

New as of:

10.2015

inEos X5

Operating Instructions

English



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1 Dear Customer,

Thank you for purchasing your inEos X5[®] from Sirona.

Improper use and handling can create hazards and cause damage. Please read and follow these operating instructions carefully and Always keep them within easy reach.

To prevent personal injury or material damage, it is important to observe all safety information.

Your
inEos X5 team,

2 General data

Please read this document completely and follow the instructions exactly. You should always keep it within reach.

Original language of the present document: German.

2.1 Structure of the document

2.1.1 Identification of the danger levels

To prevent personal injury and material damage, please observe the warning and safety information provided in the present operating instructions. Such information is highlighted as follows:

DANGER

An imminent danger that could result in serious bodily injury or death.

WARNING

A possibly dangerous situation that could result in serious bodily injury or death.

CAUTION

A possibly dangerous situation that could result in slight bodily injury.

NOTICE

A possibly harmful situation which could lead to damage of the product or an object in its environment.

IMPORTANT

Application instructions and other important information.

Tip: Information on making work easier.

2.1.2 Formats and symbols used

The formats and symbols used in this document have the following meaning:

✓ Prerequisite 1. First action step 2. Second action step or > Alternative action ↵ Result ➤ Individual action step	Requests you to do something.
See "Formats and symbols used [→ 7]"	Identifies a reference to another text passage and specifies its page number.
• List	Designates a list.
"Command / menu item"	Indicates commands, menu items or quotations.

2.2 Legend



Year of manufacture

Safety symbols

"Warning of optical radiation" symbol

Warning of injuries to eyes and skin in the vicinity of optical radiation.



"Warning of hand injuries" symbol

Warning of hand injuries in the vicinity of devices with closing mechanical parts.



Symbols on the packaging

Take note of the following symbols on the packaging:

Top



Protect from moisture



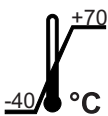
Fragile; handle with care



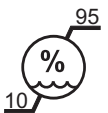
Do not stack



Temperature during storage and transport



Relative humidity during storage and transport



Air pressure during storage and transport



3 Safety

3.1 Basic safety information

3.1.1 Prerequisites

NOTICE

Important information on building installation

The building installation must be performed by a qualified expert in compliance with the national regulations. DIN VDE 0100-710 applies in Germany.

NOTICE

Restrictions regarding installation site

The system is not intended for operation in areas subject to explosion hazards.

NOTICE

Do not damage the unit!

The unit can be damaged if opened improperly.
It is expressly prohibited to open the unit with tools!

3.1.2 Connecting the unit

Perform connection by following the directions given in the present operating instructions.

3.1.3 Connection of external equipment

If any equipment not approved by Sirona is connected, it must comply with the applicable standards:

- EN 60 950 for information technology equipment, and
- EN 61 010-1 for laboratory equipment.

3.1.4 Maintenance and repair

As manufacturers of dental instruments and laboratory equipment, we can assume responsibility for the safety properties of the unit only if the following points are observed:

- The maintenance and repair of this unit may be performed only by Sirona or by agencies authorized by Sirona.
- Components which have failed and influence the safety of the unit must be replaced with original (OEM) spare parts.

Please request a certificate whenever you have such work performed. It should include:

- The type and scope of work.
- Any changes made in the rated parameters or working range.
- Date, name of company and signature.

3.1.5 Modifications to the product

Modifications to this product which may affect the safety of the operator, patients or third parties are prohibited by law!

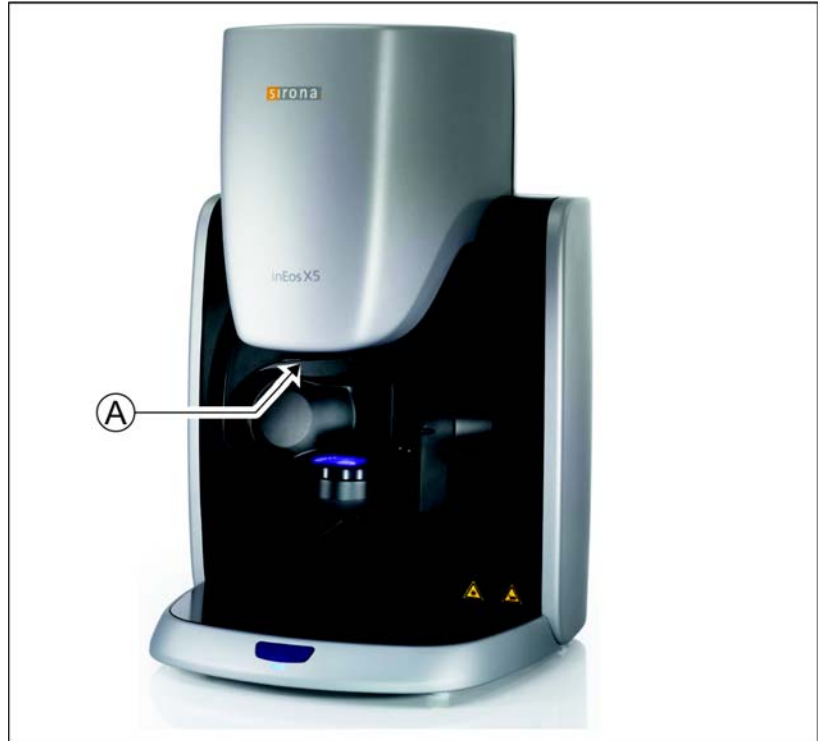
3.1.6 Accessories

In order to ensure product safety, this device may be operated only with original Sirona accessories or third-party accessories expressly approved by Sirona. In particular, only the power cable supplied with the unit or the corresponding original spare part may be used with the unit. The user assumes the risk of using non-approved accessories.

3.1.7 In case of damage

In case of noticeable malfunctions or damage, stop using the instrument immediately and notify your authorized dealer or the manufacturer.

3.2 Blue light radiation (UV)



A	Lamp
---	------

WARNING

Potentially hazardous optical radiation

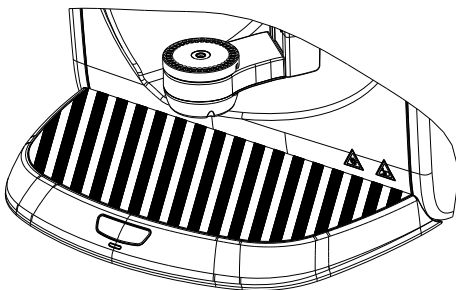
Do not look directly at the lamp during operation, as eye damage can result.

NOTICE

No reflective objects in the working area

Do not bring any reflective objects into the working area of the lamp.

3.3 To be taken into account during automatic operation



CAUTION

Risk of injury! / collision hazard!

During automatic operation there is a risk of injury/collision hazard as a result of the swiveling movement of the articulated arm.

- Ensure that there are no objects and/or body parts on the work plate (shaded area) during automatic operation.

3.4 Intended use

This system is used for 3D digitization of single tooth or complete jaw models and impressions.

This unit must not be used for any other purpose. If the unit is used for any purpose other than the one mentioned above, it may be damaged.

Intended use also includes compliance with these Operating Instructions and the relevant maintenance instructions.

CAUTION

Follow the instructions

If the instructions for operating the unit described in this document are not observed, the intended protection of the user may be impaired.

For the USA only

CAUTION: According to US Federal Law, this product may be sold only to or by instruction of physicians, dentists, or licensed professionals.

3.5 Certification

CE mark



This product bears the CE mark in accordance with the provisions of Council Directive 2006/42/EC (machinery directive). As such, the following standards apply: DIN EN ISO 12100:2011-03, DIN EN 61010-1:2011-07 and DIN EN 61326-1:2013-07.

CAUTION

CE mark for connected products

Further products which are connected to this unit must also bear the CE mark. These products must be tested according to the applicable standards.

Examples of CE mark for connected products:

- EN 60950:1992 + A1:1993 + A2:1993 + A3:1995 + A4:1997 based on IEC 60950
- CAN/CSA-C22.2 No.61010-1-04.

CSA mark



VDE mark



4 Technical description

4.1 Design and function

The inEos X5 is designed as a desktop unit and consists of several components (see Chapter "System components [→ 13]"). It is powered from the standard local power network via an external power supply unit.

The unit is connected to a PC via a USB port. The PC must fulfill the minimum requirements (see Chapter on "System requirements").

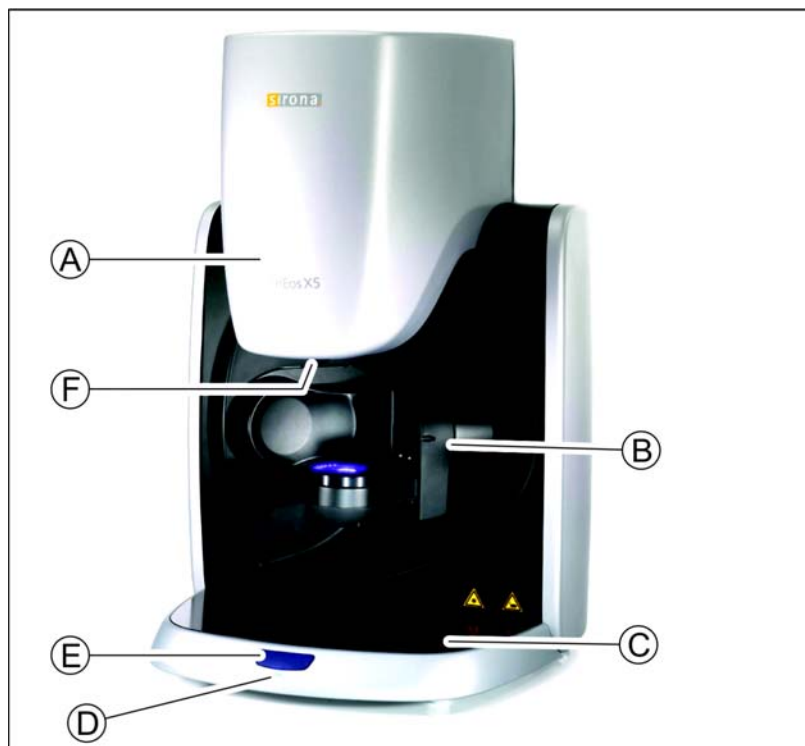
The PC serves both for controlling the inEos X5 and for displaying the captured images by means of the user software.

4.2 System components

"inEos X5" consists of a base plate, a vertical unit and an articulated arm. In addition, various accessories are included in the scope of supply of the unit.

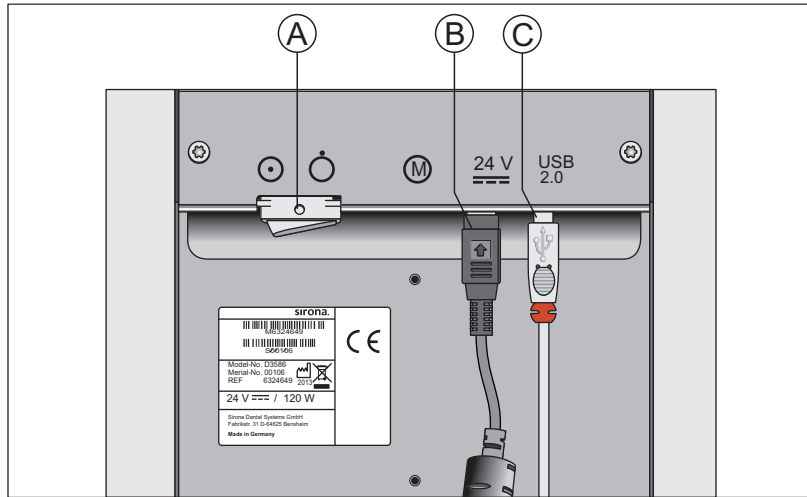
4.2.1 Components of the inEos X5

Front side



A	Vertical unit	D	Ready LED
B	Articulated arm	E	Start button
C	Base plate	F	Scan element opening, scan element

Rear side



A	Main switch
B	Supply voltage input (external power supply unit)
C	USB port

4.3 Technical data

Model designation	inEos X5
Power supply line	via power supply unit: INPUT: 100 - 240 V AC / 47- 63 Hz / 2.0 A max. permissible line voltage fluctuations: ± 10% of nominal voltage Overvoltage category II OUTPUT: 24V $\overline{=}$ / 6.25A max.
Power consumption	150W
Ambient conditions	For indoor use Pollution degree 2 Temperature: 10°C – 35°C (50°F ~ 95°F) Relative humidity: 30% – 75% Air pressure: 700hPa – 1060hPa Operating altitude: ≤ 2,000m
Transport and storage conditions	Temperature: -40°C – +70°C (-40°F ~ 158°F) Relative humidity: 10% – 95% Air pressure: 500hPa – 1060hPa
Dimensions (WxHxD)	
in mm	475 x 740 x 460 mm
in inches	18 $\frac{3}{4}$ x 29 $\frac{1}{8}$ x 18 $\frac{1}{8}$ in.
Weight	
• without power supply unit and accessories	39.6 kg (87.3 lbs)
Protection class	Class I device
Degree of protection against ingress of water	Ordinary equipment (not protected)
Operating mode	Continuous operation with intermittent loading corresponding to the laboratory mode of working. Desktop unit

Tests/approvals

This unit complies with the following requirements:
DIN EN 61 010-1: 2011 (safety)
DIN EN 61 326-1: 2006 (EMC)
DIN EN ISO 12 100: 2011 (risk management)

4.4 System requirements

A **64-bit inLab 4 PC** is required to run this software. The hardware version must be **PC hardware version 2.0.1** or higher.

4.5 Electromagnetic compatibility

Observance of the following information is necessary to ensure safe operation regarding EMC aspects.

inEos X5 complies with the requirements for electromagnetic compatibility (EMC) according to DIN EN 61326-1:2006-10.

inEos X5 is hereinafter referred to as "UNIT".

4.5.1 Electromagnetic emission

The **UNIT** is intended for operation in the electromagnetic environment specified below.

The customer or user of the **UNIT** should make sure that it is used in such an environment.


Emission measurement	Conformity	Electromagnetic environment - guidelines
RF emissions according to CISPR 11	Group 1	The UNIT uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions according to CISPR 11	Class B	The UNIT is intended for use in all facilities, including residential areas and in any facilities connected directly to a public power supply providing electricity to buildings used for residential purposes.
Harmonics according to IEC 61000-3-2	Class A	
Voltage fluctuations / flicker according to IEC 61000-3-3	coincides	

4.5.2 Interference immunity

The **UNIT** is intended for operation in the electromagnetic environment specified below.

The customer or user of the **UNIT** should make sure that it is used in such an environment.

Interference immunity tests	DIN EN 61326-1 Test level	Compliance level	Electromagnetic environment – guidelines
Electrostatic discharge (ESD) according to IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst according to IEC 61000-4-4	± 1 kV for input and output lines ± 2 kV for power supply lines	± 1 kV for input and output lines ± 2 kV for power supply lines	The quality of the line power supply should be that of a typical commercial or hospital environment.
Surge voltages according to IEC 61000-4-5	± 1 kV differential mode voltage ± 2 kV common mode voltage	± 1 kV differential mode voltage ± 2 kV common mode voltage	The quality of the line power supply should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and variations of the power supply according to IEC 61000-4-11	<5% U_T for ½ period (>95% dip of U_T) 40% U_T for 5 periods (60% dip of U_T) 70% U_T for 25 periods (30% dip of U_T) <5% U_T for 5sec. (>95% dip of U_T)	<5% U_T for ½ period (>95% dip of U_T) 40% U_T for 5 periods (60% dip of U_T) 70% U_T for 25 periods (30% dip of U_T) <5% U_T for 5sec. (>95% dip of U_T)	The quality of the line power supply should be that of a typical commercial or hospital environment. Continued operation of the UNIT is possible following interruptions of the power supply, since the UNIT is powered by an uninterruptible power supply backed up by a storage battery.
Magnetic field of power frequencies (50/60 Hz) according to IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Note: U_T is the AC supply voltage prior to application of the test level.			
			Portable and mobile radio equipment must not be used within the recommended working clearance from the UNIT and its cables, which is calculated based on the equation suitable for the relevant transmission frequency. Recommended working clearance:

Interference immunity tests	DIN EN 61326-1 Test level	Compliance level	Electromagnetic environment – guidelines
Conducted RF interference IEC 61000-4-6	3 V _{eff} 150 kHz to 80 MHz	3 V _{eff}	$\bar{d} = [1.2] \sqrt{P}$
Radiated RF interference IEC 61000-4-3	3 V/m 80 MHz to 800 MHz 3 V/m 800 MHz to 2.5 GHz	3 V/m 3 V/m	$\bar{d} = [1.2] \sqrt{P}$ at 80 MHz to 800 MHz $\bar{d} = [2.3] \sqrt{P}$ at 800 MHz to 2.5 MHz where P is the nominal transmitter output in watts (W) specified by the transmitter manufacturer and \bar{d} is the recommended working clearance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey ¹ should be less than the compliance level ² in each frequency range. Interference is possible in the vicinity of equipment bearing the following  graphic symbol.

Remark 1

The higher frequency range applies at 80 MHz and 800 MHz.

Remark 2

These guidelines may not be applicable in all cases. The propagation of electromagnetic waves is influenced by their absorption and reflection by buildings, objects and persons.

1. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM/FM radio and TV broadcasts, cannot be predicted theoretically with accuracy. An investigation of the location is recommended to determine the electromagnetic environment resulting from stationary RF transmitters. If the measured field strength in the location in which the **UNIT** is used exceeds the applicable RF compliance level specified above, the **UNIT** should be observed to verify normal operation. If unusual performance characteristics are observed, it may be necessary to take additional measures such as reorientation or repositioning of the **UNIT**.
2. Over the frequency range 150kHz to 80 MHz, field strengths should be less than 3 V/m.

4.5.3 Working clearances

Recommended working clearances between portable and mobile RF communication devices and the UNIT

The UNIT is intended for operation in an electromagnetic environment, where radiated RF interference is checked. The customer or the user of the UNIT can help prevent electromagnetic interference by duly observing the minimum distances between portable and/or mobile RF communication devices (transmitters) and the UNIT. These values may vary according to the output power of the relevant communication device as specified below.

Rated maximum output power of transmitter [W]	Working clearance according to transmission frequency [m]		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
	$d = [1,2] \sqrt{P}$	$d = [1,2] \sqrt{P}$	$d = [2,3] \sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

For transmitters whose maximum nominal output is not specified in the above table, the recommended working clearance d in meters (m) can be determined using the equation in the corresponding column, where P is the maximum nominal output of the transmitter in watts (W) specified by the transmitter manufacturer.

Remark 1

An additional factor of 10/3 is applied when calculating the recommended working clearance between transmitters in the 80 MHz to 2.3 GHz frequency range in order to reduce the probability that a mobile/portable communication device unintentionally brought into the patient area could lead to interference.

Remark 2

These guidelines may not be applicable in all cases. The propagation of electromagnetic waves is influenced by their absorption and reflection by buildings, objects and persons.

5 Transport to the installation site

5.1 Transport and unpacking

All products from Sirona are carefully checked prior to shipment. Please perform an incoming inspection immediately after delivery.

1. Check the delivery note to ensure that the consignment is complete.
2. Check whether the product shows any visible signs of damage.

NOTICE

Damage during transport

If the product was damaged during transport, please contact your carrying agent.

If return shipment is required, please use the original packaging for shipment.

Transport without packaging

CAUTION

Damage to the unit or risk of injury during transport without packaging

There is a danger of the unit falling down if it is grasped by its plastic housing.

- The unit should always be carried by two persons.
- Do not grasp the unit by its plastic housing.
- Always grasp the unit by its chassis next to its feet.

5.2 Installation site

The unit is designed for desktop use and requires a level footprint of approx. 70 x 60cm for installation.

No special requirements exist regarding the ventilation at the installation site.

Make sure that the specified operating conditions are observed (see section "Technical data [→ 15]").

NOTICE

Install inEos X5 in a protected area

3D image acquisition may be adversely affected by bright light.

Set the inEos X5 up so that it is not located directly in the beam path of an extreme light source and not exposed to direct sunlight.

NOTICE

ON/OFF switch on rear of unit

Set the inEos X5 up so that the ON/OFF switch on the rear of the unit is readily accessible.

CAUTION

Risk of injury

When assembled, fingers must not be inserted beneath the unit.

6 Initial startup

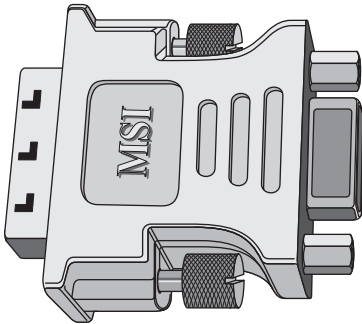
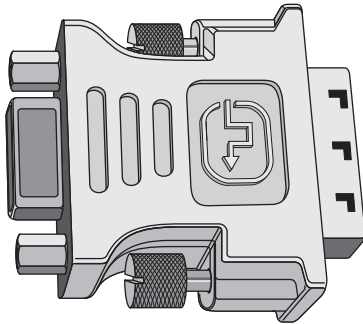
6.1 Putting the inLab 4 PC into operation

6.1.1 Startup prerequisites

6.1.1.1 Required accessories

Supplied parts:

- inLab PC with power cable
- Keyboard
- Mouse
- 2x DVI VGA converters
- Power cable
- Ethernet cable for connection of the machine with the PC.



Also required:

- VGA/DVI monitor including VGA/DVI cable (not included in scope of supply)

⚠ CAUTION

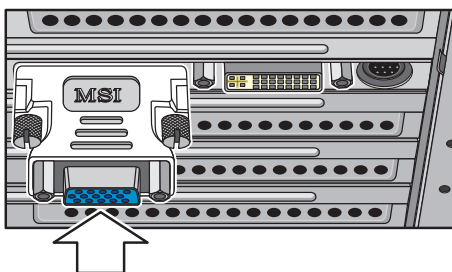
Image may not display

Please note the required minimum monitor resolution of 1280 x 1024 at 70Hz. Please refer to the technical documentation of the monitor for the correct resolution and frame rate settings.

Recommendation:

- Sirona inLab system PC monitor, Order No.: 60 42 548 D3446

In order to connect a VGA monitor, screw one of the two converters onto the left DVI port as shown in the photo.



6.1.1.2 Making connections

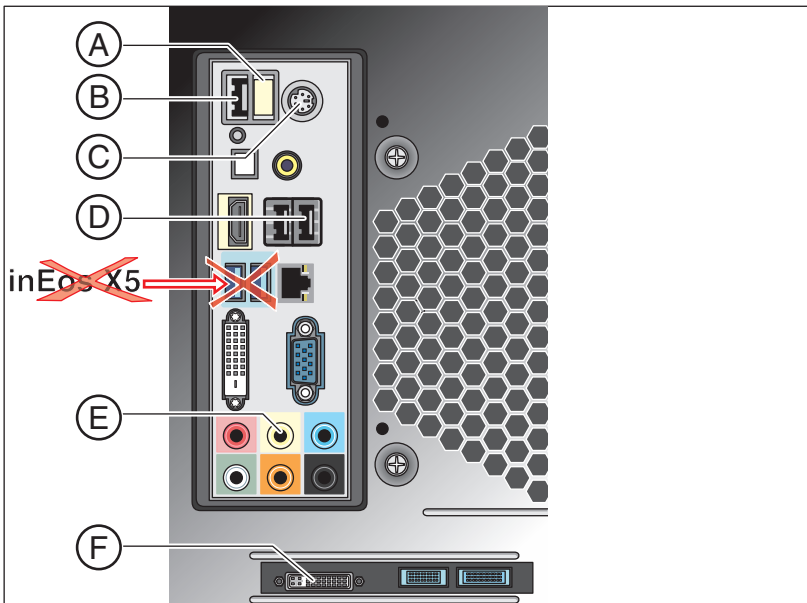
NOTICE

Do not connect or switch on the inEos X5 yet!

First, connect the PC to the monitor, keyboard, and mouse.

Follow the instructions in this document exactly in order to successfully perform start-up of your device.

You must install the user software prior to connecting the device to the PC.




A	USB license stick
B	USB for inEos X5
C	Keyboard/mouse Alternatively: Connection via USB
D	USB for inEos X5 foot control
E	Optional: Audio output
F	Monitor

1. Connect the keyboard and the mouse to the PC.
2. Connect the monitor to the PC with the VGA/DVI cable.
3. Turn on the monitor and PC power supplies.
4. Turn on the power switch on the rear panel of the PC (if present).

6.1.2 Safety

inLab 4 PC is equipped with Windows 7 Professional (64-bit). The Windows Firewall is activated. The software Microsoft Security Essentials is also pre-installed by default. Please activate the automatic update function in the settings of this software for optimal protection.

 CAUTION
<p>Damage to the system and data loss:</p> <p>If you exchange files and programs with other PC systems and/or operate this PC in a network (LAN or Internet), damage may be caused by software viruses.</p> <ul style="list-style-type: none"> ➤ Activate the "Automatic Updates" function of Microsoft Security Essentials. ➤ Activate the "Automatic Updates" function of Windows 7. ➤ Run backups of all your important files at regular intervals.

6.1.3 Possible sources of error

Error	Possible cause	Corrective action
PC does not start when the button is pressed.	If the PC has a power switch on its rear panel, this switch may possibly be switched off.	Turn the power switch on (if present).
No image appears on the monitor even though all connections have been made.	The resolution and frequency of the monitor being used do not meet the minimum requirements (1280x1024; 70Hz).	Use a monitor that meets the minimum requirements.

6.2 Installing the software

NOTICE

Initial installation without inEos X5

Perform the initial installation of the software **without** connecting inEos X5.

The software requires the 2.00 firmware version of the license stick. Update the firmware version if necessary. For additional information, refer to the "License manager" section in the user manual inLab SW.

You need at least one inLab 4 PC for the software. An inLab 4 PC V 3.0.1 is recommended.

Use the version of the license manager provided with this version to import licenses from the license certificate provided.

NOTICE

Installation only with administrator rights

You must have administrator rights on the PC on which you want to install the software!

- ✓ The license stick firmware is available in version 2.00.
- ✓ The PC is powered up and all programs are terminated.
- 1. Insert the DVD in the DVD drive.
 - ↳ The setup program starts automatically.
- 2. If this is not the case, run the "*Setup.exe*" file in the root directory of the DVD.
 - ↳ The installation wizard opens.
- 3. Click on the "*OK*" button.
- 4. Select the language for the installation and click on "*Next*".
- 5. In the next dialog, click the "*Next*" button.
- 6. Select the language for the software from the drop-down menu, and select the region you are in from the download menu below it. Then click on "*Next*".
- 7. In the next step, you can choose the installation folder. You can also change the path for the patient data folder and the path for the CAM data. Click on "*Next*".
- 8. Read the license agreement carefully. If you accept the license agreement, then activate the "*I accept the terms in the license agreement*" option button and click the "*Next*" button.
 - ↳ The installation starts. This may take several minutes.
- 9. Following successful installation, click on the "*Start*" button to complete the installation and to start the application immediately after this.

Tip: If you do not want to start the application immediately, remove the tick from the "*Start application directly*" check box and then click on the "*Exit*" button. This installation program closes.

6.3 Connecting the unit

NOTICE

Switching the PC off

Switch the PC **off** before connecting the inEos X5.

6.3.1 Connecting the unit to the PC

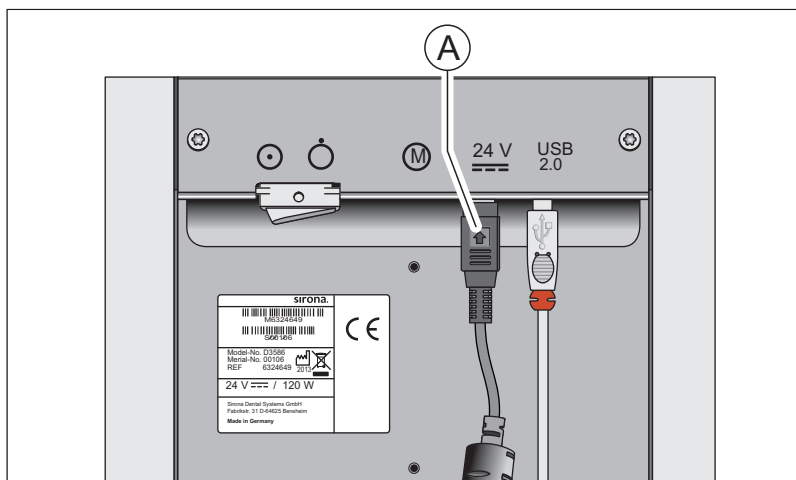
NOTICE

Install the user software first!

You must install the user software prior to connecting the device to the PC.

- Connect the socket (USB port) of the inEos X5 to the socket (USB port) of your PC via the interface cable included in the scope of supply.

6.3.2 Connecting the unit to the power supply



A Socket for power supply

- Connect the socket (**A**) of the inEos X5 to the power supply via the power supply unit included in the scope of supply.

NOTICE

Use a grounded power outlet

The power supply unit must be connected to a grounded power outlet.

6.3.3 Connecting the foot switch (optional)

- Plug the connector of the foot switch into the matching socket (USB port) of your PC.

6.3.4 Switching the unit on and starting the software

NOTICE

Do not put the unit into operation at low temperatures!

If you move the unit to the operating site from a cold environment, condensation may form and result in a short circuit.

- ✓ Install the unit at room temperature.
- Wait until the unit has reached room temperature and is absolutely dry.
 - ↳ The unit is dry and can be put into operation.

1. Switch the unit on at the main switch.
2. Start the software at the PC via the Windows start menu.

6.4 Calibrating the unit

IMPORTANT

Calibrating the system

Following installation of the inEos X5, it is recommended that you perform an axis calibration with the inLab SW software.

- ✓ The inEos X5 is switched on.
 - ✓ The jaw model supplied for calibration is ready.
 - ✓ You have restarted the software.
1. Click the "*Configuration*" button in the menu.
 2. Click the "*Devices*" button.
 3. Click "*inEos X5*".
 - ↳ A selection menu opens.
 4. Click on the "*Calibrate*" button.
 - ↳ The calibration dialog opens.
 5. Follow the steps in the calibration dialog.
 6. Position the calibration model on the rotation disk in such a way that the front teeth are facing directly in the direction of the unit.
 7. Start the scan process.
 - ↳ The unit is calibrated. Wait until the process has been completed.
 8. Restart the software.

6.5 Updating the firmware

In order to update the inEos X5 firmware, proceed as follows:

1. In the inLab SW, click on "*Configuration*" in the menu bar.
2. Click on the "*Devices*" icon.
3. Click on the icon of inEos X5.
4. Click on "*Update Firmware*".
5. Switch inEos X5 off at the main switch.
6. Then simply proceed as prompted by the inLab software.
 - ↳ The inEos X5 firmware will be updated. The percentage of completed progress is displayed.



IMPORTANT

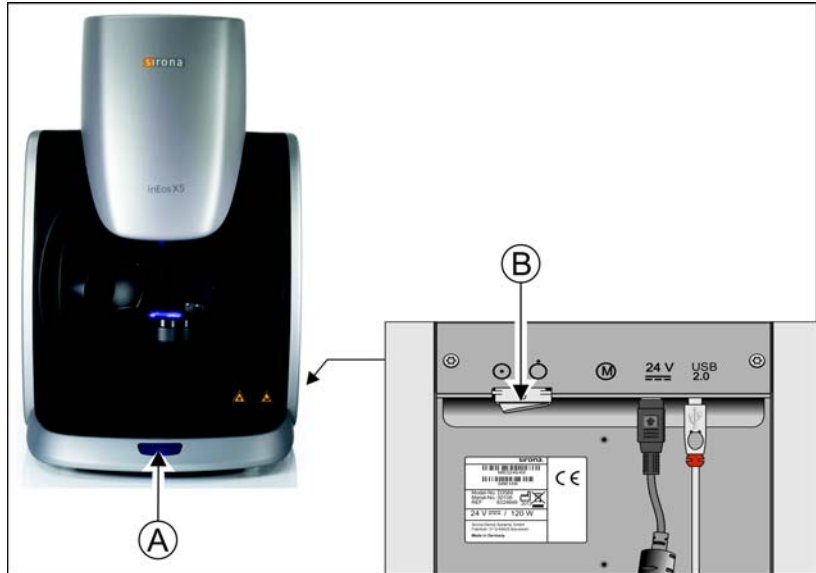
Do not disconnect the unit from the power supply

During the firmware update, ensure that the unit is not disconnected from the power supply.

7. Once the update is complete, confirm the message with "*Ok*" and switch off the inEos X5.
8. Turn the inEos X5 back on.
9. Click on "*Continue*" in order to exit the configuration and continue with the inLab SW.

7 Controls and displays

7.1 Controls on the inEos X5



inEos X5 features the following controls:

A	Start key
B	CC

CAUTION

Stopping motor movements

By pressing and holding the Start key (A), all movements of the motor are immediately stopped and the motors are switched to a voltage-free state. The unit then switches to an error state (see "Operating state LED [→ 31]LED lights up red").

7.2 Operating state LED

The LED shows the operating status of the unit:

NOTICE

Once the unit is switched on, the LED must light up in one of the following colors. Should this not be the case, this indicates a unit defect, which must be eliminated prior to further use.

LED lights up green

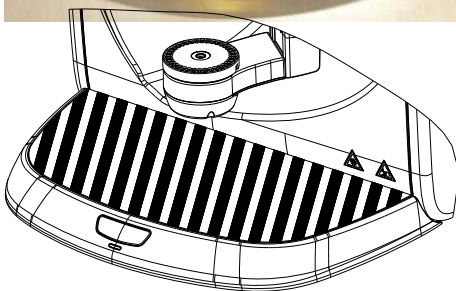


The unit is ready for operation.
The articulated arm will move only in case of user interaction in the software or if the Start key is actuated.

LED lights up yellow



An automatic acquisition process has been started; the arm is already moving or is about to start moving.



CAUTION

Risk of injury!

Do not place any part of your body either wholly or partially in the working area of the articulated arm in this operating state!

Ensure that there are no objects and/or body parts on the work plate (shaded area) during automatic operation. Otherwise this creates a collision hazard as a result of the swiveling movement of the articulated arm.

LED lights up red

Error state.

Causes may include:

- Activation of safety light barrier on the scan element
- Pressing and holding the Start key
- Malfunctioning of drives

The articulated arm will not move in this operating state.

Proceed as prompted by the inLab software.

8 Switching the system on

NOTICE

Do not put the unit into operation at low temperatures!

If you move the unit to the operating site from a cold environment, condensation may form and result in a short circuit.

- ✓ Install the unit at room temperature.
- Wait until the unit has reached room temperature and is absolutely dry.
 - ↳ The unit is dry and can be put into operation.

Switching the inEos X5 on

1. Switch on the PC.
2. Switch the inEos X5 on at the main switch.

Starting the software

- Start the software at the PC via the Windows start menu.

9 Performing 3D acquisition

9.1 General

9.1.1 Acquisition methods

Four methods are available for acquiring scans with the inEos X5:



- Automatic jaw scan
 - For all tasks
 - Especially for large, complex tasks or tasks with high accuracy requirements
- Free jaw scan
 - For simple tasks
 - For free detail scans under various angles
- Individual stump scan (rotation scan)
 - For the measurement of one or more single tooth stumps
 - For single restorations without consideration of the proximal contacts or the antagonist
- Scanbody scan
 - For the measurement of one or more inPost scanbodies

Tip: You can execute several scan methods in sequence. You can omit a scan method if, for example, it is either not suitable or is not required for your model.

IMPORTANT

Perform the individual stump scans either completely prior to or after the automatic and/or free scans.

It is not possible (for example) to initially perform an automatic scan, then carry out a scan of individual stumps, and, finally, to change back to automatic mode once again.

Tip: For stump model tasks, first take the scans of the prepared stumps. Then add automatic and/or free scans. In this way, you can reduce the processing time.

9.1.2 Scan modes



You can take the scans using two modes. You can switch between the modes using the *"Mode"* function.

Import Model



Use the *"Import Model"* mode to import a model from *.stl files. To do this, first select the image catalog for which you want to import the stl model and then click on *"Load"* in the step menu.

Additional image catalogs can be added and *.sdl data can be imported for this.

The interface module (REF 65 43 057) is required for this function.

"Single Exposure"



Use the *"Single Exposure"* mode for scans of models with no special requirements in terms of the brightness settings for the exposure (standard value).

"Multiple (HDR) Exposure"



The HDR ("high dynamic range") mode captures situations requiring a large dynamic range (differences in brightness) during the exposure.

This mainly concerns material mixes, for example:

- Dark plaster
- Abutments covered with Optispray
- When using scan wax
- When measuring scanbodies
- When capturing silicon impression trays with several multi-colored impression materials

inEos X5 captures these situations using multiple exposure, so that every part of the surface is measured with the optimal exposure setting. Accordingly, the scan takes longer.

9.1.3 Scan options

You can use the free scan option to capture models and impressions.

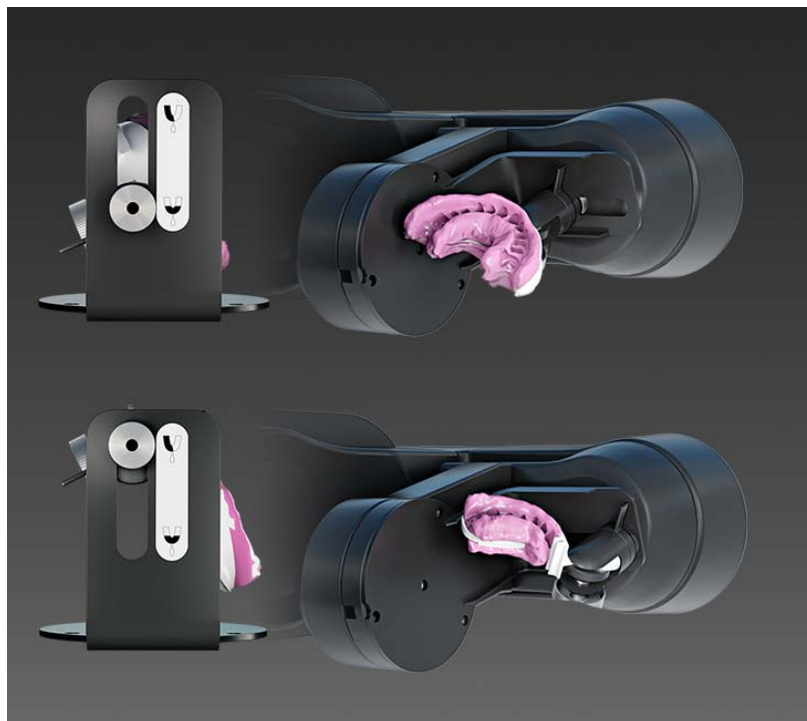
Scanning single jaw impressions



1. Click on the *"Options"* button.
2. Click on the *"Toggle Impression Scan"* button.
 - ↳ The icon for the impression scan is displayed in the live image.
3. Select the image catalog.
4. Start the acquisition procedure.

Double arch impression scanning

1. Click on the "Options" button.
2. Click on the "Toggle DoubleArch" button.
 - ↳ The icon for the double arch impression scan is displayed in the live image.



3. Position the impression tray as per the illustrations in the software.
4. Select the image catalog for the jaw section which is initially aligned with the camera.
5. Start the acquisition and follow the instructions and illustrations in the software for changing the jaw.

NOTICE! When performing double arch impression scanning, observe the following points:

- Aligning the model:
 - The buccal side of the impression must always point toward the retaining screw.
 - In the case of quadrant impressions, place the impression tray in the central holder position in such a way that the last distally cast tooth is centrally perpendicular to the rotary plate.
- Aligning the holder in the scanner:
 - The holder used for scanning the double jaw impressions has a groove. Position this in such a way that it is vertical above the light barrier opening of the rotary plate.

9.1.4 Model options



For all image catalogs (with the exception of the buccal registration), it is possible to specify for each new case whether the palate areas are taken into account for calculating the model or automatically ignored.

Complete Reconstruction



For this option, the complete model is calculated **with** the palate/model plate area. This option increases the calculation time for the model.

Reduced Reconstruction



For this option, the model is calculated as a dental arch **without** the palate/model plate area. This option reduces the calculation time for the model.

Tip: Select *"Reduced Reconstruction"* for all work which does not involve the palate areas, or if areas of the model plate were also scanned. This also helps to speed up the model calculation process.

Changing the standard settings of the model options

You can change the standard value of the reconstruction model in the global settings from *"Complete Reconstruction"* to *"Reduced Reconstruction"*.

For all future cases, the reconstruction mode set as the default in each case is selected in each image catalog. However, this can be adjusted separately at any time.

The mode can be changed under *"Configuration" | "Devices" | "inEos X5" | "Configure Device"*. You can activate the respective mode in the *"Standard Mode for model calculation"* field.

9.1.5 Scan models and impressions

Materials

You can scan all materials that correspond to the following criteria:

- Non-reflecting
- Non-transparent
- No transparent parts
- Not highly absorbent
(e.g. heavily colored plasters, scannable impression materials)

IMPORTANT

Unscannable materials generate artifacts or gaps in the image.

Tip: When using materials that do not meet these criteria, you must powder the affected areas. Otherwise the measuring accuracy will be heavily influenced.

The following is suitable for this purpose, for example: CEREC Optispray (REF 61 44 179)

For scanning with inEos X5, we recommend using CEREC Stone BC plaster (REF 62 37 502).

Saw-cut models

- When preparing saw-cut models, be careful not to mill off the single stump segments. Place the model next to the stumps so that the inEos X5 can properly capture these areas.
- Create only a slight fluting below the preparation margin.

9.1.6 Autofocus

The inEos X5 features automatic focusing.

As soon as the object stops moving, the image is automatically focused both in the automatic and in the manual mode.

9.1.7 Deleting images

You can delete individual scans by marking them with the left mouse button and dragging them into the recycle bin.

You also can delete an entire image catalog (see inLab SW Operator's Manual).

9.1.8 Operation via foot switch

As an alternative to the Start button of the inEos X5, you also can use the optionally available foot switch (REF 63 10 449) to start and end scanning processes in the respective scanning mode.

- Plug the connector of the foot switch into the matching socket (USB port) of your PC.

9.2 Starting the unit/standby mode

The inEos X5 automatically starts (if the main switch is turned on) as soon as you switch to the acquisition phase of the inLab software.

You can set the inEos X5 to standby mode and wake it up manually.

- To do this, click the inEos X5 icon in the bottom left window area of the inLab software.



Set the inEos X5 to standby mode Activate the inEos X5

Tip: Switch off the inEos X5 via the main switch only if the inEos X5 is in standby mode (projection lamp switched off and articulated arm in parking position) or if no scan process has been started.

Shutdown during a running scan process causes considerable delays when the unit is restarted.

9.3 Automatic jaw scan



Capture the model situation fully automatically in the *"Capture Jaw"* mode.

- For all tasks.
- Especially for large, complex tasks or tasks with especially high accuracy requirements

9.3.1 Preparing the optical impression

In the automatic scan, you can select from the options *"Capture Reduced"* or *"Capture Area"*.



"Capture Reduced":

The entire jaw is scanned based on a standard sequence with a lower level of detail.

Tip: This mode is especially suitable for scanning an unprepared opposite jaw. It provides all of the information required for the following steps. Hard-to-scan gaps are not automatically closed.



"Capture Area":

The area scanning option is used to define the areas in which the scan is automatically performed with a high level of detail. The areas of the preparations are usually the ones involved here.

All of the gaps in the digital model are closed in the scanned areas via the intelligent gap closing technique.

All other areas of the model are scanned with a lower degree of detail using a standard sequence.



Model holding plates

Tip: If you are using partial jaw models (e.g. quadrant models), position these on the outer edge of the model holding plate.

- ✓ You have selected the desired image catalog (lower jaw, upper jaw, etc.).
- 1. Fasten the model to the supplied model holding plate using the Blue Tack filling material. The labial side must face the straight edge of the plate.

or

- Alternatively, you can use the parallel vise provided. In this case, the labial side faces the fastening screw.

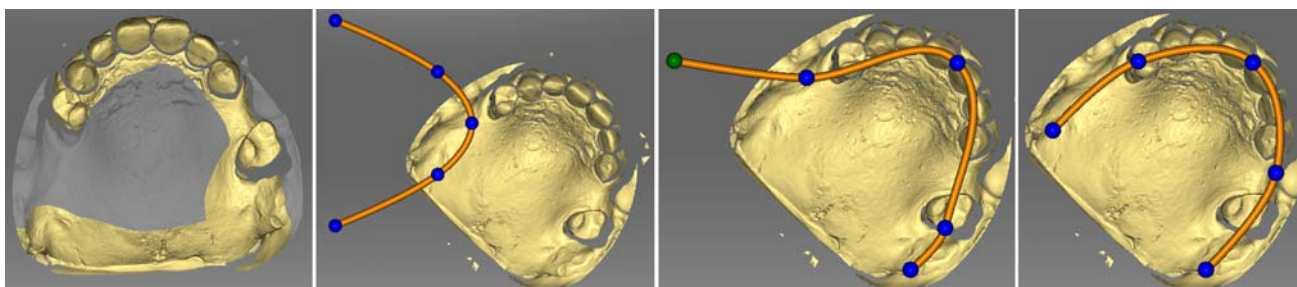
- 2. Select the *"Capture Jaw"* button in the Scan menu.
 - ↳ The articulating arm moves to the loading position.
 - ↳ A section of the scan area appears in the live image.
- 3. Select the *"Capture Complete"*, *"Capture Reduced"*, or *"Capture Area"* option in the Scan menu.
- 4. Position the model holding plate with the model on the rotation disk of the articulating arm. **IMPORTANT:** When doing so, ensure that areas including teeth or the alveolar ridge are visible to the camera (see diagram).



9.3.2 Taking the scan

1. Start the scan by pressing the Start button on the inEos X5 once.
or
 - Alternatively, you can start the scan by pressing the return key on your keyboard once, by actuating the foot switch (optional) once, or by actuating the "Ok" button in the software.
 - ↪ If you have selected the "area scanning" scan mode, the inEos X5 automatically generates five to six scans from the occlusal aspect.
 - ↪ On completion of the overview scans, the model preview appears and a selection dialog opens.
2. Press and hold the mouse button to mark the prepared area. You can mark several areas.
3. Click on the "Apply" button to confirm the selection.
You can discard the selection by clicking on the "Reset" button.
 - ↪ If you have selected "Capture Complete" or "Capture Reduced", the inEos X5 starts the automatic scan process.

9.3.3 Guideline editor



If the guideline is not automatically found after the overview scan, it can be corrected via the guideline editor.

1. Click on the "Correct Jaw Line" button.
2. Click on the balls and drag them to the correct jaw ridge line.
3. Then confirm with "Apply".

9.3.4 Starting the automatic detail scan



Following an automatic scan, individual scans can be released by clicking the mouse.

1. Position the virtual model so that the area of interest is well visible.
2. Start the automatic detail scan by double-clicking on the area of interest.
 - ↪ The inEos X5 positions the model in the scanning position with the rotation arm and automatically starts the scan. The image is automatically registered in the virtual model.

Tip: If no scans can be released, try changing the angle of the model slightly.

9.4 Free scans



In the *"Capture Free"* mode, you can capture the model situation fast, manually and in a controlled manner for simple tasks.

Moreover, you can scan e.g. areas that may not be sufficiently captured in the automatic mode with detail scans.

- For simple tasks
- For detail scans under various angles

9.4.1 Preparing the optical impression

✓ You have selected the desired image catalog (lower jaw, upper jaw etc.).

Tip: Take special care to select the right image catalog for detail scans.

1. Fasten the model to the supplied model holding plate with Blue Tack. The labial side must face the straight edge of the plate.

or

➤ Alternatively, you can use the parallel vise provided. In this case, the labial side faces the fastening screw.

2. Position the model holding plate used with the spherical model holder.

3. Select the *"Capture Free"* button in the Scan menu.

↵ The articulating arm moves to its parking position.

↵ A section of the scan area appears in the live image.

↵ Green crosshairs appear in the live image.

9.4.2 Automatic and manual release in the "free scan" mode

When working in the *"Capture Free"* mode, there are several possibilities for releasing scans.

Capture Manual

"Capture Manual" is the standard inEos X5 mode.

➤ Double-click the Start button.

or

➤ Alternatively, you can use the return key on your keyboard or the *"Capture Manual"* button below the live preview.

↵ An individual scan is taken with each release.

Capture Auto

1. Select the *"Capture Auto"* mode in the Scan menu.

or

➤ Alternatively, you can click on the Start button of the inEos X5.

↵ The crosshairs in the live image turn green.

2. Start the scans by clicking the *"Ok"* button in the software.

or



- Alternatively, you can click the Start button of the inEos X5 or press the Return key on your keyboard.
 - ↵ The crosshairs in the live image turn blue.
 - ↵ After the model has been moved or tilted and is again in the rest position, exposures are automatically released.
3. Single-click the Start button of the inEos X5 to interrupt/end the automatic release mode.
 - ↵ The crosshairs in the live image turn green.

9.4.3 Taking a free scan (without previous automatic scans)

1. Align the model.
 - ↵ The model is aligned horizontally.
 - ↵ As many teeth as possible are visible in the live image.
2. Let the model rest and wait until the autofocus has focused the model.
3. Start the acquisition process with automatic or manual release
 - ↵ A scan is generated.
4. Add additional scans from adjacent areas: Move the model freely in the working area until you have reached the next acquisition position. As soon as the model stops moving, the camera is automatically released or is manually released by a double-click on the Start button. You can tilt the model on the shifting plate by up to 40°. **NOTICE!** The new image must overlap approximately 30-50% of the previous image.
5. Repeat step 4 until all of the required scans have been taken.

9.4.4 Taking a free detail scan

1. Align the model.
 - ↵ The areas in which information is missing in the digital model preview can be seen in the live image.
2. Let the model rest and wait until the autofocus has focused the model.
3. Start the acquisition process with automatic or manual release
 - ↵ A scan is generated.
4. Add additional scans from adjacent areas: Move the model freely in the working area until you have reached the next acquisition position. As soon as the model stops moving, the camera is automatically released or is manually released by a double-click on the Start button. You can tilt the model on the shifting plate by up to 40°. **NOTICE!** The new image must overlap approximately 30-50% of the previous image.
5. Repeat step 4 until all of the required scans have been taken.

9.5 Rotational scans





Use the rotational scan mode to acquire single tooth stumps from all sides.

- For the surveying of single tooth stumps
- For single restorations without consideration of the proximal contacts or the antagonist

IMPORTANT

Perform the rotational scan either completely prior to or after the automatic and/or free scans.

Various scan options are available in the "Capture Rotation" mode.

Button	Scan option
	<ul style="list-style-type: none"> • Individual stump scan slanted • For scanning all standard individual stumps Tip: Change the angle for the individual stump scans for the scanning of heavily chamfered stumps or for scanning abutments by moving the slide controller. You can adjust the angle of incidence to the respective situation from 45° to 105° individually in 5° steps. An angle of 60° is recommended as a default value for all common single stump scans.
	<ul style="list-style-type: none"> • Multiple-stump scan • For scanning up to 4 stumps at the same time <p>Tip: The difference in height between the stumps in the group being scanned should not exceed 10 mm in relation to the assembly plate. If this cannot be avoided, scan the stumps using the individual scan option.</p> <p>If the stumps are not made from the same type of plaster, activate the HDR mode.</p>

9.5.1 Preparing the optical impression

1. Secure the object (e.g. a tooth stump) with the filling material in the center of a model holder.
 - ↳ The longitudinal alignment of the object must correspond to the model holder's axis of rotation.
2. Place the model holder on the model holding plate.
3. Select the *"Capture Rotation"* button in the Scan menu.

IMPORTANT

When scanning a single object, place the model holder in the center of the model holding plate.

When scanning more than one object simultaneously, place the model holders in the outer positions of the model holding plate.

↳ The articulating arm moves to the loading position.

4. Fasten the model holding plate using the objects on the articulated arm.

9.5.2 Taking a rotational scan



1. Select the scan type (individual stump scans at 60°, 75°, or multiple-stump scan) in the Scan menu.

IMPORTANT: In the case of multiple-stump scans, ensure that one of the stumps to be scanned is always visible to the camera (see diagram). For this, only position the same number of magnetic pots on the model plate as the number of stumps to be scanned.
2. Click the Start button of the inEos X5.

or

 - Alternatively, you can start the scan process by clicking the *"Ok"* button in the software, or by pressing the return key on your keyboard.

9.6 Acquiring a buccal registration

You can secure the model using the articulator plate which is available as an option (see "Using the articulator plate [→ 51]").

- ✓ You have selected the "*Buccal*" image catalog.
 - ✓ The image catalogs of the jaw and of the opposite jaw contain images with buccal sections at a position next to or directly on the preparation.
 - ✓ In the buccal image, both jaws must be moved to the centric jaw relation and an exposure taken that records both jaws at the same time.
 - ✓ **Tip:** The model can be left in the articulator.
 - ✓ Alternatively, it is recommended to fasten the model e.g. with wax and manually hold it under the camera. The model should be supported on the working area.
1. Select the "*Table free*" exposure mode.
 2. Position the model under the camera in such a way that one jaw is located in each half of the image.
 3. Wait until the autofocus has focused the model.
 4. Release an exposure. In most cases, one exposure is sufficient.

9.7 Scanbody scans for scanning with inPost

Use scanbody scans for the measurement of one or more implant positions with the scanbody inPost for directly screwed on bridges on multi-unit abutments.

CAUTION

Pay attention to the inPost scanbodies / multi-unit abutments matching the implant system.

Ensure the correct seating on the laboratory analog of the screwed in inPost scanbodies and multi-unit abutments prior to scanning. Elements screwed in incorrectly may lead to the incorrect detection of the implant position and thus to inappropriate restorations.

Observe the operating instructions for the inPost scanbody. The inPost scanbody must only be touched with commercial latex gloves.

1. Select these image catalogs in order to be able to record the implant location for directly screwed bridges in connection with the inPost scanbodies.
2. Clamp the model without screwed in scanbodies to the arm of the scanner and start the overview scan.
 - ↳ The "*Capture Scanbody*" button becomes active once the overview scans are complete.
3. Click on the "*Capture Scanbody*" button.

NOTICE


The scanner moves into an appropriately easy-to-access position for screwing in the scanbodies.

- Do not take the model down from the holder.

4. Screw the scanbody onto the first implant position.
5. Rotate the model in the 3D preview in the implant axis and double-click on the position in which you screwed the scanbody in beforehand.
 - ↳ The scanbody is recorded via a rotation scan and illustrated in the 3D preview once the scan is complete.
6. Continue with other implant positions.

10 Regular function test of the light barrier and the Start key

The light barrier and Start key function test must be performed by a fully qualified specialist every 12 months and the results of which must be documented.

 CAUTION
Risk of injury!
Do not place any part of your body either wholly or partially in the scan element opening!

Function test 1

- ✓ The unit is switched on at the main switch.
- Place an object as thick as a finger (e.g. a felt-tip pen) in the scan element opening in the operating mode.

Operating state LED	Test result
The operating state LED changes from green to red.	Nominal state Light barrier functioning.
The operating state LED stays green or yellow.	Error state Call customer service.

Function test 2

- ✓ The unit is switched on at the main switch.
- 1. Roll up a strip of paper to form a paper roll with a diameter of 45 to 70 mm.
- 2. Place the paper roll in the opening on the bottom of the vertical unit in the operating state.

Operating state LED	Test result
The operating state LED changes from green to red.	Nominal state Light barrier functioning.
The operating state LED stays green or yellow.	Error state Call customer service.

Function test 3

- ✓ The unit is switched on at the main switch.
- ✓ The power LED lights up green.
- Press and hold the Start key.

Operating state LED	Test result
The operating state LED changes from green to red.	Nominal state Stop function guaranteed.
The operating state LED stays green or switches to yellow.	Error state Call customer service.

No maintenance other than the light barrier function tests described above must be performed on the inEos X5 .

11 Cleaning and care

11.1 Cleaning the outer surface

Clean the outer surfaces at regular intervals with a mild, commercially available cleaning agent.

11.2 Protection against medicaments

Due to their high concentrations and the substances they contain, many medicaments can dissolve, etch, bleach or discolor surfaces.

NOTICE

Damage to the surface

Clean the surface immediately with a moist cloth and a cleaning agent.

11.3 Cleaning the optics

The 3D camera system is a very sensitive optical device and must be handled with the utmost care. It is not usually necessary to clean the optical surfaces as these are located inside the device.

If, as an exception, cleaning is required, you can clean the optical surfaces.

- ✓ The unit is switched on at the main switch.
- 1. Switch to the scan phase in the inLab software.
- 2. Select "Capture Free".
- 3. Place a sheet of paper on the work surface so that it is illuminated by the blue projector lamp.
 - ↳ The auto-focus function moves the scan element into the lowest position
 - ↳ Wait until the auto-focus movement has been completed.
- 4. Switch the unit off at the main switch.
- 5. Secure the main switch so that it cannot be switched back on inadvertently (e.g. by another person).
 - ↳ The blue light is no longer emitted from the opening of the scanning element.
 - ↳ You can view the scanning elements using a mirror or from directly below (camera lens and projection lens).
- 6. Attempt to blow away the dirt. Use conventional photo bellows for this.
- 7. If further cleaning is required, clean the optical surfaces using a dust and lint-free soft cotton swab and a little ethanol (standard alcohol for cleaning) or acetone.
- 8. Switch on the inEos X5 at the main switch and restart the software.



12 Accessories

The inEos X5 is supplied with the following accessories.

- Ball joint model holder (1x) for accommodating the model plate magnetic coupling or the parallel vise magnetic coupling for free scans.
- Model plate magnetic coupling (4x) for attaching models or impressions to the ball joint model holder or the articulated arm of the inEos X5 during free or automatic scans. Please use Blue filling material when attaching the model.
- Parallel vise magnetic coupling for attaching models or impressions to the ball joint model holder or the articulated arm of the inEos X5 during free or automatic scans.
- Magnetic pot D30 (8x) for scanning individual stumps. Please use Blue filling material.
- Magnetic pot D50 (2x) for scanning larger stump areas. Please use Blue filling material.
- Power cable (2x) for inEos X5 and PC
- inEos X5 Power supply unit (1x)
- USB cable (1x)
- Blue filling material (1x) for attaching models, impressions or individual stumps.
- Cerec Stone BC (2x)
- inEos X5 axis calibration set (1x)
- Monitor (optional, 1x, REF 60 42 548) incl. power cable (1x)
- Open inLab license voucher (optional, 1x) for activating the Open inLab license.
- USB foot control (optional, 1x, REF 63 01 449) for starting scan processes
- Articulator plate for placing articulators in the scan area during buccal scans.
- Triple tray holder (optional, 1x, REF 64 67 638) for starting double arch impression trays.

12.1 Using the articulator plate



1. Use the adjusting screw to set the height of the articulator plate in such a way that the model lies horizontally in the articulator on the articulator plate.



2. Place the articulator plate in the working area of the inEos X5 in such a way that the buccal scan can be taken.

13 Disposal



Based on Directive 2012/19/EU and country-specific disposal directives for waste electrical and electronic equipment, we would like to point out that these must be disposed of in a special way within the European Union (EU). These regulations require environmentally compliant recycling/disposal of waste electrical and electronic equipment. They must not be disposed of as domestic waste. This is shown with the symbol of the crossed out dust bin, which has been in use since March 24, 2006.

Disposal procedure

We feel responsible for our products from the initial idea to their disposal. That is why we give you the option of taking back our waste electrical and electronic equipment.

If disposal is required, please proceed as follows:

In Germany

In order to arrange return of the electrical equipment, please send a disposal request to "enretec GmbH." The following options are available for this purpose:

- On the homepage of enretec GmbH, click on the "Return of electronic equipment" button under the "eom" menu item.
- Alternatively, you may also contact the company directly.

enretec GmbH
Kanalstraße 17
16727 Velten

Tel: +49 3304 3919-500
Email: eom@enretec.de

As manufacturers, we assume the costs for disposal of waste from electrical and electronic equipment in accordance with the country-specific disposal regulations (ElektroG). All disassembly, transport and packaging costs are to be borne by the owner/operator.

Proper preparation (cleaning/disinfection/sterilization) of the equipment must be carried out prior to disassembly/disposal.

Any nonpermanently installed equipment will be picked up at its installation site in the practice. Permanently installed equipment will be picked up curbside at your address by appointment.

Other countries

The dental dealers would be glad to provide you with country-specific information.

We reserve the right to make any alterations which may be required due to technical improvements.

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