# schick

CDR PanElite

Operating Instructions
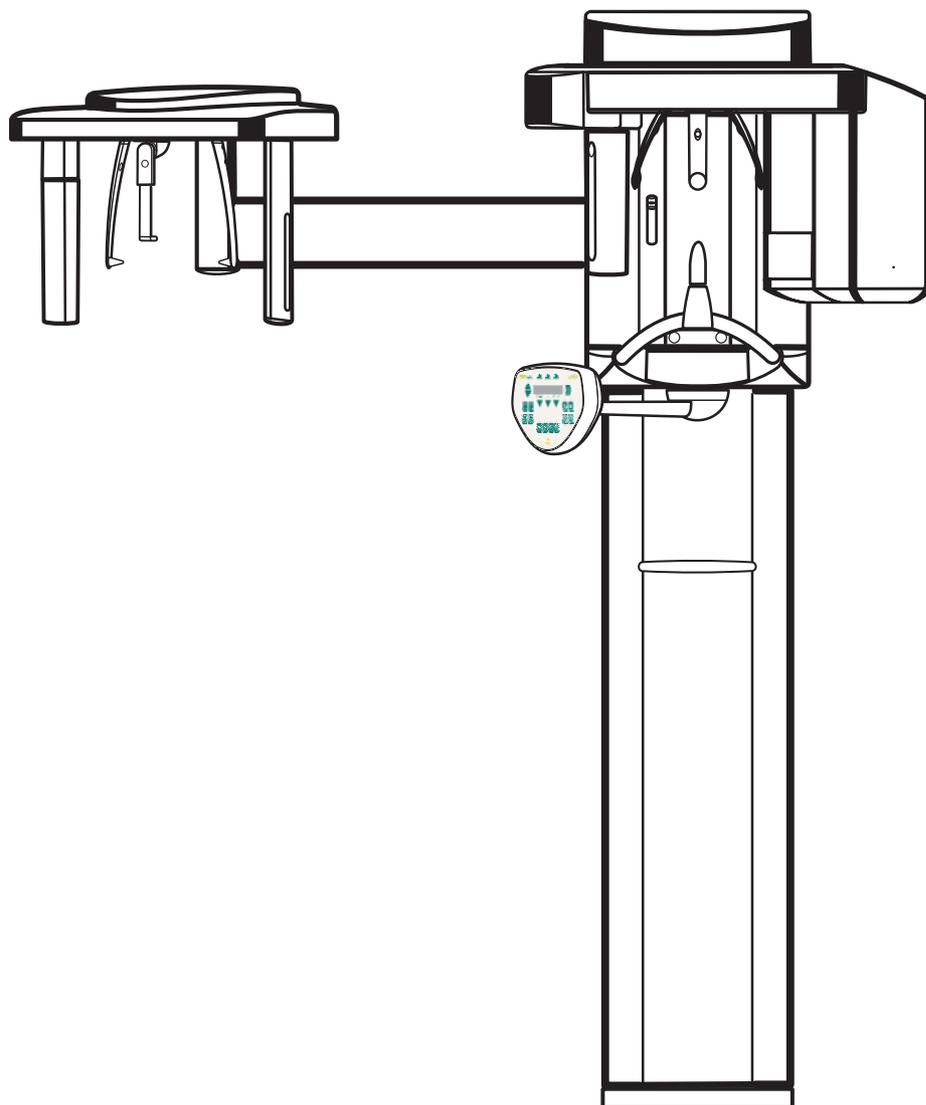
■ General information

Dear customer,

We thank you for purchasing your CDR PanElite panoramic X-ray unit from Schick Technologies, Inc.

This system enables you to take standard views (jaw area), sinus views (maxillary sinuses) and temporomandibular joint views using digital imaging technology.

If the system is equipped with a cephalometer arm, you can furthermore take cephalometric images using digital imaging technology.

The **technical documentation** supplied is also part of the product. Keep these documents handy at all times .

Please complete the attached **"Installation Report"** together with the service engineer immediately after the installation of your unit.

Please familiarize yourself with the unit by reading through these **Operating Instructions** before taking any patient exposures. Make sure to always observe the valid **radiation protection regulations** and **warnings**.

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

Your **CDR PanElite** Team

Maintenance

In the interest of the safety and health of patients, users and third persons, inspection and preventive maintenance must be performed at predetermined intervals to ensure the operational reliability and functional safety of your product (IEC 601-1 / DIN EN 60601-1, etc.).

The owner must ensure that all inspections and maintenance events take place.

If the system owner fails to have inspections and maintenance work carried out or ignores error messages, Schick Technologies, Inc. and its authorized dealers cannot assume any liability for resulting damage.

■ Contents

1 Warning and safety information

1.1 General safety information

Identification of warning and safety information

To prevent any personal injury or material damage, please observe the warning and safety information provided in the present operating instructions. They are highlighted by the caption **NOTE**, **CAUTION** or **WARNING**.

Symbols used

⚠ Observe accompanying documents (on name plate)

Intended use

This system is intended for generating panoramic or cephalometric X-ray images.

This system must not be used in areas subject to explosion hazards.

Maintenance and repair

As manufacturers of electromedical equipment we can assume responsibility for safety-related performance of the equipment only if **maintenance and repair** are carried out only by us or agencies we have authorized for this purpose, and if components affecting safe operation of the unit are replaced with **original spare parts**.

We suggest that you request a certificate showing the nature and extent of the work performed from those who carry out such work; it must contain any changes in rated parameters or working ranges (if applicable), as well as the date, the name of the company and a signature.

Modifications to the system

Modifications to this system which could impair the safety of operators, patients or third persons are prohibited by legal provisions!

For reasons of product safety, this product may be operated only with original Schick Technologies accessories or accessories manufactured by third parties expressly approved by Schick Technologies. The user is responsible for dangers resulting from the use of non-approved accessories.

Combination with other equipment

Permissible combinations are defined by the system administrator in the declaration of conformity.

The declaration of conformity is included with the technical documents.

Ventilation slots

Under no circumstances may the ventilation slots on the unit be covered, since otherwise the air circulation will be obstructed.

Do not spray disinfectants or other similar products into the ventilation slots.

X-rays of patients

X-rays of patients must be taken only when the system works without errors.

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

The movements of the unit must not be obstructed by physical constitution nor clothing, dressings, wheelchairs or hospital beds!

Do not leave the patient unattended in the unit.

Electromagnetic compatibility (EMC)

The CDR PanElite complies with the requirements of IEC 60601-1-2:2001.

Medical electrical devices are subject to special precautionary measures regarding EMC. They must be installed and operated as specified in the document "Installation Requirements".

Portable and mobile HF communication devices can influence medical electrical equipment. The use of mobile telephones in the practice or hospital area therefore must be prohibited.

Please also observe the ESD protective measures in Chapter 1.2.

Removing the sensor

To remove the sensor, hold it firmly, press the pushbutton (9) **all the way** in and hold it down. Remove the sensor from its holder by pulling it downward.
DO NOT DROP THE SENSOR!
A shock sensor for detecting shocks or dropping is built in.
When removing the sensor, and also with an already removed sensor, make sure not to touch the sensor plug on the unit end, especially not while touching the patient at the same time.

Precautionary measures when switching on the unit

Following extreme temperature fluctuations, condensation may occur; therefore please do not switch on the system until it has reached normal room temperature (see chapter "Technical Description").

No patient may be positioned in the unit during power-on.

In case of an error that requires switching off and subsequent switching on of the unit, the patient must be removed from the unit before switching it on again at the latest!

Emergency Stop

If parts of the unit contact the patient during the rotational movement (PAN exposure) or during the scan movement (cephalometric exposure), release the exposure switch (X-Ray) immediately and stop the unit by actuating the unit's main switch or an Emergency Stop switch!

Disturbance of electronic devices worn on the patient's body.

To prevent the malfunctioning of electronic devices and data storage devices, e.g. radio-controlled watches, telephone cards, etc., these objects must be removed prior to X-raying.

Radiation protection

The valid radiation protection regulations must be observed.

The operator should move as far away from the X-ray tube assembly as allowed by the coiled cable of the exposure switch. The statutory radiation protection equipment must be used.

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

In case of malfunctions, interrupt the exposure immediately by releasing the exposure switch.

Hygiene information

The protective covers must be exchanged for each new patient and the sterilizable accessories must be sterilized to prevent any transmission of infective agents which might cause serious illnesses.

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

Dismantling and reassembly

For dismantling and reassembly of the device, proceed according to the Installation Instructions for new installation in order to guarantee the operability and stability of the system.

Disposal

It generally applies that any disposal of this product must comply with the relevant national regulations. Please observe the regulations applicable in your country.

Within the European Economic Community, Council Directive 2002/96/EU (WEEE) requires environmentally sound recycling/disposal of electrical and electronic devices.

Your product is marked with the adjacent symbol. Disposal of your product with domestic
refuse is not compatible with the objectives of environmentally sound recycling/disposal.
The black bar underneath the "garbage can" symbol means that it was put into circulation after Aug. 13, 2005. (see EN 50419:2005)

Please note that this product is subject to Council Directive 2002/96/EU (WEEE) and the applicable national law of your country and must be recycled or disposed of in an environmentally sound manner.

The X-ray tube assembly of this product contains a 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.

Please contact your dealer if final disposal of your product is required.

**Laser light
localizer used**

The system contains Class 1 laser products.

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

A minimum distance of 100 mm between the eye and the laser is required. Do not stare into the beam. Safe operation is described in chapter "6.2 Positioning the patient".

The light localizers must be switched on only when they work properly and without errors. Repair work must be carried out by authorized staff only.

CAUTION

Federal Law (USA) restricts sale of this device to or on the order of a physician, dentist or licensed practitioner.

1.2   ESD protective measures

ESD is the abbreviation for **E**lectro**S**tatic **D**ischarge.

⚠ *CAUTION*

*Connector pins or sockets bearing ESD warning labels must not be contacted or interconnected **without ESD protective measures**.*
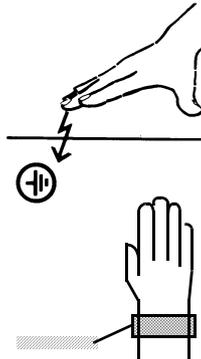
ESD protective measures include:

- Procedures for preventing electrostatic charges (e.g. via air conditioning, air moistening, conductive floor coverings and nonsynthetic clothing)
- Discharging the electrostatic charges of your own body on the frame of the UNIT, the protective ground wire or large metallic objects
- Connecting yourself to ground using a wrist band.

We therefore recommend that all persons working with this system be instructed on the significance of this warning label. Furthermore, they also should receive training in the physics of electrostatic discharges which can occur in the practice and the destruction of electronic components which may result if such components are contacted by electrostatically charged USERS.

The content of this training is specified in Chapter 1.3.

1.3   Concerning the physics of electrostatic charges

ESD is the abbreviation for **E**lectro**S**tatic **D**ischarge. Electrostatic discharge must be preceded by electrostatic charging.
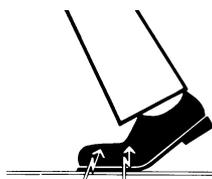
Static electric charges generally occur whenever two bodies are rubbed against each other, e.g. when walking (shoe soles against the floor) or driving a car (tires against the street pavement). The amount of the charge depends on several factors:

I.e. the charge is higher with a low air humidity than with a high air humidity and higher with synthetic materials than with natural materials (clothing, floor coverings).

The following rule of thumb can be applied to gain an overview of the compensating voltages resulting from an electrostatic discharge.

An electrostatic discharge is:

- perceptible at 3000V or higher
- audible at 5000V or higher (cracking, crackling)
- visible at 10,000V or higher (arc-over)

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

1 nanosecond = 1 / 1,000,000,000 second = 1 billionth of a second
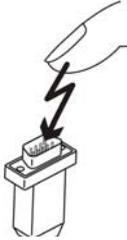
Voltage differences exceeding 30,000 volts per centimeter may lead to a charge compensation (electrostatic discharge, lightning, arc-over).

Integrated circuits (logical circuits and microprocessors) are used in order to enable a wide variety of functions in a dental/X-ray system. 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 layer thicknesses with a magnitude of several ten thousandths of a millimeter.

It is obvious that integrated circuits which are connected to plugs leading outside of the unit via cables are sensitive to electrostatic discharge. Even voltages which are imperceptible to the user can cause breakdown of the layers, thus leading to a discharge current which melts the chip in the affected areas. Damage to individual integrated circuits may cause malfunction or failure of the system.

To prevent this from happening, the ESD warning label next to the plug warns of this hazard.

2 Technical description

Model designation	CDR PanElite
Nominal voltage:	200 – 240 VAC
Permissible deviation:	±10%
Permissible drop under load:	10%
Nominal current:	12 A
Nominal power output:	2 kW at 90 kV / 12 mA with all radiation times
Nominal frequency:	50/60Hz
Internal line impedance:	max. 0.8Ohm
Main building fuse:	25A slow-blow (16A with single connection)
Power consumption:	2 kVA
Power output of tube assembly:	90 kV / 12 mA = 1080 W with all radiation times
Tube voltage:	60 – 90kV (at 90 kV max. 12 mA)
Tube current:	3 –16mA (at 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 ≤ 4kV
Program duration:	see Chapter 9
Exposure time:	see Chapter 9
Image acquisition scale:	For P1, normal dental arch (slice midportion) approx. 1:1.19, i.e. the acquired image is magnified by approx. 19% on average compared to reality.
Exposure time for cephalometry	max. 14.9 s
Total filtration of X-ray tube assembly	> 2.5 Al / 90 IEC 522
Focal spot size acc. to IEC 336, measured in the central X-ray beam:	0.5mm
Marking of focal spot:	
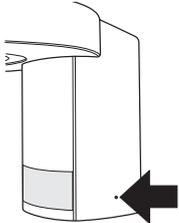
Automatic exposure lockout (see page 42):	The duration of automatic exposure lockout (cooling period) depends on the set **kV/mA** level and the actual exposure time. Depending on the tube loading, a pause duration of 8s to 300s is automatically set by the system.
	Example: For program P1 with 80kV/14mA as exposure parameters and a radiation time of 14.2s, the resulting pause duration is 255s.
Class I equipment Degree of protection against electric shock:	Type B equipment
Degree of protection against ingress of water:	Ordinary device (without protection against ingress of water)
Year of manufacture	(on the name plate) **20xx**
Mode of operation:	Continuous operation
Long-term output:	100W
Anode material:	Tungsten
Exposure parameters for determining leakage radiation:	1,1mA / 90kV
Transport and storage temperature:	-10°C – +70°C (14°F – 158°F)
Air humidity:	10% – 95%
Admissible operating temperature:	Acc. to IEC 601-1 between +10°C and +40°C (50°F – 104°F)

Panoramic images:

Sensor (image receptor):

Pan sensor type:	Digital CCD line sensor, repluggable for panoramic exposure technique
Active sensor area, Pan type:	138 x 6.48 mm
Detail resolution:	0.027mm pixel size
Focus-sensor distance for Pan:	497mm

Cephalometric exposures:

Sensor (image receptor):

Ceph sensor type:	Digital CCD line sensor, repluggable for panoramic or ceph exposure technique
Active sensor area, Ceph type:	230mm x 6.48mm
Detail resolution:	0.027mm pixel size
Focus-sensor distance for Ceph:	1714mm

X-ray tube: **SR 90 / 15 from Siemens
                                                                     or
                                                                     OCX 100 CEI**

Minimum requirements for PC systems:

Hard disk: > 4 GB / database
                                                    > 50 MB / CDR DICOM installation

RAM: min. 256 MB

Drives: CD-ROM
                                                    MOD drive, min. 640 MB (once per system / network)

Operating system: Windows 2000 Professional, Windows XP Professional

Graphic system: Min. resolution 1024x768 pixels, min. color depth 8 bits

Network: 10 / 100 MBit Ethernet

Communication interface: RJ45 for LAN cable

CDR PanElite complies with IEC 601-2-28 / 1993

CDR PanElite complies with IEC 601-1-3 / 1994

CDR PanElite complies with IEC 601-2-7 / 1998

Original language: English

Manufacture   Sirona Dental Systems GmbH

                                                   Fabrikstraße 31

                                                   64625 Bensheim

                                                   Germany

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

Cooling curve of tube housing

HUx10^4 1HU = 1.35 Joule
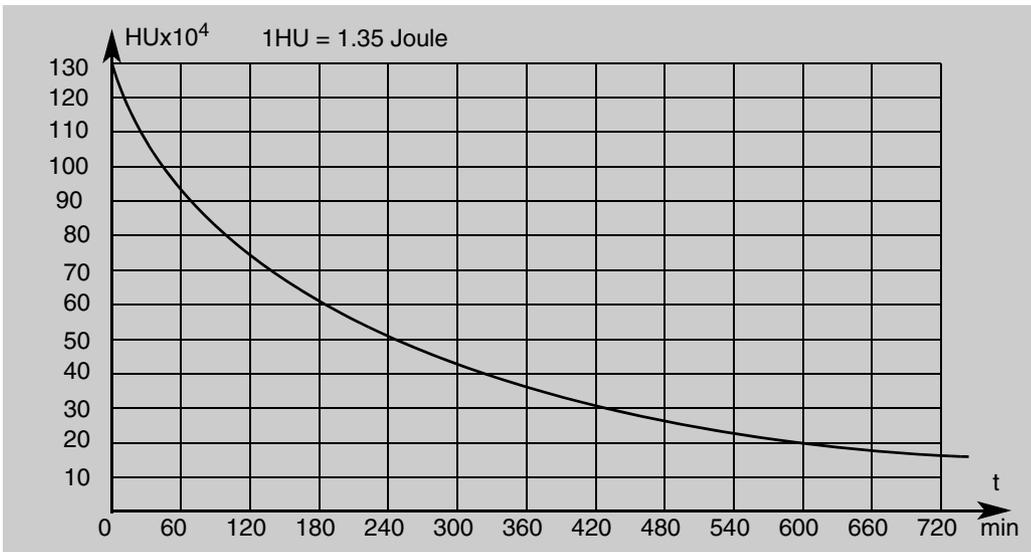
Cooling curve of X-ray tube

SR 90/15

HUx10^3 1HU = 1,35 Joule

OCX 100

HUx10^3 1HU = 1,35 Joule
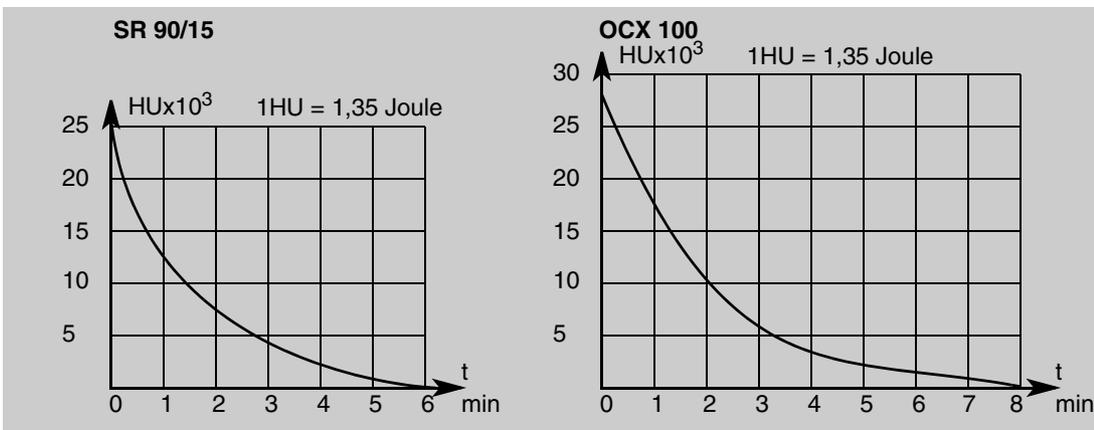
Heating curve of tube housing

HUx10^4 1HU = 1.35 Joule
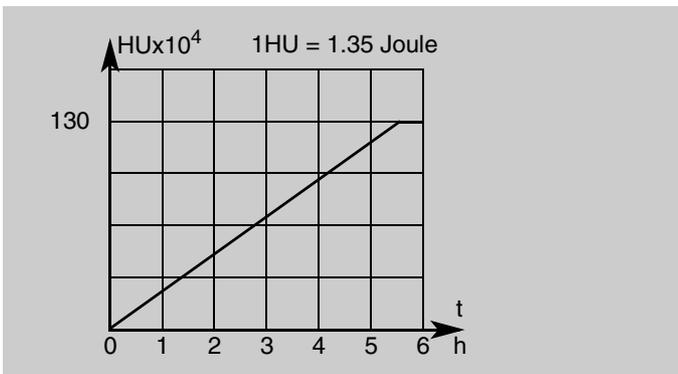
**Central X-ray beam / anode angle**

Central X-ray beam

7°

Anode angle

10°
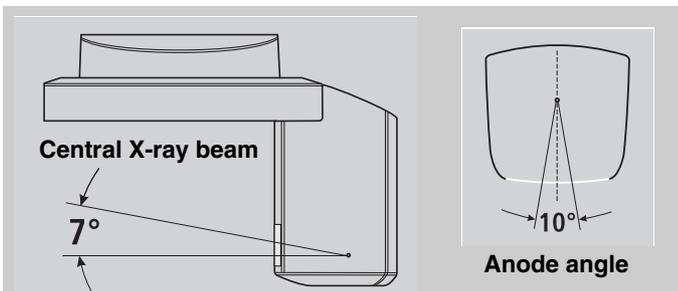
3 Controls and functional elements

3.1 Controls and displays
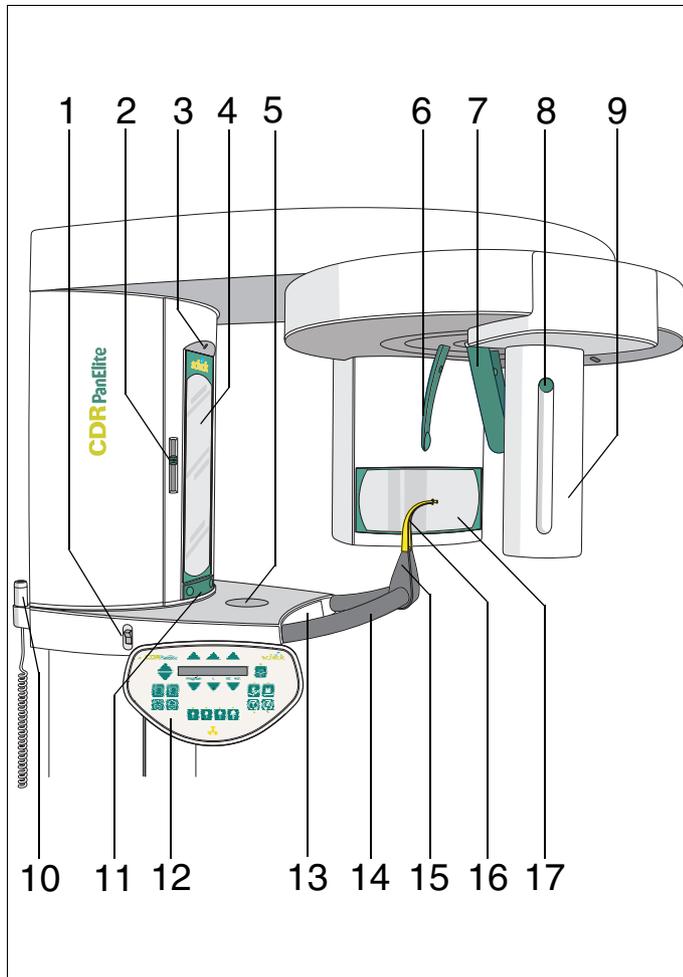
on the Panoramic unit

1. Main Power

2. Light localizer with height adjustment of FH light line (Frankfort Horizontal (FH) plane)

3. Light localizer central light beam for face center (midsagittal)

4. Control mirror for patient setting

5. Tray for jewelry, etc.

6. Forehead support

7. Temple supports

8. Pushbutton for sensor (image receptor) removal

9. Sensor (image receptor)

10. Exposure switch (must be pressed and held down during the entire exposure)

11. Touch bar for swiveling the control mirror in and out

12. Control Pad (swiveling control panel)

13. Drawer for accessories

14. Handles for patient

15. Holder for chin rest, bite blocks or contact segments, etc.

16. Bite block or contact segment or chin rest

17. Primary diaphragm field on the X-ray tube assembly
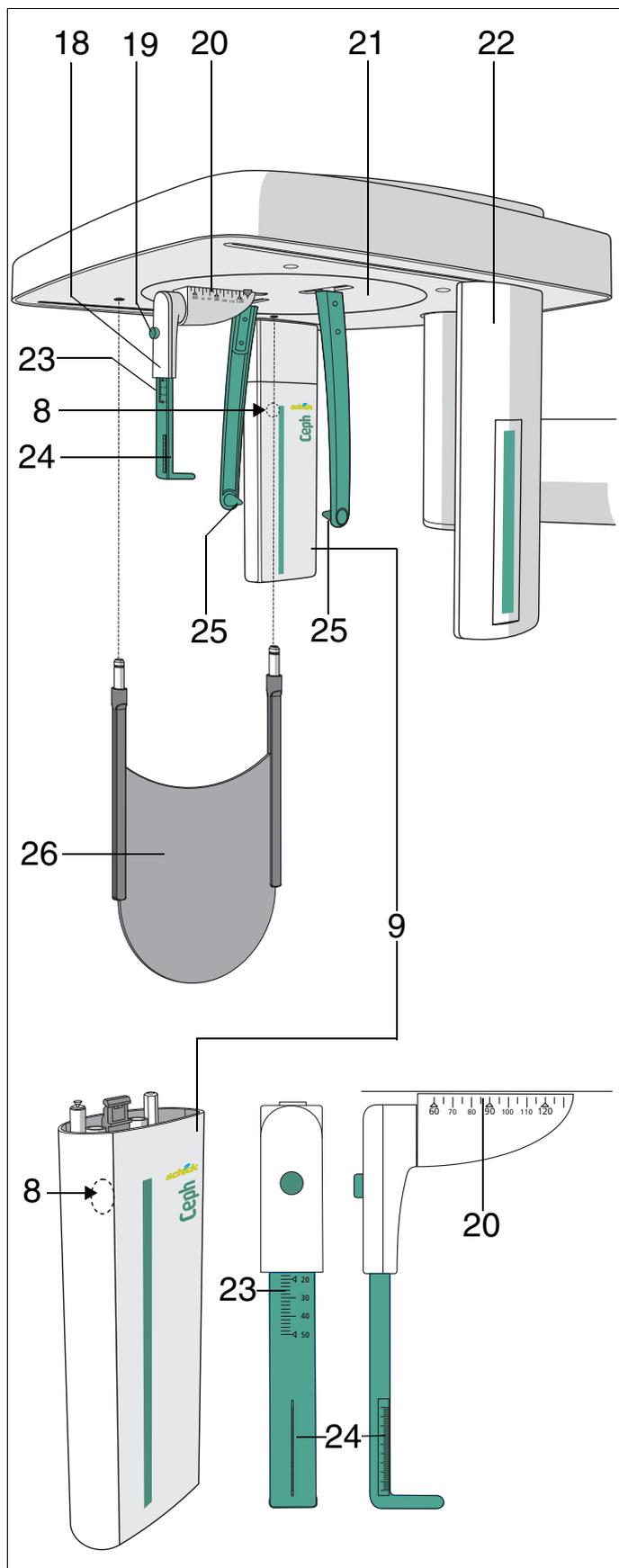
Controls and scales on the cephalometer

8. Pushbutton for sensor removal

9. Sensor (image receptor)

18. Nasion support

19. Locking button for nasion support

20. Scale for horizontal nasion support adjustment

21. Rotating element for rotary movement of head supports

22. Secondary diaphragm with FH line light localizer

23. Scale for vertical nasion support adjustment

24. Projection scale

25. Ear plugs with holders

**26.** Carpus support plate

Magnification of the lateral view

With this exposure technique, a metal scale (24) integrated in the nasion 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.

⚠ CAUTION

Never support yourself on the cephalometer or the extension arm, hang objects from them or place objects on them. Otherwise their adjustment may be altered, resulting in defective exposures.
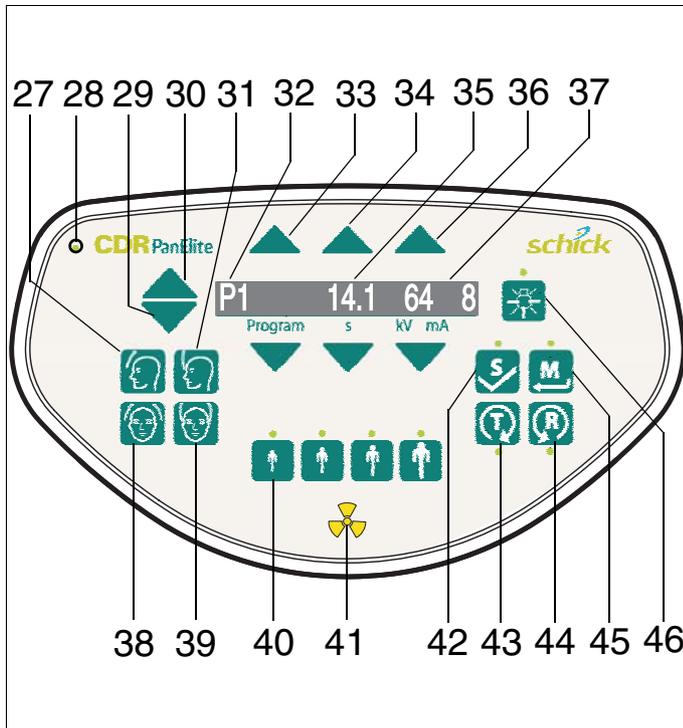
## Controls and displays on the Control Pad

27. **"Move forehead support away from forehead"** key

28. LED **"Unit ON"**

29. ∇ **"Downward movement of unit"** key

30. ∆ **"Upward movement of unit"** key

31. **"Move forehead support towards forehead"** key

32. **Program number / Help message** digital display

33. ∆ Upward / ∇ downward **program selection** keys
Sequence: P 1, P 1L, P 1R, P 1C, P 10,
TM 1.1/ 1.2, S 1, MS 1, C 3, C 4, C 1, C 2

34. ∆ Forward / ∇ backward keys, without function

35. Digital display of **expected radiation time** (following exposure: actual radiation time)

36. Keys for manually setting **kV/mA values**
∆ forward / ∇ backward

37. Digital display of **kV/mA combinations**

38. Key **"Open temple supports"**

39. Key **"Close temple supports"**

40. Row of **patient symbol** keys with LEDs, programmed kV/mA values

41. Optical **radiation indicator**

42. Key for **Service menu** display with LED

43. **"T"** key for test cycle without radiation with LED

44. **"R"** key for return of the unit with Ready LED (flashes if the unit is NOT ready for an exposure)

45. **Memory** button for saving kV/mA values and digital display of info text with LED

46. **Light localizers ON / OFF** key with LED

ℹ️ *NOTE*
The height adjustment setting, forehead support position, info texts and values as well as help and error messages are also shown on the digital display.

4 Accessories for panoramic images

4.1 Rests and supports
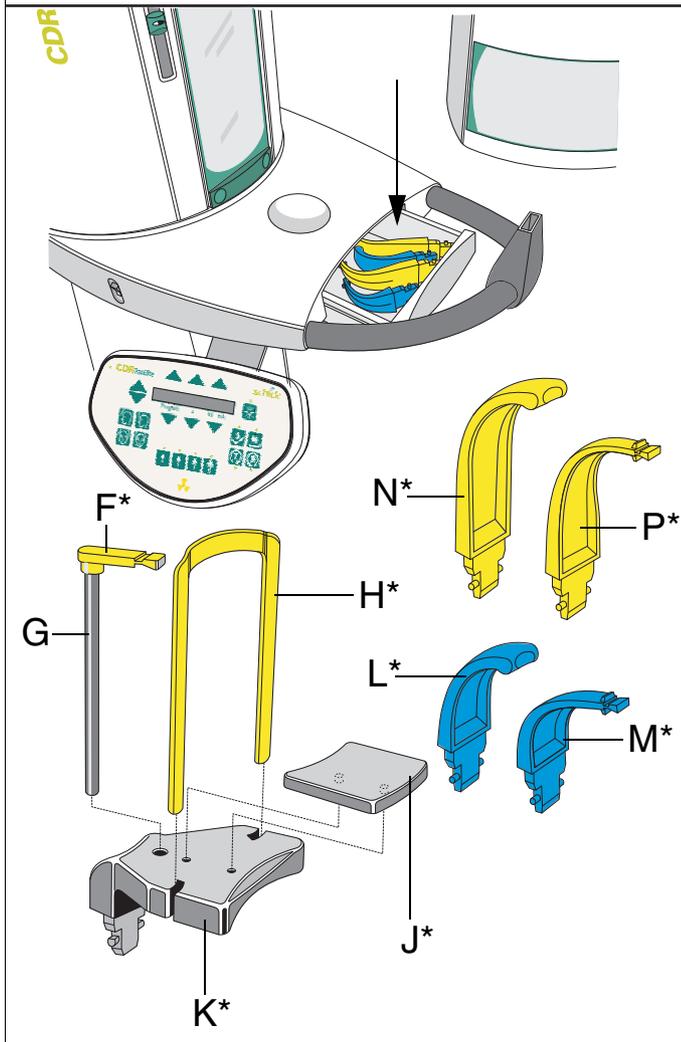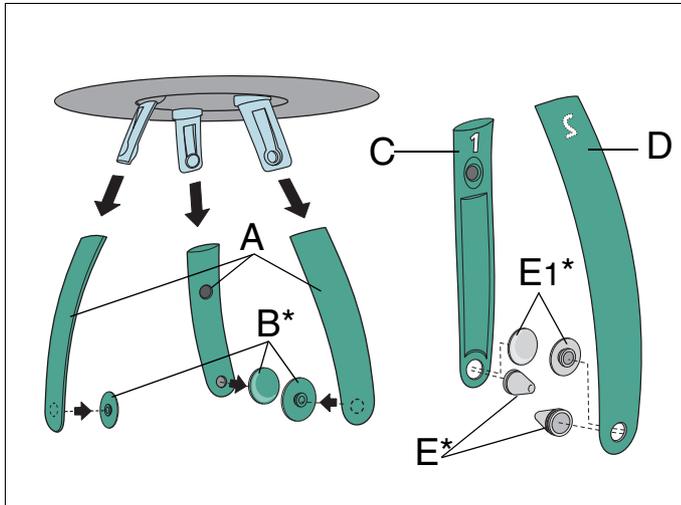
The accessories and the hygienic protective covers can be stored in the drawer between the two handles.

The forehead support and the temple supports (A) can be removed for cleaning after pressing the corresponding locking button.

Sterilization only in an autoclave at 135°C, 2.1 bar.
All accessories marked with * can be sterilized.

For reorders:

A Forehead support and temple supports
(can be removed for cleaning after pressing the corresponding locking button)
(1 piece) Order No. 61 88 457

B* Contact pads for forehead/temple supports
(1 piece) Order No. 61 88 465

C Temporomandibular joint support **"1"** (right) for temporomandibular joint views Order No. 61 88 481

D Temporomandibular joint support **"2"** (left) for temporomandibular joint views Order No. 61 88 473

E* Ear holders for temporomandibular joint supports
(10 piece) Order No. 18 88 838

E1* Contact pads for temporomandibular joint supports
(10 piece) Order No. 59 90 648

F* Bite block
(10 piece) Order No. 18 88 887

G Bite block post
(5 piece) Order No. 18 88 895

H* Bar for chin rest
Order No. 59 61 461

J* Chin pad
Order No. 14 49 227

K* Chin rest complete,
incl. 5xF, 1xG, H, J, S, T
Order No. 59 81 472

L* Contact segment **blue**
for subnasal
for sinus / PNS views
(5 piece) Order No. 89 31 552

M* Bite block **blue**
for sinus views
(5 piece) Order No. 89 21 850

N* Contact segment standard **yellow**
for subnasal
(5 piece) Order No. 89 31 545

P* Bite block standard **yellow**
(5 piece) Order No. 89 21 843

4.2   Protective covers for panoramic views
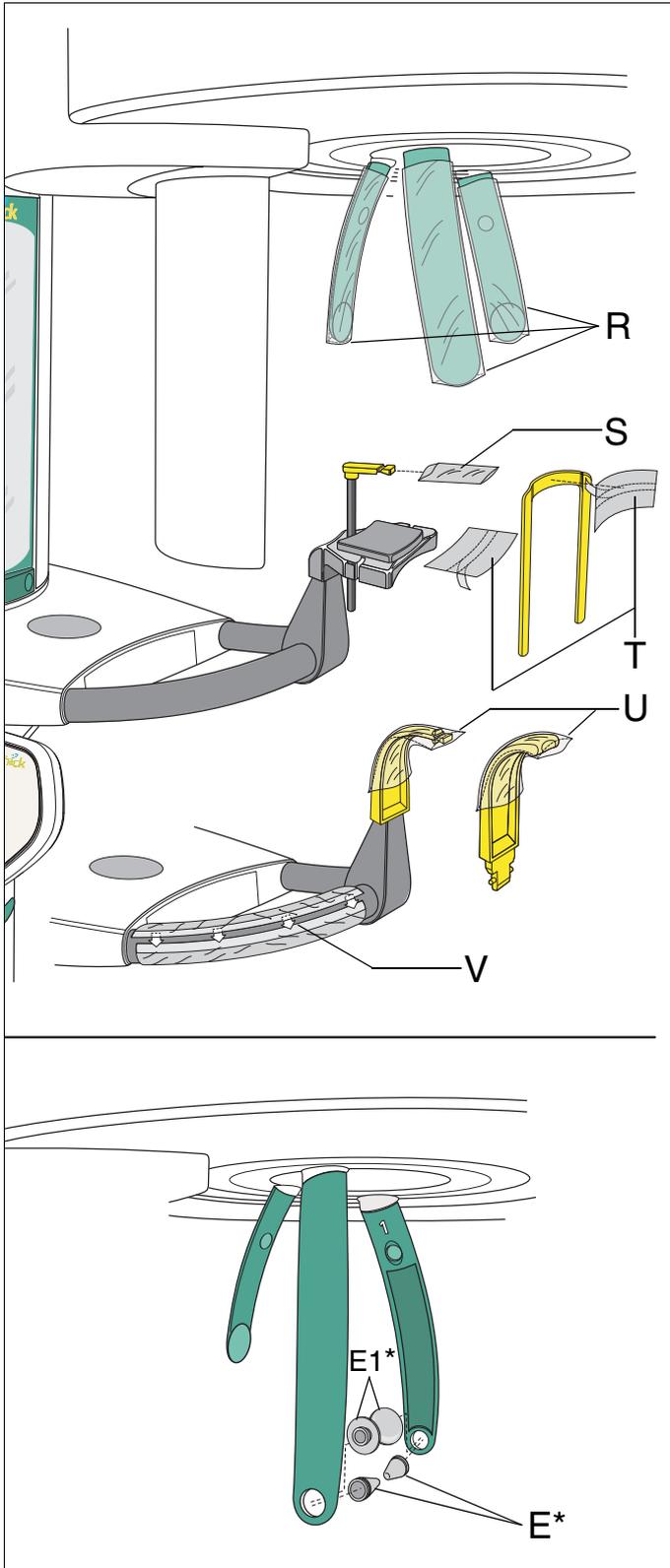
Prior to each exposure, the protective covers (disposable) must be fitted.

For the sake of clarity, the protective covers have been omitted on the subsequent illustrations.

For reorders of protective covers:

R   For forehead support and temple supports
(500 piece) Order No. 59 68 263
Dimensions: 150mm x 47mm

S   For bite block
(500 piece) Order No. 33 14 072
Dimensions: 43mm x 21mm

T   For chin rest and bar
(100 piece) Order No. 59 32 603
Dimensions: 75mm x 60mm

U   For bite blocks and contact segments
(500 piece) Order No. 33 14 080
Dimensions: 80mm x 40mm

V   Protective cover for handles
Order No. 59 68 255

E*   Sterilizable ear holders for temporomandibular joint supports for temporomandibular joint views
(10 piece) Order No. 18 88 838

E1* Sterilizable contact pads for temporomandibular joint supports for sinus views
(10 piece) Order No. 59 90 648

4.3   Protective covers for cephalometer
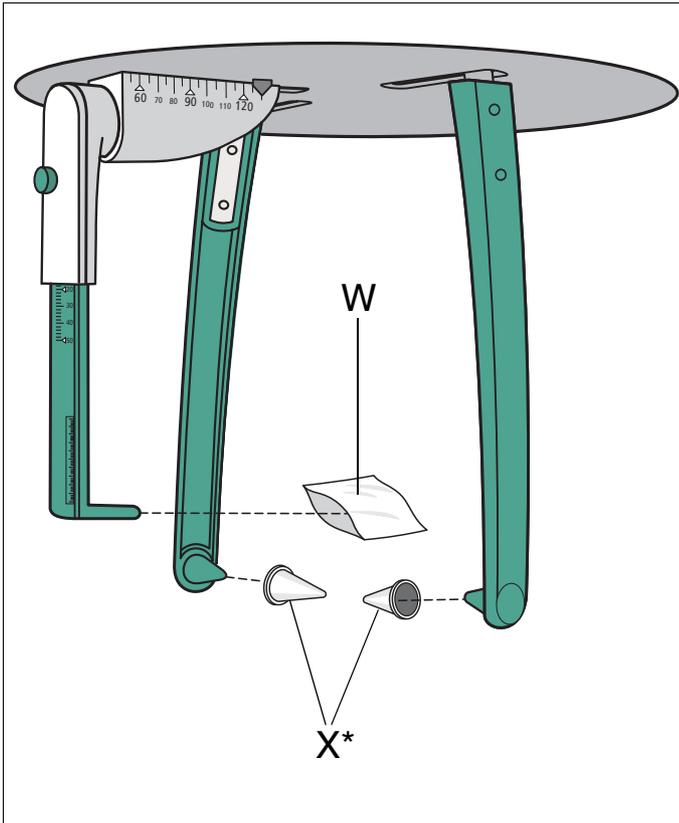
W Protective cover for nasion support,
disposable
(100 piece) Order No. 33 14 106

X* Protective caps for ear plugs,
reusable (sterilizable)
(20 piece) Order No. 89 32 261

5 Panoramic view programs

5.1 P1 Standard panoramic view

33
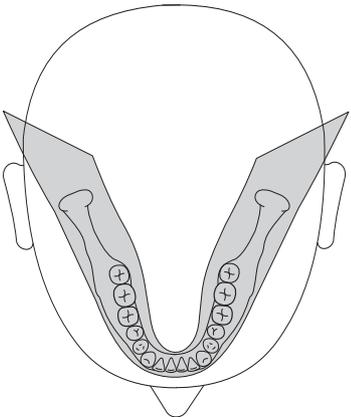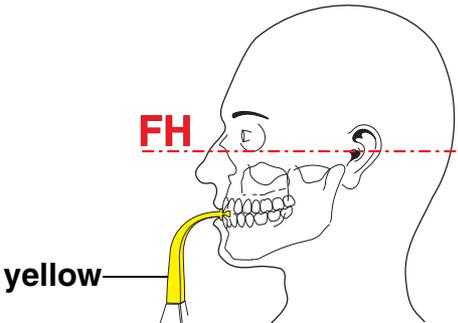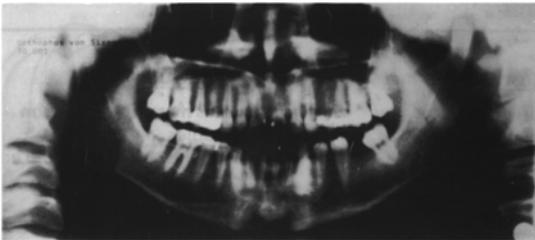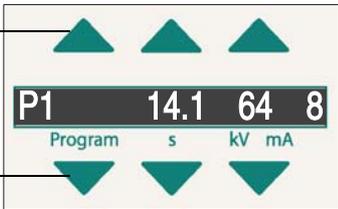
P1　　14.1　64　8
Program　　s　　kV　mA

FH

yellow

Active sensor area CCD PAN
6.5 x 138.4mm

To preselect the program, use the arrow keys (33): Δ (to count forward) or ∇ (to count backward), depending on the starting position; for program sequence see Section 3.1

P1 Normal view

- **Yellow** bite block or contact segment
  or
  Chin rest with bite block post and bite block or bar.
- Head inclination with the help of the **FH**.

## 5.2 P1 L Standard panoramic view – half-side left
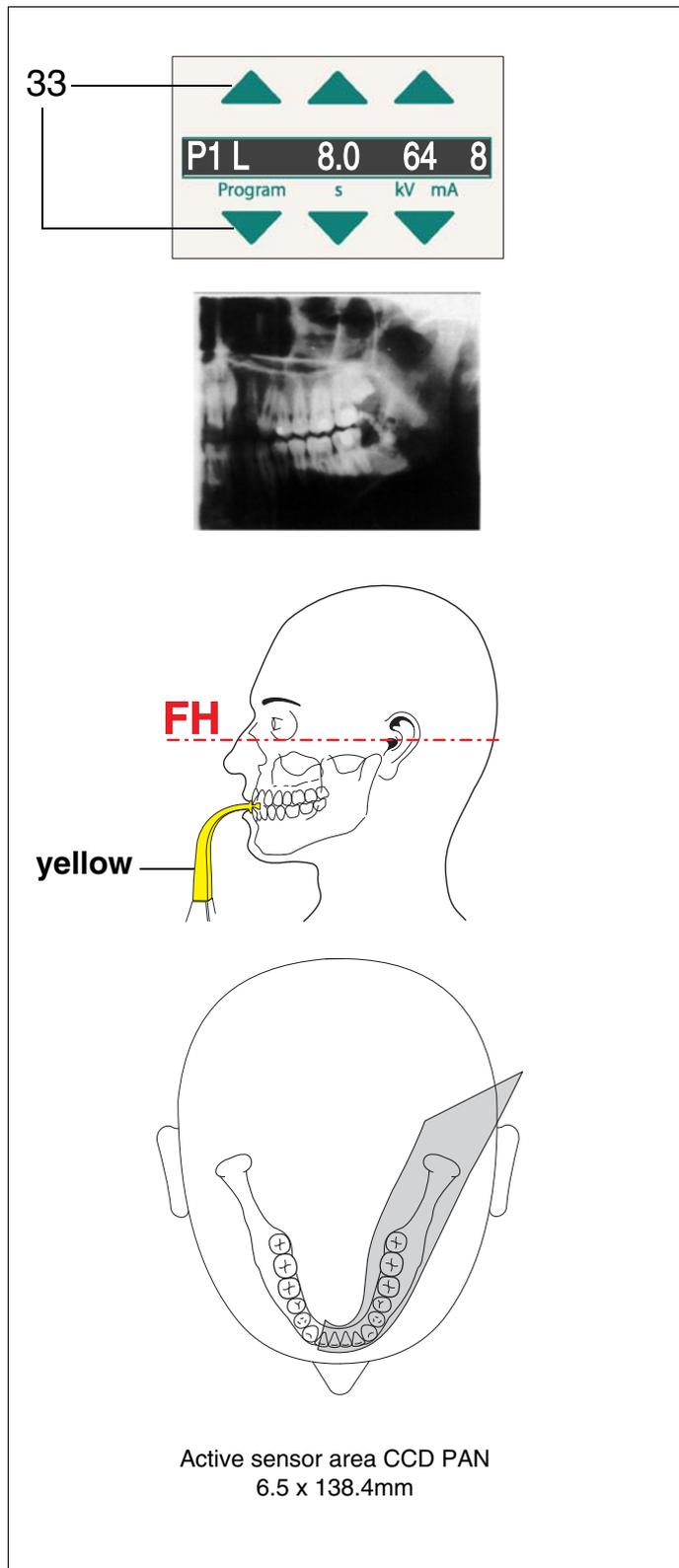
To preselect the program, use the arrow keys (33): Δ (to count forward) or ∇ (to count backward), depending on the starting position; for program sequence see Section 3.1

P1 L Normal view, half-side left

- **Yellow** bite block or contact segment
  or
  Chin rest with bite block post and bite block or bar.
- Head inclination with the help of the **FH**.

Active sensor area CCD PAN
6.5 x 138.4mm

5.3 P1 R Standard panoramic view – half-side right
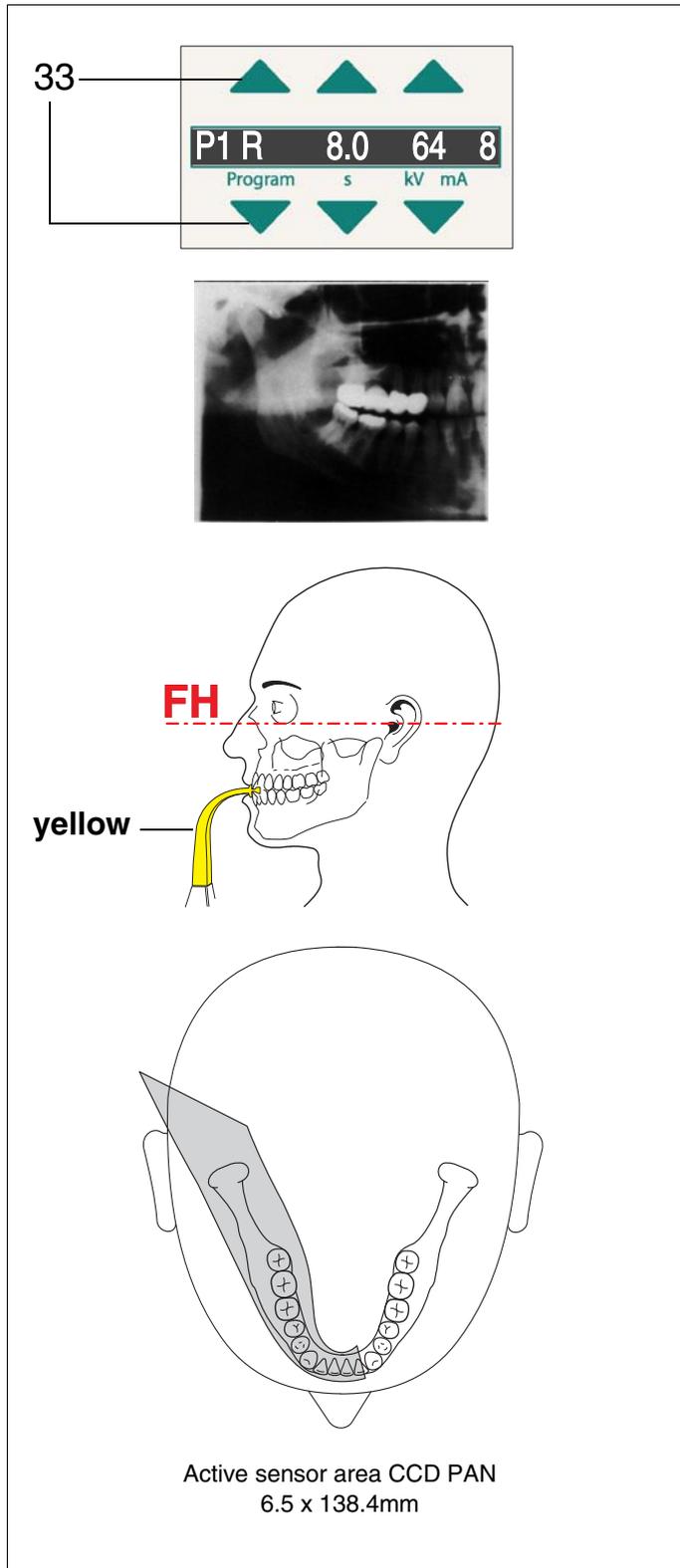
33

P1 R   8.0   64   8
Program   s   kV mA

FH

yellow

Active sensor area CCD PAN
6.5 x 138.4mm

To preselect the program, use the arrow keys (33): Δ (to count forward) or ∇ (to count backward), depending on the starting position; for program sequence see Section 3.1

P1 R Normal view, half-side right

•   **Yellow** bite block or contact segment
     or
     Chin rest with bite block post and bite block or bar.

Head inclination with the help of the **FH**.

5.4   P1 C Standard panoramic view with constant 1.25 power magnification

33 —
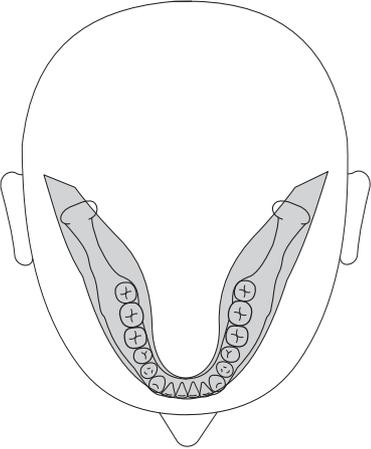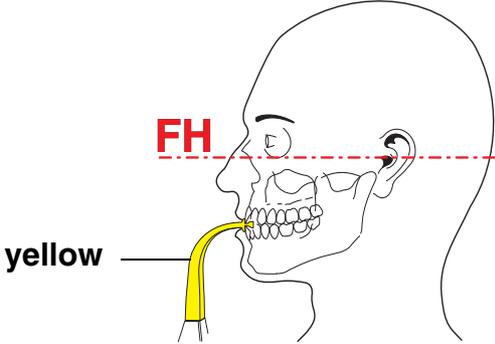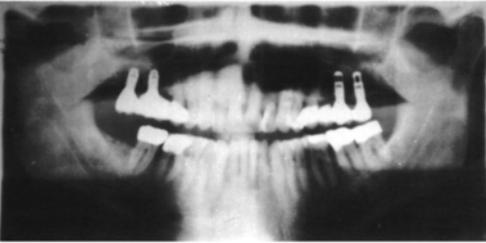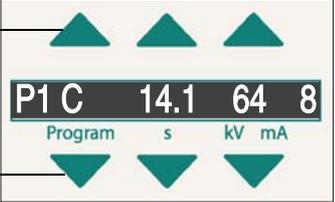
P1 C   14.1   64   8

Program   s   kV   mA

FH

yellow —

Active sensor area CCD PAN
6.5 x 138.4mm

To preselect the program, use the arrow keys (33): ∆ (to count forward) or ∇ (to count backward), depending on the starting position; for program sequence see Section 3.1

P1 C Normal view with a constant magnification factor of 1.25

e.g. for implantology

- **Yellow** bite block or contact segment
  or
  Chin rest with bite block post and bite block or bar.

Head inclination with the help of the **FH**.

5.5   P10 Normal view for children with significant dose reduction
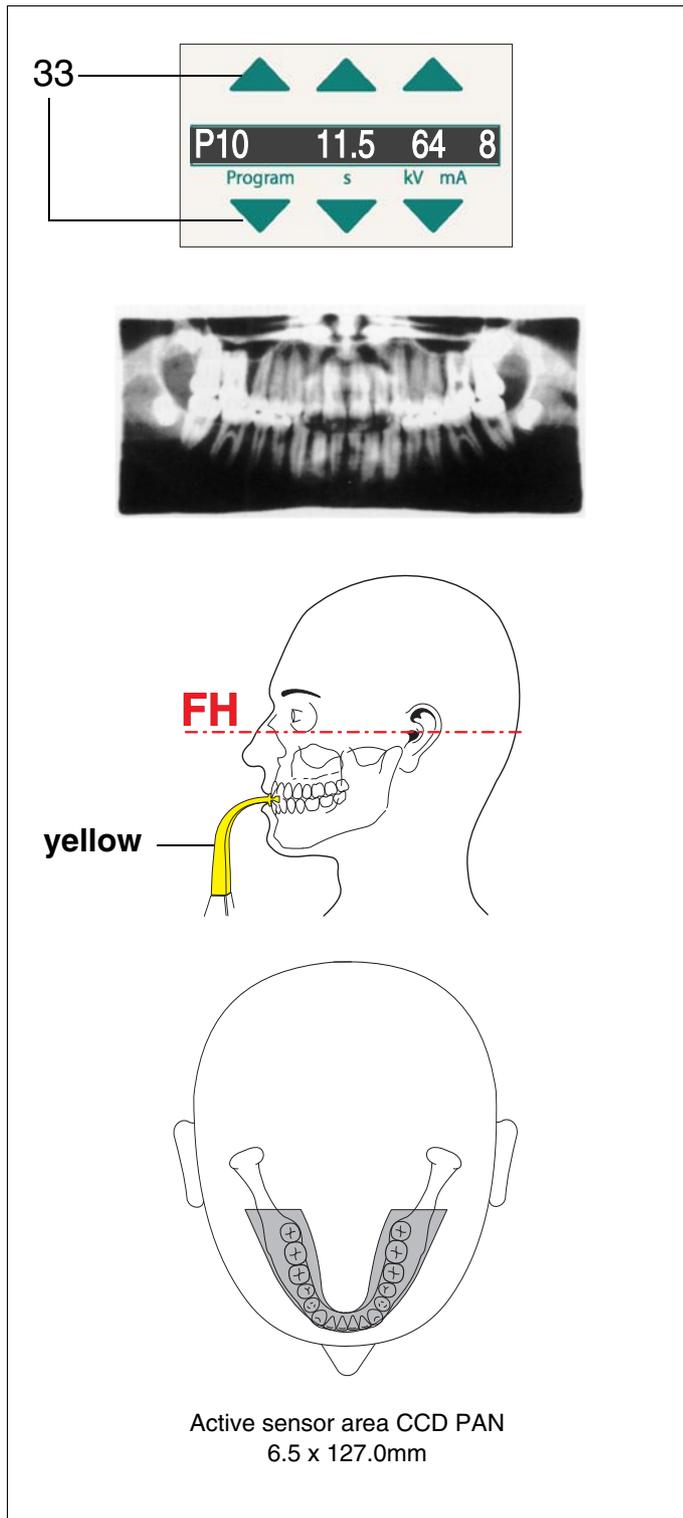
To preselect the program, use the arrow keys (33): Δ (to count forward) or ∇ (to count backward), depending on the starting position; for program sequence see Section 3.1

P10 Normal view (status)
   preferably for children

- **Yellow** bite block or contact segment
  or
  Chin rest with bite block post and bite block or bar.

- Head inclination with the help of the **FH**.

Active sensor area CCD PAN
6.5 x 127.0mm

5.6   TM1.1 / TM1.2 Temporomandibular joints lateral with closed and open mouth in one image

33

TM1.1   12.8   71   8
Program   s   kV mA

TM1.2   12.8   71   8
Program   s   kV mA

TM 1.1   TM 1.2 TM 1.2   TM 1.1

TM 1.1

FH

TM 1.2

FH

To preselect the program, use the arrow keys (33): ∆ (to count forward) or ∇ (to count backward), depending on the starting position; for program sequence see Section 3.1

TM1.1 Temporomandibular joints lateral with closed and TM1.2 with open mouth
(4 views in one image)

- Insert temporomandibular joint supports "**1**" and "**2**".
- To largely prevent overlaps, head inclination with the help of the FH.
- Start **TM 1.1**.
  Following expiry of **TM1.1**, the unit automatically returns to its starting position.
- Ask the patient to open his/her mouth and start **TM1.2**.

TM1.1 Outer views:
Closed mouth

TM1.2 Inner views:
Open mouth

5.7   S1 Paranasal sinuses
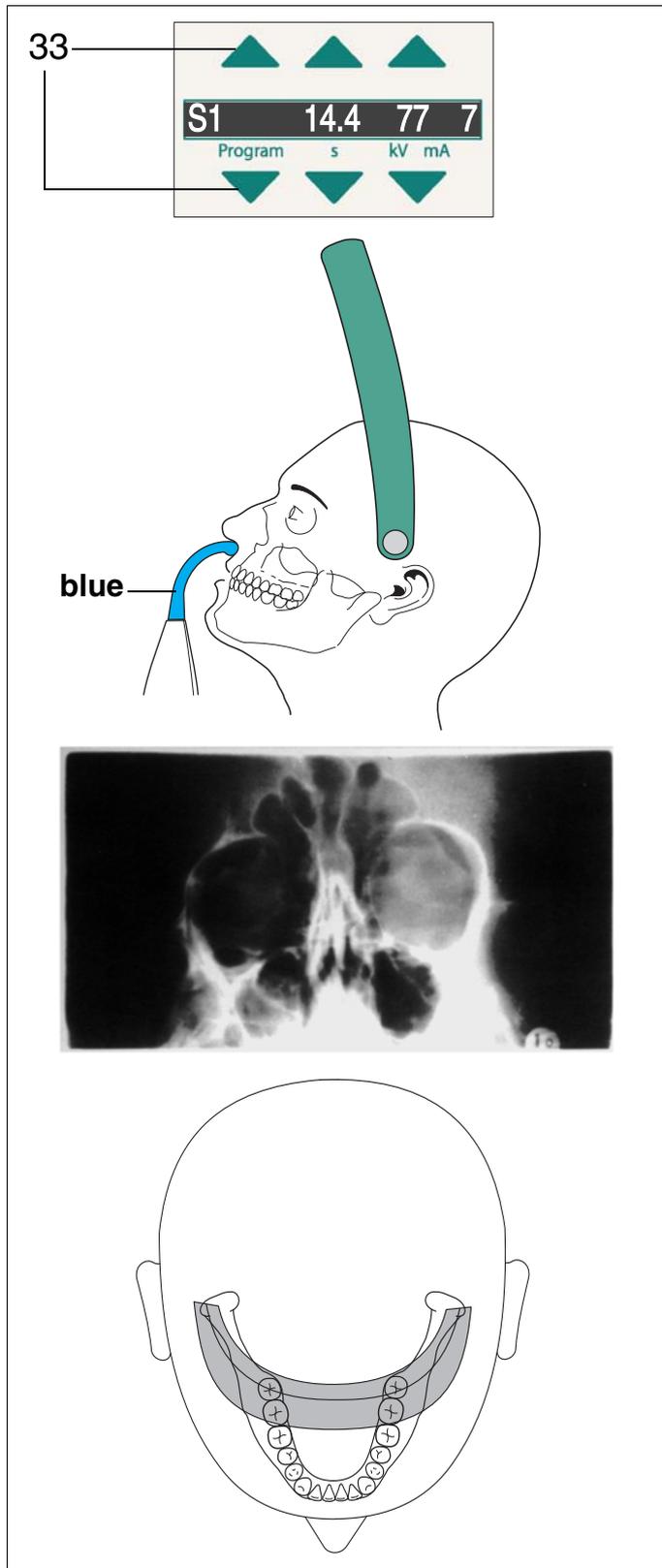
To preselect the program, use the arrow keys (33): Δ (to count forward) or ∇ (to count backward), depending on the starting position; for program sequence see Section 3.1

S1 Paranasal sinuses
   e.g. orbital floor fractures

- Fit **blue** contact segment subnasally

- Fit temporomandibular joint supports "**1**" and "**2**" **without ear holders, but with contact pads**.

- Patient's head maximally reclined.

5.8   MS1 Multislice (posterior tooth region)
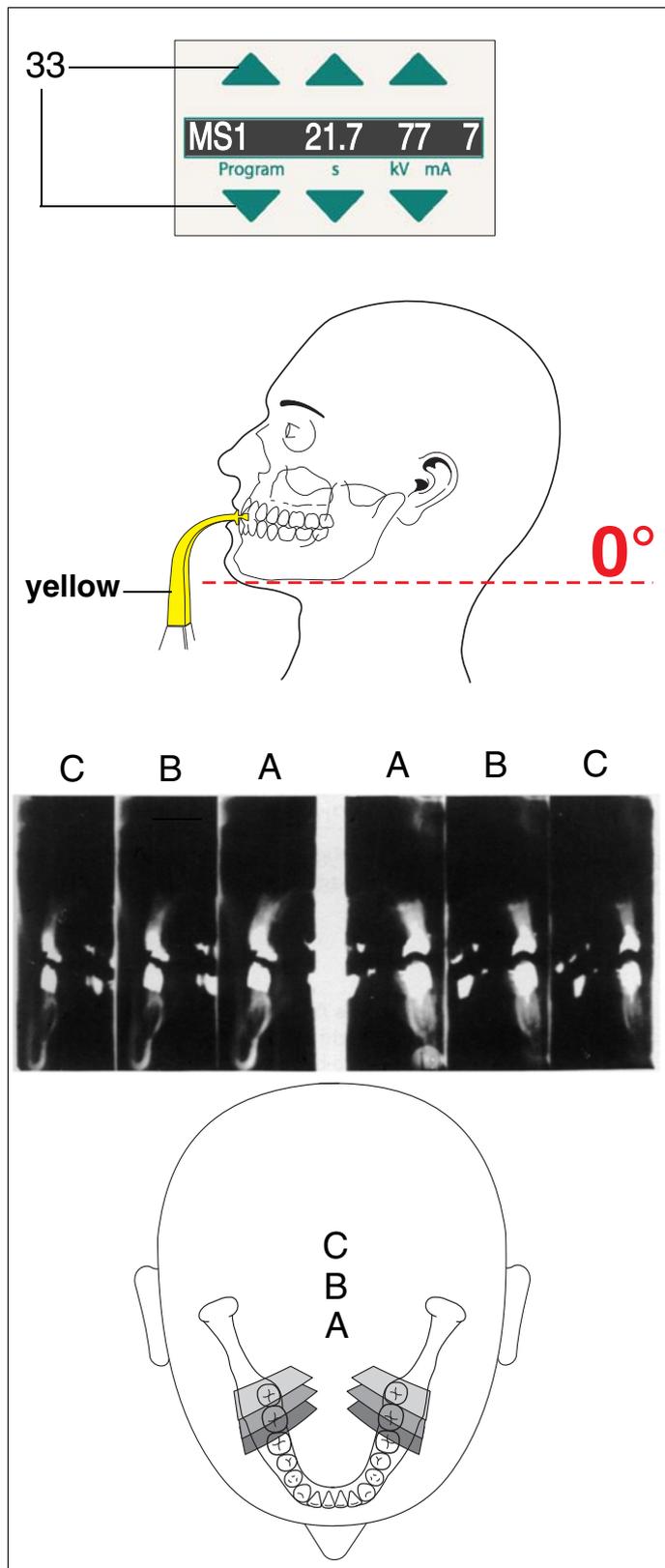
To preselect the program, use the arrow keys (33): Δ (to count forward) or ∇ (to count backward), depending on the starting position; for program sequence see Section 3.1

MS1 Multislice in posterior tooth region
   (6 views in one image)

•   **Yellow** bite block or contact segment.

•   Border of mandible horizontal.

6 Operation

6.1 Preparing the exposure
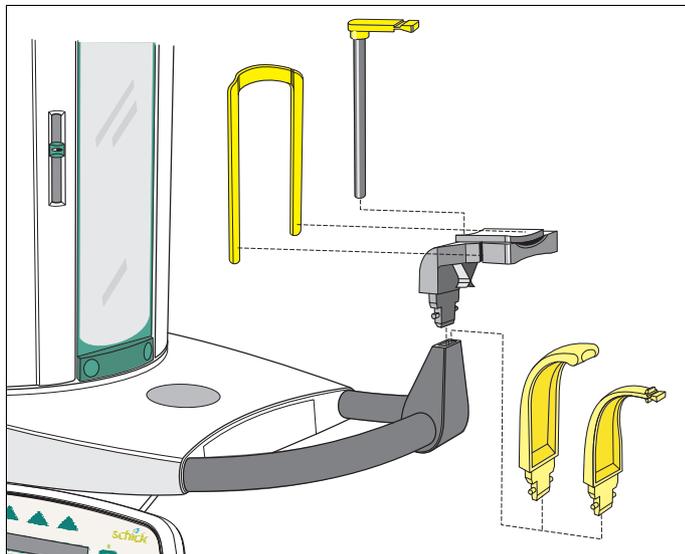
Fitting the accessories

- Push in the **bite block** or **chin rest** until it engages.

For use, see **"Panoramic view programs"**.

- Pull to disengage and remove bite block or chin rest.
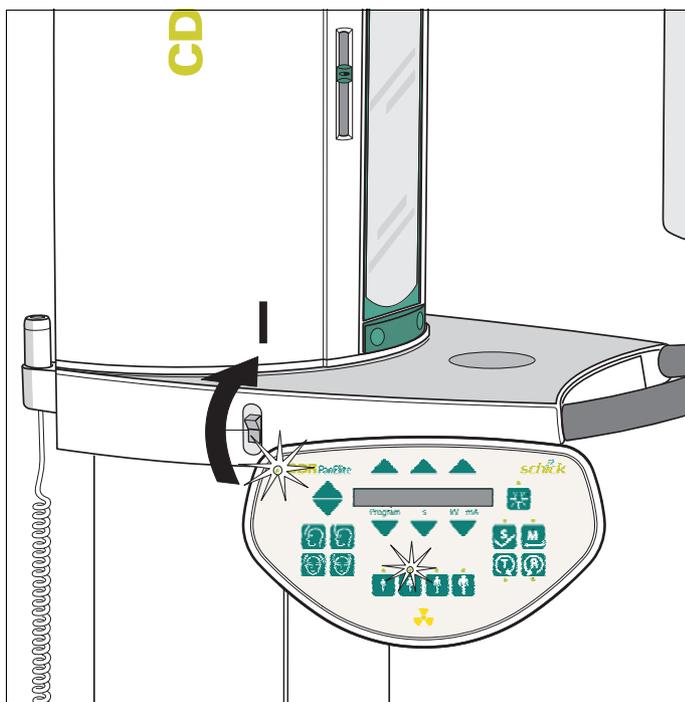
Switching the unit on

⚠ *CAUTION*

Following extreme temperature fluctuations, condensa-tion may occur; therefore please do not switch on the system until it has reached normal room temperature (see chapter "Technical Description").

- Move the main power switch to the ON position.
- The LED (28) at the top left of the Control Pad lights up.
- The other LEDs on the Control Pad light up for ap-prox. 1 second.
- Running dots will appear on the Control Pad display.
- Forehead and temple supports will move to open po-sition.
- Total startup time is approx. 1 minute.

When the unit is switched on, running dots briefly appear on the display and then automatically disappear after a while.
Then the values for program P1 are displayed.
The LED above the second patient symbol from the left lights up.

⚠ *CAUTION*

No patient may be positioned in the unit during power-on. In case of an error that requires switching off and subse-quent switching on of the unit, the patient must be re-moved from the unit before switching it on again at the latest!
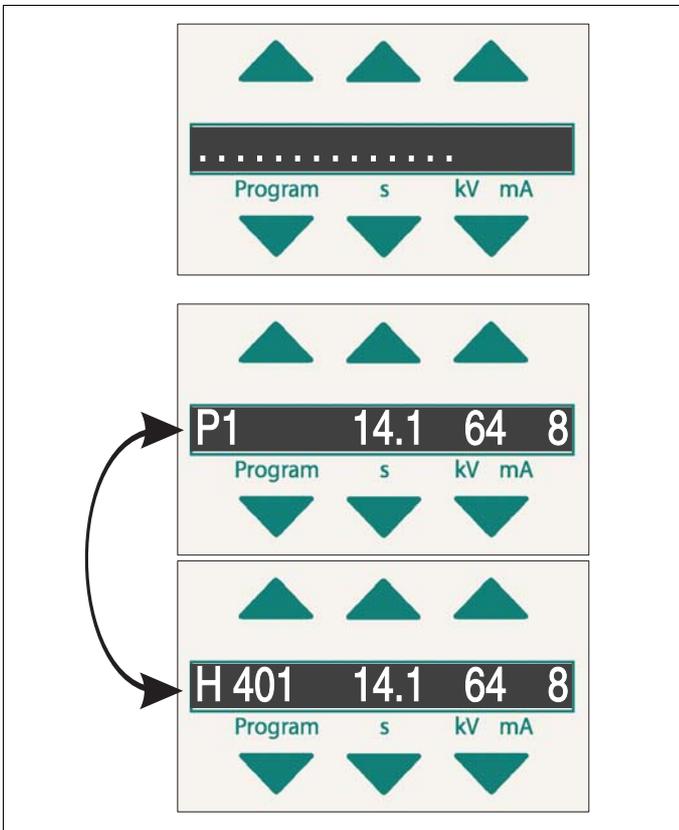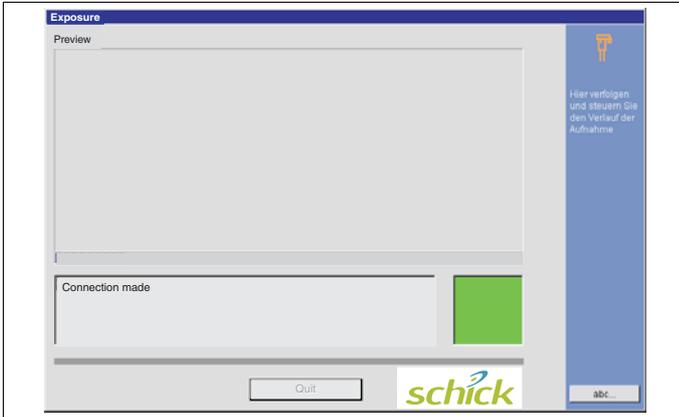
⚠ CAUTION

After switching the unit off with the main switch, you must wait for approx. 2 minutes before switching it back on.

Switching on the PC

- Make sure that the **CDR DICOM program on the PC is ready for exposure**
  (see CDR DICOM User Guide)

If there is no connection to the CDR DICOM application, error message **"H 403"** (Switch CDR DICOM to ready for exposure state) and the exposure program number will appear alternately on the digital display of the Control Pad.

Readings on the digital display

After power-on of the system, running dots appear initially 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.

The system is now ready to operate.

If the **exposure program** number and a **help message H... alternately** appear on the digital display, the help message must be processed first.
The system is ready for operation only after the help message no longer appears.

Help messages resulting from operating steps which have not yet been processed:

H 301   R key, move into starting position.

H 320   R key, confirm exposure data.

H 321   Close door of X-ray room.

**H 401**   Plug sensor into PAN slot.

H 402   Plug sensor into Ceph slot.

H 403   Switch CDR DICOM to ready for exposure.

H 404   Plug in Ceph sensor

H 406   R key, move into Ceph starting position.

H 420   Get exposure with CDR PanElite Rescue program.
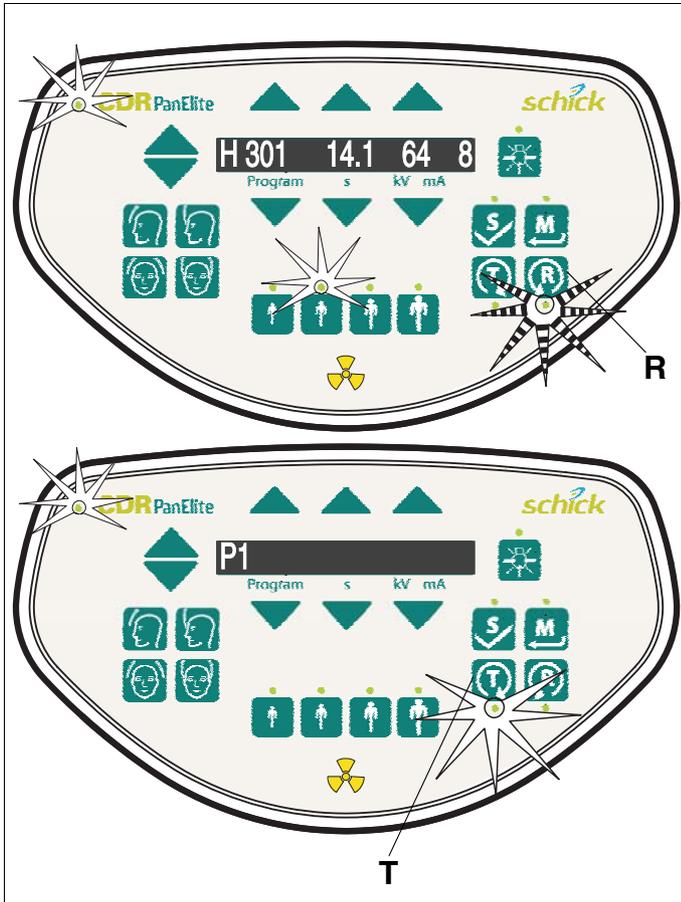
- If the Ready LED below the R key starts flashing and error message H 301 appears on the display, briefly press return key R to bring the rotating element into position for positioning. The Ready LED then switches off and the help message disappears.

ℹ️ NOTE

*After pressing the **T** key, you can start a **test cycle** of the rotating element **without radiation** with the exposure switch.*
During the test cycle the LEDs above the patient symbol keys do not light up and only the exposure program number appears on the digital display.

6.2 Positioning the patient

Preparations

- 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.

- The movement of the unit must not be obstructed by any physical or mechanical barrier including clothing, dressings, wheelchairs or hospital beds! Perform a test cyle with the T key (see also "**General safety information**").

- Fit bite block or contact segment and chin rest; see "**Panoramic view programs**".
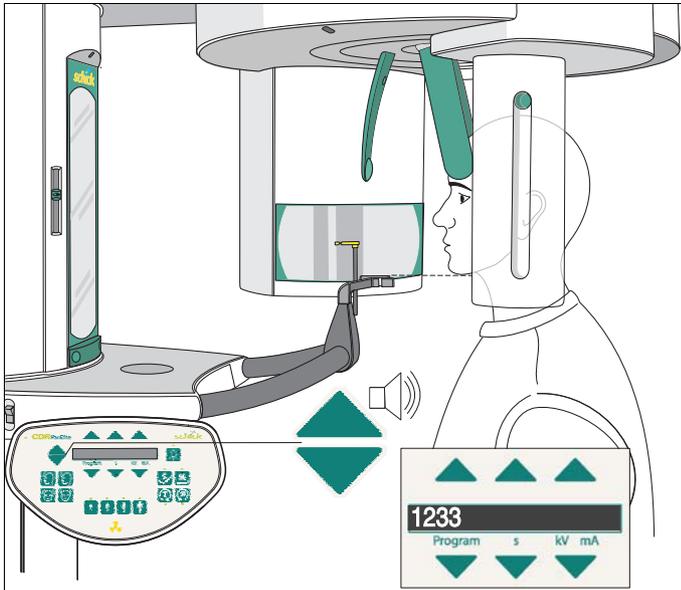
Exposure with chin rest and bite block

- The patient places himself or herself in front of the control mirror.

- Using the △ **"upward movement"** or ▽ **"downward movement"** key, adjust the height of the unit so that **the patient's chin and the chin rest are at the same height**.

The motor movement is accompanied by an acoustic signal.

Reference value

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 CDR DICOM software for further exposures.

🛈 *NOTE*

The height adjustment motor starts slowly and then increases its speed.
Press and hold down the height adjustment key until the unit has reached the desired height.
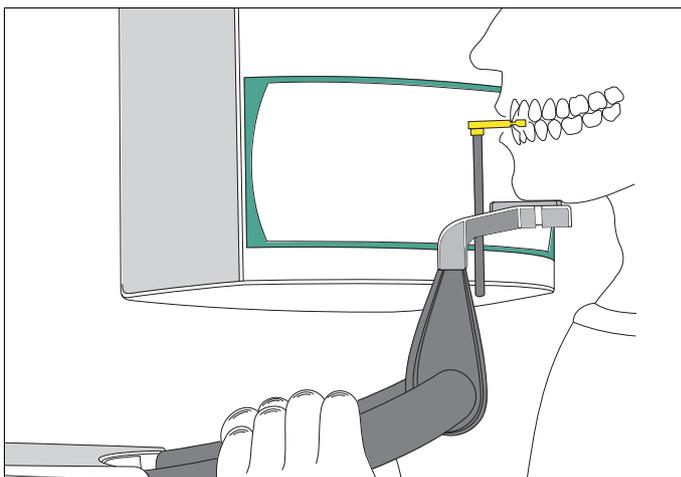
- The patient places the chin on the chin rest and holds on to the handles.

- Move the bite block into position.

- Have the patient bite into the indentation of the bite block (upper anterior teeth into the indentation, lower anterior teeth pushed forward until the stop).
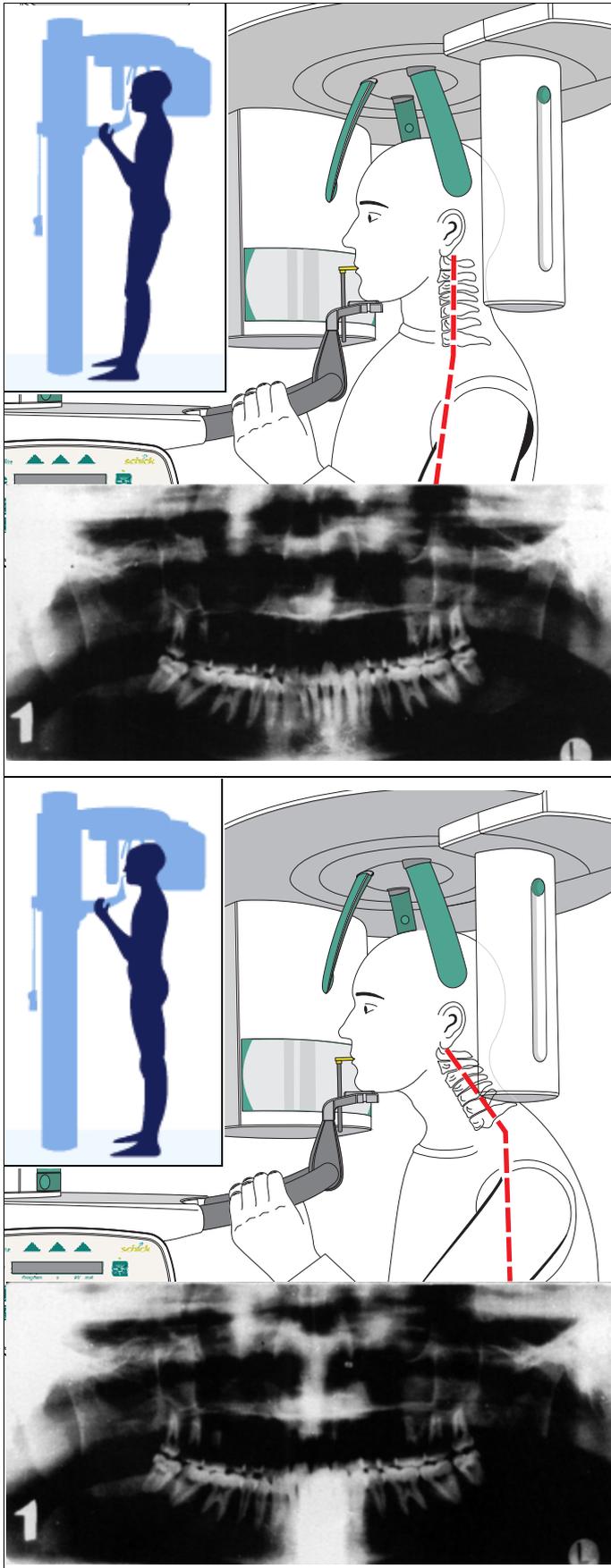
⚠ *CAUTION*

*Make sure that the patient's spine is **slightly inclined**, as illustrated.*
This can be achieved by having the patient make a small step towards the column.

Thus the cervical vertebrae of the patient are stretched.

Stretched cervical vertebrae prevent diminished density in the anterior tooth region.

In special cases, you may also position a seated patient .

RIGHT

WRONG
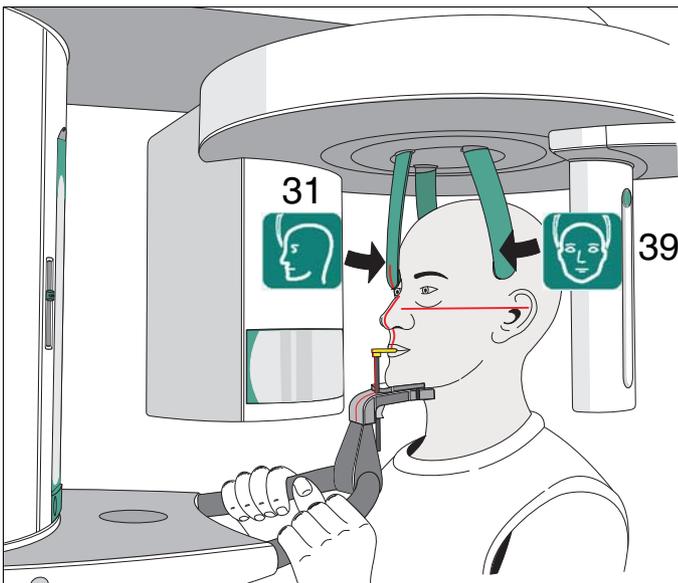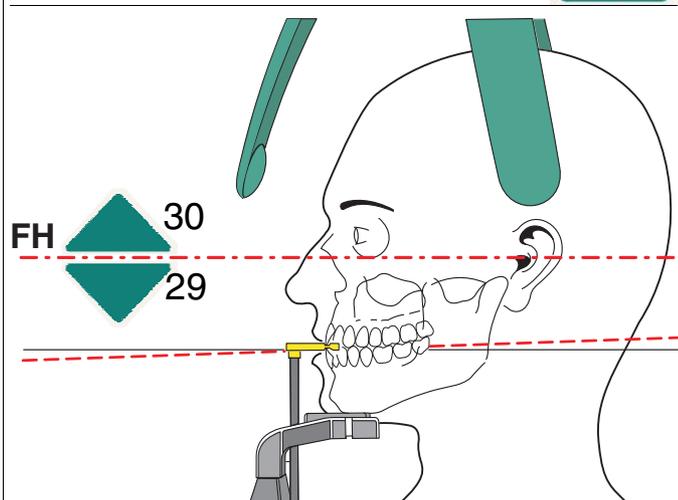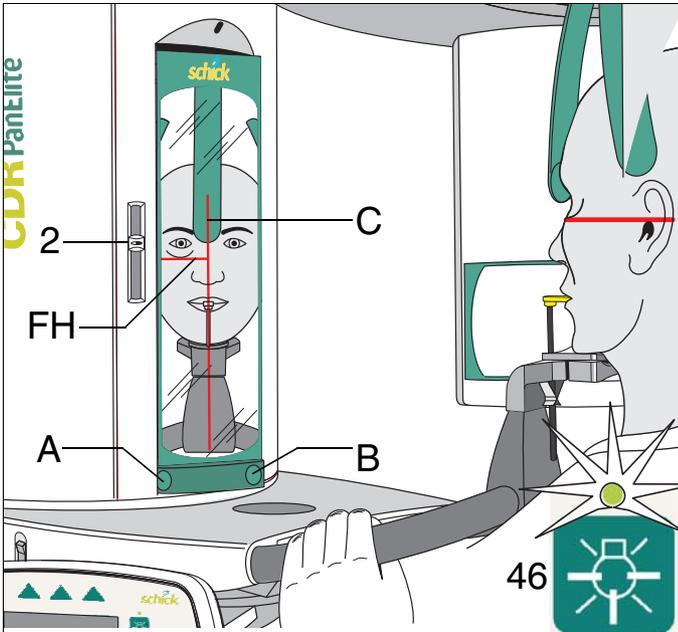
- Swivel out the mirror by pressing the left recess **A** on the touch bar.
- Position the head of the patient in such a way that the **occlusal plane is slightly inclined towards the front**.
- Switch on the **light localizer** with key (46) on the Control Pad. It is used for adjusting the correct patient position.
- The LED above the key remains lit as long as the light localizer is switched on.

ℹ️ *NOTE*

Make sure that the light beam is not directed at the patient's eyes (laser light).
The light localizer switches off automatically after approx. 100 seconds.

The FH horizontal light beam

Position the light beam between the upper edge of the outer auditory canal and the lowest point of the infraorbital margin (**F**rankfort **H**orizontal plane **FH**).

The height of the FH horizontal light beam can be adjusted with slider (2).

- Fine-tune the head inclination for the FH adjustment: **Briefly touch** △ *"upward movement"* key (30) and/or "∇ *"downward movement"* key (29) for height adjustment.
- Align the center of the anterior teeth or of the face with the **central light line** (C).
- Press key (31) on the Control Pad to move the forehead support "*towards the patient's forehead*". On touching the patient's forehead, the forehead support stops automatically.
- Close the temple supports by pressing key (39) on the Control Pad. On touching the temples, the temple supports stop automatically.

- Swivel the mirror back in by pressing the right recess **B** on the touch bar.
- Check the FH adjustment and the central light line.
- **Have the patient place his or her tongue flat against his or her palate.**

ℹ️ *NOTE*

The forehead support and the temple supports open automatically when the exposure is complete.
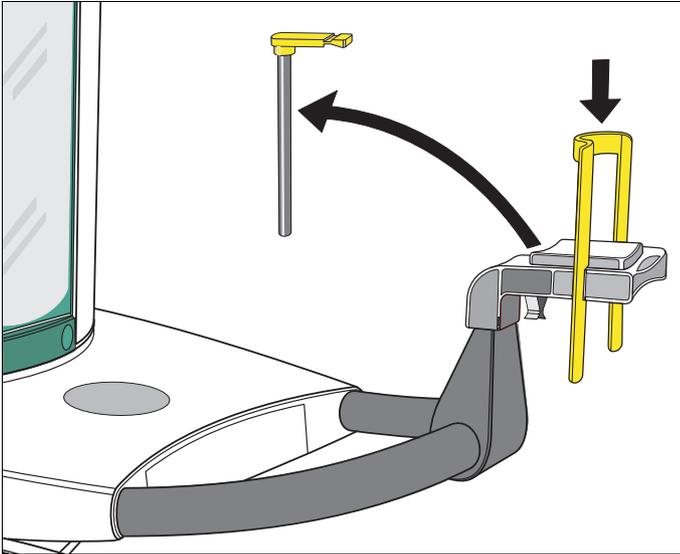
Exposure with chin rest and bar

For patients without anterior teeth

- Remove the bite block with the bite block post; instead, fit the bar as illustrated (bulge facing towards the column).
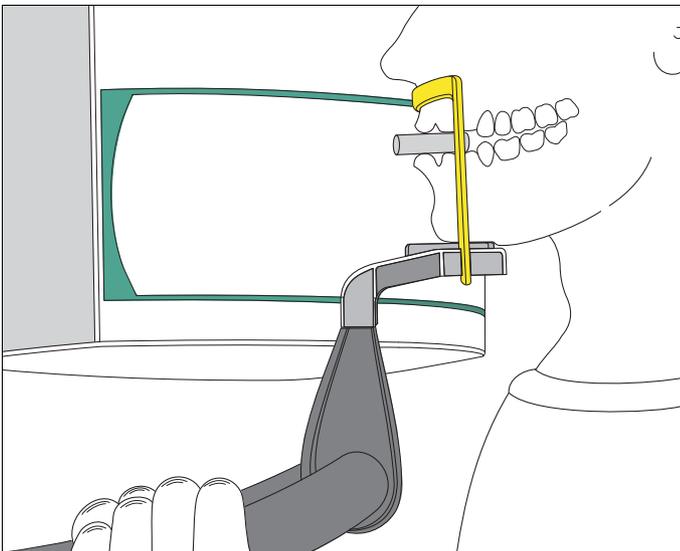
- **Make sure that the upper and lower jaw are in line.**
  This is easier when you place a cotton pellet between them.
- Proceed as for an exposure with chin rest and bite block.

Difference:
The patient places the chin on the chin rest.

- For optimal positioning of the head with relation to the slice position, the patient's subnasale must be placed against the bar.
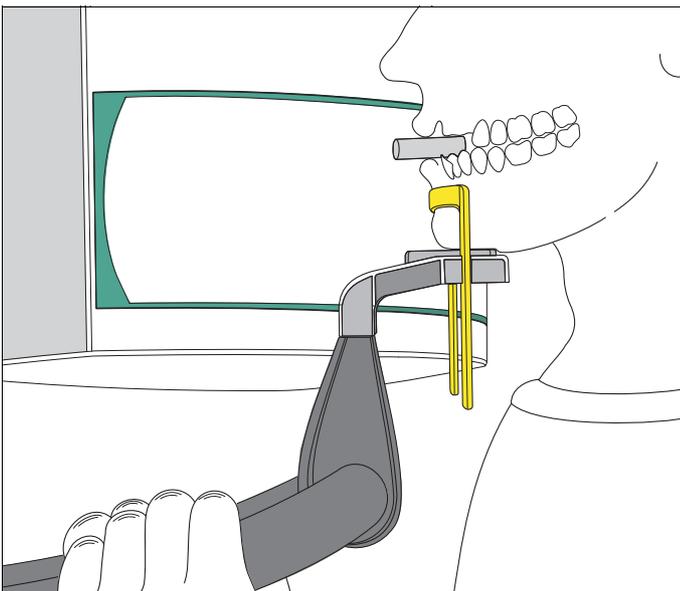
- If there are any anterior teeth left in the lower jaw, place the bar between chin and lower lip.

- **Have the patient place his or her tongue flat against his or her palate.**
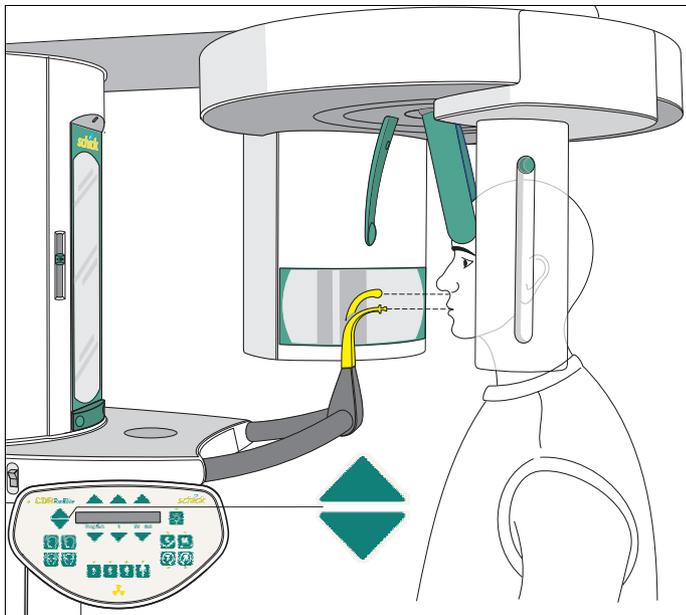
Exposure with bite block or contact segment without chin rest

- The patient places himself or herself in front of the control mirror.
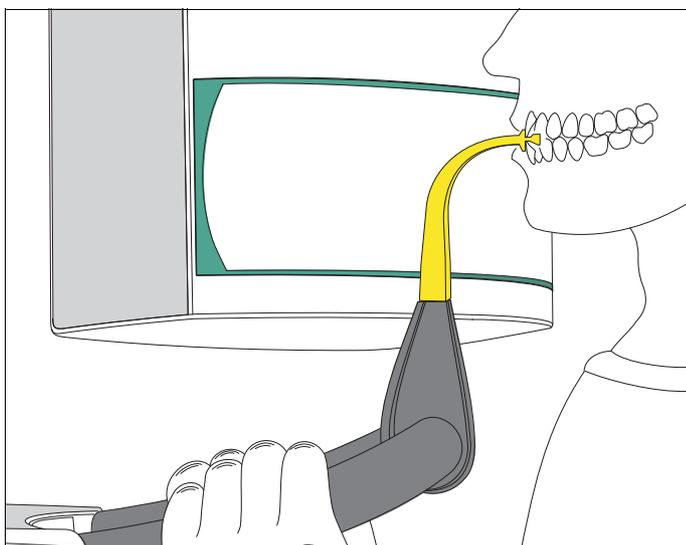
. . . with bite block

- Using the Δ"**upward movement**" and/or "∇ **downward movement**" key on the Control Pad, adjust the height of the unit so that **the bite block and the anterior teeth are at the same height**.
- The patient holds on to the handles.
- Have the patient bite into the indentation of the bite block.
  Upper anterior teeth into the indentation, lower anterior teeth pushed forward until the stop.

Reference value

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 CDR DICOM software.
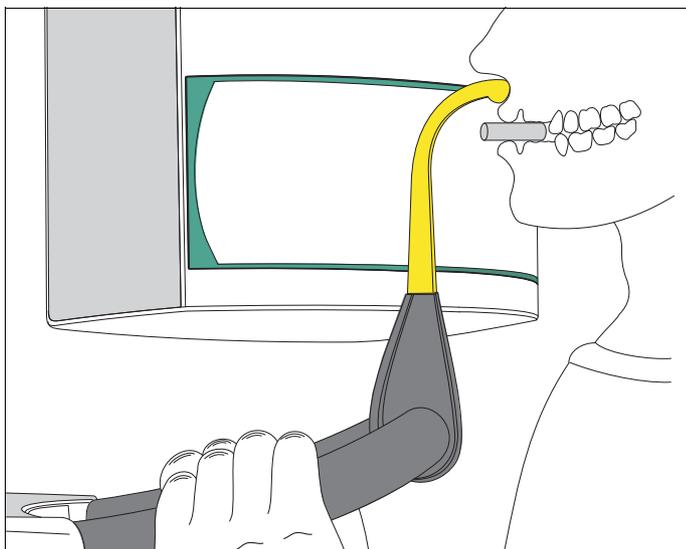
. . . with contact segment

For patients without anterior teeth

- Adjust the height of the unit so that **the contact segment and the subnasale are at the same height**.
- The patient places the subnasale against the contact segment.
 **The upper and lower jaw must be in line.**
  This is easier when you place a cotton pellet between them.

ℹ *NOTE*

*Make sure that the patient's **spine is slightly inclined**, as already described before,*
(see page 33).

- Swivel out the mirror by pressing the left recess **A** on the touch bar.
- Position the head of the patient in such a way that the **occlusal plane is slightly inclined towards the front**.
- Switch on the **light localizer** with key (46) on the Control Pad. It is used for adjusting the correct patient position.
- The LED above the key remains lit as long as the light localizer is switched on.

ℹ NOTE

Make sure that the light beam does not hit the patient's eyes (laser light).
The light localizer switches off automatically after approx. 100 seconds.

The FH horizontal light beam

Position the light beam between the upper edge of the outer auditory canal and the lowest point of the infraorbital margin (**F**rankfort **H**orizontal plane **FH**).

The height of the FH horizontal light beam can be adjusted with slider (2).

- Fine-tune the head inclination for the FH adjustment: **Briefly touch** the △ *upward movement*' key (30) and/or ▽ *"downward movement*' key (29) on the Control Pad for height adjustment.
- Align the center of the anterior teeth or of the face with the **central light line** (C).
- Press key (31) on the Control Pad to move the forehead support *"towards the patient's forehead"*. On touching the patient's forehead, the forehead support stops automatically.
- Close the temple supports by pressing key (39) on the Control Pad. On touching the patient's temples, the temple supports stop automatically.

- Swivel the mirror back in by pressing the right recess **B** on the touch bar.
- Check the FH adjustment and the central light line.
- **Have the patient place his or her tongue flat against his or her palate.**

ℹ NOTE

The forehead support and the temple supports open automatically when the exposure is complete.
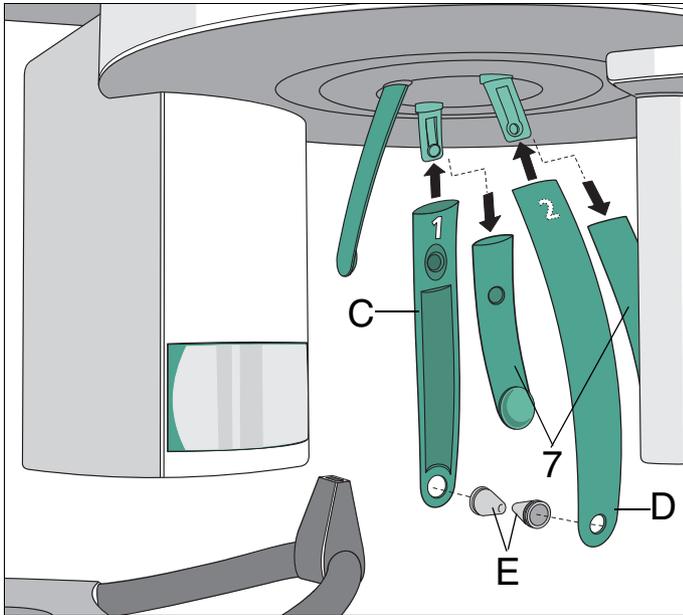
Temporomandibular joint view, program TM1.1/TM1.2 with temporomandibular joint supports

- For temporomandibular joint views, you must fit the temporomandibular joint supports (C) **"1"** and (D) **"2"** at the right and left side in place of the temple supports (7).
  To do so, remove the two temple supports (7) after pressing the corresponding locking button; instead, push in the two temporomandibular joint supports (C) and (D) until they engage.
  Two sterile ear holders (E) must be plugged into the temporomandibular joint supports (C) and (D).

- Remove the bite block or chin rest.
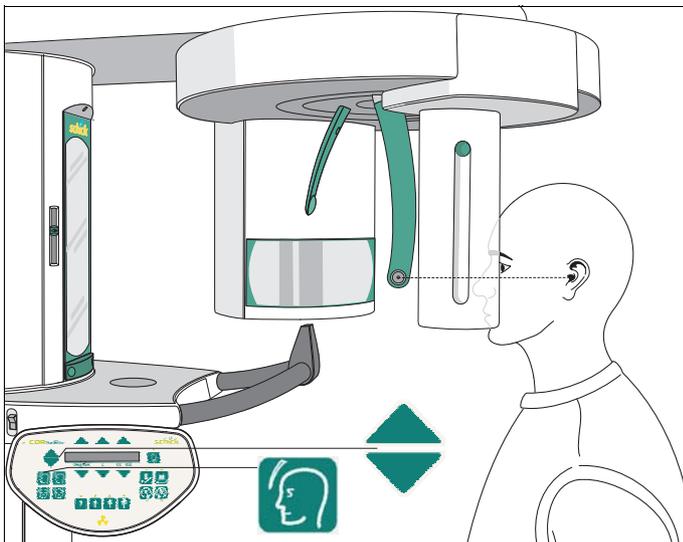
- Using the Δ **"upward movement"** or ∇ **"downward movement"** key on the Control Pad, adjust the height of the unit so that the ear holders are at the height of the outer auditory canals.
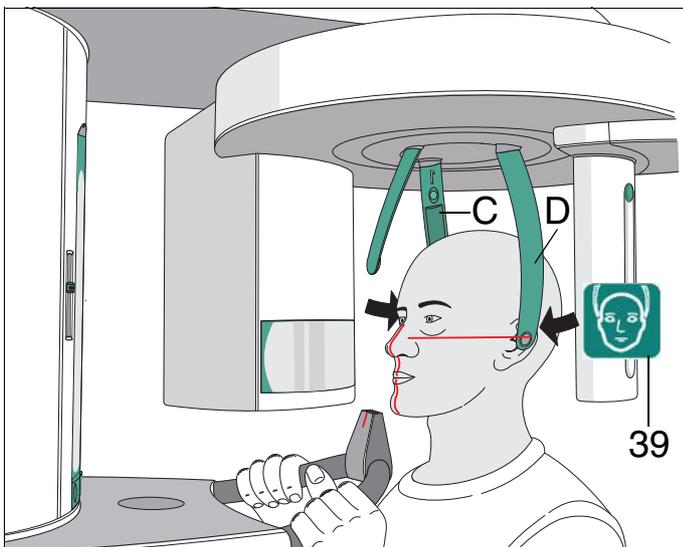
- Position the patient's head between the temporo-mandibular joint supports (C) and (D).
  Close the temporomandibular joint supports with key (39) on the Control Pad so that the ear holders fit into the outer auditory canals.

- With program **TM1/TM2** the patient's head is adjusted according to the **F**rankfort **H**orizontal plane **FH**.

- Align the center of the anterior teeth or of the face with the **midsagittal light line**.
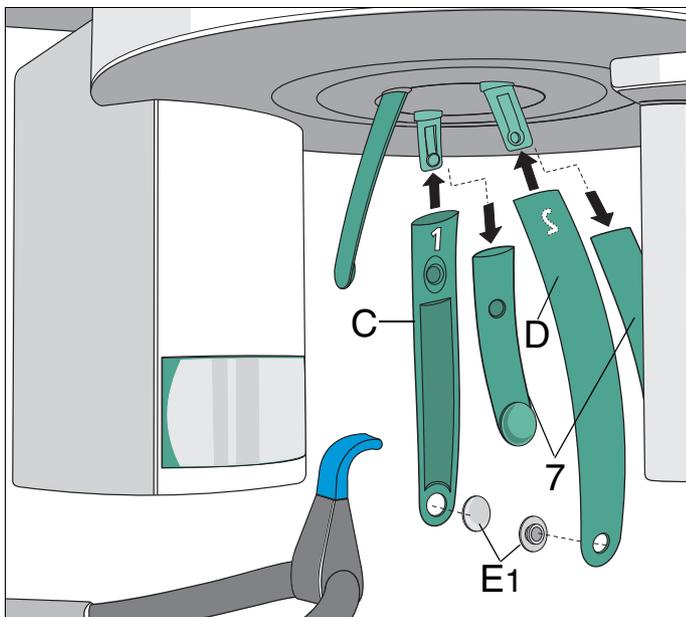
Sinus view, program S1: Paranasal sinuses with temporomandibular joint supports

- For sinus views, you must fit the temporomandibular joint supports (C) **"1"** and (D) **"2"** at the right and left side in place of the temple supports (7).
  To do so, remove the two temple supports (7) after pressing the corresponding locking button; instead, push in the two temporomandibular joint supports (C) and (D) until they engage.
  Two sterile contact pads (E1) must be plugged into the temporomandibular joint supports (C) and (D) due to the max. reclined position of the patient's head.

 **Fit blue** contact segment subnasally

6.3 Finishing the preparations (panoramic views)
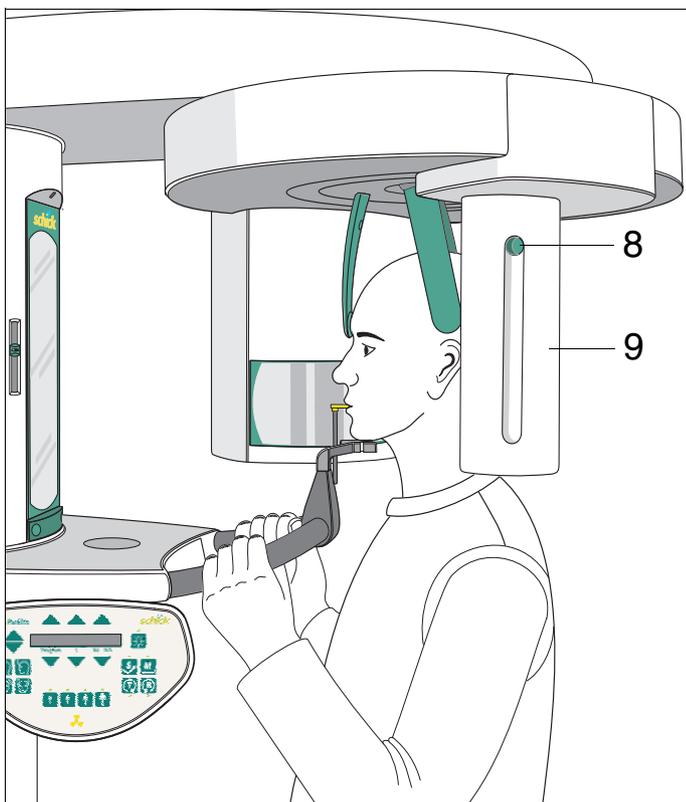
- If the light localizer is still on, switch it off with key (46) on the Control Pad. The LED in the key lights up.
- The sensor (9) must be inserted up to the stop. This is the case when the pushbutton (8) is flush with the surface.

If the sensor (9) is not inserted up to the stop, the help message "**H 401**" (Plug sensor into PAN slot) appears in the Control Pad display.

If any additional help messages appear on the digital display, they should be observed and processed in succession until only the program and its corresponding data are still displayed.

6.4   Selecting the exposure parameters
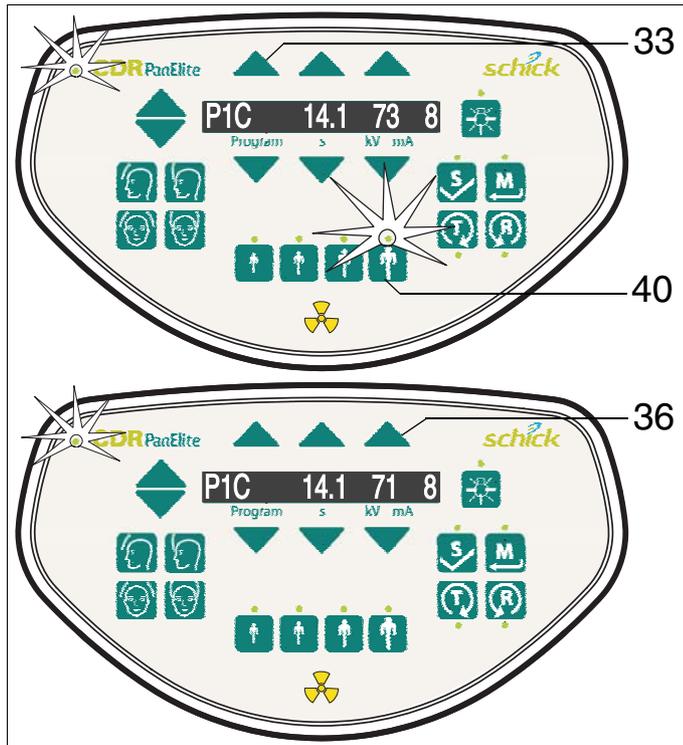
- Use the Δ forward / ∇ backward **program selection keys (33)** to select the appropriate exposure program. The program number, the appropriate exposure time and the programmed kV/mA values for the second patient symbol from the left appear on the digital display.

Sequence: P 1, P 1L, P 1R, P 1C, P 10, TM 1.1/ 1.2, S 1, MS 1, C 3, C 4, C 1, C 2.

The patient symbol keys are factory-programmed with kV/mA combinations:

- Select the exposure parameters by pressing one of the four **patient symbol keys (40)**.
  The LED above the selected patient symbol then lights up and the corresponding kV/mA value appears on the digital display.

Modifying the exposure parameters manually

If the default kV/mA combinations do not provide satisfactory results, you can manually select intermediate kV/mA values with the Δ forward / ∇ backward **kV/mA keys (36)**. In this case the LED above the patient symbol switches off. If the new value happens to agree with the value programmed for another patient symbol key, its LED then lights up.

6.5   Reprogramming the kV/mA values
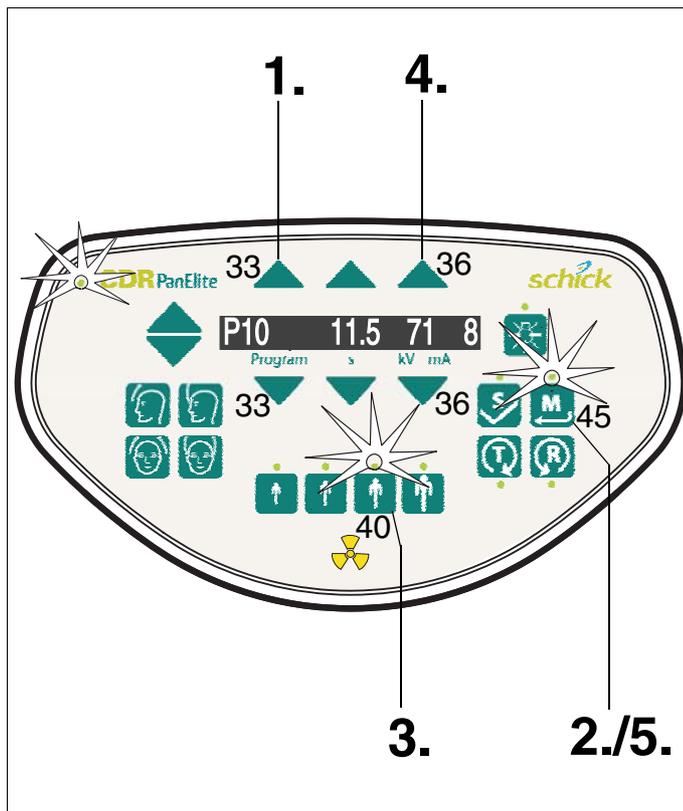
You can overwrite (reprogram) the factory-programmed kV/mA combinations for each preselected exposure program and for each individual patient symbol key.

Programming the patient symbols

1. Select the exposure program you would like to edit with the keys (33).

2. Press the **Memory** key (45) briefly; the LED above the key then lights up.

3. Select the patient symbol key (40) corresponding to the kV/mA-Wert you want to change. The LED above the key lights up.

4. Set the new kV/mA value with the keys (36).

5. Press the **Memory** key (45) briefly; the LED above the key briefly flashes and then switches off. The program display jumps back to P1 (for PAN programs) or C3 (for Ceph programs). **The new value is programmed.**

ℹ️ *NOTE*

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.

6.6 Starting the exposure
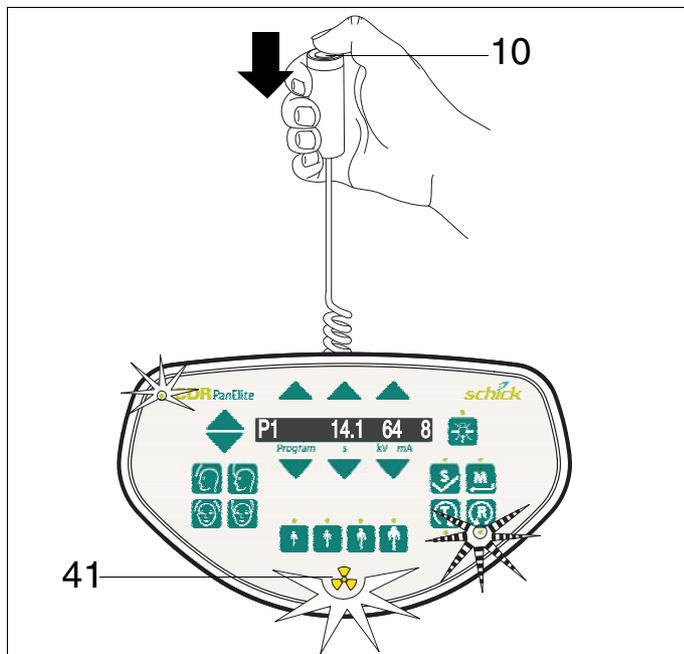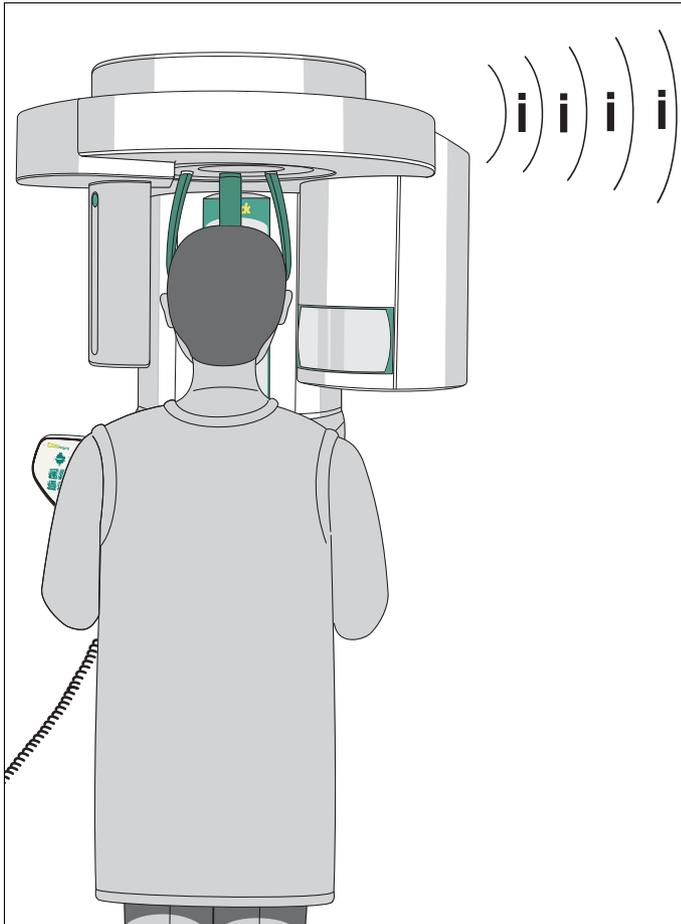
- **Observe the radiation protection regulations (see also chapter 1 "Warning and safety information"**

ℹ️ *NOTE*

*The help message **H...** must not alternatingly appear on the digital display of the Control Pad.*

ℹ️ *NOTE*

*If e.g. the door of the X-ray room is not properly shut, the message "**H 321**" (Close the door) appears on the digital display of the Control Pad and on the remote control.*

⚠️ *CAUTION*

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!

- To start the exposure, press and hold the exposure switch (10).

The rotary movement of the selected exposure program is performed automatically.

During radiation emission, the optical radiation indicator (41) on the Control Pad or on the remote control is illuminated.

In addition, an **acoustic signal** sounds during the entire radiation interval.

⚠️ *CAUTION*

Do not release the exposure switch prematurely. Radiation may be emitted several times during an exposure cycle. Wait until the unit has completed the exposure cycle.

- The exposure is finished when....

....a row of periods (..........) appears on the Control Pad and on the remote control that is displayed alternately with the program number.

....a short, pulsed series of tones can be heard at the end of the exposure (this can be disabled by the service engineer).

ℹ️ *NOTE*

The end of the exposure cycle results in an image acquired by CDR DICOM software and viewable on the PC monitor.

- For the two-part TM 1 temporomandibular joint program, TM 1.1 is automatically switched to TM 1.2 on the remote control and on the Control Pad after the end of the first part of the exposure.

In this case the exposure switch can be released.

In the meantime, the ring will move automatically back to the starting position. TM 1.2 is started and completed as described above.

• The forehead support and the temple supports open automatically, and the patient can leave the unit.

After completion of the exposure

The X-ray image is displayed in CDR DICOM on the PC monitor.

The digital display on the Control Pad again shows the exposure program, the kV/mA values and the actual radiation time.
The LED below the **R** key starts flashing.

• Acknowledge the exposure time actually needed by pressing the return key **R**.

• Then reset the rotating element to its starting position by pressing the return key **R** a second time.

The Ready LED goes out.
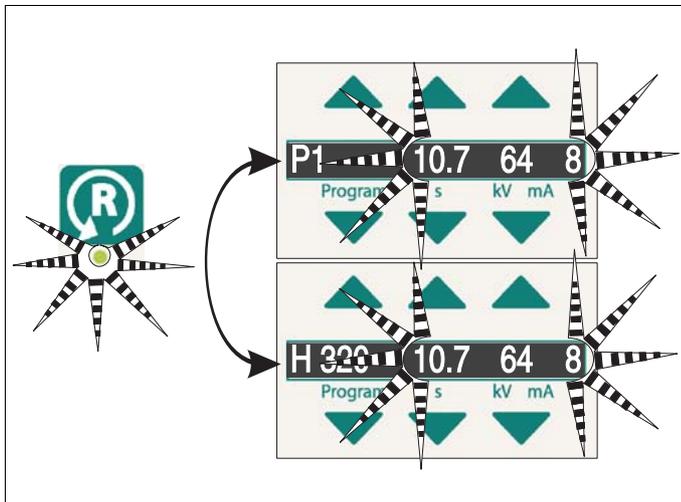
Interrupting an exposure

If you release the exposure switch prematurely, the exposure will be interrupted.

The digital display alternately shows the exposure time which had elapsed prior to exposure interruption and help message "H320".
The LED below the **"R"** key starts flashing.

• The exposure can be repeated after the help messages have been processed and the rotating element has returned to its starting position.

ℹ *NOTE*

Please note that any program settings which may have been changed must be preselected again before repeating the exposure.
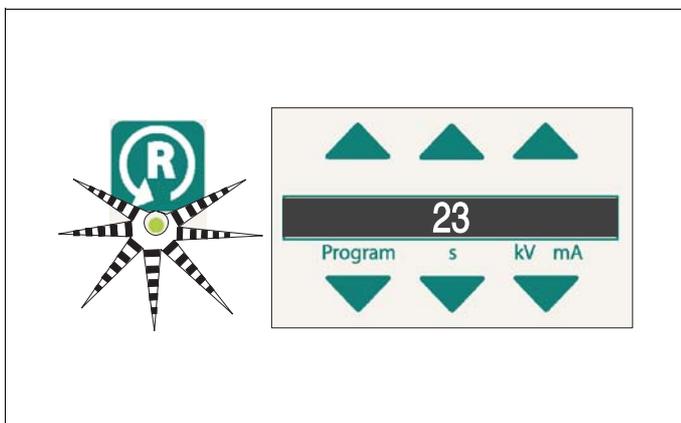
### Automatic exposure lockout

(thermal protection of the tube)

Premature start of a new exposure is prevented by the automatic exposure lockout function.

If the exposure switch is pressed during tube cooldown, the decrementing cooling time in seconds appears on the digital display.

If you release the exposure switch before the cooling time has expired, the Ready LED below the "R" key also starts flashing. After you press the "R" key, the program data again appears on the digital display.

Only after the cooling period has elapsed is it possible to start a new exposure.

6.7   Remote control
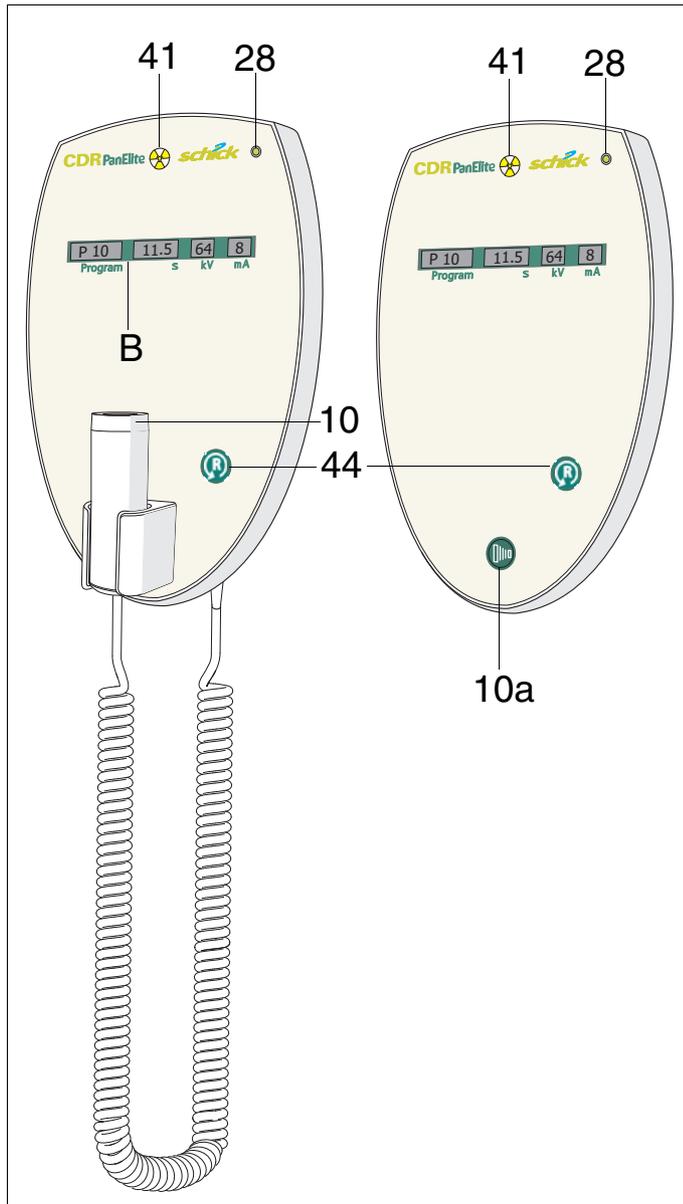
If the CDR PanElite is located in an X-ray room which has a door and enables visual contact with the patient, you can use **remote control** to start the exposure.

For that purpose, the **exposure switch (10)** can be detached from the unit and attached to the remote control.
The **exposure switch button (10a)** can be used if maintaining visual contact with the patient does not require a longer cable.

The remote control has an **"R" key** (44) for acknowledging the exposure and resetting the unit to its starting position, an optical (41) and acoustic **radiation indicator** as well as a **"Unit ON"** LED (28).

As long as **help messages** are displayed on the digital display of the Control Pad, they also appear on the **"Program"** display of the remote control, **alternating** with the **program name**.

Once all **help messages** have been processed, the **program name "Program"**, the **exposure time "s"** as well as the **"kV"** and **"mA"** values are displayed constantly on the **display panel (B).**
The exposure can be started now.

7 Cephalometric exposures (CEPH)

7.1 Preparing a cephalometric exposure (CEPH programs)
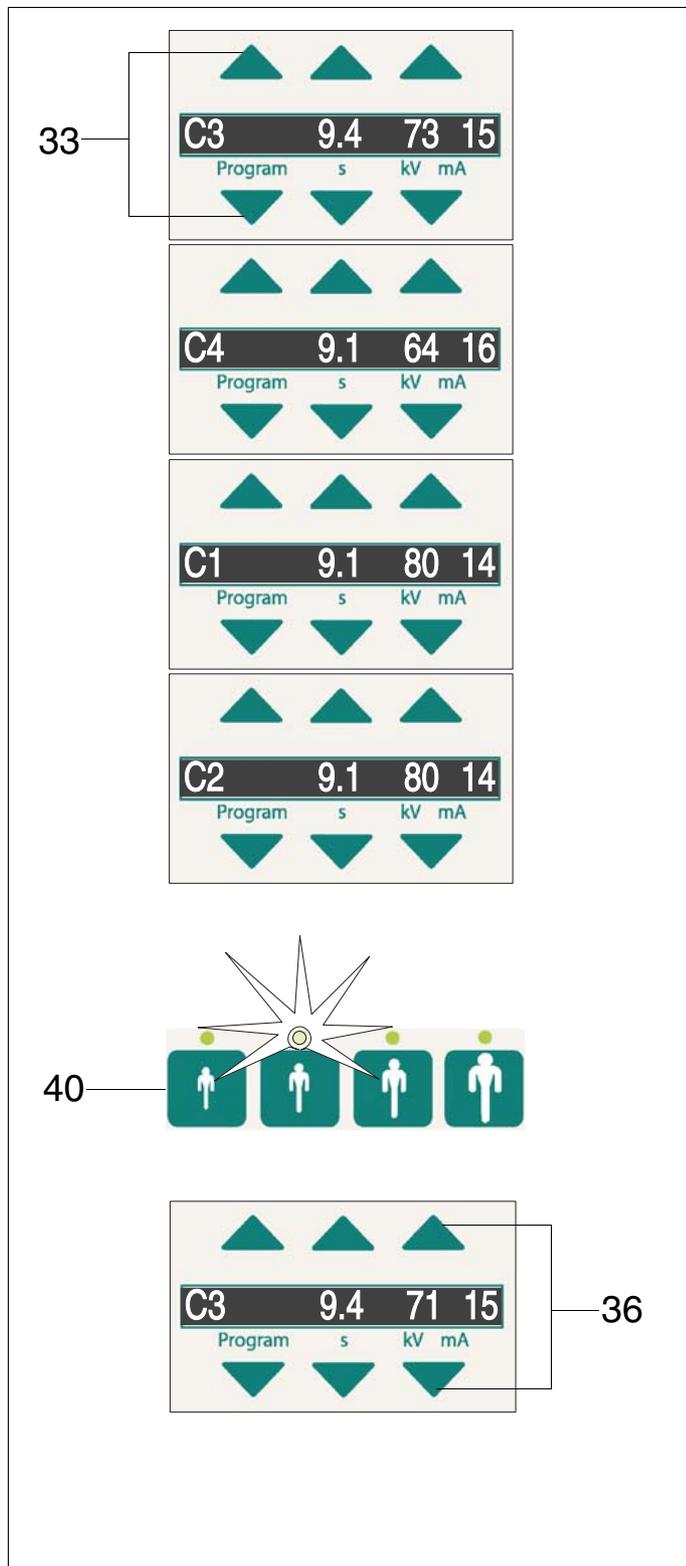
Selecting Ceph programs

Following PAN exposure programs P1 to MS1, you can make a selection from the list of Ceph programs **C3**, **C4**, **C1** and **C2**.

A selection can be made using the ∆ forward / ∇ backward **program selection keys (33)**

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 displayof the Control Pad..

Program **C3** lateral view (asymmetric A).

Program **C4** carpus view (symmetric S).

Program **C1** p.a. (symmetric S).

Program **C2** a.p. (symmetric S).

The Ready LED below the **"R"** key starts flashing.

⚠ CAUTION

Make sure that no patient is in the PAN rotating element or in the cephalometer.

Press the **"R"** key on the Control Pad now.
The rotating element moves into the position for cepha-lometric radiography. The secondary diaphragm and the ceph sensor on the cephalometer move all the way to the rear for patient positioning.

The patient symbol keys are factory-programmed with kV/mA combinations:

Select the exposure parameters by pressing one of the four **patient symbol keys (40)**.
The LED above the selected patient symbol then lights up and the corresponding kV/mA value appears on the digital display.

Modifying the exposure parameters manually

If the default kV/mA combinations do not provide satis-factory results, you can manually select intermediate kV/mA values with the ∆ forward / ∇ backward **kV/mA keys (36)**. In this case the LED above the patient symbol switches off. If the new value happens to agree with the value programmed for another patient symbol key, its LED then lights up.

18x23   **30x23**
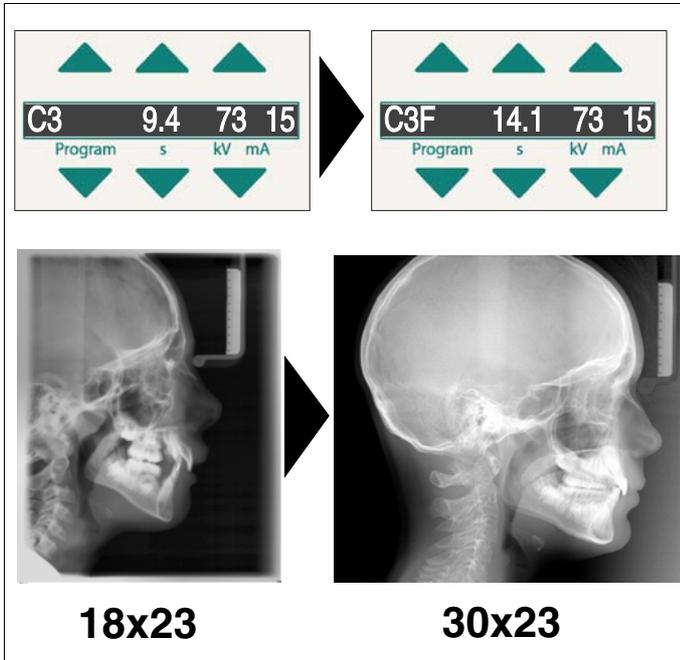
Full format program C3F (30x23) cm

Program **C3F** (30x23) cm enables you to generate a full format lateral view.
This view shows the entire head of the patient (not cut off at the back).

Your service engineer can permanently change the default program setting from **C3** (18x23) cm to **C3F** (30x23) cm if you wish.

ℹ️ *NOTE*

By default, the patient's face points to the right in the display of lateral view C3 or C3F.
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 are will then also be displayed "mirrored", i.e. laterally reversed.

7.2 Preparations on the cephalometer
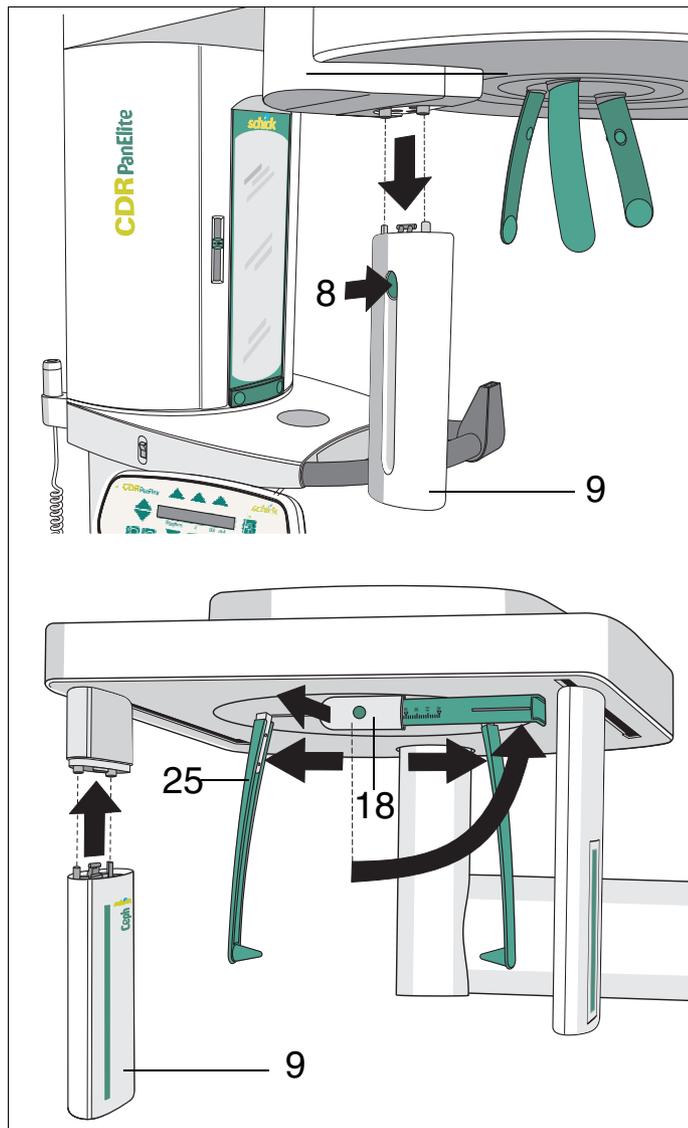
Inserting the sensor

If you operate the unit with one sensor only, you must remove the sensor (9) from its slot in the rotating element for pan exposures and plug it into the slot on the cephalometer.

ℹ️ *NOTE*

To remove the sensor, hold it firmly, press the pushbutton (8) all the way in and hold it down. Remove the sensor from its holder by pulling it downward.

⚠️ *CAUTION*

DO NOT DROP THE SENSOR!
A shock sensor for detecting shocks or dropping is built in.

⚠️ *CAUTION*

When removing the sensor from the pan/ceph slot, and also with an already removed sensor, make sure not to touch the sensor plug on the unit end, especially not while touching the patient at the same time.

Slide the sensor with its two guide bolts into the guide sleeves and push it up to the stop; it is not necessary to press the button (8) when doing this.

If the sensor (9) has not been pushed fully into the slot on the cephalometer, help message **H 402** "Plug sensor into Ceph slot"
 appears on the digital display of the Control Pad..

If a PAN sensor has accidentally been plugged into the Ceph slot, help message **H 404**
(Plug in Ceph sensor) is displayed.

ℹ️ *NOTE*

If you operate the unit with two sensors, the PAN sensor may remain in its slot on the rotating element.

- Hold the nasion support (18) at its upper front end, pull it toward the front as far as possible and fold it up toward the side.
- Hold the ear plug holders (25) at their upper ends and push them outward as far as possible.
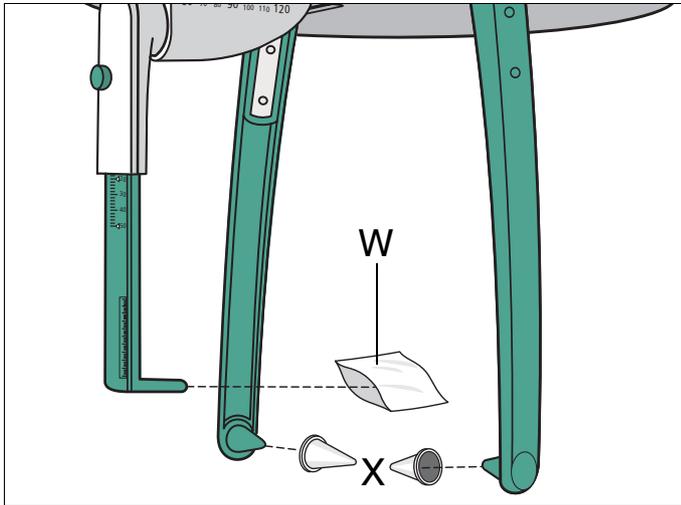
Fitting the hygienic protective covers

W   For nasion support,
        disposable
        (100 piece) Order No. 33 14 106

X   For ear plugs,
        reusable (sterilizable)
        (20 piece) Order No. 89 32 261

## 7.3   Positioning a ceph patient
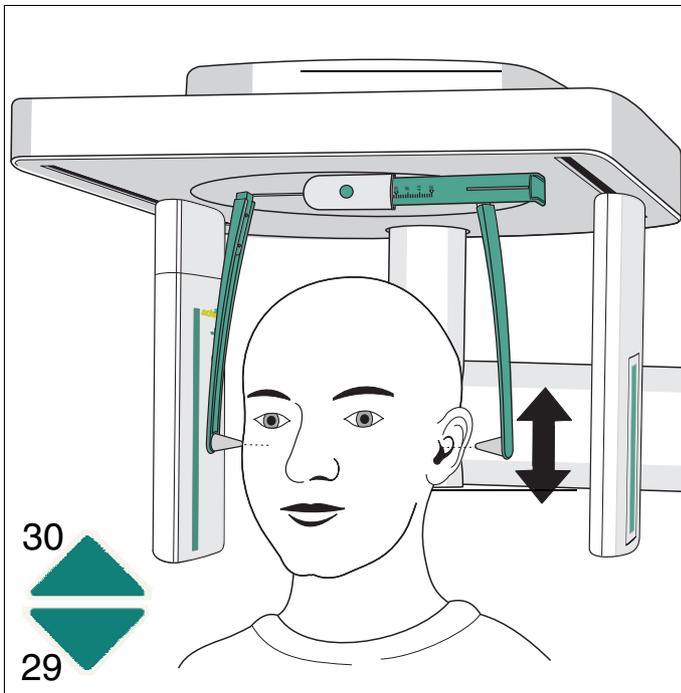
Preparations

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.

Adjusting the height of the unit

Move the cephalometer to approximately the height of
the patient's head and have the patient step back into
the head support.

Position patients with a body height between
approx. 3 ft 7 in (93 cm) and **approx. 6 ft 6 in (197 cm)**
standing between the ear plug holders, and **taller** or
shorter patients **sitting** on a fixed, height-adjustable
chair with a short backrest.

Press the "**upward movement**" key (30) or the "**down-
ward movement**" key (29) on the Control Pad and
adjust the height of the cephalometer so that the ear
plugs are at the height of the outer auditory canals.
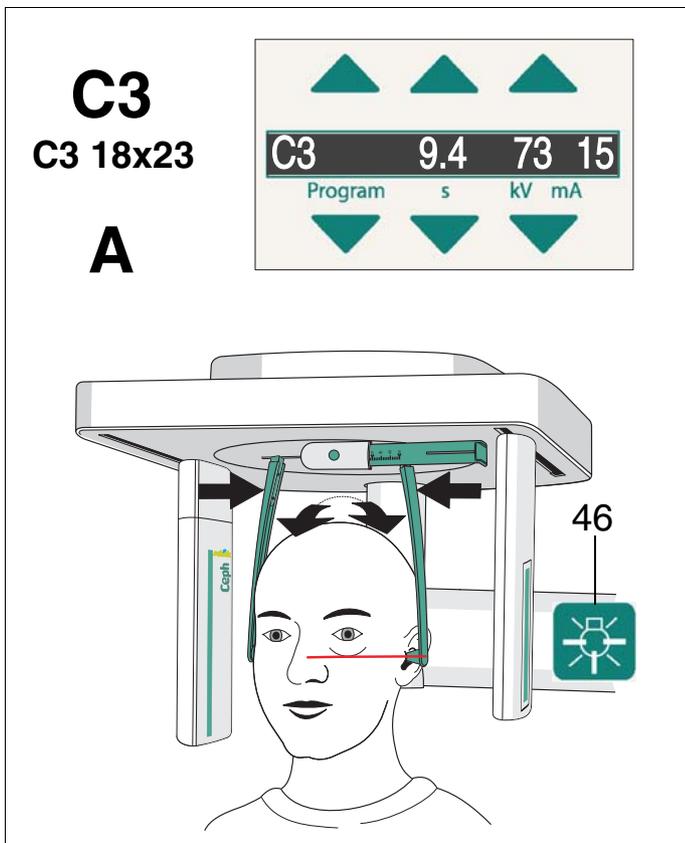
C3 lateral view (A = asymmetric)

For **lateral views**, the patient must be standing with his/her **face toward the front**.

Insert the ear plugs into the outer auditory canals. Hold the ear plug holders **at the very top** when doing this.

Switch on the light localizer

with key (46) on the Control Pad.

The secondary diaphragm with the light localizer for the positioning of the FH line moves far to the front.

When acquiring lateral views, the light localizer serves for adjusting the head according to the **FH** (**F**rankfort **H**orizontal plane) and will switch off automatically after approx. 100 seconds or automatically as soon as the exposure starts.

The light line shows the FH plane.

Have the patient incline or lift his/her head until the adjustment is perfect.

The LED above the key remains lit as long as the light localizer is switched on.

ⓘ *NOTE*

Make sure that the light beam does not hit the patient's eyes (laser light).
The light localizer switches off automatically after approx. 100 seconds.

If necessary, fine-tune the head inclination using keys (29) and (30) on the Control Pad.
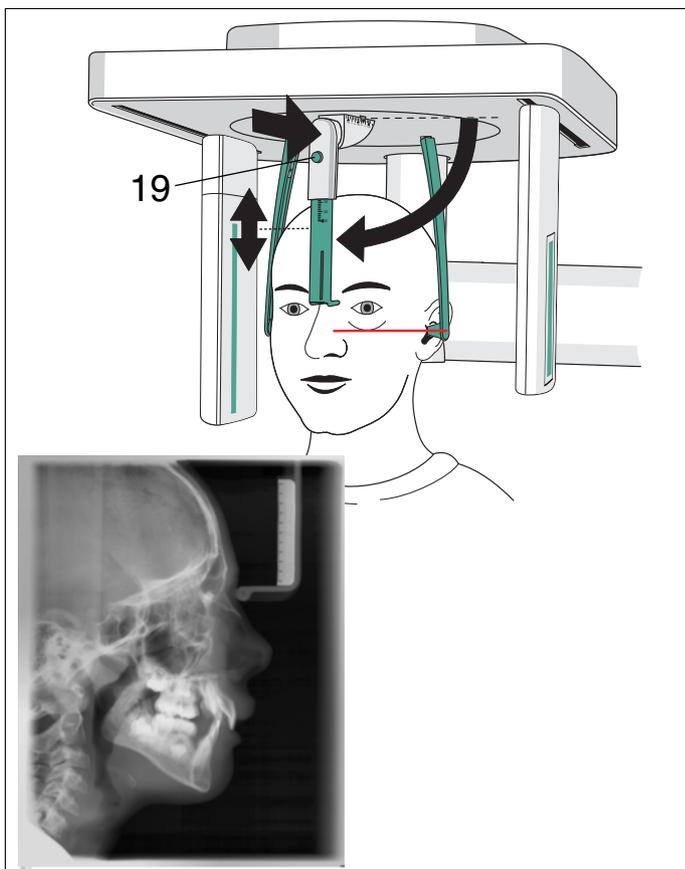
Adjusting the nasion support

Fold down the nasion support.

Slightly press and hold down the locking knob (19) while adjusting the nasion support in vertical direction to the height of the nasal root.
Push the locking button (19).
Carefully push the nasion support back to the nasal root.

If the light localizer is on, switch it off now.

Select the kV/mA values by pressing one of the four patient symbol keys on the Control Pad.

The secondary diaphragm and the sensor move all the way to the front and into the starting position for scanning.

Now you can start the exposure.

33

**C4
S**

C4   9.1   64 16
Program   s   kV mA

S A

B

26

B
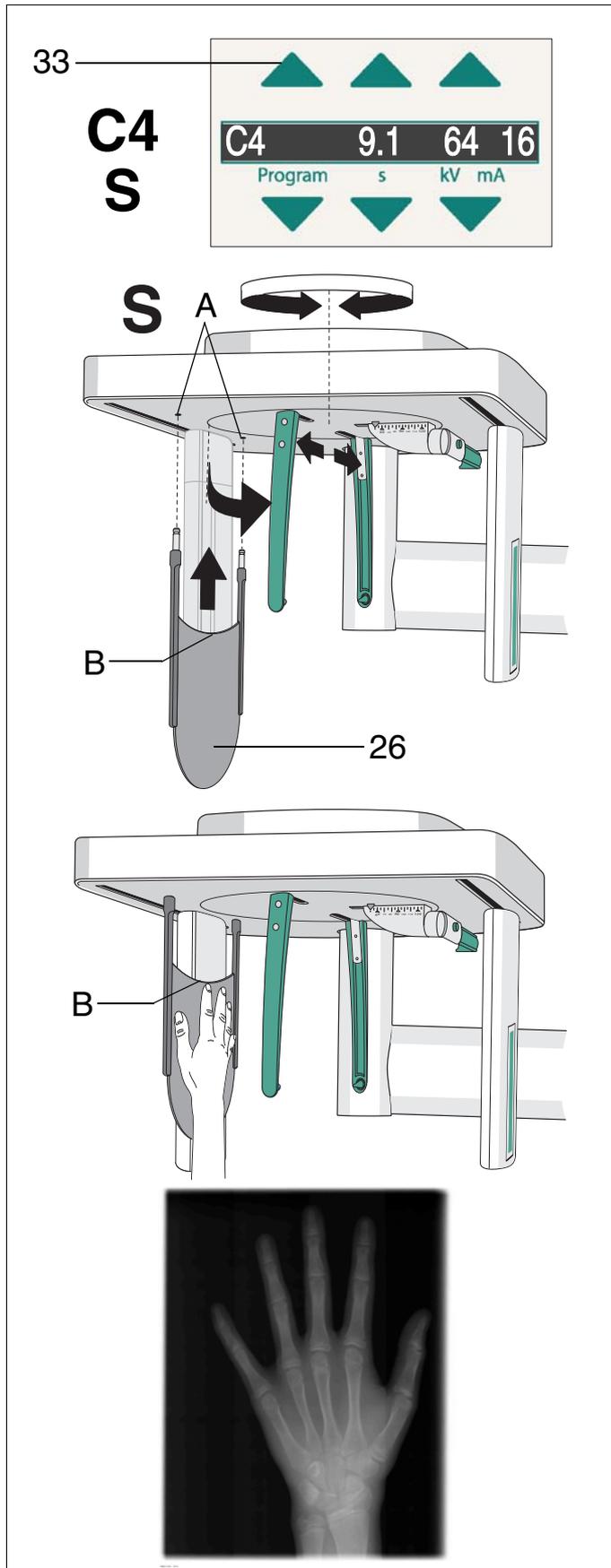
C4 Carpus views
(S = symmetric)

Select Ceph program **C4** with the program keys (33) on the Control Pad.

For carpus views, the ear plug holders must be in the S position.

Hold the ear plug holders at their upper ends and push them outward as far as possible.

For **carpus views** you must rotate the ear plug holders by 90° in such a way that the **folded-up** nasion support points toward the secondary diaphragm.
Hold the ear plug holders **at the very top** when doing this.

Hold the carpus support plate (26) at its left and right side and push it into the two holes (A) **until it engages**.

To remove the carpus support plate, hold it laterally and simply pull it out downward firmly.

The carpus support plate can be disinfected by spraying or wiping.

Place the patient beside the cephalometer.
Have him/her place his/her hand flat on the support plate. The patient's fingertips must not extend beyond the upper edge (B). His/her hand and arm must form a straight line.

⚠ CAUTION

The patient must press the hand only slightly against the support plate!

C1 p.a.
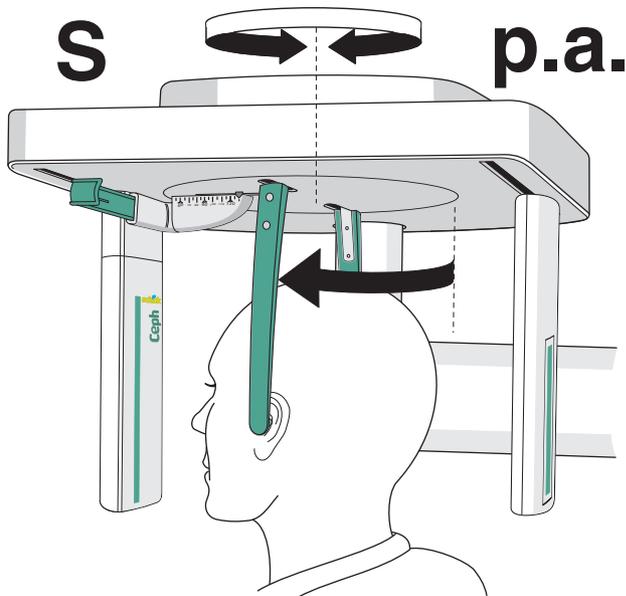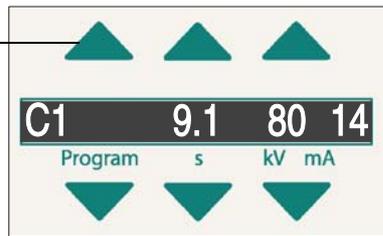
C1 p.a. views
(S = symmetric)

Select Ceph program **C1** with the program keys (33) on the Control Pad.

For symmetric exposures, the ear plug holders must be rotated by 90° into the S position.

Rotate the ear plug holders by 90° so that the **folded-up** nasion support points toward the sensor.

For a **symmetric p.a. view**, have the patient turn so that he/she faces the sensor **(p.a.)** after height adjustment and **before closing the ear plugs**.

Insert the ear plugs into the outer auditory canals. Hold the ear plug holders **at the very top** when doing this.

C2 a.p.

33 ──────

C2   9.1   80 14
Program   s   kV mA

S   a.p.
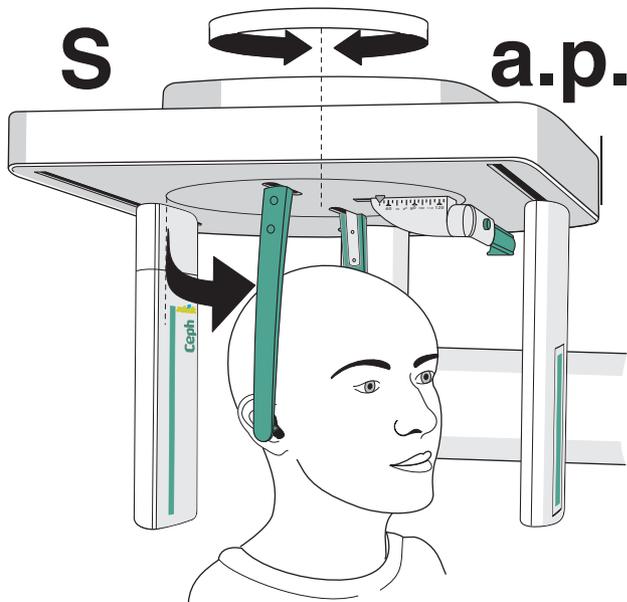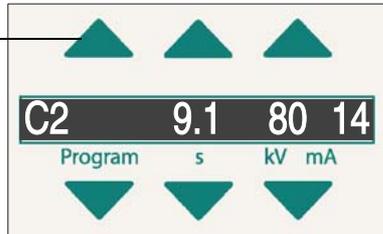
C2 a.p. views
(S = symmetric)

Select Ceph program **C2** with the program keys (33) on the Control Pad.

For symmetric exposures, the ear plug holders must be rotated by 90° into the S position.

Rotate the ear plug holders by 90° so that the **folded-up** nasion support points toward the secondary diaphragm.

For a **symmetric a.p. view**, have the patient turn so that he/she faces the secondary diaphragm **(a.p.)** after height adjustment and **before closing the ear plugs**.

Insert the ear plugs into the outer auditory canals. Hold the ear plug holders **at the very top** when doing this.

7.4 Taking a cephalometric exposure
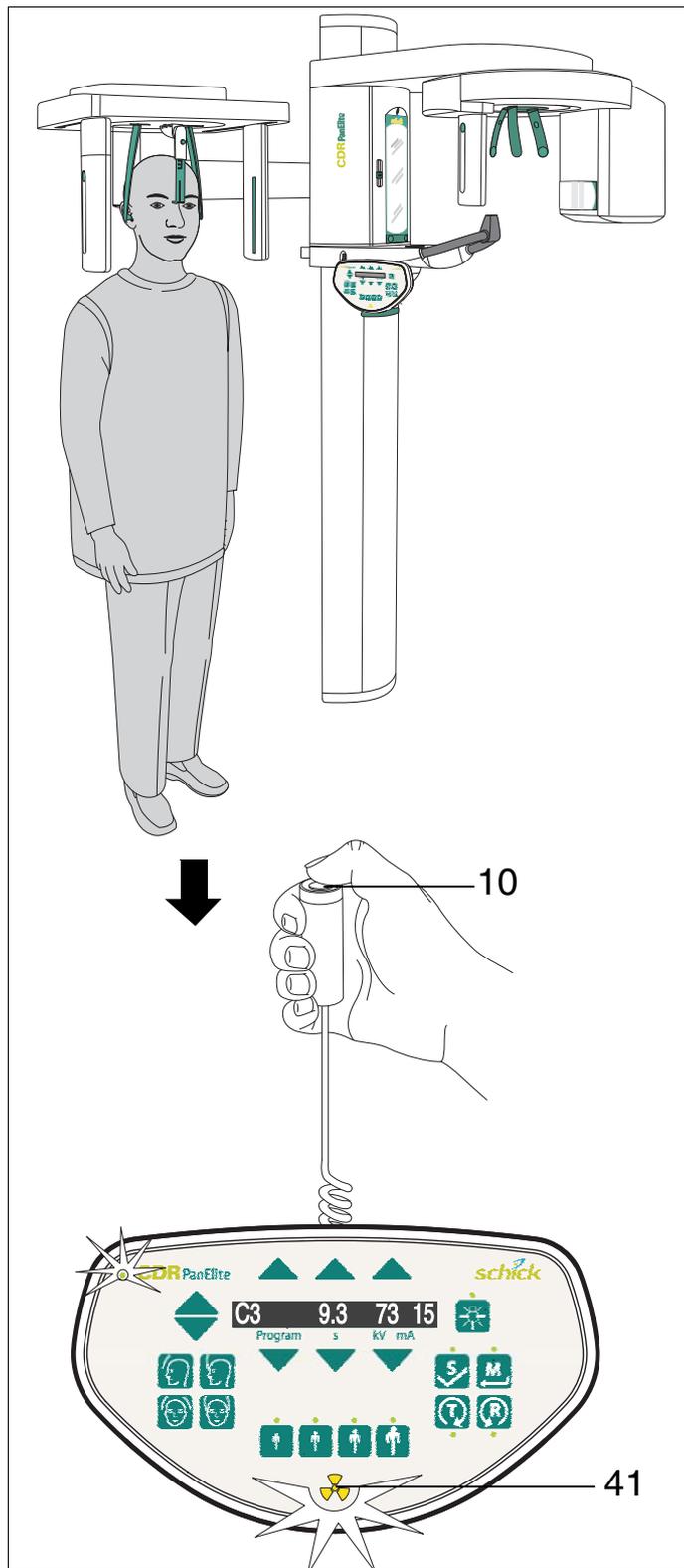
ℹ NOTE

The movements of the unit must not be obstructed by physical constitution nor clothing, dressings, wheel-chairs or hospital beds! Perform a test cycle with the "T" key, see also "General safety information".

- **Observe the radiation protection regulations (see also chapter 1 "Warning and safety information"**

ℹ NOTE

*The help message **H...** must not alternatingly appear on the digital display of the Control Pad.*

⚠ CAUTION

The patient's arms must hang down freely at the 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 scan and monitor the patient to ensure that he/she remains motionless.

Trigger the exposure scan by **pressing and holding down the exposure switch** (10).

While radiation is active the optical radiation indicator (41) is illuminated.

In addition, an **acoustic signal** sounds during the entire radiation interval.

⚠ CAUTION

Take care not to let go of the exposure switch prematurely. Wait until the unit has completed the exposure cycle.

- The exposure is finished when....
  ....a row of periods (..........) appears on the Control Pad and on the remote control that is displayed alternately with the program number.
  ....a short, pulsed series of tones can be heard at the end of the exposure (this can be disabled by the service engineer).

ℹ NOTE

The end of the exposure cycle also results in an image acquired by CDR DICOM software and viewable on the PC monitor.

After the scanning operation, from front to rear, secondary diaphragm and sensor remain at the rear in the position required for positioning the next patient.
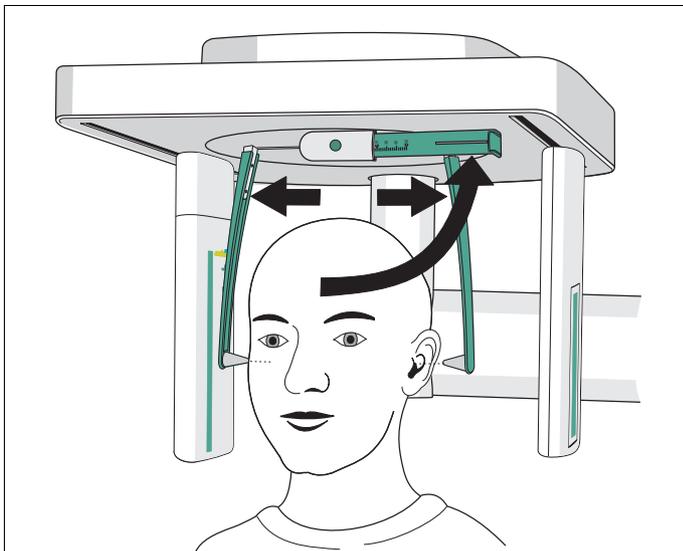
Once the exposure is complete, push the ear plug holders outward as far as possible; with a lateral view, pull the nasion support toward the front as far as possible and fold it up toward the side.
The patient can now step out of the unit.

After completion of the exposure

the X-ray image is displayed on the PC monitor in CDR DICOM.

The digital display on the Control Pad again shows the exposure program, the kV/mA values and the actual radiation time.

- Acknowledge the exposure time actually needed by pressing the return key **(R)**.

- Then reset the rotating element to its starting position by pressing return key **R** a second time.
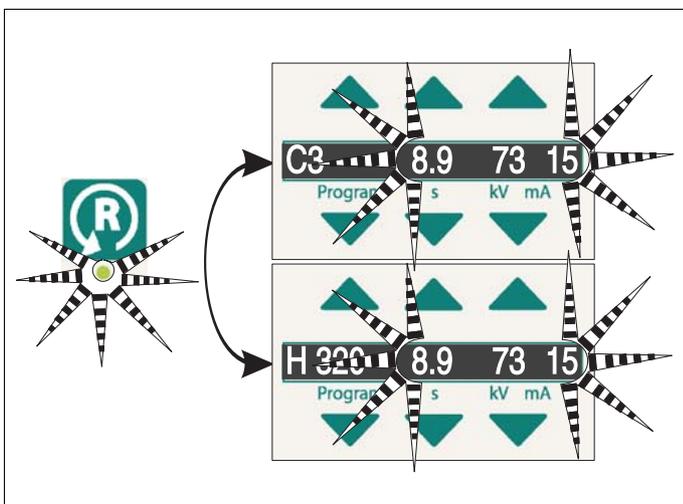
Interrupting an exposure

If you release the exposure switch prematurely, the exposure will be interrupted.

The digital display alternately shows the exposure time which had elapsed prior to exposure interruption and help message "H 320".
The LED below the **"R"** key starts flashing.

- Confirm by pressing the **"R"** key on the Control Pad.

- When the **R** key is pressed again, the X-ray tube assembly moves to the starting position and the secondary diaphragm and Ceph sensor move forward into the exposure position.

- The exposure can then be repeated.

🛈 *NOTE*

Please note that any program settings which may have been changed must be preselected again before repeating the exposure.
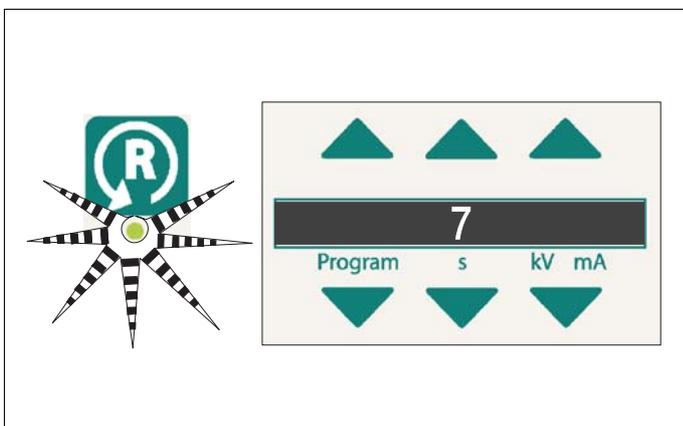
Automatic exposure lockout

(thermal protection of the tube)

Premature start of a new exposure is prevented by the automatic exposure lockout function.

If the exposure switch is pressed, the decrementing cooling time in seconds appears on the digital display.

If you release the exposure switch before the cooling time has expired, the Ready LED below the "R" key also starts flashing. After you press the "R" key, the program data again appears on the digital display.

Only after the cooling period has elapsed is it possible to start a new exposure.

8   Info and Service menus

8.1   Info menu

The info menu is intended for the dialog with the service engineer.

You can reach the Info menu by pressing the **Memory button (45)** for >2 seconds.

The **Info menü** appears on the digital display.

You can select various parameters from the list with the Δ forward / ∇ **backward program selection keys (33)** .

If you then briefly press the **Memory button (45)** again, a corresponding value appears on the digital display.

You can switch back to the parameter list by briefly pressing the **Service menu key (42)**. Pressing this key again causes exposure readiness to reappear.

8.2   Service menu

The Service menu is intended **only for the service engineer**.

The **service engineer** can reach the Service menu by pressing and holding the **Service menu key (42)** >2 seconds.

The LED above the Service menu key lights up, followed by the LEDs above all patient symbol keys (40).
The ready-for-operation LED (28) starts flashing.

Then a PIN must be entered by the service engineer.

If an incorrect PIN is entered or no entry is made within 5 seconds, the program then returns to exposure readiness.

It is also possible to quit the Service menu by briefly pressing the **Service menu key (42)**.

9 Program values

9.1 Panoramic views – program values for index 4A

Index 4A
Index 4A specifies a reduced level series for children and adolescents. National regulations must be complied with.
The table lists the maximum exposure times.

Program	Program duration approx.	Exposure time max.	Factory-programmed values for index **4A**				Custom programmed values – please enter here –			
P1	19.0s	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				
P1C	20.1s	14.1s	62/8	64/8	69/15	73/15				
P10	16.4s	11.5s	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	57.3s	21,7	73/8	77/7	80/14	84/13				

Tabelle 1: Possible kV / mA combinations for preselected patient symbols 1 and 2

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

Tabelle 2: Possible kV / mA combinations for preselected patient symbols 3 and 4

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

9.2   Program values for cephalometric images

The radiation time ranges between 9.1s and max. 14.9s.

Table: Cephalometric exposures

Program	Max. exposure time	Factory-programmed values				Freely-programmed values – please enter here –			
		👤	👤	👤	👤	👤	👤	👤	👤
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				
C1	9.1s	80/14	80/14	84/13	90/12				
C2	9.1s	80/14	80/14	84/13	90/12				

Table: Possible kV / mA combinations

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

10 List of messages

10.1 List of help messages

A number of H... help messages may appear on the Control Pad when you try to start an exposure:

- Press the **exposure switch**. **ATTENTION Observe radiation protection measures**.
  The **H3 / H4 / H5 ..** message appears on the Control Pad.
- See list below about how to proceed to make the system ready for exposure.

Help message	Measures required	Description
H3 01	R key, move into starting position.	The rotating element is not in the starting position.
H3 20	R key, confirm exposure data.	The exposure parameters have not been acknowledged yet.
H3 21	Close the door.	Check door contact of the X-ray room.
H4 01	Plug sensor into PAN slot.	The sensor is not in the appropriate slot for the exposure selected.
H4 02	Plug sensor into Ceph slot.	The sensor is not in the appropriate slot for the exposure selected.
H4 03	Switch CDR DICOM to ready for exposure state	CDR DICOM is not ready for exposure.
H4 04	Plug in Ceph sensor	The sensor does not match the selected exposure
H4 06	R key, move into Ceph starting position.	Ceph is not in the starting position
H4 20	Get exposure with CDR PanElite Rescue program.	The image could not be transferred to CDR DICOM. See CDR DICOM User Guide. **ATTENTION** Do not switch off the system until the help message has disappeared.

The above measures clear those help messages that result from operator errors.
If it is not possible to clear the help message by taking the appropriate measure, another type of error is the cause.
To locate the error, proceed as described on the following pages.

10.2   Error message structure

The error messages are displayed in the form of an error code. They are not provided in plain-text form.

12.2.1 The error message code has the following structure:

Ex yy zz

Ex	Error type / "troubleshooting" classification for the user
yy	Location; module; subsystem or logical function unit
zz	Consecutive number with error identification

All error messages of the system are grouped according to these criteria.

12.2.2 Ex

Digit (x) is intended to provide the user with quick help in deciding how to deal with this error.

Ex	Description	Measures required	Error group
1	System warning; system message	Acknowledge the error message. Contact your Customer Service. Continued operation of the system is ensured.	This error group includes all errors that indicate still acceptable tolerance variations, or messages about states which do not directly affect system operation.
2	Errors caused by system overload	Acknowledge the error message. Repeat the procedure step after a certain waiting time. If the error message re-appears, prolong the waiting time. If the error state persists, contact your Customer Service.	This error group includes states that indicate e.g. temporary overtemperatures or the like. The cause of the error disappears automatically after a certain waiting time.
3	The system detects that a key was pressed during power-on.	Switch the system off and back on; if the error re-occurs without any user intervention, contact your Customer Service. **ATTENTION!** After switching the unit off with the main switch, you must wait for approx. 2 minutes before switching it back on.	This error group includes all errors that indicate invalid signal states of keys and safety signals during power-on.
4	Malfunction or mechanical obstruction of unit movements	Acknowledge the error message; make sure that the movements of the unit are not obstructed. Repeat the last procedure step or exposure. If the error re-occurs without any identifiable cause -> contact your Customer Service	This error group includes all errors that indicate problems with the motor-controlled movements on the outside of the unit.

Ex	Description	Measures required	Error group
5	Malfunction during the exposure or during exposure preparation.	Acknowledge the error message to continue system operation. Repeat the last procedure step or exposure. If the error re-occurs -> contact your Customer Service.	This error group includes all errors resulting from a certain system action triggered by the user which could not be performed because a required (internal) partial function (SW or HW) is not ready or fails
6	Error during system self-test.	Acknowledge the error message to continue system operation. If the error occurs repeatedly, switch the system off and back on; if the error re-occurs -> contact your Customer Service.	This error group includes all errors which may occur spontaneously and without any related operator action. They may be caused by system self-tests.
7	Unrecoverable system error.	Switch off the system; immediately contact your Customer Service.	This error group includes all errors which may occur spontaneously and without any related operator action. They may be caused by system self-tests. In this case it is absolutely certain that continued system operation is not possible.

12.2.3 yy

Digits (yy) define the location or logical function unit where the error has occurred.

10	Central control DX 11; system hardware
11	Central control DX 11; system software
12	Central control DX 11; central CAN bus errors
13	Central control DX 11; DX11, DX1 periphery (motor system of stand, sensor system of stand)
14	Central control DX 11; digital extension (HSI, network...)
15	Central control DX 11; configuration (wrong software, wrong module constellation, etc.)
06	Tube assembly
71	User interface
91	Ceph digital
81	Sensor
41	Media Interface Card
42	Remote
61	Diaphragm control

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

12.2.4 zz

Digits (zz) show a consecutive number with the error identification.

11 Care of outer surfaces

Cleaning

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

Do not allow liquids to penetrate into the ventilation slots!

Wipe off any medicaments that may come into contact with the surface immediately.

Disinfecting

Surfaces can be wiped with surface disinfectants. Observe manufacturer's instructions regarding restrictions for use! Only use tested and approved disinfectants (e.g. MinutenSpray classic, PlastiSept from Alpro, or FD 333, FD 312 from Dürr)!

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

12 Inspection and maintenance

Inspection and preventive maintenance must be performed at predetermined intervals to guarantee the health and safety of patients, users and third persons.

12.1 Annual check by the system owner or other authorized persons

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

12.2 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.

12.3 Image quality check

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

On digital image receptor systems, image quality is assessed on the basis of the increasing number of brightness or contrast adjustments provided by the postprocessing functions of the image processing software (e.g., CDR DICOM).

If, after taking into account the patient's anatomy and excluding possible sources of error such as patient positioning, this assessment criterion produces insatisfactory results, you should immediately contact your Customer Service to have possible system faults rectified.

Observe any possible additional national requirements.

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