New as of: 06.2021

Dentsply Sirona

Axeos

Operating Instructions

English

Table of contents

1 General data

1.1 Dear Customer,

We are pleased that you have equipped your practice with the Axeos X-ray system from Dentsply Sirona.

Dentsply Sirona was one of the first inventors of film-based panoramic X-ray systems and since 1996 has been a pioneer of digital X-ray technology. You benefit from the vast experience we have gained through the thousands of digital panoramic X-ray systems installed worldwide. This device is characterized by many features including outstanding image quality, simple operation, and a high day-to-day reliability.

This operating manual should be of good help to you before use as well as serve anytime later as a reference material.

We wish you every success with using your Axeos system.

Your Axeos team,

1.2 Contact information

Customer Service Center

In the event of technical queries, please use our online contact form at the following address:
http://srvcontact.sirona.com

Manufacturer's address

Sirona Dental Systems GmbH
Fabrikstrasse 31
64625 Bensheim
Germany

Tel.: +49 (0) 6251/16-0
Fax: +49 (0) 6251/16-2591
e-Mail: contact@dentsplysirona.com
www.dentsplysirona.com

1.3 Copyright and trademark

Copyright

The information contained in this manual may be changed without notice.

The software and all related documentation are protected by copyright. You must therefore handle it in the same way as any other protected material.

Anyone who copies this software to any medium for any purpose other than his own personal use without the written permission of Sirona Dental Systems will be liable to prosecution.

Trademarks

Microsoft® and Windows 10® are registered trademarks.

Windows™ is a trademark of Microsoft Corporation.

All other trademarks are the property of their respective holders.

1.4 General information about this operating manual

Observe the Operating Instructions

Please familiarize yourself with the unit by reading through these Operating Instructions before putting it into operation. It is essential that you comply with the specified warning and safety information.

Keep documents safe

Always keep the Operating Instructions handy in case you or another user require(s) information at a later point in time. Save the Operating Instructions on the PC or print them out.

If you sell the unit, make sure that the Operating Instructions are included with it either as a hard copy or on an electronic storage device so that the new owner can familiarize himself with its functions and the specified warning and safety information.

Online portal for technical documents

We have set up an online portal for the Technical Documents at www.dentsplysirona.com/manuals. From here, you can download these Operating Instructions along with other documents. Please complete the online form if you would like a hard copy of a particular document. We will then be happy to send you a printed copy free of charge.

Help

If you have difficulties despite having thoroughly studied the Operating Instructions, please contact your dental depot.

1.4.1 Structure of the document

1.4.1.1 Identification of the danger levels

To prevent personal injury and material damage, please observe the warning and safety information provided in these instructions for use. 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.

NOTE
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 for simplifying work.

1.4.1.2 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 [→ 8]"	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.

1.5 Other relevant documents

The X-ray system includes other components, such as the software for the Axeos Imaging System, which are described in separate documents. Instructions and warning and safety information provided in the following documents must be taken into account:

- Sidexis 4 Operator´s Manual, REF 64 58 983
- Axeos Constancy Test 2D and 3D (DIN 6868), REF 67 35 448
- Axeos Constancy Test 2D and 3D (Dentsply Sirona / 21.CFR1020.33), REF 67 45 017

1.6 Warranty and liability

Maintenance

In the interest of the safety and health of patients, users and other persons, inspection and preventive maintenance must be performed at scheduled intervals to ensure the operational reliability and functional safety of your product (IEC 60601-1 / DIN EN 60601-1 etc.).

The system owner is responsible for making sure that all scheduled inspections and preventive maintenance activities are performed.

As manufacturers of medical electrical equipment we can assume responsibility for the safety-related features of the equipment only if maintenance and repair are carried out only by ourselves or agencies expressly authorized by us, and if components affecting safe operation of the system are replaced with original spare parts upon failure.

Exclusion of liability

In the event that the system owner fails to fulfill the obligation to perform scheduled inspections and preventive maintenance activities or ignores error messages, Sirona Dental Systems GmbH and its authorized dealers cannot assume any liability for damages.

Certificate of work

We suggest that you request a certificate, showing the nature and extent of the work performed, from those who carry out such work, and specify that the certificate show any changes in rated parameters or working ranges, as well as the date, the name of the firm and a signature.

1.7 Obligation of system owner and personnel

These operating instructions presuppose that you are familiar with the use of Sidexis software.

Prior to the exposure, please ask women of a childbearing age as to whether they are pregnant or not. If the patient is pregnant, a risk/ benefit analysis must be performed.

In Germany, the Radiation Protection Ordinance requires owners of X-ray equipment to perform constancy tests at regular intervals in order to ensure the safety of operating staff and patients. Dentsply Sirona recommends monthly testing.

1.8 Obligation to report

Any serious incident that has occurred in relation to the device must be reported to the manufacturer and the competent authority of the Member State where the user and/or patient is domiciled.

1.9 Medical purpose

The X-ray system creates data for digital exposures in the maxillofacial region and subregions for dentistry and pediatric dentistry, for hard-tissue diagnostics within ENT medicine, and for carpal exposures.

3D X-rays must not be used for routine or preventive examinations in which an X-ray image is produced irrespective of the existence or non-existence of clinical signs and symptoms. 3D X-ray examinations must be able to be justified for each patient in order to demonstrate that the benefits outweigh the risks.

The Operating and Maintenance Instructions must be observed.

1.10 Indication and contraindication

Indications in sub-fields of dentistry:

- Conservative dentistry
- Endodontics
- Periodontology
- Prosthodontics / template scan exposures
- Functional diagnosis and therapy of craniomandibular dysfunctions
- Surgical dentistry
- Implantology
- Oral and maxillofacial surgery
- Orthodontics
- Pediatric dentistry
- ENT medicine (hard-tissue diagnostics)

Contraindications:

- Representation of cartilage structures
- Representation of soft tissue

1.11 Intended user groups (according to User Specification)

Operating personnel for creation of X-ray images of humans.

- Dentists (General dentistry)
- Dentists with further training (oral surgery, orthodontia) or additional education (OMS)
- Radiologic technologists
- Dental assistants

Operating personnel for installation, commissioning, acceptance testing and technical service including creation of technical X-ray images

- Service technicians

1.12 Intended target patient groups

The intended target patient groups are children, adolescents and adults.

2 Safety instructions

2.1 Basic safety information

NOTE

This unit must not be operated in areas subject to explosion hazards.

2.2 Notes on the unit

The following symbols are applied to the unit:

This symbol can be found on the rating plate on the unit.

Meaning: Observe the Operating Instructions when operating the unit.

This symbol can be found on the rating plate on the unit.

Meaning: The accompanying documents are available on the Dentsply Sirona homepage.

Electrostatic discharge (ESD)

Connector pins or sockets bearing ESD warning labels must not be touched or interconnected without ESD protective measures. See also ‘Electrostatic discharge’ and ‘Electromagnetic compatibility’.

Identification of single use devices

Prior to each exposure, the hygienic protective sleeves (single use devices) must be fitted.

Single use devices are identified with the symbol shown on the left. They must be disposed of immediately after use. Do not use single use devices more than once.

2.3 Ventilation slots

Under no circumstances may the ventilation slots on the unit be covered, since otherwise the air circulation will be obstructed. This can cause the unit to overheat.

Do not spray into the ventilation slots

Do not spray liquids such as disinfectants into the ventilation slots. This may lead to malfunctions. Use wipe disinfection only in the vicinity of the ventilation slots.

2.4 Condensation

Extreme temperature fluctuations may cause condensation inside the unit. Do not switch the unit on before it has reached normal room temperature. See also the chapter Technical data [→ 19].

2.5 Qualifications of operating personnel

The unit may only be operated by skilled or properly trained personnel.

Personnel, who are to be trained, taught, instructed or are taking part in a general training, may operate the device only under the supervision of an experienced person.

To operate the unit, the operating personnel must:

- have read and understood the Operating Instructions
- be familiar with the fundamental structure and functions of the unit
- be able to recognize irregularities in the functioning of the unit and implement the appropriate measures where necessary

2.6 Switch on the unit

The patient may not be positioned in the unit when starting it and setting the operating mode (until the sensor has been positioned). Malfunction may cause injury to the patient.

In case of an error that requires switching the unit off and back on again, the patient must be removed from the unit, at the latest before the unit is switched back on.

2.7 Radiation protection

The valid radiation protection regulations and measures must be observed. The required radiation protection equipment must be used. In order to reduce radiation exposure, Dentsply Sirona recommends using bismuth or lead shields or aprons, especially for pediatric patients.

During the exposure, the operator is required to remove themselves as far from the X-ray tube assembly as the coiled cable permits.

With the exception of the patient, no other persons without radiation protection are allowed to stay in the room during an exposure. In exceptional cases, a third person may provide assistance, but not the practice staff. Visual contact with the patient and the unit must be maintained throughout the entire exposure.

In case of malfunctions, cancel the exposure immediately by letting go of the release button.

2.8 Emergency Stop

If any parts of the unit touch the patient during the rotary movement, let go of the exposure release button (X-Ray) immediately or stop the unit at once by actuating the unit main switch or an Emergency Stop switch (not included in the scope of supply)!

2.9 Laser light localizer

The system incorporates Class 1 laser products.

The light localizers are intended for correct patient positioning. They must not be used for any other purposes.

A minimum distance of 10 cm (4") is required between the eye and the laser. Do not stare directly into the laser beam.
Make sure that the laser beam does not meet the eyes of the patient. Prior to activating the light localizers, the patient must be asked to shut their eyes.

The light localizers may be switched on only when functioning perfectly. Repair work must be carried out by authorized staff only.

Do not use the system with any other lasers, and do not make any changes to settings or processes that are not described in these operating instructions. This may lead to a dangerous exposure to radiation.

2.10 Hygiene

A new protective sleeve must be fitted for each patient, and all auxiliary exposure tools must additionally be disinfected to preclude potential transmission of pathogens that could cause serious illnesses.

Applied parts must be disinfected prior to patient positioning in order to prevent cross-contamination.

Suitable hygienic measures must be taken to prevent cross contamination between patients, users, and other persons.

Additional information can be found in chapter "Cleaning and care".

2.11 Touchscreen

The Easypad monitor is equipped with touch-sensitive control technology.

The touchscreen must not be operated with pointed objects such as ball-point pens, pencils, etc. Such objects could damage or scratch the surface. Always operate the touchscreen by pressing it gently with your fingertip.

2.12 Trouble-free operation

Use of this system is permissible only if it works properly without malfunctions. If trouble-free operation cannot be ensured, the unit must be taken out of service, checked by authorized technicians for malfunctions and, if necessary, repaired.

X-rays of patients may be taken only when the system is working trouble-free.

The movements of the unit must not be obstructed by physical constitution, clothing, dressings, wheelchairs, or hospital beds.

The travel range of the unit must be kept free from foreign matter.

Do not leave the patient at the unit unattended.

The device may only be operated with a complete cover and protective hood.

2.13 Interference with electronic devices

To prevent the malfunctioning of electronic devices and data memories, these objects must be removed prior to the X-ray exposure.

2.14 Risks of electromagnetic fields

The function of implanted systems (cardiac pacemakers or cochlear implants, for example) can be affected by electromagnetic fields. Before commencing treatment, ask if the patient has a cardiac pacemaker or any other implanted system.
Any prevailing risks are listed in the documentation provided by the implant manufacturer.

2.15 Combination with other equipment

Putting together or altering a medical electrical system by combining with other devices in accordance with IEC 60601-1 (safety requirements for medical electrical systems) is subject to the obligation to ensure compliance with the requirements of this provision for patient safety, the operator, and the environment.

If any devices not approved by Dentsply Sirona are connected, they must comply with the applicable standards:

- IEC 60950-1 or IEC 62368-1 for information technology equipment and
- IEC 60601-1 for medical electrical equipment

To this end, refer to the ‘Installation requirements’ and compatibility list/ declaration of conformity by the system integrator.

If in doubt, contact the manufacturer of the system components.

2.16 Changes to the unit

Modifications to this unit which might affect the safety of the system owner, patients, or other persons are prohibited by law!

For reasons of product safety, this product may be operated only with original Dentsply Sirona accessories or third-party accessories expressly approved by Dentsply Sirona. The user is responsible for any damage resulting from the use of non-approved accessories.

2.17 Structural alterations

If structural changes are made in the vicinity of the X-ray unit which result in the device being exposed to very high levels of vibration or even impact, the device must be inspected by a service engineer and re-adjusted and re-calibrated if necessary.

2.18 Electromagnetic compatibility

The acquisition unit complies with the requirements of IEC 60601-1-2.

Medical electrical equipment are subject to special precautionary measures with regard to electromagnetic compatibility (EMC). They must be installed and operated as specified in the "Installation Requirements" document.

Portable and mobile RF communications equipment may affect medical electrical equipment.

If the installation requirements and the following recommendations are not observed, there is a risk that the X-ray images will not have the correct exposure.
The correctness of the radiation parameters and the repeatability of the dose values in particular may be affected.

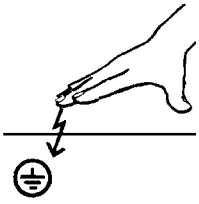
In the case of repairs, only use replacement parts approved by Dentsply Sirona.

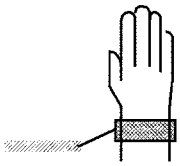
Only use disinfectants approved by Dentsply Sirona so as not to damage electrical insulation.

Portable HF equipment must not be placed within a 30 cm radius of the X-ray unit.

HF surgery units and X-ray units must not be operated at the same time.

2.19 Electrostatic discharge





Protective measures

Electrostatic discharge (abbreviated: ESD – **E**lectro**S**tatic **D**ischarge)

Electrostatic discharge from people can damage electronic components when the components are touched. Damaged components usually have to be replaced. Repairs must be performed by qualified personnel.

Measures to protect against ESD include:

- Procedures to avoid electrostatic charging via
  - air conditioning
  - air humidification
  - conductive floor coverings
  - non-synthetic clothing
- Discharging the electrostatic charges from your own body through contact with
  - a metallic unit casing
  - a larger metallic object
  - any other metal part grounded with the protective earth
- Wearing an antistatic band that creates a connection between the body and a protective ground wire.

Areas at risk are indicated on the unit with the ESD warning label:

We recommend that all persons working with this system are made aware of the significance of the ESD warning label. A training course should also be held to inform users about the physics of electrostatic charges.

Physics of electrostatic charges

An electrostatic discharge requires prior electrostatic charging.

There is a danger of electrostatic charges building up whenever two bodies rub against each other, e.g. when:

- walking (soles of shoes against the floor) or
- moving (chair casters against floor).

The amount of charge depends on several factors: The charge is:

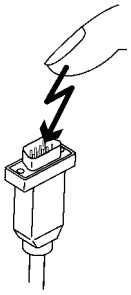
- higher at low air humidity than at high air humidity, and
- higher with synthetic materials than with natural materials (clothing, floor coverings).

The following rule of thumb can be applied to assess the transient voltages resulting from an electrostatic discharge.

An electrostatic discharge is:

- perceptible at 3,000 V or higher
- audible at 5,000 V or higher (cracking, crackling)
- visible at 10,000 V or higher (arc-over)

The transient currents resulting from these discharges have a magnitude of over 10 amps. They are not hazardous for humans because they last for only several nanoseconds.



Tip: 1 nanosecond= 1/1,000,000,000 second= 1 billionth of a second

Voltage differentials exceeding 30,000 volts per centimeter may lead to a charge transfer (electrostatic discharge, lightning, spark-over).

Integrated circuits (logical circuits and microprocessors) are used in order to implement a wide variety of functions in a device. The circuits must be miniaturized to a very high degree in order to include as many functions as possible on these chips. This leads to structure thicknesses as low as a few ten thousandths of a millimeter. Integrated circuits that are connected to wires leading externally are therefore particularly at risk from electrostatic discharge.

Even voltages that are imperceptible to the user can cause breakdown of the structures, thus leading to a discharge current that melts the chip in the affected areas. Damage to individual integrated circuits may cause malfunction or failure of the unit.

2.20 IT / Cybersecurity

An important concern of our company is to draw our customers' attention to the protection of Dentsply Sirona X-ray units and to related recommendations for ensuring an optimal and secure IT environment for these units.

- If the unit is integrated in a network of a practice or clinic, Dentsply Sirona strongly recommends the setup of a "private LAN" between the X-ray unit and the X-ray image PC with PC software, for example by installing a second network adapter.
- To guarantee adequate IT / cybersecurity, a fixed IP address must be assigned for the unit. The IP address must not be assigned via DHCP.
- For an optimal and secure IT environment, Dentsply Sirona strongly recommends the usage of a Windows 10 operating system with long-term support, e.g. Windows 10 Enterprise LTS.
- To guarantee effective protection against malware and cyberattacks, Dentsply Sirona strongly recommends installing the latest security tools for Windows networks (e.g. malware protection, firewalls, intrusion detection system) on the X-ray image PC.
- Error message E5 14 04 (Network connection lost):
  Before establishing readiness for exposure, the unit must be restarted. If the error recurs after the restart, assume a cyberattack and contact the network administrator before performing a patient exposure.
- Dentsply Sirona strongly recommends avoiding the use of virtual machines for operating systems.
- Dentsply Sirona strongly recommends against installing additional software on the X-ray image PC (unless absolutely necessary).
- Dentsply Sirona strongly recommends the prompt installation of security updates for the PC operating system.
- Dentsply Sirona strongly recommends installing the PC software only on work stations with restricted user access.
- Dentsply Sirona strongly recommends restricting physical access to the IT infrastructure of the practice or clinic.

3 Unit description

3.1 Certification and registration

The Axeos X-ray unit complies with IEC 60601-1:2005 + A1:2012

The Axeos X-ray unit complies with IEC 60601-1-3:2008 + A1:2013

The Axeos X-ray unit complies with IEC 60601-2-63:2012+A1:2017

Original language: German

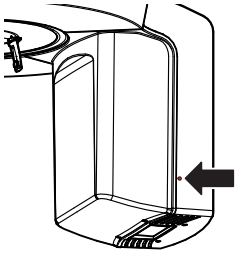
CE
0123

This product bears the CE marking in accordance with the provisions of Council Directive 93/42/EEC of June 14, 1993 concerning medical devices.

3.2 Technical data

3.2.1 Unit data

Model name:	Axeos
Nominal voltage:	200 – 240 V
Permissible fluctuation:	± 10%
Permissible drop under load:	10 %
Nominal current:	12 A
Nominal power output:	2 kW at 90 kV/12 mA with any radiation time
Nominal frequency:	50 Hz / 60 Hz
Mains resistance:	Max. 0.8 ohms
Main building fuse:	25 A slow-blow (16 A for single line)
Power consumption:	2 kVA
Power output of tube assembly:	69 kV / 16 mA = 1104 W with any radiation time
Tube voltage:	60 – 90 kV (for 90 kV max. 12 mA)
Tube current:	3 – 16 mA (for 16 mA max. 69 kV)
Maximum setting range:	60 kV / 3 mA to 90 kV / 12 mA
High-voltage waveform:	High-frequency multipulse Residual ripple ≤ 4 kV
High voltage generation frequency:	40 – 120 kHz
Program duration:	See "Program values"
Exposure time:	See "Program values"
Image acquisition scale:	For P1, normal dental arch (slice center) approx. 1:1.25, i.e. the acquired image is magnified by approx. 24% on average compared to reality.
Exposure time for a cephalometric exposure:	Max. 14.9 s
Image acquisition scale for a cephalometric exposure:	Approx. 1:1.1, i.e. the acquired image is magnified by approx. 10% on average compared to reality.
Total filtration of X-ray tube assembly:	> 2.5 mm Al / 90 IEC 60522 For volume exposures: 0.3 mm Cu for VOL1/2/3 in SD and HD modes 0.5 mm Cu for VOL4 in SD and HD modes 1 mm Cu VOL1/2/3/4 in Low Dose mode

Focal spot size as specified in IEC 60336, measured in the central X-ray beam:	0.5 mm
Marking of focal spot:	
Source-to-skin distance:	> 200 mm (8")
Automatic exposure blocking:	The duration of automatic exposure blocking (cooling period) depends on the set kV/mA level and the actual exposure time. Depending on the tube load, interval times of 8 s to 300 s are automatically set by the system. Example: For program P1 with exposure data of 84 kV / 12 mA and a radiation time of 14.1 s, the pause duration is 150 s.
Equipment class:	IPX0
Class I device Degree of protection against electric shock:	Type B device 
Degree of protection against ingress of water:	Ordinary equipment (without protection against ingress of water)
Year of manufacture:	 **20XX** (on the rating plate)
Operating mode:	Continuous operation
Long-term power output:	200 W
Anode material:	Tungsten
Exposure parameters for determining leakage radiation:	2 mA / 90 kV

X-ray tube

Siemens SR 90/15 FN

2D sensor

Digital CdTe sensor with direct converter technology (DCS) for panoramic radiographic technique

Active sensor area, Pan type:	146 x 6 mm
Pixel size:	0.1 mm
Focus-to-sensor distance:	497 mm

3D sensor

Digital flat panel detector with a-Si technology (amorphous silicon)

With 3D exposure technology:

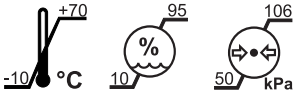
Active sensor area:	230 mm x 160 mm
Pixel size:	0.12 mm
Focus-to-sensor distance:	524 mm
Max. filtration in front of sensor:	< 1.2 mm Al

Ceph sensor

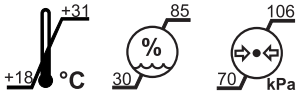
Digital line sensor with CCD technology

Active sensor area, Ceph type:	230 mm x 6.48 mm
Pixel size:	0.027 mm
Focus-to-sensor distance:	1714 mm

3.2.2 Transport, storage, and operating conditions

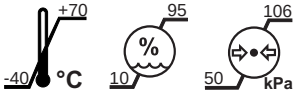


Transport and storage conditions:	Temperature: -10 °C – +70 °C (14 °F – 158 °F)
	Relative humidity: 10 % – 95 %
	Air pressure: 50 kPA – 106 kPA



Operating conditions:	Ambient temperature +18 °C – +31 °C (64 °F – 88 °F)
	Relative humidity: 30 % - 85 % (no condensation)
	Air pressure: 70 kPA – 106 kPA
Operating altitude:	≤ 3000 m above sea level

Cephalometer



Transport and storage conditions:	Temperature: -40°C – +70°C (-40°F – 158°F)
	Relative humidity: 10% – 95%
	Air pressure: 50 kPA – 106 kPA

3.2.3 Weight and packaging

Weight (with packaging / without packaging):

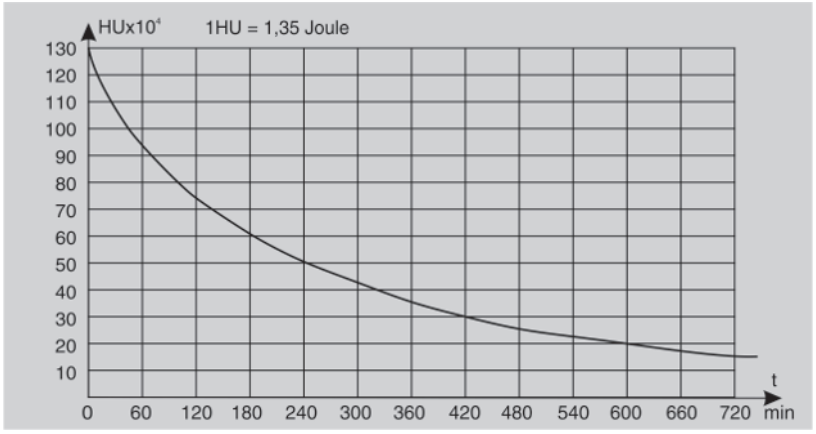
Axeos	191 kg / 113 kg 415 lb / 243 lb
Cephalometer	40 kg / 33 kg 95 lb / 49 lb
Floor stand	50 kg / 31 kg 110 lb / 68 lb

Dimensions of the packaging:

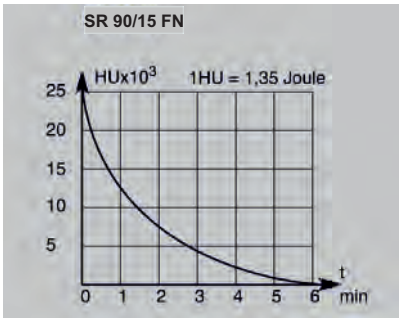
Axeos	199 cm x 69 cm x 122 cm 78 3/8" x 27 1/8" x 48"
Cephalometer	175 cm x 78 cm x 73 cm 68 7/8" x 30 3/4" x 28 3/4"
Floor stand	114 cm x 105 cm x 22 cm 56 3/4" x 41 3/8" x 8 5/8"

3.2.4 Diagrams

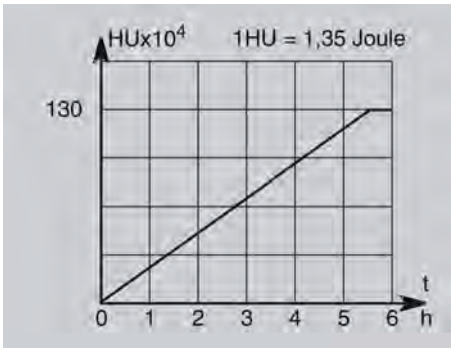
Cooling curve for tube housing



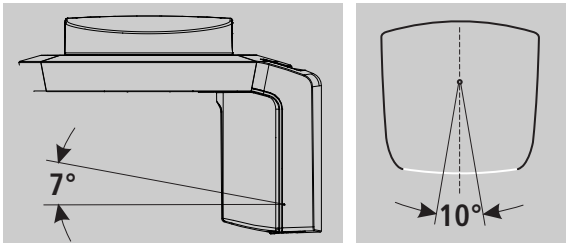
Cooling curve of X-ray tube



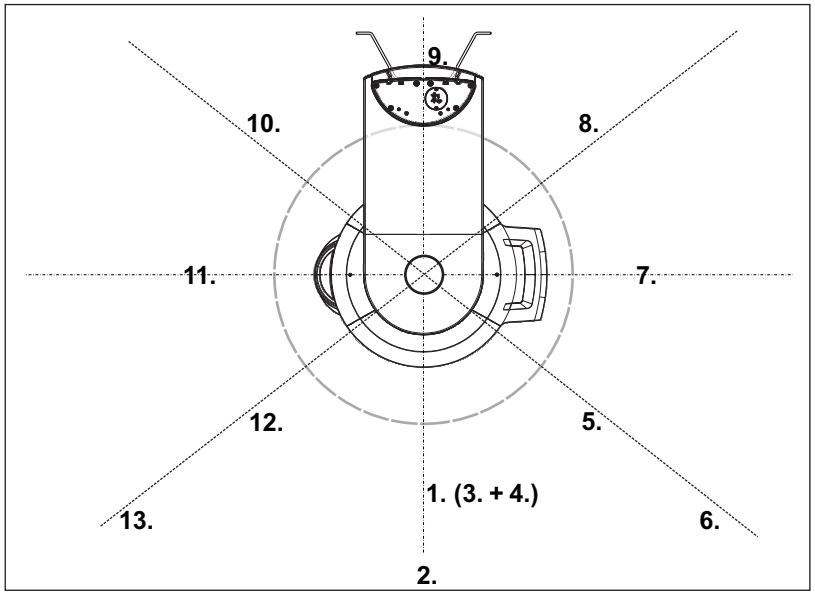
Heating curve for tube housing



Central X-ray beam and anode angle



3.2.5 Values of the secondary scattered radiation



Because the highest scattered radiation is generated in HD mode with 3D X-ray operation, it is listed here.

3D X-ray measurement criteria:

The following parameters were set for the measurements:
Tube voltage 85 kV,
tube current 12 mA,
radiation time 16.7 s (corresponds to a current-time product of 200.4 mAs).

Angle [°]	Measuring point	Distance [m]	Measured dose [µSv]	Dose/mAs [µSv]
0	1	1	5.69	0.0284
	2	2	1.45	0.00723
	3	1 (45° below)	3.46	0.0173
	4	1 (45° above)	1.01	0.00503
45	5	1	6.87	0.0343
	6	2	1.90	0.00948
90	7	1	8.5	0.0424
135	8	1	9.63	0.0481
180	9	1	0.51	0.00254
225	10	1	10.3	0.514
270	11	1	8.44	0.414
315	12	1	6.93	0.0346
315	13	2	1.89	0.00943

3.2.6 Requirements for the PC system

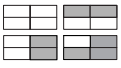
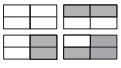
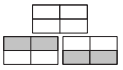
For information on the requirements for the PC systems, please refer to the installation requirements

Sidexis 4 REF 66 63 236
Axeos REF 67 30 761

3.3 Overview of exposure programs

The following is a list of the available exposure programs and the possible program settings. The exposure programs are displayed on the touchscreen in abbreviated form.

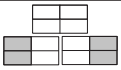
Panoramic exposures

Panoramic exposure program		Quadrants
P1	Panoramic exposure, standard	
P1 A	Panoramic exposure, artifact-reduced	
P1 C	Panoramic exposure, constant 1.25x magnification	
P2	Panoramic exposure, without ascending rami	
P2 A	Panoramic exposure, without ascending rami, artifact-reduced	
P2 C	Panoramic exposure, without ascending rami, constant 1.25x magnification	
P10	Panoramic exposure for children	
P10 A	Panoramic exposure for children, without ascending rami, artifact-reduced	
P10 C	Panoramic exposure for children, without ascending rami, constant 1.25x magnification	
P12	Thick slice, anterior tooth region	

Program settings:
Single-quadrant selection (only upper/ lower jaw for P12),
Quickshot function (no P12 for Quickshot function),
kV/mA values

For more information about the panoramic exposure programs, see "P1 – Panoramic exposure [→ 53]" onwards.

Bite wing exposures

Bitewing exposure programs		Quadrants
BW1	Bitewing exposures in the posterior tooth region	
BW2	Bitewing exposures in the anterior tooth region	

Program settings: For BW1 quadrant selection left/right half-view or both sides, kV/mA values

For more information about the bitewing exposure programs, see BW1 – Bite wing exposure in the posterior tooth region [→ 56].

Temporomandibular joint exposures

TM1.1/TM1.2	Temporomandibular joints from a lateral aspect with the mouth open and closed, two-part exposure
TM3	Temporomandibular joints lateral, ascending rami

Program settings: In two-part exposure programs with angle preselection (0°, 5°, 10°, 15°), kV/mA values

For more information about the temporomandibular joint exposure programs, see "TM1.1 / TM1.2 – Lateral view of temporomandibular joints with mouth open and closed [→ 70]" onwards.

Sinus exposures

S1	Paranasal sinuses
S3	Paranasal sinuses, linear slice orientation

Program settings: kV/mA values

For more information about the sinus exposure programs, see "S1 – Paranasal sinuses [→ 77]" onwards.

Cephalometric exposures

If the unit is equipped with a cephalometer, you can also take cephalometric images.

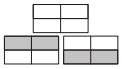
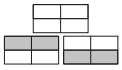
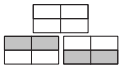
C1	Posterior-anterior exposure, symmetrical
C2	Anterior-posterior exposure, symmetrical
C3	Lateral exposure
C3F	Full-format exposure, lateral
C4	Carpus view, symmetrical

Program settings: Quickshot function, collimation (except for C4), kV/mA values

For more information about the cephalometric exposure programs, see "C1 – Posterior-anterior exposure, symmetrical [→ 106]" onwards.

Volume exposure

The Axeos X-ray system is available as a 2D/3D hybrid unit. The volume programs VOL1 SD, VOL1 HD, VOL1 Low, VOL2 SD, VOL2 HD, VOL2 Low, VOL3 SD, VOL3 HD, VOL3 Low, VOL4 SD, VOL4 HD, VOL4 Low are available with this unit.

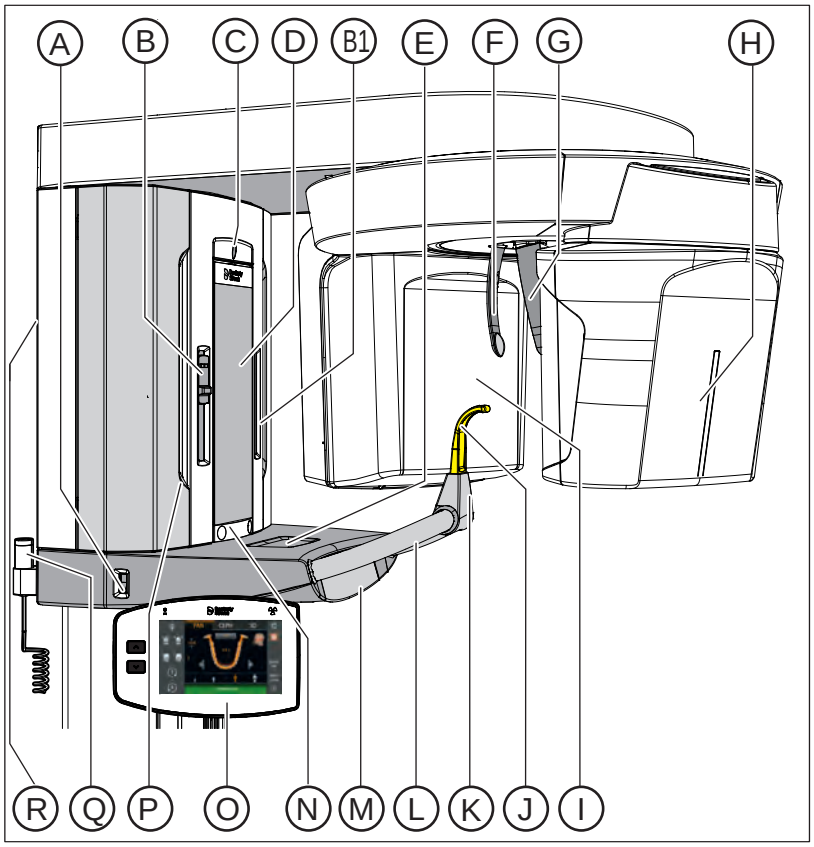
Programs	Volume area	Collimation
VOL1 SD Isotropic voxel edge length: 160 µm VOL1 HD Isotropic voxel edge length: 160 µm VOL1 Low Isotropic voxel edge length: 160 µm	Volume exposure with a diameter of approx. 8 cm and a height of approx. 8 cm or 5.5 cm collimated.	
VOL2 SD Isotropic voxel edge length: 160 µm VOL2 HD Isotropic voxel edge length: 80 µm VOL2 Low Isotropic voxel edge length: 160 µm	Volume exposure with a diameter of approx. 5 cm and a height of approx. 5.5 cm for upper **or** lower jaw	
VOL3 SD Isotropic voxel edge length: 220 µm VOL3 HD Isotropic voxel edge length: 160 µm VOL3 Low Isotropic voxel edge length: 220 µm	Volume exposure with a diameter of approx. 11 cm and a height of approx. 10 cm or selection of upper quadrant collimated to 7.5 cm and selection of lower quadrant collimated to 8.0 cm	
VOL4 SD Isotropic voxel edge length: 220 µm VOL4 HD Isotropic voxel edge length: 220 µm VOL4 Low Isotropic voxel edge length: 220 µm	Volume exposure with a diameter of approx. 17 cm and a height of approx. 13 cm or selection of upper quadrant collimated to 10 cm and selection of lower quadrant collimated to 7.5 cm	

Program settings: Volume area (anterior teeth, molars right/left or temporomandibular joints right/left), collimation of upper/lower jaw, radiation time

For more information about the 3D exposure program, see Volume exposures [→ 85]" onwards.

3.4 Main components of the product

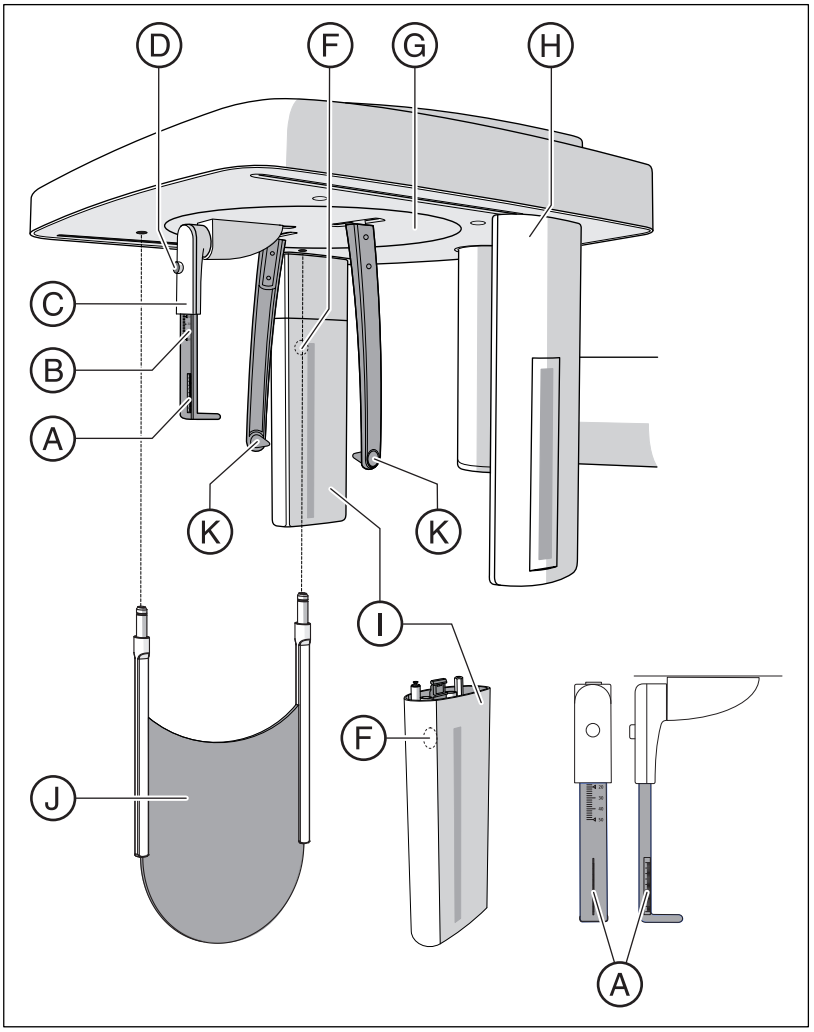
3.4.1 Basic unit



A	Main switch
B	Light localizer with height adjustment of the laser line (Frankfurt plane) for panoramic exposures
B1	Light localizers for 3D positioning
C	Light localizer central laser line for face center
D	Control mirror for patient positioning
E	Tray for jewelry, etc.
F	Forehead support
G	Temple supports
H	PAN/3D sensor unit
I	Primary diaphragm field on the X-ray tube assembly
J	Bite block, contact segment or chin rest
K	Holder for chin rest, bite blocks, or contact segments, etc.
S	Handle for patient
M	Drawer for accessories
N	Touch bar for swiveling the control mirror in and out
O	Easypad (swiveling and tilting operator panel)

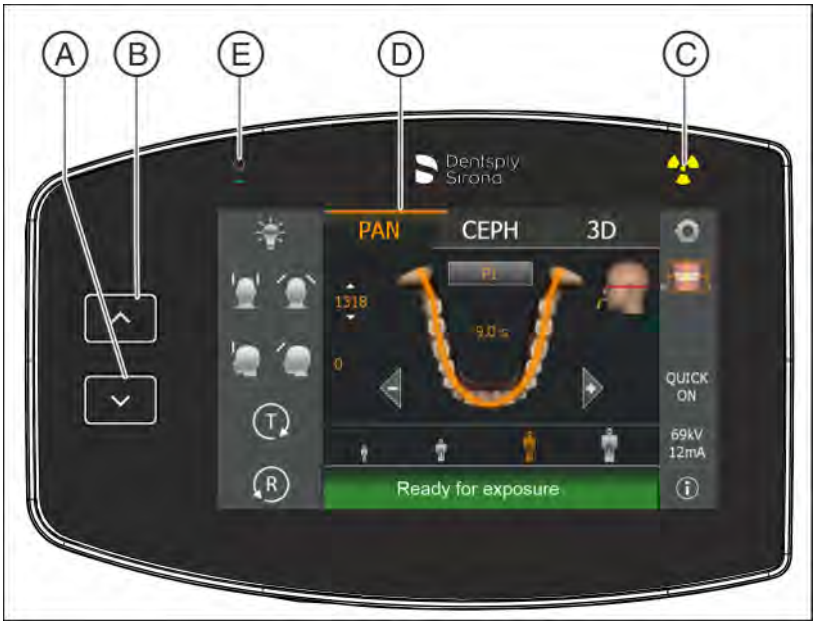
P	Door for accessories
Q	Exposure release button
R	Ambient light (backlight), adjustable via Easypad

3.4.2 Cephalometer



A	Projection scale
B	Scale for vertical nose support adjustment
C	Nose support
D	Locking knob for nose support
F	Pushbutton for sensor removal
G	Rotating element for rotary movement of head supports
H	Secondary diaphragm with light localizer of laser line (Frankfurt horizontal plane)
I	Sensor
J	Carpus support plate
K	Ear plugs with holders

3.4.3 Easypad



A	"Unit down" key
B	"Unit up" key
C	Optical radiation indicator
D	Touchscreen (touch-sensitive screen)
E	LED display "Unit ON"

3.4.4 Easypad touchscreen

The screen for this unit is a touchscreen.

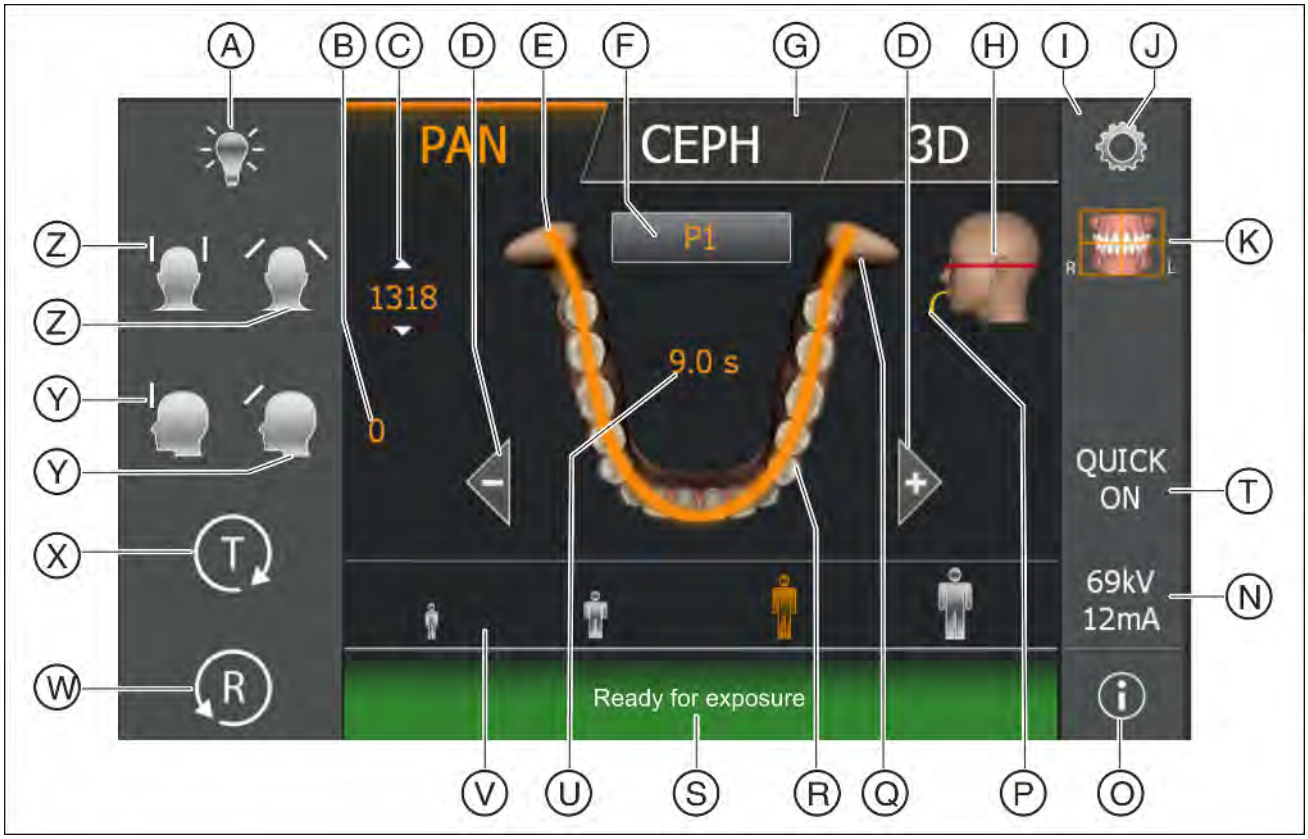
The structure of the user interface is subdivided into 2 levels.

Level 1 (X-raying of patients): The settings for the X-ray exposure are made by touching the screen surface.

Level 2 (user settings): By touching the toothed wheel **J** in the upper right corner of the touchscreen, you can switch to the 2nd level. In the 2nd level, the factory preset basic settings can be changed.

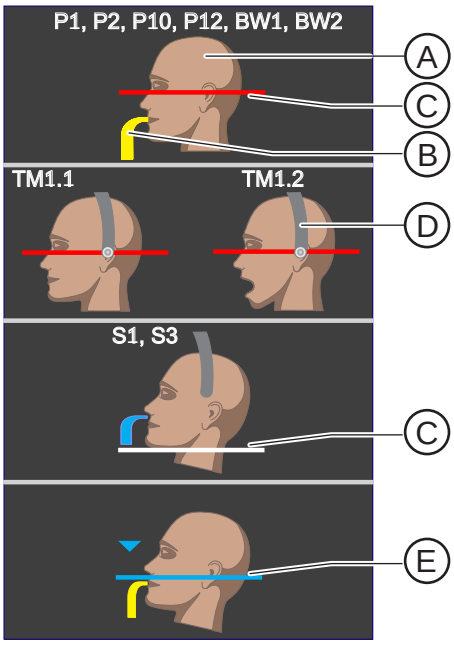
Level 1: X-raying of patients

Control and display elements



A	Light localizer ON/OFF
B	Forehead support adjustment display
C	Height adjustment display
D	Program selection keys -/+ Order of programs PAN: P1, P2, P10, P12, BW1, BW2, TM1.1, TM3, S1, S3 CEPH: C1, C2, C3, C4 3D: VOL1, VOL2, VOL3, VOL4
E	Orange: Display of the minimum exposure area for the selected program (dental arch or segment)
F	Program display, selection of subprograms (A/C)

G	Display of program group selection
H	Display of patient head positioning
I	Submenu column (options)
J	Toothed wheel: Navigation element to switch between level 1 (X-raying of patients) and level 2 (user settings)
K	Quadrant selection display marked with R (right) and L (left)
N	Display of kV/mA value
O	Display of unit information
P	Display of color-coded bite block or contact segment for the chosen program
Q	Symbol for temporomandibular joints
R	Symbol for dental arch
S	Comment line for help and error messages
T	PAN: Quick ON / Quick OFF Reduction in the exposure/radiation time 3D: SD / HD / Low Dose Reduction in the patient dose
U	Expected radiation time (after completion: actual radiation time)
V	Patient symbols (child, adolescent/woman, woman/man, large individuals): Exposure parameter presettings
W	"R" key for acknowledging device messages. The return of the unit is one of these messages!
X	"T" key for test cycle without radiation
Y	"Move forehead support toward forehead" and "Move forehead support away from forehead" keys
Z	"Close temple supports" and "Open temple supports" keys



Display aid for patient head positioning

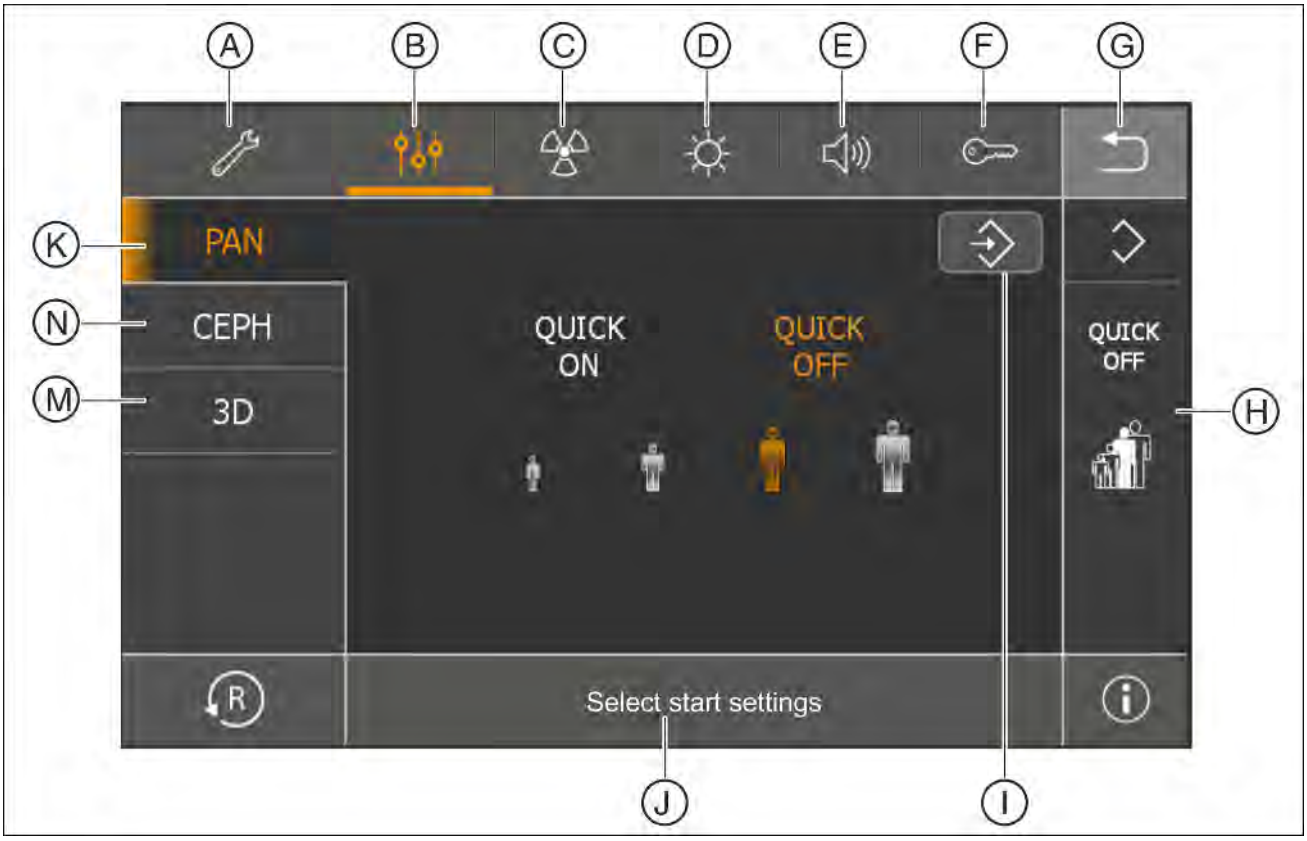
The patient head symbol shown on the top right helps you to position the patient's head.

A	The patient head symbol shows the head posture: straight (Frankfort horizontal plane), bent forward (anterior) with open or closed mouth, or bent backward (reclined).
B	If a bite block or a contact segment is to be used, it is displayed in the corresponding color - yellow or blue.
C	In red, this line shows the reflecting light localizer line (Frankfort horizontal), in white it is simply used as a guide for the corresponding head inclination.
D	For temporomandibular joint and sinus views, the temporomandibular joint support is also displayed in blue. If a small circle with a dot in its center appears at the end of the support, ear olives must be used; only contact pads are required if this symbol is not displayed.
E	When using the occlusal bite block, a blue line and a blue arrow are shown for positioning.

Level 2: User settings

Presetting elements

Orange: Selected
The function or value has been selected by the user.



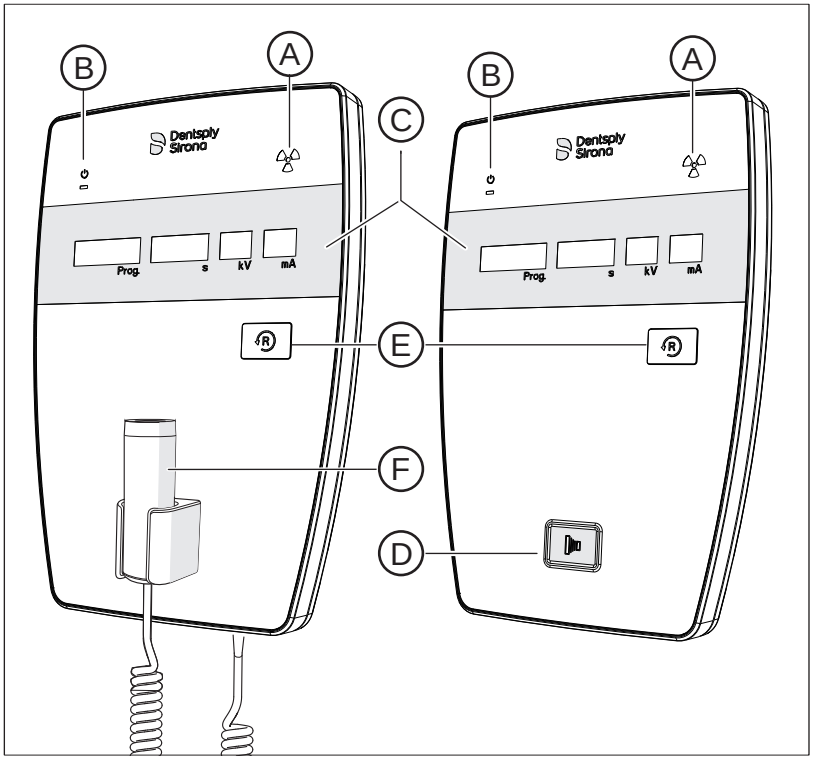
A	Service functions (for service engineer only)
B	Select start settings: Quickshot ON/OFF, SD/HD mode
C	Select basic settings: Assign kV/mA values to patient symbols
D	Select light settings: (backlight of touchscreen, ambient light)
E	Sound volume: Touchscreen touch sound, cycle sound, height adjustment
F	Input of an activation key (only needed in service case)
G	Back to level 1 (X-raying of patients)
H	Display the selected settings after saving
I	Save the selected settings
J	Display the selected presetting element
K	Presetting for Pan
N	Presetting for Ceph
M	Presetting for 3D

3.4.5 Remote control

⚠ CAUTION

Increased radiation

If several units are installed in the same room, the remote controls must be suitably labeled to make it clear which control is for which unit.

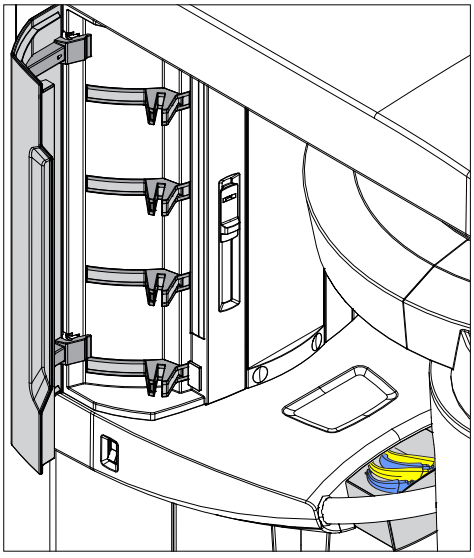


A	Radiation indicator
B	LED display "Unit ON"
C	Display field
D	Exposure release button
E	"R" button to reverse the unit
F	Exposure release button with coiled cable

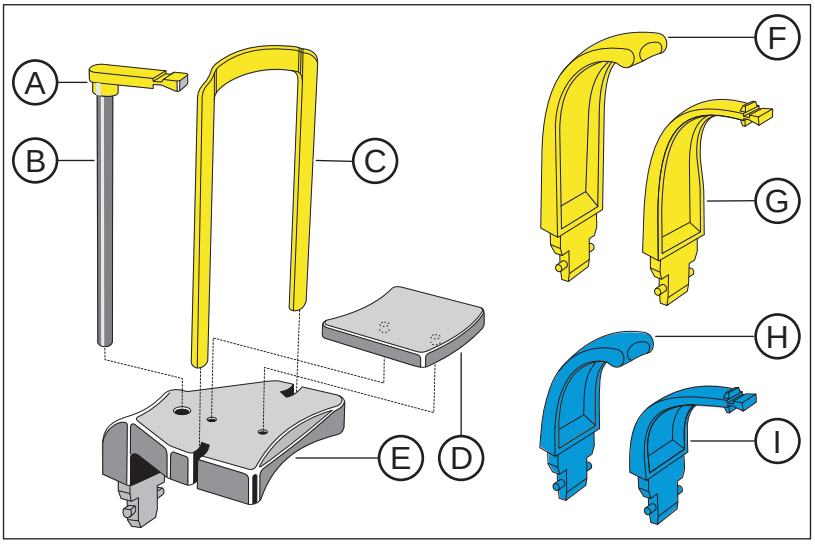
3.5 Spare parts and consumables

3.5.1 Accessory parts

3.5.1.1 Bite blocks and contact segments

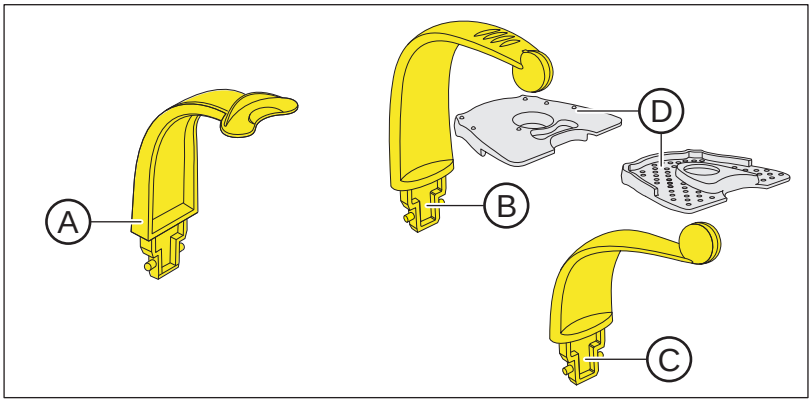


The drawer between the handles and the door in the movable stand are provided for the storage of accessory parts and hygienic protective sleeves.



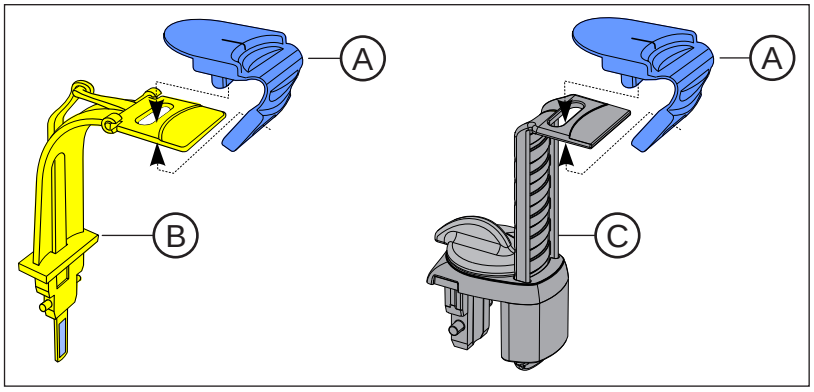
A	Bite block (10 pieces) REF 18 88 887
B	Bite block rod (5 pieces) REF 18 88 895
C	Bar for chin rest REF 59 61 461
D	Rest REF 14 49 227
E	Chin rest assembly, including A (5 pieces), B (1 piece), C, D, protective sleeves for bite block (500 pieces), protective sleeves for chin rest and bar (100 pieces), see "Hygiene protective sleeves" [→ 39] REF 59 81 472
F	Contact segment yellow for subnasal (5 pieces) REF 89 31 545
G	Bite block yellow (5 pieces) REF 89 21 843
H	Contact segment blue for subnasal (5 pieces) REF 89 31 552
I	Bite block blue (5 pieces) REF 89 21 850

3.5.1.2 3D bite block and spherical bite blocks



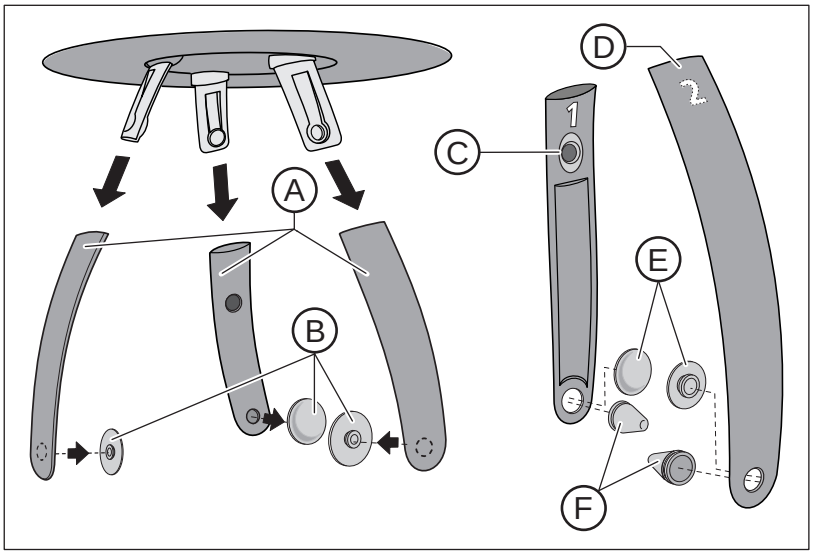
A	3D bite block rod (5 pieces) REF 61 34 949
B	Lower jaw spherical bite block (with symbol for UK) (1 piece) REF 61 50 226
C	Upper jaw spherical bite block (with symbol for UK) (1 piece) REF 61 50 218
D	Spherical bite block plate with markers for creating implant surgical guides Available at the online shop of SICAT www.sicat.com

3.5.1.3 Universal and occlusal bite block



A	Foam bite block, disposable (100 pcs.) REF 61 41 449
B	Occlusal bite block REF 62 11 143
C	Universal bite block REF 61 41 431

3.5.1.4 Temple supports, forehead support, and temporomandibular joint supports



A	Forehead support and temple supports (1 piece) REF 64 84 989
B	Contact buttons for forehead and temple supports (1 set) REF 64 85 010
C	Temporomandibular joint support 1 for temporomandibular joint exposures REF 64 84 997
D	Temporomandibular joint support 2 for temporomandibular joint exposures REF 64 85 002
E	Contact buttons for temporomandibular joint supports (10 pieces) REF 59 90 648
F	Ear olives for temporomandibular joint supports (10 pieces) REF 18 88 838

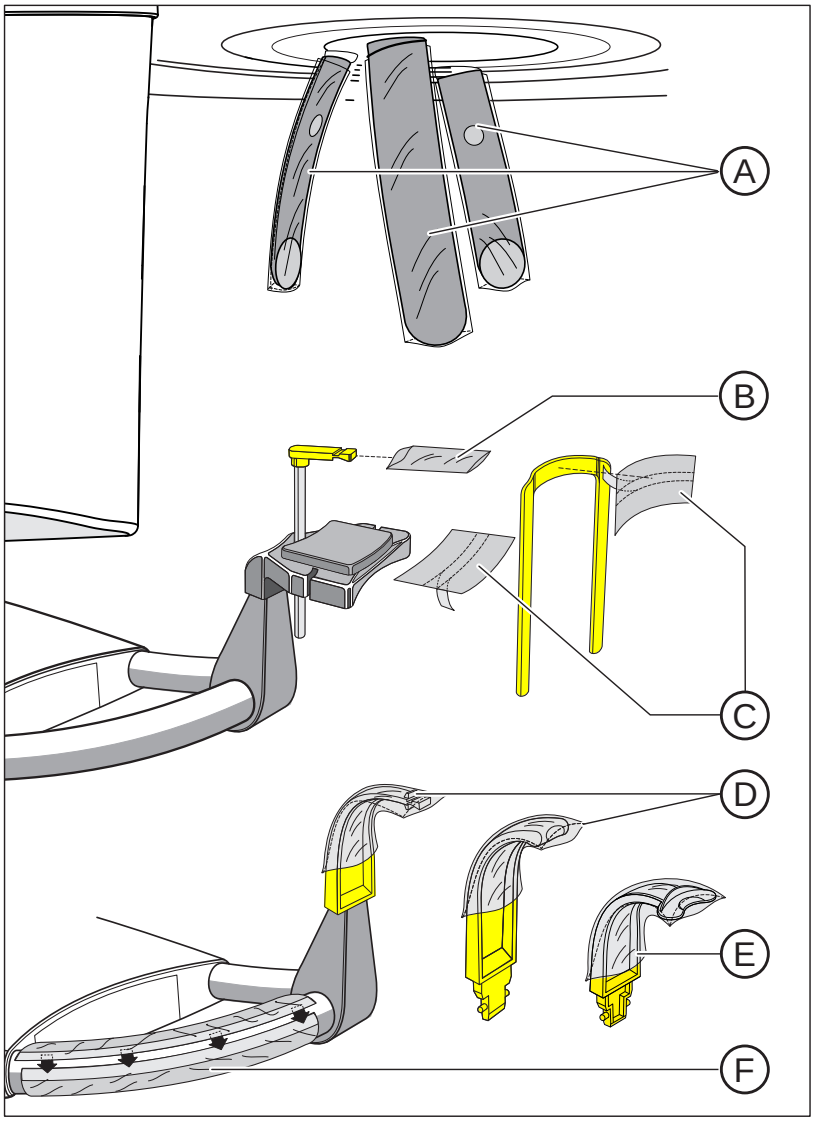
3.5.2 Hygienic protective sleeves

Identification of single use devices

Prior to each exposure, the hygienic protective sleeves (single use devices) must be fitted.

Single use devices are identified with the symbol shown on the left. They must be disposed of immediately after use. Do not use single use devices more than once.

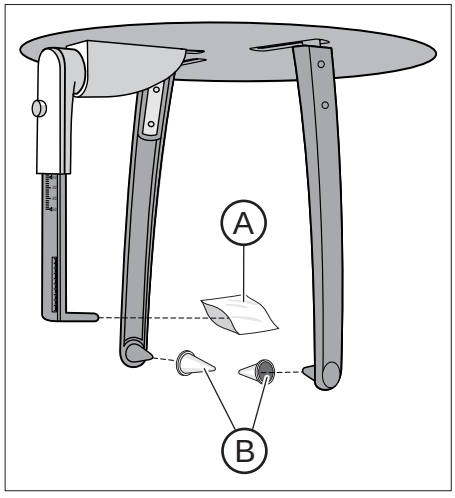
3.5.2.1 Protective sleeves for the basic unit



A	For forehead support and temple supports (500 pieces) REF 59 68 263
B	For bite block of chin rest, dimensions, 43 x 21 mm (500 pieces) REF 33 14 072
C	For chin rest and bar (100 pieces) REF 59 32 603

D	For bite blocks (500 pieces) REF 33 14 080
E	For 3D bite block (500 pieces) REF 61 27 745
F	For hand grip REF 59 68 255

3.5.2.2 Protective sleeves for cephalometer

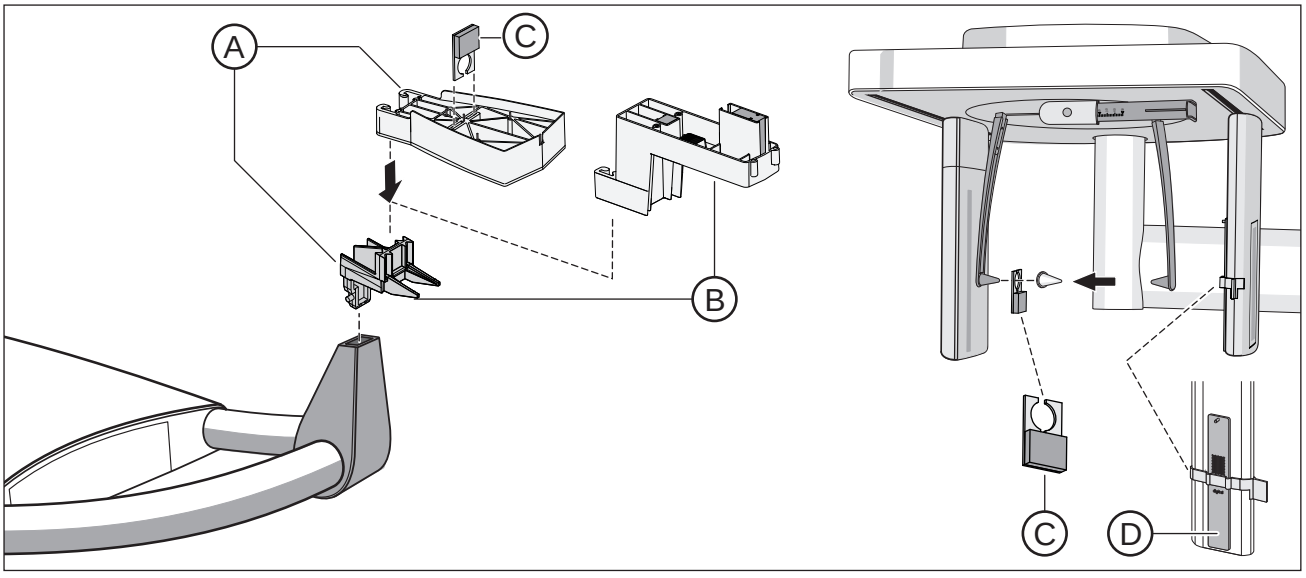


A	Protective sleeve for nose support, single use devices (100 pieces) REF 33 14 106
B	Protective caps for ear plugs, reusable devices (20 pieces) REF 89 32 261

3.5.3 Test phantom for acceptance/constancy test

Worldwide

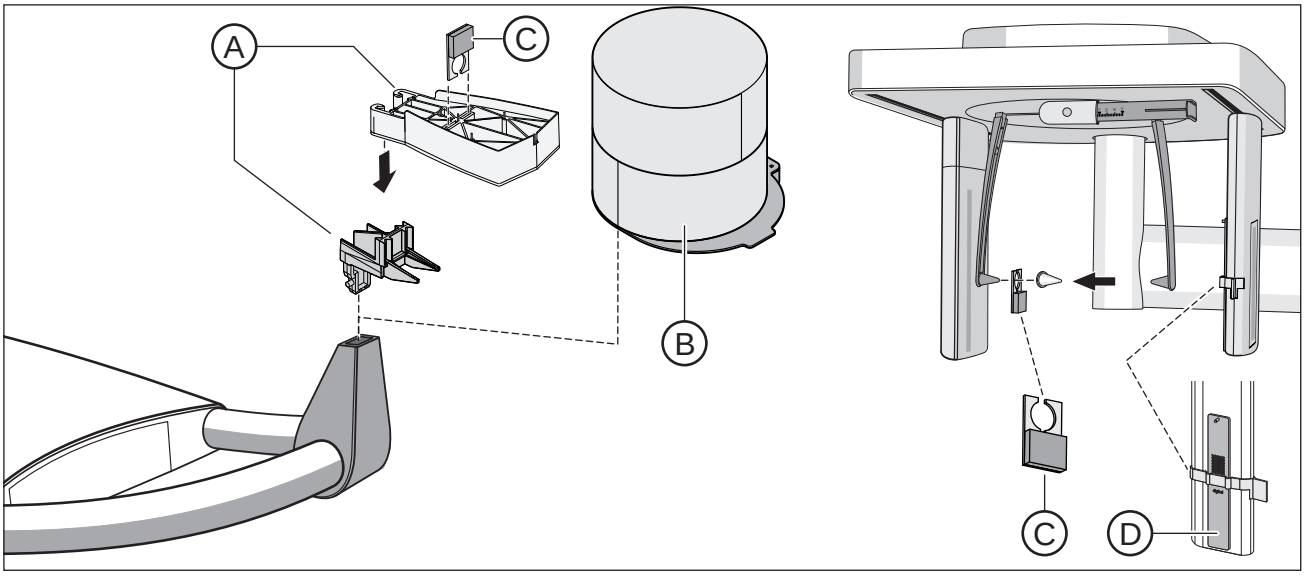
At regular intervals, perform constancy tests according to the specifications for operating an X-ray unit in order to ensure the safety of operating staff and patients. Dentsply Sirona recommends monthly testing.



A	Exposure phantom, complete, spare (for 2D test) REF 59 85 416
B	Constancy test phantom, spare (for 3D test) REF 67 39 077
C	Contrast element OP 2.0 complete, spare REF 64 90 895 (not in the scope of supply for all countries)
D	Test phantom Ceph REF 65 55 051 (not in the scope of supply for all countries)

For Germany only

At regular intervals, perform constancy tests according to the specifications for operating an X-ray unit in order to ensure the safety of operating staff and patients. Dentsply Sirona recommends monthly testing.



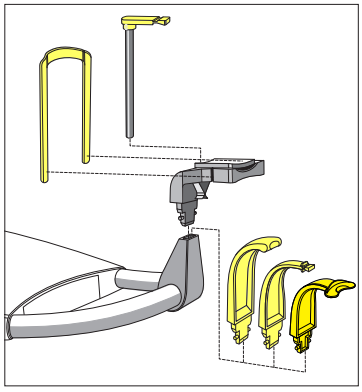
A	Exposure phantom, complete, spare (for 2D test) REF 59 85 416
B	Constancy test phantom, spare (for 3D testing according to DIN 6868-161) REF 67 39 101
C	Contrast element OP 2.0 complete, spare REF 64 90 895
D	Test phantom Ceph REF 65 55 051

4 Installation and start-up

Please also see the chapter titled: “Cleaning and care [→ 143]“

4.1 Replacing accessories on the basic unit

4.1.1 Replacing the bite block, contact segment, 3D bite block or chin rest



You will need to replace accessory parts according to the patient or exposure program.

1. Pull the accessories upwards and out of the holder.
   ↳ The accessory part disengages.
2. Insert the bite block, contact segment, 3D bite block or chin rest.
   ↳ The bite block, contact segment, 3D bite block or chin rest engages in position.

↳ The accessory has been replaced.

The chin rest can be combined with the bite block rod or the bar.

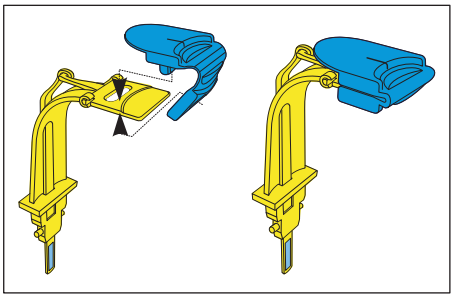
➢ Insert the rod for the bite block or the bar into the chin rest from above.

4.1.2 Using the occlusal bite block

The occlusal bite block can be used for all panoramic and 3D exposures (except temporomandibular and sinus exposures) in place of the yellow bite block or contact segment. The angle of the bite block plate is transmitted to the X-ray unit. The displays on the touchscreen and the color change of the height adjustment buttons for adjusting the unit height and an automatic stop function assist the user in positioning the patient. An interchangeable bite block foam is used for the bite block and can also be used for patients without anterior teeth.

Bite block foam (disposable item), 100 pieces
REF 61 41 449

Inserting the bite block foam



1. Insert the plug of the top section into the opening on the bite block plate.
2. Fold the bite block foam downwards.
3. Place the lower section onto the plug of the top section.

Inserting the occlusal bite block

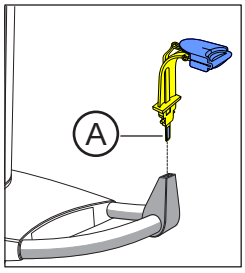
NOTE

A contact for transmitting the angle to the X-ray system is located on the occlusal bite block.

The contact can be broken off or bent during insertion, removal, and storage.

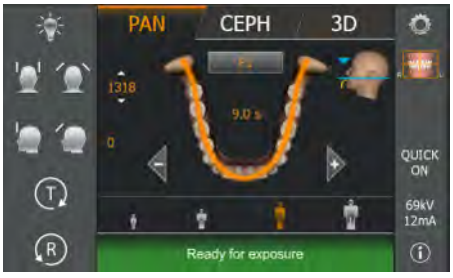
➢ Be careful not to damage the contact.

➢ Prior to taking patient X-rays, check the function of the occlusal bite block described in this section.



➢ Insert the occlusal bite block into the bite block holder on the unit.

↳ The head symbol on the touchscreen changes as soon as the contact **A** is inserted into the unit; a blue arrow may appear, indicating the direction in which the height needs to be adjusted. When the head is properly aligned, the blue arrows on the head symbol disappear.



↳ The height adjustment buttons light up depending on the bite block position.
Only one of the two buttons is blue at any time. The blue button indicates the direction of movement of the stand required to achieve the best possible patient positioning.
Both buttons become blue if the optimum position is achieved and no further change to the height is necessary.
The height adjustment can be moved upwards and downwards irrespective of the lighting of the buttons. The color of the button is just a suggestion!

4.1.3 Using the universal bite block

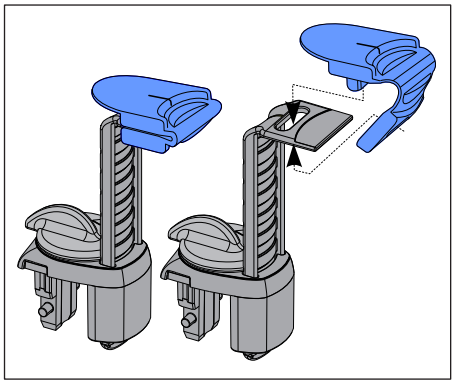
IMPORTANT

Before every use, check that the color markings required for the adjustment are clearly visible.

The universal bite block can replace all other bite blocks and contact segments. An interchangeable foam bite block is used for the bite block, which can also be used for patients without anterior teeth.

Foam bite block (disposable), 100 pcs.
REF 61 41 449

Inserting the foam bite block



1. Insert the plug of the top section into the opening on the bite block plate.
2. Fold the foam bite block downwards.
3. Place the lower section onto the plug of the top section.

Adjusting the bite block height

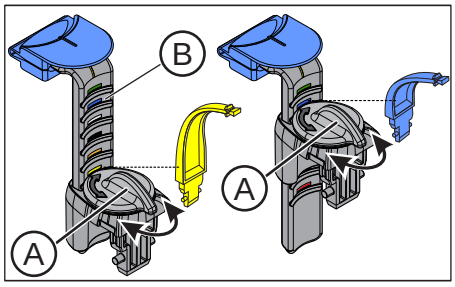
The colored marking lines on the bite block slider are identical to the colors of the bite blocks. These correspond to the same bite block height.

The yellow marking has the same meaning as the bite block height of the yellow standard bite block or contact segment for the panoramic and bite wing exposures: P1, P2, P10, P12, BW1 and BW2.
If the mandibular ramus is not displayed on the exposure and parts of the sinus region are not necessarily of interest, then use the red marking.

The blue marking has the same meaning as the bite block height of the blue bite block or contact segment for sinus exposures: S1, S3.

The green marking is for maxillary exposures, where the alveolar ridge of the patient's head is aligned horizontally to position the patient a little lower in relation to the beam path.

The gray, black and white color markings offer further grid positions each with a position distance of 1 cm, in order to distinguish between the yellow and blue color marking.

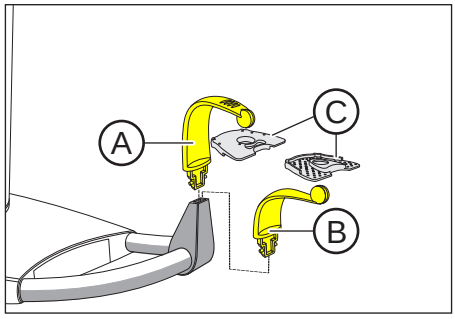


1. Insert the universal bite block into the unit.
2. Open the lock with the rotary knob (**A**).
3. Adjust the bite block slider (**B**), according to the desired bite block height, to one of the colored marking lines and lock this position in place with the rotary knob (**A**).

IMPORTANT
For programs BW1 and BW2, the universal bite block must **not** be used above the black marking. The positioning is otherwise too low.

4.1.4 Using spherical bite blocks and the spherical bite block plate

Two spherical bite blocks are available for preparing an implant drilling template for measuring scans of the upper or lower jaw.

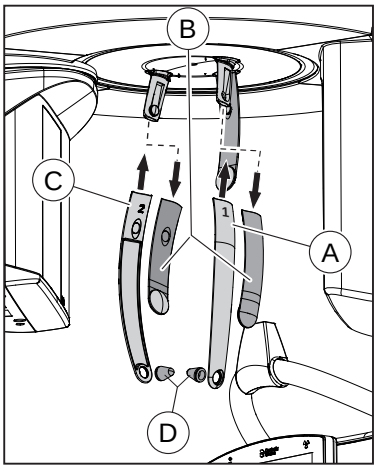


1. Insert the spherical bite block for mandibular exposures **(A)** (sphere-down) and the spherical bite block for maxillary exposures **(B)** (sphere-up) in the unit.
2. Position the spherical bite block plate **(C)** onto the sphere of the corresponding spherical bite block.

The spherical bite block plate **(C)** contains 6 radiopaque markers (spheres) which are used for orientation in the X-ray volume. Further applications can be set up on this spherical bite block plate.

4.1.5 Changing the temple supports and temporomandibular joint supports

For temporomandibular joint views, the temporomandibular joint supports **(A)** "1" right and **(C)** "2" left must be inserted in place of the temple supports **(B)**.



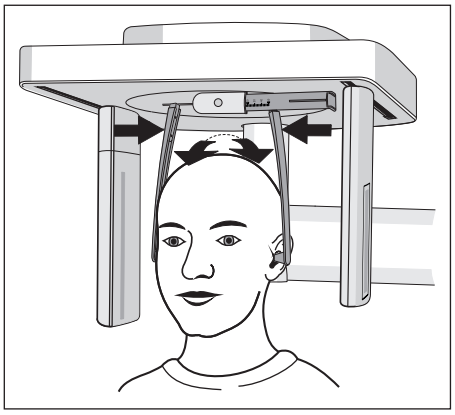
✓ Temple supports are inserted in the unit.

1. Press the respective locking button and remove the temple supports **B**.
   ↳ Both temple supports are removed.
2. Plug a sterile ear holder **D** into each of the temporomandibular joint supports **A** and **C**.
   ↳ The ear holders snap into the temporomandibular joint supports.
3. Insert temporomandibular joint supports **A** and **C** into the holders on the device.
   ↳ The temporomandibular joint supports snap into place.

↳ The unit is converted for temporomandibular joint exposures.

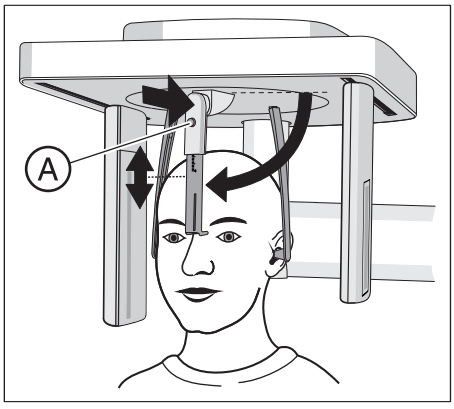
4.2 Adjusting/inserting accessory parts on the cephalometer

Adjusting the holder for ear plugs



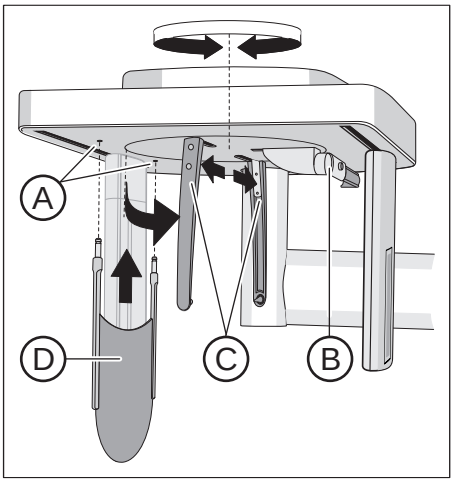
1. Grasp the ear plug holders at the very top with both hands.
2. Simultaneously pull the holders apart or push them together.
   ↳ The ear plugs are inserted into the patient's outer ear canal.

Adjusting the nose support



1. Fold down the nose support.
2. Lightly press and hold latching button **(A)**.
   ↳ The vertical adjustment is released.
3. Move the blue section of the nose support upwards or downwards.
4. Release latching button **(A)**.
   ↳ The vertical adjustment of the nose support is latched in position.

Inserting the carpus support plate



✓ The holders for the ear plugs **(C)** stand in line with the sensor and the secondary diaphragm.

1. Grasp the ear plug holders **(C)** at the very top with both hands. Simultaneously twist the holders by 90 degrees.
   ↳ The nose support **(B)** is on the side facing away from the carpus support plate **(D)**.
2. Grasp the carpus support plate **(D)** by its sides.
3. Insert the carpus support plate into both holes **(A)** until it reaches a stop.
   ↳ The carpus support plate **(D)** engages with a slight resistance.

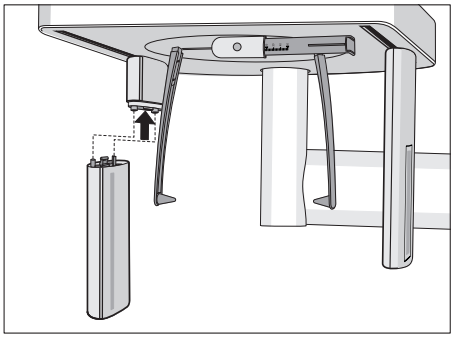
4.3 Removing/inserting the Ceph sensor

The Ceph sensor must always be inserted in order for the unit to be operated. However, should the Ceph sensor need to be removed, please proceed as follows:

Removing the sensor

1. Hold the sensor firmly.
2. Press the button all the way in and hold it.
   ↳ The sensor is released from the fastening.
3. Pull the sensor downwards out of the guide.

Inserting the sensor



1. Hold the sensor firmly.
2. Using both guide pins, insert the sensor into the guide sleeves on the unit and push until it reaches a stop.
   ↳ The sensor engages in the X-ray unit.

NOTE

When the sensor is being removed, it could be damaged by impact or if it is dropped.

The sensor contains an integrated vibration sensor to detect impacts or falls. If the vibration sensor has triggered, guarantee claims become void.

➢ Do not drop the sensor under any circumstances!

NOTE

Electrostatic charges from persons are discharged on the unit.

This will destroy electrical components in the unit.

➢ Do not touch any electrical components or unprotected plug contacts.

➢ Discharge yourself by touching a conductive grounded object.

5 Operation

5.1 Acquiring the X-ray image

5.1.1 Switching the unit on and starting the software

5.1.1.1 Switching the unit on

⚠ CAUTION

Malfunctions can occur when switching on the unit.

A patient positioned in the unit may be injured by moving parts.

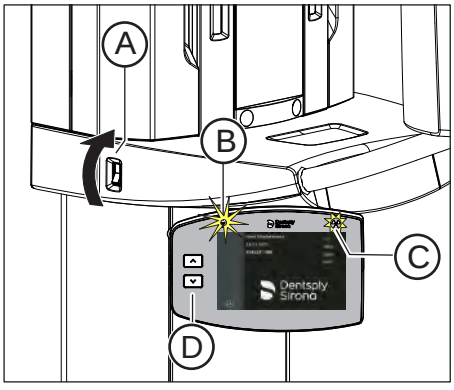
➢ Please ensure that a patient is not positioned in the unit when switching on the unit and selecting the operating mode (up until the completion of sensor positioning).

NOTE

Fluctuations in temperature can cause condensation to form in the unit.

Electrical components are destroyed by short circuits.

➢ Do not switch the unit on until the temperature of the unit has adapted to the ambient temperature and the condensation has evaporated. See the chapter on ‘Technical data’.



✓ The unit is properly installed.

✓ The unit is connected to the mains.

1. Turn the main switch **A** to position **I**.
2. Wait for one minute.

↯ The LED **B** lights up on the Easypad.

↯ The radiation indicator **C** and the height adjustment keys **D** light up for approximately one second as a function check.

↯ The home screen is displayed on the touchscreen for approximately 1 minute.

↯ The program selection is then displayed on the touchscreen.

↯ The forehead support and temple supports are completely open.

NOTE

The unit must not be switched on/off constantly.

Constant switching on and off reduces the service life of individual unit components and results in increased power consumption.

➢ After switching the unit off, wait for approx. 60 seconds before switching it on again.

NOTE

The surface of the touchscreen is sensitive.

The touchscreen will be damaged or its surface scratched.

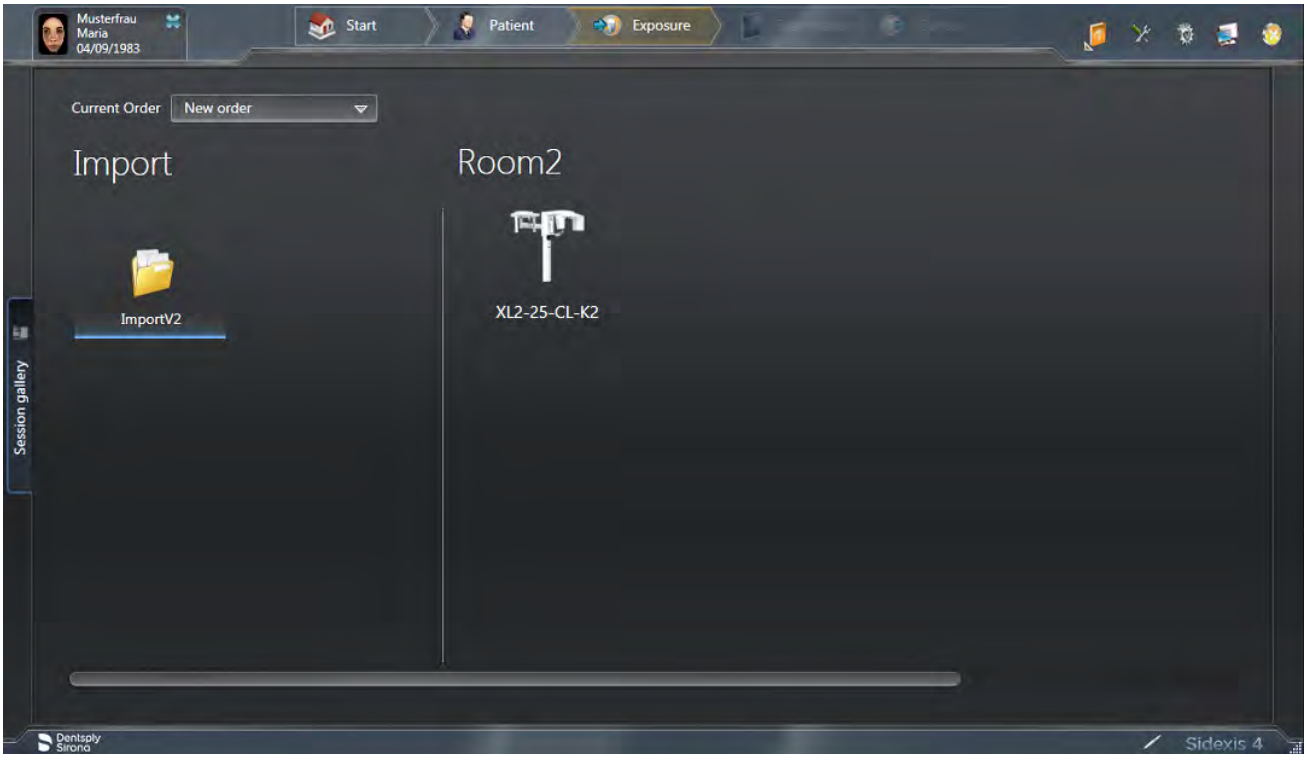
➢ Never use pointed objects such as ballpoint pens, pencils, etc. to operate the touchscreen.

➢ Only use your fingertips to operate the touchscreen.

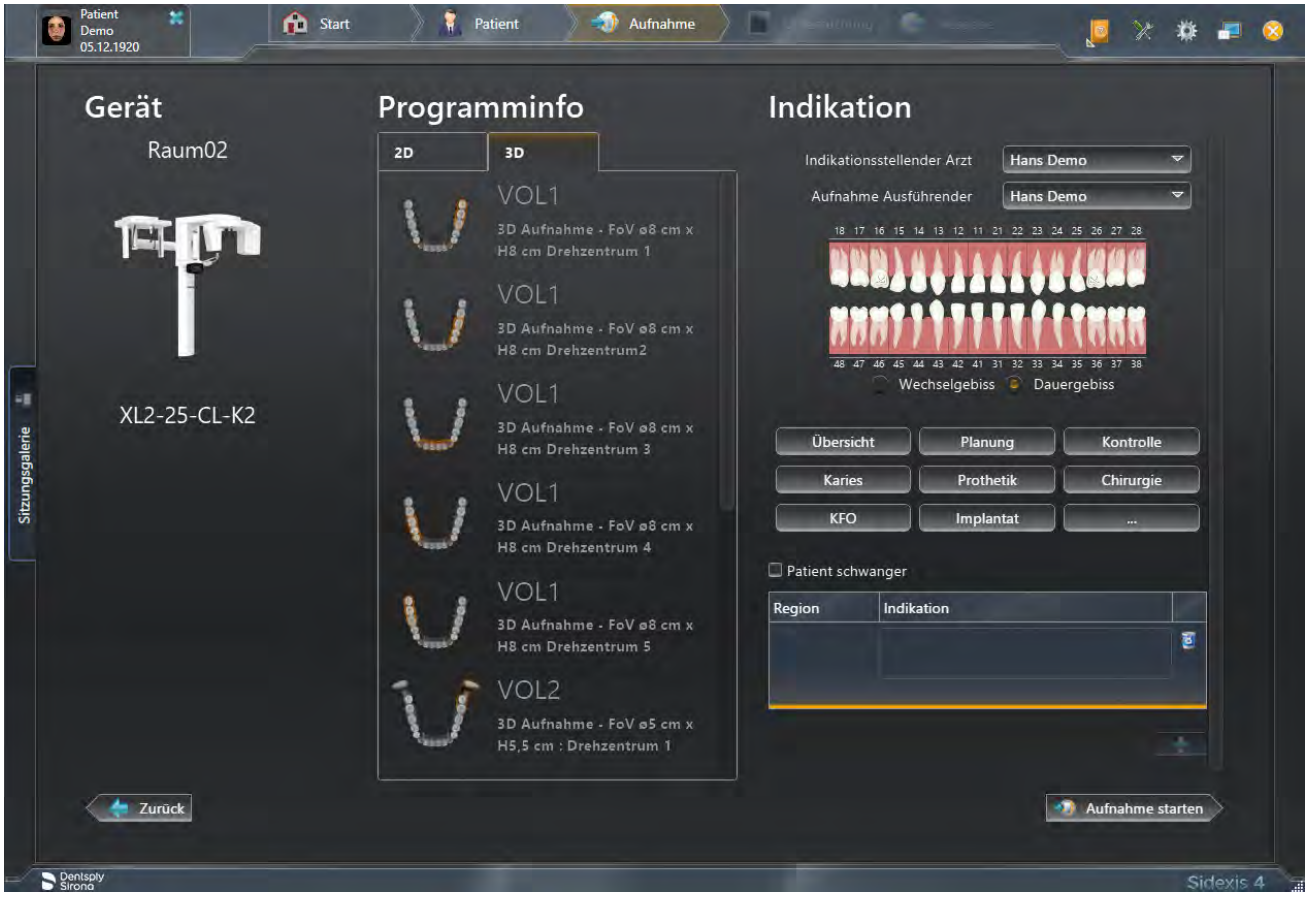
5.1.1.2 Enabling exposure readiness in Sidexis 4

The procedures for starting Sidexis 4, for registering a patient, and for selecting the *"Exposure"* work phase can be found in the technical document *"Sidexis 4 Operator´s Manual"* (REF 64 47 028).

- ✓ Sidexis 4 must be started.
- ✓ A patient must be registered.
- ✓ The *"Exposure"* work phase must be selected.



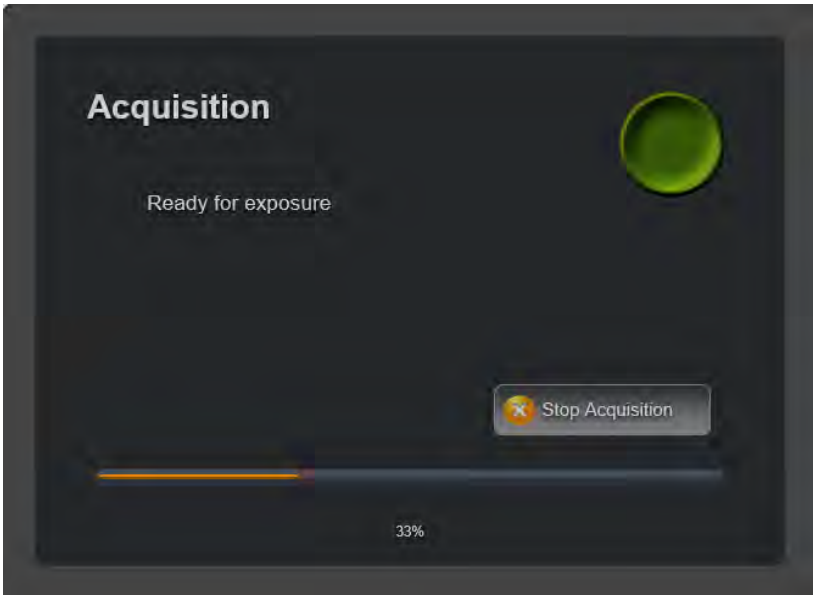
1. Select the X-ray unit for the exposure.



↳ The "Prepare exposure" dialog box appears.

2. Enter the indication for the exposure in the input field *"Indication"*.
3. Activate or deactivate the check box *"Patient pregnant"*.
4. Click the *"Start acquisition"* button.

↳ Sidexis 4 makes the unit ready for exposure.



Display of patient information

The "Patient information" dialog is displayed on the user interface of the unit after exposure readiness is activated in Sidexis 4. Depending on the configuration (either in Sidexis 4 or in the service routines of the unit), the name, date of birth and card-index number of the patient are displayed along with the set exposure parameters and the selected program.

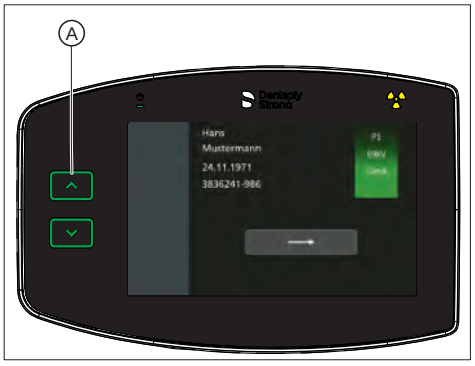
The display of patient information before every exposure can enabled or disabled by the service technician.
The factory setting is enabled.

In order to use the "Presetting of the unit height", the display of patient information must be enabled.

The display of patient information can be exited by tapping on the arrow on the user interface.

Presetting of the unit height

Starting from the second X-ray image, a patient-based presetting of the unit height can be made for the same patient before positioning the patient in the unit.



✓ The dialog for display of patient information must be enabled.
✓ Sidexis 4 is ready for exposure.
✓ If a presetting exists for this patient due to an earlier exposure, this is indicated by a green flashing height adjustment button.

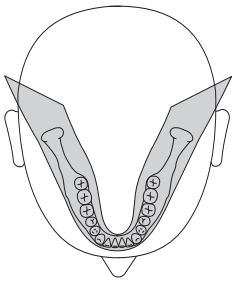
1. Press the flashing height adjustment button until the adjustment process of the unit height is independently completed by the unit and both height adjustment buttons light up permanently green (A)
   ↳ Presetting of the unit height is then complete.
2. Tap on the arrow shown on the user interface to exit the display of patient information and the presetting of the unit height.

5.1.2 Selecting an exposure program

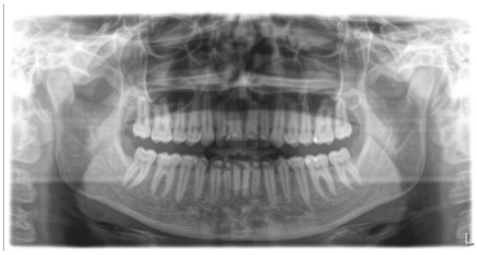
5.1.2.1 Panoramic and bite wing exposure

5.1.2.1.1 Program descriptions

5.1.2.1.1.1 P1 – Panoramic exposure

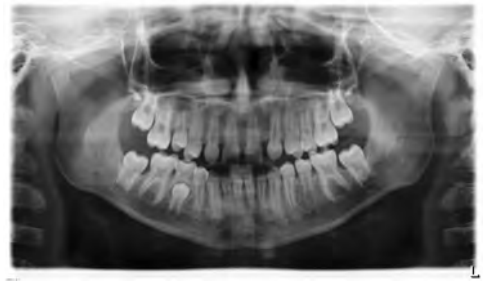


The exposure displays the full tooth region with ascending rami.

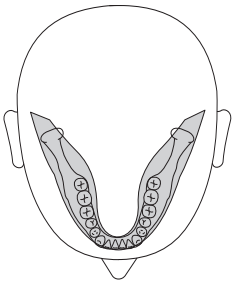


P1 A – Panoramic exposure, artifact-reduced

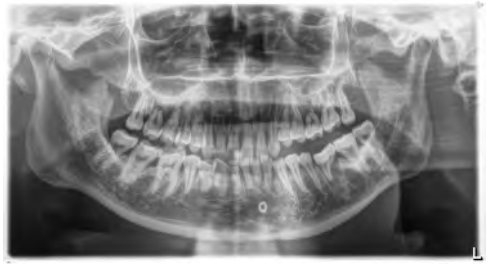
The exposure can be taken in an artifact-reduced format to avoid artifacts in the condylar and molar regions, and to reduce shadowing by the opposite jaw.

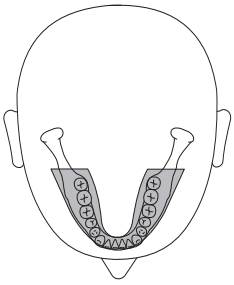


P1 C – Panoramic exposure, constant 1.25x magnification



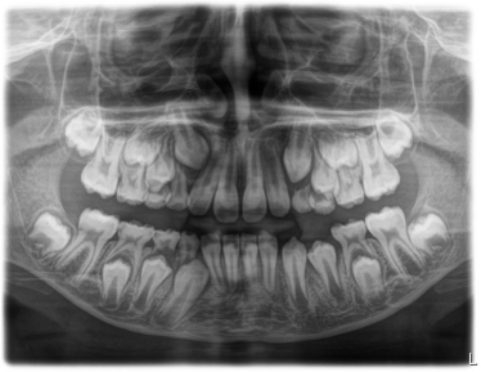
The exposure can be taken at a constant magnification of 1.25x, for example, for implantology.





5.1.2.1.1.2 P2 – Panoramic exposure, without ascending rami

The exposure represents a reduced tooth region without ascending rami.



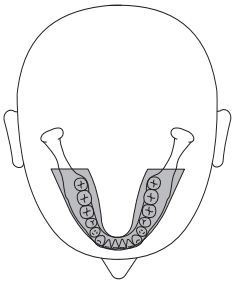
P2 A - Artifact-reduced panoramic exposure without ascending rami

The exposure can also be taken in an artifact-reduced format to avoid artifacts in the condylar and molar regions, and to reduce shadowing by the opposite jaw.

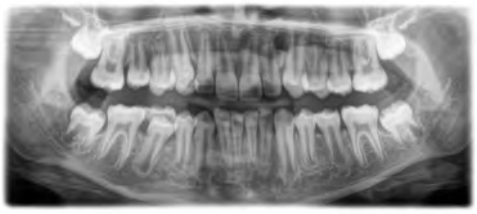
P2 C - Panoramic exposure without ascending rami at a constant magnification of 1.25x

The exposure can be taken at a constant magnification of 1.25x, for example, for implantology.

5.1.2.1.1.3 P10 – Panoramic exposure for children



The exposure represents a reduced tooth region without ascending rami. For this exposure the radiation dose is considerably reduced.



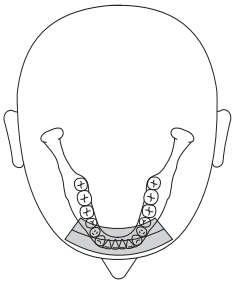
P10 A – Panoramic exposure for children, without ascending rami, artifact-reduced

The exposure can also be taken in an artifact-reduced format to avoid artifacts in the condylar and molar regions, and to reduce shadowing by the opposite jaw. For this exposure the radiation dose is considerably reduced.

P10 C – Panoramic exposure for children, without ascending rami, constant 1.25x magnification

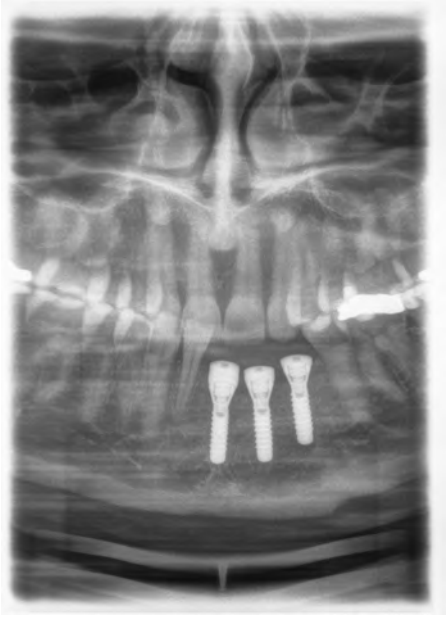
The exposure can be taken at a constant magnification of 1.25x, for example, for implantology. For this exposure the radiation dose is considerably reduced.

5.1.2.1.1.4 P12 – Thick slice, anterior tooth region

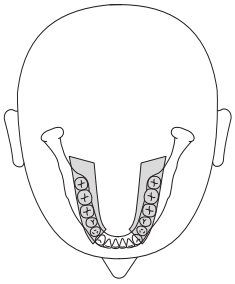


The exposure shows the anterior tooth region with a larger slice thickness, e.g. for implantology.

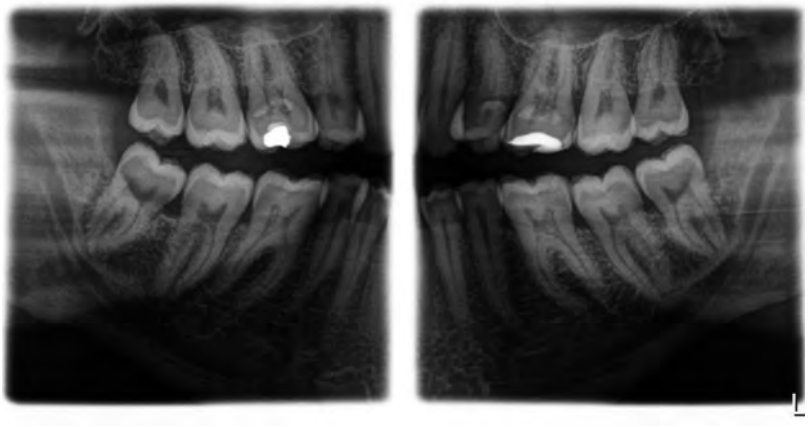
The image section can be selected for UJ/LJ.



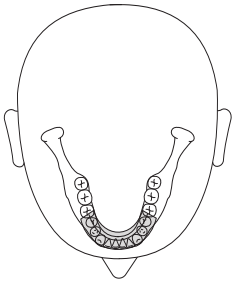
5.1.2.1.1.5 BW1 – Bite wing exposure in the posterior tooth region



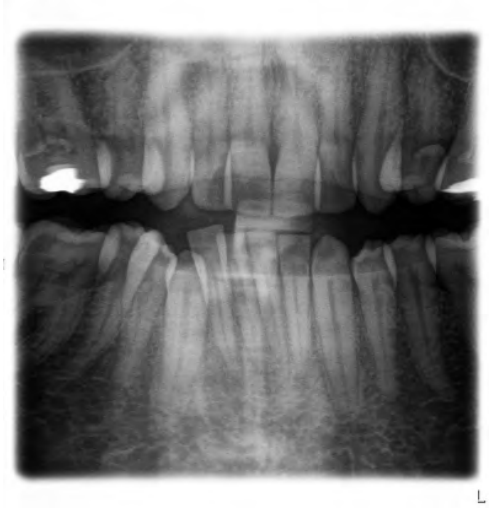
The exposure displays the posterior tooth regions with an image height restricted to the bite wing and an optimized projection.



5.1.2.1.1.6 BW2 – Bite wing exposure in the anterior tooth region



The exposure displays the anterior tooth regions with an image height restricted to the bite wing and an optimized projection.



5.1.2.1.2 Preparing the exposure

Depending on the patient or the exposure program, accessory parts must be replaced and the appropriate exposure mode must be selected; see "Installation and start-up" [→ 43].

You will require the following accessories:

- Chin rest with bite block rod or bar or
  yellow bite block or contact segment or
  universal bite block or occlusal bite block.

⚠ CAUTION

The chin rest must **not** be used for children when using programs BW1 and BW2. The positioning is otherwise too low.

IMPORTANT

For programs BW1 and BW2, the universal bite block must **not** be used above the black marking. The positioning is otherwise too low.

- Temple supports
- Forehead support

➢ Insert the accessory parts to be used into the unit and pull on the relevant hygienic protective sleeves, see "Hygienic protective sleeves" [→ 39].

➢ Switch SIDEXIS to a ready-for-exposure state; see ‘Switch SIDEXIS to ready-for-exposure state’.

5.1.2.1.3 Selecting an exposure program

⚠ CAUTION

Pressing the R key moves the unit to the starting position.

A patient positioned in the unit may be injured by moving parts.

➢ Check that a patient is not positioned in the unit before moving it to the starting position.

✓ The unit is switched on and ready for exposure.

1. Touch the Pan symbol at the top of the touchscreen.
   ↳ The Pan program group is selected.
2. Select an exposure program. To do this, touch the arrow keys **+C** and **-A**. If a subroutine, e.g. without artifacts or 1.25x magnification, is available for this program, the program display is grayed out. Touch the program display **B** several times. All subroutines of the selected program are displayed one by one.
3. Follow the instructions in the comment line on the touchscreen. If required, press the R key to move the unit back to the starting position.
   ↳ The diaphragm and the sensor move into the starting position.

↳ The exposure program is selected.

NOTE

The PAN/3D sensor unit is rotated via a motor drive.

The gearing of the sensor unit can be damaged if it is turned by hand.

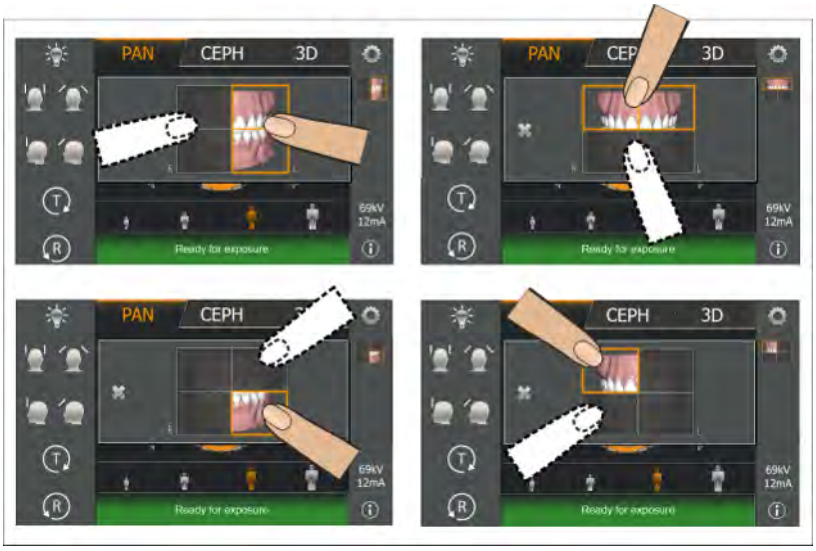
➢ Press the R key to rotate the sensor unit back to the starting position via the motor drive. The sensor unit is always rotated in combination with the entire main rotation unit. The combisensor travels to the proper starting position for panoramic, Ceph, or 3D exposures, depending on the program group selected.

5.1.2.1.4 Setting quadrants

The exposure can be restricted to quadrants. You can select a half-view of the right or left jaw in programs P1, P2, P10 and BW1, or upper jaw/ lower jaw in programs P1, P2, P10 and P12. In P1, P2, P10, also for constant magnification and artifact-reduced view.

✓ Level 1 (X-raying of patients) is displayed on the touchscreen.

1. Press the quadrant symbol **A** on the right side of the touchscreen.
   ↳ A submenu line is opened.
2. Select the desired quadrants. See the figure below. Quadrants can be selected as half-views or individually. Touch the quadrant field in the center to reactivate the full view.
   ↳ The selected quadrants are emphasized or the non-selected ones are grayed out.



3. Touch the cross on the left side of the submenu line.

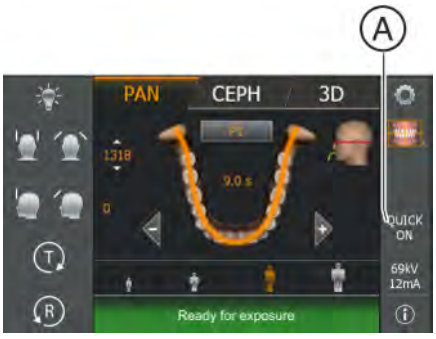
or

➢ Touch the quadrant symbol **A** again.
   ↳ The submenu line is closed.

↳ The quadrant or quadrants are set.

IMPORTANT
The program duration for individual quadrant exposures corresponds to the program duration for half-view exposures.

5.1.2.1.5 Adjusting the Quickshot function



✓ Level 1 is displayed on the touchscreen.

1. Touch the Quickshot display **A** on the right side of the touchscreen.
   ↳ A submenu line is opened.

2. Press the *Quick On* or *Quick Off* symbols on the touchscreen.
   ↳ The selection is highlighted orange in the submenu line.
3. Touch the cross on the left side of the submenu line.

or

➢ Touch the Quick symbol **A** again.
   ↳ The submenu line is closed.

↳ The Quickshot function is set.

5.1.2.1.6 Setting the temple width

The set temple support width changes the radiation time slightly.
The slice width for different dental arches is automatically selected in P1, P2, P10 and their subprograms.

5.1.2.1.7 Setting the kV/mA values

Setting the kV/mA values via the patient symbols

Preset kV/mA combinations are assigned to the patient symbols, which are selected according to the patient's size and weight. The symbols roughly correspond to child, youth/woman, woman/man, hefty persons.

✓ Level 1 is displayed on the touchscreen.

➢ Touch the required patient symbol.

↳ The selection **(A)** is highlighted in orange. The selected kV/mA value is displayed on the right side of the touchscreen.

↳ The kV/mA value is set.

Setting the kV/mA values via the submenu line

If the preset kV/mA combinations do not provide a satisfactory result, you can also set the kV/mA values manually in all programs.

✓ Level 1 is displayed on the touchscreen.

1. Touch the kV/mA symbol **(B)** on the right side of the touchscreen.
   ↳ A submenu line is opened.

2. Select a kV/mA value. Touch the - or + keys.
   ↳ The selected kV/mA value is displayed.
3. Touch the cross on the left side of the submenu line.

or

➢ Touch the kV/mA symbol **(B)** again.

↳ The submenu line is closed.

↳ The kV/mA value is set.

5.1.2.1.8 Positioning the patient

The patient is positioned on the unit while standing. Positioning in the seat is also possible without issue.

⚠ CAUTION

The height adjustment motor starts slowly and then increases its speed.

A patient positioned in the unit may be injured by moving parts.

➢ Monitor the patient and the movement of the unit during height adjustment! To make minor corrections, press and immediately release the buttons. Release the button immediately in the event of unwanted contact of the unit with the patient.

⚠ CAUTION

Hazard due to laser light.

Patients and users can be blinded by the laser light localizer.

➢ Prior to activating the laser light localizers, the patient **must** be asked to shut their eyes.

➢ Do not stare directly into the laser beam. Make sure that the laser beam does not meet the eyes of the patient.

➢ A distance of at least 10 cm must be maintained between the eye and the laser.

⚠ CAUTION

Reduced image quality

The image quality is adversely affected by metal or other radiopaque materials located in the patient's mouth and in its vicinity.

➢ Ask the patient to take off all metallic objects such as glasses and jewelry in the head and neck area as well as all removable dental prostheses. The tray in front of the control mirror is used for depositing jewelry.

Tip: Reference values are shown for the height and forehead support settings, which are saved for further exposures in the additional information area of the SIDEXIS software.

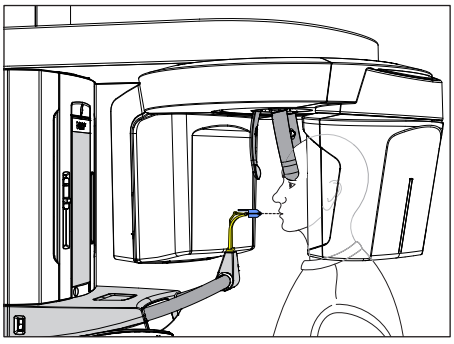
5.1.2.1.8.1 Positioning with an occlusal bite block

The occlusal bite block sets the inclination according to the occlusal plane by default. This results in fewer overlaps in the anterior tooth and upper jaw area.

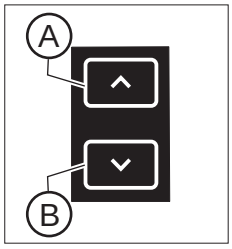
If required, the service engineer can adjust the angle to the Frankfort horizontal plane in order to preset the Frankfort horizontal plane (see Service Manual).

✓ The occlusal bite block with foam bite block is inserted in the unit. Blue arrows appear on the touchscreen.

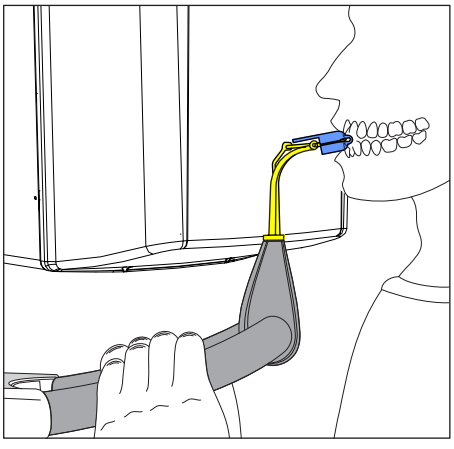
✓ The forehead support and temple supports are inserted in the unit. The hygienic protective sleeves are pulled on.



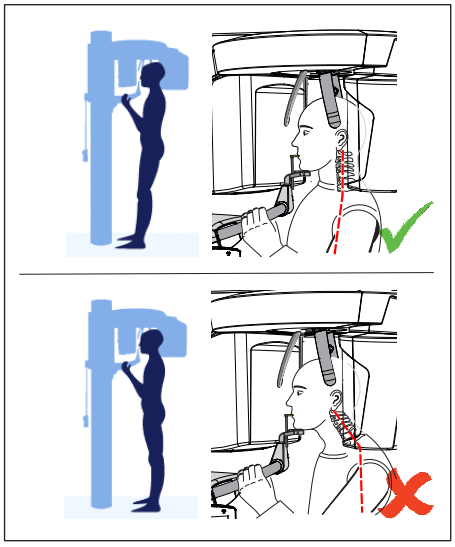
1. Guide the patient in front of the control mirror.



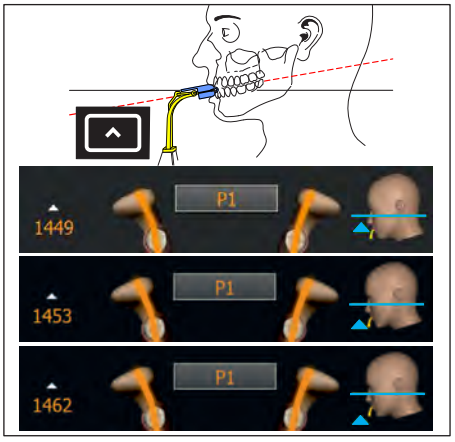
2. Set the unit height using the up **A** and down **B** buttons. The height adjustment buttons are illuminated and show the direction in which the unit is to be moved by a blue arrow.
CAUTION! The height adjustment motor starts slowly and then increases its speed.
Press and hold down the button until the desired height is reached. The unit movement is accompanied by a beep.
Release the height adjustment buttons once the bite block plate and the patient's anterior teeth are at the same height.
3. Guide the patient to the unit and instruct them to hold the handles with both hands.



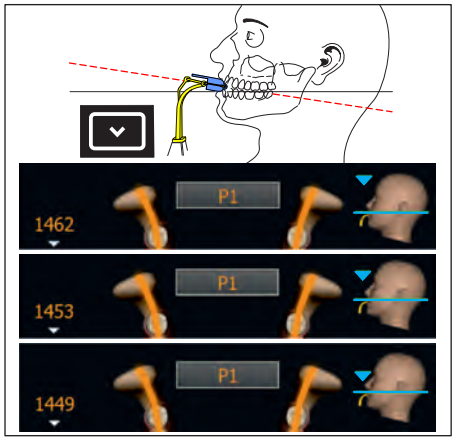
4. Instruct the patient to bite into the grooves of the bite block foam with the teeth.
   ↳ If necessary, push the lower anterior teeth forwards until they reach a stop.



5. Check the position of the patient's spine.
   - Ensure that the patient's spine is slightly inclined, as shown in the diagram.
     Tip: To achieve the correct positioning of the spine, ask the patient to take a small step towards the column of the unit. The patient's cervical vertebrae are thus stretched. This prevents shadowing of the anterior tooth region on the X-ray.

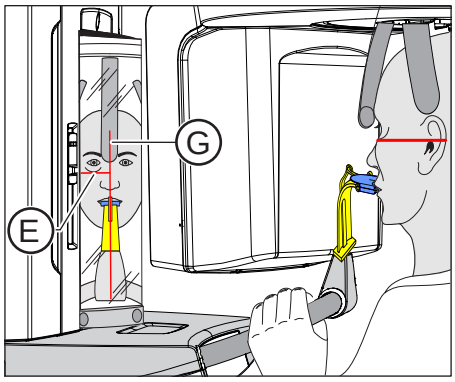


6. Use the blue arrows on the touchscreen to align the patient's head inclination until the desired position is reached. Instruct the patient to let their head rest.
   If the green arrow on the touchscreen points up, press the height adjustment up button **A**.
   CAUTION! If no change in the angle of the bite block plate is detected within approx. 3 seconds, the height adjustment motor runs at a higher speed.

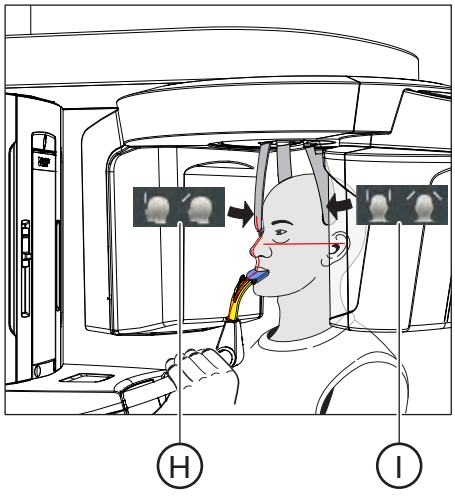


7. If the blue arrow points downwards, press the down button **B**.
   - The inclination of the patient's head changes according to the height of the unit. While the angle of the bite block plate is being changed, the unit height can only be adjusted at a very slow speed.
   - The blue arrow on the head symbol indicates how far the unit height must be moved until the nominal position for head inclination is reached. The inclination of the displayed head symbol also changes accordingly.
   - Once the desired position is reached, the movement stops automatically and a beep is sounded by the user interface.

8. Switch on the light localizer. **CAUTION! Risk of dazzle**
   - Two red laser lines reflect on the patient's head. To switch off the light localizer, press the key again. It switches off automatically after approx. 100 seconds.



9. Align the patient with the central laser line **G**.
   ↳ The laser line reflects in the center of the patient's anterior teeth or face (mid-sagittal). The head inclination is already set using the occlusal bite block and the laser line E can be ignored.



10. Press the temple support adjustment key **I**.
    ↳ When the temple supports touch the patient’s head, they stop automatically.
11. Press the forehead support adjustment key **H** until the forehead support comes in contact with the patient.
    ↳ When the forehead support touches the patient's head, it stops automatically.
    Make sure that the patient's head does not move backwards after contacting the forehead support.
12. Instruct the patient to exhale, place his tongue against the roof of his mouth, and hold this position until the end of the exposure.

↳ The patient is positioned in the unit.

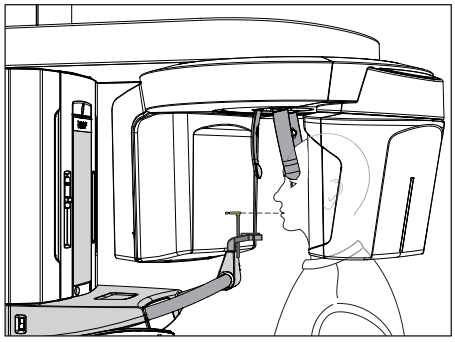
If the occlusal bite block remains inserted in the bite block holder after the exposure is complete and you select an exposure program that is not intended for the use of the occlusal bite block, the help message "H307 - Change bite block " will appear in the comment line. Insert the bite block or contact segment required for this exposure. The help message disappears as soon as the occlusal bite block is removed.

IMPORTANT
In P1, P2, P10, the slice width is selected automatically for different dental arches with the temple support setting, and the radiation time is also changed slightly through this in accordance with the temple support width which is set.

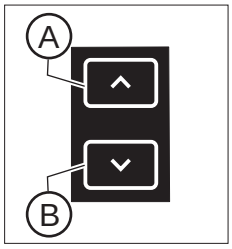
5.1.2.1.8.2 Positioning with chin rest and rod for bite block

✓ The chin rest and bite block segment, as well forehead support and temple supports are inserted in the unit.

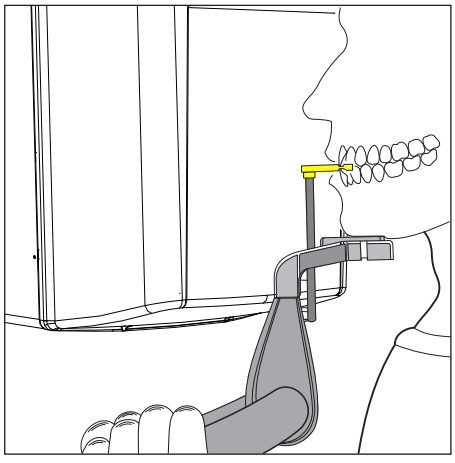
✓ The relevant hygienic protective sleeves are pulled over the accessories.



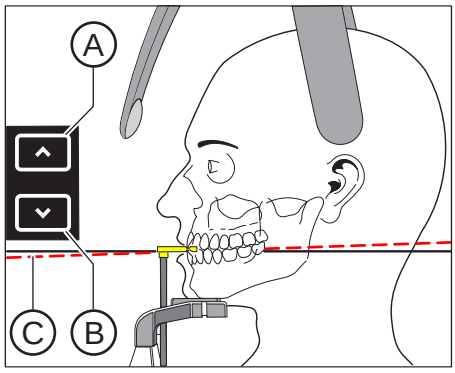
1. Guide the patient in front of the control mirror.



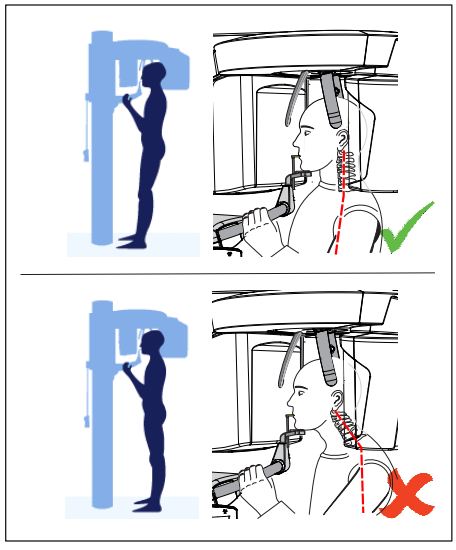
2. Set the unit height using the up **A** and down **B** buttons.
   CAUTION! The height adjustment motor starts slowly and then increases its speed.
   Press and hold down the button until the desired height is reached.
   The unit movement is accompanied by a beep.
   Release the height adjustment buttons once the patient's chin and the chin rest on the unit are at the same height.
3. Turn the bite block away from the patient.
   ↳ The bite block is pointing towards the control mirror.
4. Instruct the patient to place his chin on the chin rest and place both hands on the hand grips.



5. Turn the bite block towards the patient and instruct him to bite on the bite block.
   ↳ The patient's anterior teeth are positioned in the indentation in the bite block. If necessary, push the lower anterior teeth forwards until they reach a stop.

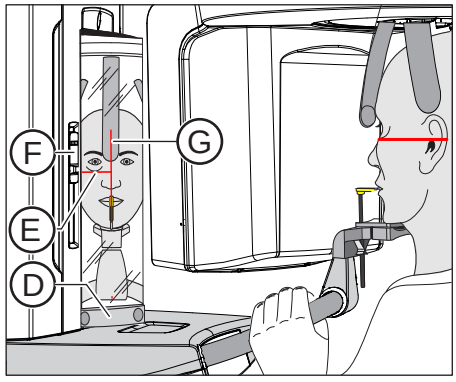


6. Check the patient's occlusal plane **C**. Adjust the unit height using the up **A** and down **B** buttons.
   ↳ The occlusal plane is slightly inclined toward the front.

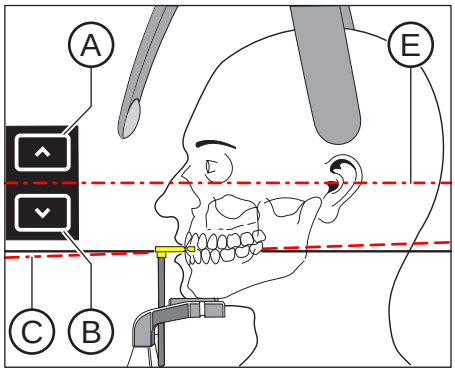


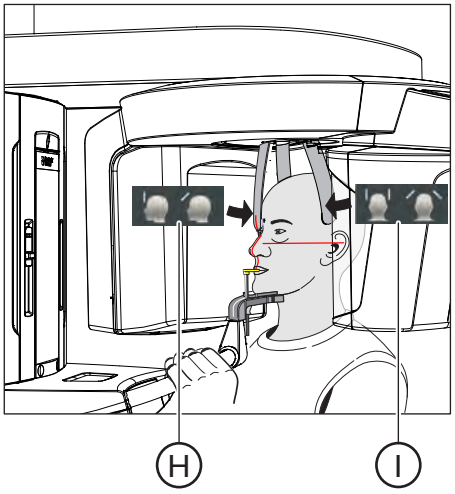
7. Check the position of the patient's spine.
   ↳ Ensure that the patient's spine is slightly inclined, as shown in the diagram.
   Tip: To achieve the correct positioning of the spine, ask the patient to take a small step towards the column of the unit. The patient's cervical vertebrae are thus stretched. This prevents shadowing of the anterior tooth region on the X-ray.
8. Swivel the control mirror outwards. Press the left recess on the touchbar **D**.
   ↳ You can see the patient in the control mirror.

9. Switch on the light localizer. **CAUTION! Risk of dazzle**
   ↳ Two red laser lines reflect on the patient's head. To switch off the light localizer, press the key again. It switches off automatically after approx. 100 seconds.



10. Align the patient with the central laser line **G**.
    ↳ The laser line reflects in the center of the patient's anterior teeth or face (mid-sagittal).



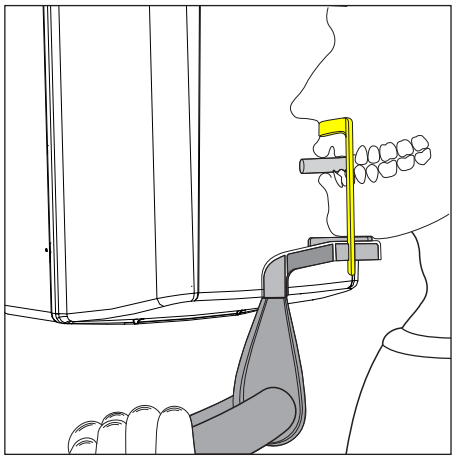


11. Align the patient's head according to the Frankfort horizontal plane **E**.
    Tip: The Frankfort horizontal plane is used as a reference plane. It runs between the upper edge of the ear canal and the lowest point of the lower edge of the eye socket.
12. Adjust the height of the light localizer using the slider **F**.
    ↳ The laser line reflects on the upper edge of the outer ear canal.
13. Correct the patient's head inclination as necessary. Briefly tap on the up **A** and down **B** height adjustment buttons.
    ↳ The laser line reflects on the lowest point of the lower edge of the eye socket.
14. Press the desired temple support adjustment key **I**.
    ↳ When the temple supports touch the patient's head, they stop automatically.
15. Press the desired forehead support adjustment key **H**.
    ↳ When the forehead support touches the patient's head, it stops automatically.
    Make sure that the patient's head does not move backwards after contacting the forehead support.
16. Check the patient's position and make any final corrections as necessary.
17. Swivel the control mirror back into place. Press the right recess on the touchbar **D**.
    ↳ The patient can see himself in the control mirror.
18. Instruct the patient to exhale, place his tongue against the roof of his mouth, and hold this position until the end of the exposure.

↳ The patient is positioned in the unit.

IMPORTANT
In P1, P2, P10, the slice width is selected automatically for different dental arches with the temple support setting, and the radiation time is also changed slightly through this in accordance with the temple support width which is set.

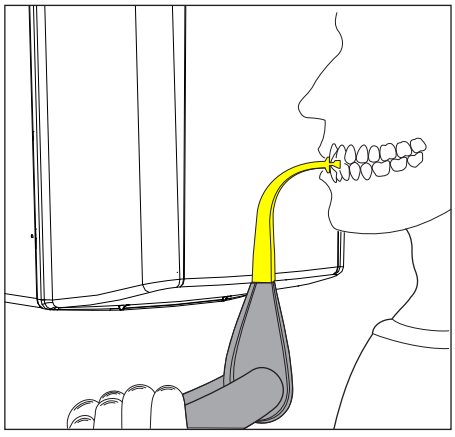
5.1.2.1.8.3 Positioning with chin rest and bar



- ✓ The patient has no or only a few anterior teeth.
- ✓ The chin support and bar, and the forehead support and temple supports are inserted in the unit.
- ✓ The relevant hygienic protective sleeves are pulled over the accessories.

1. Instruct the patient to place his chin on the chin rest and place both hands on the hand grips.
2. Instruct the patient to place his subnasale (the base of his nose) against the bar. If the patient's lower jaw contains anterior teeth, place the bar between his chin and his lower lip.
3. Place a cotton roll between the patient's upper and lower jaw.
   - ↳ The patient's upper and lower jaw are aligned.
4. Proceed as described under "Positioning with chin rest and rod for bite block" from step 6.

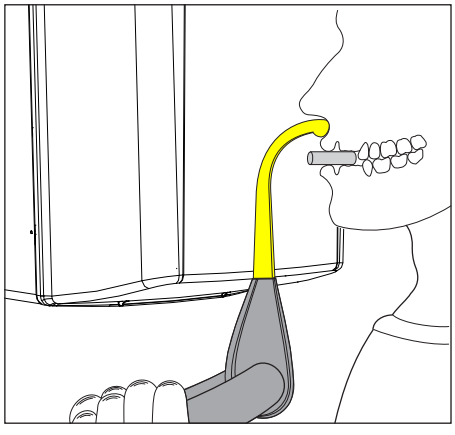
5.1.2.1.8.4 Positioning with bite block



- ✓ The yellow bite block, forehead support and temple supports are inserted in the unit.
- ✓ The relevant hygienic protective sleeves are pulled over the accessories.

1. Instruct the patient to hold the handles with both hands and bite into the bite block.
   - ↳ The patient's anterior teeth are positioned in the indentation in the bite block. If necessary, push the lower anterior teeth forwards until they reach a stop.
2. Proceed as described under "Positioning with chin rest and rod for bite block" from step 6.

5.1.2.1.8.5 Positioning with contact segment



- ✓ The patient has no or only a few anterior teeth.
- ✓ The yellow contact segment, forehead support and temple supports are inserted in the unit.
- ✓ The relevant hygienic protective sleeves are pulled over the accessories.

1. Instruct the patient to hold the handles with both hands and place his subnasale (the base of his nose) against the contact segment.
2. Place a cotton roll between the patient's upper and lower jaw.
   - ↳ The patient's upper and lower jaw are aligned.
3. Proceed as described under "Positioning with chin rest and rod for bite block" from step 6.

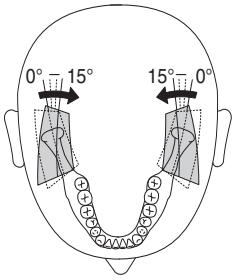
5.1.2.2 Temporomandibular joint exposure

5.1.2.2.1 Program descriptions

IMPORTANT
Note the information on the two-part exposure programs in the "Releasing the exposure" chapter, see “Two-part exposure programs [→ 125]“.

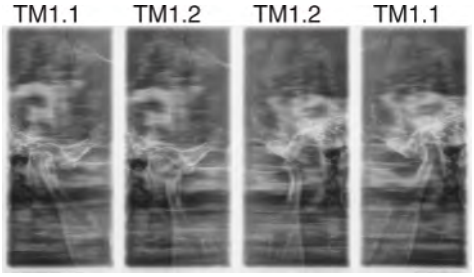
5.1.2.2.1.1 TM1.1 / TM1.2 – Lateral view of temporomandibular joints with mouth open and closed

(Two-part exposure program)

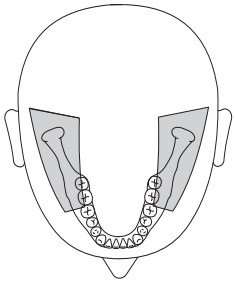


This exposure displays the temporomandibular joints from a lateral aspect with the mouth open and closed and provides 4 views in one image.

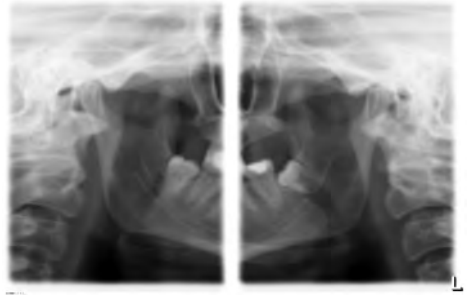
This program enables angle preselection (0°, 5°, 10°, and 15°) for the temporomandibular joint area.



5.1.2.2.1.2 TM3 – Temporomandibular joints lateral, ascending rami



The exposure shows a lateral projection of the temporomandibular joints with ascending rami, with 2 views in one image.



5.1.2.2.2 Preparing the exposure

Depending on the patient or the exposure program, accessory parts must be replaced and the appropriate exposure mode must be selected; see "Installation and start-up" [→ 43].

You will require the following accessories:

- Temporomandibular joint supports with ear holders
- Forehead support

➢ Insert the accessory parts to be used into the unit and pull on the relevant hygienic protective sleeves, see "Hygienic protective sleeves" [→ 39].

➢ Switch SIDEXIS to a ready-for-exposure state; see ‘Switch SIDEXIS to ready-for-exposure state’.

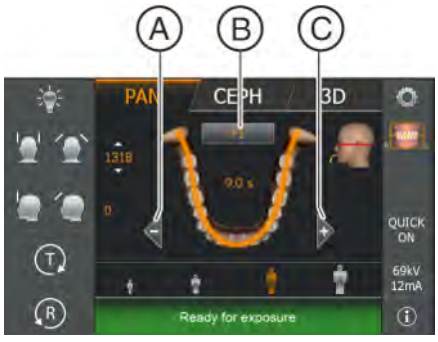
5.1.2.2.3 Selecting an exposure program

⚠ CAUTION

Pressing the R key moves the unit to the starting position.

A patient positioned in the unit may be injured by moving parts.

➢ Check that a patient is not positioned in the unit before moving it to the starting position.

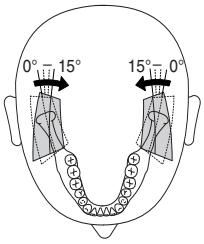


✓ The unit is switched on and ready for exposure.

1. Touch the Pan symbol at the top of the touchscreen.
   ↳ The Pan program group is selected.
2. Select the exposure program. Touch the arrow keys + **C** and - **A**.
   ↳ The exposure program is displayed in the program display **(B)**.
3. Follow the instructions in the comment line on the touchscreen. Press the R key if necessary.
   ↳ The diaphragm and the sensor move into the starting position.

↳ The exposure program is selected.

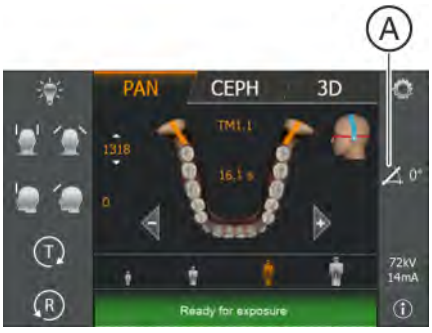
5.1.2.2.4 Adjusting the angle preselection



TM1

In the TM1 exposure program, angle (0°, 5°, 10° and 15°) can be preset for the temporomandibular joint area. This can be helpful if more detailed analyses of the temporomandibular joint are necessary, but the standard projections (0°) do not provide an optimal image.

The figure shows the direction in which the slice orientation is being swiveled during angle preselection.



✓ Level 1 is displayed on the touchscreen.

1. Touch the angle preselection symbol **(A)** on the right side of the touchscreen.
   ↳ A submenu line is opened.

2. Select the corresponding angle preselection.
   ↳ The selection is highlighted orange in the submenu line. The selected angle preselection is displayed on the right side of the touchscreen.
3. Touch the cross on the left side of the submenu line.

or

➢ Touch the angle preselection symbol **(A)** again.
   ↳ The submenu line is closed.

↳ The angle preselection is set.

IMPORTANT
When you confirm the exposure with the R key, the angle setting that was changed in the submenu line will automatically be reset to the default setting of 0°.

5.1.2.2.5 Setting the kV/mA values

Setting the kV/mA values via the patient symbols

Preset kV/mA combinations are assigned to the patient symbols, which are selected according to the patient's size and weight. The symbols roughly correspond to child, youth/woman, woman/man, hefty persons.

✓ Level 1 is displayed on the touchscreen.

➢ Touch the required patient symbol.

↳ The selection **(A)** is highlighted in orange. The selected kV/mA value is displayed on the right side of the touchscreen.

↳ The kV/mA value is set.

Setting the kV/mA values via the submenu line

If the preset kV/mA combinations do not provide a satisfactory result, you can also set the kV/mA values manually in all programs.

✓ Level 1 is displayed on the touchscreen.

1. Touch the kV/mA symbol **(B)** on the right side of the touchscreen.
   ↳ A submenu line is opened.

2. Select a kV/mA value. Touch the - or + keys.
   ↳ The selected kV/mA value is displayed.
3. Touch the cross on the left side of the submenu line.

or

➢ Touch the kV/mA symbol **(B)** again.

↳ The submenu line is closed.

↳ The kV/mA value is set.

5.1.2.2.6 Positioning the patient

The patient is positioned on the unit while standing. Positioning in the seat is also possible without issue.

⚠ CAUTION

The height adjustment motor starts slowly and then increases its speed.

A patient positioned in the unit may be injured by moving parts.

➢ Monitor the patient and the movement of the unit during height adjustment! To make minor corrections, press and immediately release the buttons. Release the button immediately in the event of unwanted contact of the unit with the patient.

⚠ CAUTION

Hazard due to laser light.

Patients and users can be blinded by the laser light localizer.

➢ Prior to activating the laser light localizers, the patient **must** be asked to shut their eyes.

➢ Do not stare directly into the laser beam. Make sure that the laser beam does not meet the eyes of the patient.

➢ A distance of at least 10 cm must be maintained between the eye and the laser.

⚠ CAUTION

Reduced image quality

The image quality is adversely affected by metal or other radiopaque materials located in the patient's mouth and in its vicinity.

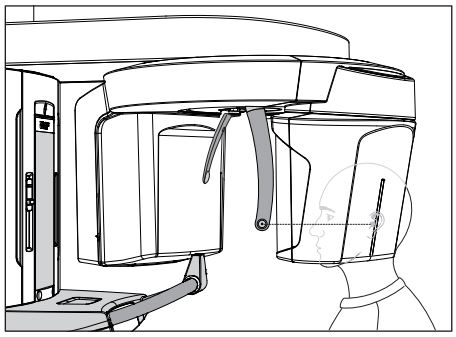
➢ Ask the patient to take off all metallic objects such as glasses and jewelry in the head and neck area as well as all removable dental prostheses. The tray in front of the control mirror is used for depositing jewelry.

Tip: Reference values are shown for the height and forehead support settings, which are saved for further exposures in the additional information area of the SIDEXIS software.

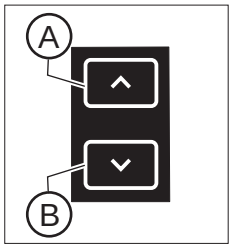
5.1.2.2.6.1 Positioning for a lateral temporomandibular joint exposure

✓ The forehead support and temporomandibular joint supports with ear olives are plugged into the unit (1 right, 2 left, see "Changing the temple supports and temporomandibular joint supports".

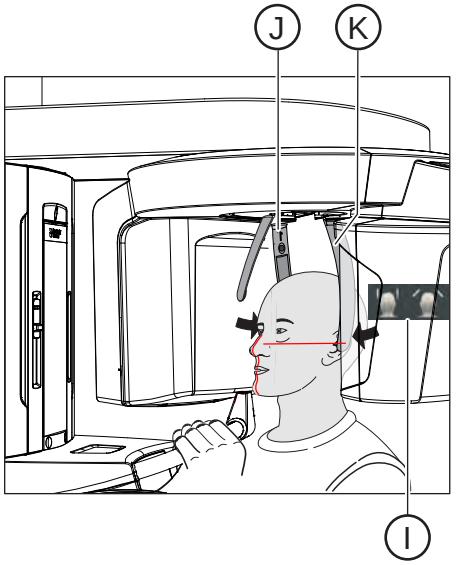
✓ The relevant hygienic protective sleeves are pulled over the accessories.



1. Guide the patient in front of the control mirror.

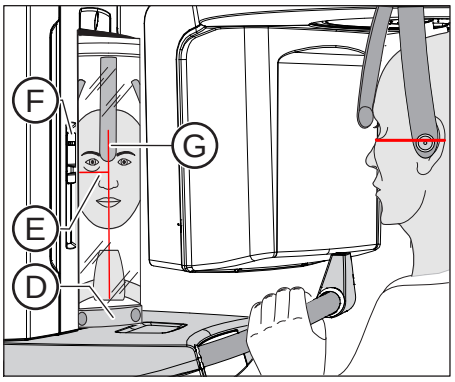


2. Set the unit height using the up **A** and down **B** buttons.
CAUTION! The height adjustment motor starts slowly and then increases its speed.
Press and hold down the height adjustment key until the unit has reached the desired height. The unit movement is accompanied by a beep.
Release the height-adjustment buttons once the ear holders of the temporomandibular joint supports are at the same height as that of the patient's ears.
3. Instruct the patient to position himself between the temporomandibular joint supports and hold the handles with both hands.

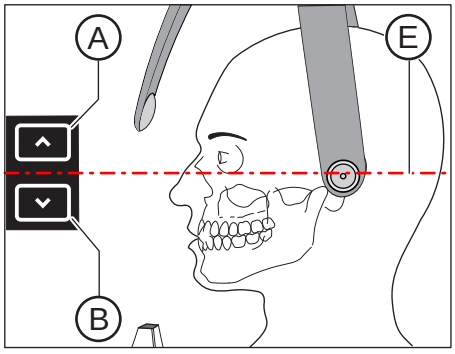


4. Close the temporomandibular joint supports **J** and **K**. Press the desired key **I**.
   ↳ The temporomandibular joint supports stop automatically when they come into contact with the patient's head. The patient is stabilized at the unit by the ear olives.
5. Swivel the control mirror outwards. Press the left recess on the touchbar **D**.
   ↳ You can see the patient in the control mirror.

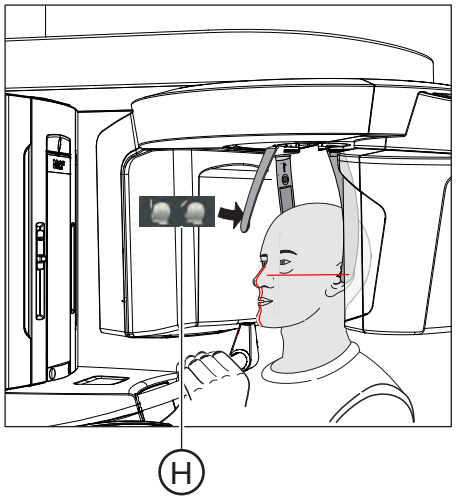
6. Switch on the light localizer. **CAUTION! Risk of dazzle**
   ↳ Two red laser lines reflect on the patient’s head. To switch off the light localizer, press the key again. It switches off automatically after approx. 100 seconds.



7. Align the patient with the central laser line **G**.
   ↳ The laser line reflects in the center of the patient's anterior teeth or face (mid-sagittal).



8. Align the patient's head according to the Frankfort horizontal plane **E**.
9. Adjust the height of the light localizer using the slider **F**.
   ↳ The laser line reflects on the upper edge of the outer ear canal.
10. Correct the patient's head inclination as necessary. Briefly tap on the up **A** and down **B** height adjustment buttons.
    ↳ The laser line reflects on the lowest point of the lower edge of the eye socket.



11. Press the desired forehead support adjustment key **H**.
    ↳ The forehead supports stop moving automatically when they come into contact with the patient's forehead.
    Ensure that the patient's head does not move backward after contact with forehead support.
12. Check the patient's position and make any final corrections as necessary.
13. Swivel the control mirror back into place. by pressing the right recess on the touchbar **D**.
    ↳ The patient can see himself in the control mirror.
14. Instruct the patient to exhale, place his tongue against the roof of his mouth, and hold this position until the end of the exposure.

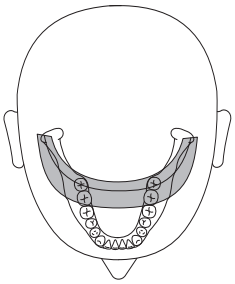
↳ The patient is positioned in the unit.

IMPORTANT
Note the information on the two-part exposure programs in the "Releasing the exposure" chapter, see “Two-part exposure programs [→ 125]“.

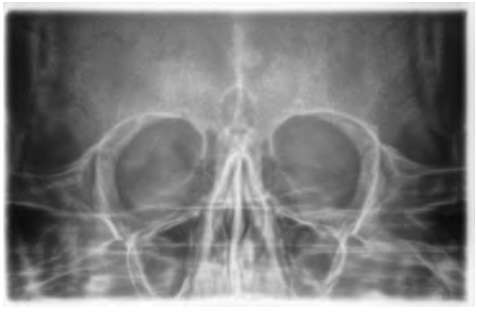
5.1.2.3 Sinus view

5.1.2.3.1 Program descriptions

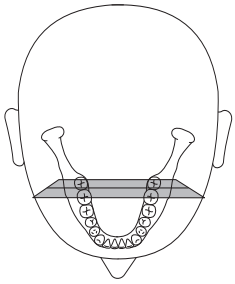
5.1.2.3.1.1 S1 – Paranasal sinuses



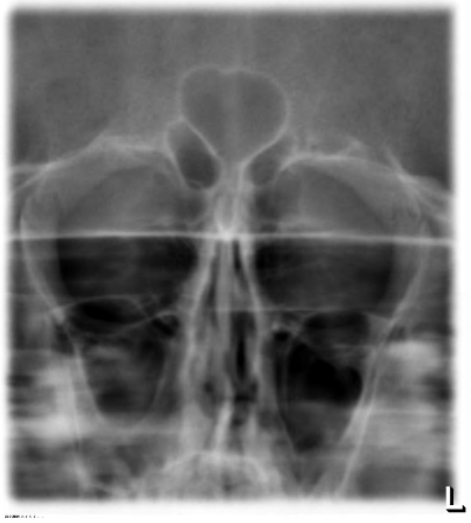
This exposure shows the paranasal sinuses e.g. for the diagnosis of orbital floor fractures.



5.1.2.3.1.2 S3 – Paranasal sinuses, linear slice orientation



This exposure shows the paranasal sinuses e.g. for the diagnosis of orbital floor fractures. The section has a linear orientation.



5.1.2.3.2 Preparing the exposure

Depending on the patient or the exposure program, accessory parts must be replaced and the appropriate exposure mode must be selected; see "Installation and start-up" [→ 43].

You will require the following accessories:

- Blue bite block or contact segment
- Temporomandibular joint supports with contact pads
- Forehead support

➢ Insert the accessory parts to be used into the unit and pull on the relevant hygienic protective sleeves, see "Hygienic protective sleeves" [→ 39].

➢ Switch SIDEXIS to a ready-for-exposure state; see ‘Switch SIDEXIS to ready-for-exposure state’.

5.1.2.3.3 Selecting an exposure program

⚠ CAUTION

Pressing the R key moves the unit to the starting position.

A patient positioned in the unit may be injured by moving parts.

➢ Check that a patient is not positioned in the unit before moving it to the starting position.

✓ The unit is switched on and ready for exposure.

1. Touch the Pan symbol at the top of the touchscreen.
   ↳ The Pan program group is selected.
2. Select the exposure program. Touch the arrow keys + **C** and - **A**.
   ↳ The exposure program is displayed in the program display **(B)**.
3. Follow the instructions in the comment line on the touchscreen. Press the R key if necessary.
   ↳ The diaphragm and the sensor move into the starting position.

↳ The exposure program is selected.

5.1.2.3.4 Setting the kV/mA values

Setting the kV/mA values via the patient symbols

Preset kV/mA combinations are assigned to the patient symbols, which are selected according to the patient's size and weight. The symbols roughly correspond to child, youth/woman, woman/man, hefty persons.

✓ Level 1 is displayed on the touchscreen.

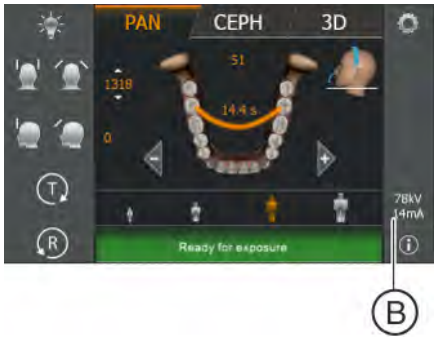
➢ Touch the required patient symbol.

↳ The selection **(A)** is highlighted in orange. The selected kV/mA value is displayed on the right side of the touchscreen.

↳ The kV/mA value is set.

Setting the kV/mA values via the submenu line

If the preset kV/mA combinations do not provide a satisfactory result, you can also set the kV/mA values manually in all programs.



✓ Level 1 is displayed on the touchscreen.

1. Touch the kV/mA symbol **(B)** on the right side of the touchscreen.
   ↳ A submenu line is opened.

2. Select a kV/mA value. Touch the - or + keys.
   ↳ The selected kV/mA value is displayed.
3. Touch the cross on the left side of the submenu line.

or

➢ Touch the kV/mA symbol **(B)** again.

↳ The submenu line is closed.

↳ The kV/mA value is set.

5.1.2.3.5 Positioning the patient

The patient is positioned on the unit while standing. Positioning in the seat is also possible without issue.

⚠ CAUTION

The height adjustment motor starts slowly and then increases its speed.

A patient positioned in the unit may be injured by moving parts.

➢ Monitor the patient and the movement of the unit during height adjustment! To make minor corrections, press and immediately release the buttons. Release the button immediately in the event of unwanted contact of the unit with the patient.

⚠ CAUTION

Hazard due to laser light.

Patients and users can be blinded by the laser light localizer.

➢ Prior to activating the laser light localizers, the patient **must** be asked to shut their eyes.

➢ Do not stare directly into the laser beam. Make sure that the laser beam does not meet the eyes of the patient.

➢ A distance of at least 10 cm must be maintained between the eye and the laser.

⚠ CAUTION

Reduced image quality

The image quality is adversely affected by metal or other radiopaque materials located in the patient's mouth and in its vicinity.

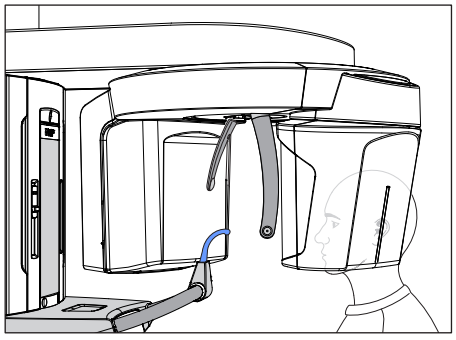
➢ Ask the patient to take off all metallic objects such as glasses and jewelry in the head and neck area as well as all removable dental prostheses. The tray in front of the control mirror is used for depositing jewelry.

Tip: Reference values are shown for the height and forehead support settings, which are saved for further exposures in the additional information area of the SIDEXIS software.

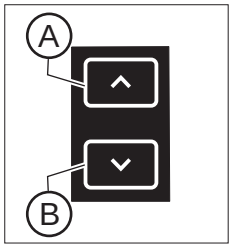
5.1.2.3.5.1 Positioning for paranasal sinus exposures

✓ The blue contact segment and the temporomandibular joint supports with contact pads are inserted into the unit.

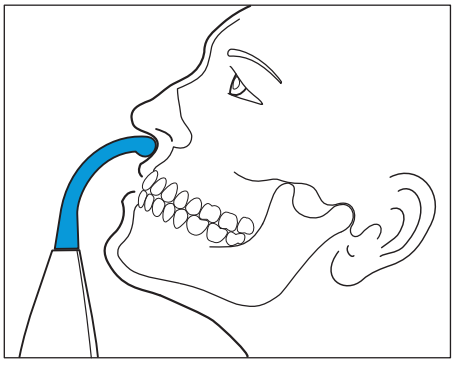
✓ The relevant hygienic protective sleeves are pulled over the accessories.



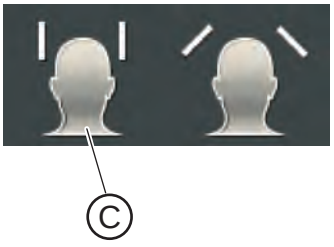
1. Guide the patient in front of the control mirror.



2. Set the unit height using the up **(A)** and down **(B)** keys.
CAUTION! The height adjustment motor starts slowly and then increases its speed.
Press and hold down the button until the desired height is reached.
The unit movement is accompanied by a beep.
Release the height-adjustment buttons once the contact pads of the temporomandibular joint supports are located above the patient's ears.
3. Instruct the patient to position himself between the temporomandibular joint supports and hold the handles with both hands.



4. Instruct the patient to place his subnasale (the base of his nose) against the contact segment and tilt his head backwards as far as possible.
   ↳ The patient's head is reclined as far as possible.



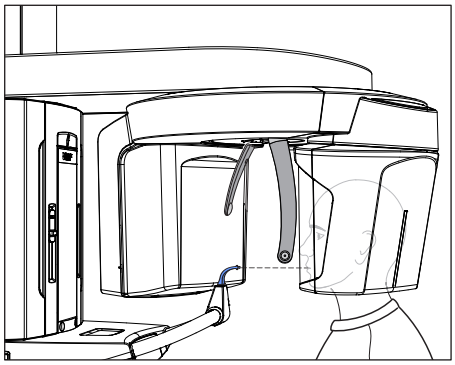
5. Close the temporomandibular joint supports with the key **(C)**.
   ↳ The temporomandibular joint supports stop automatically when they come into contact with the patient's head. The patient is fixed to the unit by the contact pads.
6. Check the patient's position and make any final corrections as necessary.
7. Instruct the patient to exhale, place his tongue against the roof of his mouth, and to hold this position until the end of the exposure.

↳ The patient is positioned in the unit.

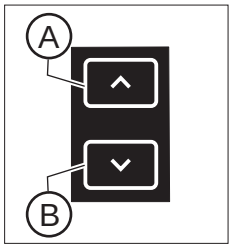
5.1.2.3.5.2 Positioning for maxillary sinus exposures using the bite block

✓ The blue bite block, the forehead support and temple supports are inserted in the unit.

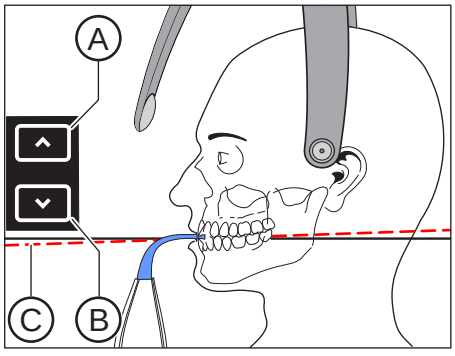
✓ The relevant hygienic protective sleeves are pulled over the accessories.



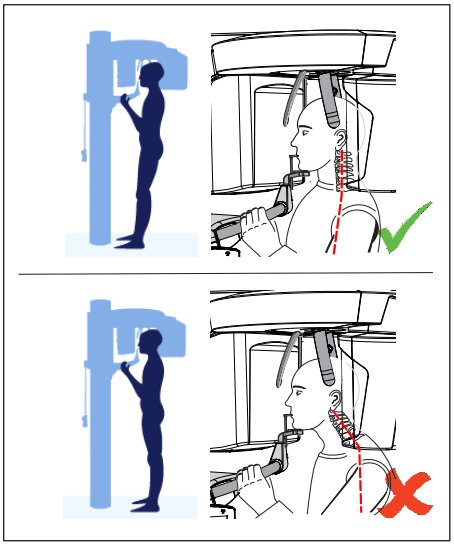
1. Guide the patient in front of the control mirror.



2. Set the unit height using the up **A** and down **B** buttons.
   CAUTION! The height adjustment motor starts slowly and then increases its speed.
   Press and hold down the button until the desired height is reached.
   The unit movement is accompanied by a beep.
   Release the height-adjustment buttons once the bite block is at the same height as that of the patient's anterior teeth.
3. Instruct the patient to hold the handles with both hands and bite into the bite block.
   ↳ The patient's anterior teeth are positioned in the indentation in the bite block. If necessary, push the lower anterior teeth forwards until they reach a stop.

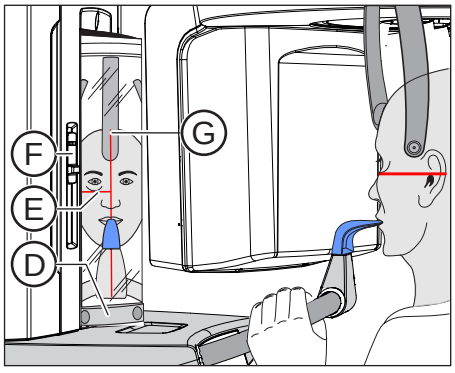


4. Check the patient's occlusal plane **C**. Adjust the unit height using the up **A** and down **B** buttons.
   ↳ The occlusal plane is slightly inclined toward the front.

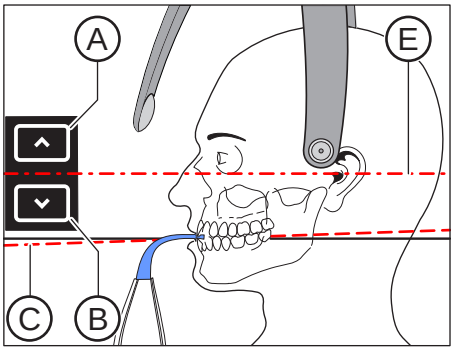


5. Check the position of the patient's spine.
   - Ensure that the patient's spine is slightly inclined, as shown in the diagram.
     Tip: To achieve the correct positioning of the spine, ask the patient to take a small step towards the column of the unit. The patient's cervical vertebrae are thus stretched. This prevents shadowing of the anterior tooth region on the X-ray.
6. Swivel the control mirror outwards. Press the left recess on the touchbar **D**.
   - You can see the patient in the control mirror.

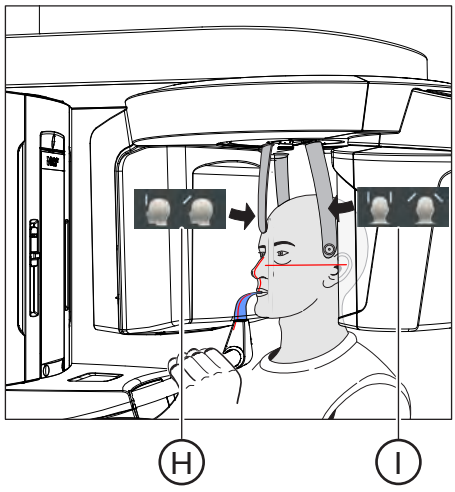
7. Switch on the light localizer. **CAUTION! Risk of dazzle**
   - Two red laser lines reflect on the patient's head. To switch off the light localizer, press the key again. It switches off automatically after approx. 100 seconds.



8. Align the patient with the central laser line **G**.
   - The laser line reflects in the center of the patient's anterior teeth or face (mid-sagittal).



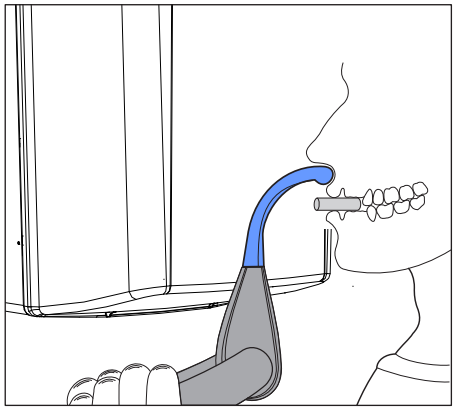
9. Align the patient's head according to the Frankfort horizontal plane **E**
10. Adjust the height of the light localizer using the slider **F**.
    - The laser line reflects on the upper edge of the outer ear canal.
11. Correct the patient's head inclination as necessary. Briefly tap on the up **A** and down **B** height adjustment buttons.
    - The laser line reflects on the lowest point of the lower edge of the eye socket.



12. Press the desired temple support adjustment key **I**.
    - ↳ When the temple supports touch the patient's head, they stop automatically.
13. Press the desired forehead support adjustment key **H**.
    - ↳ When the forehead support touches the patient's head, it stops automatically.
      Make sure that the patient's head does not move backwards after contacting the forehead support.
14. Check the patient's position and make any final corrections as necessary.
15. Swivel the control mirror back into place. Press the right recess on the touchbar **D**.
    - ↳ The patient can see himself in the control mirror.
16. Instruct the patient to exhale, place his tongue against the roof of his mouth, and hold this position until the end of the exposure.

↳ The patient is positioned in the unit.

5.1.2.3.5.3 Positioning for maxillary sinus exposures using the contact segment



- ✓ The patient has no or only a few anterior teeth.
- ✓ The blue contact segment is inserted in the unit.
- ✓ The relevant hygienic protective sleeves are pulled over the accessories.

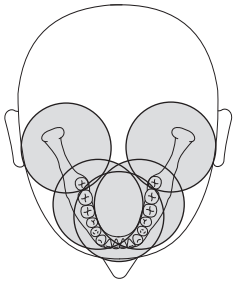
1. Instruct the patient to hold the handles with both hands and place his subnasale (the base of his nose) against the contact segment.
2. Place a cotton roll between the patient's upper and lower jaw.
   - ↳ The patient's upper and lower jaw are aligned.
3. Proceed as described under "Positioning for maxillary sinus exposures using the bite block [→ 82]" from step 4.

5.1.2.4 Volume exposures

5.1.2.4.1 Program description

With the Axeos, volume exposures can be made using cone-beam technology. This enables the diagnosis of cross-sections in the axial, sagittal, and coronal planes.

5.1.2.4.1.1 VOL1 HD / VOL1 SD / VOL1 Low



The Easypad can be used to select one of the five volume regions:

- Anterior tooth region
- Right/left molar region
- Right/left temporomandibular joint region

The volume region on the object / field of view (FoV) corresponds to a cylinder with a diameter of approx. 8 cm and a height of approx. 8 cm. For dose reduction, the height of the volume for upper/lower jaw exposures can be collimated to approx. 5.5 cm.

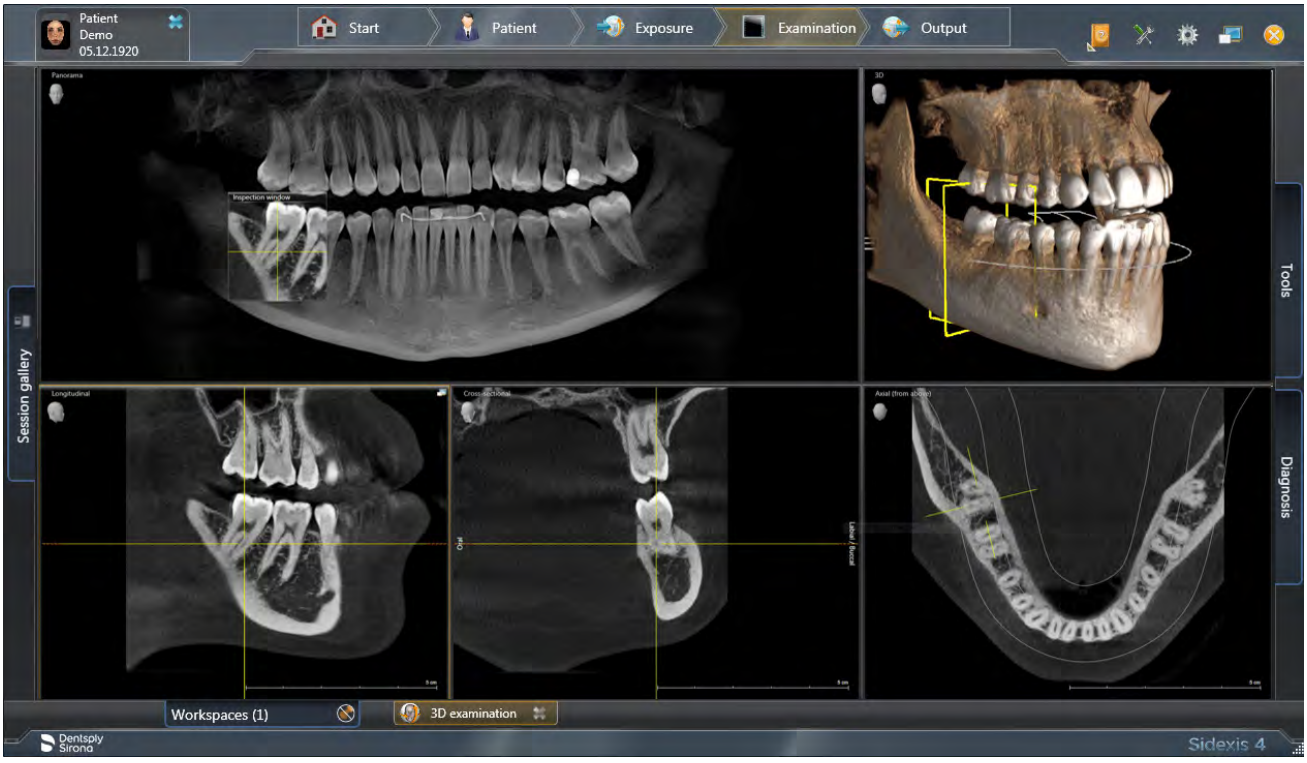
SD mode (Standard Definition mode):
Standard mode for producing a volume exposure

HD mode (High Definition mode):
Four times more single projections are generated in HD mode than in SD mode and are used for finer reconstructed image quality. This can reduce typical DVT/conebeam artifacts.
Please take into account the higher patient dose.

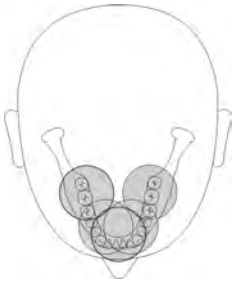
Low Dose mode:
The effective dose for the patient is reduced significantly in Low Dose mode.

VOL1 (8x8 cm)

Please note that blurring can occur in the marginal area of the cylinder. Objects are nevertheless represented in the maximum possible image quality.



5.1.2.4.1.2 VOL2 HD / VOL2 SD / VOL2 Low



The Easypad can be used to select one of the five volume regions:

- Upper jaw or lower jaw anterior tooth region
- Left/right, upper/lower premolar or molar region

The volume range on the object / field of view (FoV) corresponds to a cylinder with a diameter of approx. 5 cm and a height of approx. 5.5 cm. A smaller volume reduces the patient dose.

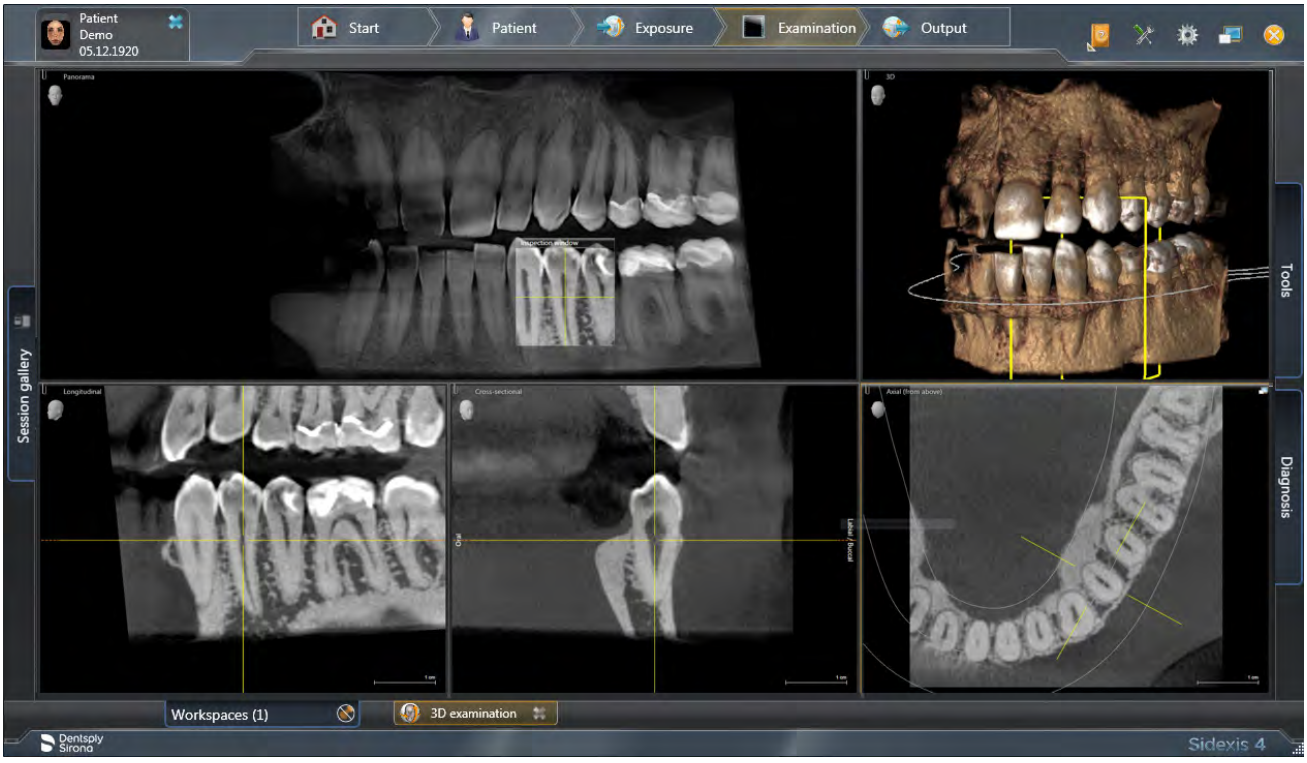
SD mode (Standard Definition mode):
Standard mode for producing a volume exposure

HD mode (High Definition mode):
Four times more single projections are generated in HD mode than in SD mode and are used for finer reconstructed image quality. This can reduce typical DVT/conebeam artifacts.
HD mode offers a voxel resolution of 80µm for VOL2.
Please be aware of the higher patient dose.

Low Dose mode:
The effective dose for the patient is reduced significantly in Low Dose mode.

VOL2 (5x5.5 cm)

Please note that blurring can occur in the marginal area of the cylinder. Objects are nevertheless represented in the maximum possible image quality.



5.1.2.4.1.3 VOL3 HD / VOL3 SD / VOL3 Low

The Easypad can be used to select the VOL3 volume region:

- Anterior tooth and molar regions

The volume region on the object / field of view (FoV) corresponds to a cylinder with a diameter of approx. 11 cm and a height of approx. 10 cm. For dose reduction, the height of the volume can be collimated for upper jaw exposures to approx. 7.5 cm and, by selecting the lower quadrants, to approx. 8.0 cm.

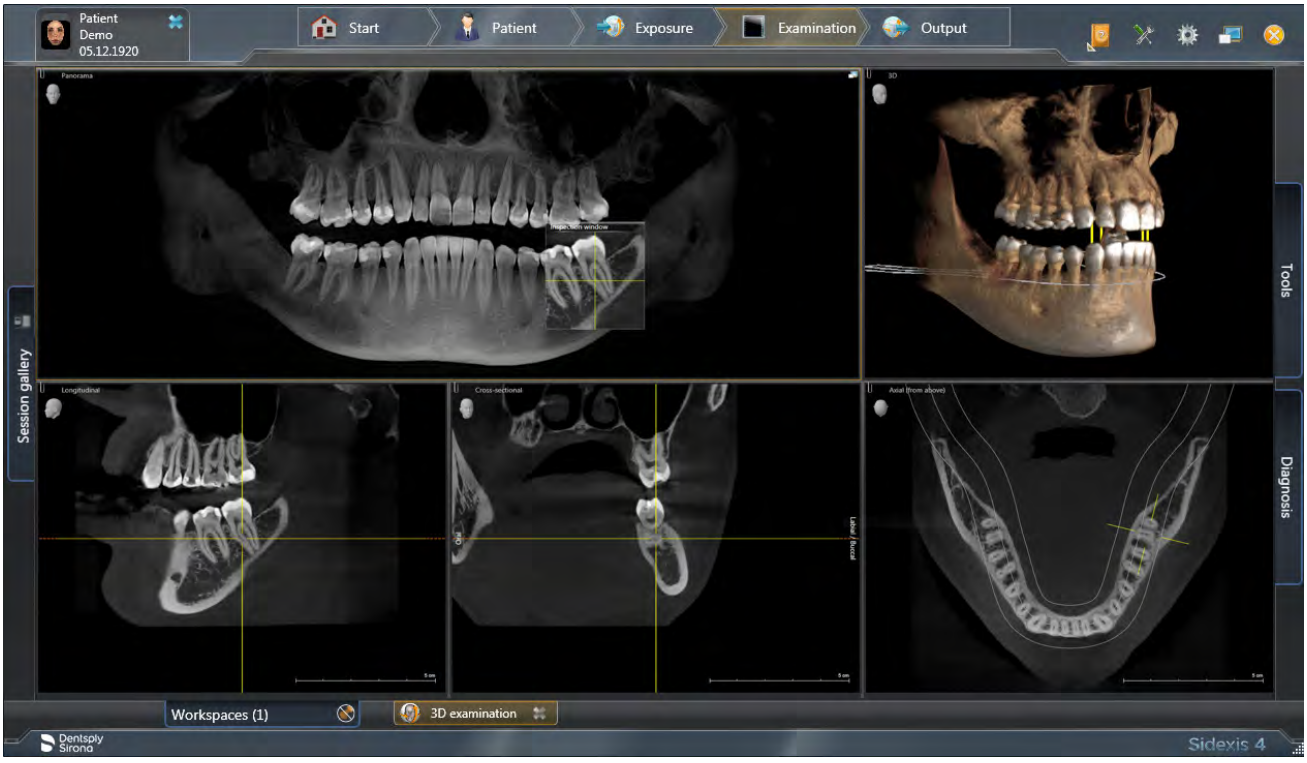
SD mode (Standard Definition mode):
Standard mode for producing a volume exposure.

HD mode (High Definition mode):
Four times more single projections are generated in HD mode than in SD mode and are used for finer reconstructed image quality. This can reduce typical DVT/conebeam artifacts.
Please take into account the higher patient dose.

Low Dose mode:
The effective dose for the patient is reduced significantly in Low Dose mode.

VOL3 (11x10cm)

Please note that blurring can occur in the marginal area of the cylinder. Objects are nevertheless represented in the maximum possible image quality.



5.1.2.4.1.4 VOL4 HD / VOL4 SD / VOL4 Low

The Easypad can be used to select the VOL4 volume regions:

- Anterior tooth and molar regions including temporomandibular joints (without height collimation)

The volume region on the object / field of view (FoV) corresponds to a cylinder with a diameter of approx. 17 cm and a height of approx. 13 cm. For dose reduction, the height of the volume can be collimated for maxillary exposures to approx. 10 cm and for mandibular exposures to approx. 7.5 cm.

SD mode (Standard Definition mode):
Standard mode for producing a volume exposure.

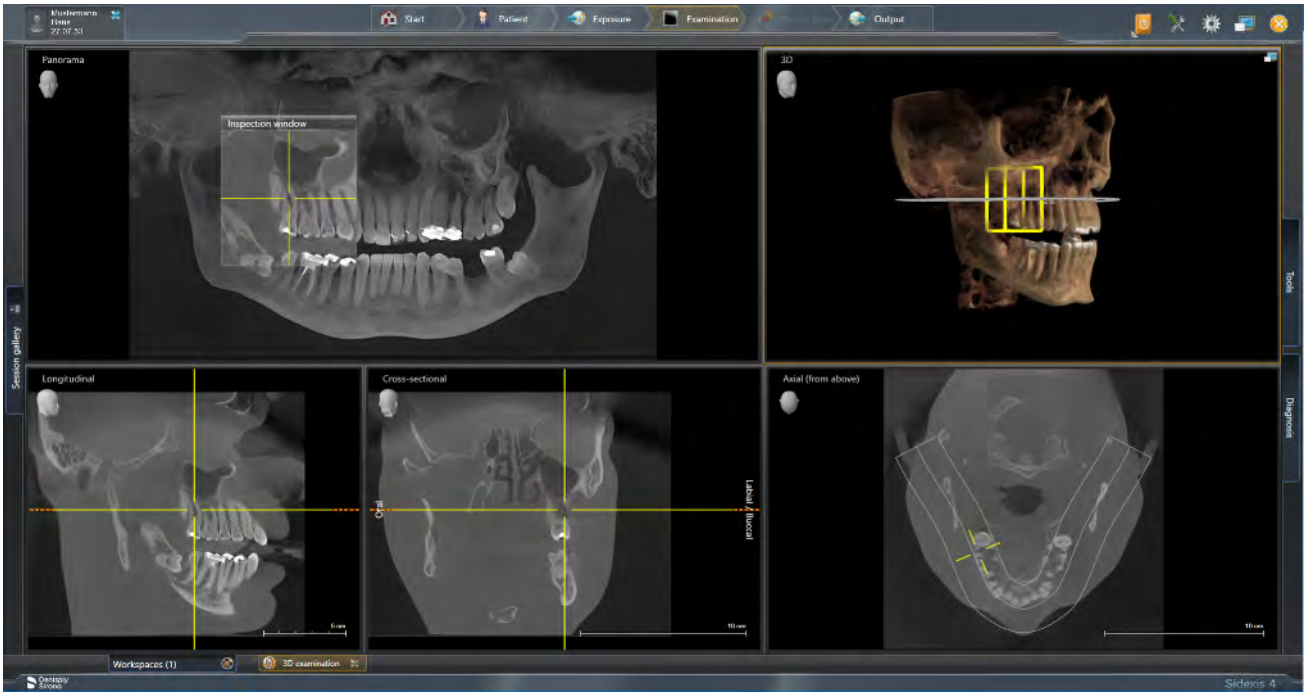
HD mode (High Definition mode):
Four times more single projections are generated in HD mode than in SD mode and are used for finer reconstructed image quality.

This can reduce typical DVT/conebeam artifacts.
Please take into account the higher patient dose.

Low Dose mode:
The effective dose for the patient is reduced significantly in Low Dose mode.

VOL4 (17x13 cm)

Please note that blurring can occur in the marginal area of the cylinder. Objects are nevertheless represented in the maximum possible image quality.

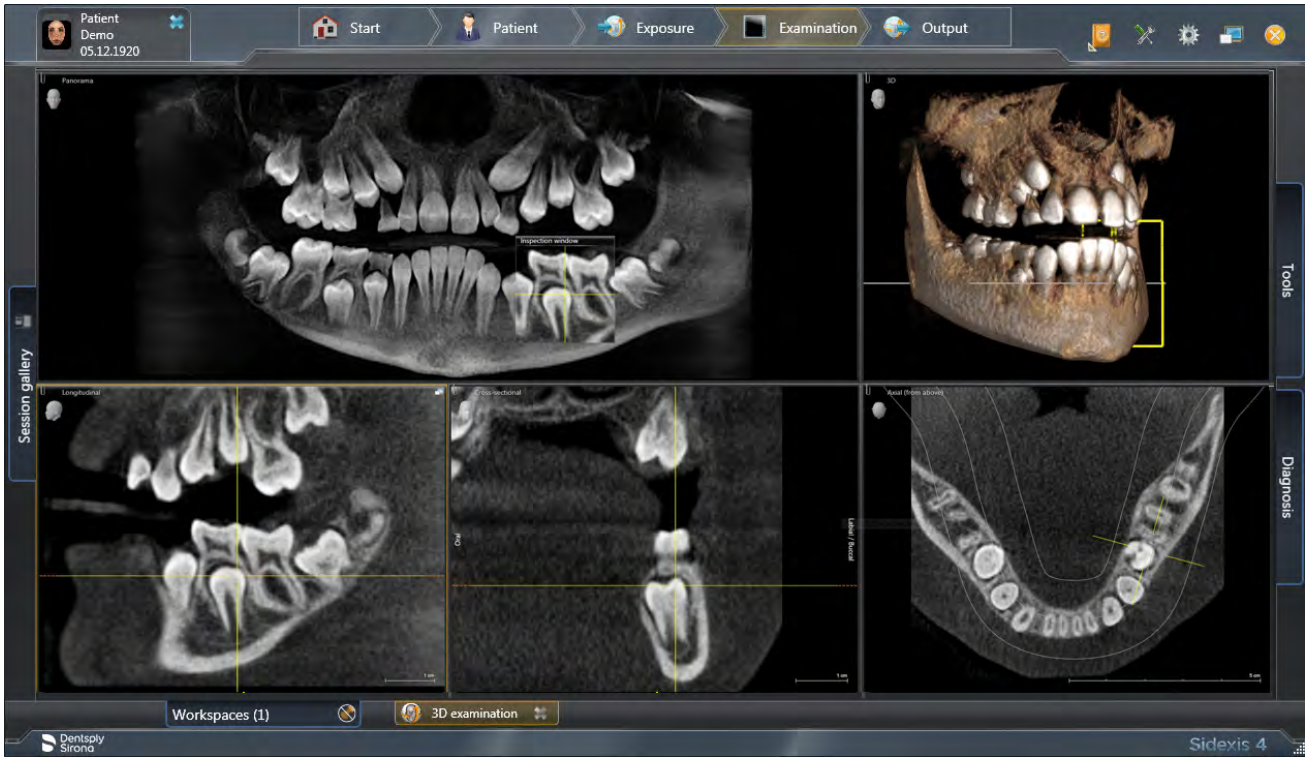


5.1.2.4.1.5 Low Dose exposure mode VOL1 Low, VOL2 Low, VOL3 Low und VOL4 Low

The Low Dose exposure mode can be selected for all volume sizes (VOL1, VOL2, VOL3, VOL4) and collimations.

Only the centers of rotation for temporomandibular joint exposures for the VOL1 volume region are excluded (for setting of the volume regions and the collimation, refer to chapter "Adjusting the volume area and collimation").

Low Dose mode:
The effective dose for the patient is reduced significantly in Low Dose mode.



5.1.2.4.2 Preparing the exposure

You will need to replace accessory parts according to the patient or exposure program.

In general, exposures of all volume areas can be made with the 3D bite block, the yellow bite block or the universal bite block. **The 3D bite block or universal bite block is recommended for volume exposures.** If it is not possible to work with these bite blocks, another possibility is to use the chin rest with the bite block rod or bar.

While positioning the patient, the upper and lower volume limit is shown with the light localizer on the patient's head. If it then becomes apparent that the desired exposure area is located outside of the limits of the light localizer, the patient's head can be positioned lower or higher in the beam path by using a different bite block.

If exposures are to be taken in the maxillary, temporomandibular joint, sinus and orbital regions, the patient can be positioned lower as needed in several stages with the blue bite block or the universal bite block. The portion of the volume in the sinus region is thus greater.

Positioning is also possible with the universal bite block, as this can be adjusted in several stages and the wide, soft foam bite block offers increased safety against vibrations. The foam bite block is equally suitable for patients without anterior teeth.

Positioning is also possible with the occlusal bite block. The occlusal bite block sets the inclination according to the occlusal plane instead of the standard Frankfort horizontal plane.

Two spherical bite blocks are available for preparing an implant drilling template for measuring scans of the upper or lower jaw. The bite block plates can be ordered from the SICAT Online Shop, www.sicat.com.

The following accessories are also required:

- Temple supports or temporomandibular joint supports with contact buttons
- Forehead support

➢ Insert the accessory parts to be used into the unit and pull on the relevant hygienic protective sleeves, see "Hygienic protective sleeves" [→ 39].

➢ Switch SIDEXIS to a ready-for-3D-exposure state; see ‘Switch SIDEXIS to ready-for-exposure state’.

5.1.2.4.3 Selecting the volume exposure

⚠ CAUTION

Pressing the R key moves the unit to the starting position.

A patient positioned in the unit may be injured by moving parts.

➢ Check that a patient is not positioned in the unit before moving it to the starting position.

✓ The unit is switched on and ready for exposure.

1. Touch the 3D symbol at the top of the touchscreen.
   ↳ The 3D program group is selected.
2. Select the exposure program. Touch the arrow keys + **C** and - **A**.
   ↳ The exposure program is displayed in the program display **(B)**. The radiation time is displayed under the name of the exposure program.
3. Follow the instructions in the comment line on the touchscreen. Press the R key if necessary.
   ↳ The diaphragm and the sensor move into the starting position for volume exposures.

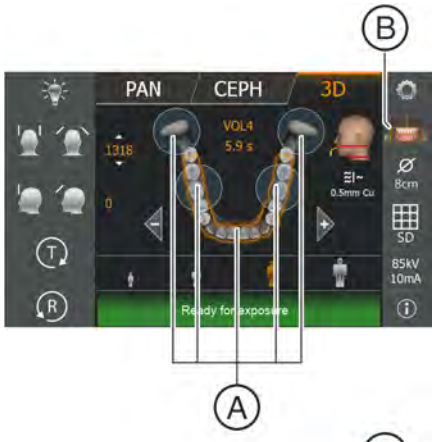
↳ The exposure program is selected.

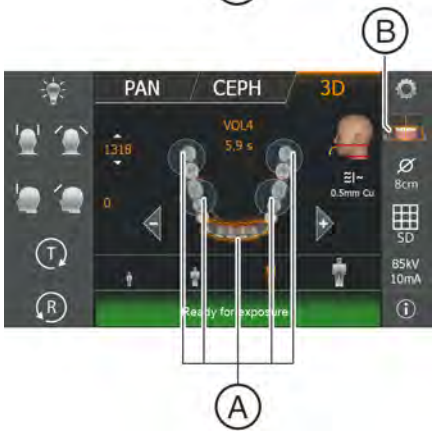
↳ In volume exposures, the total filtration of the X-ray tube assembly is displayed below the head symbol on the touchscreen.
0.3 mm Cu for VOL1/2/3 in SD and HD modes;
0.5 mm Cu for VOL4 in SD and HD modes
1 mm Cu for VOL1/2/3/4 in Low Dose mode.

5.1.2.4.4 Setting the volume area and collimation

You can change between VOL1, VOL2, VOL3 and VOL4 depending on whether a smaller or larger volume can be used.
For volume exposures one of the predefined volume areas must be selected. Through quadrant selection, collimation of the height of the volume can be set to 5.5 cm for the upper or lower jaw area in the VOL1 program. In the VOL2 program, the height is permanently set to 5.5 cm. In the VOL3 program, collimation of the height of the volume can be set to 7.5 cm for the upper jaw and 8.0 cm for the lower jaw. In the VOL4 program, collimation of the height of the volume can be set to 10 cm for the mandibular area and 7.5 cm for the maxillary area.

IMPORTANT
The areas shown on the touchscreen do not correspond to the actual diameter of the volume. See the figure in the section "VOL1 – Program description". The actual boundary of the selected area is indicated by the laser lines on the patient.





✓ Level 1 is displayed on the touchscreen.

✓ The message "H403 – Switch SIDEXIS to ready for exposure state" appears in the comment line.

1. For VOL1, VOL2: Select the desired volume region **A**. Touch one of the circles for the anterior tooth, molar, or temporomandibular joint region (only) in the center of the touchscreen.
   For VOL3, VOL4: There is only one volume region, which is selected automatically.
   ↳ The volume region is marked in orange. According to your selection, the quadrant selection presetting **B** changes if necessary:
   The volume can be collimated using the quadrant selection. For example, when the molar or temporomandibular joint region is selected, a collimation to the upper or lower jaw area is possible.
2. Press the quadrant symbol **B** on the right side of the touchscreen.
   ↳ A submenu line is opened.
3. To adjust the collimation, select the lower or upper jaw in the quadrant selection.
   ↳ The selection is highlighted in orange.
4. Touch the cross on the left side of the submenu line.

or

➢ Touch the quadrant symbol **B** again.
   ↳ The submenu line is closed.

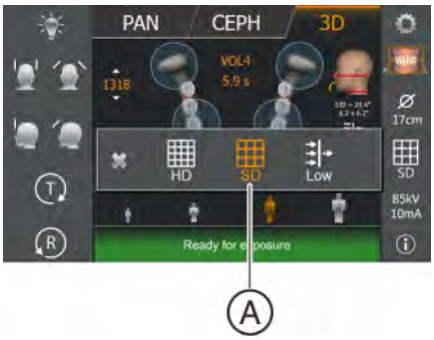
↳ The volume region is selected.
The collimation is set.

5.1.2.4.5 Selecting 3D exposure mode

HD mode (high-definition mode).

SD mode (standard definition mode)

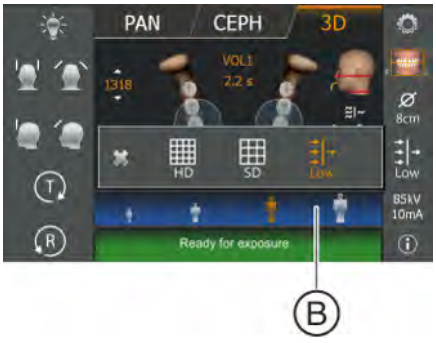
Low (Low Dose exposure mode)



You can select the exposure mode via the selection list on the side for the volume programs.

✓ Level 1 is displayed on the touchscreen.

➢ Touch the desired exposure mode.



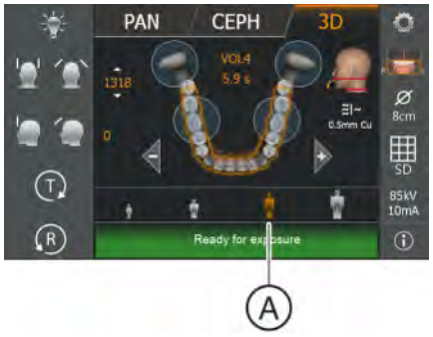
↳ The selection **(A)** is highlighted in orange. The selected mode is displayed on the right side of the touchscreen.
If Low Dose mode is enabled the patient symbols are highlighted with a blue bar **B**.

↳ The desired mode is selected.
The SD and HD options can also be set in the Start settings menu by default.

IMPORTANT
The Low Dose mode is not persistent and must be selected again following each exposure if required.

5.1.2.4.6 Selecting kV/mA values

85 kV are usually emitted for volume exposures. Preset kV/mA combinations and radiation times are assigned to the patient symbols, which are selected according to the patient's size and weight. The symbols roughly correspond to child, youth/woman, woman/man, hefty persons. The kV/mA values and radiation times are preset, see also "Program values for volume exposures".



✓ Level 1 is displayed on the touchscreen.

➢ Touch the required patient symbol.

↳ The selection **(A)** is highlighted in orange. The selected kV/mA value is displayed on the right side of the touchscreen and the radiation time is shown below the program name.

↳ The kV/mA value is selected.

In HD exposure mode: Setting the kV/mA values via the submenu line

If the preset kV/mA combinations do not provide a satisfactory result via the patient symbols, you can also set the kV/mA values manually in all programs in HD exposure mode.

✓ Level 1 is displayed on the touchscreen.

1. Touch the kV/mA symbol **(B)** on the right side of the touchscreen.
   ↳ A submenu line is opened.
2. Select a kV/mA value. To do this, touch the arrow keys - or +. Please be aware of the maximum patient dose.
   ↳ The selected kV/mA value is displayed.

3. Touch the cross on the left side of the submenu line.

or

➢ Touch the kV/mA symbol **(B)** again.

↳ The submenu line is closed.

↳ The kV/mA value is set.

5.1.2.4.7 Positioning the patient

The patient is positioned on the unit while standing. Positioning in the seat is also possible without issue.

⚠ CAUTION

The height adjustment motor starts slowly and then increases its speed.

A patient positioned in the unit may be injured by moving parts.

➢ Monitor the patient and the movement of the unit during height adjustment! To make minor corrections, press and immediately release the buttons. Release the button immediately in the event of unwanted contact of the unit with the patient.

⚠ CAUTION

Hazard due to laser light.

Patients and users can be blinded by the laser light localizer.

➢ Prior to activating the laser light localizers, the patient **must** be asked to shut their eyes.

➢ Do not stare directly into the laser beam. Make sure that the laser beam does not meet the eyes of the patient.

➢ A distance of at least 10 cm must be maintained between the eye and the laser.

⚠ CAUTION

Reduced image quality

The image quality is adversely affected by metal or other radiopaque materials located in the patient's mouth and in its vicinity.

➢ Ask the patient to take off all metallic objects such as glasses and jewelry in the head and neck area as well as all removable dental prostheses. The tray in front of the control mirror is used for depositing jewelry.

Tip: Reference values are shown for the height and forehead support settings, which are saved for further exposures in the additional information area of the SIDEXIS software.

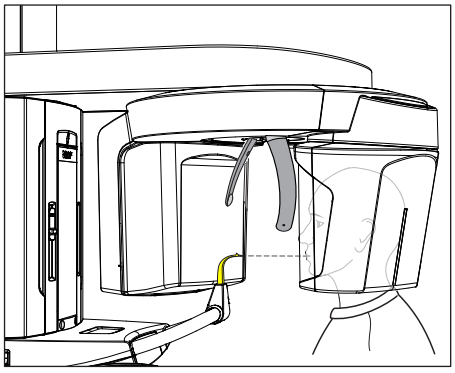
In volume exposures, 2 red laser lines are emitted after switching on the light localizer. The laser lines show the upper and lower volume limit depending on the program and collimation.

2 red lines are displayed in the head symbol on the touchscreen. They indicate the limit of the volume at the bottom and at the top, and the approximate position of the light beam.

The patient should be aligned in accordance with the occlusal plane. The position can be easily corrected via the head inclination.

5.1.2.4.7.1 Positioning with 3D bite block or universal bite block

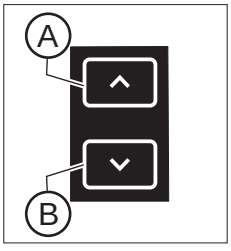
In general, exposures of all volume areas can be made with the 3D bite block, the yellow bite block or the universal bite block. The 3D bite block or the universal bite block is recommended for volume exposures, as the patient is positioned more securely. For setting the universal bite block, refer to chapter "Using the universal bite block [→ 45]". If it is not possible to work with these bite blocks, another possibility is to use the chin rest with the bite block rod or bar, see "Positioning with chin rest [→ 103]". The foam of the universal bite block is equally suitable for patients without anterior teeth.



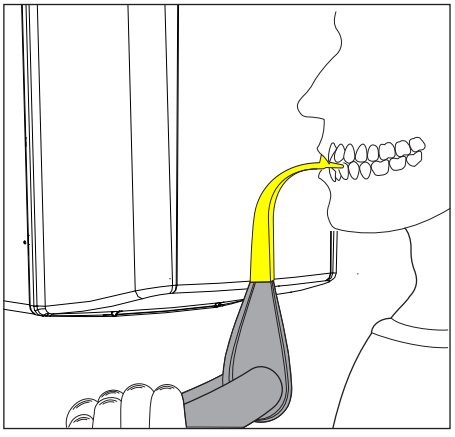
✓ The 3D bite block, the yellow bite block, the universal bite block and forehead support and temple supports are inserted in the unit.

✓ The relevant hygienic protective sleeves are pulled over the accessories.

1. Guide the patient in front of the control mirror.

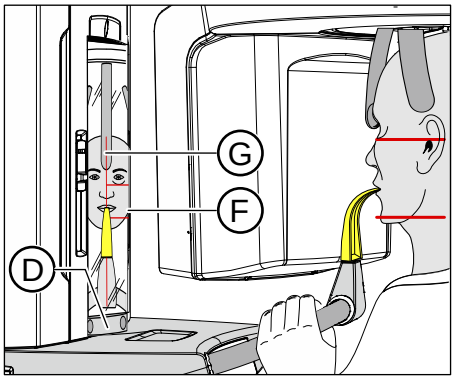


2. Set the unit height using the up **A** and down **B** buttons.
CAUTION! The height adjustment motor starts slowly and then increases its speed.
Press and hold down the button until the desired height is reached.
The unit movement is accompanied by a beep.
Release the height adjustment buttons once the patient's mouth and the bite block are at the same height.

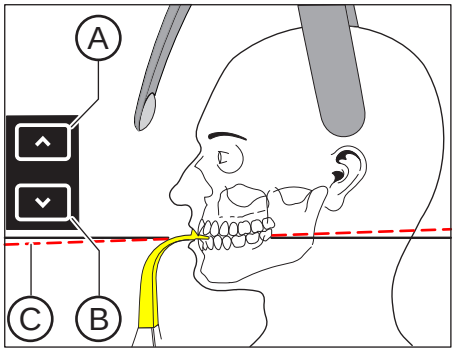


3. Instruct the patient to hold the handles with both hands and bite into the bite block.

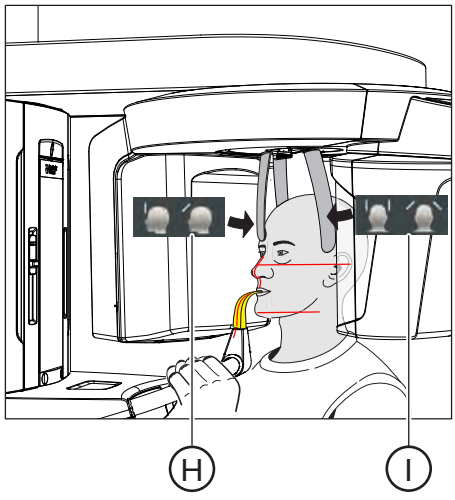
↳ The patient's anterior teeth are positioned in the indentation in the bite block. If necessary, push the lower anterior teeth forwards until they reach a stop.



4. Swivel the control mirror outwards. Press the left recess on the touchbar **D**.
   - You can see the patient in the control mirror.
5. Switch on the light localizer **F**.
   CAUTION! Risk of dazzle
   - Depending on a preselected program and collimation, the laser lines show the upper and lower edges of the volume on the patient's head. If the desired exposure area is not located within the horizontal laser lines, the blue bite block or the universal bite block must be used, see "Positioning with blue bite block or the universal bite block. [→ 104]".
     To switch off the light localizer, press the key again. It switches off automatically after approx. 100 seconds.
6. Align the patient with the central laser line **G**.
   - The laser line reflects in the center of the patient's anterior teeth or face (mid-sagittal).



7. Align the patient's head as closely as possible along the occlusal plane **C**. Correct the patient's head inclination as necessary. Briefly tap on the up **A** and down **B** height adjustment buttons.



8. Press the desired temple support adjustment key **I**.
   - When the temple supports touch the patient’s head, they stop automatically.
9. Press the forehead support adjustment key **H**.
   - When the forehead support touches the patient's head, it stops automatically.
     Make sure that the patient's head does not move backwards after contacting the forehead support.
10. Check the patient's position and make any final corrections as necessary.
11. Swivel the control mirror back into place. Press the right recess on the touchbar **D**.
    - The patient can see himself in the control mirror.
12. Instruct the patient to exhale, place his tongue against the roof of his mouth, and hold this position until the end of the exposure.

- The patient is positioned in the unit.

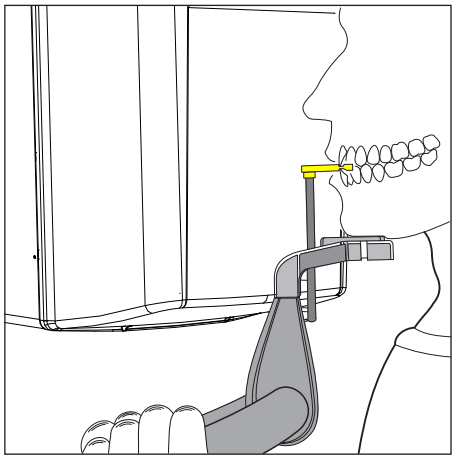
Tip: You can limit the volume by selecting individual segments using the quadrant selection, see "Adjusting the volume area and collimation".

5.1.2.4.7.2 Positioning with chin rest

If it is not possible to work with the 3D bite block or the yellow bite block, it is possible to use the chin rest instead. Patients without anterior teeth also can be positioned with the bar.

The chin rest can be used to ensure that the mandible is represented in the volume.

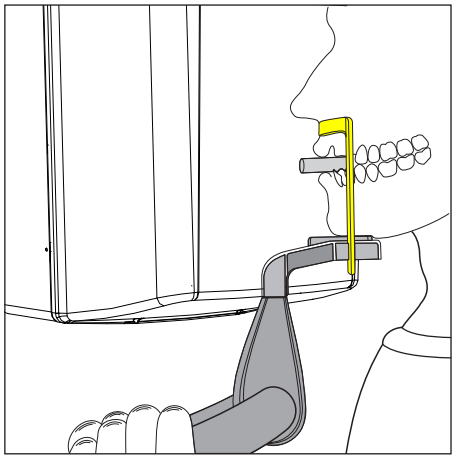
Chin rest with bite block rod



- ✓ The chin rest and bite block rod, and the forehead support and temple supports are inserted in the unit.
- ✓ The relevant hygienic protective sleeves are pulled over the accessories.

1. Turn the bite block away from the patient.
   - ↳ The bite block is pointing towards the control mirror.
2. Instruct the patient to place his chin on the chin rest and place both hands on the hand grips.
3. Turn the bite block towards the patient and instruct him to bite on the bite block.
   - ↳ The patient's anterior teeth are positioned in the indentation in the bite block. If necessary, push the lower anterior teeth forwards until they reach a stop.
4. Proceed from step 4 as described under "Positioning with 3D bite block or universal bite block [→ 101]".

Chin rest with bar



- ✓ The patient has no or only a few anterior teeth.
- ✓ The chin rest and bar and the forehead support and temple supports are inserted in the unit.
- ✓ The relevant hygienic protective sleeves are pulled over the accessories.

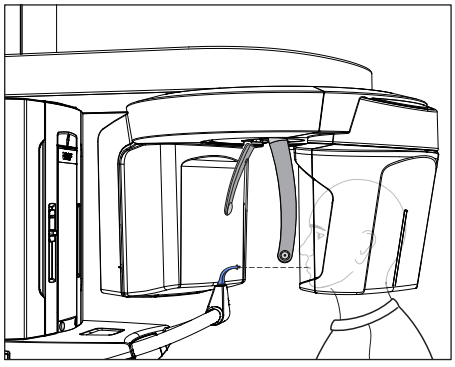
1. Instruct the patient to place his chin on the chin rest and place both hands on the hand grips.
2. Instruct the patient to place his subnasale (the base of his nose) against the bar. The patient's upper and lower jaws must be aligned above one another. If the patient's lower jaw contains anterior teeth, place the bar between his chin and his lower lip.
3. Proceed from step 4 as described under "Positioning with 3D bite block or universal bite block [→ 101]".

5.1.2.4.7.3 Positioning with blue bite block or the universal bite block.

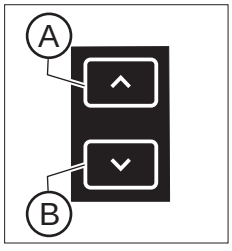
For maxillary exposures with full volume, the patient should be positioned lower in the beam path with the blue bite block or universal bite block in the position marked in blue; this also applies to exposures taken in the temporomandibular joint region as well as the sinus and orbital regions. The portion of the volume in the sinus region is thus greater.

More secure positioning is possible with the universal bite block due to the wider bite area. The foam bite block is equally suitable for patients without anterior teeth.

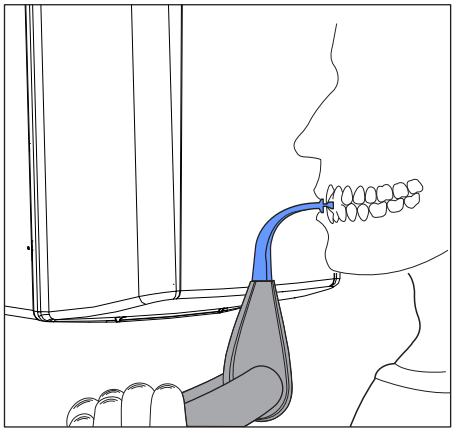
- ✓ The blue bite block or the universal bite block and the temporomandibular joint supports with contact buttons are inserted into the unit.
- ✓ The relevant hygienic protective sleeves are pulled over the accessories.



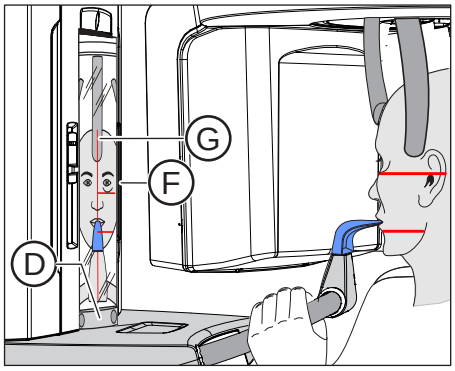
1. Guide the patient in front of the control mirror.



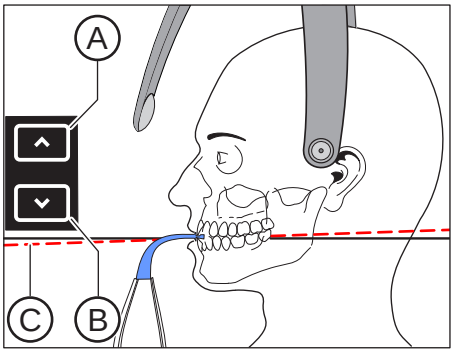
2. Set the unit height using the up **A** and down **B** buttons.
   CAUTION! The height adjustment motor starts slowly and then increases its speed.
   Press and hold down the button until the desired height is reached. The unit movement is accompanied by a beep.
   Release the height-adjustment buttons once the bite block is at the same height as that of the patient's anterior teeth.



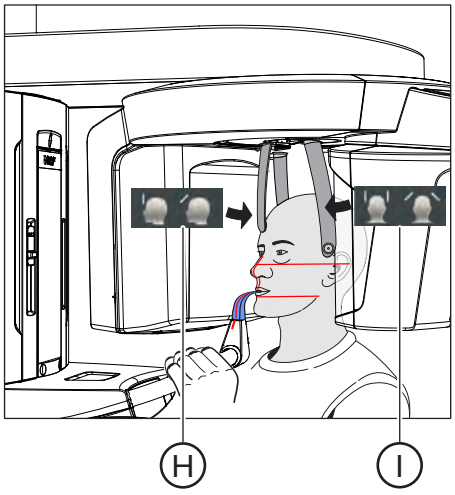
3. Instruct the patient to hold the handles with both hands and bite into the bite block.
   - The patient's anterior teeth are positioned in the indentation in the bite block. If necessary, push the lower anterior teeth forwards until they reach a stop.
4. Swivel the control mirror outwards. Press the left recess on the touchbar **D**.
   - You can see the patient in the control mirror.
5. Switch on the light localizer **F**.
   CAUTION! Risk of dazzle
   - Depending on a preselected program and collimation, the laser lines show the upper and lower edges of the volume on the patient's head. The desired exposure area must be located between the two horizontal laser lines.
     To switch off the light localizer, press the key again. It switches off automatically after approx. 100 seconds.



6. Align the patient with the central laser line **G**.
   - The laser line reflects in the center of the patient's anterior teeth or face (mid-sagittal).



7. Align the patient's head as closely as possible along the occlusal plane **C**. Correct the patient's head inclination as necessary. Briefly tap on the up **A** and down **B** height adjustment buttons.



8. Press the temple support adjustment key **I**.
   - When the temple supports touch the patient’s head, they stop automatically.
9. Press the forehead support adjustment key **H**.
   - When the forehead support touches the patient's head, it stops automatically.
     Make sure that the patient's head does not move backwards after contacting the forehead support.
10. Check the patient's position and make any final corrections as necessary.
11. Swivel the control mirror back into place. Press the right recess on the touchbar **D**.
    - The patient can see himself in the control mirror.
12. Instruct the patient to exhale, place his tongue against the roof of his mouth, and hold this position until the end of the exposure.

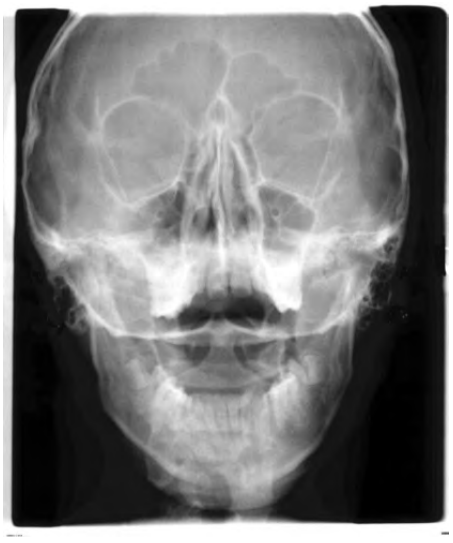
- The patient is positioned in the unit.

5.1.2.5 Cephalometric exposures

5.1.2.5.1 Program description

Be aware of the different viewing directions in medical and dental radiology.

5.1.2.5.1.1 C1 – Posterior-anterior exposure, symmetrical



The program takes a full-format exposure from posterior to anterior. This program is suitable only for semi-axial cranial exposures. The exposure provides a cranio-eccentric overview.

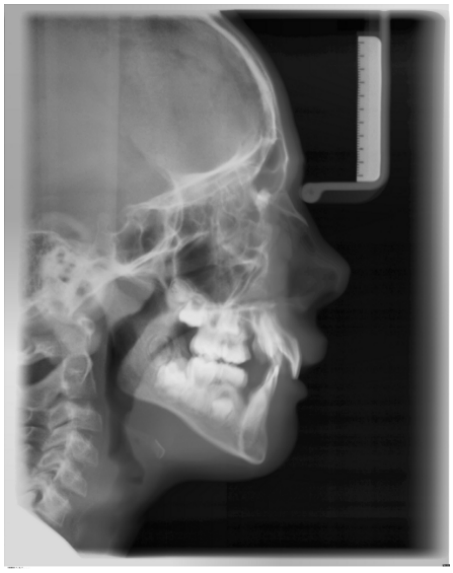
5.1.2.5.1.2 C2 – Anterior - posterior exposure, symmetrical

The program takes a full-format exposure from anterior to posterior. This program is suitable only for semi-axial cranial exposures. The exposure provides a cranio-eccentric overview.

5.1.2.5.1.3 C3 – Lateral exposure

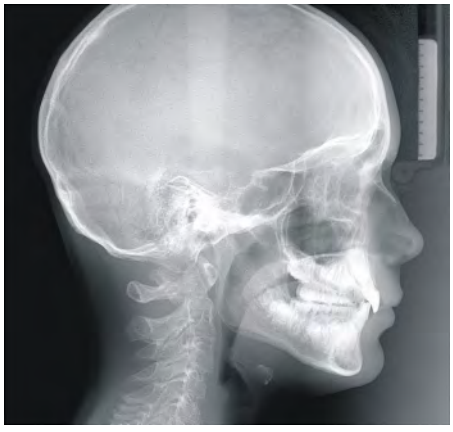
With this exposure technique, a metal scale integrated in the nose support is displayed on the X-ray exposure. Using this scale, the magnification factor in the median plane can be determined precisely via a measurement.

C3 - Lateral exposure, asymmetric



This program displays a full-format lateral view (approx. 18x23cm). This program omits the front of the patient's head.

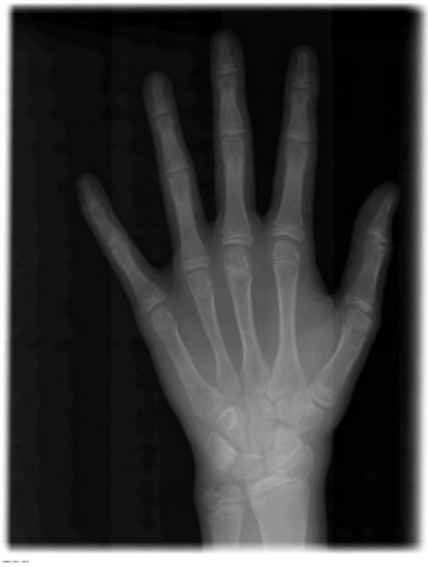
C3F - Lateral full-format exposure



This program displays a full-format lateral view (approx. 30x23cm). This program displays the whole of the patient's head.

Tip: By default, the image of the lateral exposure C3 or C3F shows the patient‘s face facing to the right. You can change this representation in SIDEXIS. *"Settings"* - *"General Settings"* - Representation - *"Ceph a.p./p.a."*
Please note that all other Ceph exposures C1, C2, and C4 will then also be displayed ‘mirrored’, i.e. laterally reversed.

5.1.2.5.1.4 C4 – Carpus view, symmetrical



The program displays a carpus view. The carpus view is used to determine the growth stage of the body or the jaw.

5.1.2.5.2 Preparing the exposure

NOTE

The adjustment of the cephalometer may alter depending on the load.

A change in the adjustment may lead to faulty X-rays.

➢ Never lean against the cephalometer or the extension arm.

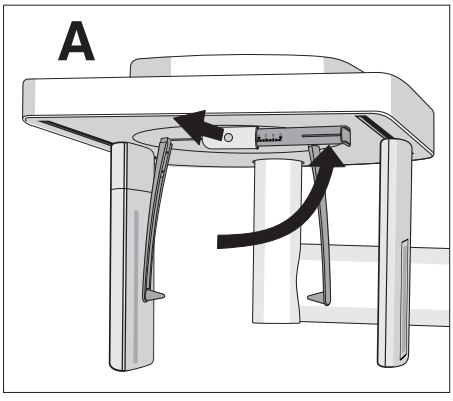
➢ Do not hang or place any objects against or on the cephalometer or extension arm.

Depending on the patient or the exposure program, accessory parts must be replaced and the appropriate exposure mode must be selected; see "Installation and start-up" [→ 43].

The following illustrations of the cephalometer are shown in the left-handed arm version. They also apply for the cephalometer with a right-handed arm.

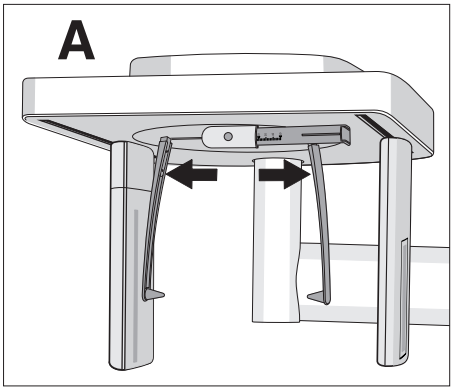
A = asymmetrical
S = symmetrical

Preparing the nose support

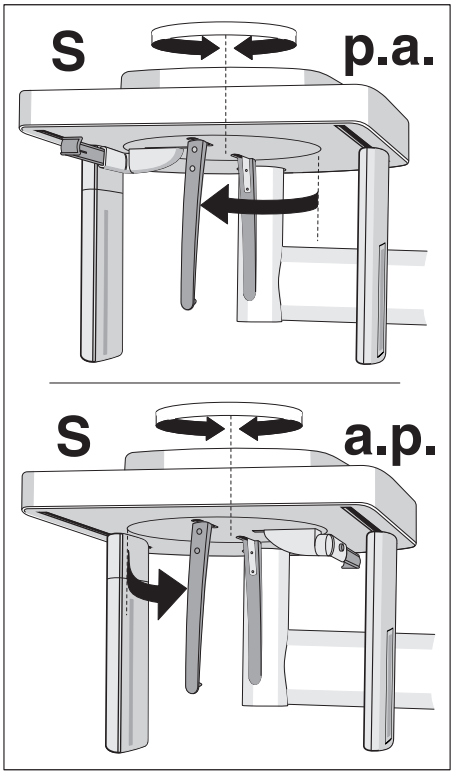


1. Grasp the nose support at the rotary joint.
2. Pull the nose support forwards until it reaches the stop.
3. Swivel the nose support sideways and upwards.

Move the ear plug holders



1. Grasp the holders at the very top with both hands.
2. Push the holders simultaneously outwards as far as they will go.



Turn the ear plug holders

Note that the holder for the ear plugs must be rotated by 90 degrees for symmetrical exposures and carpus exposures.

1. Grasp the holders at the very top with both hands.
2. Rotate the ear plug holders.
   ↳ In posterior-anterior exposure: The nose support points towards the sensor. In posterior-anterior exposure and carpal exposures: The nose support points towards the secondary diaphragm.

Protective caps and hygienic protective sleeves

➢ Plug the protective caps onto the ear plugs and pull the hygienic protective sleeve onto the nose support, see "Hygienic protective sleeves" [→ 39].

Preparing for a 2D exposure

➢ Switch SIDEXIS to a ready-for-exposure state; see ‘Switch SIDEXIS to ready-for-exposure state’.

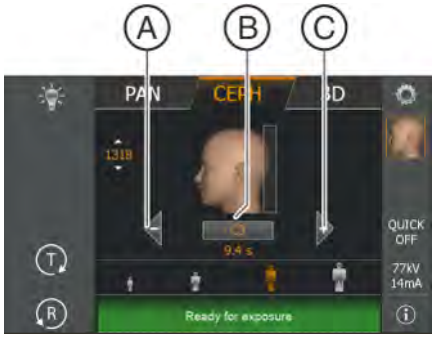
5.1.2.5.3 Selecting an exposure program

⚠ CAUTION

Pressing the R key moves the unit to the starting position.

A patient positioned in the unit may be injured by moving parts.

➢ Check that a patient is not positioned in the unit before moving it to the starting position.



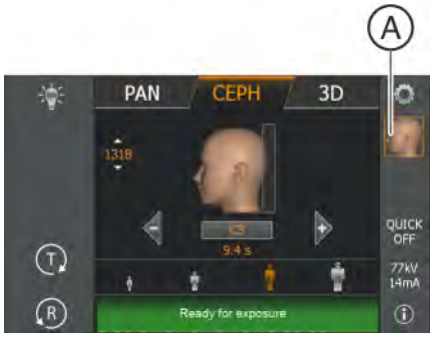
✓ The unit is switched on and ready for exposure.

1. Touch the Ceph symbol at the top of the touchscreen.
   ↳ The Ceph program group is selected.
2. Select an exposure program. To do this, touch the arrow keys + **C** and - **A**. If you want to select a subprogram, such as C3F, touch the program display **B** repeatedly. All the subprograms of the selected program are displayed one after the other.
3. Follow the instructions in the comment line on the touchscreen. Press the R key if necessary.
   ↳ The diaphragm and the sensor move into the starting position for cephalometric exposures.

↳ The exposure program is selected.

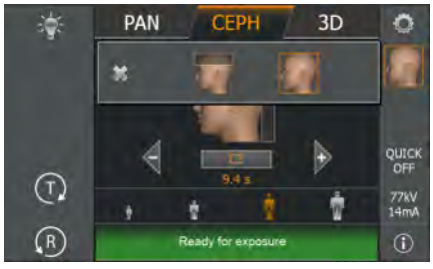
5.1.2.5.4 Adjusting the collimation

In programs C3, C3 F, C1 p.a. and C2 a.p, the exposure area can be limited so that certain parts of the patient's head, e.g. the upper cranial region, thyroid gland and posterior cranial region, are not irradiated. This reduces the patient dose.



✓ Level 1 is displayed on the touchscreen.

1. Press the collimation symbol **(A)** on the right side of the touchscreen.
   ↳ A submenu line is opened.



2. Select the collimation.
   ↳ The selection is highlighted orange in the submenu line.
3. Touch the cross on the left side of the submenu line.

or

➢ Press the collimation symbol **(A)** again.
   ↳ The submenu line is closed.

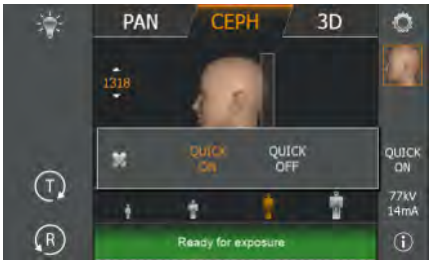
↳ The collimation is set.

5.1.2.5.5 Adjusting the Quickshot function

You can set whether the Quickshot function is to be switched on or off for each CEPH program. The Quickshot function reduces the exposure time by 30%.

✓ Level 1 is displayed on the touchscreen.

1. Touch the Quickshot display **A** on the right side of the touchscreen.
   ↳ A submenu line is opened.



2. Press the *Quick On* or *Quick Off* icons on the touchscreen.
   ↳ The selection is highlighted orange in the submenu line.
3. Touch the cross on the left side of the submenu line.

or

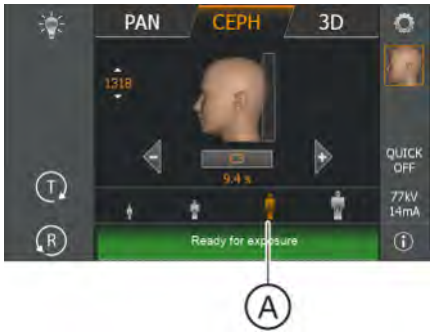
➢ Touch the Quick symbol **(A)** again.
   ↳ The submenu line is closed.

↳ The Quickshot function is set.

5.1.2.5.6 Setting the kV/mA values

Setting the kV/mA values via the patient symbols

Preset kV/mA combinations are assigned to the patient symbols, which are selected according to the patient's size and weight. The symbols roughly correspond to child, youth/woman, woman/man, hefty persons.



✓ Level 1 is displayed on the touchscreen.

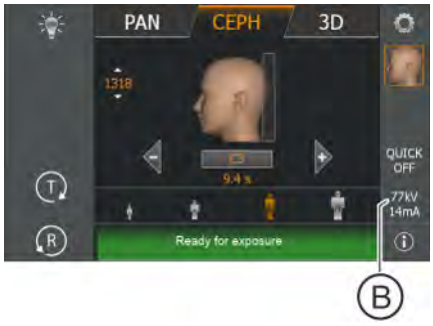
➢ Touch the required patient symbol.

↳ The selection **(A)** is highlighted in orange. The selected kV/mA value is displayed on the right side of the touchscreen.

↳ The kV/mA value is set.

Setting the kV/mA values via the submenu line

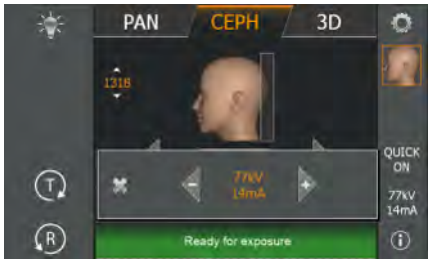
If the preset kV/mA combinations do not provide a satisfactory result, you can also set the kV/mA values manually in all programs.



✓ Level 1 is displayed on the touchscreen.

1. Touch the kV/mA symbol **(B)** on the right side of the touchscreen.

↳ A submenu line is opened.



2. Select a kV/mA value. Touch the - or + keys.

↳ The selected kV/mA value is displayed.

3. Touch the cross on the left side of the submenu line.

or

➢ Touch the kV/mA symbol **(B)** again.

↳ The submenu line is closed.

↳ The kV/mA value is set.

5.1.2.5.7 Positioning the patient

The patient is positioned on the unit while standing. Positioning in the seat is also possible without issue.

This is the case, for example, if the patient is shorter than approx. 93 cm or taller than 197 cm. In this case, you position the patient on a fixed and height-adjustable chair with a short backrest.

⚠ CAUTION

The height adjustment motor starts slowly and then increases its speed.

A patient positioned in the unit may be injured by moving parts.

➢ Monitor the patient and the movement of the unit during height adjustment! To make minor corrections, press and immediately release the buttons. Release the button immediately in the event of unwanted contact of the unit with the patient.

⚠ CAUTION

Hazard due to laser light.

Patients and users can be blinded by the laser light localizer.

➢ Prior to activating the laser light localizers, the patient **must** be asked to shut their eyes.

➢ Do not stare directly into the laser beam. Make sure that the laser beam does not meet the eyes of the patient.

➢ A distance of at least 10 cm must be maintained between the eye and the laser.

⚠ CAUTION

Reduced image quality

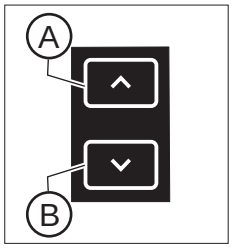
The image quality is adversely affected by metal or other radiopaque materials located in the patient's mouth and in its vicinity.

➢ Ask the patient to take off all metallic objects such as glasses and jewelry in the head and neck area as well as all removable dental prostheses. The tray in front of the control mirror is used for depositing jewelry.

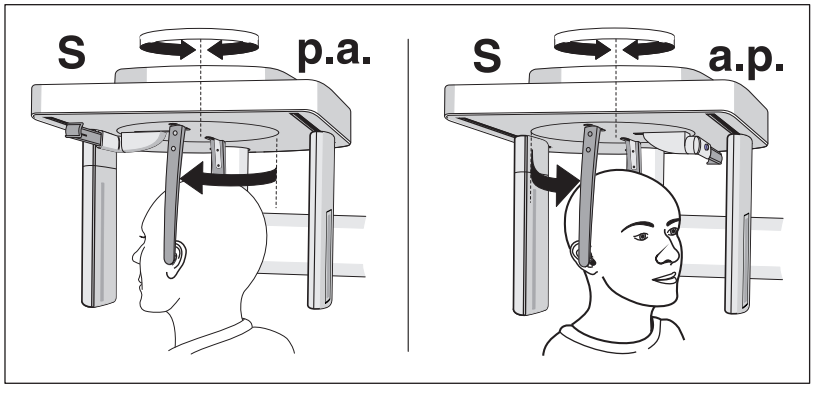
Tip: Reference values are shown for the height and forehead support settings, which are saved for further exposures in the additional information area of the SIDEXIS software.

5.1.2.5.7.1 Positioning for symmetrical exposures C1, C2

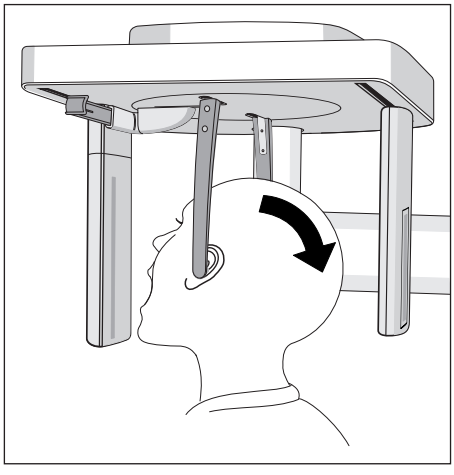
- ✓ The ear olive holders are pushed apart.
- ✓ The nose support is swiveled upwards.
- ✓ The ear olive holders are rotated at an angle of 90° towards the sensor and the secondary diaphragm.
- ✓ The protective caps for ear olives are inserted.



1. Set the unit height using the up **A** and down **B** buttons.
   CAUTION! The height adjustment motor starts slowly and then increases its speed.
   Press and hold down the button until the desired height is reached.
   The unit movement is accompanied by a beep.
   Release the height-adjustment button once the Cephalometer is at the same height as that of the patient's head.
2. Guide the patient between the ear olive holders.
   - ↳ In posterior-anterior exposure: The patient stands facing the sensor. For anterior-posterior exposure: The patient stands facing the secondary diaphragm. This position applies for both right and left-handed arms.



3. Grasp the ear olive holders at the top and simultaneously slide them together.
   - ↳ The ear olives are positioned at the patient's outer ear canal.

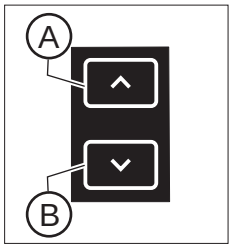


4. Only for program C1 p.a. and C2 a.p: Instruct the patient to tilt his head back and open his mouth as far as possible.
5. Instruct the patient to hold this position until the end of the exposure.

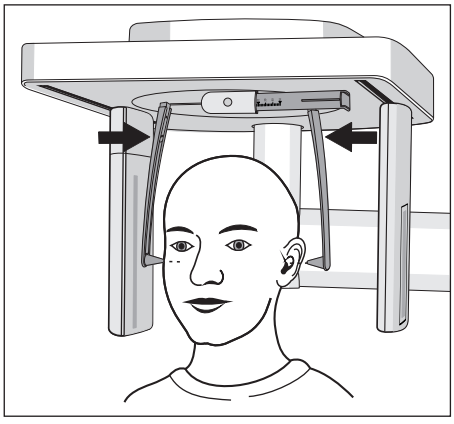
↳ The patient is positioned at the unit.

5.1.2.5.7.2 Positioning for C3 lateral exposures

- ✓ The nose support is swiveled upwards.
- ✓ The ear olive holders are pushed apart.
- ✓ The ear olive holders are in a line with the sensor and the secondary diaphragm.
- ✓ The protective caps for ear olives are inserted. The hygienic protective sleeve for the nose support is pulled on.

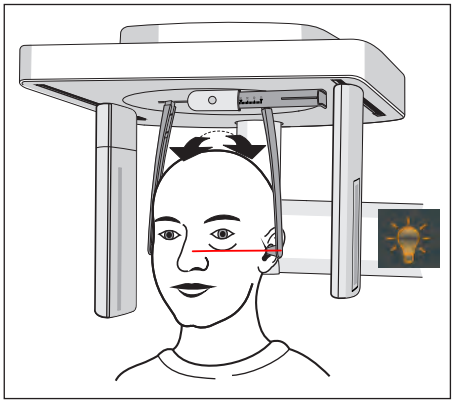


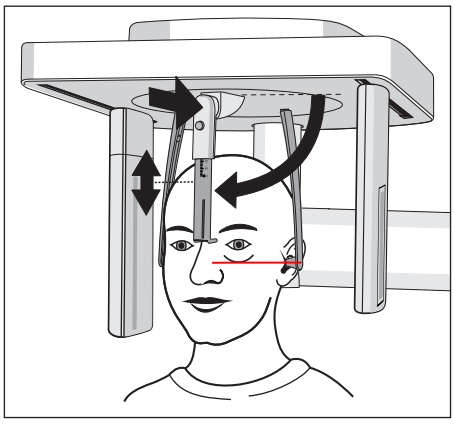
1. Set the unit height using the up **A** and down **B** buttons.
   CAUTION! The height adjustment motor starts slowly and then increases its speed.
   Press and hold down the button until the desired height is reached. The unit movement is accompanied by a beep.
   Release the height-adjustment buttons once the Cephalometer is at the same height as that of the patient's head.
2. Guide the patient backwards between the ear olive holders.



3. Grasp the ear olive holders at the top and simultaneously slide them together.
   ↳ The ear olives are positioned at the patient's outer ear canal.

4. Switch on the light localizer. **CAUTION! Risk of dazzle**
   ↳ A red laser line reflects on the patient's head. To switch off the light localizer, press the key again. It switches off automatically after approx. 100 seconds.
5. Align the patient's head according to the Frankfort horizontal plane.
6. Correct the patient's head inclination as necessary. Briefly tap on the up **A** and down **B** height adjustment buttons.
   ↳ The laser line reflects on the upper edge of the outer ear canal and on the lowest point of the lower edge of the eye socket.





7. Optional: Swivel the nose support downward and adjust it in a vertical and horizontal direction, see "Setting/inserting the cephalometer accessories" [→ 47].
   ↳ The nose support rests on the root of the nose.
8. Instruct the patient to hold this position until the end of the exposure.

↳ The patient is positioned in the unit.

5.1.2.5.7.3 Positioning for carpal exposures C4

NOTE

The patient may press too forcefully against the carpus support plate.

This can damage the carpus support plate.

➢ Instruct the patient to only press lightly on the carpus support plate.

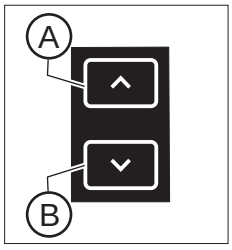
✓ The nose support is swiveled upwards.

✓ The carpus support plate is locked in place on the unit.

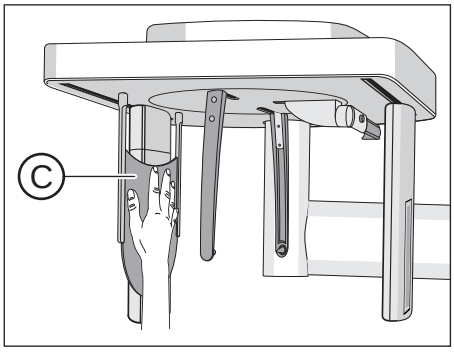
✓ The ear olive holders are pushed apart.

✓ The ear olive holders are rotated at an angle of 90 degrees to the sensor and the secondary diaphragm. The nose support points towards the secondary diaphragm.

✓ Hygienic protection is ensured.



1. Guide the patient sideways into the unit.
2. Set the unit height using the up **A** and down **B** buttons.
   CAUTION! The height adjustment motor starts slowly and then increases its speed.
   Press and hold down the button until the desired height is reached. The unit movement is accompanied by a beep.
   Release the height adjustment keys once the patient can place his/her hand on the carpus support plate with the arm bent.
3. Instruct the patient to place his hand on the carpus support plate.
   ↳ For a cephalometer with extension arm on right-hand side: The patient's left hand is positioned on the carpus support plate. For a cephalometer with extension arm on left-hand side: The patient's right hand is positioned on the carpus support plate. The patient's fingertips do not protrude beyond the upper edge **C**. The patient's hand and arm form a line.



4. Instruct the patient to hold this position until the end of the exposure.

↳ The patient is positioned at the unit.

5.1.2.6 Pediatric exposures

Compared to middle-aged adults, children and adolescents are three times more at risk from radiation. A justifying indication requires that the health benefits of use outweigh the risk posed by radiation. Other procedures with similar health benefits that do not involve any, or only involve low-level, exposure to radiation must be preferred when weighing up the situation.

Medical radiation exposure as part of dental care provided to children and adolescents must produce sufficient benefits, whereby the radiation exposure resulting from an X-ray examination must be limited to the extent that is consistent with the needs of medical science (ALARA principle).

Dentsply Sirona offers numerous options for reducing the radiation exposure for adults, and especially for children and adolescents, to a necessary minimum. Furthermore, there are numerous options for simplifying the X-ray applications for children and adolescents.

Please observe the detailed descriptions for these in the respective chapters of these Operating Instructions!

Dose reduction
Overview of the options for reducing doses, in particular for children and adolescents, with the Axeos:

- Using child panoramic radiographs P10, P10A, P10C.
  - The exposures present a reduced tooth region without ascending rami. In addition, exposure times are reduced and the exposure dose is cut by up to 40% compared with panoramic radiographs P1.
- Selecting the relevant patient symbol for children/adolescents.
  - The two smallest patient symbols represent the exposure values for children/adolescents. Through their reduction in the Kv/mA values for these exposure parameters, the dose is lowered accordingly.
- Selecting the "Quickshot" setting parameter.
  - In addition to the child exposures P10, P10A, and P10C, the "Quickshot" function of the unit can be selected for these panoramic radiographs. Due to the quicker cycle, the dose is reduced by up to 40% depending on the program; the image quality is reduced a little in the process.
- Collimation to the smallest possible area / FoV for 3D exposures:

  2D X-ray panoramic radiograph:
  - By collimating the X-ray area to a quadrant, the dose for panoramic radiographs can be reduced by up to 30%.
  - Through a combination of "Collimation to a quadrant" and the "Quickshot" setting parameter, the dose can be reduced by up to 60%.

  2D X-ray Ceph exposure:
  - In the case of cephalography, the exposure area can be collimated in the C3 and C3 F programs and the C1 p.a and C2 a.p programs. This reduces the patient dose.
  - In addition to the collimation, the "Quickshot" setting parameter can also be selected in Ceph mode. This further reduces the patient dose.

  3D X-ray:
  - For volume exposures VOL1, VOL3 and VOL 4, the height of the image can be collimated for all centers of rotation.
    VOL1: UJ/LJ 5.5 cm
    VOL3: UJ 7.5 cm / LJ 8 cm
    VOL4: UJ 7.5 cm / LJ 10 cm
  - By selecting the VOL2 volume, the volume can also be reduced in diameter to 5 cm. This reduces the effective dose by approx. 30 %.
  - By selecting the Low Dose exposure mode, the effective dose can be reduced significantly compared with the SD exposure mode.

Optimized X-ray applications

Overview of the options for simplifying X-ray applications for children/adolescents with the Axeos:

- Children and adolescents can often be positioned in a stiller and more stable position if they are seated. The Axeos can therefore be brought down to a bite block height of 80 cm for an exposure in sitting position.
- To explain the exposure and to alleviate any fears, a radiation-free test cycle can be started at any time.
- The Axeos has been designed so that it functions openly and does not scare or induce fear in children and adolescents.
- There are no distressing cycle noises.
- Optimum and stable positioning options and adjustment tools help the user to avoid exposure errors.
- The Axeos does not require any target exposures to check the correct patient positioning. This means no unnecessary extra dosing.

5.1.3 Releasing the exposure

5.1.3.1 Starting the test cycle

The test cycle is executed without radiation. The test cycle is used to check that the unit is functioning correctly and to ensure that a complete, uninterrupted cycle is possible. The rotating unit stops automatically if the resistance increases.

✓ The unit is in its starting position. Selecting an exposure program [→ 71]

1. Press the T key.
   ↳ The program enters test cycle mode. On the touchscreen, the display of the kV/mA value, the exposure time and the patient symbols is hidden. Two test cycle symbols appear.
2. Press the release button.
   ↳ The test cycle is started.
3. Wait until the test cycle has been completed.
4. Press the T key again.
   ↳ The program exits test cycle mode.

5.1.3.2 Releasing the exposure

The exposure can be released using the release button on the spiral cable or the remote control. If the unit is installed in an X-ray room, which features a door edge, and the line of sight towards the patient is guaranteed, the exposure is to be released via the remote release, see "Using remote release" [→ 132].

⚠ WARNING

The unit emits X-ray radiation.

Excess exposure to X-rays is detrimental to health.

➢ Use the prescribed accessories for radiation protection.

➢ Do not stay in the X-ray room during exposure. Move as far away from the unit as the coiled cable for the release button allows you to.

⚠ CAUTION

The movement of the system may be adversely affected by the patient's physical constitution, clothing, or dressings, or by wheelchairs or hospital beds.

The exposure is automatically terminated if the movement of the unit is inhibited. The exposure must be repeated.

➢ Ensure that the movement of the unit is not impaired when positioning the patient. Before the exposure, perform a test cycle using the T key.

⚠ CAUTION

Prematurely letting go of the release button cancels the exposure immediately.

The exposure must be repeated.

➢ Take care not to let go of the exposure release button prematurely. Press the release button until the end of the exposure. Note that radiation may be released several times during an exposure cycle.

⚠ CAUTION

The exposure memory of the unit is cleared when the unit is switched off.

Images that have not been transferred to SIDEXIS are irretrievably lost. The exposure must be repeated.

➢ Wait until the exposure data have be completely transferred. Do not switch the unit off before the X-ray exposure is displayed on the SIDEXIS screen.

⚠ CAUTION

In the case of cephalometric exposures with extension arm on right-hand side, the secondary diaphragm and sensor automatically return to the starting position following exposure.

A patient who exits the unit too quickly risks injury from the moving parts.

➢ Be sure to explain the entire exposure procedure to the patient. The patient may leave only after the exposure has been taken and the secondary diaphragm and sensor have automatically returned from the cephalometer.

↳ In the case of extension arm on left-hand side: Scanning operation from rear to front – after the exposure, the secondary diaphragm and the sensor move automatically to the rear for the positioning of the next patient.
In the case of extension arm on right-hand side: Scanning operation from front to rear, secondary diaphragm and sensor remain at the rear in the position required for positioning the next patient.

⚠ CAUTION

Pressing the R key moves the unit to the starting position.

A patient positioned in the unit may be injured by moving parts.

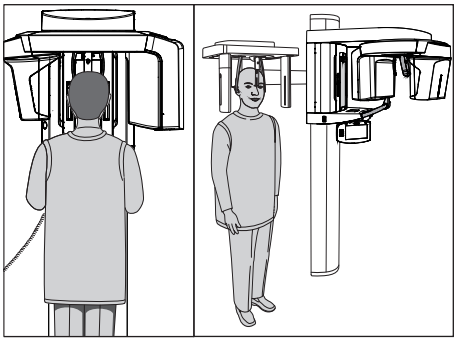
➢ Check that a patient is not positioned in the unit before moving it to the starting position.

IMPORTANT

Prior to exposure, ensure that you have selected the correct exposure program and accessories. Check the program display on the touchscreen and the position of the sensor.

IMPORTANT

Premature initiation of a new exposure is prevented by the automatic exposure blocking function. This function is used for thermal protection of the X-ray tubes.
After the release button is pressed, the message *"Ready for exposure in XX seconds"* appears in the comment line of the touchscreen. The remaining cooling time is counted down and is displayed under "XX". Another exposure can be made only after the cooling period has elapsed.

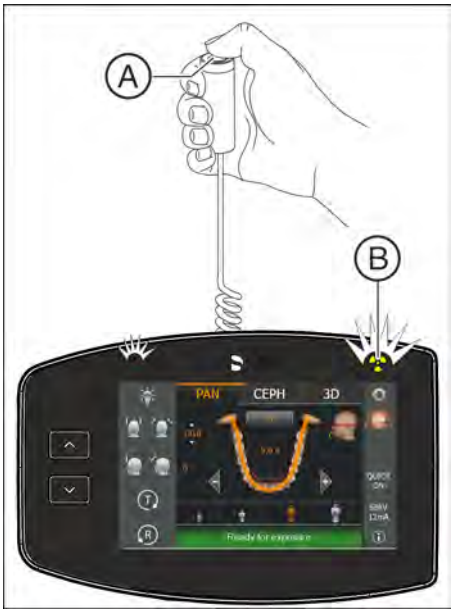


- ✓ The program settings have been made.
- ✓ The patient is positioned in the unit.
- ✓ No help message is permitted to be displayed in the comment line of the touchscreen. The *"Ready for exposure"* message must appear.
  Tip: If you press the release button on the remote control while the door is open, the help message *"Close the door"* is displayed with the help code H321. Close the door and acknowledge the message.

IMPORTANT

Advise the patient of what to do during the exposure and check to make sure that they comply:

- The patient must not move his/her head in any way.
- The patient's shoulders must not be hunched.
- For cephalometric images, the arms of the patient must hang down freely at the sides.



1. Press release button **A** and hold it down until the end of the exposure.
   - ↳ The exposure is made. *"Exposure is performed"* appears in the comment line on the touchscreen. During radiation, the visual radiation indicator **B** lights up on the Easypad. In addition, an acoustic signal sounds throughout the radiation. Radiation can be released several times during the exposure.
2. Press and hold release button **A**. Wait until the continuous tone is followed by a short pulsed tone sequence sounds (can be deactivated by a service engineer). The message *"Please wait"* shortly appears in the comment line of the touchscreen followed by confirmation of the exposure data. Exposure mode, exposure program, tube voltage and current, actual radiation time and dose area product are displayed.
   - ↳ The forehead and temple or temporomandibular joint supports open automatically.
3. Let go of release button **A**.
   - ↳ The exposure is complete.
   - ↳ The X-ray image is displayed on the PC monitor after a brief period.
4. Guide the patient out of the unit.
5. Press return key **R** on the Easypad.
   - ↳ Confirmation of the exposure data is acknowledged.

6. **WARNING! The patient may be injured by moving parts.** Press return key **R** on the Easypad again.
   - ↳ The rotating unit moves to the starting position.

↳ The unit is ready for the next exposure.

Two-part temporomandibular joint exposure program TM 1.1

In the **Two-part exposure program TM 1.1**, two exposures (TM 1.1 and TM 1.2) are made.

- ✓ Once the first temporomandibular joint exposure has been made as described above, the message *"Please wait"* appears in the comment line on the touchscreen.
- ✓ The rotating unit has automatically moved to the starting position.

1. Instruct the patient to open his/her mouth.
   - ↳ The patient has opened his/her mouth without changing his/her position.
2. Press the release button **A** and hold it down until the end of the second exposure.
   - ↳ The second exposure is made. *"Exposure is performed"* appears in the comment line on the touchscreen.
3. Wait until the continuous tone is followed by a short pulsed tone sequence sounds (can be deactivated by a service engineer).
   - ↳ The message *"Please wait"* shortly appears in the comment line of the touchscreen followed by confirmation of the exposure data. Exposure mode, exposure program, tube voltage and current, actual radiation time, dose area product are displayed.
4. Let go of release button **A**.
   - ↳ The second exposure is complete. Proceed as described above starting with step 5.
   - ↳ The X-ray image is displayed on the PC monitor after a brief period.

5.1.3.3 Rescue program for image transfer problems

In case of unexpected network errors or exposure interruptions, there may be problems with image transfer to Sidexis 4.

There are two options available in **Sidexis 4** for transferring images, which are described below:

- The exposure data can still be found in the exposure memory of the unit and auxiliary message H420 is displayed on the Easypad; see “Unit rescue”.
- The exposure data has been transferred from the X-ray unit, but has not yet been imported into Sidexis 4, see “Data container rescue”.

5.1.3.3.1 Unit rescue

⚠ CAUTION

The exposure memory of the unit is cleared when the unit is switched off.

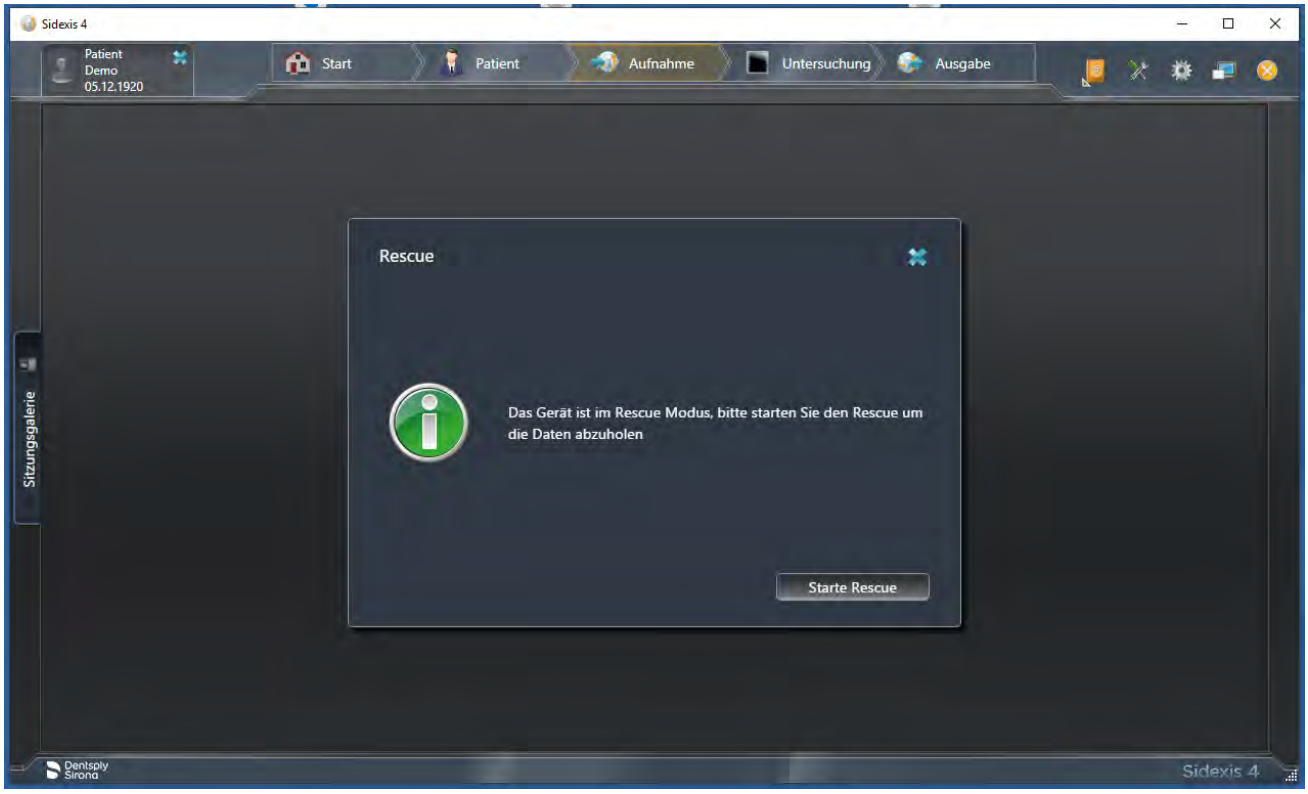
Images that have not been transferred to SIDEXIS are irretrievably lost. The exposure must be repeated.

➢ Wait until the exposure data have be completely transferred. Do not switch the unit off before the X-ray exposure is displayed on the SIDEXIS screen.

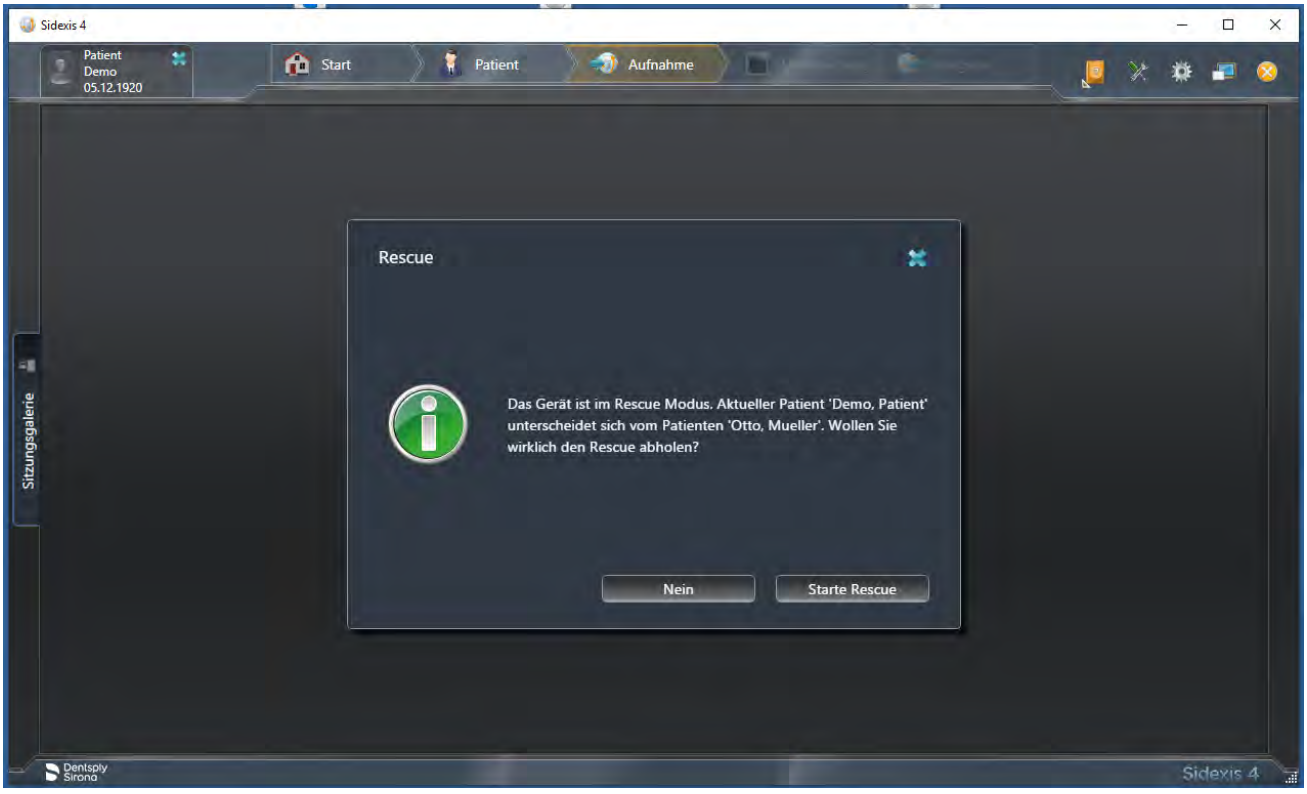
✓ The auxiliary message H420 is displayed on the Easypad.

✓ **The X-ray exposure could not be transferred, as a network fault exists or the PC failed.**
In this case, the system terminates the connection after a unit-dependent time and switches to Rescue mode.
This means: the image is not lost, but is kept in the RAM of the X-ray unit by a safety mechanism until it is retrieved by Sidexis 4. A further exposure with this device is blocked until then.

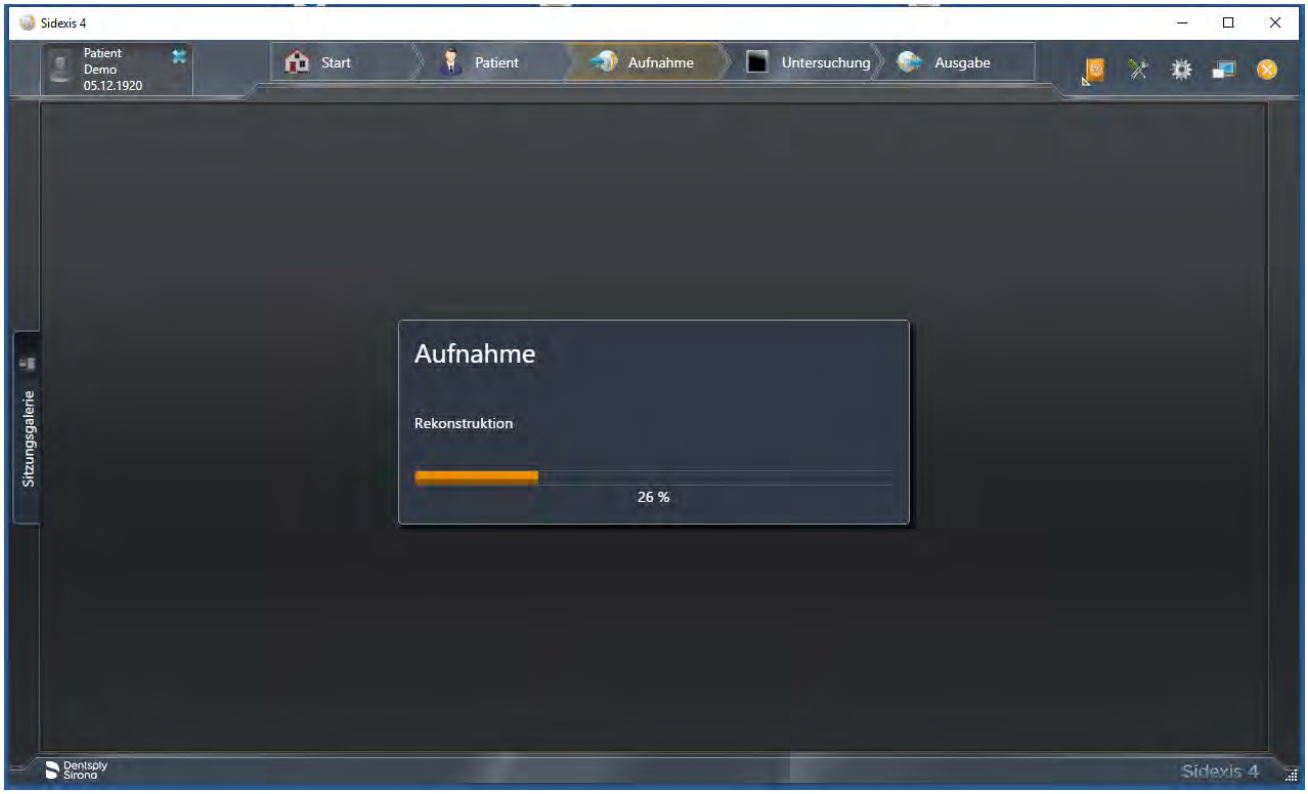
1. Select the X-ray unit that is in Rescue mode.



2. Click Start rescue if the registered patient has been X-rayed with the unit that is in Rescue mode.
   ↳ The program establishes a connection to the X-ray unit that is in Rescue mode.



3. Click No if the registered patient on the PC and on the unit do not match.
4. Register the appropriate patient for the Rescue mode in Sidexis 4 (see *"Sidexis 4 Operator´s Manual"*) and click on the "Start rescue" button.



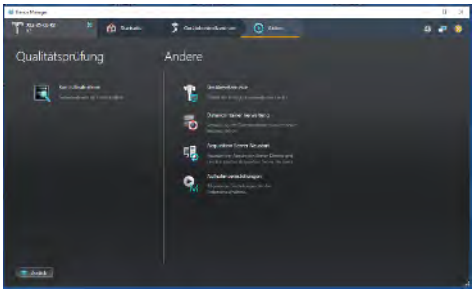
↳ If a connection is successfully established, data is transferred.

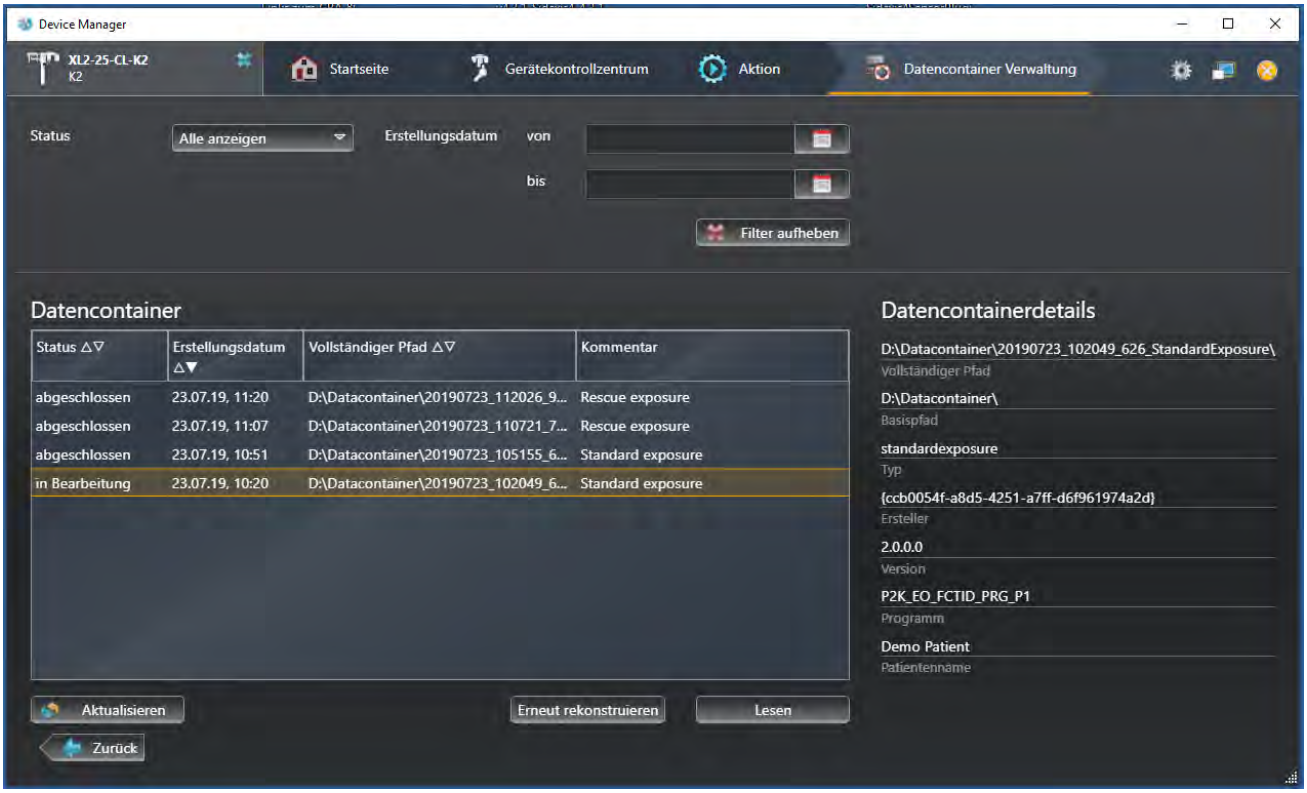
IMPORTANT
The displayed exposure may be of lower quality if the exposure was terminated prematurely or a data transfer problem occurred between the unit and the reconstruction server.

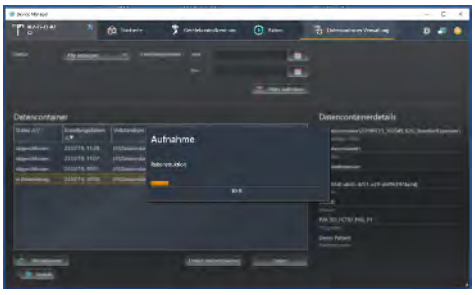
5.1.3.3.2 Data container rescue

✓ **Data exists that has not yet been transferred to the Sidexis 4 database.**

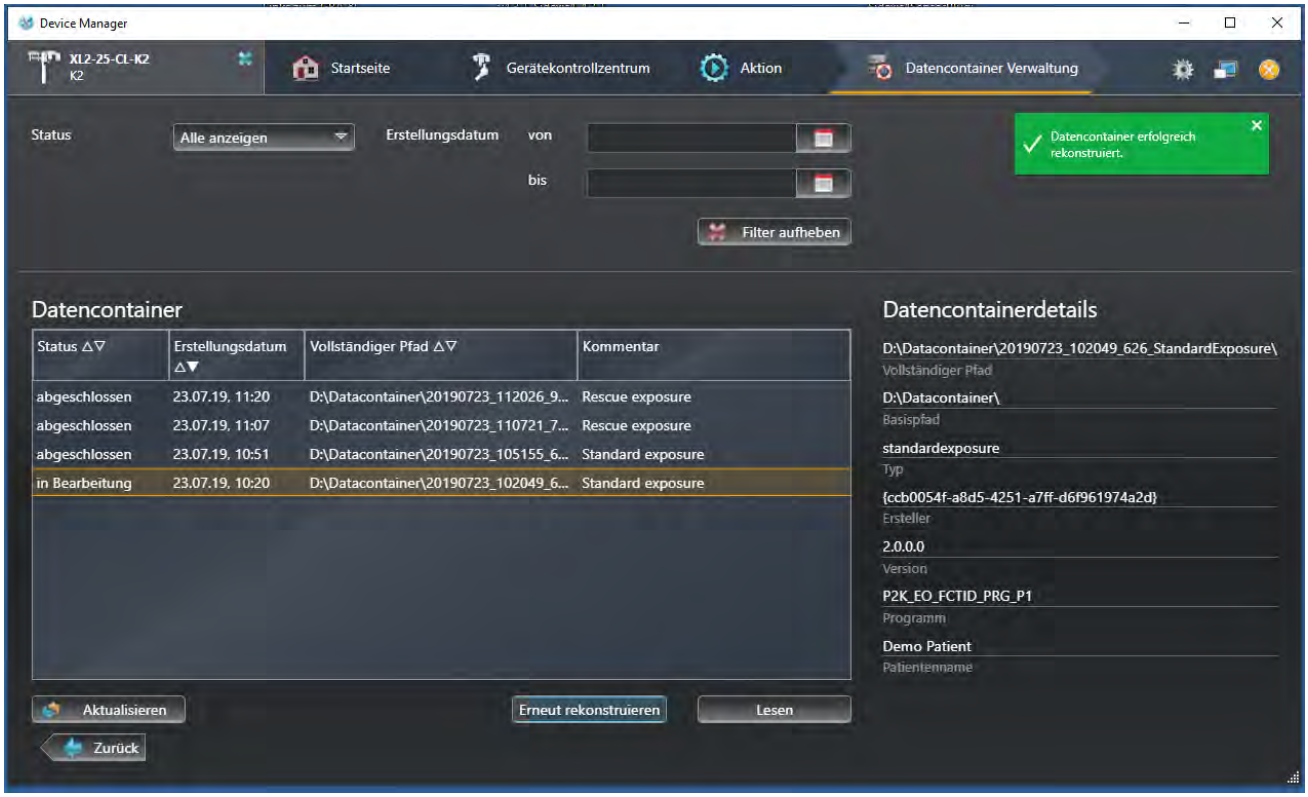
1. Start the Device Manager.
   ↳ The data container rescue view is displayed if, when the unit is being made ready for exposure, patient exposures exist that have not yet been imported into the Sidexis 4 database. In this case, there is no Unit rescue H420.
2. Select the "Manage data container" dialog.
   ↳ All patient exposure data containers available in the Sidexis 4 database are displayed in a list.



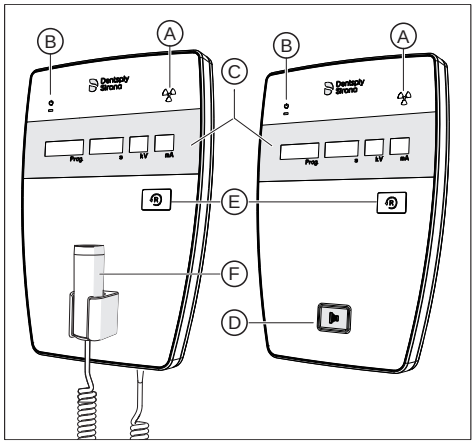




3. Select a data container and import it by clicking on "Reconstruct again".
   ↳ The exposure is reconstructed again.
   ↳ If the corresponding patient is registered in Sidexis 4, the exposure is directly displayed in the *"Light box"* of Sidexis 4.


Device Manager
X12-25-CL-K2
K2
Startseite
Gerätekontrollzentrum
Aktion
Datencontainer Verwaltung
Status
Alle anzeigen
Erstellungsdatum
von
bis
Filter aufheben
Datencontainer erfolgreich rekonstruiert.
Datencontainer
Status
Erstellungsdatum
Vollständiger Pfad
Kommentar
abgeschlossen 23.07.19, 11:20 D:\Datacontainer\20190723_112026_9... Rescue exposure
abgeschlossen 23.07.19, 11:07 D:\Datacontainer\20190723_110721_7... Rescue exposure
abgeschlossen 23.07.19, 10:51 D:\Datacontainer\20190723_105155_6... Standard exposure
in Bearbeitung 23.07.19, 10:20 D:\Datacontainer\20190723_102049_6... Standard exposure
Datencontainerdetails
D:\Datacontainer\20190723_102049_626_StandardExposure\
Vollständiger Pfad
D:\Datacontainer\
Basispfad
standardexposure
Typ
{ccb0054f-a8d5-4251-a7ff-d6f961974a2d}
Ersteller
2.0.0.0
Version
P2K_EO_FCTID_PRG_P1
Programm
Demo Patient
Patientenname
Aktualisieren
Erneut rekonstruieren
Lesen
Zurück

5.1.3.4 Using the remote control



On the remote control, exposures are triggered using the release button **(D)**. If it is not possible to maintain visual contact with the patient when releasing the exposure, the release key with the coiled cable **(F)** on the X-ray unit can be removed and used on the remote control.

If the unit is ready for exposure and no auxiliary messages are displayed, the current program parameters appear on display **(C)**: Program designation, exposure time, voltage, current in the individual fields (*Prog.*, *s*, *kV*, *mA*). The exposure can be released now.

If plain-text help messages are displayed on the Easypad touchscreen, they also appear in coded form on the *Prog.* display of the remote control, alternating with the program name.

When switching on the unit, the X-ray indicator **A** lights up for a functional check for approx. 1 second.
The LED **B** lights up when the unit is on.

Use the Return key **E** to acknowledge exposures, error messages and auxiliary messages and move the rotating unit to the starting position.

If a row of dots appears in the *Prog.* field on the digital display **(C)**, this means the unit is currently in a preparatory phase (e.g. unit movements, parameter settings, program loading times, etc.). Wait until the dots disappear automatically and the system is ready for operation.

5.1.3.5 Canceling an exposure

An exposure that has been triggered can be canceled again at any time.

⚠ CAUTION

Pressing the R key moves the unit to the starting position.

A patient positioned in the unit may be injured by moving parts.

➢ Check that a patient is not positioned in the unit before moving it to the starting position.

✓ The exposure is released.

1. Let go of the exposure release button.
   ↳ The exposure is immediately terminated.
   Message H320 appears.
   The exposure data of the terminated exposure is displayed in Sidexis.
   The radiation time and dose area product flash on the Easypad.
2. Guide the patient out of the unit.
3. Press the R key.
   ↳ The actual required radiation time is acknowledged.
4. Press the R key again.
   ↳ The rotating unit moves to the starting position.

↳ The unit is ready for the next exposure.

IMPORTANT

The program settings must be checked before the exposure is repeated. Any changed program settings must be preselected again.

5.2 Preselecting user settings

5.2.1 Changing default settings

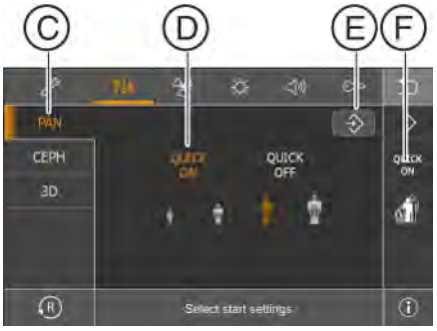
For the Pan and Ceph program groups, the preselection of the patient symbol can be changed and the switching on or off of the Quickshot function can be preset in the start settings.
For the 3D program group, the preselection of the 3D exposure mode and the patient symbol can be changed in the start settings.

✓ The touchscreen display is at level 1.

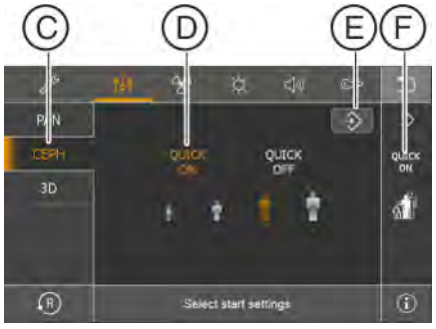
1. Touch the toothed wheel (A) in the upper right corner of the touchscreen.
   ↳ Level 2 is displayed.

2. Touch the Start settings symbol (B).
   ↳ The setting for Quick On or Quick Off appears.

Pan start settings

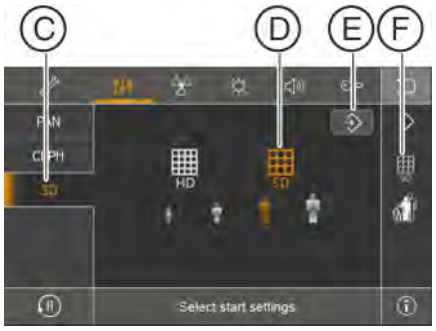


1. Touch the Pan symbol (C).
   ↳ The following appears: Select start settings.
2. Select the patient symbol that you want to preset.
   ↳ The selection is highlighted in orange.
3. Select whether the Quickshot function is to be switched on or off. Touch the *Quick On* or *Quick Off* symbols (D) on the touchscreen. The Quickshot function reduces the cycle time by approx. 20 to 50%, depending on the exposure program. The function is set independent of the exposure program.
   ↳ The selection is highlighted in orange.
4. Touch the Save symbol (E).
   ↳ The setting is saved and is displayed in the side display area (F).



Ceph start settings

1. Touch the Ceph symbol (C).
   ↳ The following appears: Select start settings.
2. Select the patient symbol that you want to preset.
   ↳ The selection is highlighted in orange.
3. Select whether the Quickshot function is to be switched on or off. Touch the *Quick On* or *Quick Off* symbols (D) on the touchscreen. The Quickshot function reduces the cycle time by approx. 20 to 50%, depending on the exposure program. The function is set independent of the exposure program.
   ↳ The selection is highlighted in orange.
4. Touch the Save symbol (E).
   ↳ The setting is saved and is displayed in the side display area (F).



3D start settings

1. Touch the 3D symbol (C).
   ↳ The following appears: Select start settings.
2. Select the patient symbol that you want to preset.
   ↳ The selection is highlighted in orange.
3. Select whether HD or SD exposure mode is preset.
   ↳ The selection is highlighted in orange.
4. Touch the Save symbol (E).
   ↳ The setting is saved and is displayed in the side display area (F).

5.2.2 Changing basic settings

The kV/mA values stored for the patient symbols can be adjusted for each program in the basic settings.

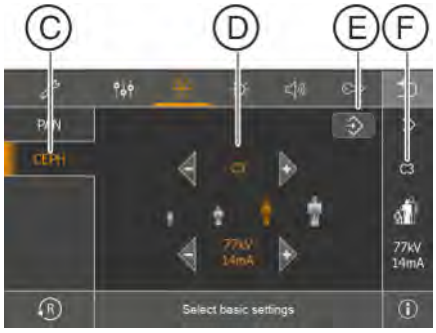
✓ The touchscreen display is at level 1.

1. Touch the toothed wheel (A) in the upper right corner of the touchscreen.
   ↳ Level 2 is displayed.

2. Touch the Basic setting symbol (B).
   ↳ The settings for the kV/mA values appear.

Pan basic settings

1. Touch the Pan symbol (C).
   ↳ The following appears: Select basic settings.
2. Select the exposure program for which you want to change the kV/mA value. Touch the - or + arrows.
   ↳ The selected setting is displayed on the right side of the touchscreen (F).
3. Select the patient symbol for which you want to change the kV/mA value.
   ↳ The selection is highlighted in orange.
4. Select the kV/mA value that you want to apply to the selected program and patient symbol.
5. Touch the Save symbol (E).
   ↳ The kV/mA value is saved for the selected program and patient symbol and is displayed in the side display area (F).
6. Repeat this procedure for the other patient symbols and programs.
   ↳ The settings of the kV/mA values stored for the patient symbols are complete.



Ceph basic settings

1. Touch the Ceph symbol (C).
   ↳ The following appears: Select basic settings.
2. Select the exposure program for which you want to change the kV/mA value. Touch the - or + arrows.
   ↳ The selected setting is displayed on the right side of the touchscreen (F).
3. Select the patient symbol for which you want to change the kV/mA value.
   ↳ The selection is highlighted in orange.
4. Select the kV/mA value that you want to apply to the selected program and patient symbol.
5. Touch the Save symbol (E).
   ↳ The kV/mA value is saved for the selected program and patient symbol and is displayed in the side display area (F).
6. Repeat this procedure for the other patient symbols and programs.
   ↳ The settings of the kV/mA values stored for the patient symbols are complete.

5.2.3 Changing the light settings

IMPORTANT

The light color of the unit lighting (ambient light) has no connection with the unit status that is displayed on the user interface (Easypad).

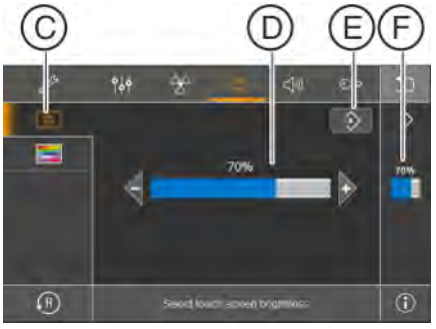
The intensity of the touchscreen display can be adjusted to the lighting conditions. Color and brightness of the ambient light can be changed.

✓ The touchscreen display is at level 1.

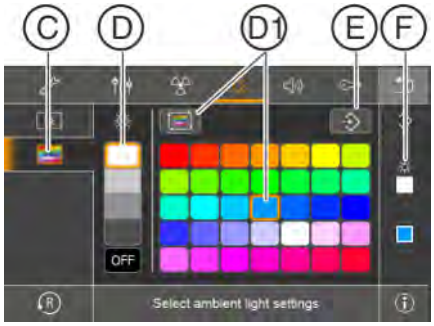
1. Touch the toothed wheel (A) in the upper right corner of the touchscreen.
   ↳ Level 2 is displayed.

2. Touch the light symbol (B).
   ↳ The settings for the lighting appear.

Backlight for touchscreen



1. Touch the touchscreen symbol (C).
   ↳ The following appears: Select backlight of touchscreen.
2. Set the light by touching the -/+ keys (D), the lowest possible setting is 10%.
   ↳ The light is displayed in percent.
3. Touch the Save symbol (E).
   ↳ The setting is saved and is displayed in the side display area (F).



Ambient light settings

1. Touch the ambient light symbol (C)
   ↳ The following appears: Select ambient light settings.
2. Adjust the brightness by touching one of the 4 different gray tones (D) or switch off the ambient light.
   ↳ The selection is highlighted in orange.
3. Set Demo mode or a color from the color section (D1) by touching.
   ↳ The selection is highlighted in orange.
4. Touch the Save symbol (E).
   ↳ The setting is saved and is displayed in the side display area (F).

5.2.4 Changing the sound volume settings

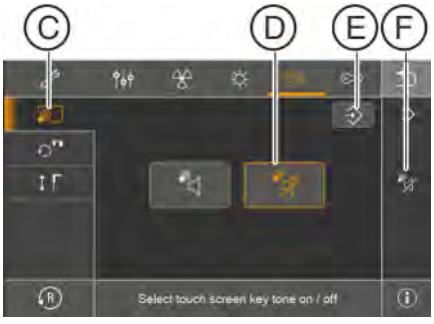
For acoustic confirmation, there is a touchscreen sound, cycle sound and height adjustment sound.

✓ The touchscreen display is at level 1.

1. Touch the toothed wheel (A) in the upper right corner of the touchscreen.
   ↳ Level 2 is displayed.

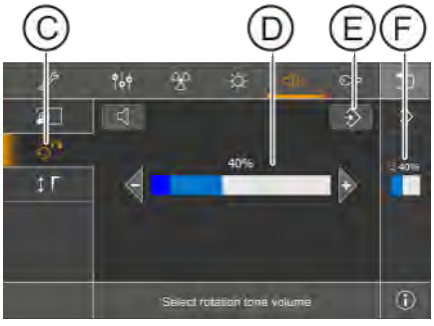
2. Touch the Speaker symbol (B).
   ↳ The setting for the acoustic signals appears.

Touchscreen touch sound

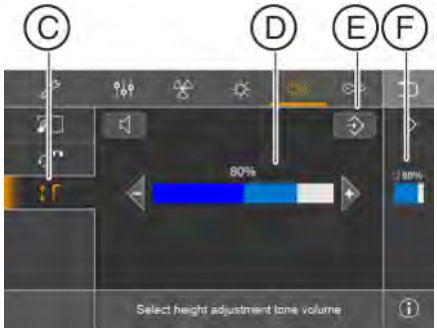


1. Touch the Touch sound symbol (C).
   ↳ The following appears: Enable/disable touchscreen touch sound.
2. Enable or disable the touch sound (D).
   ↳ The selection is highlighted in orange.
3. Touch the Save symbol (E).
   ↳ The setting is saved and is displayed in the side display area (F).

Cycle sound



1. Touch the Cycle sound symbol (C).
   ↳ The following appears: Define volume of cycle sound.
2. Set the volume by touching the -/+ keys (D), the lowest possible setting is 10%.
   ↳ The volume is displayed in percent.
3. Touch the Save symbol (E).
   ↳ The setting is saved and is displayed in the side display area (F).



Height adjustment sound

1. Touch the Height adjustment symbol (C).
   ↳ The following appears: Define volume of height adjustment.
2. Set the volume by touching the -/+ keys (D), the lowest possible setting is 50%.
   ↳ The volume is displayed in percent.
3. Touch the Save symbol (E).
   ↳ The setting is saved and is displayed in the side display area (F).

5.2.5 Displaying unit information

Unit data useful for any discussions with your service engineer is listed.

✓ The touchscreen display is at level 1.

1. Touch the i symbol (A) in the lower right corner of the touchscreen.
   ↳ The unit information is displayed.

2. Touch the arrows (B) in the scroll bar to the right of the list.
   ↳ The next or previous page of the list is displayed.
3. Touch the back symbol (C) in the lower right corner of the touchscreen.
   ↳ The display changes to level 1.

5.2.6 Service functions

The service functions are intended exclusively for service engineers. You will find a description of the service functions in the relevant service manuals.

6 Service

6.1 Cleaning and care

IMPORTANT

Service life

The actual service life of the X-ray unit directly depends on the intensity and type of use. In addition, external conditions (e.g. stability of the power supply) and technical care and maintenance (according to the maintenance instructions) have a direct influence on the operational service life.

6.1.1 Cleaning the unit

Remove dirt, grime and disinfectant residue regularly using mild, commercially available cleaning agents.

NOTE

When cleaning or disinfecting, liquids can get inside the unit via the ventilation slots and inside the release button and the ambient light.

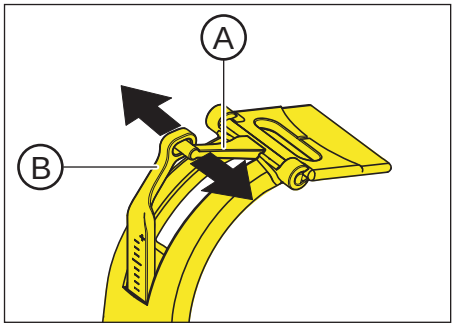
Electrical components of the unit can be destroyed by liquids.

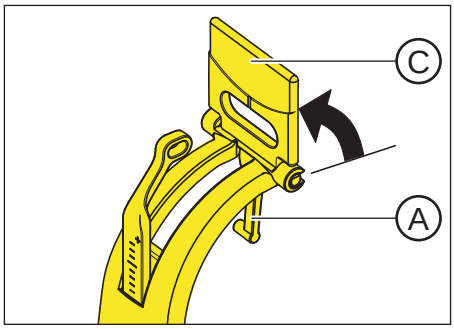
- ➢ Do not spray any liquids into the ventilation slots or onto the release button or ambient light.
- ➢ First spray the liquid onto a cleaning cloth. Then wipe the ventilation slots, release button or ambient light with the cleaning cloth.
- ➢ Make sure that no liquids run along the surface into the ventilation slots, release button or ambient light.

6.1.2 Cleaning the occlusal bite block

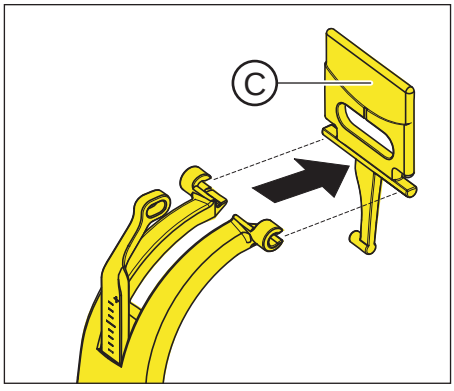
If the hinges of the occlusal bite block begin to squeak during operation after prolonged periods of use, they must be cleaned.

1. Unplug the occlusal bite block from its holder on the unit.
2. Gently push apart the guide mandrel of the lever **(A)** on the bite block plate and the eyelet of the rod **(B)** in the direction of the arrows and unhinge the lever.

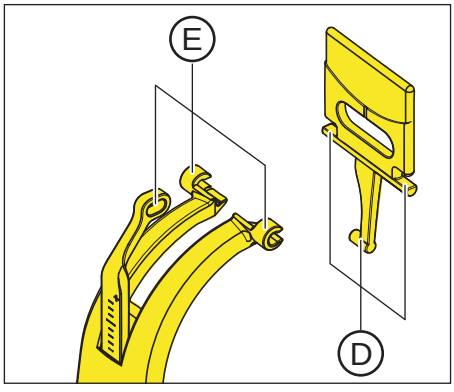




3. Swivel the bite block plate **(C)** vertically upward so that the lever **(A)** is pointing downwards.



4. Pull the bite block plate **(C)** forwards out of its hinge.



5. Clean the hinge axles **D** and the guide lugs **E** with cleaning agent/ disinfectant.
6. Assemble the occlusal bite block by following the same procedure in reverse order. When assembling, check the position of the bite block plate; the segment must point toward the connecting lever.
7. Plug the occlusal bite block back into its holder on the unit.

6.1.3 Disinfecting

Only the external surfaces may be disinfected with approved chemical disinfectants. Use only disinfectants that comply with the valid requirements of the respective national regulatory body or whose bactericidal, fungicidal, and virucidal properties have been verifiably tested and approved accordingly.

NOTE

Cleaning and care agents may contain aggressive ingredients.

Unsuitable cleaning and care agents are detrimental to health and attack the surface of the unit.

➢ Do NOT use: Substances containing phenol, peracetic acid, peroxide, or any other oxygen-splitting agents, sodium hypochlorite, or iodine-splitting agents.

➢ Use only care, cleaning and disinfecting agents approved by Dentsply Sirona.

A continuously updated list of approved agents can be downloaded from the Internet on the online portal for technical documents. The portal can also be accessed directly via the following address: www.dentsplysirona.com/manuals
Click on the menu item *"General documents"* and then open the *"Care, cleaning and disinfection agents"* document.

If you do not have access to the Internet, you can order the list (REF **59 70 905**) in one of the following two ways:

- Order from your local dental depot
- Order from Dentsply Sirona:
  Phone: +49 (0) 62 51 / 16-16 70
  Fax: +49 (0) 62 51 / 16-18 18

6.1.4 Information on preparation

Machine cleaning and disinfection

Valid for patient stabilizers such as bite blocks, ear olives, etc.
(see also chapter Spare parts and consumables [→ 36]).

Instruction	
Initial treatment at location of use	Not applicable to: • Forehead and temple supports • Temporomandibular joint supports • Spherical bite block plate • Foam bite block (See chapter "Accessory parts")
Preparation for decontamination:	Not applicable.
Cleaning: automatic	Cleaning in a cleaning and disinfecting device according to DIN EN ISO 15883-1/-2, using mild alkaline solutions as per the manufacturer's specifications.
Disinfection	Disinfection in a cleaning and disinfecting device according to DIN EN ISO 15883 Parts 1 and 2, solutions as per the manufacturer's specifications.
Drying	Drying in a cleaning and disinfecting device according to DIN EN ISO 15883 Parts 1 and 2, solutions as per the manufacturer's specifications.
Maintenance, inspection and testing of the cleaning and disinfecting device	As per the manufacturer's specifications.
Sterilization	Not specified.
Storage	Store prepared parts in a dust-free, dry and dark environment.
Additional information	Small parts (all silicone parts and bite blocks) are to be treated in a small parts sieve tray.

Manual cleaning and disinfection

Valid for handle and carpus support plate
(See also chapter Spare parts and consumables [→ 36]).

NOTE

Components can be damaged

Use only agents approved by Dentsply Sirona for disinfection as components may otherwise be damaged.

Instruction	
Initial treatment at location of use	Not applicable.
Preparation for decontamination:	Not applicable.
Cleaning: manual	The components can be cleaned by hand. To do so, thoroughly wipe down the components (handle and carpus support plate) with a soft towel moistened with water until contamination is no longer visible.
Disinfection	The components (handle and carpus support plate) can be wipe-disinfected by hand. After cleaning, disinfect the components with a disinfectant wipe. Use disinfection agents approved by Sirona Dental Systems for wipe disinfection (see URL). The relevant manufacturer specifications for application and contact time must be observed. After the contact time elapses, remove disinfectant residues by wiping with a towel moistened with water.
Drying	Wiping with a dry, lint-free cloth.
Maintenance, inspection and testing	Not applicable.
Sterilization	Not specified.
Storage	Store prepared parts in a dry environment.

6.2 Inspection and maintenance

Inspection and maintenance work must be performed at scheduled intervals to protect the health and safety of patients, users, and other persons.

The information provided in the document *"Inspection and maintenance and safety-related checks"* REF 67 30 944 should be helpful here. The document can be downloaded at http://www.dentsplysirona.com/manuals.

Annual inspection

In order to ensure the operational safety and functional reliability of your product, you as the system owner should check the equipment at regular intervals (at least once a year) or commission your dental depot to do so.

In the event of visible external damage, commission your dental depot with an inspection of the unit.

Maintenance by the service engineer

In addition to the annual check to be carried out by the system owner or authorized persons, preventive maintenance must be performed after 4, 7 and 10 years, and then at two-year intervals.

Checking image quality

The image quality should be assessed by the system owner at regular intervals, at least once a year.

On digital image receptor systems, the degree of postprocessing (brightness or contrast adjustment) that is required in the image processing software (e.g. Sidexis) to produce satisfactory results is used as an assessment criterion.

If an image cannot be evaluated and a unit defect cannot be ruled out as the cause, then proceed as follows:

Worldwide: Quality inspection

A quality inspection must be performed by an authorized service technician.

The quality inspection must be performed using the control exposures in the Device Manager. These are described in the technical document *"Installation, Inbetriebnahme und Service der Software für das Axeos Imagine System"* (REF 67 30 852).

Perform a constancy test. Dentsply Sirona provides you with the Device Manager for easy implementation of this constancy test and for its documentation.
The required test specimen and the description of the constancy test come with the unit in these countries.

If a constancy test exposure cannot be evaluated, the unit must be taken out of service. In this case, contact an authorized dealer.

Country-specific requirements for the constancy test

Perform a constancy test according to the requirements in your country. You will find descriptions for this in the following technical documents:

Germany / Austria / Switzerland

- Axeos Constancy Test 2D and 3D (DIN 6868), ?? ?? ???

Germany: Diagnostic monitor

In Germany, a regular constancy test of the diagnostic monitor is required by the Radiation Protection Ordinance in accordance with DIN 6868-157. To easily implement the necessary legal requirements, Dentsply Sirona provides the Simocon 2 software. You can find this software and the operating instructions that belong to it on your Sidexis CD under the "Tools" section.

Worldwide / USA

- Axeos Constancy Test 2D and 3D (Dentsply Sirona / 21.CFR1020.33), 67 45 017

7 Malfunctions

7.1 Help messages

When working with the unit, help messages are displayed for certain actions (e.g. H301 for press R key), which require the user to perform an action. These help messages are listed below. If an error occurs, error messages are output starting with "E" followed by 5 digits, see "Error description" [→ 153].

✓ The unit is switched on and ready for operation.

1. Press the exposure release button.
   ↳ The message H3 / H4 xx appears.
2. See list below about how to proceed to make the system ready for exposure.

H301 – R button, move into starting position

The rotating unit is not in the starting position.

⚠ CAUTION

Pressing the R key moves the unit to the starting position.

A patient positioned in the unit may be injured by moving parts.

➢ Check that a patient is not positioned in the unit before moving it to the starting position.

➢ Press the R key.
   ↳ The unit travels to the starting position.

H307 – Change bite block

The occlusal bite block cannot be used for the selected exposure program.

➢ Remove the occlusal bite block from the unit, use the positioning aid that matches the exposure type.
   ↳ The program sequence is continued.

H320 – R button, confirm exposure data

The exposure data has not yet been acknowledged.

➢ Press the R key.
   ↳ Exposure data is confirmed.

H321 – Close the door

Check door contact of the X-ray room.

➢ Close the door to the X-ray room.
   ↳ The contact switch on the door is closed.

H322 – Select quadrant

No quadrant is selected.

➢ Select the desired quadrant.
   ↳ The program sequence is continued.

H325 – Select region of exposure

No volume region selected.

➢ A dental arch showing the volume regions is displayed on the touchscreen. Touch a region to select it.
  ↳ The program sequence is continued.

H403 – Switch SIDEXIS to ready for exposure state

SIDEXIS is not ready for exposure.

➢ Make SIDEXIS ready for exposure; see the SIDEXIS Operator's Manual.

H406 – R button, move into Ceph starting position

Ceph is not in the starting position.

➢ Press the R key.
  ↳ The unit travels to the starting position.

H420 – Rescue: do not switch off! See instructions, Rescue program for image transfer problems

The image could not be transferred to Sidexis.

⚠ CAUTION

The exposure memory of the unit is cleared when the unit is switched off.

Images that have not been transferred to Sidexis cannot be restored using Unit Rescue.

➢ Never switch off the unit before transferring the images to Sidexis.

➢ Save the exposure using Unit Rescue.
  ↳ The image is transferred to Sidexis.

7.2 Error message structure

The error messages are displayed on the device in the form of an error code. The display does not show any plain text error output.

The error codes are structured according to the following pattern: **Ex yy zz**.

Explanation of abbreviations:

Ex – Error type

The x character provides a foundation for making quick decisions as to how serious the error is and how to handle the error.

yy – Locality

Describes the impaired function of the device.

zz – Identification

Further specification of the error with a consecutive number.

7.3 Error description

7.3.1 Ex – Error type

NOTE

The unit must not be switched on/off constantly.

Constant switching on and off reduces the service life of individual unit components and results in increased power consumption.

➢ After switching the unit off, wait for approx. 60 seconds before switching it on again.

E1 – System warning/message

The error is in an acceptable tolerance range. Device operation is not directly impaired.

1. Acknowledge the error message.
2. Contact your Customer Service.
   ↳ Continued device operation is ensured.

E2 – Overload

The error can be traced back to temporary overheating or something similar.

1. Acknowledge the error message.
2. Wait for a moment and repeat the procedure step. If the error reappears, extend the waiting time.
   ↳ The error no longer occurs after a certain waiting period.
3. If the error persists, contact your Customer Service.

E3 – Key pressed during power-up

The error results from an invalid signal state due to pushing buttons and security signals during power-up.

1. Switch the unit off and on again. **NOTE! Observe waiting period!**
2. If the error persists, contact your Customer Service.

E4 – mechanical blocking

Errors that indicate mechanical blocking of motor-driven parts.

1. Check whether the device is mechanically blocked.
   Remove objects.
2. Switch off/on. Check whether the error occurs again.
   If the error is persistent, inform customer service.

E5 – Malfunction during exposure or exposure preparation

Error resulting from a certain system action triggered by the user which could not be performed because a required (internal) partial function (software or hardware) is not ready or fails.

1. Acknowledge the error message.
2. Repeat the last procedure step or exposure.
   ↳ The error no longer occurs.
3. If the error persists, contact your Customer Service.

E6 – Self-check

The error occurs spontaneously and without a corresponding operation.

1. Acknowledge the error message.
   ↳ The error no longer occurs.
2. If the error remains, switch the unit off and on again. **NOTE! Observe waiting period!**
   ↳ The error no longer occurs.
3. If the error persists, contact your Customer Service.

E7 – Serious system error

The error occurs spontaneously and without a corresponding operation.

1. Switch off the unit.
2. Contact your Customer Service immediately.
   ↳ The unit is functional.

7.3.2 yy – Locality

The location may be a DX module number standing for an entire HW function unit, or a logical SW function unit on board DX11 (central control).

06 – Tube assembly

07 – Easypad user interface

10 – Central control DX 11; system hardware

11 – Central control DX 11; system software

12 – Central control DX 11; central CAN bus fault

13 – Central control DX 11; DX11, DX1 periphery (motor system of stand, sensor system of stand)

14 – Central control DX 11; digital extension (HSI, network, etc.)

15 – Central control DX 11; configuration (wrong software, wrong module constellation, etc.)

16 – Central control DX 11; Zero Management

20 – Central control DX 11; Framegrabber application

22 – Central control DX 11; 2D Imaging System

23 – Central control DX 11; 3D Imaging System

42 – Remote

61 – Diaphragm control

81 – Ceph Sensor

83/831 – DX83 Sensor

91 – Ceph digital

8 Program values

8.1 2D exposures (Pan/Ceph)

8.1.1 Panoramic exposure index 1E

Code 1E

This level series is factory programmed for the Federal Republic of Germany. The code 1E, which specifies a reduced level series for children and young people, should at least be complied with by law for new installations or relocation/ shifting of operations since 01/01/1999 in the Federal Republic of Germany. Furthermore, this level series can also be applied worldwide.

Level series for code 1E

Program		Program duration approx.	Max. exposure time	Quick-shot program duration approx.	Max. Quick-shot exposure time	Factory setting				User-defined values – Please enter here –			
P1		19.0s 12.9s	14.1s 8.0s	14.2s 10.3s	9.0s 5.1s	63/6	63/8	69/12	72/14				
P1A		21.8s 15.4s	14.1s 8.0s	18.2s 13.9s	9.0s 5.1s	63/6	63/8	69/12	72/14				
P1C		20.1s 13.3s	14.1s 8.0s	17.1s 12.6s	10.5s 5.9s	63/6	63/8	69/12	72/14				
P2		16.4s 11.6s	11.5s 6.7s	12.4s 9.4s	7.3s 4.2s	63/6	63/8	69/12	72/14				
P2A		18.0s 12.1s	11.5s 6.7s	15.0s 11.8s	7.3s 4.2s	63/6	63/8	69/12	72/14				
P2C		16.8s 11.7s	11.5s 6.7s	13.7s 9.7s	8.5s 4.9s	63/6	63/8	69/12	72/14				
P10		16.4s 11.6s	11.5s 6.7s	11.4s 9.4s	7.3s 4.2s	63/6	63/8	69/12	72/14				
P10A		18.0s 12.1s	11.5s 6.7s	15.0s 11.8s	7.3s 4.2s	63/6	63/8	69/12	72/14				
P10C		16.8s 11.7s	11.5s 6.7s	13.7s 9.8s	8.5s 4.9s	63/6	63/8	69/12	72/14				
P12		11.9s	4.9s			69/8	75/8	78/14	84/12				
BW1		23.0s 23.0s	8.8s 4.5s			63/6	63/8	69/12	72/14				
BW2		18.0s	5.1s			63/6	66/8	69/12	72/14				

Program	Program duration approx.	Max. exposure time	Quick-shot program duration approx.	Max. Quick-shot exposure time	Factory setting				User-defined values – Please enter here –			
TM1.1+ TM1.2	16.1+ 16.1s	6.4+ 6.4s			66/8	69/8	72/14	75/14				
TM3	18.4s	8.1s			63/8	66/8	69/12	72/14				
S1	19.8s	14.4s			69/8	75/8	78/14	84/12				
S3	20.0s	8.1s			69/8	75/8	78/14	84/12				

Possible kV/mA combinations for preselected patient symbols 1 and 2 for code 1E selectable using the +/- keys on the kV/mA setting

kV	60	60	60	60	60	63	63	66	69	72	75	78	81	84	90
mA	3	5	6	7	8	6	8	8	8	8	8	7	7	6	6

Possible kV/mA combinations for preselected patient symbols 3 and 4 for code 1E selectable using the +/- buttons on the kV/mA setting

kV	60	60	60	60	60	63	63	69	69	72	75	78	81	84	90
mA	8	10	12	14	16	14	16	12	16	14	14	14	12	12	12

8.1.2 Panoramic exposure index 2E

Code 2E

It guarantees that the applicable legal regulations which must be complied with since January 1, 1999 are strictly observed. Furthermore, this level series can also be applied worldwide. National regulations must be complied with. The exposure times indicated represent the corresponding maximum.

Level series for code 2E

Program	Program duration approx.	Max. exposure time	Quick-shot program duration approx.	Max. Quick-shot exposure time	Factory setting				User-defined values – Please enter here –			
												
P1	19.0s 12.9s	14.1s 8.0s	14.2s 10.3s	9.0s 5.1s	63/6	63/8	69/8	72/8				
P1A	21.8s 15.4s	14.1s 8.0s	18.2s 13.9s	9.0s 5.1s	63/6	63/8	69/8	72/8				
P1C	20.1s 13.3s	14.1s 8.0s	17.1s 12.6s	10.5s 5.9s	63/6	63/8	69/8	72/8				
P2	16.4s 11.6s	11.5s 6.7s	12.4s 9.4s	7.3s 4.2s	63/6	63/8	69/8	72/8				
P2A	18.0s 12.1s	11.5s 6.7s	15.0s 11.8s	7.3s 4.2s	63/6	63/8	69/8	72/8				
P2C	16.8s 11.7s	11.5s 6.7s	13.7s 9.7s	8.5s 4.9s	63/6	63/8	69/8	72/8				
P10	16.4s 11.6s	11.5s 6.7s	11.4s 9.4s	7.3s 4.2s	63/6	63/8	69/8	72/8				
P10A	18.0s 12.1s	11.5s 6.7s	15.0s 11.8s	7.3s 4.2s	63/6	63/8	69/8	72/8				
P10C	16.8s 11.7s	11.5s 6.7s	13.7s 9.8s	8.5s 4.9s	63/6	63/8	69/8	72/8				
P12	11.9s	4.9s			69/8	75/8	78/7	84/6				
BW1	23.0s 23.0s	8.8s 4.5s			63/6	63/8	69/8	72/8				
BW2	18.0s	5.1s			63/6	66/8	69/8	72/8				
TM1.1+ TM1.2	16.1+ 16.1s	6.4+ 6.4s			66/8	69/8	72/8	75/8				
TM3	18.4s	8.1s			63/8	66/8	69/8	72/8				
S1	19.8s	14.4s			69/8	75/8	78/7	84/6				
S3	20.0s	8.1s			69/8	75/8	78/7	84/6				

Possible kV/mA combinations for code 2E selectable using the +/- keys on the kV/mA setting

kV	60	60	60	60	60	63	63	66	69	72	75	78	81	84	90
mA	3	5	6	7	8	6	8	8	8	8	8	7	7	6	6

8.1.3 Panoramic exposure index 3E

Index 3E

It guarantees that the applicable legal regulations which must be complied with since January 1, 1999 are strictly observed. Furthermore, this level series can also be applied worldwide. National regulations must be complied with. The exposure times indicated represent the corresponding maximum.

Level series for index 3E

Program	Program duration approx.	Max. exposure time	Quick-shot program duration approx.	Max. Quick-shot exposure time	Factory setting				User-defined values – Please enter here –			
												
P1	19.0s 12.9s	14.1s 8.0s	14.2s 10.3s	9.0s 5.1s	63/6	63/8	69/12	72/14				
P1A	21.8s 15.4s	14.1s 8.0s	18.2s 13.9s	9.0s 5.1s	63/6	63/8	69/12	72/14				
P1C	20.1s 13.3s	14.1s 8.0s	17.1s 12.6s	10.5s 5.9s	63/6	63/8	69/12	72/14				
P2	16.4s 11.6s	11.5s 6.7s	12.4s 9.4s	7.3s 4.2s	63/6	63/8	69/12	72/14				
P2A	18.0s 12.1s	11.5s 6.7s	15.0s 11.8s	7.3s 4.2s	63/6	63/8	69/12	72/14				
P2C	16.8s 11.7s	11.5s 6.7s	13.7s 9.7s	8.5s 4.9s	63/6	63/8	69/12	72/14				
P10	16.4s 11.6s	11.5s 6.7s	11.4s 9.4s	7.3s 4.2s	63/6	63/8	69/12	72/14				
P10A	18.0s 12.1s	11.5s 6.7s	15.0s 11.8s	7.3s 4.2s	63/6	63/8	69/12	72/14				
P10C	16.8s 11.7s	11.5s 6.7s	13.7s 9.8s	8.5s 4.9s	63/6	63/8	69/12	72/14				
P12	11.9s	4.9s			69/8	75/8	78/14	84/12				
BW1	23.0s 23.0s	8.8s 4.5s			63/6	63/8	69/12	72/14				
BW2	18.0s	5.1s			63/6	66/8	69/12	72/14				
TM1.1+ TM1.2	16.1+ 16.1s	6.4+ 6.4s			66/8	69/8	72/14	75/14				
TM3	18.4s	8.1s			63/8	66/8	69/12	72/14				
S1	19.8s	14.4s			69/8	75/8	78/14	84/12				
S3	20.0s	8.1s			69/8	75/8	78/14	84/12				

Possible kV/mA combinations for preselected patient symbols 1 and 2 for index 3E selectable using the +/- keys on the kV/mA setting

kV	60	60	60	60	60	63	63	66	69	72	75	78	81	84	90
mA	3	5	6	7	8	6	8	8	8	8	8	7	7	6	6

Possible kV/mA combinations for preselected patient symbols 3 and 4 for index 3E selectable using the +/- buttons on the kV/mA setting

kV	60	60	60	60	60	63	63	69	69	72	75	78	81	84	90
mA	8	10	12	14	15	14	15	12	15	14	14	14	12	12	12

8.1.4 Cephalometric exposures

The radiation time is max. 14.9 s and can be reduced to 7.5 s by selecting the Quickshot function.

Level series for cephalometric exposures

Program	Max. exposure time	Max. Quickshot exposure time	Factory setting				User-defined values – Please enter here –			
C1	9.1 s	6.1 s	80/14	80/14	84/13	90/12				
C2	9.1 s	6.1 s	80/14	80/14	84/13	90/12				
C3	9.4 s	4.7 s	73/15	73/15	77/14	84/13				
C3 F	14.9 s	7.5 s	73/15	73/15	77/14	84/13				
C4	9.1 s	4.6 s	64/16	64/16	64/16	64/16				

Possible kV/mA combinations for cephalometric exposures

kV	60	60	60	60	60	62	64	66	69	71	73	77	80	84	90
mA	9	10	12	14	16	16	16	16	15	15	15	14	14	13	12

8.2 3D exposures (DVT)

Program: VOL1 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	2.6 s	4.4 s	4.4 s	4.4 s

Program: VOL1 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	14.4 s	14.4 s	14.4 s	14.4 s

Program: VOL1 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	2.2 s	2.2 s	2.2 s	2.2 s

Program: VOL2 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	2.6 s	4.4 s	4.4 s	4.4 s

Program: VOL2 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	14.4 s	14.4 s	14.4 s	14.4 s

Program: VOL2 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	2.2 s	2.2 s	2.2 s	2.2 s

Program: VOL3 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	2.6 s	4.4 s	4.4 s	4.4 s

Program: VOL3 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	14.4 s	14.4 s	14.4 s	14.4 s

Program: VOL3 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	2.2 s	2.2 s	2.2 s	2.2 s

Program: VOL4 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	4.5 s	5.9 s	5.9 s	5.9 s

Program: VOL4 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	16.7 s	16.7 s	16.7 s	16.7 s

Program: VOL4 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	3.9 s	3.9 s	3.9 s	3.9 s

Possible kV/mA combinations for the 3D exposures selectable in HD capture mode using the +/- keys of the kV/mA setting

kV	85	85	85	85	85	85	85
mA	4	5	6	7	8	10	12

9 Dose information

The radiation exposure is expressed as a dose area product [mGycm²].

To offset measurement errors and system and unit variations, a tolerance of 20% must be taken into account.

Two different dose measurement methods are used worldwide to determine the dose area product:

- Measurement method 1: without measurement of backscatter effects [→ 165]
- Measurement method 2: with measurement of backscatter effects [→ 176]

Because of the different measurement methods, the measured values differ significantly for the same program setting.

This corresponding values are listed in the following sections.

The dose area product for the parameter combinations proposed by Dentsply Sirona has been calculated already. The DAP value can be used without any further calculations.

9.1 DFP values according to measurement method 1

IMPORTANT

The dose area product values given in this chapter were determined according to measurement method 1 (without measurement of backscatter effects).

9.1.1 2D exposures Pan

Dose level series index 1E (8 mA / 12/14 mA series)

Information on dose area product (DAP/absorbed dose) for panoramic radiographs, temporomandibular joint exposures, and sinus exposures.

Program	Maximum effective radiation time		Factory-programmed values											
	Seconds		kV/mA	DAP $mGycm^2$		kV/mA	DAP $mGycm^2$		kV/mA	DAP $mGycm^2$		kV/mA	DAP $mGycm^2$	
		Quick-shot			Quick-shot			Quick-shot			Quick-shot			Quick-shot
P1	14.1	9.0	63/6	43	28	63/8	58	37	69/12	105	67	72/14	134	85
P1 L/R	8.0	5.1	63/6	25	16	63/8	33	21	69/12	59	38	72/14	76	48
P1A	14.1	9.0	63/6	43	28	63/8	58	37	69/12	105	67	72/14	134	85
P1A L/R	8.0	5.1	63/6	25	16	63/8	33	21	69/12	59	38	72/14	76	48
P1C	14.1	10.5	63/6	43	32	63/8	58	43	69/12	105	78	72/14	134	99
P1C L/R	8.0	6.0	63/6	25	19	63/8	33	25	69/12	59	44	72/14	76	57
P2	11.5	7.3	63/6	35	23	63/8	47	30	69/12	85	54	72/14	109	69
P2 L/R	6.7	4.3	63/6	21	13	63/8	27	18	69/12	50	32	72/14	63	40
P2A	11.5	7.3	63/6	35	23	63/8	47	30	69/12	85	54	72/14	109	69
P2A L/R	6.7	4.3	63/6	21	13	63/8	27	18	69/12	50	32	72/14	63	40
P2C	11.5	8.5	63/6	35	26	63/8	47	35	69/12	85	63	72/14	109	80
P2C L/R	6.7	5.0	63/6	21	16	63/8	27	21	69/12	50	37	72/14	63	47
P10	11.5	7.3	63/6	23	15	63/8	30	19	69/12	55	35	72/14	70	44
P10 L/R	6.7	4.3	63/6	13	9	63/8	18	11	69/12	32	21	72/14	41	26
P10A	11.5	7.3	63/6	23	15	63/8	30	19	69/12	55	35	72/14	70	44
P10A L/R	6.7	4.3	63/6	13	9	63/8	18	11	69/12	32	21	72/14	41	26
P10C	11.5	8.5	63/6	23	17	63/8	30	22	69/12	55	41	72/14	70	52
P10C L/R	6.7	5.0	63/6	13	10	63/8	18	13	69/12	32	24	72/14	41	30
P12	4.9		69/8	24		75/8	29		78/14	54		84/12	54	
BW1	8.8		63/6	16		63/8	21		69/12	39		72/14	50	

Program	Maximum effective radiation time		Factory-programmed values											
BW1 L/R	4.5		63/6	8		63/8	11		69/12	20		72/14	26	
BW2	5.1		63/6	9		66/8	14		69/12	23		72/14	29	
TM1.1	12.8		66/8	58		69/8	64		72/14	121		75/14	132	
TM3	8.1		63/8	33		66/8	37		69/12	60		72/14	77	
S1	14.4		69/8	72		75/8	85		78/14	161		84/12	159	
S3	8.1		69/8	40		75/8	48		78/14	90		84/12	89	

Dose level series index 2E (8 mA series)

Information on dose area product (DAP/absorbed dose) for panoramic radiographs, temporomandibular joint exposures, and sinus exposures.

Program	Maximum effective radiation time		Factory-programmed values											
	Seconds		kV/ mA	DAP mGycm^2		kV/ mA	DAP mGycm^2		kV/ mA	DAP mGycm^2		kV/ mA	DAP mGycm^2	
		Quick-shot			Quick-shot			Quick-shot			Quick-shot			Quick-shot
P1	14.1	9.0	63/6	43	28	63/8	58	37	69/8	70	45	72/8	77	49
P1 L/R	8.0	5.1	63/6	25	16	63/8	33	21	69/8	40	25	72/8	43	28
P1A	14.1	9.0	63/6	43	28	63/8	58	37	69/8	70	45	72/8	77	49
P1A L/R	8.0	5.1	63/6	25	16	63/8	33	21	69/8	40	25	72/8	43	28
P1C	14.1	10.5	63/6	43	32	63/8	58	43	69/8	70	52	72/8	77	57
P1C L/R	8.0	6.0	63/6	25	19	63/8	33	25	69/8	40	30	72/8	43	33
P2	11.5	7.3	63/6	35	23	63/8	47	30	69/8	57	36	72/8	62	40
P2 L/R	6.7	4.3	63/6	21	13	63/8	27	18	69/8	33	21	72/8	36	23
P2A	11.5	7.3	63/6	35	23	63/8	47	30	69/8	57	36	72/8	62	40
P2A L/R	6.7	4.3	63/6	21	13	63/8	27	18	69/8	33	21	72/8	36	23
P2C	11.5	8.5	63/6	35	26	63/8	47	35	69/8	57	42	72/8	62	46
P2C L/R	6.7	5.0	63/6	21	16	63/8	27	21	69/8	33	25	72/8	36	27
P10	11.5	7.3	63/6	23	15	63/8	30	19	69/8	37	23	72/8	40	26
P10 L/R	6.7	4.3	63/6	13	9	63/8	18	11	69/8	21	14	72/8	23	15
P10A	11.5	7.3	63/6	23	15	63/8	30	19	69/8	37	23	72/8	40	26
P10A L/R	6.7	4.3	63/6	13	9	63/8	18	11	69/8	21	14	72/8	23	15
P10C	11.5	8.5	63/6	23	17	63/8	30	22	69/8	37	27	72/8	40	30
P10C L/R	6.7	5.0	63/6	13	10	63/8	18	13	69/8	21	16	72/8	23	18
P12	4.9		69/8	24		75/8	29		78/7	27		84/6	27	
BW1	8.8		63/6	16		63/8	21		69/8	26		72/8	29	
BW1 L/R	4.5		63/6	8		63/8	11		69/8	14		72/8	15	
BW2	5.1		63/6	9		66/8	14		69/8	15		72/8	17	
TM1.1	12.8		66/8	58		69/8	64		72/8	69		75/8	75	
TM3	8.1		63/8	33		66/8	37		69/8	40		72/8	44	
S1	14.4		69/8	72		75/8	85		78/7	81		84/6	80	
S3	8.1		69/8	40		75/8	48		78/7	45		84/6	45	

Dose level series index 3E (8 mA / 12/14 mA series)

Information on dose area product (DAP/absorbed dose) for panoramic radiographs, temporomandibular joint exposures, and sinus exposures.

Program	Maximum effective radiation time		Factory-programmed values											
	Seconds		kV/mA	DAP mGycm^2		kV/mA	DAP mGycm^2		kV/mA	DAP mGycm^2		kV/mA	DAP mGycm^2	
		Quick-shot			Quick-shot			Quick-shot			Quick-shot			Quick-shot
P1	14.1	9.0	63/6	43	28	63/8	58	37	69/12	105	67	72/14	134	85
P1 L/R	8.0	5.1	63/6	25	16	63/8	33	21	69/12	59	38	72/14	76	48
P1A	14.1	9.0	63/6	43	28	63/8	58	37	69/12	105	67	72/14	134	85
P1A L/R	8.0	5.1	63/6	25	16	63/8	33	21	69/12	59	38	72/14	76	48
P1C	14.1	10.5	63/6	43	32	63/8	58	43	69/12	105	78	72/14	134	99
P1C L/R	8.0	6.0	63/6	25	19	63/8	33	25	69/12	59	44	72/14	76	57
P2	11.5	7.3	63/6	35	23	63/8	47	30	69/12	85	54	72/14	109	69
P2 L/R	6.7	4.3	63/6	21	13	63/8	27	18	69/12	50	32	72/14	63	40
P2A	11.5	7.3	63/6	35	23	63/8	47	30	69/12	85	54	72/14	109	69
P2A L/R	6.7	4.3	63/6	21	13	63/8	27	18	69/12	50	32	72/14	63	40
P2C	11.5	8.5	63/6	35	26	63/8	47	35	69/12	85	63	72/14	109	80
P2C L/R	6.7	5.0	63/6	21	16	63/8	27	21	69/12	50	37	72/14	63	47
P10	11.5	7.3	63/6	23	15	63/8	30	19	69/12	55	35	72/14	70	44
P10 L/R	6.7	4.3	63/6	13	9	63/8	18	11	69/12	32	21	72/14	41	26
P10A	11.5	7.3	63/6	23	15	63/8	30	19	69/12	55	35	72/14	70	44
P10A L/R	6.7	4.3	63/6	13	9	63/8	18	11	69/12	32	21	72/14	41	26
P10C	11.5	8.5	63/6	23	17	63/8	30	22	69/12	55	41	72/14	70	52
P10C L/R	6.7	5.0	63/6	13	10	63/8	18	13	69/12	32	24	72/14	41	30
P12	4.9		69/8	24		75/8	29		78/14	54		84/12	54	
BW1	8.8		63/6	16		63/8	21		69/12	39		72/14	50	
BW1 L/R	4.5		63/6	8		63/8	11		69/12	20		72/14	26	
BW2	5.1		63/6	9		66/8	14		69/12	23		72/14	29	
TM1.1	12.8		66/8	58		69/8	64		72/14	121		75/14	132	
TM3	8.1		63/8	33		66/8	37		69/12	60		72/14	77	
S1	14.4		69/8	72		75/8	85		78/14	161		84/12	159	
S3	8.1		69/8	40		75/8	48		78/14	90		84/12	89	

9.1.2 3D exposures

The Axeos X-ray system operates with a fixed setting of 85 kV and values ranging from 4 to 13 mA for volume exposures.

Program: VOL1 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	2.6 s	4.4 s	4.4 s	4.4 s
Dose area product (mGycm²) with whole volume dia. 8 cm x 8 cm	128	220	314	408
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (UJ*)	89	152	217	282
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (LJ*)	91	157	223	290

Program: VOL1 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	14.4 s	14.4 s	14.4 s	14.4 s
Dose area product (mGycm²) with whole volume dia. 8 cm x 8 cm	453	566	679	792
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (UJ*)	313	391	469	547
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (LJ*)	320	400	480	560

* UJ = Upper jaw, LJ = Lower jaw

Program: VOL1 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	2.2 s	2.2 s	2.2 s	2.2 s
Dose area product (mGycm²) with whole volume dia. 8 cm x 8 cm	26	30	43	56
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (UJ*)	18	21	30	39
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (LJ*)	19	22	31	40

Program: VOL2 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	2.6 s	4.4 s	4.4 s	4.4 s
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (UJ*)	56	96	137	178
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (LJ*)	58	99	141	183

Program: VOL2 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	14.4 s	14.4 s	14.4 s	14.4 s
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (UJ*)	195	244	293	342
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (LJ*)	200	250	300	350

* UJ = Upper jaw, LJ = Lower jaw

Program: VOL2 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	2.2 s	2.2 s	2.2 s	2.2 s
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (UJ*)	12	14	19	25
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (LJ*)	12	14	20	26

Program: VOL3 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	2.6 s	4.4 s	4.4 s	4.4 s
Dose area product (mGycm²) with whole volume dia. 11 cm x 10 cm	210	361	516	671
Dose area product (mGycm²) with collimation to dia. 11 cm x 7.5 cm (UJ*)	160	274	392	509
Dose area product (mGycm²) with collimation to dia. 11 cm x 8 cm (LJ*)	164	281	402	522

Program: VOL3 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	14.4 s	14.4 s	14.4 s	14.4 s
Dose area product (mGycm²) with whole volume dia. 11 cm x 10 cm	733	917	1100	1283
Dose area product (mGycm²) with collimation to dia. 11 cm x 7.5 cm (UJ*)	557	696	835	974
Dose area product (mGycm²) with collimation to dia. 11 cm x 8 cm (LJ*)	571	714	856	999

* UJ = Upper jaw, LJ = Lower jaw

Program: VOL3 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	2.2 s	2.2 s	2.2 s	2.2 s
Dose area product (mGycm²) with whole volume dia. 11 cm x 10 cm	43	50	71	92
Dose area product (mGycm²) with collimation to dia. 11 cm x 7.5 cm (UJ*)	32	38	54	69
Dose area product (mGycm²) with collimation to dia. 11 cm x 8 cm (LJ*)	33	39	55	71

Program: VOL4 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	4.5 s	5.9 s	5.9 s	5.9 s
Dose area product (mGycm²) with whole volume dia. 17 cm x 13 cm	308	406	580	754
Dose area product (mGycm²) with collimation to dia. 17 cm x 7.5 cm (UJ*)	181	239	341	444
Dose area product (mGycm²) with collimation to dia. 17 cm x 10 cm (LJ*)	250	330	471	612

Program: VOL4 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	16.7 s	16.7 s	16.7 s	16.7 s
Dose area product (mGycm²) with whole volume dia. 17 cm x 13 cm	717	896	1075	1255
Dose area product (mGycm²) with collimation to dia. 17 cm x 7.5 cm (UJ*)	421	526	632	737
Dose area product (mGycm²) with collimation to dia. 17 cm x 10 cm (LJ*)	577	721	865	1009

* UJ = Upper jaw, LJ = Lower jaw

Program: VOL4 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	3.9 s	3.9 s	3.9 s	3.9 s
Dose area product (mGycm²) with whole volume dia. 17 cm x 13 cm	103	120	171	222
Dose area product (mGycm²) with collimation to dia. 17 cm x 7.5 cm (UJ*)	60	70	100	129
Dose area product (mGycm²) with collimation to dia. 17 cm x 10 cm (LJ*)	83	97	139	180

* UJ = Upper jaw, LJ = Lower jaw

9.1.3 Calculating dosage information

For any freely programmed value pairs, you must calculate the value using the kV/DAP lists; see sample calculation:

The Expert Guideline requires either that devices for DAP display of the patient's radiation exposure be present or that this information can be determined e.g. in the form of tables.

To compensate for measuring errors as well as for system and instrument variations, a tolerance of 20 % must be taken into account.

The radiation exposure is expressed as the dose area product (DAP) of the absorbed dose (Gy x cm^2) per mAs for each unit as well as each selectable kV level and diaphragm.

Calculation

The information has been calculated for the value pairs suggested by Dentsply Sirona. If other setting values are used, proceed as follows using the kV/DAP lists:

1. Select the set kV level from the table of the respective X-ray system and note down the DAP factor.
2. Multiply the DAP factor by the actually used mA (as indicated on the X-ray system).
3. Multiply the result by the actual exposure time (see Multitimer or table).

Sample calculation

X-ray with program P1 and a kV/mA value pair of 60 kV/10 mA

For step 1: 60 kV has a DAP factor of 0.5693 with diaphragm 10

For step 2: 10 mA displayed

For step 3: the exposure time is 14.1 s

$$DFP = 0,5693 \frac{mGycm^2}{mAs} \times 10mA \times 14,1s = 80,2713 mGycm^2$$

2D exposures

kV	DAP factor Programs P1/P2/P12/TM1.1/ TM3/S1/S3 (mGy x cm^2/mAs)			DAP factor Programs P10 (mGy x cm^2/mAs)			DAP factor Programs BW1 (mGy x cm^2/mAs)	DAP factor Programs BW2 (mGy x cm^2/mAs)
		UJ*	LJ*		UJ*	LJ*		
60	0.4583	0.3099	0.2588	0.2916	0.1808	0.2265	0.2661	0.2652
63	0.5103	0.3464	0.2885	0.3243	0.2029	0.2525	0.2992	0.2980
66	0.5643	0.3847	0.3204	0.3591	0.2259	0.2800	0.3328	0.3319
69	0.6210	0.4239	0.3538	0.3975	0.2505	0.3109	0.3701	0.3696
72	0.6787	0.4655	0.3884	0.4348	0.2765	0.3412	0.4080	0.4065
75	0.7382	0.5085	0.4237	0.4739	0.3030	0.3733	0.4472	0.4453
78	0.8001	0.5526	0.4612	0.5146	0.3314	0.4062	0.4880	0.4873
81	0.8664	0.6008	0.5017	0.5592	0.3627	0.4416	0.5314	0.5301
84	0.9218	0.6405	0.5382	0.5983	0.3901	0.4741	0.5751	0.5740
90	1.0444	10.7310	0.6126	0.6756	0.4446	0.5378	0.6680	0.6670

* UJ = Upper jaw, LJ = Lower jaw

3D exposures

kV	3D exposure mode	DAP factor Program VOL1 (mGy x cm^2/mAs)		
		8 x 8	8 x 5.5 (UJ*)	8 x 5.5 (LJ*)
85	SD	7.295	5.043	5.184
85	HD	7.967	5.498	5.634
85	Low Dose	2.027	1.394	1.437

kV	3D exposure mode	DAP factor Program VOL2 (mGy x cm^2/mAs)	
		5 x 5.5 (UJ*)	5 x 5.5 (LJ*)
85	SD	3.170	3.262
85	HD	3.433	3.52
85	Low Dose	0.887	0.916

kV	3D exposure mode	DAP factor Program VOL3 (mGy x cm^2/mAs)		
		11 x 10	11 x 7.5 (UJ*)	11 x 8 (LJ*)
85	SD	11.992	9.095	9.327
85	HD	12.902	9.793	10.046
85	Low Dose	3.356	2.525	2.592

kV	3D exposure mode	DAP factor Program VOL4 (mGy x cm^2/mAs)		
		17 x 13	17 x 7.5 (UJ*)	17 x 10 (LJ*)
85	SD	9.99	5.876	8.104
85	HD	10.859	6.375	8.728
85	Low Dose	4.486	2.605	3.634

* UJ = Upper jaw, LJ = Lower jaw

9.2 DFP values according to measurement method 2

IMPORTANT

The dose area product values given in this chapter were determined according to measurement method 2 (with measurement of backscatter effects).

9.2.1 2D exposures Pan

Dose level series index 1E (8 mA / 12/14 mA series)

Information on dose area product (DAP/absorbed dose) for panoramic radiographs, temporomandibular joint exposures, and sinus exposures.

Program	Maximum effective radiation time		Factory-programmed values											
	Seconds		kV/mA	DAP mGycm²		kV/mA	DAP mGycm²		kV/mA	DAP mGycm²		kV/mA	DAP mGycm²	
		Quick-shot			Quick-shot			Quick-shot			Quick-shot			Quick-shot
P1	14.1	9.0	63/6	51	33	63/8	68	43	69/12	121	77	72/14	151	96
P1 L/R	8.0	5.1	63/6	29	18	63/8	38	24	69/12	69	44	72/14	85	54
P1A	14.1	9.0	63/6	51	33	63/8	68	43	69/12	121	77	72/14	151	96
P1A L/R	8.0	5.1	63/6	29	18	63/8	38	24	69/12	69	44	72/14	85	54
P1C	14.1	10.5	63/6	51	38	63/8	68	50	69/12	121	90	72/14	151	112
P1C L/R	8.0	6.0	63/6	29	22	63/8	38	29	69/12	69	51	72/14	85	64
P2	11.5	7.3	63/6	42	26	63/8	55	35	69/12	99	62	72/14	123	78
P2 L/R	6.7	4.3	63/6	24	16	63/8	32	21	69/12	57	37	72/14	71	46
P2A	11.5	7.3	63/6	42	26	63/8	55	35	69/12	99	62	72/14	123	78
P2A L/R	6.7	4.3	63/6	24	16	63/8	32	21	69/12	57	37	72/14	71	46
P2C	11.5	8.5	63/6	42	31	63/8	55	41	69/12	99	73	72/14	123	91
P2C L/R	6.7	5.0	63/6	24	18	63/8	32	24	69/12	57	43	72/14	71	53
P10	11.5	7.3	63/6	24	15	63/8	32	20	69/12	56	36	72/14	70	44
P10 L/R	6.7	4.3	63/6	14	9	63/8	18	12	69/12	33	21	72/14	41	26
P10A	11.5	7.3	63/6	24	15	63/8	32	20	69/12	56	36	72/14	70	44
P10A L/R	6.7	4.3	63/6	14	9	63/8	18	12	69/12	33	21	72/14	41	26
P10C	11.5	8.5	63/6	24	18	63/8	32	23	69/12	56	41	72/14	70	52
P10C L/R	6.7	5.0	63/6	14	11	63/8	18	14	69/12	33	24	72/14	41	30
P12	4.9		69/8	28		75/8	32		78/14	61		84/12	58	
BW1	8.8		63/6	18		63/8	24		69/12	42		72/14	53	

Program	Maximum effective radiation time		Factory-programmed values											
BW1 L/R	4.5		63/6	9		63/8	12		69/12	21		72/14	27	
BW2	5.1		63/6	10		66/8	15		69/12	24		72/14	30	
TM1.1+ TM1.2	6.4+ 6.4		66/8	67		69/8	73		72/14	137		75/14	148	
TM3	8.1		63/8	39		66/8	43		69/12	69		72/14	86	
S1	14.4		69/8	83		75/8	96		78/14	179		84/12	173	
S3	8.1		69/8	46		75/8	54		78/14	101		84/12	97	

Dose level series index 2E (8 mA series)

Information on dose area product (DAP/absorbed dose) for panoramic radiographs, temporomandibular joint exposures, and sinus exposures.

Program	Maximum effective radiation time		Factory-programmed values											
	Seconds		kV/ mA	DAP mGycm^2		kV/ mA	DAP mGycm^2		kV/ mA	DAP mGycm^2		kV/ mA	DAP mGycm^2	
		Quick-shot			Quick-shot			Quick-shot			Quick-shot			Quick-shot
P1	14.1	9.0	63/6	51	33	63/8	68	43	69/8	81	52	72/8	86	55
P1 L/R	8.0	5.1	63/6	29	18	63/8	38	24	69/8	46	29	72/8	49	31
P1A	14.1	9.0	63/6	51	33	63/8	68	43	69/8	81	52	72/8	86	55
P1A L/R	8.0	5.1	63/6	29	18	63/8	38	24	69/8	46	29	72/8	49	31
P1C	14.1	10.5	63/6	51	38	63/8	68	50	69/8	81	60	72/8	86	64
P1C L/R	8.0	6.0	63/6	29	22	63/8	38	29	69/8	46	34	72/8	49	37
P2	11.5	7.3	63/6	42	26	63/8	55	35	69/8	66	42	72/8	70	45
P2 L/R	6.7	4.3	63/6	24	16	63/8	32	21	69/8	38	25	72/8	41	26
P2A	11.5	7.3	63/6	42	26	63/8	55	35	69/8	66	42	72/8	70	45
P2A L/R	6.7	4.3	63/6	24	16	63/8	32	21	69/8	38	25	72/8	41	26
P2C	11.5	8.5	63/6	42	31	63/8	55	41	69/8	66	49	72/8	70	52
P2C L/R	6.7	5.0	63/6	24	18	63/8	32	24	69/8	38	29	72/8	41	31
P10	11.5	7.3	63/6	24	15	63/8	32	20	69/8	37	24	72/8	40	26
P10 L/R	6.7	4.3	63/6	14	9	63/8	18	12	69/8	22	14	72/8	23	15
P10A	11.5	7.3	63/6	24	15	63/8	32	20	69/8	37	24	72/8	40	26
P10A L/R	6.7	4.3	63/6	14	9	63/8	18	12	69/8	22	14	72/8	23	15
P10C	11.5	8.5	63/6	24	18	63/8	32	23	69/8	37	28	72/8	40	30
P10C L/R	6.7	5.0	63/6	14	11	63/8	18	14	69/8	22	16	72/8	23	18
P12	4.9		69/8	28		75/8	32		78/7	31		84/6	29	
BW1	8.8		63/6	18		63/8	24		69/8	28		72/8	30	
BW1 L/R	4.5		63/6	9		63/8	12		69/8	14		72/8	16	
BW2	5.1		63/6	10		66/8	15		69/8	16		72/8	18	
TM1.1+ TM1.2	6.4+ 6.4		66/8	67		69/8	73		72/8	78		75/8	85	
TM3	8.1		63/8	39		66/8	43		69/8	46		72/8	50	
S1	14.4		69/8	83		75/8	96		78/7	90		84/6	87	
S3	8.1		69/8	46		75/8	54		78/7	51		84/6	49	

Dose level series index 3E (8 mA / 12/14 mA series)

Information on dose area product (DAP/absorbed dose) for panoramic radiographs, temporomandibular joint exposures, and sinus exposures.

Program	Maximum effective radiation time		Factory-programmed values											
	Seconds		kV/mA	DAP mGycm^2		kV/mA	DAP mGycm^2		kV/mA	DAP mGycm^2		kV/mA	DAP mGycm^2	
		Quick-shot			Quick-shot			Quick-shot			Quick-shot			Quick-shot
P1	14.1	9.0	63/6	51	33	63/8	68	43	69/12	121	77	72/14	151	96
P1 L/R	8.0	5.1	63/6	29	18	63/8	38	24	69/12	69	44	72/14	85	54
P1A	14.1	9.0	63/6	51	33	63/8	68	43	69/12	121	77	72/14	151	96
P1A L/R	8.0	5.1	63/6	29	18	63/8	38	24	69/12	69	44	72/14	85	54
P1C	14.1	10.5	63/6	51	38	63/8	68	50	69/12	121	90	72/14	151	112
P1C L/R	8.0	6.0	63/6	29	22	63/8	38	29	69/12	69	51	72/14	85	64
P2	11.5	7.3	63/6	42	26	63/8	55	35	69/12	99	62	72/14	123	78
P2 L/R	6.7	4.3	63/6	24	16	63/8	32	21	69/12	57	37	72/14	71	46
P2A	11.5	7.3	63/6	42	26	63/8	55	35	69/12	99	62	72/14	123	78
P2A L/R	6.7	4.3	63/6	24	16	63/8	32	21	69/12	57	37	72/14	71	46
P2C	11.5	8.5	63/6	42	31	63/8	55	41	69/12	99	73	72/14	123	91
P2C L/R	6.7	5.0	63/6	24	18	63/8	32	24	69/12	57	43	72/14	71	53
P10	11.5	7.3	63/6	24	15	63/8	32	20	69/12	56	36	72/14	70	44
P10 L/R	6.7	4.3	63/6	14	9	63/8	18	12	69/12	33	21	72/14	41	26
P10A	11.5	7.3	63/6	24	15	63/8	32	20	69/12	56	36	72/14	70	44
P10A L/R	6.7	4.3	63/6	14	9	63/8	18	12	69/12	33	21	72/14	41	26
P10C	11.5	8.5	63/6	24	18	63/8	32	23	69/12	56	41	72/14	70	52
P10C L/R	6.7	5.0	63/6	14	11	63/8	18	14	69/12	33	24	72/14	41	30
P12	4.9		69/8	28		75/8	32		78/14	61		84/12	58	
BW1	8.8		63/6	18		63/8	24		69/12	42		72/14	53	
BW1 L/R	4.5		63/6	9		63/8	12		69/12	21		72/14	27	
BW2	5.1		63/6	10		66/8	15		69/12	24		72/14	30	
TM1.1 + TM1.2	6.4 + 6.4		66/8	67		69/8	73		72/14	137		75/14	148	
TM3	8.1		63/8	39		66/8	43		69/12	69		72/14	86	
S1	14.4		69/8	83		75/8	96		78/14	179		84/12	173	
S3	8.1		69/8	46		75/8	54		78/14	101		84/12	97	

9.2.2 3D exposures

The Axeos X-ray system operates with a fixed setting of 85 kV and values ranging from 4 to 13 mA for volume exposures.

Program: VOL1 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	2.6 s	4.4 s	4.4 s	4.4 s
Dose area product (mGycm²) with whole volume dia. 8 cm x 8 cm	174	299	427	555
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (UJ*)	121	208	297	386
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (LJ*)	121	208	297	387

Program: VOL1 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	14.4 s	14.4 s	14.4 s	14.4 s
Dose area product (mGycm²) with whole volume dia. 8 cm x 8 cm	613	766	919	1072
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (UJ*)	427	533	640	747
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (LJ*)	427	533	640	747

* UJ = Upper jaw, LJ = Lower jaw

Program: VOL1 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	2.2 s	2.2 s	2.2 s	2.2 s
Dose area product (mGycm²) with whole volume dia. 8 cm x 8 cm	36	42	60	78
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (UJ*)	25	30	42	54
Dose area product (mGycm²) with collimation to dia. 8 cm x 5.5 cm (LJ*)	25	30	42	54

Program: VOL2 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	2.6 s	4.4 s	4.4 s	4.4 s
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (UJ*)	79	135	193	250
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (LJ*)	79	135	193	250

Program: VOL2 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	14.4 s	14.4 s	14.4 s	14.4 s
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (UJ*)	276	345	414	483
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (LJ*)	276	345	414	483

* UJ = Upper jaw, LJ = Lower jaw

Program: VOL2 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	2.2 s	2.2 s	2.2 s	2.2 s
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (UJ*)	17	19	27	35
Dose area product (mGycm²) with whole volume dia. 5 cm x 5.5 cm (LJ*)	17	19	27	35

Program: VOL3 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	2.6 s	4.4 s	4.4 s	4.4 s
Dose area product (mGycm²) with whole volume dia. 11 cm x 10 cm	286	491	701	911
Dose area product (mGycm²) with collimation to dia. 11 cm x 7.5 cm (UJ*)	220	377	539	700
Dose area product (mGycm²) with collimation to dia. 11 cm x 8 cm (LJ*)	218	374	534	694

Program: VOL3 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	14.4 s	14.4 s	14.4 s	14.4 s
Dose area product (mGycm²) with whole volume dia. 11 cm x 10 cm	1007	1258	1510	1761
Dose area product (mGycm²) with collimation to dia. 11 cm x 7.5 cm (UJ*)	774	967	1160	1353
Dose area product (mGycm²) with collimation to dia. 11 cm x 8 cm (LJ*)	767	959	1150	1342

* UJ = Upper jaw, LJ = Lower jaw

Program: VOL3 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	2.2 s	2.2 s	2.2 s	2.2 s
Dose area product (mGycm²) with whole volume dia. 11 cm x 10 cm	59	69	98	128
Dose area product (mGycm²) with collimation to dia. 11 cm x 7.5 cm (UJ*)	46	53	76	98
Dose area product (mGycm²) with collimation to dia. 11 cm x 8 cm (LJ*)	45	53	75	97

Program: VOL4 SD				
kV/mA	85/7	85/7	85/10	85/13
Effective radiation time	4.5 s	5.9 s	5.9 s	5.9 s
Dose area product (mGycm²) with whole volume dia. 17 cm x 13 cm	444	586	836	1087
Dose area product (mGycm²) with collimation to dia. 17 cm x 7.5 cm (UJ*)	275	363	518	673
Dose area product (mGycm²) with collimation to dia. 17 cm x 10 cm (LJ*)	342	451	644	837

Program: VOL4 HD				
kV/mA	85/4	85/5	85/6	85/7
Effective radiation time	16.7 s	16.7 s	16.7 s	16.7 s
Dose area product (mGycm²) with whole volume dia. 17 cm x 13 cm	1047	1308	1570	1832
Dose area product (mGycm²) with collimation to dia. 17 cm x 7.5 cm (UJ*)	648	810	972	1134
Dose area product (mGycm²) with collimation to dia. 17 cm x 10 cm (LJ*)	806	1007	1208	1410

* UJ = Upper jaw, LJ = Lower jaw

Program: VOL4 Low				
kV/mA	85/6	85/7	85/10	85/13
Effective radiation time	3.9 s	3.9 s	3.9 s	3.9 s
Dose area product (mGycm²) with whole volume dia. 17 cm x 13 cm	152	178	254	329
Dose area product (mGycm²) with collimation to dia. 17 cm x 7.5 cm (UJ*)	95	110	157	204
Dose area product (mGycm²) with collimation to dia. 17 cm x 10 cm (LJ*)	117	137	195	254

* UJ = Upper jaw, LJ = Lower jaw

9.2.3 Calculating dosage information

For any freely programmed value pairs, you must calculate the value using the kV/DAP lists; see sample calculation:

The Expert Guideline requires either that devices for DAP display of the patient's radiation exposure be present or that this information can be determined e.g. in the form of tables.

To compensate for measuring errors as well as for system and instrument variations, a tolerance of 20 % must be taken into account.

The radiation exposure is expressed as the dose area product (DAP) of the absorbed dose (Gy x cm^2) per mAs for each unit as well as each selectable kV level and diaphragm.

Calculation

The information has been calculated for the value pairs suggested by Dentsply Sirona. If other setting values are used, proceed as follows using the kV/DAP lists:

1. Select the set kV level from the table of the respective X-ray system and note down the DAP factor.
2. Multiply the DAP factor by the actually used mA (as indicated on the X-ray system).
3. Multiply the result by the actual exposure time (see Multitimer or table).

Sample calculation

X-ray with program P1 and a kV/mA value pair of 60 kV/10 mA

For step 1: 60 kV has a DAP factor of 0.5693 with diaphragm 10

For step 2: 10 mA displayed

For step 3: the exposure time is 14.1 s

$$DFP = 0,5693 \frac{mGycm^2}{mAs} \times 10mA \times 14,1s = 80,2713mGycm^2$$

2D exposures

kV	DAP factor Programs P1/P2/P12/TM1.1/ TM3/S1/S3 (mGy x cm^2/mAs)			DAP factor Programs P10 (mGy x cm^2/mAs)			DAP factor Programs BW1 (mGy x cm^2/mAs)	DAP factor Programs BW2 (mGy x cm^2/mAs)
		UJ*	LJ*		UJ*	LJ*		
60	0.543	0.370	0.290	0.312	0.185	0.237	0.303	0.297
63	0.600	0.402	0.320	0.340	0.203	0.258	0.332	0.330
66	0.658	0.445	0.351	0.374	0.223	0.284	0.369	0.360
69	0.718	0.481	0.383	0.405	0.241	0.308	0.396	0.392
72	0.767	0.518	0.409	0.435	0.261	0.330	0.431	0.427
75	0.832	0.557	0.444	0.465	0.280	0.353	0.461	0.461
78	0.893	0.599	0.477	0.498	0.299	0.378	0.498	0.497
81	0.961	0.642	0.513	0.536	0.322	0.407	0.532	0.533
84	1.007	0.680	0.537	0.566	0.341	0.430	0.571	0.568
90	1.129	0.756	0.603	0.622	0.375	0.472	0.644	0.642

* UJ = Upper jaw, LJ = Lower jaw

3D exposures

kV	3D exposure mode	DAP factor Program VOL1 (mGy x cm²/mAs)		
		8 x 8	8 x 5.5 (UJ*)	8 x 5.5 (LJ*)
85	SD	9.921	6.905	6.905
85	HD	10.784	7.506	7.506
85	Low Dose	2.835	1.973	1.973

kV	3D exposure mode	DAP factor Program VOL2 (mGy x cm²/mAs)	
		5 x 5.5 (UJ*)	5 x 5.5 (LJ*)
85	SD	4.466	4.466
85	HD	4.854	4.855
85	Low Dose	1.276	1.276

kV	3D exposure mode	DAP factor Program VOL3 (mGy x cm²/mAs)		
		11 x 10	11 x 7.5 (UJ*)	11 x 8 (LJ*)
85	SD	16.295	12.521	12.414
85	HD	17.712	13.61	13.494
85	Low Dose	4.656	3.577	3.547

kV	3D exposure mode	DAP factor Program VOL4 (mGy x cm²/mAs)		
		17 x 13	17 x 7.5 (UJ*)	17 x 10 (LJ*)
85	SD	14.411	8.925	11.091
85	HD	15.853	9.818	12.201
85	Low Dose	6.659	4.124	5.125

* UJ = Upper jaw, LJ = Lower jaw

9.3 DAP values cephalometry (Ceph)

Program	Max. exposure time		Factory-programmed values											
	Seconds		kV/ mA	DAP mGycm²		kV/ mA	DAP mGycm²		kV/ mA	DAP mGycm²		kV/ mA	DAP mGycm²	
		Quick-shot			Quick-shot			Quick-shot			Quick-shot			Quick-shot
C1	9.1	6.1	80/14	24	16	80/14	24	16	84/13	25	17	90/12	26	18
C2	9.1	6.1	80/14	24	16	80/14	24	16	84/13	25	17	90/12	26	18
C3	9.4	4.7	73/15	22	11	73/15	22	11	77/14	23	12	84/13	26	13
C3 F	14.9	7.5	73/15	35	18	73/15	35	18	77/14	37	19	84/13	40	20
C4	9.1	4.6	64/16	18	9	64/16	18	9	64/16	18	9	64/16	18	9

9.4 Effective doses by region, volume area on the object/field of view and setting

Program: VOL1 SD (8x8 cm, 8x5.5 cm maxillary/mandibular), details on the effective dose in µSv

Region	Setting	85 kV / 7 mA	85 kV / 7 mA	85 kV / 10 mA	85 kV / 13 mA
Anterior tooth	Full	35 µSv	55 µSv	79 µSv	102 µSv
	Maxillary	26 µSv	40 µSv	57 µSv	74 µSv
	Mandibular	26 µSv	41 µSv	59 µSv	76 µSv
Molar	Full	37 µSv	57 µSv	81 µSv	105 µSv
	Maxillary	26 µSv	40 µSv	58 µSv	75 µSv
	Mandibular	28 µSv	44 µSv	64 µSv	83 µSv
Temporomandibular joint	Full	19 µSv	30 µSv	43 µSv	56 µSv
	Maxillary	6 µSv	10 µSv	15 µSv	19 µSv

Program: VOL1 HD (8x8 cm, 8x5.5 cm maxillary/mandibular), details on the effective dose in µSv

Region	Setting	85 kV / 4 mA	85 kV / 5 mA	85 kV / 6 mA	85 kV / 7 mA
Anterior tooth	Full	109 µSv	136 µSv	163 µSv	191 µSv
	Maxillary	78 µSv	98 µSv	117 µSv	137 µSv
	Mandibular	81 µSv	101 µSv	121 µSv	142 µSv

Region	Setting	85 kV / 4 mA	85 kV / 5 mA	85 kV / 6 mA	85 kV / 7 mA
Molar	Full	112 µSv	140 µSv	168 µSv	196 µSv
	Maxillary	80 µSv	100 µSv	119 µSv	139 µSv
	Mandibular	88 µSv	110 µSv	132 µSv	154 µSv
Temporomandibular joint	Full	60 µSv	75 µSv	90 µSv	105 µSv
	Maxillary	20 µSv	25 µSv	30 µSv	36 µSv

Program: VOL1 Low (8x8 cm, 8x5.5 cm maxillary/mandibular), details on the effective dose in µSv

Region	Setting	85 kV / 6 mA	85 kV / 7 mA	85 kV / 10 mA	85 kV / 13 mA
Anterior tooth	Full	7 µSv	8 µSv	11 µSv	15 µSv
	Maxillary	4 µSv	5 µSv	7 µSv	9 µSv
	Mandibular	5 µSv	6 µSv	9 µSv	11 µSv

Program: VOL2 SD (5x5.5 cm maxillary / mandibular), details of the effective dose in µSv

Region	Setting	85 kV / 7 mA	85 kV / 7 mA	85 kV / 10 mA	85 kV / 13 mA
Anterior tooth	Maxillary	15 µSv	23 µSv	33 µSv	43 µSv
	Mandibular	15 µSv	24 µSv	34 µSv	45 µSv
Premolar	Maxillary	15 µSv	23 µSv	33 µSv	43 µSv
	Mandibular	15 µSv	24 µSv	34 µSv	45 µSv
Molar	Maxillary	17 µSv	27 µSv	39 µSv	50 µSv
	Mandibular	18 µSv	28 µSv	40 µSv	52 µSv

Program: VOL2 HD (5x5.5 cm maxillary / mandibular), details of the effective dose in µSv

Region	Setting	85 kV / 4 mA	85 kV / 5 mA	85 kV / 6 mA	85 kV / 7 mA
Anterior tooth	Maxillary	46 µSv	57 µSv	68 µSv	79 µSv
	Mandibular	48 µSv	60 µSv	71 µSv	83 µSv
Premolar	Maxillary	46 µSv	57 µSv	69 µSv	80 µSv
	Mandibular	47 µSv	59 µSv	71 µSv	83 µSv
Molar	Maxillary	54 µSv	67 µSv	80 µSv	93 µSv
	Mandibular	55 µSv	69 µSv	82 µSv	96 µSv

Program: VOL2 Low (5x5.5 cm maxillary/mandibular), details on the effective dose in µSv

Region	Setting	85 kV / 6 mA	85 kV / 7 mA	85 kV / 10 mA	85 kV / 13 mA
Anterior tooth	Maxillary	3 µSv	3 µSv	4 µSv	6 µSv
	Mandibular	3 µSv	3 µSv	4 µSv	6 µSv
Premolar	Maxillary	3 µSv	3 µSv	4 µSv	6 µSv
	Mandibular	3 µSv	3 µSv	4 µSv	6 µSv
Molar	Maxillary	3 µSv	4 µSv	6 µSv	7 µSv
	Mandibular	3 µSv	4 µSv	6 µSv	7 µSv

Program: VOL3 SD (11x10 cm full, 11x7.5 cm maxillary / 11x8 cm mandibular), effective dose specified in µSv

Setting	85 kV / 7 mA	85 kV / 7 mA	85 kV / 10 mA	85 kV / 13 mA
Full	50 µSv	78 µSv	111 µSv	145 µSv
Maxillary	36 µSv	56 µSv	79 µSv	103 µSv
Mandibular	45 µSv	70 µSv	100 µSv	129 µSv

Program: VOL3 HD (11x10 cm full, 11x7.5 cm maxillary / 11x8 cm mandibular), effective dose specified in µSv

Setting	85 kV / 4 mA	85 kV / 5 mA	85 kV / 6 mA	85 kV / 7 mA
Full	154 µSv	193 µSv	231 µSv	270 µSv
Maxillary	110 µSv	137 µSv	165 µSv	192 µSv
Mandibular	138 µSv	172 µSv	207 µSv	241 µSv

Program: VOL3 Low (11x10 cm full), effective dose specified in µSv

Setting	85 kV / 6 mA	85 kV / 7 mA	85 kV / 10 mA	85 kV / 13 mA
Full	9 µSv	11 µSv	16 µSv	20 µSv

Program: VOL4 SD (17x13 cm full, 17x7.5 cm maxillary / 17x10 cm mandibular), effective dose specified in µSv

Setting	 85 kV / 7 mA	 85 kV / 7 mA	 85 kV / 10 mA	 85 kV / 13 mA
Full	39 µSv	51 µSv	73 µSv	95 µSv
Maxillary	11 µSv	15 µSv	21 µSv	27 µSv
Mandibular	37 µSv	49 µSv	70 µSv	91 µSv

Program: VOL4 HD (17x13 cm full, 17x7.5 cm maxillary / 17x10 cm mandibular), effective dose specified in µSv

Setting	 85 kV / 4 mA	 85 kV / 5 mA	 85 kV / 6 mA	 85 kV / 7 mA
Full	98 µSv	122 µSv	147 µSv	171 µSv
Maxillary	28 µSv	35 µSv	42 µSv	49 µSv
Mandibular	89 µSv	111 µSv	133 µSv	155 µSv

Program: VOL4 Low (17x13 cm full), effective dose specified in µSv

Setting	 85 kV / 6 mA	 85 kV / 7 mA	 85 kV / 10 mA	 85 kV / 13 mA
Full	13 µSv	15 µSv	21 µSv	28 µSv
Maxillary	4 µSv	4 µSv	6 µSv	8 µSv
Mandibular	12 µSv	14 µSv	21 µSv	27 µSv

10 Dismantling and disposal

IMPORTANT
Please export all test reports that require safekeeping before dismantling the device.

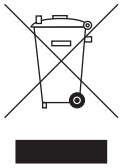
10.1 Dismantling and reinstallation

When dismantling and reassembling the unit, proceed according to the installation instructions for new installation in order to guarantee its functioning and stability.

The X-ray unit must be recalibrated whenever structural alterations in the area surrounding the X-ray room or new installations have been performed.

10.2 Disposal

For disposal, the information in the installation instructions Axeos REF. 67 30 811 in section "Important information for repacking and transport" must be observed.



In accordance with Directive 2012/19/EU and national disposal regulations regarding old electrical and electronic devices, please be advised that such items must be disposed of in a special way within the European Union (EU). These regulations require the environmentally friendly recycling/disposal of old electrical and electronic devices. Such items must not be disposed of as domestic refuse. This has been expressed, among other methods, using the icon of the "crossed out trash can" since 24.03.2006.

Disposal procedure

We feel responsible for our products from the first idea to their disposal. For this reason, we give you an option to return our waste electrical and electronic equipment.

If you wish to dispose of your equipment, please proceed as follows:

In Germany

To initiate return of the electrical equipment, please send a disposal request to enretec GmbH. You have the following options here:

- Use the "Returning an electrical device" button under the "eom" menu item on the enretec GmbH homepage (www.enretec.de).
- Alternatively, you can also contact enretec GmbH directly.

  enretec GmbH
  Kanalstrasse 17
  16727 Velten

  Phone: +49 3304 3919-500
  E-mail: eom@enretec.de

In accordance with the national disposal regulations regarding old electrical and electronic devices (ElektroG), as the manufacturer, we assume the costs for disposing of the electrical and electronic devices in question. Disassembly, transport, and packaging costs shall be borne by the owner/operator.

Prior to disassembly/disposal of the unit, it must be prepared professionally (cleaned/disinfected/sterilized).

If your unit is not permanently installed, it will be collected from the practice. If it is permanently installed, it will be picked up curbside at your address by appointment.

Abroad:

For country-specific information on disposal, contact your local dental dealer.

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

D3644.201.01.02.02 06.2021

Sprache: englisch
Ä.-Nr.: 130 866

Printed in Germany

Sirona Dental Systems GmbH

Fabrikstr. 31
64625 Bensheim
Germany
www.dentsplysirona.com

Order No 67 30 563 D3644