer to your specialist dealer to clarify the cause of the fault.



2.3. Symbols on the device



Warning against hand injuries

This symbol refers to the lid or the closing mechanism of the scanner. If a body part enters the scanner opening, there is a risk of crushing. Always exercise care when reaching into the scanner to place the object holder.



Electrical voltage warning

This sign warns of electrical voltage inside the scanner. The rear cover of the scanner may only be removed by skilled personnel if the mains plug has been disconnected from the mains.



Do not touch

This symbol refers to the calibrated optical system. This must never be touched or cleaned as it could be damaged in the process.



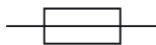
CE label

The CE label on the type plate documents that the European directives that are applicable to the device were complied with at the time of issue of the CE certificate.

EN 55011 CLASS A

EM labelling

The electromagnetic compatibility of the device was checked for compliance with the limit values according to the European standard and the measuring methods for radio interference of industrial, scientific and medical high frequency devices. Labelling as "Class A" states that the device meets the standard for commercial applications.



Fuse

Sign for an integrated overvoltage device.



USB

Sign for a USB connection, also for a camera connection



3. Scope of delivery

The scope of delivery of the Vinyl includes the following components:

- 1 scanner with touch screen
- Accessory case with:
 - 1 mains cable 2.5 meters
 - 1 USB cable 2 meters
 - 1 object holder with knurled screw
 - 1 object holder, flexible, with large plate
 - 1 multiDie adapter
 - 1 Triple Tray® impression holder
 - 2 packs of adhesive putty pads, ultra-strong, Uhu patafix PROPower or a similar branded product
- 1 calibration model in plastic box
- 1 installation data carrier

The scanner is fitted with a lid as standard (Vinyl, article number 90334). The scanner can also be supplied without a lid as Vinyl open air (article number 90351).

Contents of the installation data carrier:

- Software dental Scan including the modules:
 - secondDie
 - multiDie
 - multiCase
 - Texture-Scan^{monochrome}
 - Texture-Scan^{color}
 - Triple Tray® impression scan
- Calibration data for the scanner
- Instructions in digital form (PDF)
 - Operating manual (this manual)
 - Installation manual dental Scan
 - User manual dental Scan

Optional accessories

All accessory components for the Vinyl are already included in the standard scope of delivery. The exception being articulators (not an accessory) as well as adapter plates for articulators (chargeable accessory).

You can purchase spare parts and chargeable accessories from your specialist dealer.

Item number	Item designation	Description
90036	PC Dell Optiplex	computer (with pre-installed software)
90164	Workstation Dell Precision	computer (with pre-installed software)
90073	3D Calibration model	Replacement or additional items
90082	Object holder with knurled screw	Replacement or additional items
90350	multiDie adapter	Replacement or additional items
90242	Occlusion clip	Aid for the occlusion of non-articulated jaw models
90352	Triple Tray® impression holder	Replacement or additional items
90358	Object holder, flexible, with large plate	Replacement or additional items
90345	Adapter plate for articulated individual jaw models suitable for SAM® AXIOSPLIT®	Additional items
90346	Adapter plate for articulated individual jaw models suitable for GAMMA® Reference	Additional items

Item number	Item designation	Description
90370	Adapter plate for articulated individual jaw models suitable for Whip Mix Denar®	Additional items
90371	Adapter plate for articulated individual jaw models suitable for KaVo PROTAR®	Additional items



Activate the optional modules in the software for which optional accessories are required for their use. Further information is given in the user manual for dental Scan.

Supported articulator systems

Articulators are available from the specialist dental trade, can however not be purchased from smart optics as accessories for scanners.

All conventional articulators can be used for vestibular scans with articulated occlusion models. Condyle-related measurements are possible with the articulators of the following manufacturers:

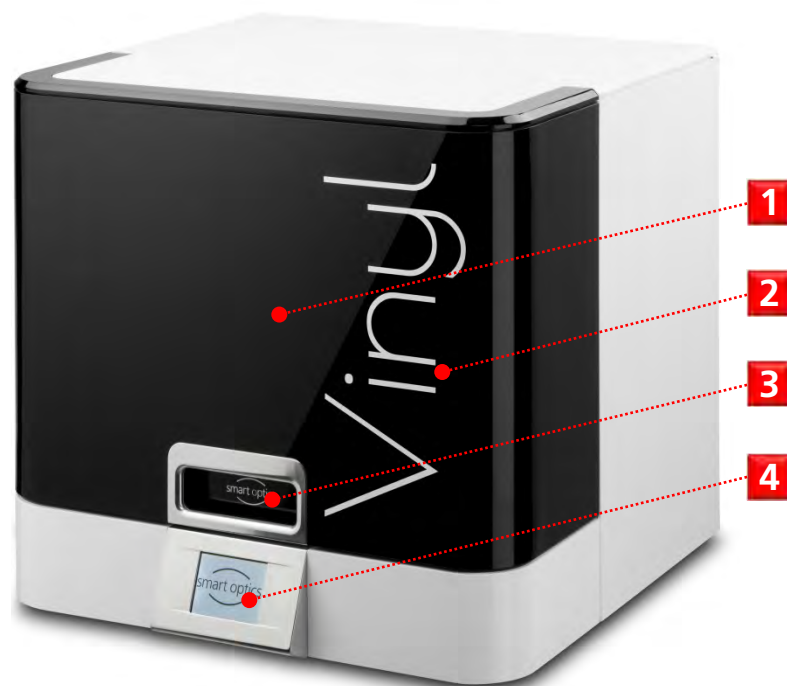
- AMANN GIRRBACH Artex®
- Baumann Dental Artist/arTO®
- SAM® AXIOSPLIT®
- GAMMA® Reference
- Whip Mix Denar®
- KaVo PROTAR®

Other articulators can be used for mean value measurements.



4. Components of the device

4.1. Front view



CAPTION

- 1 Lid (not included in the Vinyl open airvariant)
- 2 Device designation
- 3 Handle
- 4 Touch screen

Detailed view touch screen

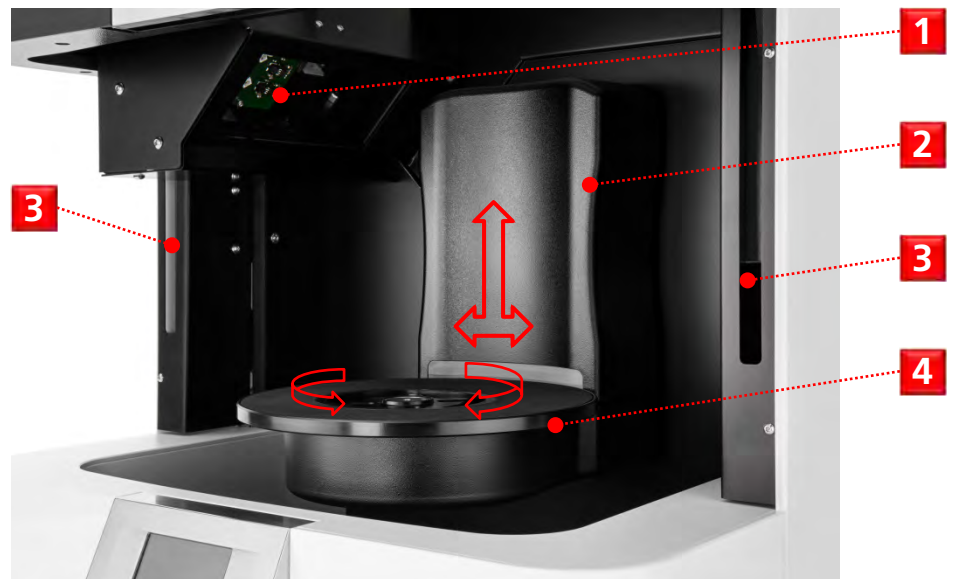


CAPTION

- 1 Stand-by mode (logo or screen saver)
- 2 Operating mode (start button and process display)



4.2. Internal view

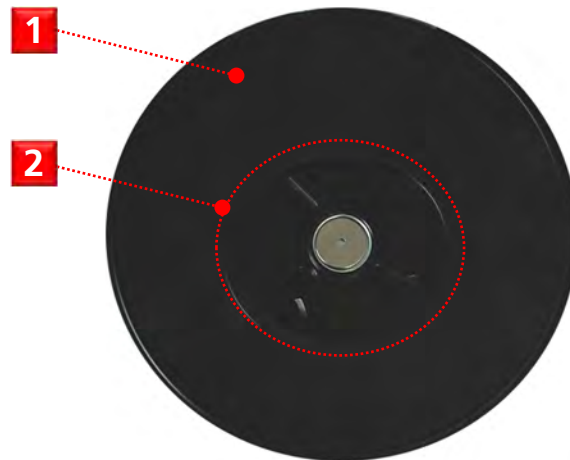


CAPTION

- 1 Optics (camera and 3D sensor)
- 2 Swivel axis (electromotive lateral movement 0 - 45°)
Z-axis (electromotive up and downwards movement 0 – 30 mm)
- 3 Guide rails for lid
(not present on Vinyl open air variant)
- 4 Rotating axis (electromotive rotation up to 315°)
System plate with Adesso Multisplit base plate



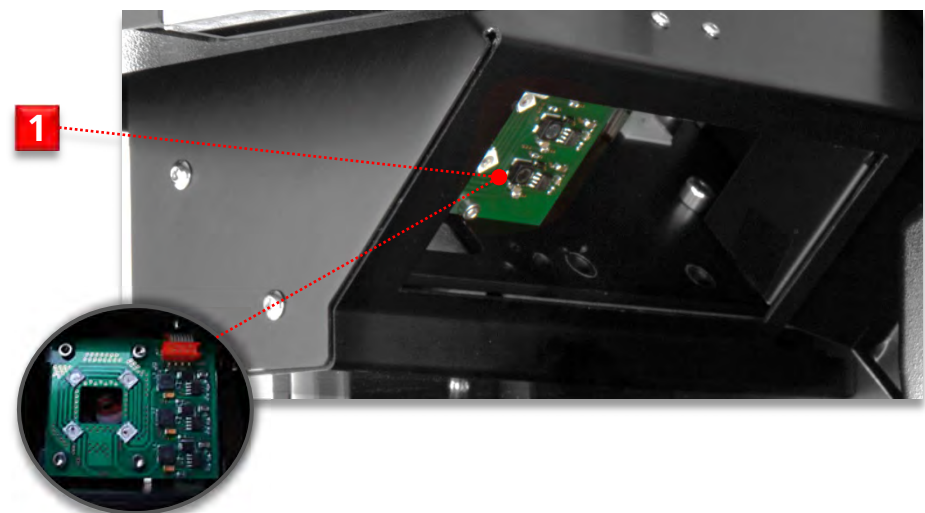
Detailed view of system plate



CAPTION

- 1 Turntable with non-slip rubber mat for the placement of articulators
- 2 Adesso® Multisplit base plate for mounting object holders, adapter plates and Multisplit mounting plates

Detailed view of camera and sensor



CAPTION

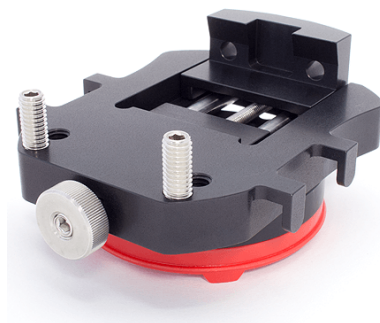
- 1 Optics (camera and sensor)



4.3. Views of accessories (standard scope of delivery)



Accessory case with foam insert



Object holder with knurled screw



Flexible object holder with large plate, fixing with adhesive pads



multiDie adapter, fixing with adhesive pads



Triple Tray® impression holder



Adhesive putty pads, ultra-strong
(Fig. as example)



Calibration model



Mains cable



USB cable



Installation data carrier
(Fig. as example)



4.4. Rear view and connections



CAPTION

- 1 ON/OFF switch
- 2 Functional grounding
- 3 USB connection for device control and camera
- 4 Mains connection with fuse

Type plate



The type plate with technical information such as serial number of the device, place and date of manufacture is located on the rear of the device.

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

The serial number of the 3D sensor is given on a separate label.



5. Setting up of scanner and commissioning

5.1. Choose workstation

Observe safety instructions!

 Section 2

Before unpacking and installing the scanner, carefully choose the workstation. As a device of EMC Class A, the Vinyl is suitable for use in a commercial environment.

 Section 17

The scanner has a weight of 23 kg and installation dimensions of 455 x 430 x 420 mm (W x H x D).

- ▶ Choose a stable work desk that is big enough to allow the scanner to be connected to a PC.
- ▶ Ensure easy access to the rear as this is where the ON/OFF switch is located.
- ▶ Ensure that there are enough and sufficiently fused mains sockets for all the devices. After consultation with an electrician, you can use an approved extension cable, a multiple power socket and a socket adapter (additional electrical devices not included in the scope of delivery).





5.2. Unpacking of scanner

Observe safety instructions!

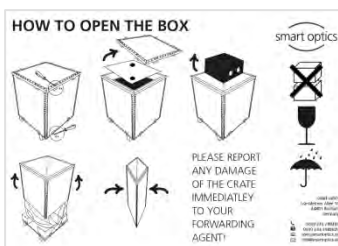


The scanner is supplied in a foldable wooden box. The wooden box is equipped with an impact and tilt indicator (outside) and clad with a foam transport protection (inside). The accessories are supplied in a plastic case placed on the transport safety.

- ▶ Check the outer packaging for visible damage immediately on receipt.



- ▶ If an indicator indicates a careless storage or even any shipping irregularities or if damage is evident on the packaging, please inform the delivery company and your specialist dealer. Follow the instructions provided by the delivery company and specialist dealer before continuing to unpack the device.
- ▶ Transport the scanner in the packaging as close to the workstation as possible.



Notes on unpacking

- ▶ Open the lid of the wooden box.
- ▶ Lift the lid and the inside covering.
- ▶ Remove the accessory case and place aside.



- ▶ Pull the wooden box upwards.
- ▶ Press the wooden box together from two opposite corners.

- ▶ Store the wooden box for possible transportation or return.
- ▶ Remove the transport safety from the scanner.



Carry with two persons (recommended)

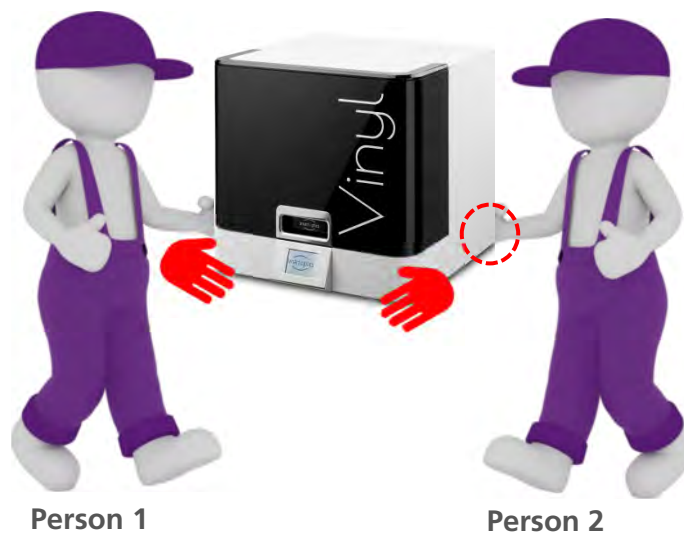


TIP

Due to the dimensions and weight, smart optics recommends carrying by two persons.

Never touch the lid to transport the scanner.

This is protected with a protective foil. This also prevents the lid from opening accidentally.



- ▶ Position yourself with a second person to the right and left of the scanner.

- ▶ Place one hand each under the front and rear bottom corner of the scanner.
- ✓ Each person now holds the scanner at the lifting points.
- ▶ Lift the scanner simultaneously.
- ▶ When carrying, incline the scanner slightly backwards.
- ✓ In this position the lid remains secured.

Carrying by one person



- ▶ Position yourself behind the scanner.
- ▶ Place one hand each under the front corners of the scanner.
- ✓ You now hold the scanner at the lifting points.
- ▶ Lift the scanner such that it is slightly inclined backwards when carrying.
- ✓ In this position the lid remains secured.

Setting the scanner down

- ▶ Set the scanner down carefully and straight at the place of installation.
- ▶ Remove the protective foil.



 Section 3

- ▶ Immediately check the scanner and the accessories for completeness and any visible damage.
- ✓ If the scope of delivery is not complete or if one of the supplied parts shows visible damage, inform your specialist dealer immediately. Follow the instructions provided by the specialist dealer before continuing with set-up.

5.3. Connecting the scanner

Observe safety instructions!

 Section 2

The scanner requires a mains connection and a PC connection. The scanner cannot function without a software.

 Section 4.4

The connections are located on the rear of the scanner.



- ▶ Connect the device plug of the mains cable to the corresponding mains socket on the scanner.
- ▶ Connect the mains plug of the mains cable to the mains.
- ✓ It is not necessary to use an adapter to adjust the voltage as an adapter is integrated in the scanner.
- ▶ Connect the type B plug of the USB cable to the USB port of the scanner.



- ▶ Connect the type A plug of the USB cable to a USB port of the PC.
- ✓ The scanner is operational.



- ▶ Switch the scanner on at the power switch.
- ✓ The mains switch is on position I.



- ✓ The touch screen displays the stand-by mode.
- ▶ Now install the dental Scan. Comprehensive information is given in the installation manual for dental Scan.



5.4. Opening and closing the scanner

Observe safety instructions!

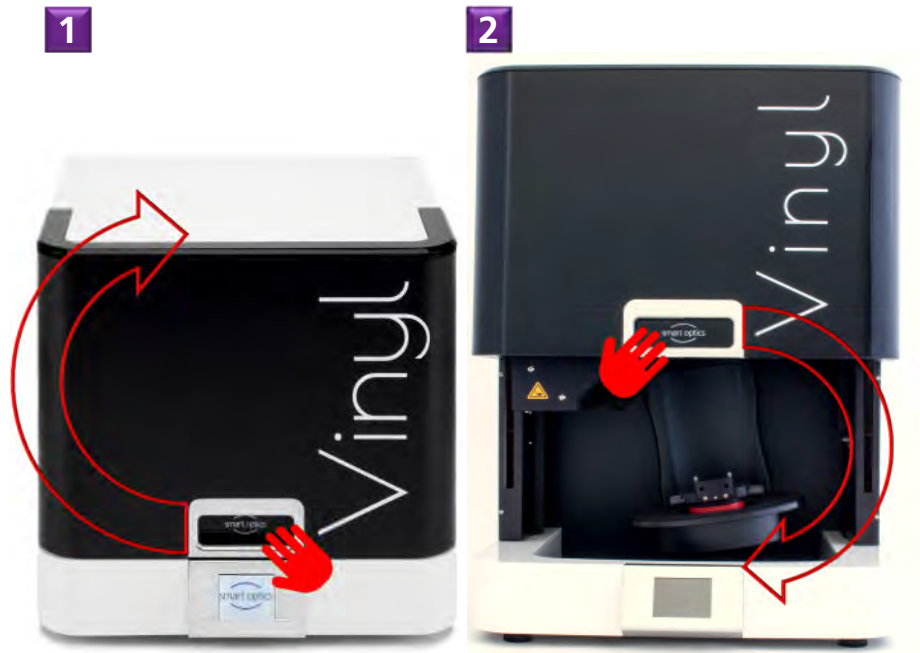


Section 2

The large lid of the Vinyl can remain open during operation.

smart optics recommends closing the lid to protect the sensitive components. If you are using Vinyl open air, you can cover the opening if required, for example with light-proof foil.

- ▶ Hold the handle at the lower edge of the lid.
- ▶ Lift the lid gently until the stop.
- ▶ Release the lid in this position.



- ✓ The lid will stay in a vertical position without fixing.
- ▶ To close the lid, hold the handle.
- ▶ Gently move the lid to the closed position.



6. The object holder system

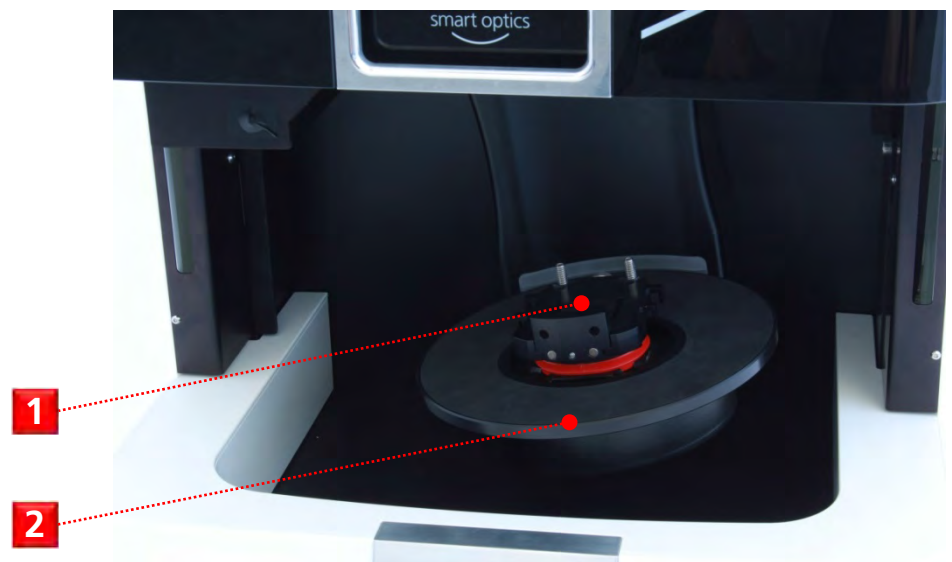
6.1. Overview

Observe safety instructions!



Section 2

With the extensive object holder system of the Vinyl you can securely mount and place jaw models, partial models, tooth stump models, Triple Tray® impressions and occlusion models.

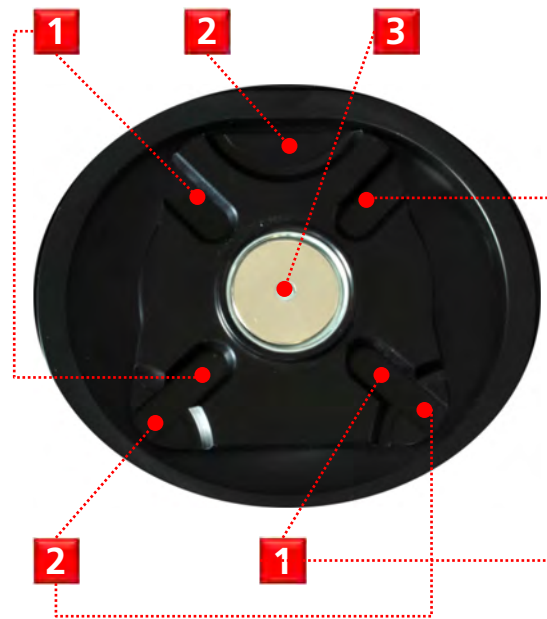


CAPTION

- 1 Object holder, here the model with knurled screw for individual jaw models
- 2 Base plate with non-slip rubber mat and Multisplit base for object holder, adapter plates and Multisplit mounting plates



Multisplit base plate



CAPTION

- 1 Contact points for object holders and adapter plates ("Ovals")
- 2 Contact points for Multisplit mounting plates ("Corners")
- 3 Magnetic adhesive disk for mounting object holders, adapter plates and Multisplit mounting plates



7. Positioning of individual jaw model

You have several options for securing individual jaw models.



Section 7.1 – 7.3

- Inserting jaw model with Multisplit mounting plate
- Inserting jaw model with adapter plate
- Inserting the jaw model with the object holder

7.1. Inserting jaw model with Multisplit mounting plate

Observe safety instructions!



Section 2

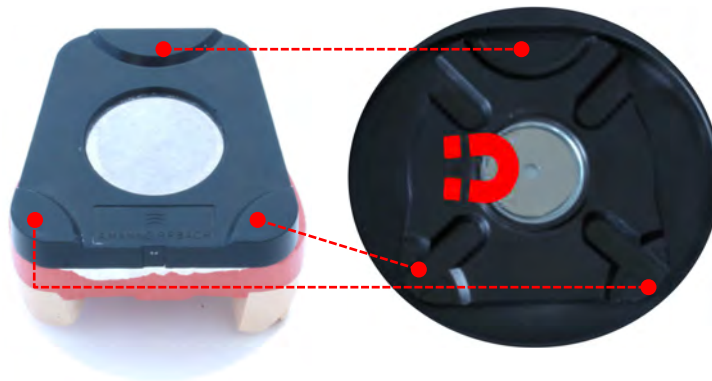
You do not require additional mounting for jaw models plastered on a Multisplit mounting plate.

You can place the Multisplit mounting plate directly on the Multisplit base plate of the scanner. This option exists for the articulator systems AMANN GIRRBACH Artex® and Baumann Dental Artist/arTO®.

- ▶ Plaster the jaw model onto the Multisplit mounting plate according to the manufacturer's instructions. Make sure to insert a magnetic adhesive disk into the Multisplit mounting plate.



- ▶ Place the Multisplit mounting plate on the Multisplit base plate of the scanner. Ensure that the protrusions ("Corners") on the underside of the Multisplit mounting plate fit into the recesses of the Multisplit base plate.



- ✓ The Multisplit mounting plate will adhere to the magnet of the Multisplit base plate.
- ✓ The Multisplit mounting plate fits correctly when the plates are exactly congruent. Additional securing of the plastered jaw model is not necessary.





7.2. Inserting jaw model with adapter plate

Overview

Using an adapter plate as spacer, you can place the mounting plates of articulated jaw models on the Multisplit base plate of the scanner.



Adapter plates are available as optional accessories for the following articulator systems:

- SAM® AXIOSPLIT®
- GAMMA® Reference
- Whip Mix Denar®
- KaVo PROTAR®



Section 7.1

You do not require adapter plates for AMANN GIRRBACH Artex® and Baumann Dental Artist/arTO®.

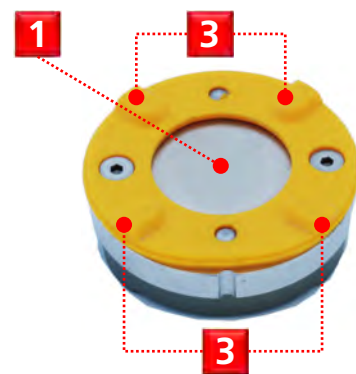
CAPTION

- 1 Magnet
- 2 Recess ("Corner")
- 3 Protrusion ("Oval")

Top (here: SAM®)



Bottom (here: SAM®)



The mounting plates of the corresponding articulator fit the top of the adapter plate. The underside fits to the Multisplit base plate in the scanner.

Placing mounting plate on adapter plate

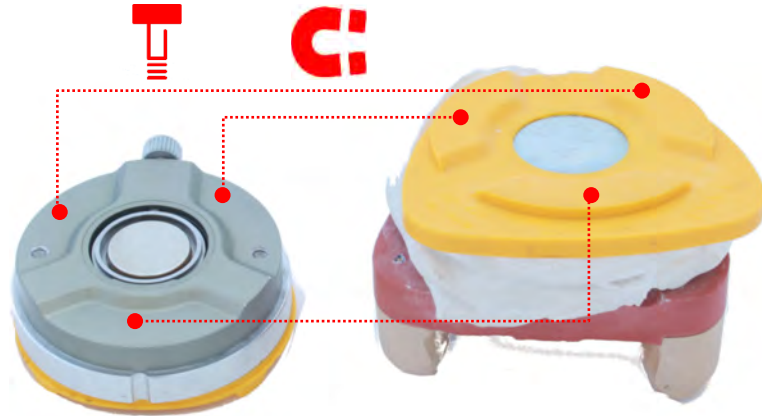
- ▶ Plaster the jaw model onto the mounting plate according to the manufacturer's instructions. Make sure to insert a magnetic adhesive disk into the mounting plate.



Observe safety instructions!

Section 2

- ▶ Place the mounting plate on the adapter plate such, that the protrusions ("Corners") on the underside of the mounting plate fit into the identically shaped recesses of the adapter plate.



- ✓ The mounting plate will adhere to the magnet of the adapter plate.
- ✓ The mounting plate fits correctly when the plates are exactly congruent.

SAM® AXIOSPLIT®

- ▶ The magnetic adhesive disk in the adapter plates for SAM® AXIOSPLIT® are retained with a fixating screw. Ensure that this is tightened firmly.



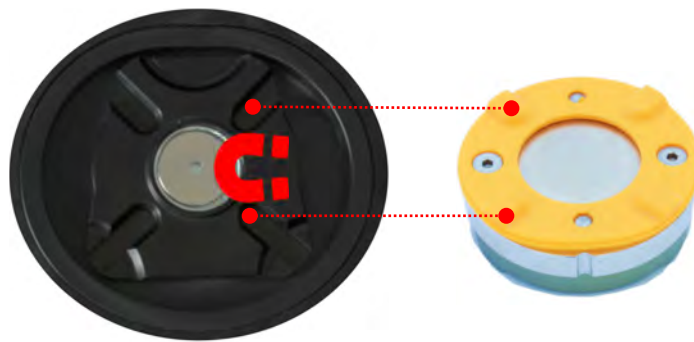
- ✓ Additional securing of the plastered jaw model is not necessary.

Inserting adapter plates

Observe safety instructions!

Section 2

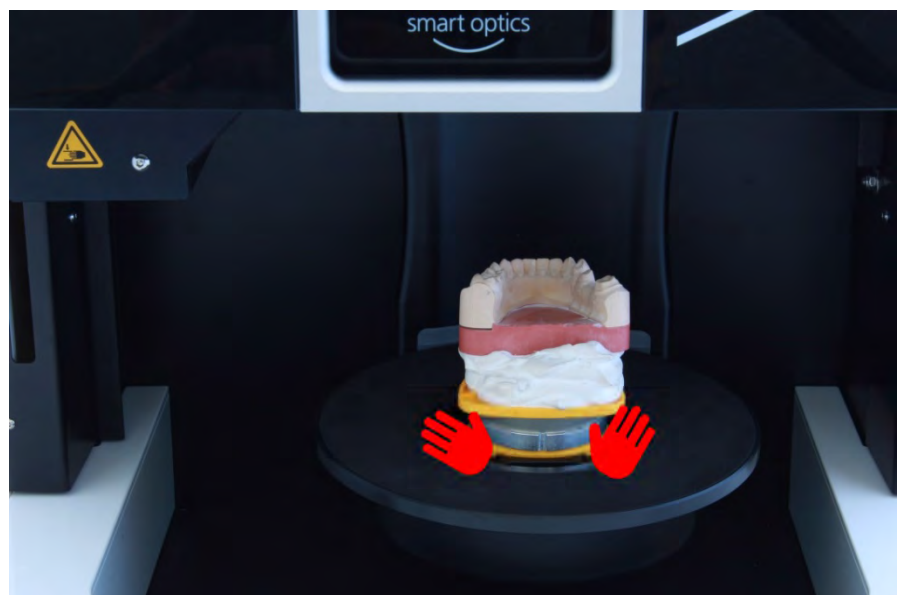
- ▶ Hold the adapter plate from the side of the Adesso Split® plastic plate.
- ▶ Insert the adapter plate into the scanner.
- ✓ The protrusions ("Ovals") on the underside of the plastic plate engage with the recesses of the Multisplit base plate.



- ✓ The adapter plate adheres to the magnet of the Multisplit base plate.
- ▶ Check whether the adapter plate can be shifted easily. If this is the case, correct the fit until the adapter plate fits securely.

Removing the adapter plate

- ▶ Hold the adapter plate on two sides, if necessary, use both hands. If you reach too high, you will grip the mounting plate instead of the adapter plate.



- ▶ Carefully pull the adapter plate upwards. A certain amount of force is required due to the magnetic attraction.
- ✓ The adapter plate loosens from the Multisplit base plate.



Service position

TIP

The axes can move inadvertently during removal. For this case, there is a function in dental Scan to return the axes to the service position.

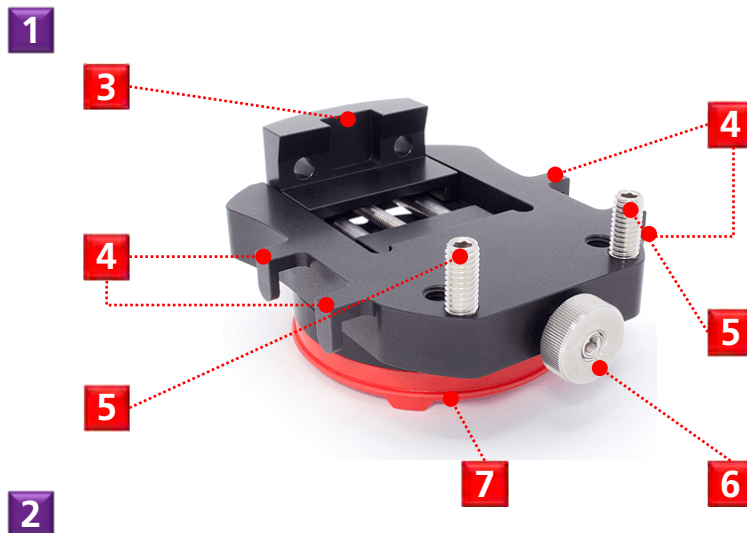
7.3. Inserting the jaw model with the object holder

Overview

Object holder with knurled screw

CAPTION

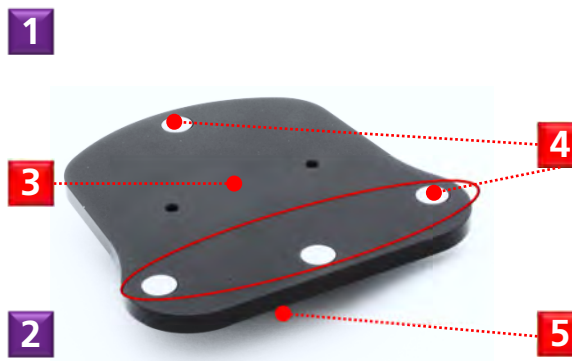
- 1 Rear
- 2 Front
- 3 Floating stop
- 4 Hook
- 5 Threaded pins
- 6 Knurled screw with clockwise thread
- 7 Adesso Split® plastic plate with adhesive disk



CAPTION

- 1 Front
- 2 Rear
- 3 Top
- 4 Magnet points
- 5 Adesso Split® plastic plate with adhesive disk

Flexible object holder





Mounting jaw model on an object holder

The object holders for Vinyl serve to mount a jaw model mechanically. This method is to be applied to jaw models which are not plastered.

Object holder with knurled screw

Different sizes of jaw models can be mounted securely on the object holder with the knurled screw.

Observe safety instructions!



Section 2

- ▶ Place the jaw model (upper or lower jaw) with the bottom side on the object holder.
- ▶ If required, loosen the knurled screw to increase the space.
- ✓ The anterior teeth point in direction of the knurled screw.
- ▶ Press the jaw model gently against the threaded pins.
- ▶ Tighten the knurled screw.
- ✓ The jaw model is fitted correctly if it is flush with the floating stop and the threaded pins.



Flexible object holder

Both partial models as well as complete jaw models can be mounted securely on the flexible object holder with the large plate. For mounting, you require adhesive putty pads.



Section 3

Two packs of adhesive pads are included in the scope of delivery. You can purchase replacements from office suppliers if required.

- ▶ Cover the topside of the plate with putty. You should use at least three pads for complete jaw models.
- ▶ Place the jaw model (upper or lower jaw) with the bottom side on the adhesive pads.
- ✓ The anterior teeth point in direction of the individual magnet points.
- ▶ Press the jaw model firmly.

- ✓ The jaw model fits correctly when it does not extend beyond the magnet points.
- ▶ Tilt the object holder carefully to the right and left.
- ✓ The jaw model fits correctly when it does not slip.
- ▶ Should the jaw model slip, use additional adhesive pads.

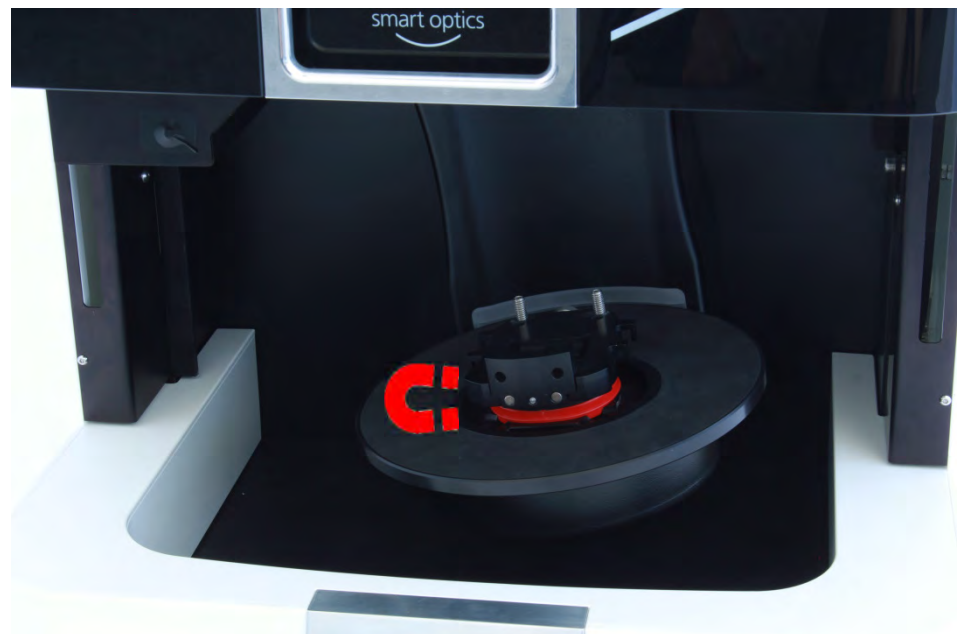
Inserting object holders

The described procedure is the same for both object holders.

Observe safety instructions!



- ▶ Hold the object holder from the side.
- ▶ Place the object holder with the front side or the knurled screw facing forwards into the scanner.
- ✓ The protrusions ("Ovals") on the underside of the object holder engage with the recesses of the Multisplit base plate.
- ✓ The object holder adheres to the magnet of the Multisplit base plate.



- ▶ Check whether the object holder can be shifted easily. If this is the case, correct the fit until the object holder fits securely.



Removing the object holder

The described procedure is the same for both object holders. To mount a jaw model on the object holder, you should always remove the object holder from the scanner.

- ▶ Hold the object holder on both sides, if necessary, use both hands.
- ▶ Carefully pull the object holder upwards. A certain amount of force is required due to the magnetic attraction.
- ✓ The object holder is released from the Multisplit base plate.

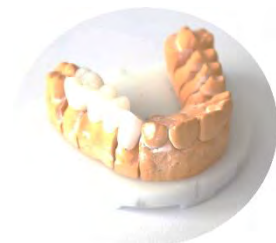


Service position

TIP

The rotating axis can move inadvertently during removal. For this case, there is a function in dental Scan to return the axes to the service position.

7.4. Mounting gingiva, squeeze bite, scanbody or wax-up



- ▶ For scanning gingiva, squeeze bites, scanbodies or wax-ups, mount the small prosthetic parts on the jaw model according to the manufacturer's instructions.
- ▶ Tighten the scanbodies firmly.
- ▶ Mount the prepared jaw model on an object holder or a mounting plate for your articulator.
- ✓ As a rule, no further fixation is required. Loosely placed parts can be glued slightly in two places with a removable adhesive if required.



Section 7



8. Positioning of non-articulated occlusion model

You have various options for inserting an occlusion model into the scanner. The easiest method for non-articulated occlusion is to mount the occlusion model on the object holder with knurled screw using a rubber band.

The flexible object holder is not suitable for this purpose.

Section 8.2

Alternatively you can use an occlusion clip.

Section 9

For articulated occlusion you require an articulator.

8.1. Mounting occlusion model with a rubber band

Observe safety instructions!

Section 2

For securing the upper and lower jaw in occlusion, you require a conventional rubber band of approx. 0.4 cm width and approx. 8.5 cm diameter. Alternatively, you can use a crossed band. The length and strength of the rubber band varies depending on the jaw model. For this reason, always keep several different rubber bands available.

Rubber bands are not included in the optional scanner accessories. For safety reasons, use only new, robust rubber bands and replace these regularly.

- ▶ Place the upper jaw model on the lower jaw model in occlusion.
- ▶ Place the rubber band cross-wise over the top part of the upper jaw model so that an equally long loop hangs from each side.
- ▶ Guide the end of each rubber loop around the hooks on the side of the object holder.

Section 7.3



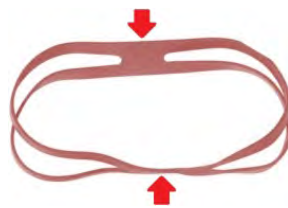
- ✓ Attachment is adequate if the upper jaw model cannot be tipped or shifted with slight pressure.
- ▶ If necessary, shorten the rubber bands by coiling over the hooks several times.



Alternatively, you can use two shorter rubber bands or a crossed band. Depending on the length and strength of the rubber bands used, alternative attachment methods are possible, e.g.:

- ▶ place two shorter rubber bands at an angle over the jaw model.
- ▶ Guide one end each at the front and back around one of the hooks on the side of the object holder.

If you are using a crossed band, you can only secure the jaw models to the object holder in occlusion.



- ▶ Place the crossed band around the jaw models in occlusion such, that one crossed part is on the top and one on the bottom and that the two partial bands are stretched on the side.

 Page 47

- ▶ Secure the connected jaw models on the object holder.
- ▶ Guide the laterally stretched rubber bands around the hooks on the object holder.



8.2. Mounting occlusion model with the occlusion clip

Observe safety instructions!

Section 2

With the aid of the smart optics occlusion clip you can mount the upper and lower jaw model easily and conveniently in non-articulated occlusion. Occlusion is closed in this manner and remains firmly joined, even during mechanical movement.



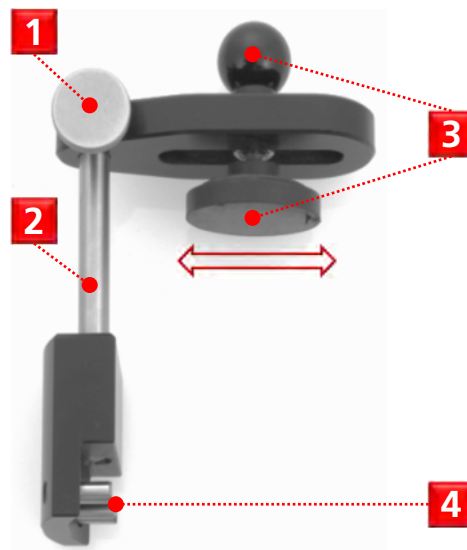
The occlusion clip for non-articulated occlusion is an optional accessory for Vinyl and can be obtained from your specialist dealer.

Overview

CAPTION

- 1 Locking screw
- 2 Mounting rod
- 3 Pressure fitting with ball knob
- 4 Metal pins
- 5 Plug-in connection

Occlusion clip without object holder



Occlusion clip with attached object holder



Mounting

Section 7.3

- ▶ First secure the lower jaw model to the object holder with the knurled screw.
- ▶ Place the upper jaw model on the lower jaw model in occlusion.
- ▶ Then loosen the ball knob (3) so the the pressure fitting can be slid forwards and backwards. Attach the occlusion clip to the floating stop of the object holder by pushing the metal pins (4) into the holes of the floating stop on the object holder (5).
- ▶ Hold the occlusion model firmly.



- ▶ Push the pressure fitting **(3)** on the ball knob as central as possible over the upper jaw model.
- ▶ Loosen the locking screw **(1)** until the the mounting rod **(2)** of the pressure fitting can be moved up and down.
- ▶ Hold the ball knob and press the upper jaw model onto the lower jaw model.
- ▶ Carefully tighten the screw **(1)** and the ball knob **(3)** until the occlusion model can no longer be moved.
- ✓ The occlusion model is clipped.



- ▶ Now place the object holder into the scanner as usual.



9. Positioning articulated occlusion models

The articulated occlusion of the upper and lower jaw model is prepared with aid of an articulator.

For vestibular scans, you can insert any articulator into the scanner without using further aids.

Condyle-related measurements are possible with the following articulators:

- AMANN GIRRBACH Artex® (without adapter plate)
- Baumann Dental Artist/arTO® (without adapter plate)
- SAM® AXIOSPLIT®
- GAMMA® Reference
- Whip Mix Denar®
- KaVo PROTAR®

Articulators are available from the specialist trade, can however not be purchased from smart optics as accessories for scanners.

9.1. Positioning occlusion model with an articulator

Overview

CAPTION

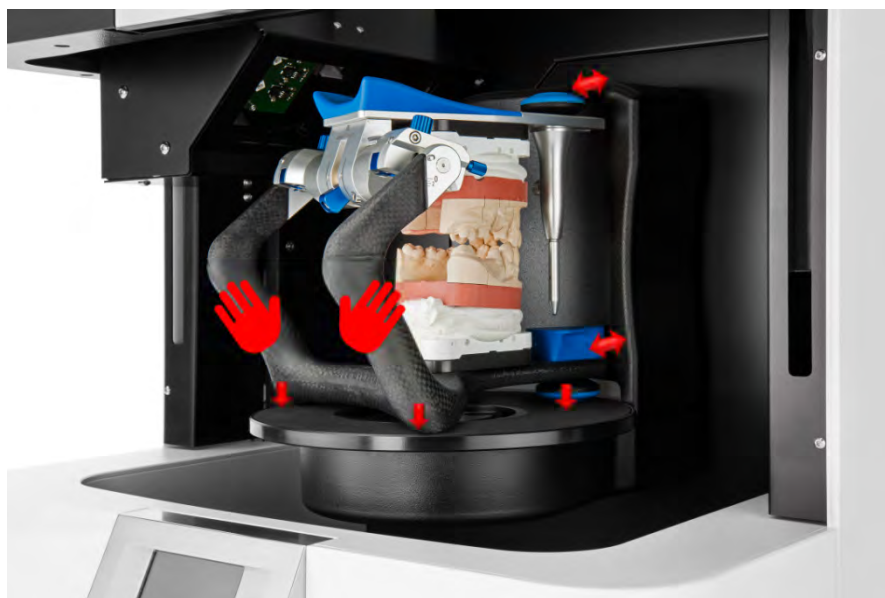
- 1 Front
- 2 Rear
- 3 Support pin top
- 4 Support pin front
- 5 Feet



Inserting articulator

Example
AMANN GIRRBACH Artex®

Regardless of type and manufacturer, all articulators are to be treated in the same manner.



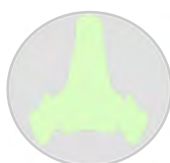
Observe safety instructions!

 Section 2

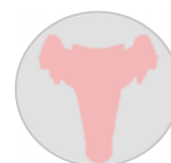
 Service position

- ▶ Ensure that the occlusion model has been articulated correctly.
- ▶ Remove the upper support pin from the articulator.
- ▶ Remove the front support pin if possible.
- ▶ It is essential to wait until the software asks you insert the articulator. Only then is it assured that the movements of the axes are minimal for the following scanning process.
- ✓ The system plate of the scanner is moved to the horizontal service position. Should this not be the case, there is a function in dental Scan to travel to this position.
- ▶ Hold the articulator at the rear braces with both hands.
- ▶ Place the articulator in the scanner with the front facing forwards.
- ✓ The front side of the articulator faces to the rear of the scanner. Any other orientation is not permissible.

CORRECT:



WRONG:



- ✓ The articulator stands free and does not touch the scanner.

- ▶ Place the articulator onto the system plate such, that **ALL** feet stand on the rubber mat. Position the articulator centrally.
- ✓ The articulator is positioned centrally on the system plate. Any other position is not permissible.
- ✓ The rubber mat is non-slip. No further fixation is required.



TIP

Always leave the lid open during an articulator scan.

Removing the articulator

- ▶ Wait until the software announces the end of the scanning process.
- ▶ Remove the articulator as soon as the software asks you to do so.
- ▶ Hold the articulator at the rear braces as before.
- ▶ Lift the articulator vertically from the scanner.
- ▶ Now continue with the workflow in the software.



TIP

The rotating axis can move inadvertently during removal. For this case, there is a function in dental Scan to return the axes to the service position.



Service position



10. Positioning tooth stump models with the multiDie adapter

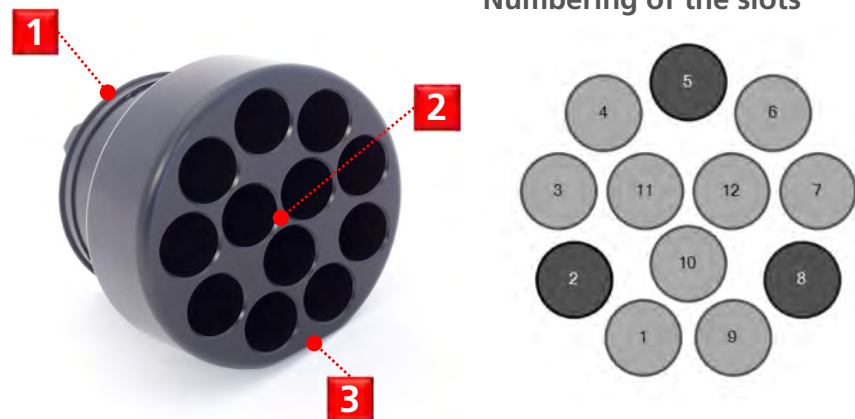
You can position up to twelve tooth stump models individually with the multiDie adapter.

You can use the multiDie adapter for the two modules multiDie and multiCase.

Overview

CAPTION

- 1 Adesso Split® plastic plate with adhesive disk
- 2 Slots
- 3 Flat side (front)



Mounting of tooth stump models

To ensure that the tooth stump models sit firmly on the multiDie adapter, you require the adhesive pads as mounting material.

Two packs of adhesive pads are included in the scope of delivery. As replacement you can use commercially available adhesive putty pads. These should be ultra-strong, but not stick, stain or harden.

- ▶ Fill all slots with putty material.
- ✓ The putty material should reach the end of the slots, but not protrude. The putty material can remain in the slots permanently.
- ▶ Insert the metal pins of the tooth stump models into the slots.



 Cropping (multiDie)
Project definition multiCase

TIP

If you only insert of 1, 2 or 3 tooth stump models, the slots 2, 5 and 8 must be assigned. For all other tooth stump models you can choose the slots freely.

Correct mounting

The prepared tooth stump models are mounted correctly if:

- they stand straight (not tilted)
- stand free (no contact to adjacent stump).
- are fitted flush to the multiDie adapter – in other words, insert the metal pins as deep as possible into the kneadable material
- remain in position if the multiDie adapter is rotated or tilted.

It is of advantage, but not a precondition, to insert the tooth stump models such that the buccal side faces outwards.

Inserting the multiDie adapter



Observe safety instructions!

 Section 2

- ▶ Hold the multiDie adapter from the side.
- ▶ Place the multiDie adapter into the scanner such, that the flat side faces to the front of the scanner.
- ✓ The protrusions ("Ovals") on the underside engage with the recesses of the Multisplit base plate.
- ✓ The multiDie adapter adheres to the magnet of the Multisplit base plate.

- ▶ Check whether the multiDie adapter can be shifted easily. If this is the case, correct the fit until the multiDie adapter fits securely.

Removing the multiDie adapter

- ▶ Hold the multiDie adapter adapter from the side, if necessary with both hands.
- ▶ Pull the multiDie adapter carefully upwards. A certain amount of force is required due to the magnetic attraction.
- ✓ The multiDie adapter is released from the Multisplit base plate.



TIP

The rotating axis can move inadvertently during removal. For this case, there is a function in dental Scan to return the axes to the service position.



11. Positioning of Triple Tray® impression

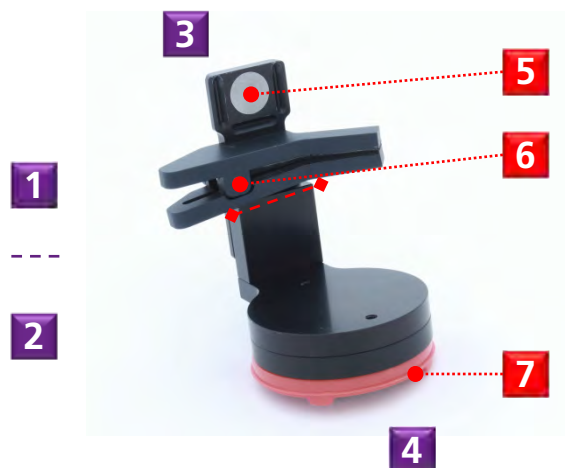
The Triple Tray® impression holder lets you position Triple Tray® impression trays in the scanner.

You can use the Triple Tray® impression holder with the Triple Tray® impression scan module.

Overview

CAPTION

- 1 Upper part
- 2 Lower part
- 3 Rear part
- 4 Front part
- 5 Magnetic adhesion point
- 6 Clip with spring
- 7 Adesso Split® plastic plate with adhesive disk



Mounting Triple Tray® impression

Observe safety instructions!



A Triple Tray® impression tray can be clipped quite easily in the Triple Tray® impression holder.

- ▶ Press the clip together on the broad section and keep this side pressed.



- ✓ The opposite side is pressed apart.



Insertion of a Triple Tray® impression

- ▶ Turn the side of the Triple Tray® impression demanded by the software upwards.
- ▶ Insert the flat shaft of the Triple Tray® impression holder into the narrowest position between the open side of the clip.
- ▶ Release the clip.



Correct mounting

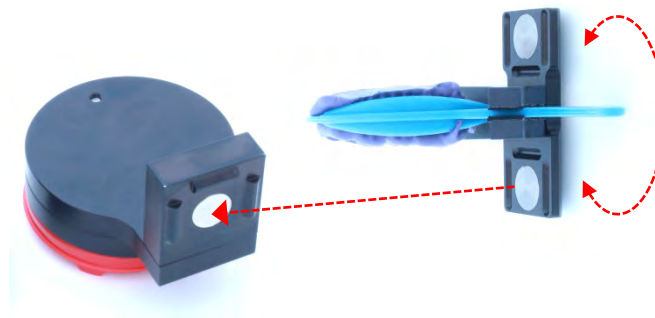
The Triple Tray®-impression is mounted correctly if:

- it is clipped
- is positioned parallel to the lower part of the Triple Tray® impression holder
- the impression to be scanned faces upwards.

Turning the Triple Tray® impression

To scan the other side of the Triple Tray® impression, turn the upper part without taking the impression from the clip.

- ▶ Loosen the upper part from the lower part using slight force.
- ✓ The magnetic contact is separated.
- ▶ Turn the upper part such, that the other side of the impression faces upwards.
- ▶ Press the lower magnetic point against the lower part.



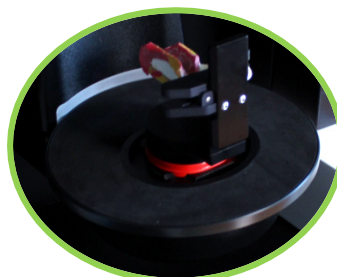
- ✓ The upper part will adhere magnetically to the lower part. The adhesive effect is reinforced by the grooves and braces.

Inserting the Triple Tray® impression holder



- ▶ Hold the Triple Tray® impression holder from the rear.
- ▶ Place the Triple Tray® impression holder with the impression facing forwards into the scanner.
- ✓ The Triple Tray® impression holder adheres to the magnet of the Multisplit base plate.
- ✓ The protrusions ("Ovals") on the underside of the magnetic plate engage with the recesses of the Multisplit base plate.
- ✓ The Triple Tray® impression faces to the rear of the scanner.

Correct ■
Wrong ■





- ▶ Check whether the Triple Tray® impression holder can be shifted easily. If this is the case, correct the fit until the Triple Tray® impression holder fits securely.

Removing the Triple Tray® impression holder

- ▶ Hold the lower part of the Triple Tray® impression holder, if necessary with both hands.
- ▶ Pull the Triple Tray® impression holder carefully upwards. A certain amount of force is required due to the magnetic attraction.
- ✓ The Triple Tray® impression holder is released from the Multisplit base plate.



Service position

TIP

The rotating axis can move inadvertently during removal. For this case, there is a function in dental Scan to return the axes to the service position.

12. Positioning the calibration model

You require a calibration model for calibrating the scanner. A calibration model is included in the scope of delivery. Each calibration model is measured industrially and assigned these measurements.



TIP

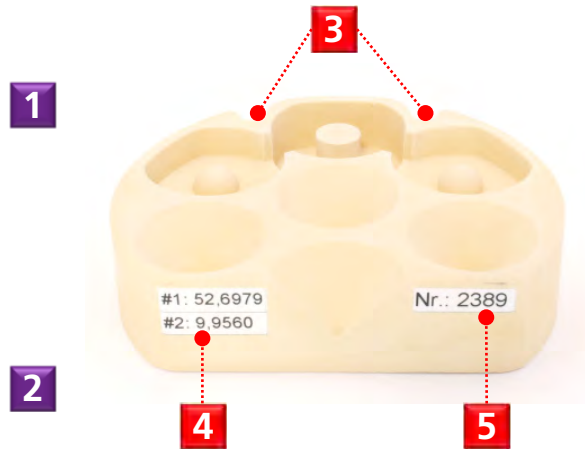
If your calibration model is damaged and are unsure whether this model can be used, your specialist dealer will be pleased to advise you and provide you with a replacement if necessary.



Overview

CAPTION

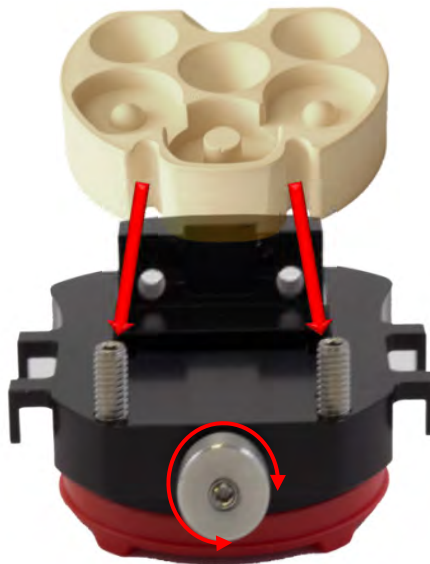
- 1 Top
- 2 Bottom
- 3 Bowls
- 4 Measured values
- 5 Model number



Inserting and removing the calibration model

Section 7.3

The calibration model is to be handled in the same manner as a single jaw model. For mounting purposes, you require the object holder with knurled screw.



Observe safety instructions!

Section 2

- ▶ If required, loosen the knurled screw to provide more room on the object holder.
- ▶ Place the underside of the calibration model on the object holder.
- ▶ Press the grooves of the calibration model slightly against the threaded pins of the object holder.
- ▶ Tighten the knurled screw.

- ✓ The calibration model is fitted correctly when it is flush both at the front and the rear.
- ✓ The imprint with the measured values faces towards the floating stop.
- ▶ Insert the object holder. To this purpose, observe the messages in the software.



TIP

Information on calibration is given in the user manual for dental Scan.



- ▶ Remove the object holder as usual.



13. Operating principle of the scanner

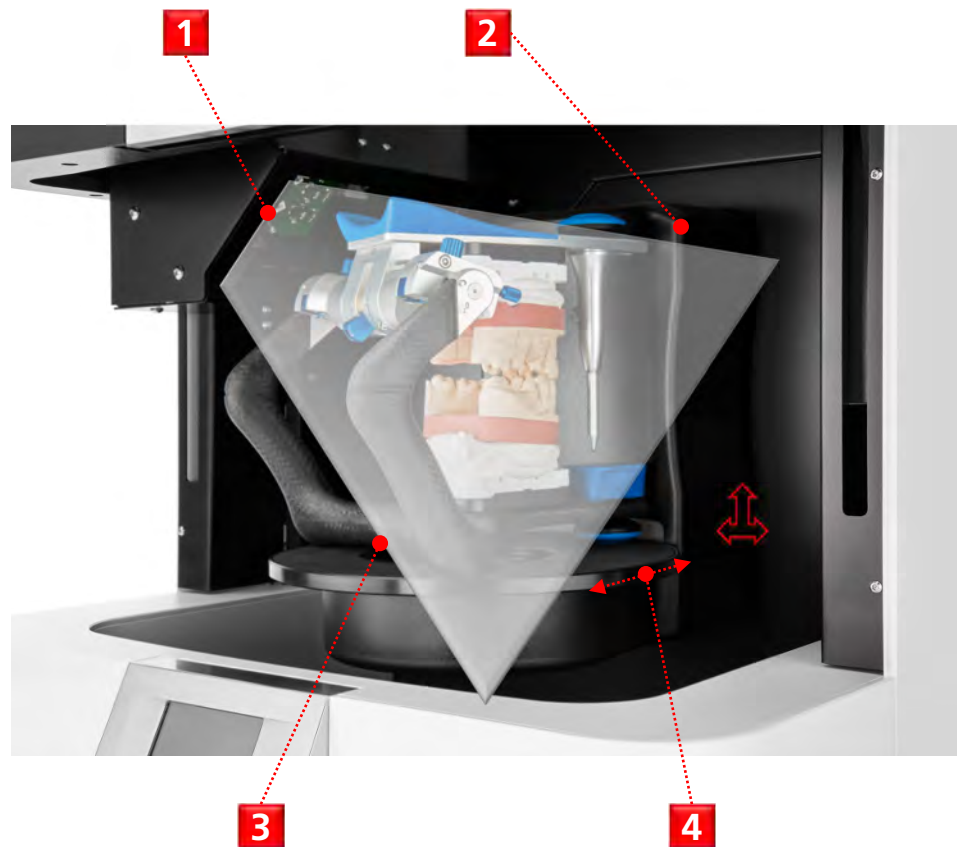


Use dental Scan

TIP

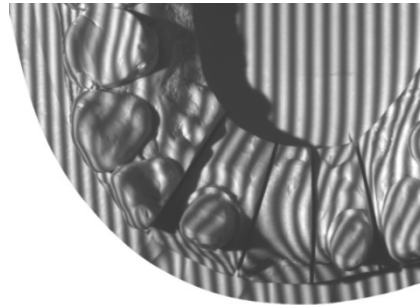
Information on all scanning procedures, the setting options and the use of optional modules can be found in the user manual for dental Scan.

The most important components of the scanner are the 3D sensor and a positioning mechanism.



The positioning mechanics in the interior of the scanner consist of an electromotively driven rotating and swivel axis **(4)** as well as an automatic z-axis **(2)**.

The freely rotating Multisplit base plate **(3)** positions the object to be measured with regard to the 3D sensor **(1)**, which is located above the swivel axis.



The swivel axis moves the rotating axis with the object holder to the side so that the 3D sensor can capture the object to be measured from the side.

During a measurement, the 3D sensor projects a striped pattern onto the object being scanned. At the same time the striped pattern is recorded by a camera.

With the aid of several camera images taken from different angles, the dental Scan calculates a 3-dimensional image of the object.

13.1. Operation per touch screen

The scanner is equipped with a touch screen which allows you to start scanning processes. Operation per touch screen is an alternative to a mouse click in the software.



Use dental Scan

You can also control the scanner exclusively via the software. Further information on is given in the dental Scanuser manual.

The company logo is displayed after switching on the scanner.



When the software requests starting a scanning process, a starting button is displayed.



- ▶ Follow the software instructions.
- ▶ Press the button to start.



- ✓ The scanning process starts.
- ✓ During scanning, a white arc circulates permanently around a red circle.



- ✓ After prolonged inactivity, the screen saver is activated automatically.





14. Device maintenance

The scanner is a delicate and sensitive optical device. To ensure trouble-free operation of the scanner, it is necessary to regularly follow the correct care measures.

Further maintenance measures by the user are not required.

Calibration

The scanner is calibrated with the aid of the software. This measure is necessary to ensure accurate measurements.



Calibration

Always perform calibration when the software asks you to do so. To this purpose, follow the dental Scan user manual.

Cleaning the scanner

Observe safety instructions!



Section 2

The scanner should be cleaned regularly during operation.

However, never clean the optics or other electronic components. If the optics are soiled, please contact your specialist dealer.

Before cleaning

- ▶ Switch off the scanner for safety reasons.
- ▶ Remove the cable connections.
- ▶ Remove the object holder.

Cleaning the outside

- ▶ To remove major soiling, moisten a soft microfiber cloth with window cleaner.
- ▶ Only clean surfaces with a soft microfiber cloth.
- ▶ Clean the touch screen without applying force.
- ▶ Never clean sensitive surfaces with scouring agents or coarse cloths.

Cleaning the inside

- ▶ Remove dust, foreign matter etc. from the interior with a vacuum cleaner. Attach the crevice nozzle and set the vacuum cleaner to its lowest level.
- ▶ Alternatively, use a universal compressed air cleaner. Spray briefly and set the spray strength to low.



15. Faults and repairs

Section 2, Page 20

If a fault occurs, first follow the safety notes on response to a defect. If the fault persists, contact your specialist dealer to clarify the cause of the fault.

Only have repairs carried out by your specialist dealer. Improper repairs can cause the scanner to stop working perfectly.

Warranty smart optics accepts no liability for damages caused by improper repairs. Please note that in this case your warranty claim will also become void.

If you have questions or complaints relating to your device, please have the serial number of your device and the 3D sensor at the ready. You will find these numbers on the type plate and label on the rear of the device.

Serial numbers

If you have questions or complaints relating to your device, please have the serial number of your scanner and the serial number of the 3D sensor at the ready.

You will find these numbers on the on the rear of the device:

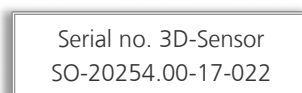
Type plate

Serial number of the scanner



Sticker

Serial number of the 3D sensor





16. Environmentally friendly disposal

The information in this section refers to EU directives and German law.

In non-European countries you must follow the corresponding national legislation for the disposal of packaging and electronic scrap.

You can prevent negative consequences for people and avoid harming the environment by the proper disposal of the device.

16.1. Disposal of packaging

In accordance with the German packaging ordinance (VerpackV), you can return the packaging to your dealer for disposal in Germany. However, smart optics recommends that you keep the packaging in case you need it to transport the scanner or to send it back in the event of warranty claims.

16.2. Disposal of the device



The devices marked with this symbol are subject to European Directive 2002/96/EC for WEEE (Waste Electrical and Electronic Equipment).

WEEE registration number of smart optics:
DE47893210

Electrical equipment does not belong in domestic waste.

Please note that the scanner is a device that only serves for commercial or industrial use. Disposal via public waste management authorities is therefore not possible.

The device must be returned to the manufacturer for disposal. If you are resident within the area in which the EU directive applies you can also return the device to your dealer.



17. Technical data

HOUSING

Dimensions	455 x 430 x 420 mm (W x H x D)
------------	--------------------------------

Weight	23 kg
--------	-------

Axes	1 rotating axis, 1 swiveling axis, 1 z-axis
------	---

Colors	black-white
--------	-------------

Pullout system	no
----------------	----

Lid	optional
-----	----------

Touch display	yes
---------------	-----

E-TECHNOLOGY

Supply voltage	100 - 240 V AC, 50/60 Hz
----------------	--------------------------

Fuse	2 x T 1.6 A L 250 V
------	---------------------

Power consumption	60 W max.
-------------------	-----------

Connections	1 x USB, 1 x power
-------------	--------------------

TEMPERATURE

Operating temperature	18°C - 30°C
-----------------------	-------------

Storage temperature	-5°C - 50°C
---------------------	-------------

MEASUREMENT

Resolution	2.8 Mpx
------------	---------

Measuring field	80 x 60 x 85 (X x Y x Z) mm
-----------------	-----------------------------

Measuring accuracy according to ISO 12836	up to 6 µm
---	------------

Measuring speed complete jaw	Scan	16 seconds
	data processing	13 seconds
	Overall time	29 seconds



Measuring speed single stump	Scan	25 seconds
	data processing	9 seconds
	Overall time	34 seconds
Measuring speed 3-pontic bridge	Scan	33 seconds
	data processing	22 seconds
	Overall time	55 seconds
SYSTEM REQUIREMENTS (PC & CAD-SOFTWARE AVAILABLE EXTRA)		
PC (recommended)	Quadcore CPU, i7	
	16 GB RAM	
	USB 3.0 Port	
	approx. 80 – 150 GB free hard drive space Graphics card 2 056 MB RAM	
Operating system (minimum)	Windows 7	
	64 Bit	
Operating system (recommended)	Windows 10	
	64 Bit	
USB	2.0 and 3.0	
CAD software	exocad [®] Dental CAD	



18. Declaration of CE Conformity



smart optics Sensortechnik GmbH
Lise-Meitner-Allee 10
44801 Bochum, Germany

Declaration of CE- Conformity

According to EU-regulation 2006/42/EG Appendix II A

We declare that the device identified below complies with the requirements of the EU guideline which regard to safety and physical health requirements both in concept and construction put in circulation.

This declaration becomes invalid in case of an unauthorized change of the device.

Device description:	Optical 3D scanner
Device type:	Vinyl
EU guidelines applicable:	machine guideline (2006/42/EG) low voltage guideline (2014/35/EU) EMC guideline (2014/30/EG)

Harmonized standards applied:
DIN EN ISO 12100:2010 Safety of machinery
DIN EN 61326-1:2013
DIN EN 61010-1:2010

The CE label was used first for this product in 2017.

Document prepared by: Jörg Friemel

Bochum, 22.05.2017

smart optics
Sensortechnik GmbH
Lise-Meitner-Allee 10
D-44801 Bochum / Germany
Fon: +49 234 29 82 8-0 Fax: -20



19. Checklists

Workstation

Step 1



Lifting capacity 2 x 23 kg | dimensions of scanner
455 x 430 x 420 mm (W x H x D)



Step 2



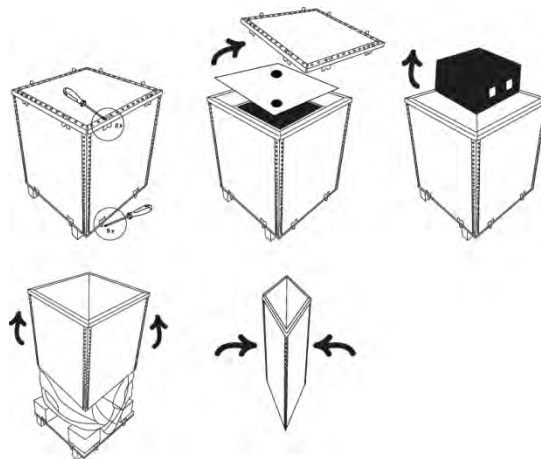
Quadcore CPU, i7 | 16 GB RAM | USB 3.0 Port
approx. 80 – 150 GB free hard drive space
Windows 10 64 Bit



Graphics card 2 056 MB RAM

Unpacking

Step 3





Carrying

Step 4



- ▶ 2 persons recommended.
- ▶ Position on sides.
- ▶ Hold below corners.
- ▶ Tilt slightly backwards.

Connection

Step 5



- ▶ Connect mains cable.
- ▶ Connect USB cable.
- ▶ Switch on.

Installation

Step 9



Installation dental Scan



Use dental Scan

- ▶ Copy software and operating manual from data carrier.
- ▶ Install software.
- ▶ Load calibration data.
- ▶ Start software.
- ▶ Calibrate.
- ✓ Ready for scanning!



20. Glossary

3D scan	Three-dimensional image of the model in the software.
3D sensor	Electronic component for three-dimensional measurement. The 3D sensor is not movable.
Articulator	Dental tool for fabricating a condyle-related occlusion. Articulators are available from various manufacturers. The most common articulators can be scanned condyle-related with Vinyl.
Rotating axis	One of the motion axes of the scanner. The base can rotate. Free rotation of the base allows full circumferential positioning in front of the camera.
Height alignment	Positioning of the model in the measuring field of the 3D sensor with the aid of the z-axis.
Calibration	A metrological term. A) alignment of the scanner to the values of an industrially calibrated model. B) alignment of the motion axes with regard to the individual calibration data.
Calibration model	Industrially measured model which is used for calibrating the scanner.
Measuring field	Size of the maximum area which can be captured by the 3D sensor.
Measurement	Calculation of the surface which can be measured through the projection of stripe light. Triangulation is the measuring principle.
Model	Model which is scanned, e.g. the impression of a plaster jaw.

Object holder	Holder on which the object to be measured (e.g. jaw model) is mounted and which itself is then mounted to the base in the scanner.
Lens	Optical component of the camera.
Occlusion clip	Special holder for the smart optics scanners with which a non-articulated jaw model is placed in the scanner. The occlusion clip is used for easy mounting of occlusion models.
Swivel axis	<p>One of the motion axes of the scanner. The swivel axis moves sideways so that the model is positioned in front of the camera at different angles.</p> <p>The swivel axis carries the rotating axis.</p>
Multisplit base plate	Permanently mounted magnetic plate on which the Multisplit mounting plates, object holders and adapter plates can be mounted.
Stripe light	Pattern which is projected on the model to measure the surface three-dimensionally.
Z-axis	One of the motion axes of the scanner. The z-axis moves up and down so that the model is positioned in front of the camera at different heights.

21. Index

μ

μ (unit of measurement) 7

3

3D sensor 66
3D-Scan-Spray 10

A

Accessories 33
Adapter 43
 articulator..... 23, 43, 44, 45
 multiDie/multiCase 57, 58, 59
 scope of delivery..... 22
 Triple Tray® 60
Adhesive pads..... 47, 57
Application (as intended) 10
Articulator 54
 adapter 43, 44, 45
 inserting/removing..... 55, 56
 manufacturer 24
 single jaw model 41, 43
ASCII (data format) 8
Axes 27

B

Box (transport) 33

C

Cables 36
Cabling..... 36
CAD software 73
Calibration..... 69
Calibration data 22
Calibration model 64
 mounting in scanner..... 64
Case (accessories) 33
Caution (convention) 9
CE
 conformity..... 74
 label..... 21
Clasp forceps..... 52
Cleaning..... 69
Cleaning agents..... 69

Clip

 occlusion..... 52
 Triple Tray® 60
Code of response 20
Colors (material) 10
Comma
 notation of numbers..... 7
Commissioning..... 32
Compressed air (cleaning)..... 69
Connecting mounting plate to adapter plate..... 43
Connections
 mains 31, 36
 USB..... 31, 36
Conventions 5
Cover 37

D

Data carrier..... 22
Defect
 calibration model..... 63
 device 20, 70
dental Scan..... 67, 69
 scope of delivery..... 22
Depth of the device 72
Designation
 outer view 25
Designations
 accessories 29
 adapter plate..... 43
 articulator 54
 calibration model..... 64
 internal view 27, 28, 39
 multiDie adapter..... 57
 object holder..... 46
 occlusion clip..... 52
 rear view 31
 system plate 40
 touch screen 26
 Triple Tray® impression holder 60
Dimensions (technical data)..... 72
DIN Standards..... 74
Display..... 26, 67
Disposal
 device 71
 environment..... 71
 packaging 71

E

Electromagnetic compatibility.....	32
EMC	
Directive.....	74
labelling.....	21
workstation.....	32
Environment.....	10, 71
Error.....	20, 70
EU Directives.....	74

F

Fault.....	20, 70
Fuse.....	21
Fuse (technical data).....	72

G

Gingiva.....	49
Gingival sculpture.....	49

H

Handle (lid).....	37
Height of the device.....	72
Holder	
articulator.....	54
mounting plate.....	41, 43
multiDie/multiCase.....	57
object holder.....	46
occlusion.....	50
Triple Tray®.....	60
Hz (technical data).....	72

I

Impression	
clipping.....	60
inserting/removing.....	62, 63
Injuries (protective measures).....	12
Insert/remove the articulated jaw model.....	44, 45
Installation.....	22
Interfaces (technical data).....	73

J

Jaw model	
securing in scanner.....	41, 43, 47, 50, 55
securing with articulator.....	54
securing with occlusion clip.....	52
securing with rubber band.....	50
with gingiva.....	49

with scanbody.....	49
with squeeze bite.....	49
with wax-up.....	49

K

kg (technical data).....	72
kg (unit of measurement).....	7
Knurled screw.....	47, 52, 63

L

Lifting (scanner).....	34, 35
Lifting points.....	34, 35
Low Voltage Directive.....	74

M

Machine Directive.....	74
Mains cable.....	22
Mains connection.....	31
Maintenance.....	69
Manuals (types).....	5
Material (colors).....	10
Material damage (safety measures).....	14
Measured values (calibration model).....	64
Measuring accuracy.....	69, 72
Measuring field (technical data).....	72
Measuring speed (technical data).....	72
mm (unit of measurement).....	7
Model holder.....	22
Mounting plate	
direct insertion.....	41
MSH (data format).....	8
multiDie/multiCase	
adhesive pads.....	57
module.....	57
mounting tooth stumps.....	57
scope of delivery.....	22
slots.....	57

N

Names.....	25, 26, 27, 28, 29, 31, 39, 40, 43, 46, 52, 54, 57, 60, 64
Note (convention).....	9
Number (calibration model).....	64
Numbers	
decimal system.....	7

O

Object holder.....	46
--------------------	----

adapter	43
articulator.....	54
inserting/removing.....	44, 45, 58
insertion	48
mounting calibration model.....	64
mounting gingiva	49
mounting plate.....	41, 43
mounting scanbody.....	49
mounting squeeze bite	49
mounting wax-up.....	49
multiDie/multiCase	57
occlusion clip.....	52
removal.....	49
removal/removal.....	59
rubber band	50
scope of delivery.....	22
securing jaw models	41, 47, 50
Occlusion.....	54
securing model with articulator.....	54
with occlusion clip	52
Occlusion clip.....	52
Occlusion with rubber band	50
Occupational safety	11
Open air (Vinyl).....	22
Opening and closing	37
Operating manuals (types)	5
Operating temperature (technical data)	72
Operating the lid.....	37
Optics.....	27, 28, 69
P	
Packaging.....	33
Parts	
accessories	29
adapter plate.....	43
articulator.....	54
calibration model.....	64
internal view.....	27, 28, 39
multiDie adapter.....	57
object holder	46
occlusion clip.....	52
outer view	25
rear view	31
system plate	40
touch screen.....	26
Triple Tray® impression holder	60
PC (scope of delivery optional)	23
PC (technical data).....	73
PCM (data format).....	8
Place tooth stumps individually.....	57
Placement	
dimensions.....	32

location.....	32
weight	32
Plug-in position (multiDie adapter)	57
PLY (data format).....	8
Power consumption (technical data).....	72
Protective measures	12, 14, 20

R

Removing dirt	69
Repairs	70
Representation	5
Requirements (workstation)	32
Rubber band.....	50

S

Safety.....	11–20
construction	11
correct response.....	20
injuries	12
material damage	14
qualification of the user.....	11
symbols.....	21
touching	21
Scanbody.....	49
Scanning	
principle	66
starting by touch screen	67
Scope of delivery	22
Sensor number	31, 70
Serial numbers.....	31, 70
Slots (multiDie adapter).....	57
SO number	31, 70
Software.....	67, 69
scope of delivery.....	22
Squeeze bite	49
Standards (EU Directives).....	74
Standards (safety)	11
STL (data format)	8
Storage temperature (technical data).....	72
Stripe pattern	66
Suction	69
Supply voltage (technical data).....	72
Symbols.....	5
System plate	28, 39, 40

T

Tick (symbol).....	5
Tip (convention).....	5
Touch screen	26, 67
Training	11

Triangle (symbol)..... 5

Triple Tray

- clip..... 60
- inserting/removing..... 62, 63
- scope of delivery..... 22

Triple Tray impression scan..... 60

Type plate..... 31, 70

U

Units of measurement

- international system of units..... 7

Unpacking 33

USB (technical data)..... 73

USB cable 22

Use (as intended) 10

V

V (technical data)..... 72

Vestibular scan (occlusion) 50, 54

W

Warning (convention) 9

Warranty 70

Watt (technical data)..... 72

Wax-up 49

WEEE..... 71

Weight (technical data)..... 72

Width of the device 72

Windows (technical data)..... 73

Workstation..... 32



Manufacturer

smart optics Sensortechnik GmbH
Lise-Meitner-Allee 10
D-44801 Bochum, Germany



ID: SO-20900-OMBA-90334-EN

www.smartoptics.de

