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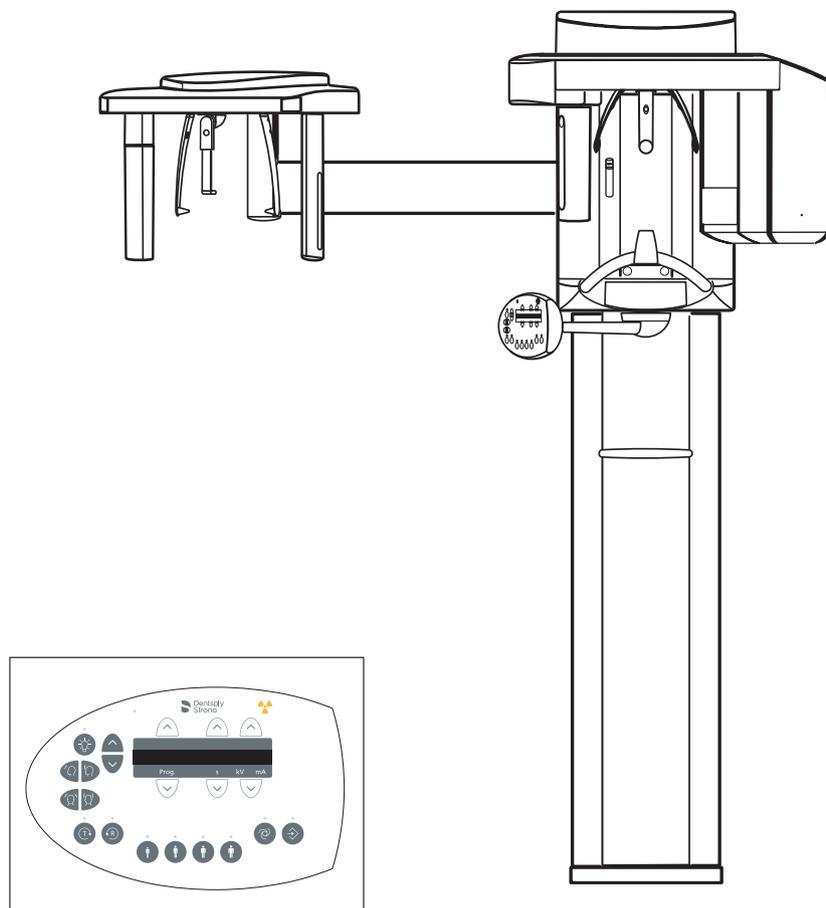
03.2019



# Orthophos E Orthophos E Ceph

## Operating Instructions

English



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# 1 General data

## 1.1 Dear Customer, ...

We are pleased that you have equipped your practice with the Orthophos E 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 Orthophos E system.

Your Orthophos E 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](mailto:contact@dentsplysirona.com)

[www.dentsplysirona.com](http://www.dentsplysirona.com)

## 1.3 Copyright and trademark

### Copyright

© Sirona Dental Systems GmbH. All rights reserved.

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<sup>®</sup>, Windows 7<sup>®</sup>, and Windows 10<sup>®</sup> are registered trademarks.

Windows<sup>™</sup> 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.

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](http://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 continue to 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 operating instructions. Such information is highlighted as follows:

#### **DANGER**

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

#### **WARNING**

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

#### **CAUTION**

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

#### **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:

<ul style="list-style-type: none"> <li>✓ Prerequisite</li> <li>1. First action step</li> <li>2. Second action step</li> <li>or</li> <li>➤ Alternative action</li> <li>↔ Result</li> <li>➤ Individual action step</li> </ul>	Requests you to do something.
See "Formats and symbols used [→ 7]"	Identifies a reference to another text passage and specifies its page number.
• List	Designates a list.
"Command / menu item"	Indicates commands / menu items or quotations.

## 1.5 Other relevant documents

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

- SIDEXIS 4 User Manual

## 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.

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

## 1.8 Intended use

The Orthophos E / Ceph is designed for producing different tomographic exposures of the maxillofacial area or of parts of this. Projections of the skull and carpus exposures for orthodontics are also possible with the cephalometric arm.

## 1.9 Indication and contraindication

Indications in dentistry areas:

- Conservative dentistry
- Endodontics
- Periodontology
- Prosthodontics
- Functional diagnosis and therapy of craniomandibular dysfunctions
- Surgical dentistry
- Implantology
- Oral and maxillofacial surgery
- Orthodontics

Contraindications:

- Display of cartilage structures
- Display of soft tissue

## 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 next to 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 [→ 18].

## 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 statutory 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 an exposure, the operator should move as far away from the X-ray tube assembly as the coiled cable of the release button 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 exposure 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.

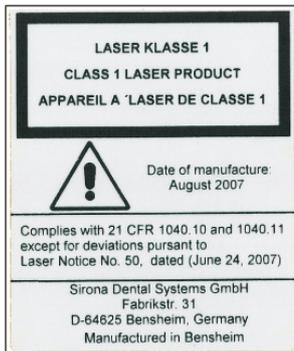
A minimum distance of 10 cm (4") is required between the eye and the laser. Do not stare directly into the laser beam.

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

The protective sleeves must be reapplied for each patient, all auxiliary exposure tools must also be disinfected to avoid potential transmission of pathogens that may cause serious illnesses.

Application components without disposable protective covers 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.

The following chapters contain more information about sterilization and hygienic protective sleeves: "Hygienic protective sleeves [→ 31]", "Preparing the exposure", "Sterilization [→ 92]".

## 2.11 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.

## 2.12 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.

## 2.13 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.

## 2.14 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.

## 2.15 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.

## 2.16 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.

## 2.17 Electromagnetic compatibility

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

Medical electrical devices are subject to special precautionary measures with regard to electromagnetic compatibility (EMC). It 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.

## 2.18 Electrostatic discharge

### Protective measures

ESD stands for **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).

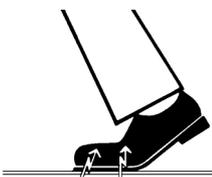
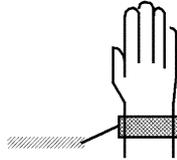
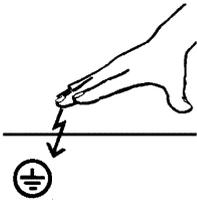
The amount of charge depends on several factors. The charge is:

- 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)



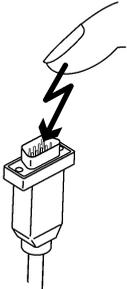
The transient currents resulting from these discharges have a magnitude of over 10 amps. They are not hazardous for humans because they last for only several nanoseconds.

**Note:** 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.



## 3 Unit description

### 3.1 Certification and registration

The Orthophos E / Ceph X-ray unit complies with IEC 60601-1:2005 + A1:2012

The Orthophos E / Ceph X-ray unit complies with IEC 60601-1-3:2008 + A1:2013

The Orthophos E / Ceph X-ray unit complies with IEC 60601-2-63:2012 + A1:2017

Original language: German

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

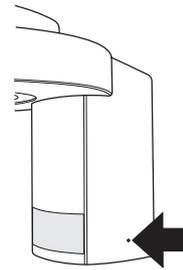


## 3.2 Technical data

### 3.2.1 Unit data

Model name:	Orthophos E / Ceph
Nominal voltage:	200 – 240 V
Permissible fluctuation:	± 10%
Permissible drop under load:	10%
Rated 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:	90 kV/12 mA = 1080 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. 66 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" [→ 100]
Exposure time:	see "Program values" [→ 100]
Image acquisition scale:	For P1, normal dental arch (slice center) approx. 1:1.19, i.e. the acquired image is magnified by approx. 19% on average compared to reality.
Exposure time for a cephalometric image:	14.9 s max.
Image acquisition scale for a cephalometric image:	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 Al / 90 IEC 60522
Focal spot size as specified in IEC 60336, measured in the central X-ray beam:	0.5 mm

Marking of focal spot:



Source-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 80 kV/14 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:

100 W

Anode material:

Tungsten

Exposure parameters for determining leakage radiation:

2mA / 90 kV

### X-ray tube

Siemens SR 90/15 FN or  
CEI OCX 100

### PAN sensor

Digital CCD line sensor, repluggable for panoramic exposure technique

Active sensor area, Pan type:	138 mm x 6.48 mm
Detail resolution:	0.027 mm pixel size
Focus-sensor distance:	497 mm

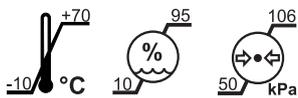
### Ceph sensor

Digital CCD line sensor, repluggable for panoramic or ceph exposure technique

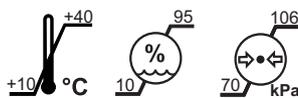
Active sensor area, Ceph type:	230 mm x 6.48 mm
Detail resolution:	0.027 mm pixel size
Focus-sensor distance:	1,714 mm

## 3.2.2 Transport, storage, and operating conditions

### Orthophos E

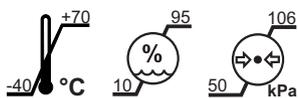


Transport and storage conditions:	Temperature: -10 °C – +70 °C (14 °F – 158 °F)
	Relative humidity: 10% – 95%



Operating conditions:	Ambient temperature: +10°C – +40°C (50°F – 104°F)
	Relative humidity: 10% - 95% (no condensation)
Operating altitude:	≤ 3,000 m above sea level

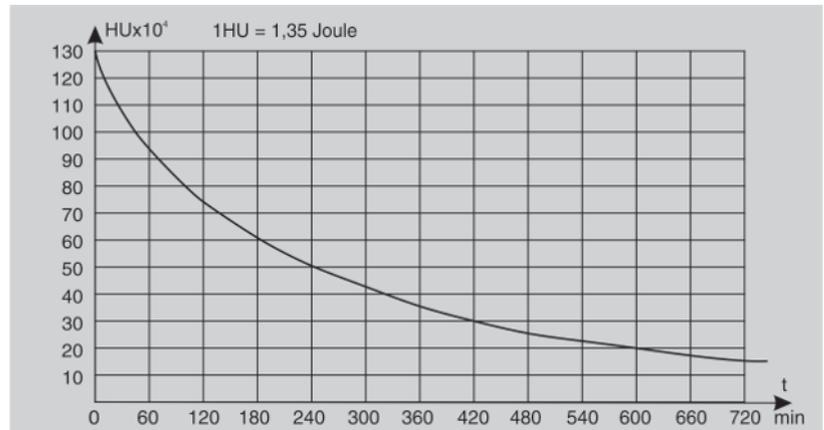
### Cephalometer



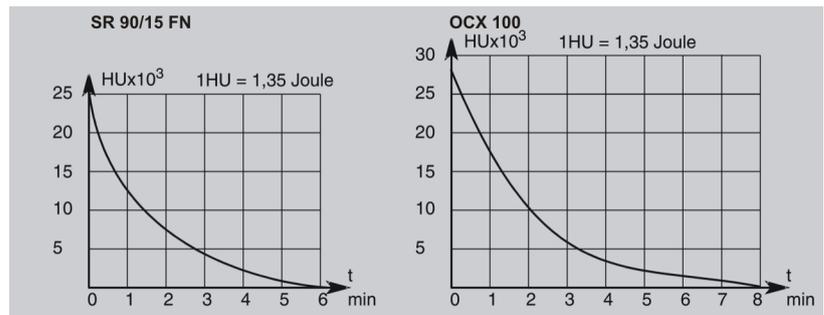
Transport and storage conditions:	Temperature: -40°C – +70°C (-40°F – 158°F)
	Relative humidity: 10% – 95%
	Air pressure: 500 hPa – 1060 hPa

### 3.2.3 Diagrams

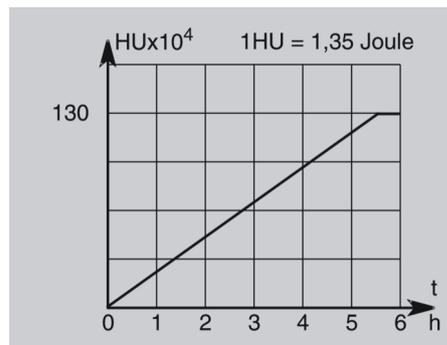
Cooling curve for tube housing



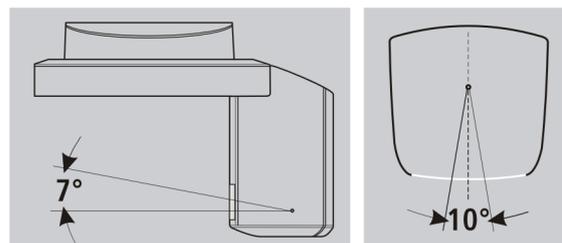
Cooling curve of X-ray tube



Heating curve of tube housing



Central X-ray beam and anode angle



### 3.2.4 Requirements on the PC systems

The requirements on the PC systems can be found in the installation requirements

Sidexis 4 REF 66 63 236.

Orthophos E REF 67 10 532

## 3.3 Overview of exposure programs

### Panoramic exposures

P1	Panoramic exposure, standard
P1 L	Panoramic exposure, half-side left
P1 R	Panoramic exposure, half-side right
P1 A	Panoramic exposure, artifact-reduced
P1 C	Panoramic exposure, constant 1.25x magnification
P10	Panoramic exposure for children
P12	Thick slice, anterior tooth region

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

### Bite wing exposures

BW1	Bitewing exposures in the posterior tooth region
-----	--

For more information about the bite wing exposure programs, see BW1 – Bite wing exposures in the posterior tooth region.

### Temporomandibular joint exposures

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

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

### Sinus exposures

S1	Paranasal sinuses
----	-------------------

For more information about the sinus exposure programs, see "S1 – Paranasal sinuses [→ 58]" onwards.

### Transversal multi-slice posterior teeth

MS1	Transversal multi-slice posterior teeth
-----	---

For more information on the MS exposure program, see from page [→ 62] onwards.

### Cephalometric exposures

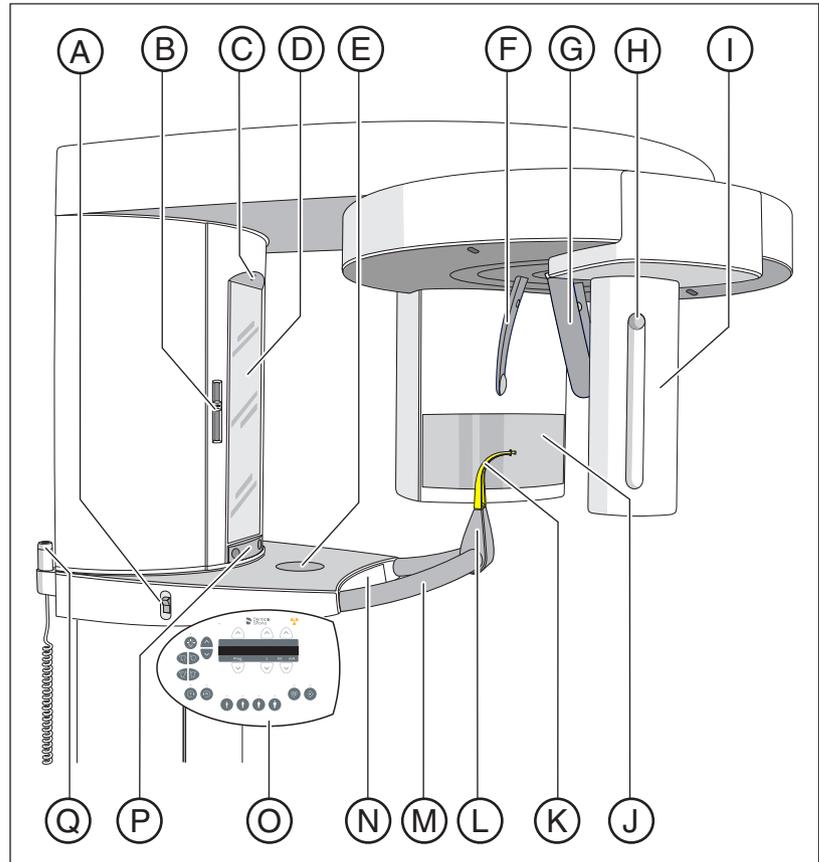
If the unit is equipped with a cephalometer, you can also take cephalometric images.

C1	Posterior-anterior exposure, symmetrical
C2	Anterior-posterior exposure, symmetrical
C3	Lateral exposure
C3F	Full format exposure, lateral (can optionally be permanently set by service engineer)
C4	Carpus view, symmetrical

For more information about the cephalometric exposure programs, see "C1 – Posterior-anterior exposure, symmetrical [→ 67]" onwards.

### 3.4 Main components of the product

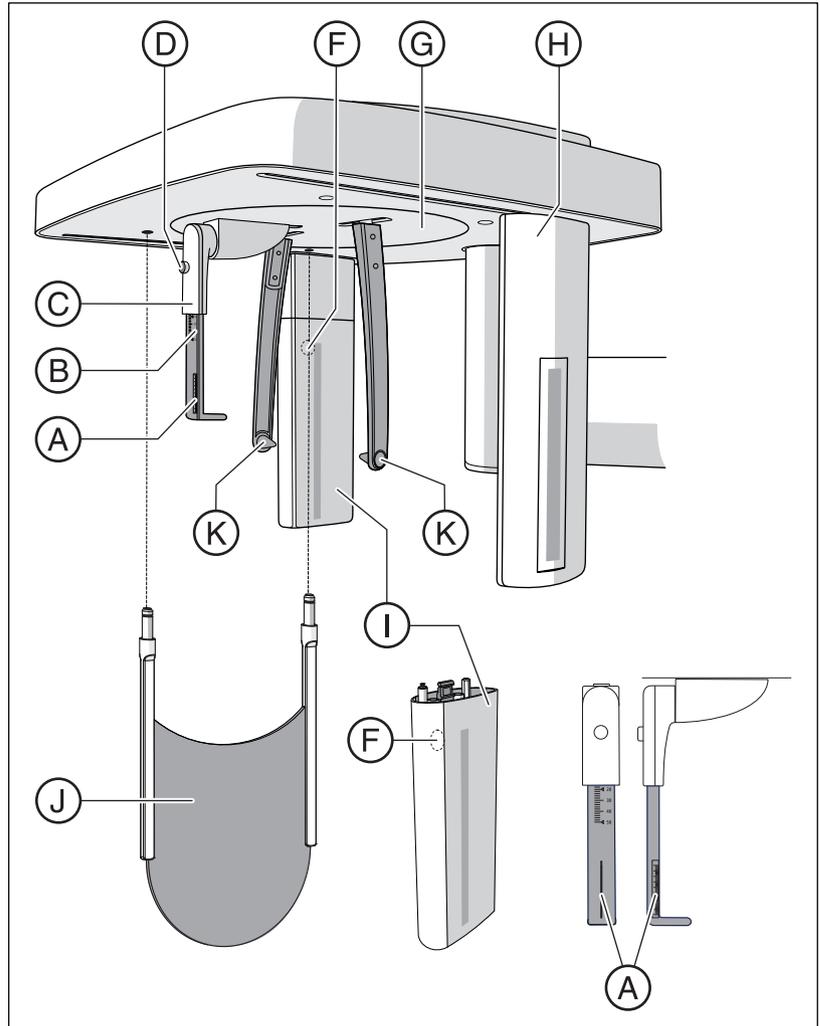
#### 3.4.1 Basic unit



A	Main switch
B	Light localizer with height adjustment of the laser line (Frankfurt plane)
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	Pushbutton for sensor removal
I	Sensor
J	Primary diaphragm field on the X-ray tube assembly
K	Bite block, contact segment or chin rest
L	Holder for chin rest, bite blocks, or contact segments etc.
M	Handle for patient
N	Drawer for accessories
O	Multipad (swiveling control panel)

P	Touch bar for swiveling the control mirror in and out
Q	Release button

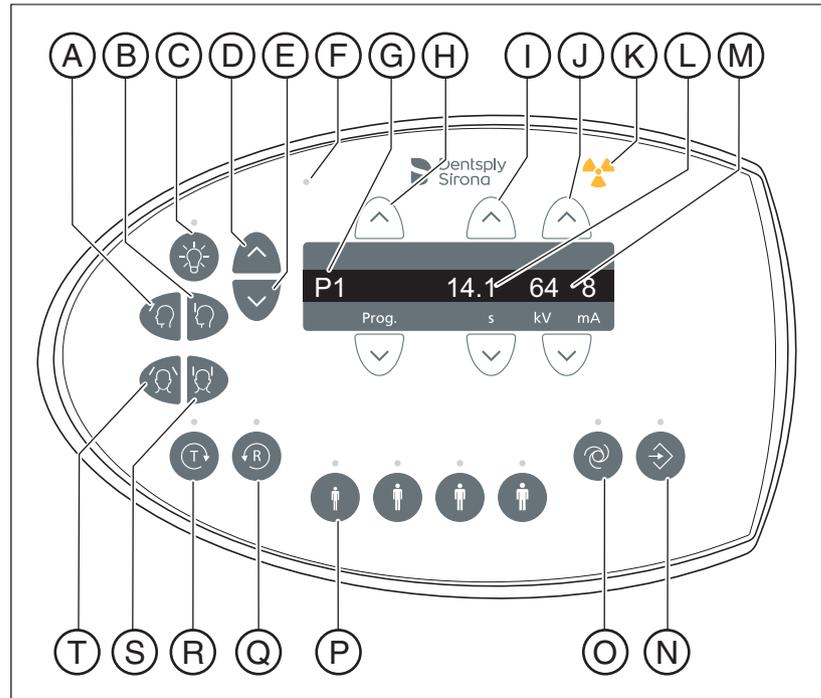
### 3.4.2 Cephalometer



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 Multipad

In addition to the program numbers, help messages, kV/mA combinations and the expected and actual radiation time, the height adjustment setting, forehead support position, info texts and values as well as the help and error messages are also shown on the digital display.



A	"Move forehead support away from forehead" key
B	"Move forehead support towards forehead" key
C	Light localizers ON/OFF key with LED
D	"Unit up" arrow key
E	"Unit down" key
F	LED display "Unit ON"
G	Program number/Help message digital display
H	Forward/backward program selection keys
I	Forward/backward keys, without function
J	Keys for manually setting kV/mA combinations forward/backward
K	Optical radiation indicator
L	Digital display of expected radiation time (after completion: actual radiation time)
M	Digital display of kV/mA combinations
N	Memory key for saving kV/mA values and digital display of info text with LED
O	Key for service menu display with LED

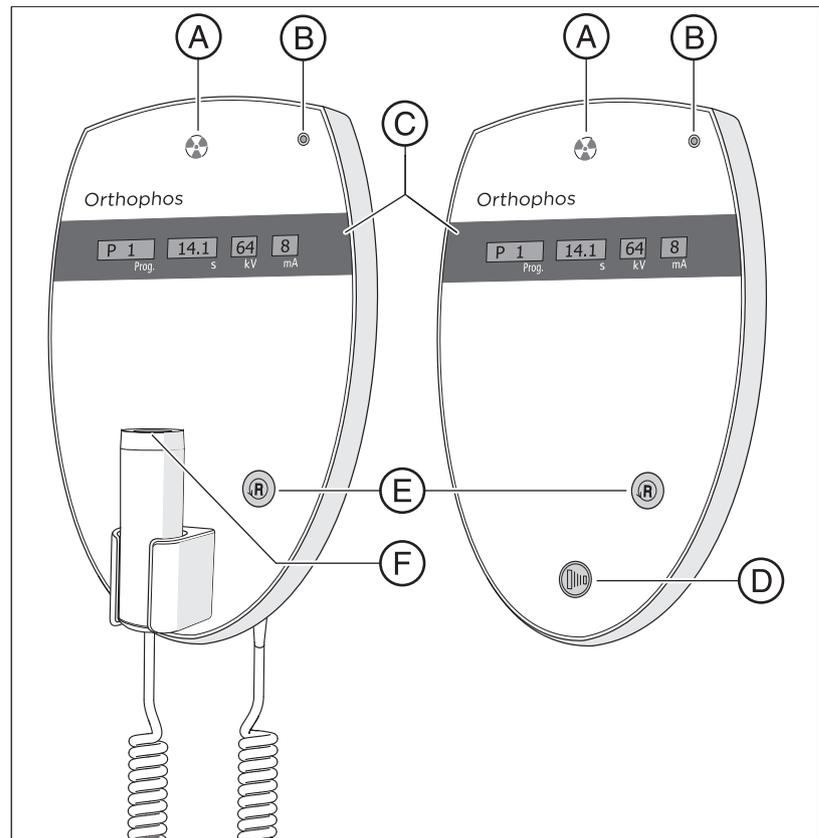
P	Row of patient symbol keys with LEDs, programmed kV/mA values
Q	"R" key for unit return with Ready LED (flashes if the unit is not ready for an exposure).
R	"T" key for test cycle without radiation with LED display
S	"Close temple supports" key
T	"Open temple supports" key

### 3.4.4 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.

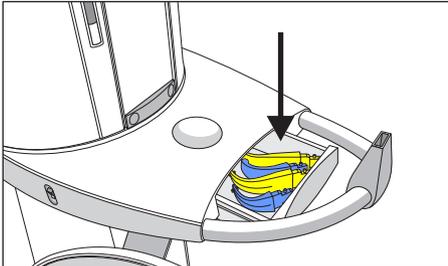


A	Radiation indicator
B	LED display "Unit ON"
C	Display field
D	Exposure release button
E	"R" button to reverse the unit
F	Exposure release button with coiled cable

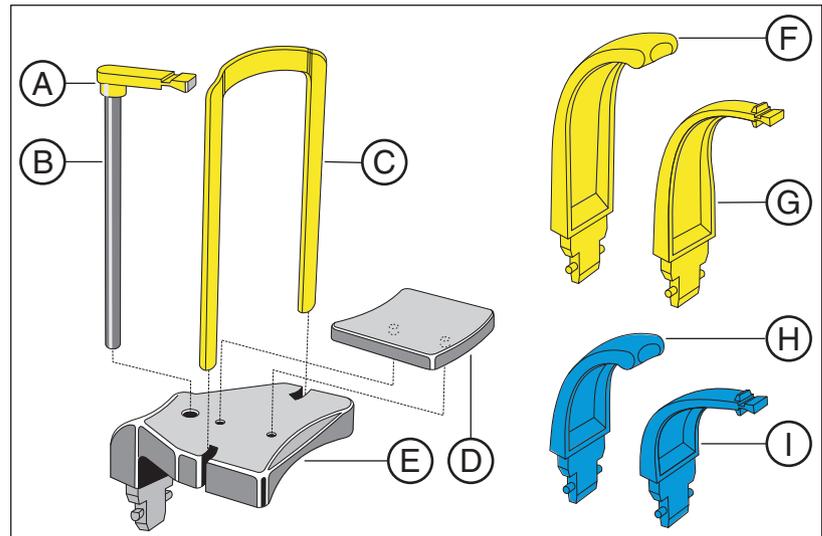
## 3.5 Spare parts and consumables

### 3.5.1 Accessory parts

#### 3.5.1.1 Bite blocks and contact segments

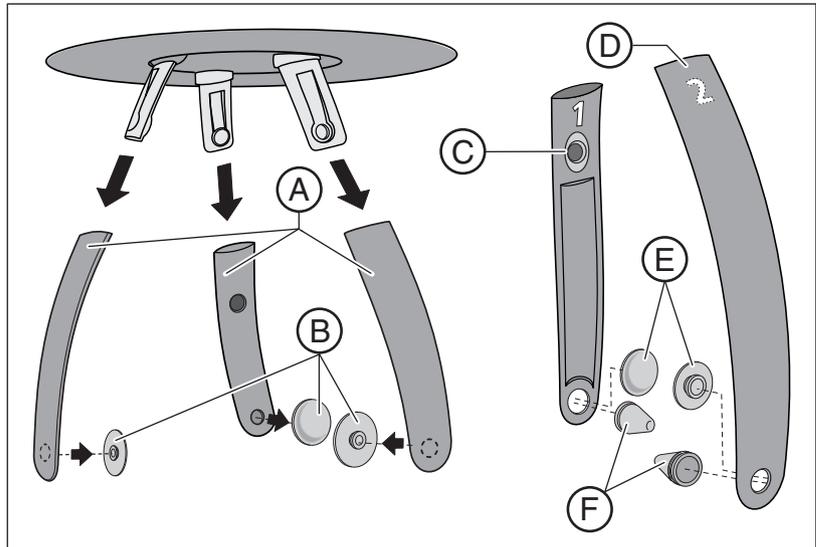


The drawer between the handles is provided for the storage of accessory parts and hygienic protective sleeves.



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" [-> 31] REF 59 81 472
F	Contact segment yellow for subnasale (5 pieces) REF 89 31 545
G	Bite block yellow (5 pieces) REF 89 21 843
H	Contact segment blue for subnasale (5 pieces) REF 89 31 552
I	Bite block blue (5 pieces) REF 89 21 850

**3.5.1.2 Temple supports, forehead support, and temporomandibular joint supports**



A	Forehead support and temple supports (1 piece) REF 59 80 383
B	Contact pads for forehead and temple supports (1 set) REF 59 80 391
C	Temporomandibular joint support 1 for temporomandibular joint exposures REF 59 80 607
D	Temporomandibular joint support 2 for temporomandibular joint exposures REF 59 80 599
E	Contact pads for temporomandibular joint supports (10 pieces) REF 59 90 648
F	Ear holders for temporomandibular joint supports (10 pieces) REF 18 88 838

### 3.5.2 Hygienic protective sleeves

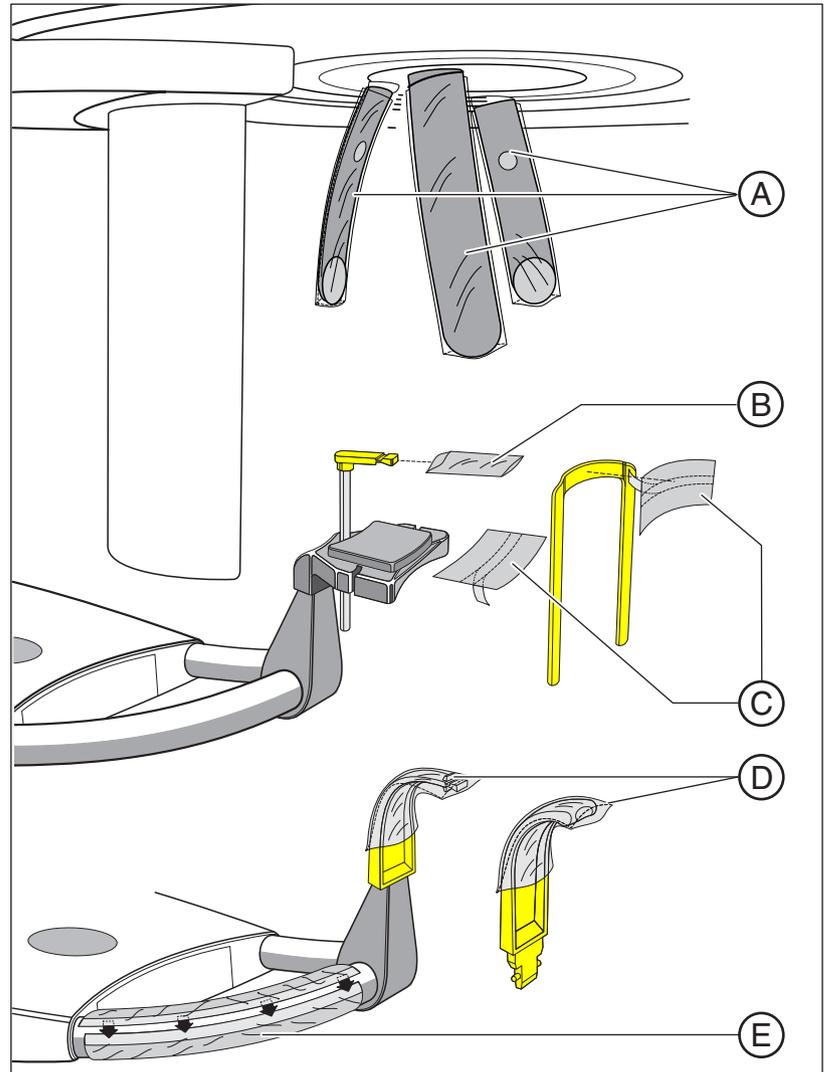
#### Identification of single use devices



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.

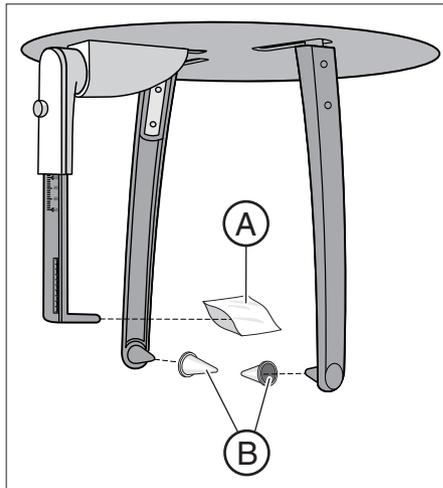
#### 3.5.2.1 Protective sleeves for basic unit



A	For forehead support and temple supports (500 pcs) Order No. 59 68 263
B	For bite block, dimensions 43 x 21 mm (500 pcs) Order No. 33 14 072
C	For chin rest and bar (100 pcs) Order No.: 59 32 603

D	For bite blocks and contact segments (500 pcs) Order No. 33 14 080
E	Protective film for handles Order No.: 59 68 255

### 3.5.2.2 Protective sleeves for cephalometer

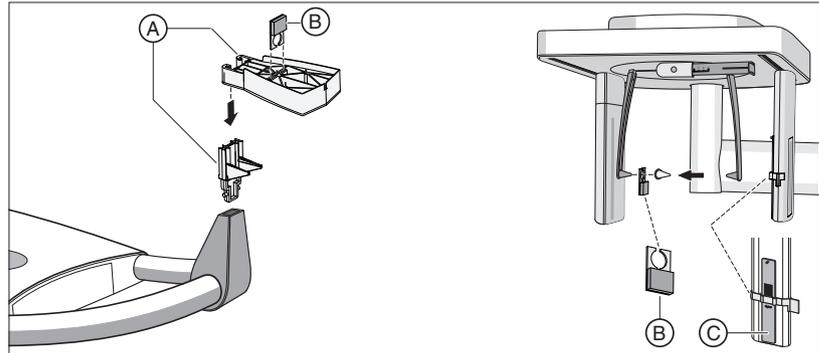


A	Protective sleeve for nose support, single use devices (100 pieces) REF 33 14 106
B	Protective caps for ear plugs, reusable devices (20 pieces) REF 89 32 261

### 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.

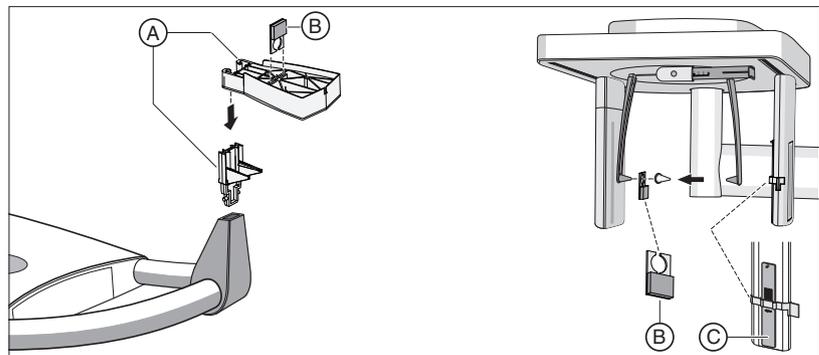


A	Exposure phantom, complete, spare (for 2D test) REF 59 85 416
B	OP SL contrast element, spare (not included in the scope of supply) REF 64 90 895
C	Ceph test phantom (not included in the scope of supply) REF 59 79 419

#### Germany

**and all countries that must be in alignment with DIN standard 6868.**

Perform constancy tests according to the specifications for operating an X-ray unit at regular intervals in order to ensure the safety of operating staff and patients.



A	Exposure phantom, complete, spare (for 2D test) REF 59 85 416
B	Contrast element OP SL, spare REF 64 90 895
C	Test phantom Ceph REF 59 79 419

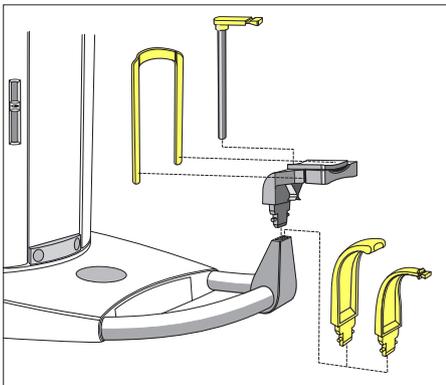
## 4 Installation and start-up

Please also see the chapter titled: "Cleaning and care [-> 91]"

### 4.1 Replacing accessories on the basic unit

#### 4.1.1 Replacing the bite block, contact segment, or chin rest

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



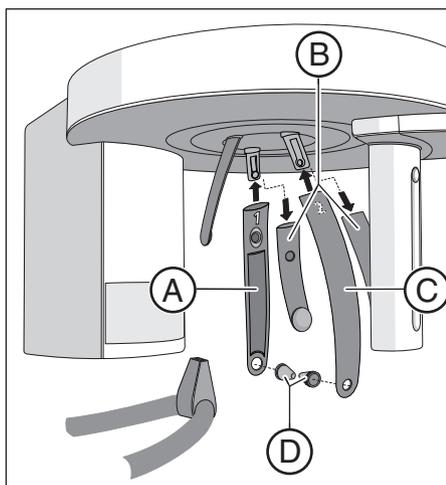
1. Pull the accessories upwards and out of the holder.
  - ↳ The accessory part disengages.
2. Insert the bite block, contact segment, or chin rest.
  - ↳ The accessory part engages.

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 Changing the temple supports and temporomandibular joint supports

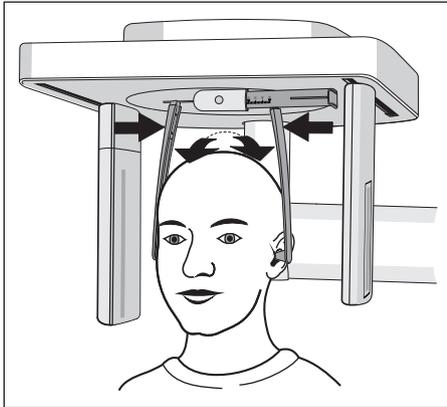
For temporomandibular joint views, the temporomandibular joint supports (A) "1" right and (C) "2" left must be inserted in place of the temple supports (B).



- ✓ 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.

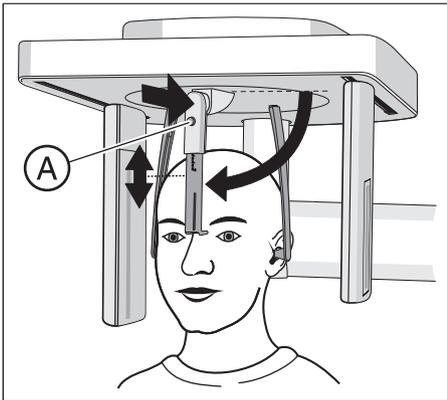
### 4.1.3 Adjusting/inserting accessory parts on the cephalometer

#### Adjusting the holder for ear plugs



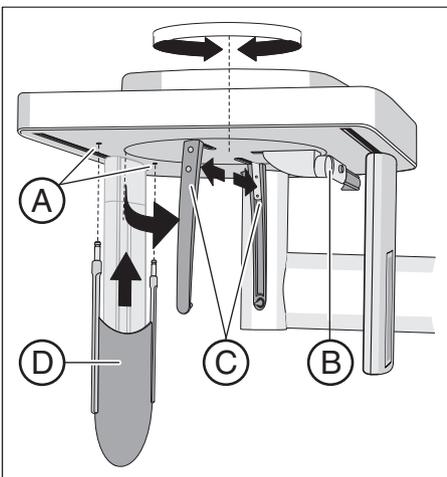
1. Grasp the ear plug holders at the very top with both hands.
2. Simultaneously pull the holders apart or push them together.
  - ↳ The ear plugs are inserted into the patient's outer ear canal.

#### 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.

#### 4.1.4 Moving the sensor

If the device is operated using a single sensor, the sensor has to be moved to the socket on the panoramic unit or the socket on the cephalometer, depending on the type of exposure being taken.

Note that only one CEPH sensor can be operated at both sockets. The active sensor area of a PAN sensor is too small for cephalometric images.

**Tip:** If two sensors (a PAN sensor and a CEPH sensor) are used for operation, replugging is not required.

##### NOTE

**When removing the sensor, it can be damaged by impact or if dropped.**

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

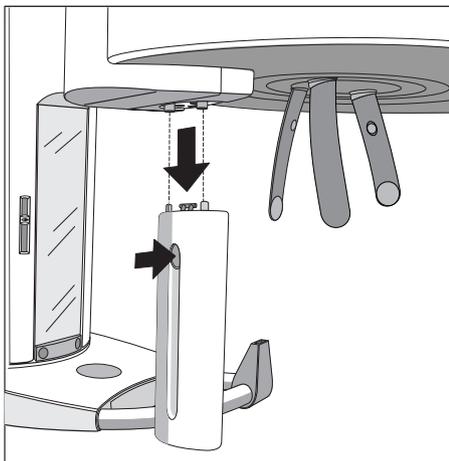
- > Do not drop the sensor under any circumstances!

##### NOTE

**Electrostatic charges from persons are discharged on the unit.**

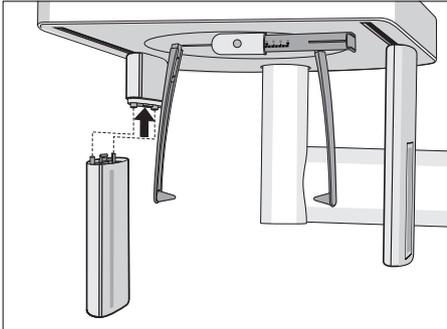
Electrical components of the unit are destroyed.

- > Do not touch any electrical components or unprotected plug contacts.
- > Discharge yourself by touching a conductive grounded object.



##### 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.

## 5 Operation

### 5.1 Acquiring the X-ray image

#### 5.1.1 Switching the unit on and starting the software

##### 5.1.1.1 Switch on the unit

#### NOTE

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

Electrical components are destroyed by short circuits.

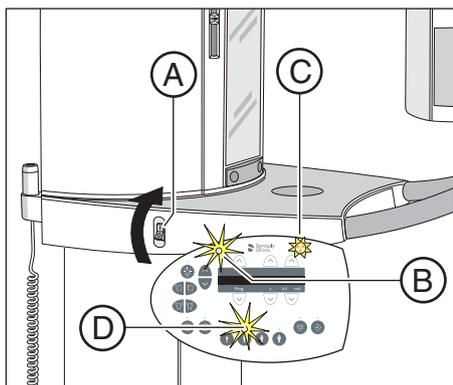
- Do not switch the unit on until the temperature of the unit has adapted to the ambient temperature and the condensation has evaporated. See the chapter on "Technical data".

#### ⚠ CAUTION

**Malfunctions can occur when the unit is switched on.**

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

- Ensure that no patient is positioned in the unit when it is switched on. 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 switching the unit on again!



- ✓ 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 Multipad.
- ↻ The radiation indicator (C) lights up for approx. one second as a functional check.
- ↻ Running dots are displayed on the Multipad for several seconds.
- ↻ The values for Program P1 appear on the display. LED D above the second patient symbol from the left lights up.
- ↻ The forehead support and temple supports are completely open.

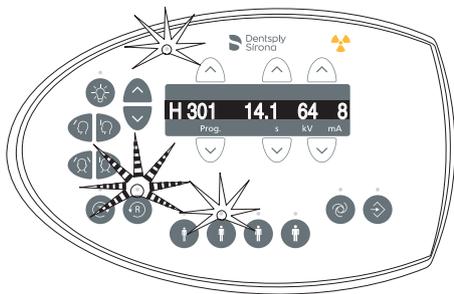
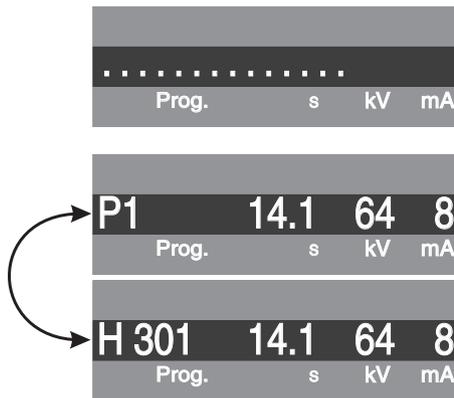
#### NOTE

**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.

### 5.1.1.1.1 Readings on the digital display



After power-on of the system, running dots initially appear on the digital display for a brief time.

Then exposure program number P1, the maximum exposure time for this program in seconds *s* and the "*kV/mA*" combination stored for this exposure program are displayed.

If the exposure program number and a help message H... alternately appear on the digital display, the help message must be processed first, see "Help messages" [→ 95]. The device is ready for operation when no more help messages are displayed.

#### **⚠ 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.

If the Ready LED above the R key starts flashing and error message H 301 appears on the display, briefly press return key R to bring the rotating element into the starting position. The Ready LED then switches off and the help message disappears.

The system is now ready to operate.

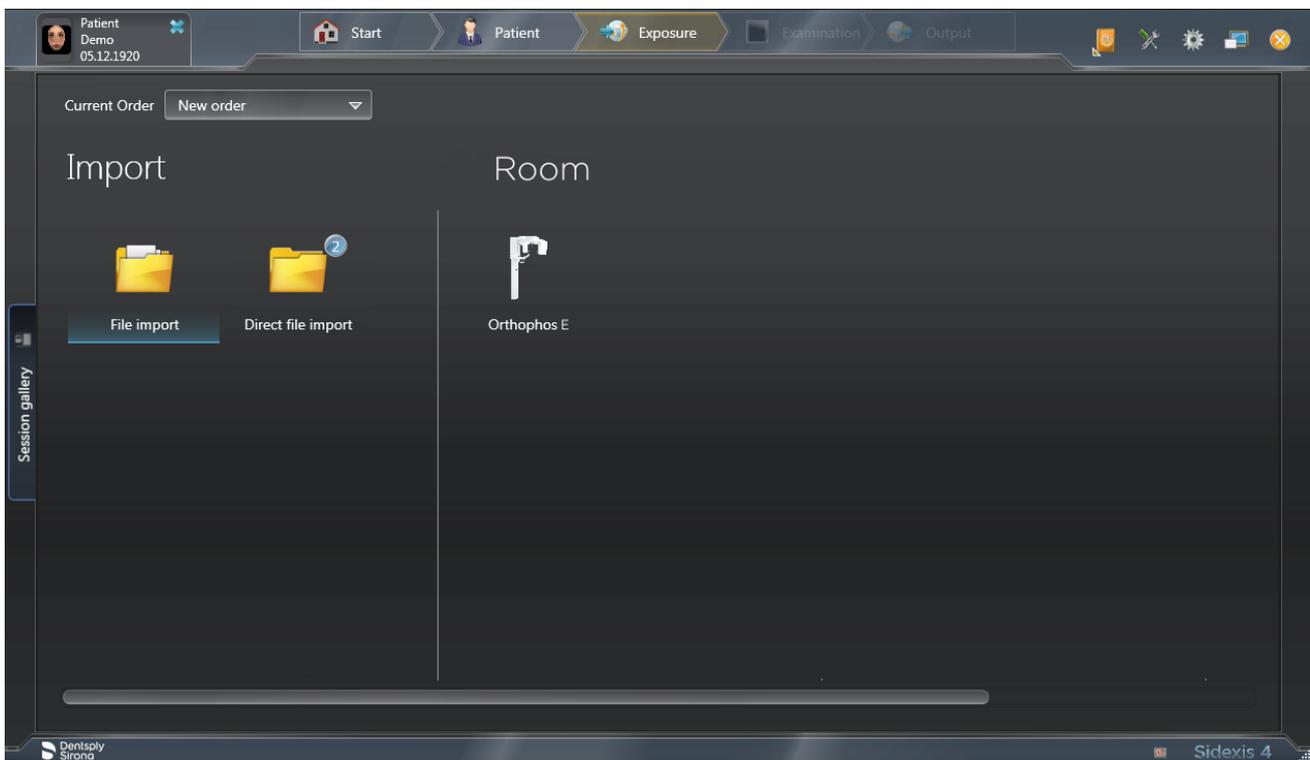
### 5.1.1.2 Enabling exposure readiness in Sidexis 4

The Sidexis software displays the prepared X-ray exposures on the screen of the PC.

As long as there is no connection to Sidexis, error message "H403 – Switch SIDEXIS to ready for exposure state" and the exposure program number will alternately appear on the digital display of the Multipad.

NOTE: The procedures for starting Sidexis 4, for logging in a patient, and for selecting the processing step "Exposure" can be found in the technical document "Sidexis 4 Operator's Manual" (REF 64 47 028).

1. Sidexis 4 must have been started.
  2. A patient must be logged in.
  3. The processing step "Exposure" must be selected.
- ↳ Sidexis is ready for exposure.



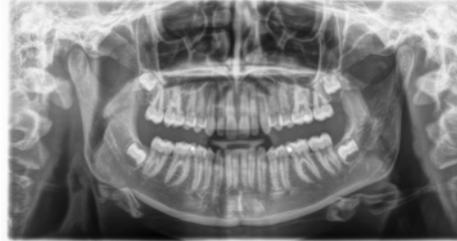
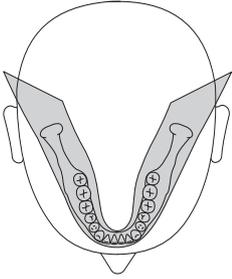
## 5.1.2 Selecting an exposure program

### 5.1.2.1 Panoramic and bite wing exposure

#### 5.1.2.1.1 Program descriptions

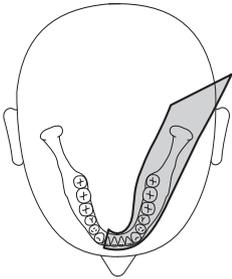
##### 5.1.2.1.1.1 P1 – Panoramic exposure

The exposure displays the full tooth region with ascending rami.



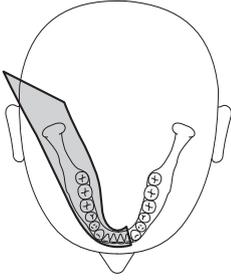
##### 5.1.2.1.1.2 P1 L – Panoramic exposure, half-side left

The exposure displays the left tooth region with ascending rami.



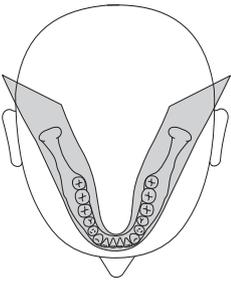
#### 5.1.2.1.1.3 P1 R – Panoramic exposure, half-side right

The exposure displays the right tooth region with ascending rami.



#### 5.1.2.1.1.4 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.

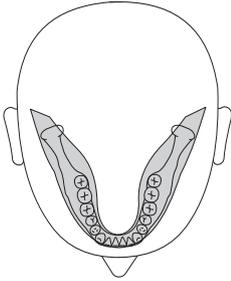


#### 5.1.2.1.1.5 P1 C - Panoramic exposure at a constant magnification of 1.25x

##### IMPORTANT

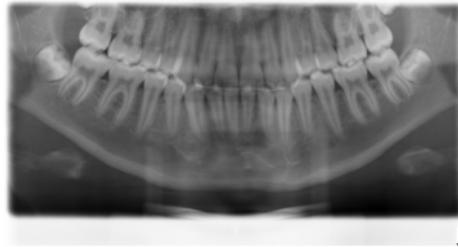
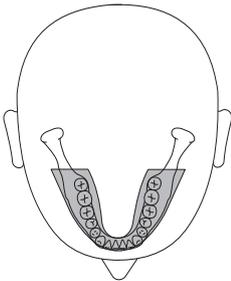
Please ensure that the 1.25 x enlargement is only guaranteed at the vertical level. As patient positioning can vary, a reference object is to be used at the point where a measurement is to be performed.

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



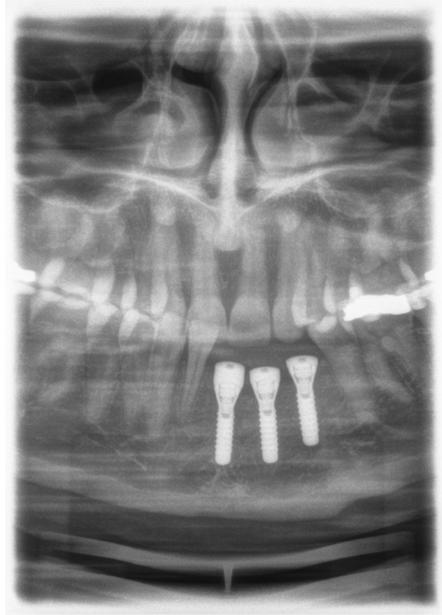
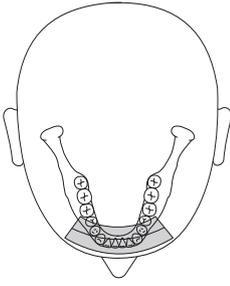
#### 5.1.2.1.1.6 P10 – Panoramic exposure for children

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



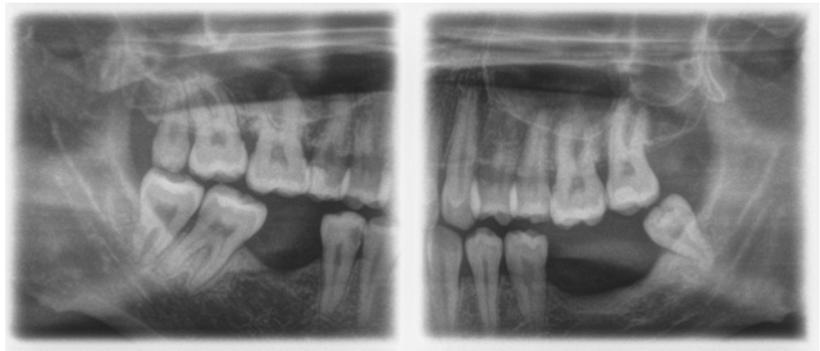
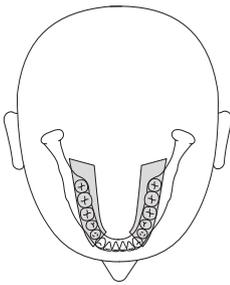
#### 5.1.2.1.1.7 P12 – Thick slice, anterior tooth region

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



#### 5.1.2.1.1.8 BW1 – Bitewing exposure in the posterior tooth region

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



#### 5.1.2.1.2 Preparing the exposure

Depending on the patient or the exposure program, you may have to replace accessory parts and, if necessary, reconnect the sensor, see "Installation and start-up" [-> 34].

You will require the following accessories:

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

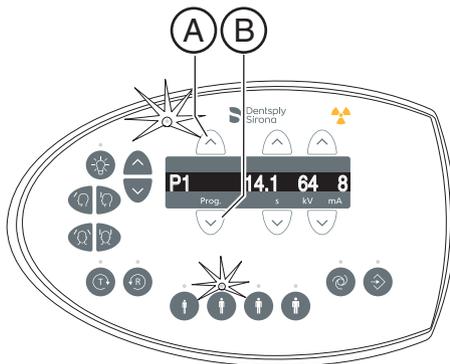
#### **⚠ CAUTION**

The chin rest must **not** be used for children when using program BW1. 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" [-> 31].
- > Switch Sidexis to a "Ready for 2D exposure" state; see "Switching SIDEXIS to ready for exposure state".

#### 5.1.2.1.3 Selecting an exposure program

The exposure programs appear in the sequence P1, P1 L, P1 R, P1 A, P1 C, P10, P12, BW1, TM1.1/TM1.2, S1, MS1, C3, C4, C1, C2 on the digital display of the Multipad.



- ✓ The unit is switched on and ready for exposure.
- > Select the exposure program. Push the program selection key forward (**A**) and backward (**B**).
  - ↳ The program number, the appropriate exposure time and the programmed kV/mA values for the second patient symbol from the left appear on the digital display.
- ↳ The exposure program is selected.

#### 5.1.2.1.4 Automatic measurement of the temple support width

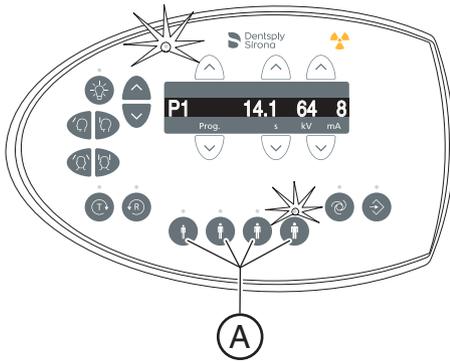
By adjusting the temple supports, the patient's specific temple support width is automatically determined. The set temple support width changes the radiation time slightly. The slice width for different dental arches is automatically selected in P1, P1L, P1R, P1A, P1C, and P10.

### 5.1.2.1.5 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.

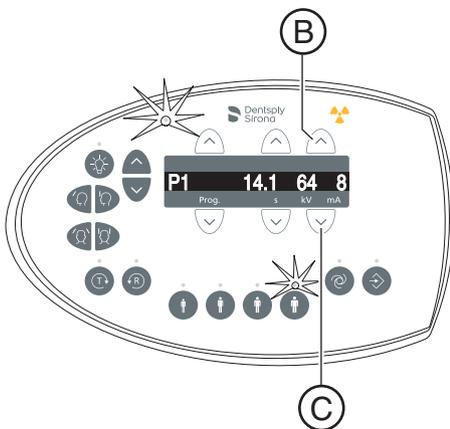
- > Select the desired patient symbol. Press one of the four patient symbol keys **(A)**.
  - ↳ The LED above the selected patient symbol lights up. The corresponding kV/mA values appear on the digital display.
  - ↳ The kV/mA value is set.



#### Manual setting of kV/mA values

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

- > Select another kV/mA value. Push the kV/mA keys forward **(B)** and backward **(C)**.
  - ↳ The selected kV/mA value is shown on the digital display. If the new value happens to agree with the value programmed for another patient symbol key, its LED then lights up.
  - ↳ The kV/mA value is set.



#### 5.1.2.1.6 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 keys. Release the button immediately in the event of involuntary contact between patient and device.

##### 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 limited by metal or other radiopaque materials located in the patient's mouth and in its vicinity.

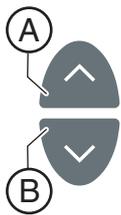
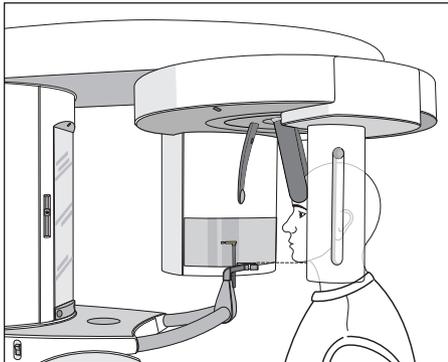
- Ask the patient to take off all metallic objects such as glasses and jewelry in the head and neck area as well as all removable dental prostheses. The tray in front of the control mirror is used for depositing jewelry.



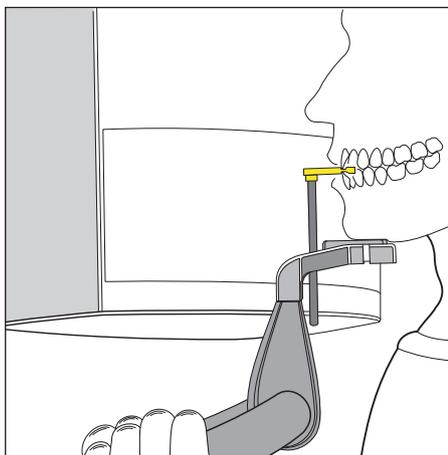
**Tip:** As long as a height adjustment key is pressed, the digital display shows a reference value for the height setting which is saved in the additional information area of the Sidexis software.

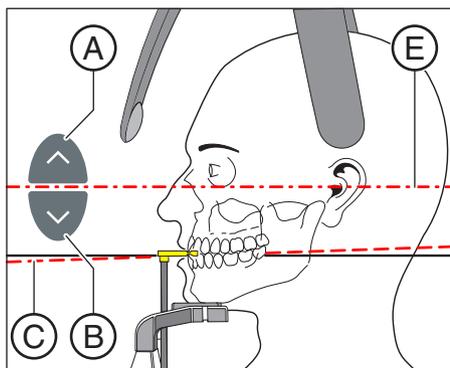
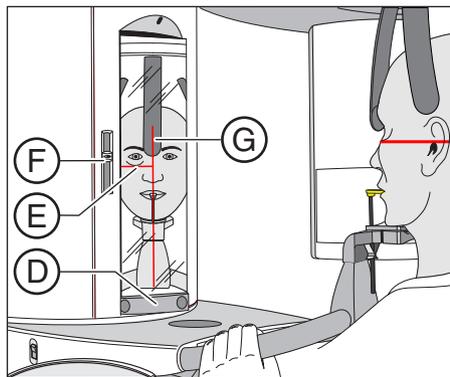
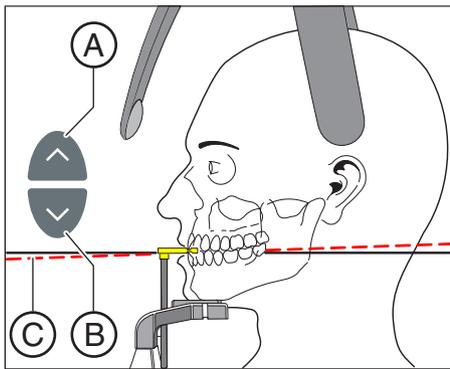
#### 5.1.2.1.6.1 Positioning with chin rest and rod for bite block

- ✓ 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) keys. **CAUTION! The height adjustment motor starts slowly and then increases its speed.** Press and hold the key until the desired height is reached. The motor movement is accompanied by an acoustic signal.
  - ↳ 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.

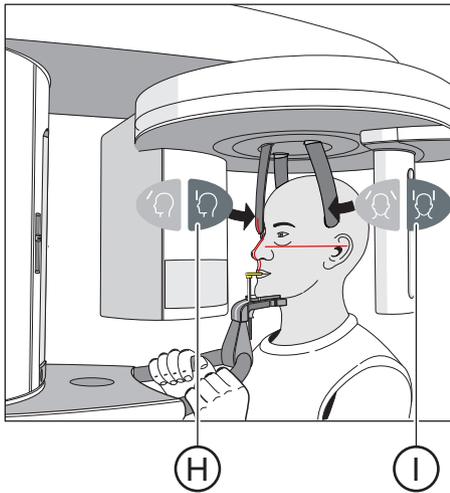




6. Check the patient's occlusal plane **C**. Adjust the unit height using the up (**A**) and down (**B**) keys.
  - ↳ The occlusal plane is slightly inclined toward the front.
7. Check the position of the patient's spine.
  - ↳ Ensure that the patient's spine is slightly inclined, as shown in the diagram.
 

**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 the middle of the face (mid-sagittal).
11. Align the patient's head according to the Frankfurt horizontal plane (**E**).
 

**Tip:** The Frankfurt horizontal is used as a reference plane. It runs between the upper edge of the ear canal and the deepest point of the lower eye socket edge.
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 press the up **A** and down **B** height adjustment keys.
  - ↳ The laser line reflects on the lowest point of the lower eye socket edge.

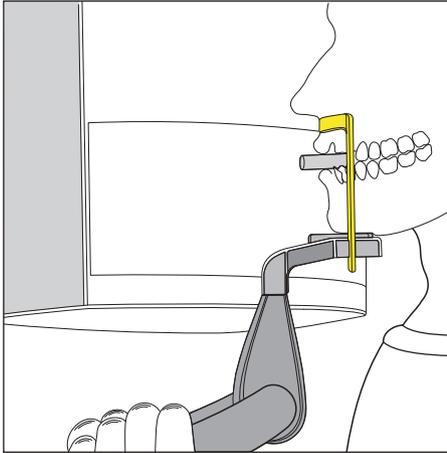


14. Press the forehead support adjustment key **(H)** and the temple support adjustment key **(I)**.
  - ↳ The forehead and temple supports stop moving automatically when they come into contact with the patient's head. Ensure that the patient's head does not move backward when the forehead support is put in place.
15. Check the patient's position and make any final corrections as necessary.
16. Swivel the control mirror back into place. Press the right recess on the touchbar **D**.
  - ↳ The patient can see himself in the control mirror.
17. 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**

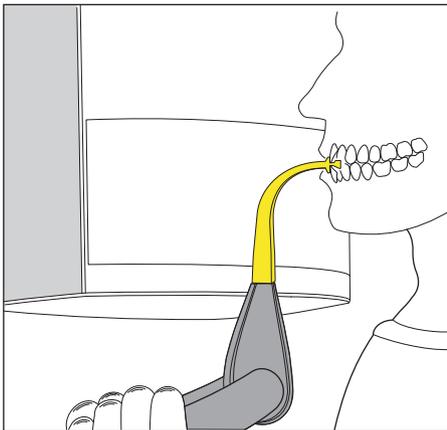
The slice width is selected automatically for different dental arches with the temple support setting, and the radiation time is also changed through this in accordance with the temple support width which is set.

#### 5.1.2.1.6.2 Positioning with chin rest and bar



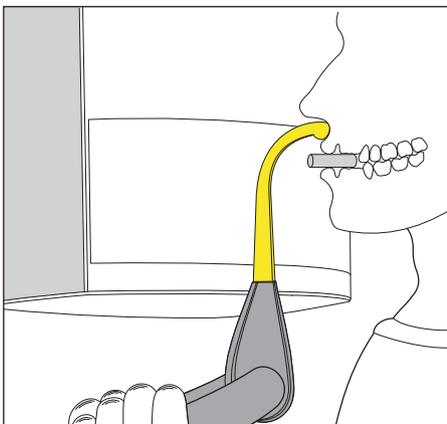
- ✓ The patient has no or only a few anterior teeth.
  - ✓ The chin support and bar, and the forehead support and temple supports are inserted in the unit.
  - ✓ The relevant hygienic protective sleeves are pulled over the accessories.
1. Instruct the patient to place his chin on the chin rest and place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

#### 5.1.2.1.6.3 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.

#### 5.1.2.1.6.4 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

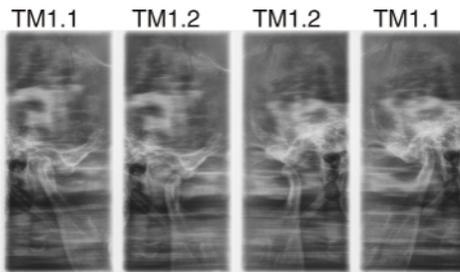
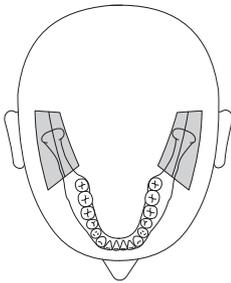
#### 5.1.2.2.1 Program descriptions

##### **IMPORTANT**

Note the information on the two-part exposure programs in the "Releasing the exposure" chapter, see "Two-part exposure programs".

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

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



### 5.1.2.2.2 Preparing the exposure

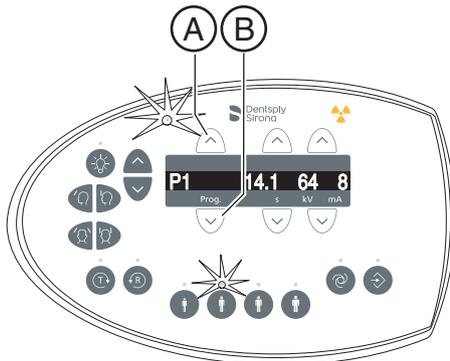
Depending on the patient or the exposure program, you may have to replace accessory parts and, if necessary, reconnect the sensor, see "Installation and start-up" [-> 34].

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" [-> 31].
- > Switch Sidexis to a "Ready for 2D exposure" state; see "Switching SIDEXIS to ready for exposure state".

### 5.1.2.2.3 Selecting an exposure program

The exposure programs appear in the sequence P1, P1 L, P1 R, P1 A, P1 C, P10, P12, BW1, TM1.1/TM1.2, S1, MS1, C3, C4, C1, C2 on the digital display of the Multipad.



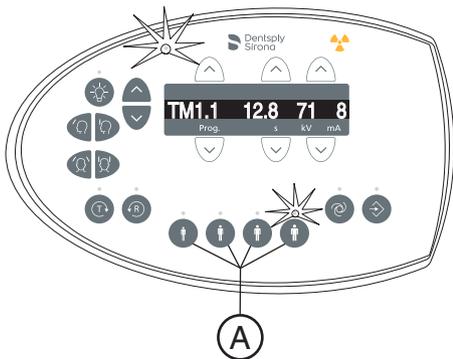
- ✓ The unit is switched on and ready for exposure.
- > Select the exposure program. Push the program selection key forward **(A)** and backward **(B)**.
  - ↳ The program number, the appropriate exposure time and the programmed kV/mA values for the second patient symbol from the left appear on the digital display.
- ↳ The exposure program is selected.

### 5.1.2.2.4 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.

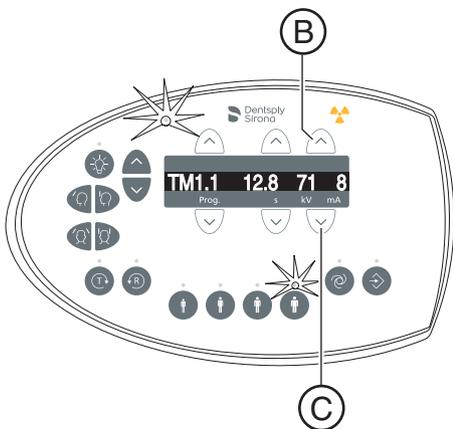
- > Select the desired patient symbol. Press one of the four patient symbol keys **(A)**.
  - ↳ The LED above the selected patient symbol lights up. The corresponding kV/mA values appear on the digital display.
  - ↳ The kV/mA value is set.



#### Manual setting of kV/mA values

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

- > Select another kV/mA value. Push the kV/mA keys forward **(B)** and backward **(C)**.
  - ↳ The selected kV/mA value is shown on the digital display. If the new value happens to agree with the value programmed for another patient symbol key, its LED then lights up.
  - ↳ The kV/mA value is set.



#### 5.1.2.2.5 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 keys. Release the button immediately in the event of involuntary contact between patient and device.

##### 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 limited 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.

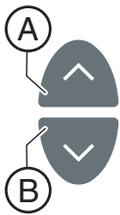
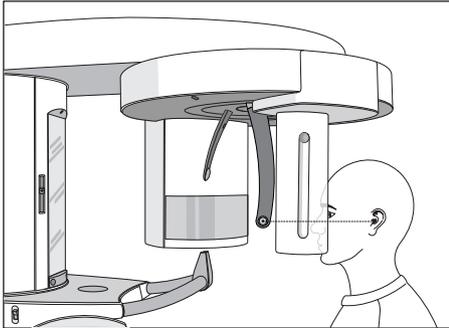


**Tip:** As long as a height adjustment key is pressed, the digital display shows a reference value for the height setting which is saved in the additional information area of the Sidexis software.

### 5.1.2.2.5.1 Positioning for a lateral temporomandibular joint exposure

- ✓ The forehead support and temporomandibular joint supports with ear holders 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) 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 ear holders of the temporomandibular joint supports are at the same height as that of the patient's ears.

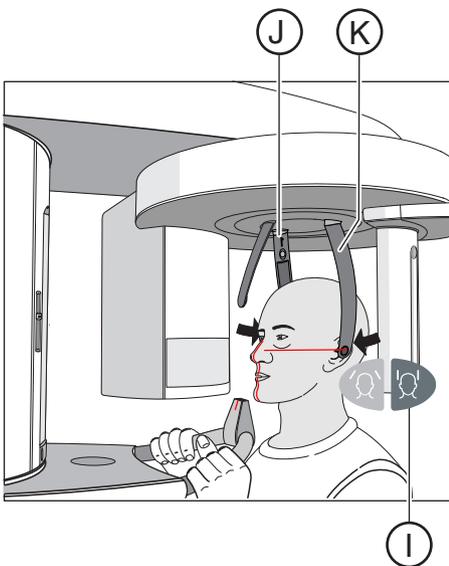
3. Instruct the patient to position himself between the temporomandibular joint supports and hold the handles with both hands.

4. Close the temporomandibular joint supports (J and K). Press the I key.

↳ 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 ear holders.

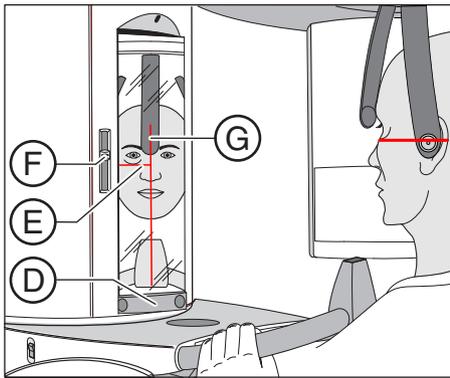
5. Swivel the control mirror outwards. Press the left recess on the touchbar D.

↳ You can see the patient in the control mirror.

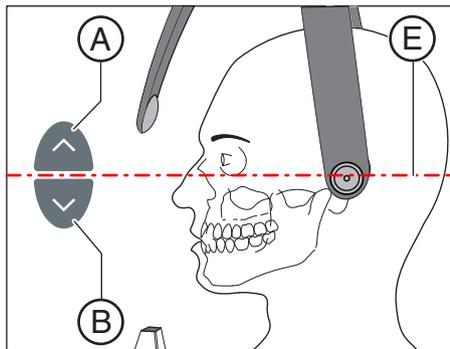


6. Switch on the light localizer. **CAUTION! Risk of dazzle**

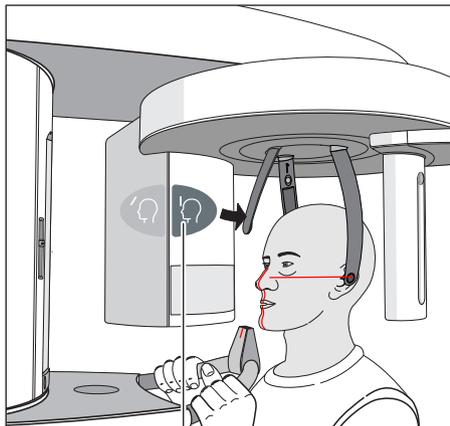
↳ Two red laser lines reflect on the patient's head. To switch off the light localizer, press the key again. It switches off automatically after approx. 100 seconds.



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



8. Align the patient's head according to the Frankfurt 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 press the up **A** and down **B** height adjustment keys.
  - ↳ The laser line reflects on the lowest point of the lower eye socket edge.



11. Press the 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 when the forehead support is put in place.
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.

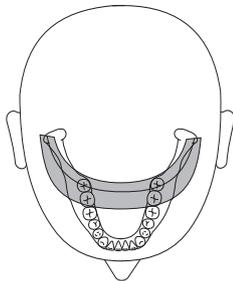
### IMPORTANT

Note the information on the two-part exposure programs in the "Releasing the exposure" chapter, see "Two-part exposure programs".

### 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.



#### 5.1.2.3.2 Preparing the exposure

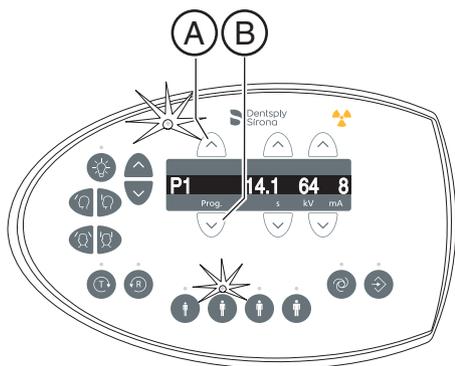
Depending on the patient or the exposure program, you may have to replace accessory parts and, if necessary, reconnect the sensor, see "Installation and start-up" [→ 34].

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" [→ 31].
- > Switch Sidexis to a "Ready for 2D exposure" state; see "Switching SIDEXIS to ready for exposure state".

#### 5.1.2.3.3 Selecting an exposure program

The exposure programs appear in the sequence P1, P1 L, P1 R, P1 A, P1 C, P10, P12, BW1, TM1.1/TM1.2, S1, MS1, C3, C4, C1, C2 on the digital display of the Multipad.



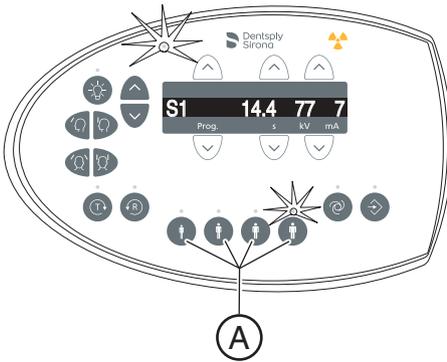
- ✓ The unit is switched on and ready for exposure.
- > Select the exposure program. Push the program selection key forward **(A)** and backward **(B)**.
  - ↳ The program number, the appropriate exposure time and the programmed kV/mA values for the second patient symbol from the left appear on the digital display.
- ↳ 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.

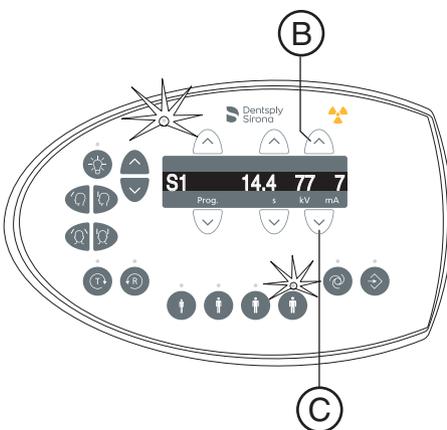
- > Select the desired patient symbol. Press one of the four patient symbol keys **(A)**.
  - ↳ The LED above the selected patient symbol lights up. The corresponding kV/mA values appear on the digital display.
  - ↳ The kV/mA value is set.



#### Manual setting of kV/mA values

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

- > Select another kV/mA value. Push the kV/mA keys forward **(B)** and backward **(C)**.
  - ↳ The selected kV/mA value is shown on the digital display. If the new value happens to agree with the value programmed for another patient symbol key, its LED then lights up.
  - ↳ 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 keys. Release the button immediately in the event of involuntary contact between patient and device.

#### 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 limited by metal or other radiopaque materials located in the patient's mouth and in its vicinity.

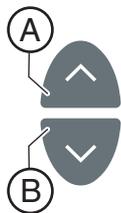
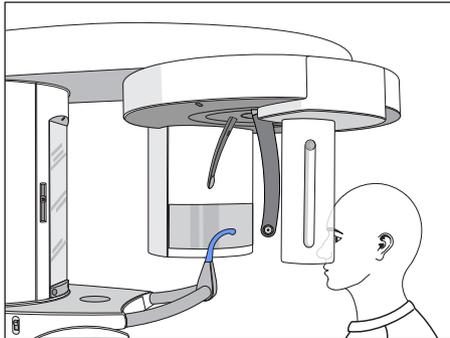
- Ask the patient to take off all metallic objects such as glasses and jewelry in the head and neck area as well as all removable dental prostheses. The tray in front of the control mirror is used for depositing jewelry.



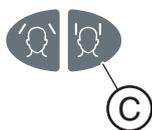
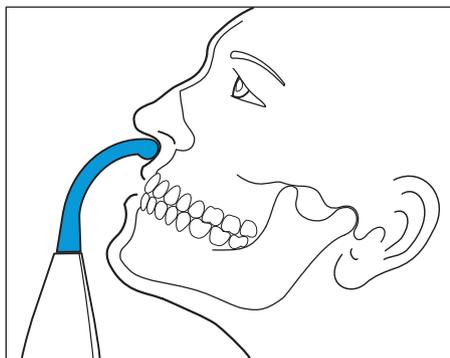
**Tip:** As long as a height adjustment key is pressed, the digital display shows a reference value for the height setting which is saved in the additional information area of the Sidexis software.

#### 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.



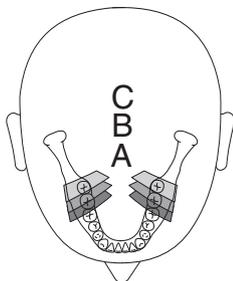
1. Guide the patient in front of the control mirror.
2. Set the unit height using the up (A) and down (B) keys.  
**CAUTION! The height adjustment motor starts slowly and then increases its speed.**  
Press and hold down the button until the desired height is reached. The unit movement is accompanied 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 hold this position until the end of the exposure.
  - ↳ The patient is positioned in the unit.



### 5.1.2.4 Transversal multi-slice posterior teeth

#### 5.1.2.4.1 Program descriptions

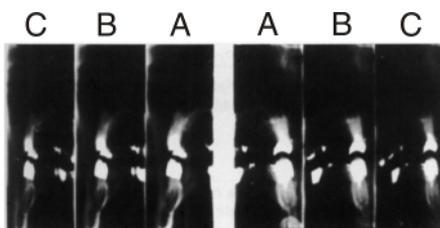
##### 5.1.2.4.1.1 MS1 – Program description



This exposure shows the posterior tooth region as a multislice with 6 views in one image.

#### IMPORTANT

Note that, due to the large slice thickness, program MS1 is not suitable for implantology planning.



#### 5.1.2.4.2 Preparing the exposure

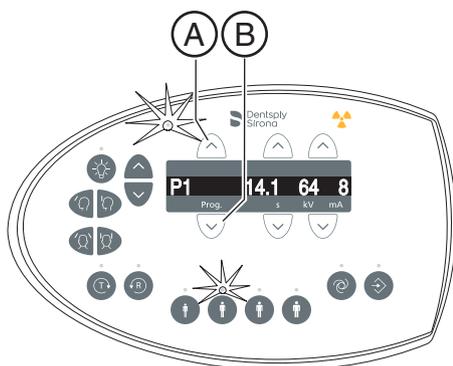
Depending on the patient or the exposure program, you may have to replace accessory parts and, if necessary, reconnect the sensor, see "Installation and start-up" [→ 34].

You will require the following accessories:

- Yellow bite block or contact segment.
- 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" [→ 31].
- > Switch Sidexis to a "Ready for 2D exposure" state; see "Switching SIDEXIS to ready for exposure state".

#### 5.1.2.4.3 Selecting an exposure program

The exposure programs appear in the sequence P1, P1 L, P1 R, P1 A, P1 C, P10, P12, BW1, TM1.1/TM1.2, S1, MS1, C3, C4, C1, C2 on the digital display of the Multipad.



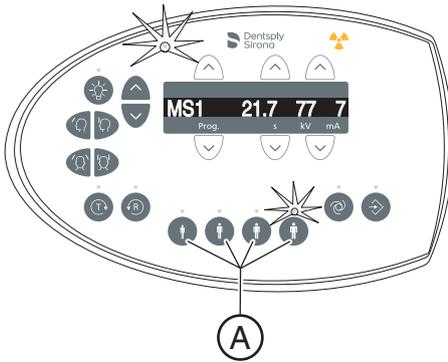
- ✓ The unit is switched on and ready for exposure.
- > Select the exposure program. Push the program selection key forward (A) and backward (B).
  - ↪ The program number, the appropriate exposure time and the programmed kV/mA values for the second patient symbol from the left appear on the digital display.
- ↪ The exposure program is selected.

#### 5.1.2.4.4 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.

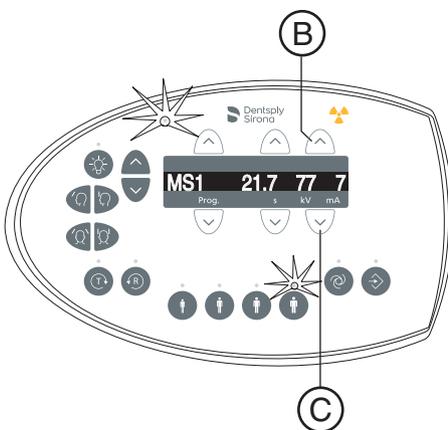
- > Select the desired patient symbol. Press one of the four patient symbol keys **(A)**.
  - ↳ The LED above the selected patient symbol lights up. The corresponding kV/mA values appear on the digital display.
  - ↳ The kV/mA value is set.



##### Manual setting of kV/mA values

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

- > Select another kV/mA value. Push the kV/mA keys forward **(B)** and backward **(C)**.
  - ↳ The selected kV/mA value is shown on the digital display. If the new value happens to agree with the value programmed for another patient symbol key, its LED then lights up.
  - ↳ The kV/mA value is set.



#### 5.1.2.4.5 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 keys. Release the button immediately in the event of involuntary contact between patient and device.

##### 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 limited by metal or other radiopaque materials located in the patient's mouth and in its vicinity.

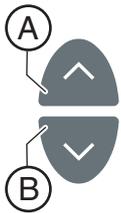
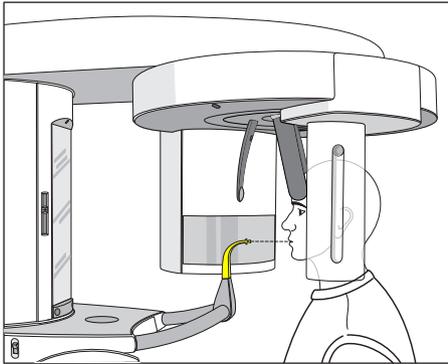
- Ask the patient to take off all metallic objects such as glasses and jewelry in the head and neck area as well as all removable dental prostheses. The tray in front of the control mirror is used for depositing jewelry.



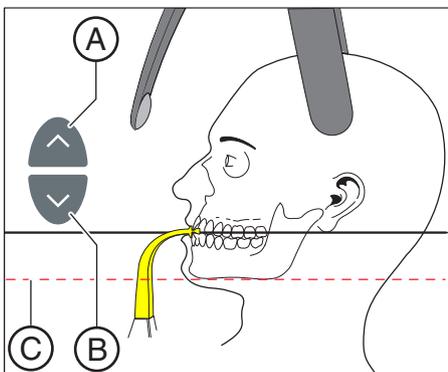
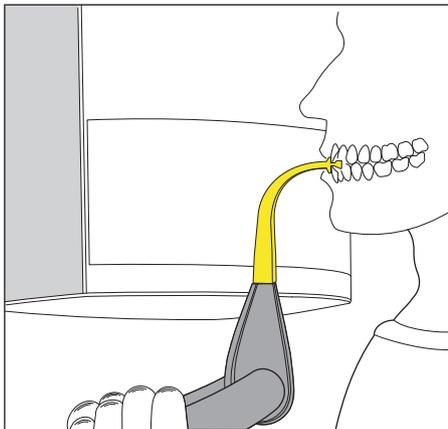
**Tip:** As long as a height adjustment key is pressed, the digital display shows a reference value for the height setting which is saved in the additional information area of the Sidexis software.

#### 5.1.2.4.5.1 Positioning with bite block

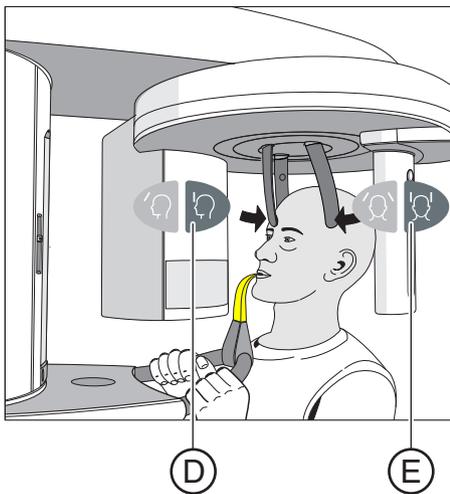
- ✓ The yellow bite block, the forehead support and temple supports are inserted in the unit.
- ✓ The relevant hygienic protective sleeves are pulled over the accessories.



1. Guide the patient in front of the control mirror.
2. Set the unit height using the up (A) and down (B) keys. **CAUTION! The height adjustment motor starts slowly and then increases its speed.** Press and hold the key until the desired height is reached. The motor movement is accompanied by an acoustic signal.
  - ↳ The bite block is located at the height of the patient's anterior teeth.
3. Guide the patient to the unit and instruct them to hold the handles with both hands.
4. Instruct the patient 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 teeth forwards until they reach a stop.

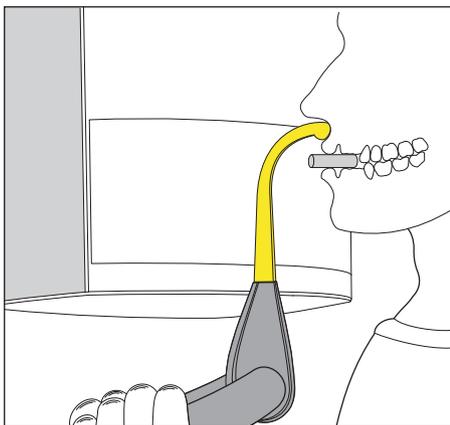


5. Align the patient's head in a slightly reclined position.
  - ↳ The patient's mandible (C) should be parallel with the floor.



6. Press the forehead support adjustment key **(D)** and the temple support key **(E)**.
  - ↪ The forehead and temple supports stop moving automatically when they come into contact with the patient's head. Ensure that the patient's head does not move backward when the forehead support is put in place.
7. Check the patient's position and make any final corrections as necessary.
8. 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.

#### 5.1.2.4.5.2 Positioning with contact segment



- ✓ The patient has no or only a few anterior teeth.
  - ✓ The yellow 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 from step 5 as described under "Positioning with bite block".

### 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.

The C3F - Lateral full-format exposure can be fixed set by the service engineer upon request.

**Tip:** By default, the image of the lateral exposure C3 or C3F shows the patient's face facing to the right. At your request, this orientation can be permanently changed by your service engineer so that the patient's face points to the left on the X-ray.

Please also 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.

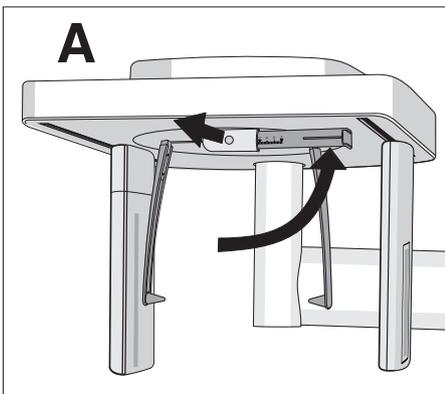
The following illustrations of the cephalometer are shown in the left-handed arm version. They also apply for the cephalometer with a right-handed arm.

A = asymmetrical

S = symmetrical

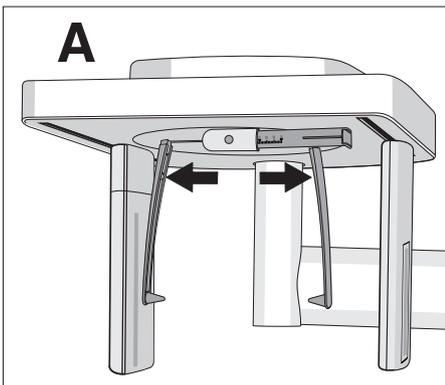
#### Preparing the nose support

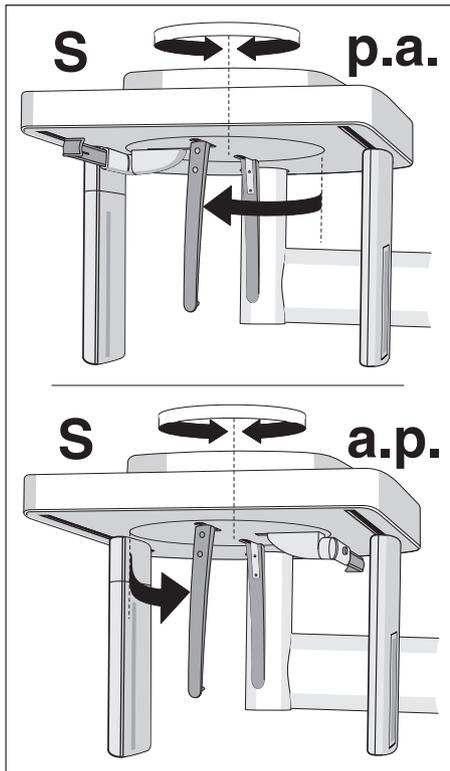
1. Grasp the nose support at the rotary joint.
2. Pull the nose support forwards until it reaches the stop.
3. Swivel the nose support sideways and upwards.



#### 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.

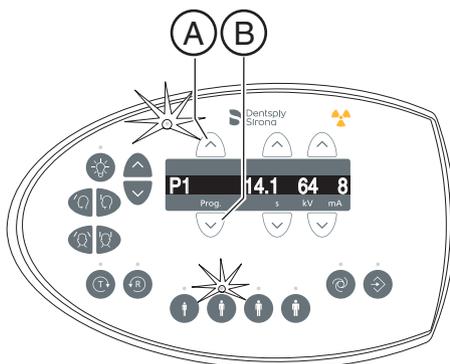
### Protective caps and hygienic protective sleeves

- > Plug the protective caps onto the ear plugs and pull the hygienic protective sleeve onto the nose support, see "Hygienic protective sleeves" [→ 31].

### Preparing for a 2D exposure

#### 5.1.2.5.3 Selecting an exposure program

The exposure programs appear in the sequence P1, P1 L, P1 R, P1 A, P1 C, P10, P12, BW1, TM1.1/TM1.2, S1, MS1, C3, C4, C1, C2 on the digital display of the Multipad.



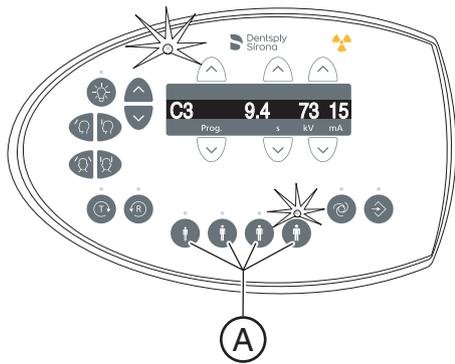
- ✓ The unit is switched on and ready for exposure.
- > Select the exposure program. Push the program selection key forward (A) and backward (B).
  - ↳ The program number, the appropriate exposure time and the programmed kV/mA values for the second patient symbol from the left appear on the digital display.
- ↳ The exposure program is selected.

### 5.1.2.5.4 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.

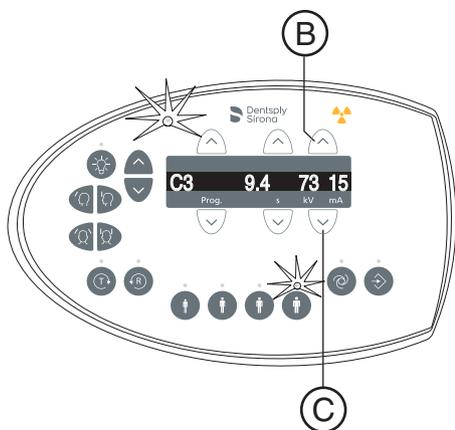
- > Select the desired patient symbol. Press one of the four patient symbol keys **(A)**.
  - ↳ The LED above the selected patient symbol lights up. The corresponding kV/mA values appear on the digital display.
  - ↳ The kV/mA value is set.



#### Manual setting of kV/mA values

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

- > Select another kV/mA value. Push the kV/mA keys forward **(B)** and backward **(C)**.
  - ↳ The selected kV/mA value is shown on the digital display. If the new value happens to agree with the value programmed for another patient symbol key, its LED then lights up.
  - ↳ The kV/mA value is set.



#### 5.1.2.5.5 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 keys. Release the button immediately in the event of involuntary contact between patient and device.

#### 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 limited by metal or other radiopaque materials located in the patient's mouth and in its vicinity.

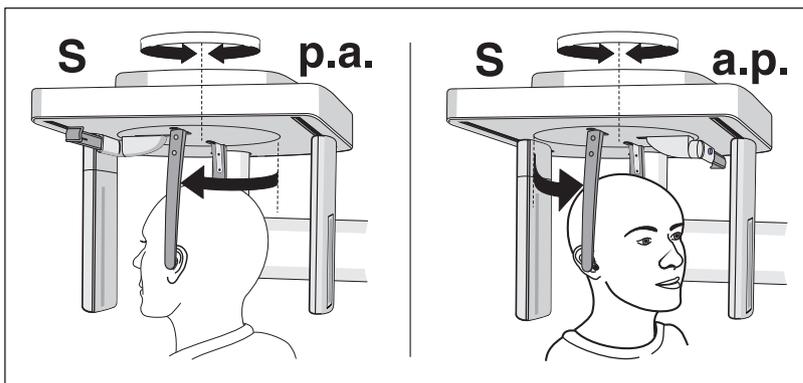
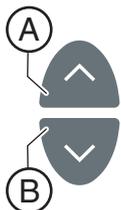
- Ask the patient to take off all metallic objects such as glasses and jewelry in the head and neck area as well as all removable dental prostheses. The tray in front of the control mirror is used for depositing jewelry.



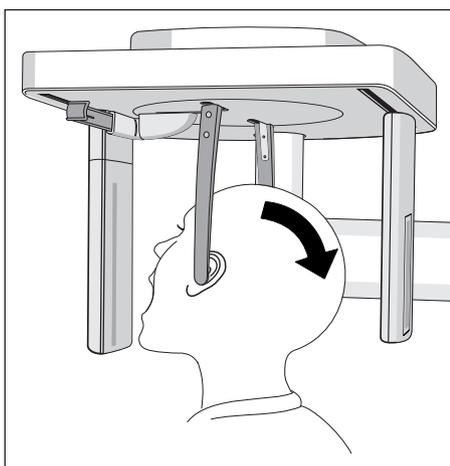
**Tip:** As long as a height adjustment key is pressed, the digital display shows a reference value for the height setting which is saved in the additional information area of the Sidexis software.

### 5.1.2.5.5.1 Positioning for symmetrical exposures C1, C2

- ✓ Push the ear plug holders apart.
  - ✓ The nose support is swiveled upwards.
  - ✓ The ear plug holders are rotated at an angle of 90° towards the sensor and the secondary diaphragm.
  - ✓ The protective caps for ear plugs are inserted.
1. 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 button once the Cephalometer is at the same height as that of the patient's head.
  2. Guide the patient between the ear plug 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.

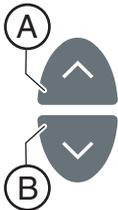


3. Grasp the ear plug holders at the top and simultaneously slide them together.
  - ↳ The ear plugs are positioned on the patient's outer auditory passage.
4. Only for program C1 p.a. and C2 a.p.: Instruct the patient to tilt his head back and open his mouth as far as possible.
5. Instruct the patient to hold this position until the end of the exposure.
  - ↳ The patient is positioned in the unit.

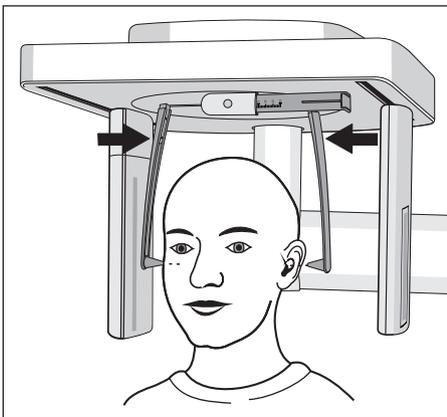


#### 5.1.2.5.5.2 Positioning for C3 lateral exposures

- ✓ The nose support is swiveled upwards.
  - ✓ Push the ear plug holders apart.
  - ✓ The ear plug holders are in a line with the sensor and the secondary diaphragm.
  - ✓ The protective caps for ear plugs 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) keys.  
**CAUTION! The height adjustment motor starts slowly and then increases its speed.**



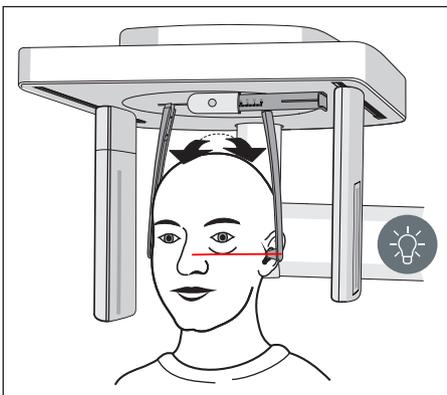
Press and hold down the button until the desired height is reached. The unit movement is accompanied by a beep. Release the height-adjustment buttons once the Cephalometer is at the same height as that of the patient's head.



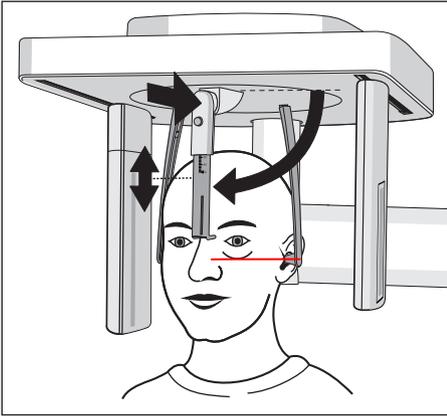
2. Guide the patient backwards between the ear plug holders.
3. Grasp the ear plug holders at the top and simultaneously slide them together.
  - ↳ The ear plugs are positioned on the patient's outer auditory passage.



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 Frankfurt horizontal plane.
6. Correct the patient's head inclination as necessary. Briefly press the up (A) and down (B) height adjustment keys.
  - ↳ The laser line reflects on the upper edge of the outer auditory passage and at the deepest point of the lower eye socket.



7. Optional: Swivel the nose support downward and adjust it in a vertical and horizontal direction, see "Setting/inserting the cephalometer accessories" [→ 35].
  - ↪ 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.

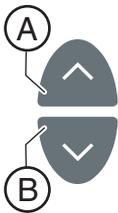
### 5.1.2.5.5.3 Positioning for carpal exposures C4

#### NOTE

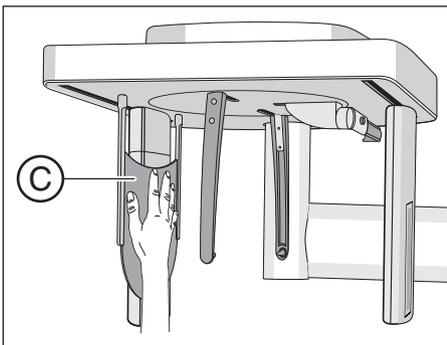
**The patient may press too forcefully against the carpus support plate.**

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 inserted in the unit.
  - ✓ Push the ear plug holders apart.
  - ✓ The ear plug holders are rotated at an angle of 90 degrees towards 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** 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 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 a right-handed arm: The patient's left hand is positioned on the carpus support plate. For a cephalometer with a left-handed arm: 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 in the unit.



### 5.1.2.6 Pediatric exposure

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 radiation exposure resulting from an X-ray examination is to be limited as much as can be accepted with the requirements of medical science (the 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 on 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 Orthophos E:**

- Using the P10 children's panoramic exposures.
  - 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 to panorama layer imaging 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.

### **Optimized X-ray applications**

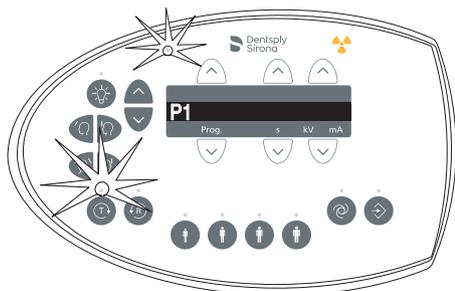
#### **Overview of the options for simplifying X-ray applications for children/adolescents with the Orthophos E:**

- Children and adolescents can often be positioned in a stiller and more stable position if they are seated. The Orthophos E can therefore be brought down for an exposure in the seat to a bite block height of 80 cm.
- To explain the exposure and to alleviate any fears, a radiation-free test cycle can be started at any time.
- The Orthophos E 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 prevent faulty exposures.
- The Orthophos E 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.



1. Press the T key.
  - ↳ The program enters test cycle mode. The LED above the T key lights up. Only the exposure program number appears on the digital display. None of the LEDs above the patient symbol keys light up.
2. Press the exposure 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" [→ 87].

#### **! 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.

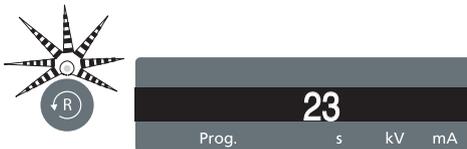
- Wait until the exposure data have been completely transferred. Do not switch the unit off before the X-ray exposure is displayed on the SIDEXIS screen.

**⚠ 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.

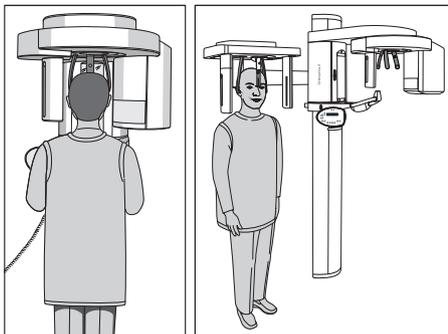


**IMPORTANT**

Premature release of a new exposure is prevented by the automatic exposure blocking function. This function is used for thermal protection of the X-ray tube.

After the release button is pressed, the expiring cooling time in seconds appears on the digital display. If you let go of the release button before the cooling time has expired, the Ready LED above the "R" key also starts flashing. After you press the "R" key, the program data again appears on the digital display.

Another exposure can be released only after the cooling period has elapsed.

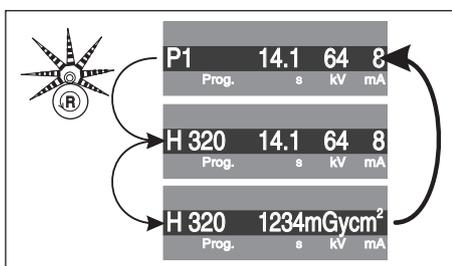
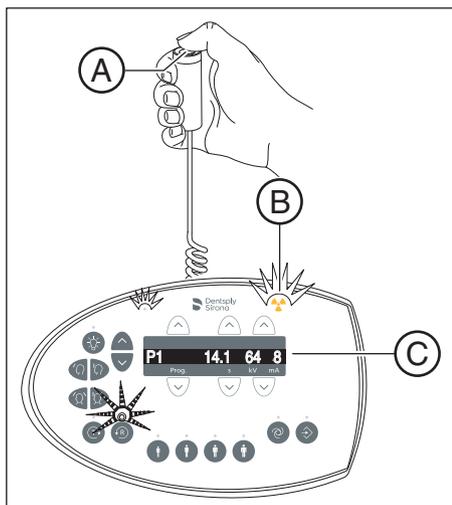


- ✓ The help message H... must not appear alternating on the digital display of the Multipad.  
**Tip:** If the doors of the X-ray room are not properly shut, the message "H321" (Close the door) appears on the digital display of the Multipad and on the remote control.
- ✓ The exposure program, radiation time, and kV/mA values are selected and appear on the digital display C.
- ✓ The patient is positioned in the unit.

**IMPORTANT**

The patient's arms must hang down freely at his/her sides. He/she should not tense or hunch his/her shoulders.

Advise the patient not to move his/her head in any way during the exposure and check to make sure that this does not happen.



1. Press release button **(A)** and hold it down until the end of the exposure.
    - ↳ The exposure is released. The rotary movement of the selected exposure program is performed automatically. During radiation, the optical radiation indicator **B** lights up on the Multipad. In addition, a beep sounds throughout the entire radiation time. Radiation can be released several times during the exposure.
  2. Press and hold release button **A**. Wait until a short pulsed tone sequence sounds (can be deactivated by a service engineer). The exposure is finished when a row of dots and the program number are alternately displayed on the Multipad. The end of the exposure cycle can also be seen on the SIDEXIS monitor, namely when the progress indicator shows 100% and the preview image starts to build up.
    - ↳ The X-ray image is displayed on the PC monitor in SIDEXIS. The forehead and temple supports open automatically.
  3. Let go of release button **(A)**.
    - ↳ The exposure is completed. The confirmation of the exposure data appears on the digital display of the Multipad. The program number, the elapsed radiation time, the tube voltage, the tube current, error/help messages and the dose area product are displayed. The Ready LED above the R key flashes.
  4. Guide the patient out of the unit.
  5. Press the Return key **R** on the Multipad.
    - ↳ Confirmation of the exposure data is acknowledged.
  6. **WARNING! The patient may be injured by moving parts.** Press the Return key **R** on the Multipad again.
    - ↳ The rotating unit moves to the starting position. The Ready LED switches off.
- ↳ The unit is now ready for the next exposure.

<b>TM1.2</b>	<b>12.8</b>	<b>71</b>	<b>8</b>
Prog.	s	kV	mA

With the two-part **exposure program TM 1** two exposures (TM 1.1 and TM 1.2) are prepared.

- ✓ The first temporomandibular joint exposure has been released as described above. The exposure program has changed from TM 1.1 to TM 1.2 on the digital display of the Multipad. 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 released.
- 3. Wait until a short pulsed tone sequence sounds (can be deactivated by a service engineer).
  - ↳ The exposure is finished when a row of dots and the program number alternately appear on the digital display of the Multipad. The end of the exposure cycle can also be seen on the SIDEXIS monitor, namely when the progress indicator shows 100% and the preview image starts to build up. The forehead support and temporomandibular joint supports open automatically.
- 4. Let go of release button **(A)**.
  - ↳ The second exposure is completed. Proceed as described above starting with step 3.

### 5.1.3.3 Data recovery in case of problems with image transfer

In case of an unexpected network error, there may be problems with image transfer from the X-ray components to Sidexis 4.

In this case the system closes the connection after a while and enters the so-called Rescue state. This means that the image is not lost, but is kept in the RAM of the X-ray component by a safety mechanism until it is retrieved by the "Sirona Control Admin Rescue" rescue program. A further exposure with this X-ray unit is blocked until this moment.

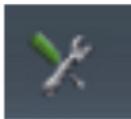
#### CAUTION

The X-ray component may not be switched off during the Rescue state.

If the X-ray unit is switched off, the image is lost and the unit will be ready for operation after the next power on.

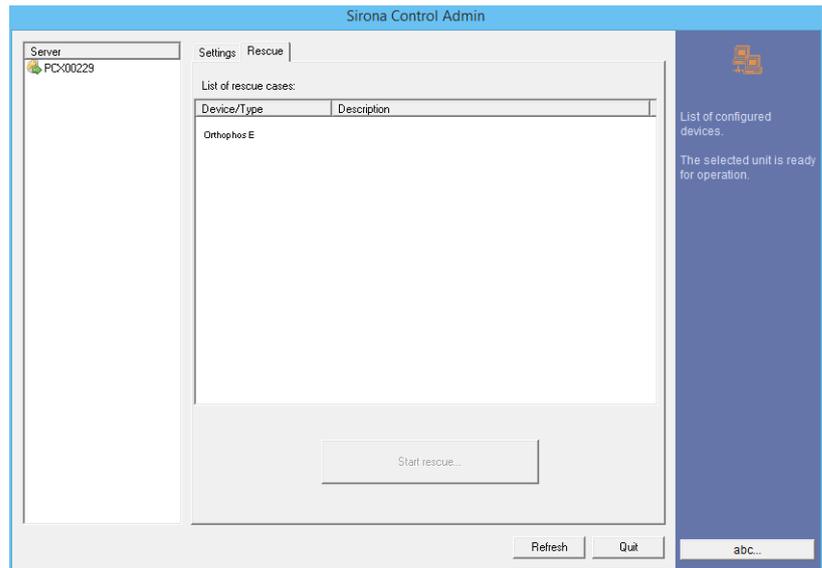
#### 5.1.3.3.1 Starting the "Sirona Control Admin Rescue" program

- ✓ Sidexis 4 is installed.
  - ✓ The workstation software for the corresponding X-ray component is installed on the workstation.
1. Start Sidexis 4.
  2. Open the Sidexis 4 menu "Global tools" by clicking on the corresponding icon in the header line of the software.
    - ↳ The "Global tools" menu opens.
  3. Click on the button "Sidexis Manager" => "Devices" in the structure tree.



Starting the "Sirona Control Admin Rescue" program

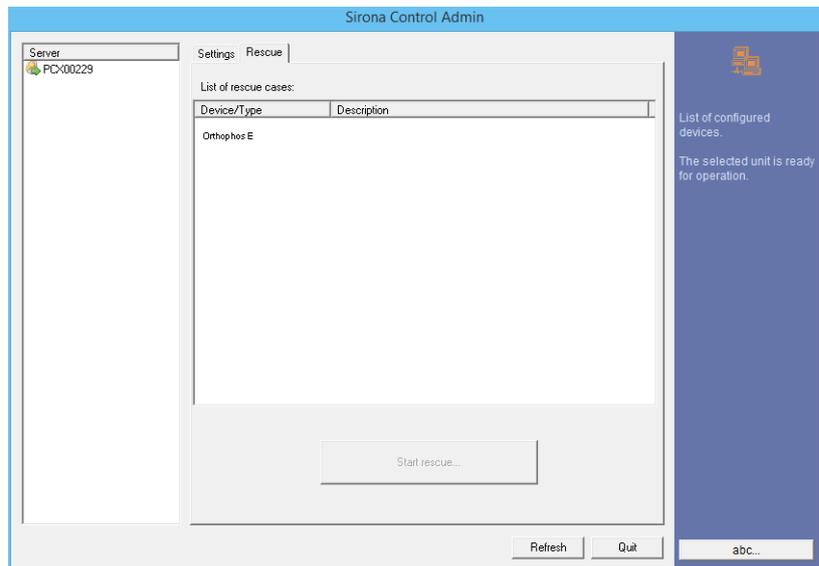
4. Click on the "Sirona Control Admin Rescue" button.



- ↪ The "Sirona Control Admin Rescue" program opens.
- ↪ The program tries to establish a connection to the X-ray component which is in Rescue state. If the X-ray component cannot be located, the network must be checked. Once a connection is successfully established, the X-ray component will be displayed in the list.

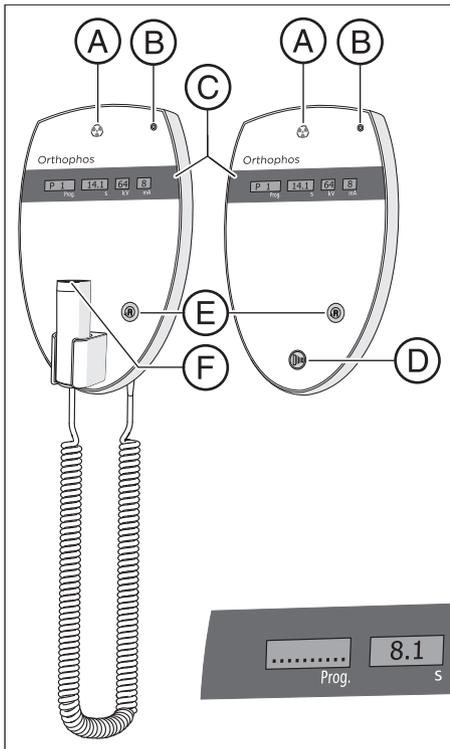
### 5.1.3.3.2 Requesting data

- ✓ The "Sirona Control Admin Rescue" program is opened.



- > Click on the "Start rescue..." button.

### 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.

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

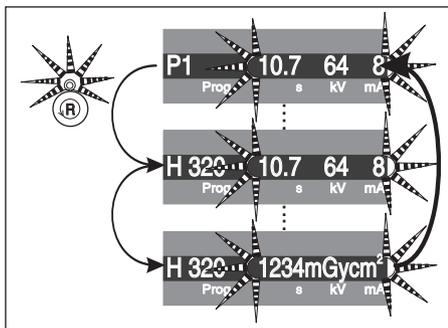
An exposure that has been triggered can be canceled again at any time.

#### 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.  
The confirmation of the exposure data is displayed on the Multipad. The radiation time which has already elapsed, help message H320 and the dose area product are alternately displayed. The LED above the R key flashes.

2. Guide the patient out of the unit.

3. Press the R key.

- ✎ The rotating unit moves to the starting position.
- ✎ The unit is now 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 basic settings

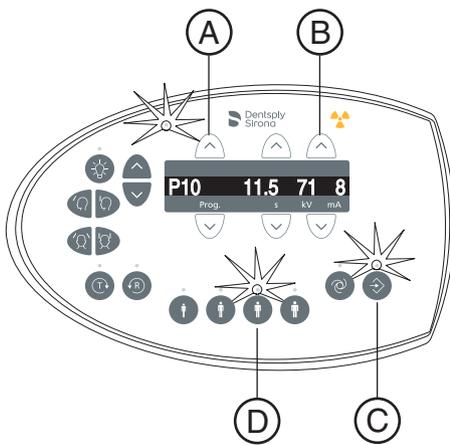
### 5.2.1 Changing the basic settings and start settings

#### 5.2.1.1 Reprogramming the kV/mA values

The factory-programmed kV/mA combinations for each preselected exposure program and for each individual patient symbol key can be overwritten (reprogrammed).

#### IMPORTANT

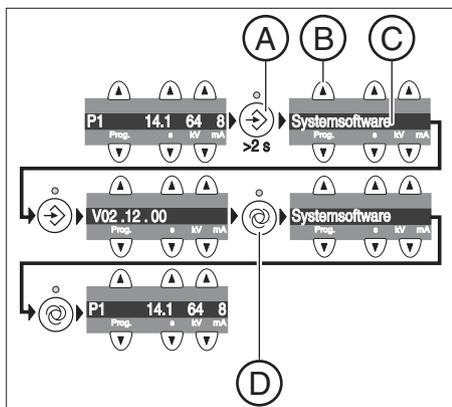
If no entry is made for a period of time exceeding 5 seconds during the programming procedure, the programming mode is automatically terminated without saving any of the changes previously entered.



1. Select the exposure program for which the values are to be changed. Press the program selection keys **(A)** forward/backward.
  - ↳ The desired program is displayed.
2. Briefly press the Memory key **(C)**.
  - ↳ The LED above the Memory key lights up.
3. Select the patient symbol corresponding to the kV/mA value you want to change. Press the desired patient symbol key **(D)**.
  - ↳ The LED above the patient symbol key lights up.
4. Set the new kV/mA value. Push the kV/mA keys **(B)** forward and backward.
  - ↳ The desired kV/mA value is displayed.
5. Save the setting. Briefly press the Memory key **(C)**.
  - ↳ The LED above the Memory key briefly flashes and then switches off. The program display jumps back to P1 for PAN programs or C3 for Ceph programs.
  - ↳ The new kV/mA value is programmed.

### 5.2.1.2 Activating the Info menu

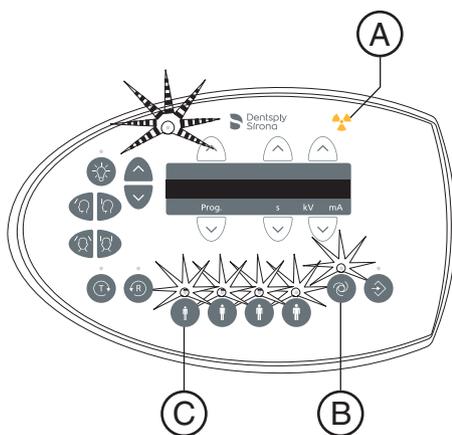
The Info menu lists device data that are useful for any discussions with your service engineer.



1. Press and hold the Memory key **(A)** for at least 2 seconds.
  - ↳ The Info menu appears on the digital display **(C)**.
2. Select the individual parameters from the list. Press the program selection keys **(B)** forward/backward.
  - ↳ The desired parameter is displayed.
3. Briefly press the Memory key **(A)**.
  - ↳ The value selected for the parameter is displayed.
4. Press the service menu key **(D)** briefly.
  - ↳ The list of parameters is displayed.
5. Press the service menu key **(D)** briefly.
  - ↳ The Info menu is terminated. The unit displays exposure readiness.

### 5.2.1.3 Activating the service menu

The service menu is intended exclusively for service engineers.



1. Press and hold the service menu key **(B)** for at least 2 seconds.
  - ↳ The LED above the service menu key **(B)** lights up, followed by the LEDs above all patient symbol keys **(C)**. The ready-for-operation LED **(A)** flashes.
2. Enter the PIN.
  - ↳ The service menu is opened.
  - NOTE:** If an incorrect PIN is entered or no entry is made within 5 seconds, the program then returns to exposure readiness.
3. Press the service menu key briefly **(B)**.
  - ↳ The service menu is terminated. The unit displays exposure readiness.

## 6 Service

### 6.1 Cleaning and care

#### 6.1.1 Cleaning

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

#### NOTE

**When cleaning or disinfecting, liquids may enter the unit or the release button via the ventilation slots.**

Electrical components of the system can be destroyed by liquids.

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

#### 6.1.2 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 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](http://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 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

REF 59 70 905

### 6.1.3 Sterilization

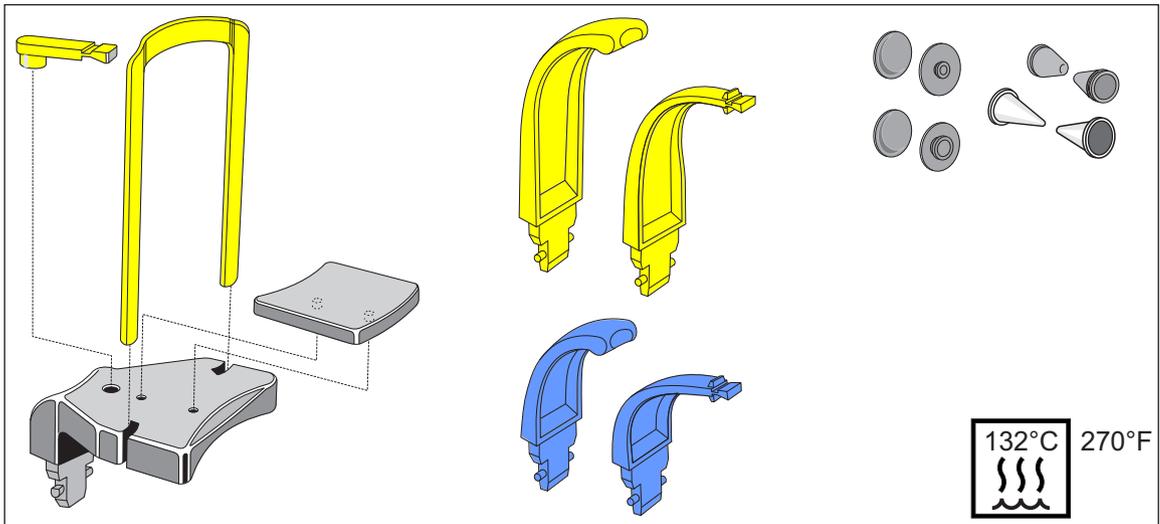
#### **WARNING**

**Infections can be transmitted from patient to patient.**

Accessories that are not sterilized correctly can cause illness in patients.

- > All accessories that are suitable for sterilization should only be sterilized in an autoclave at 132 °C (270 °F), with at least 4 minutes holding time and at 2.1 bar (30.5 psi) overpressure.

The following accessories can be sterilized:



In addition, also use the hygienic protective sleeves; see 'Hygienic protective sleeves' [→ 31].



#### **WARNING**

**The hygienic protective sleeves are single use devices.**

Contaminated hygienic protective sleeves can cause illness in patients.

- > Replace the hygienic protective sleeves after each patient.

## 6.2 Inspection and maintenance

Inspection and preventive maintenance 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 10 961 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.

### Worldwide: Quality inspection

If a unit defect cannot be ruled out in the event of an image that cannot be evaluated, it is imperative a quality inspection is performed by an authorized service technician.

**Germany:  
Constancy test**

**Unit:**

Please note the legally required regular checks of the image quality of your X-ray device as stipulated in your country (e.g. the German Radiation Protection Ordinance). Dentsply Sirona provides you with the Sidexis software 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 the event of a constancy test that cannot be evaluated, the unit must be taken out of service. In this case, contact an authorized dealer.

**Diagnostic monitor:**

In Germany, a regular constancy test of the results 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.

**Country-specific requirements**

Observe any possible additional country-specific requirements.

## 7 Malfunctions

### 7.1 Help messages

When working with the unit, auxiliary messages are displayed for certain actions (e.g. press H301 for the return key), which call for the user to perform a specific action. These auxiliary messages are listed below. If an error occurs, error messages are output starting with "E" followed by 5 digits, see "Error description" [→ 98].

- ✓ The unit is switched on and ready for operation.
- 1. Press the 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.

#### H320 – R button, confirm exposure data

The exposure data have not been acknowledged yet.

- > Press the R key.
  - ↳ Exposure data are 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.

#### H401 – Plug sensor into PAN slot

The sensor is not in the appropriate slot for the selected exposure type.

- > Plug the sensor into the PAN sensor slot.
  - ↳ The program sequence is continued.

#### H402 – Plug sensor into Ceph slot

The sensor is not in the appropriate slot for the selected exposure type.

- > Plug the sensor into the Ceph sensor slot.
  - ↳ The program sequence is continued.

#### H403 – Switch SIDEXIS to ready for exposure state

SIDEXIS is not ready for exposure.

- > Switch SIDEXIS to a ready-for-exposure state; see the SIDEXIS user manual.

#### H404 – Plug in Ceph sensor

The sensor does not match the selected exposure type.

- > Plug the sensor into the Ceph sensor slot.
  - ↳ The program sequence is continued.

#### 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 – Get existing exposure

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 SiRescue.

- > Never switch off the unit before transferring the images to SIDEXIS with SiRescue.

- > Save the exposure using SiRescue. Refer to SIDEXIS manual for users.
  - ↳ 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 – Unassigned

#### 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

71 – Multipad 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, DX11 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 – Sensor

91 – Ceph digital

## 8 Program values

### 8.1 Panoramic exposure

#### Index 4A

Index 4A, which specifies a reduced level series for children and adolescents, must be complied with as a minimum requirement in all new installations and systems moved from one location to another in the Federal Republic of Germany since January 1, 1999. Furthermore, this level series can also be applied worldwide. National regulations must be complied with. The exposure times indicated represent the corresponding maximum.

Slight deviations in time may result from the selection of temple width.

#### Level series for code 4A

Program	Program duration approx.	Max. exposure time	Factory setting				User-defined values – Please enter here –			
										
P1	19s	14.1s	62/8	64/8	69/15	73/15				
P1L	12.9s	8.0s	62/8	64/8	69/15	73/15				
P1R	12.9s	8.0s	62/8	64/8	69/15	73/15				
P1A	21.8s	14.1s	62/8	64/8	69/15	73/15				
P1C	20.1s	14.1s	62/8	64/8	69/15	73/15				
P10	16.4 s	11.5s	62/8	64/8	69/15	73/15				
P12	18.0 s	4.9s	71/8	77/7	80/14	84/13				
BW1	23.0s	8.8s	62/8	64/8	69/15	73/15				
TM1.1+ TM1.2	16.1+ 16.1s	6.4+6.4s	68/8	71/8	73/15	77/14				
S1	19.8s	14.4s	71/8	77/7	80/14	90/12				
MS1	57.3 s	21.7s	73/8	77/7	80/14	84/13				

#### Possible kV/mA combinations with preselected patient symbols 1 and 2 for index 4A

kV	60	60	60	60	60	62	64	66	68	71	73	77	80	85	90
mA	3	5	6	7	8	8	8	8	8	8	8	7	7	6	6

#### Possible kV/mA combinations with preselected patient symbols 3 and 4 for index 4A

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

### Index 2A

This level series 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.

Slight deviations in time may result from the selection of temple width.

#### Level series for index 2A

Program	Program duration approx.	Max. exposure time	Factory setting				User-defined values – Please enter here –			
										
P1	19s	14.1s	62/8	64/8	68/8	73/8				
P1L	12.9s	8.0s	62/8	64/8	68/8	73/8				
P1R	12.9s	8.0s	62/8	64/8	68/8	73/8				
P1A	21.8s	14.1s	62/8	64/8	68/8	73/8				
P1C	20.1s	14.1s	62/8	64/8	68/8	73/8				
P10	16.4 s	11.5s	62/8	64/8	68/8	73/8				
P12	18.0 s	4.9s	71/8	77/7	80/7	85/6				
BW1	23.0s	8.8s	62/8	64/8	68/8	73/8				
TM1.1+ TM1.2	16.1+ 16.1s	6.4+6.4s	68/8	71/8	73/8	77/7				
S1	19.8s	14.4s	71/8	77/7	80/7	90/6				
MS1	57.3 s	21.7s	73/8	77/7	80/7	85/6				

#### Possible kV/mA combinations for index 2A

kV	60	60	60	60	60	62	64	66	68	71	73	77	80	85	90
mA	3	5	6	7	8	8	8	8	8	8	8	7	7	6	6

### Index 1A

As of 01/01/1999, this level series is no longer admissible in the Federal Republic of Germany. The exposure times indicated represent the corresponding maximum.

Slight deviations in time may result from the selection of temple width.

#### Level series for code 1A

Program	Program duration approx.	Max. exposure time	Factory setting				User-defined values – Please enter here –			
P1	19s	14.1s	62/16	64/16	69/15	73/15				
P1L	12.9s	8.0s	62/16	64/16	69/15	73/15				
P1R	12.9s	8.0s	62/16	64/16	69/15	73/15				
P1A	21.8s	14.1s	62/16	64/16	69/15	73/15				
P1C	20.1s	14.1s	62/16	64/16	69/15	73/15				
P10	16.4 s	11.5s	62/16	64/16	69/15	73/15				
P12	18.0 s	4.9s	71/15	77/14	80/14	84/13				
BW1	23.0s	8.8s	62/16	64/16	69/15	73/15				
TM1.1+ TM1.2	16.1+ 16.1s	6.4+6.4s	69/15	71/15	73/15	77/14				
S1	19.8s	14.4s	71/15	77/14	80/14	90/12				
MS1	57.3 s	21.7s	73/15	77/14	80/14	84/13				

#### Possible kV/mA combinations with preselected patient symbols 3 and 4 for index 1A

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 Cephalometric exposures

The radiation time ranges from 9.1s to max. 14.9s.

### Level series for cephalometric exposures

Program	Max. exposure time	Factory setting				User-defined values – Please enter here –			
									
C1	9.1s	80/14	80/14	84/13	90/12				
C2	9.1s	80/14	80/14	84/13	90/12				
C3	9.4s	73/15	73/15	77/14	84/13				
C3 30 x 23	14.9s	73/15	73/15	77/14	84/13				
C4	9.1s	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

## 8.3 Dose information

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.

### 8.3.1 Dose area product parameters for Panorama images

The dose area product (DAP) values were measured in a CT ionization chamber.

#### Dose level series index 4A (8 mA/16 mA series)

Specification of the dose area product (DAP/absorbed dose) for panoramic views, temporomandibular joint (TMJ) views and sinus views

Program	Maximum effective radiation time	Factory-programmed values							
		 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>
P1	14.2s	62/8	64	64/8	68	69/15	147	73/15	164
P1L	8.0s	62/8	36	64/8	39	69/15	83	73/15	92
P1R	8.0s	62/8	36	64/8	39	69/15	83	73/15	92
P1A	14.2s	62/8	64	64/8	68	69/15	147	73/15	164
P1C	14.2s	62/8	64	64/8	68	69/15	147	73/15	164
P10	11.6 s	62/8	33	64/8	35	69/15	75	73/15	83
P12	4.9s	71/8	29	77/7	30	80/14	63	84/13	63
BW1	8.8s	62/8	20	64/8	21	69/15	46	73/15	51
TM1.1+TM1.2	6.4+6.4s	68/8	69	71/8	75	73/15	147	77/14	151
S1	14.4s	71/8	85	77/7	87	80/14	185	90/12	192
MS1	21.7s	73/8	135	77/7	131	80/14	280	84/13	282

### Dose level series index 2A (8 mA series)

Specification of the dose area product (DAP/absorbed dose) for panoramic views, temporomandibular joint (TMJ) views and sinus views

Program	Maximum effective radiation time	Factory-programmed values							
		 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>
P1	14.2s	62/8	64	64/8	68	68/8	77	73/8	89
P1L	8.0s	62/8	36	64/8	39	68/8	43	73/8	50
P1R	8.0s	62/8	36	64/8	39	68/8	43	73/8	50
P1A	14.2s	62/8	64	64/8	68	68/8	77	73/8	89
P1C	14.2s	62/8	64	64/8	68	68/8	77	73/8	89
P10	11.6 s	62/8	33	64/8	35	68/8	39	73/8	45
P12	4.9s	71/8	29	77/7	30	80/7	32	84/6	30
BW1	8.8s	62/8	20	64/8	21	68/8	24	73/8	28
TM1.1+TM1.2	6.4+6.4s	68/8	69	71/8	75	73/8	79	77/7	77
S1	14.4s	71/8	85	77/7	87	80/7	94	90/6	98
MS1	21.7s	73/8	135	77/7	131	80/7	142	84/6	134

### Dose level series index 1A (16 mA series)

Specification of the dose area product (DAP/absorbed dose) for panoramic views, temporomandibular joint (TMJ) views and sinus views

Program	Maximum effective radiation time	Factory-programmed values							
		 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>
P1	14.2s	62/16	128	64/16	134	69/15	147	73/15	164
P1L	8.0s	62/16	72	64/16	75	69/15	83	73/15	92
P1R	8.0s	62/16	72	64/16	75	69/15	83	73/15	92
P1A	14.2s	62/16	128	64/16	134	69/15	147	73/15	164
P1C	14.2s	62/16	128	64/16	134	69/15	147	73/15	164
P10	11.6 s	62/16	65	64/16	68	69/15	75	73/15	83
P12	4.9s	71/15	53	77/14	58	80/14	63	84/13	63
BW1	8.8s	62/16	40	64/16	42	69/15	46	73/15	51
TM1.1+TM1.2	6.4+6.4s	69/15	132	71/15	139	73/15	147	77/14	151
S1	14.4s	71/15	158	77/14	172	80/14	185	90/12	192
MS1	21.7s	73/15	251	77/14	259	80/14	280	84/13	282

### 8.3.2 Dose area product parameters for Ceph-images

The ceph exposure values were measured with a semiconductor detector, as very low dose values are hard to measure in a CT ionization chamber.

Specification of the dose area product (DAP/absorbed dose) for lateral, a.p., p.a. and carpus views

Program	Max. exposure time	Factory-programmed values							
		 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>	 kV/mA	DAP mGycm <sup>2</sup>
C1	9.1s	80/14	24	80/14	24	84/13	25	90/12	26
C2	9.1s	80/14	24	80/14	24	84/13	25	90/12	26
C3	9.4s	73/15	22	73/15	22	77/14	23	84/13	26
C3F 30x23	14.9s	73/15	35	73/15	35	77/14	37	84/13	40
C4	9.1s	64/16	16	64/16	16	64/16	16	64/16	16

### 8.3.3 Calculate dosage

**For any freely programmed parameter combinations, you must calculate the value using the kV/DAP lists; see sample calculation:**

#### Explanation

The Radiation Protection Ordinance requires that the system must include either devices that show the DAP display for the radiation exposure of the patient, or that this information can be derived e.g. from tables.

The manufacturers of dental equipment have agreed on using the same measurement method. 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 specified as the dose area product (DAP) of the absorbed dose ( $\text{Gy} \times \text{cm}^2$ ) per mAs for each unit as well as each selectable kV level and diaphragm.

#### Calculation:

The values indicated below have been calculated for the parameter combinations proposed by Dentsply Sirona. If other settings are used, with the help of kV/DAP lists, proceed as follows:

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 parameter combination of 60 kV/8 mA

Ad 1. 60 kV has a DAP factor of 0.52 in diaphragm 10

Ad 2. 8 mA displayed

Ad 3. the exposure time is 14.1 s

$$DFP = 0,52 \frac{\text{mGy}\text{cm}^2}{\text{mAs}} \times 8\text{mA} \times 14,1\text{s} = 58,66\text{mGy}\text{cm}^2$$

### 2D-images

kV	DAP factor Programs P1/P12/TM/S/MS1 (mGy x cm <sup>2</sup> /mAs)	DAP factor program P10 (mGy x cm <sup>2</sup> /mAs)	DAP factor Program BW1 (mGy x cm <sup>2</sup> /mAs)	DAP factor program C1-C4 (mGy x cm <sup>2</sup> /mAs)
60	0.52	0.32	0.26	0.10
62	0.56	0.35	0.28	0.11
64	0.60	0.37	0.30	0.12
66	0.64	0.40	0.32	0.13
68	0.68	0.42	0.34	-
69	0.69	0.43	0.35	0.14
71	0.74	0.46	0.37	0.15
73	0.78	0.48	0.39	0.16
77	0.86	0.54	0.43	0.17
80	0.93	0.58	0.47	0.19
84	1.00	0.62	0.50	0.21
85	1.03	0.64	0.52	-
90	1.13	0.70	0.57	0.24

## 9 Dismantling and disposal

### IMPORTANT

Please export all test reports that require safekeeping before dismantling the device.

### 9.1 Dismantling and reinstallation

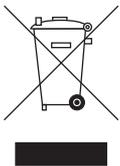
When dismantling and reassembling the unit, proceed according to the installation instructions for new installation in order to guarantee its functioning and stability.

The X-ray unit must be recalibrated whenever structural alterations in the area surrounding the X-ray room or new installations have been performed.

### 9.2 Disposal

Please observe the notices in the chapter "Important information for repacking and transport".

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 03.24.2006.



#### 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 old electronic and electrical devices.

If you wish to dispose of your devices, please proceed as follows:

#### In Germany

To initiate return of the electrical device, 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](http://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](mailto: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 dealers.

The X-ray tube assembly for this product contains an X-ray tube with a potential implosion hazard, a small amount of beryllium, a lead lining, and mineral oil.

The unit contains counterbalancing weights made of lead.

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

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