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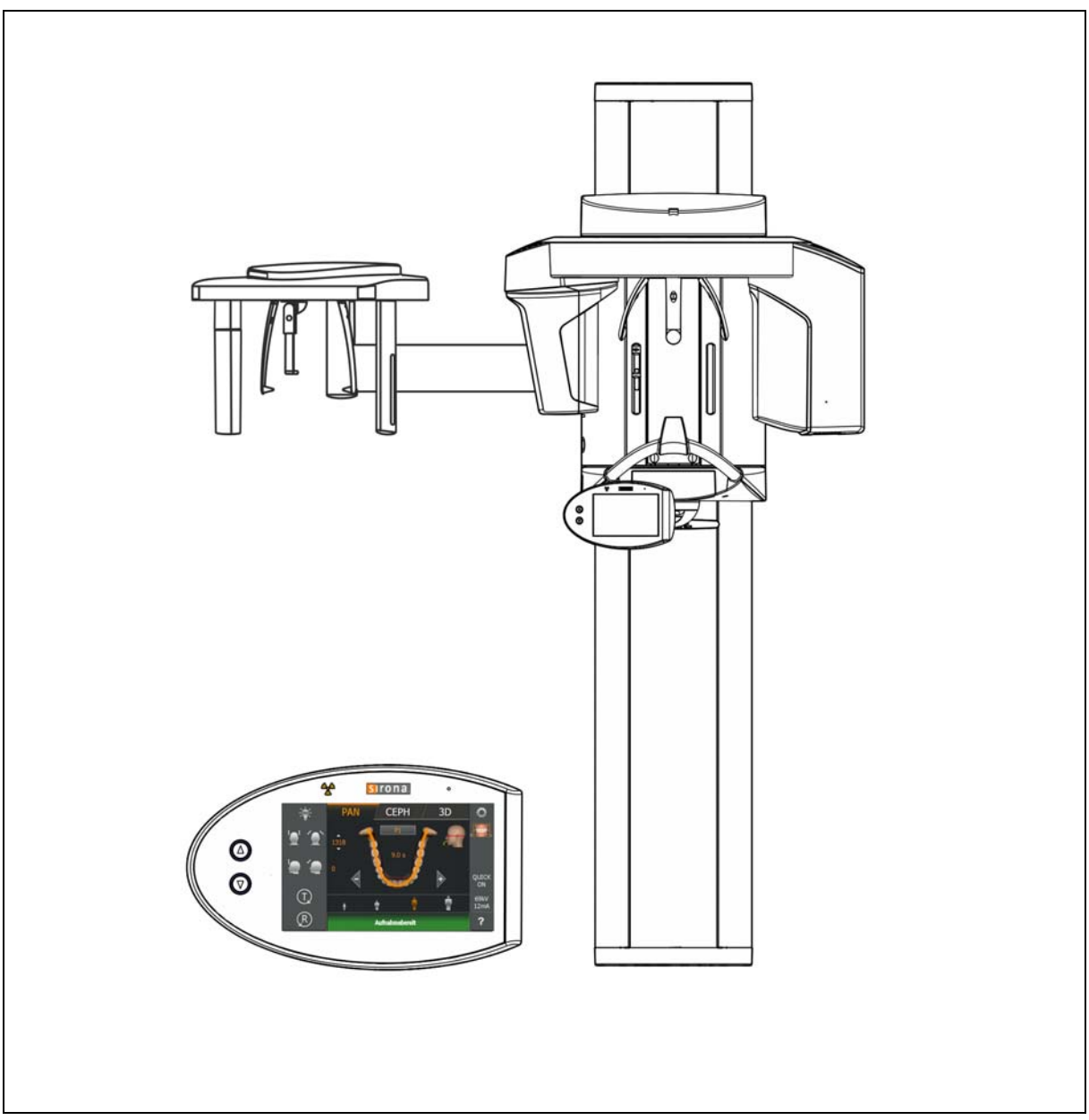
sirona
The Dental Company

ORTHOPHOS SL 2D
ORTHOPHOS SL 2D / Ceph
ORTHOPHOS SL 3D
ORTHOPHOS SL 3D / Ceph

Installation Manual

English



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1 About these Installation Instructions

1.1 Structure of the document

1.1.1 Identification of the danger levels

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

IMPORTANT

Application instructions and other important information.

Tip: Information on making work easier.

1.1.2 Formats and symbols used

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

✓ Prerequisite **1.** First action step **2.** Second action step or ➢ Alternative action ↳ Result ➢ Individual action step	Requests you to do something.
See "Formats and symbols used [→ 10]"	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.

1.2 Scope

These installation instructions describe the installation of the ORTHOPHOS SL digital X-ray unit/digital volume tomograph. They are intended for use exclusively by trained and authorized distributors and service technicians.

1.3 Other relevant documents

In addition to these installation instructions you will require the following documentation:

Wiring diagrams

- ORTHOPHOS SL Wiring References: REF 64 95 233

Installation Instructions

- ORTHOPHOS SL Software Installation: REF 65 44 287
- GALAXIS Operator's Manual: REF 61 23 488
- SIDEXIS 4 Installation Instructions: REF 64 47 200

Service Manual

- ORTHOPHOS SL Service Manual: REF 64 95 258

Current Service Documentation, such as the Service Manual, can be downloaded from the Sirona dealer website.

2 Safety instructions

2.1 Information on the unit

The following symbols are applied to the unit:

Accompanying documents

This symbol is affixed next to the unit rating plate.

Meaning: When operating the unit, observe the operating instructions.

This symbol is affixed on the unit rating plate.

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

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" [→ 14].

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.

2.2 Fixed connection

⚠ DANGER

Potentially lethal shock hazard!

Fixed connection!
Installing a mains plug instead of the specified fixed connection infringes international medical regulatory actions and is prohibited. In case of error, this puts patients, users, and other parties seriously at risk.

2.3 Ventilation slots

Never cover the ventilation slots on the unit under any circumstances, since this may obstruct air circulation. This can cause the unit to overheat.

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

2.4 Condensation

Extreme fluctuations of temperature may cause condensation inside the unit. Do not switch the unit on before it has reached normal room temperature. See also Technical Data.

2.5 Qualifications of service personnel

Installation and startup may be carried out only by personnel specifically authorized by Sirona.

2.6 Switching the unit on

Due to the risk of injury caused by malfunction, no person may be positioned in the unit when it is switched on.

2.7 Radiation protection

The valid radiation protection regulations and measures must be observed. The statutory radiation protection equipment must be used.

During an exposure, the service engineer should move as far away from the X-ray tube assembly as the coiled cable of the manual release permits.

With the exception of the service engineer, no other persons are allowed to stay in the room during an exposure.

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

NOTICE

3D imaging should not be used for screening examinations. 3D imaging examinations must be clinically warranted and each exam must be justified by demonstrating that the benefits outweigh the risks.

NOTICE

Where it is likely that evaluation of soft tissues will be required as part of the patient's radiological assessment, the appropriate imaging should be conventional medical CT or MR, rather than 3D imaging using Cone Beam technology.

2.8 Laser light localizer

The system incorporates Class 1 laser products.

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

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.

2.9 Modifications 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 Sirona accessories or third-party accessories expressly approved by Sirona. The user is responsible for any damage resulting from the use of non-approved accessories.

2.10 Transport safety devices

IMPORTANT
The transport safety devices (marked in red) attached to the unit must be removed prior to initial startup.

2.11 Electromagnetic compatibility

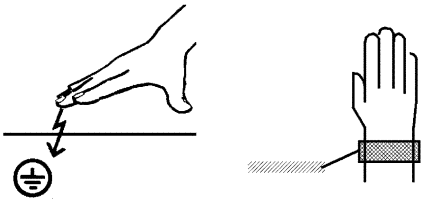
The unit complies with the requirements of standard IEC 60601-1-2.

Medical electrical equipment is subject to special EMC-related precautions. It must be installed and operated as specified in the document "Installation Requirements".

If high-voltage systems, radio link systems or MRI systems are located within 5 m of the unit, please observe the specifications stated in the installation requirements.

Portable and mobile RF communications equipment may affect medical electrical equipment. Therefore, the use of mobile wireless phones in medical office or hospital environments must be prohibited.

2.12 Electrostatic discharge



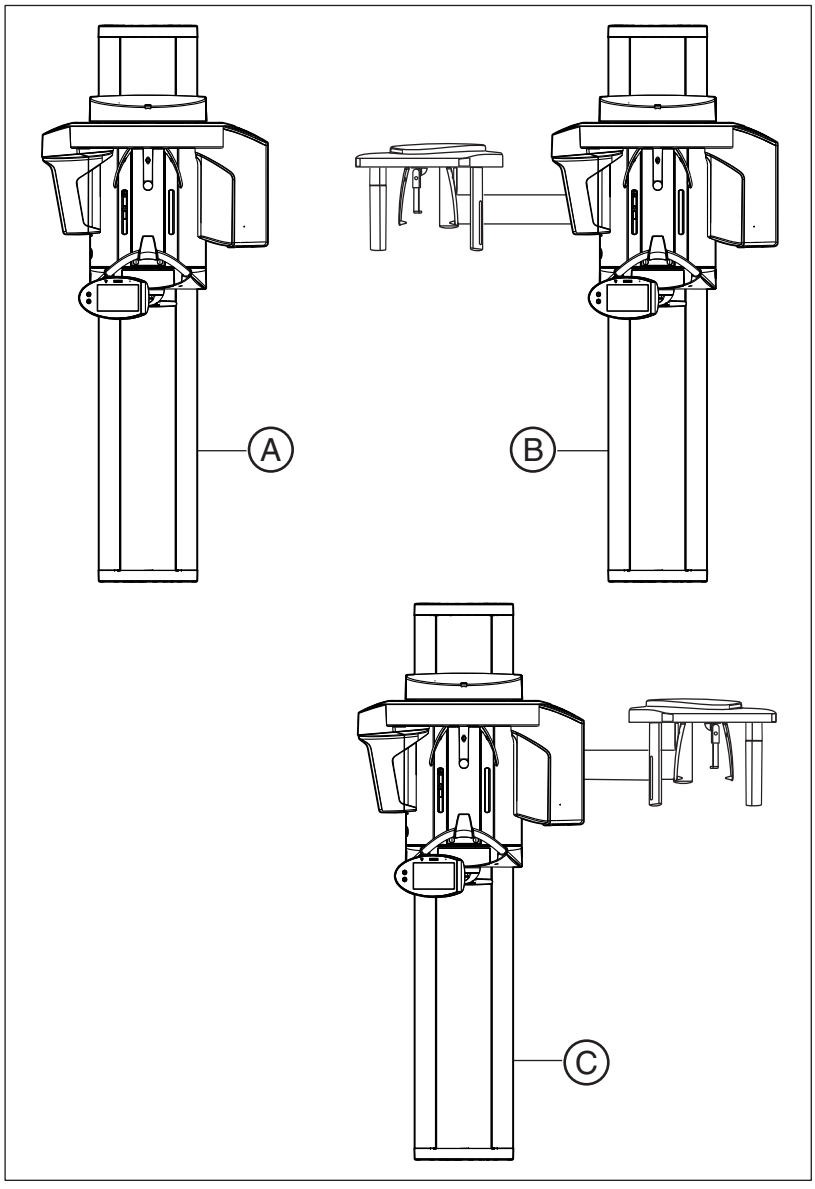
Electrostatic discharge (abbreviated: ESD – **E**lectro**S**tatic **D**ischarge)

Electrostatic discharge from people can damage electronic components when the components are touched.

Touch a ground point to discharge static electricity before touching any boards.

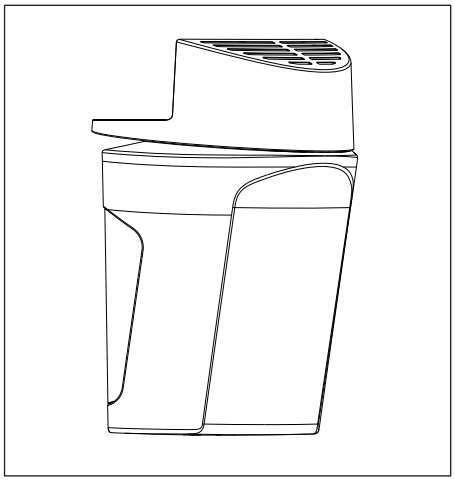
3 Unit description

3.1 System version



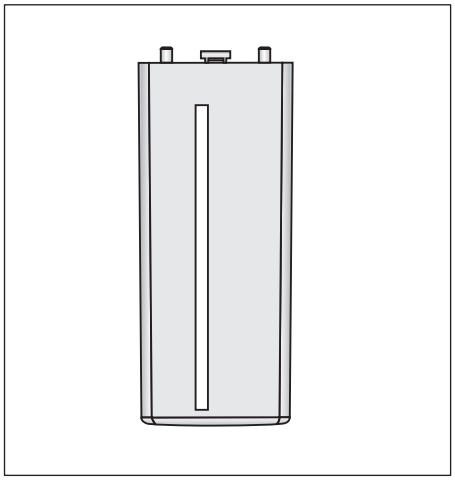
	Version	Description
A	ORTHOPHOS SL 2D	*Digital X-ray unit with DCS sensor* Pan sensor: Digital CdTe sensor with direct converter technology for panoramic exposure technology
	ORTHOPHOS SL 3D	*Digital X-ray unit with digital Flat Panel Detector and DCS sensor* Flat Panel Detector: Digital Flat Panel Detector with a-Si technology (amorphous silicon) Pan sensor: Digital CdTe sensor with direct converter technology for panoramic exposure technology
B	ORTHOPHOS SL 2D/3D Ceph, left-arm version	Digital X-ray unit ORTHOPHOS SL (all variants A) with cephalometer, left-arm version
C	ORTHOPHOS SL 2D/3D Ceph, right-arm version	Digital X-ray unit ORTHOPHOS SL (all variants A) with cephalometer, right-arm version

3.2 Sensor versions



2D sensor unit:
Sensor unit for panoramic X-ray (PAN): DCS sensor (2D)

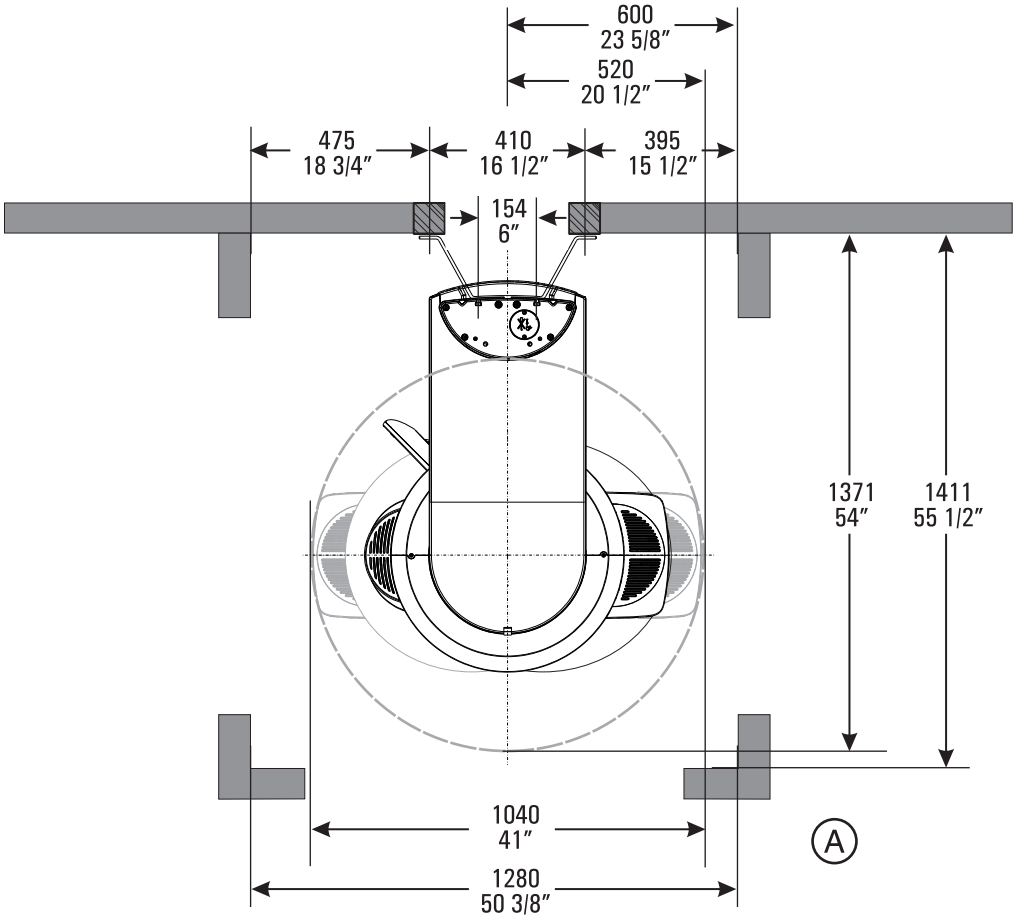
2D/3D sensor unit:
Sensor unit for panoramic X-ray (PAN) and volume exposures (3D): DCS sensor (2D) and flat panel detector (3D)



CEPH sensor: Sensor for cephalometric X-ray (Ceph) (2D)

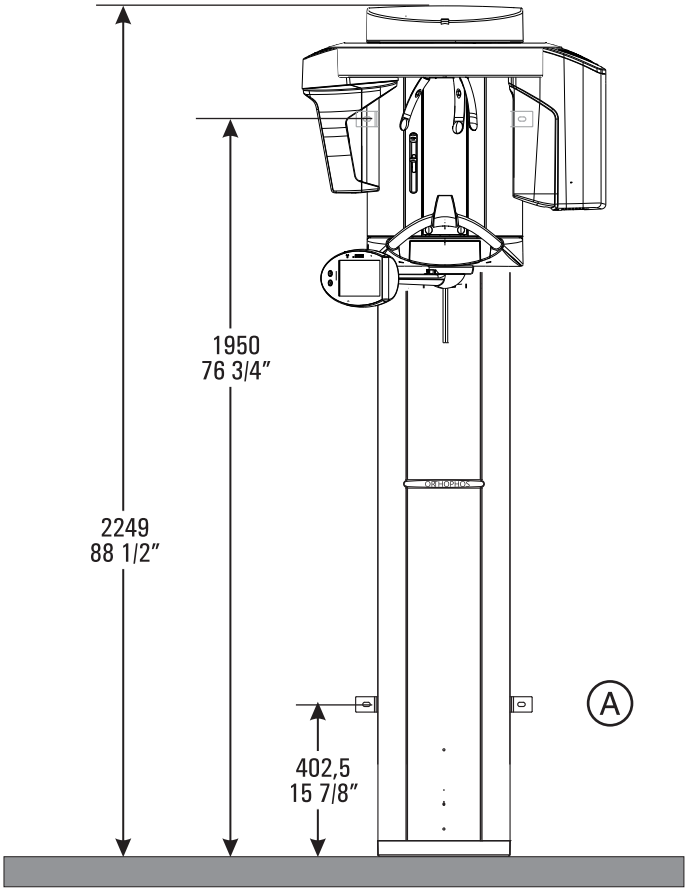
3.3 Dimensions/Space requirements

3.3.1 Top view



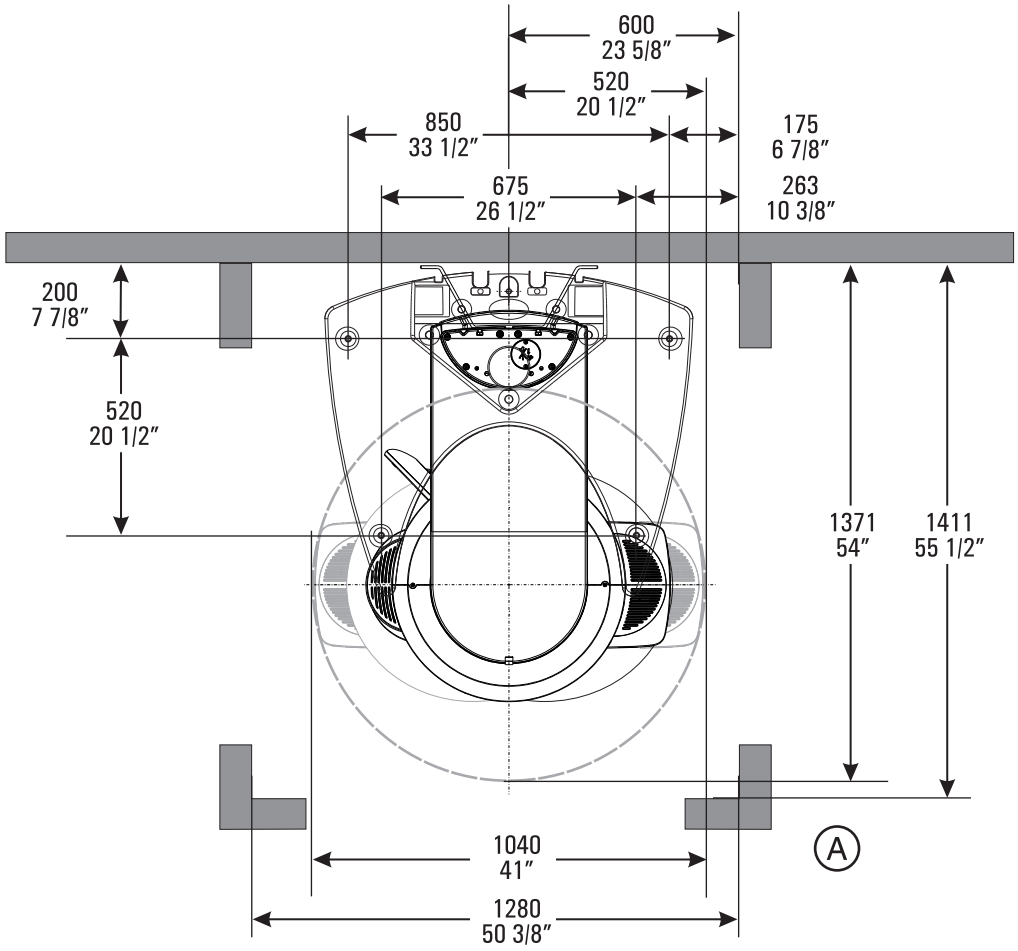
A	Recommended distances from cabinet or wall

3.3.2 Front view



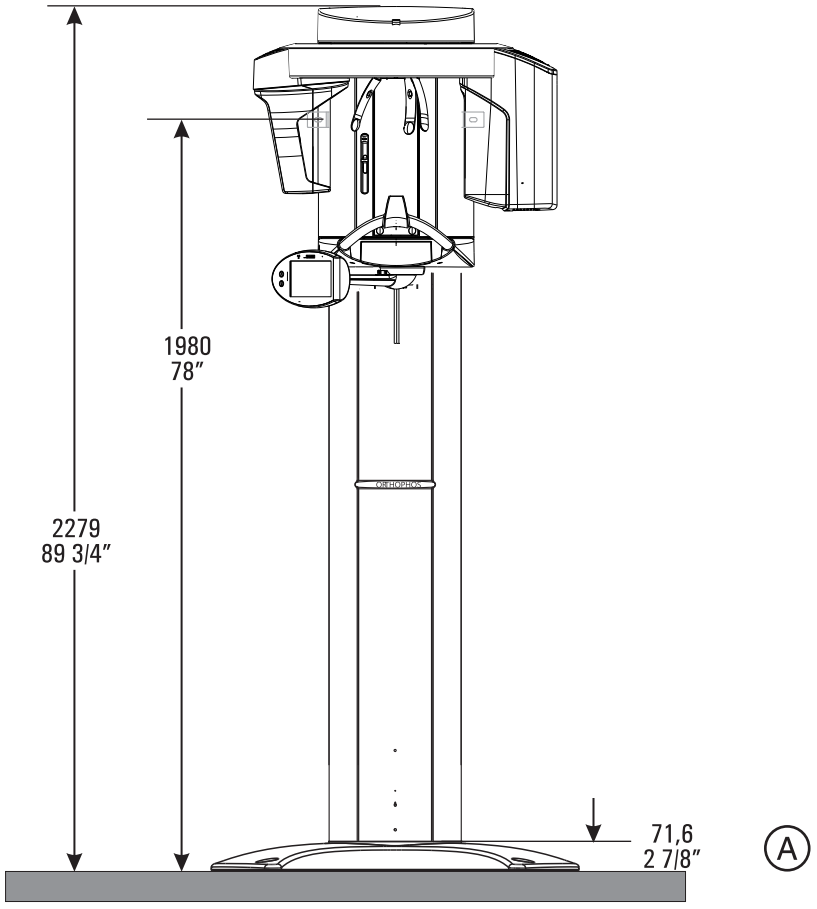
A	Alternative fastening if it is not possible to screw the unit onto the floor. Order bracket separately.

3.3.3 Top view with floor stand



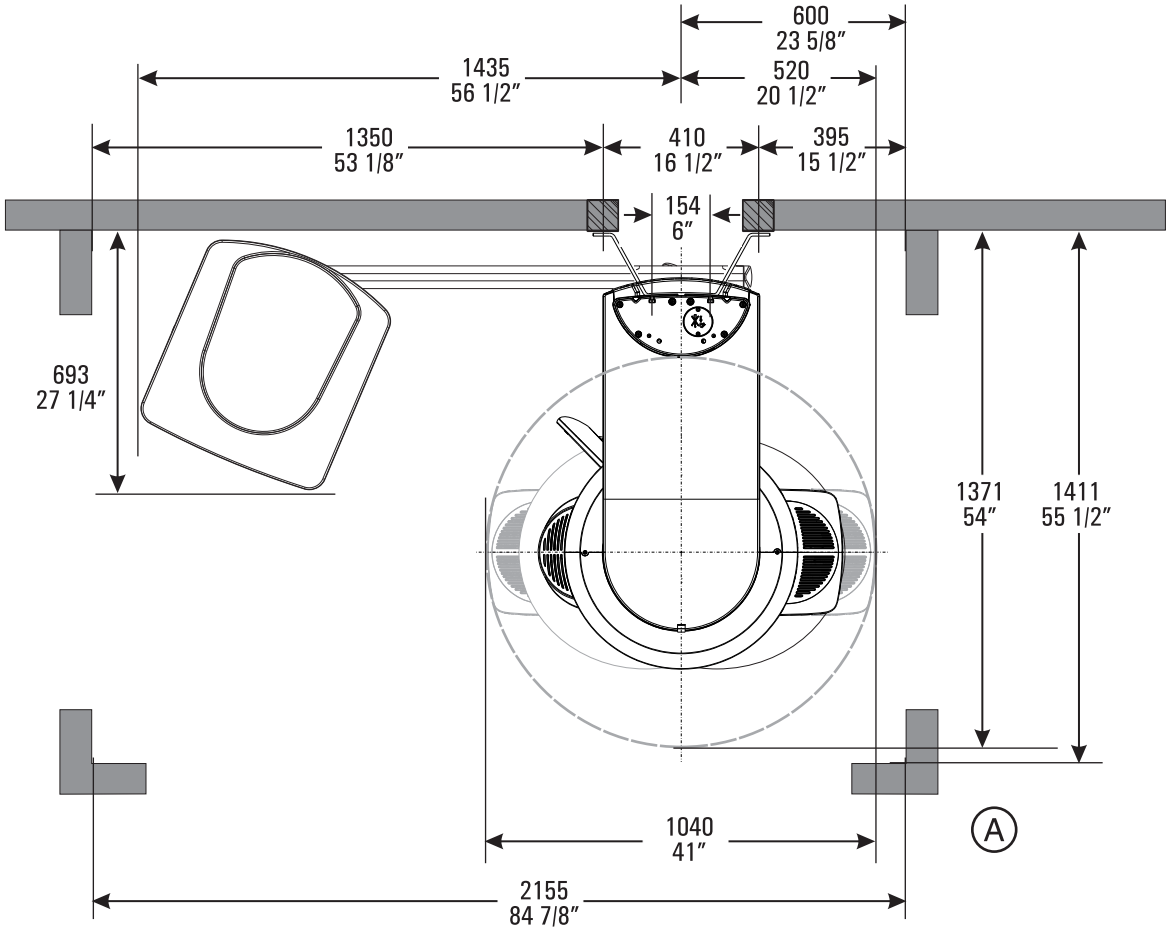
A	Recommended distances from cabinet or wall

3.3.4 Front view with floor stand



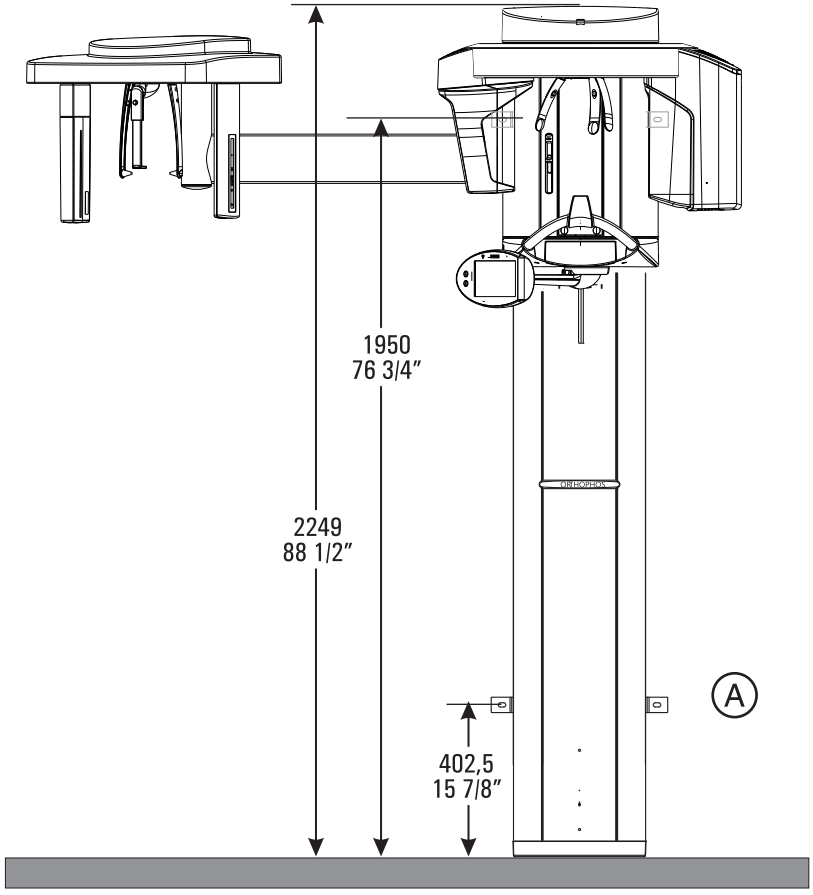
A	Floor stand: Order floor stand separately. The unit must also always be secured to the top wall holder.

3.3.5 Top view with Ceph left



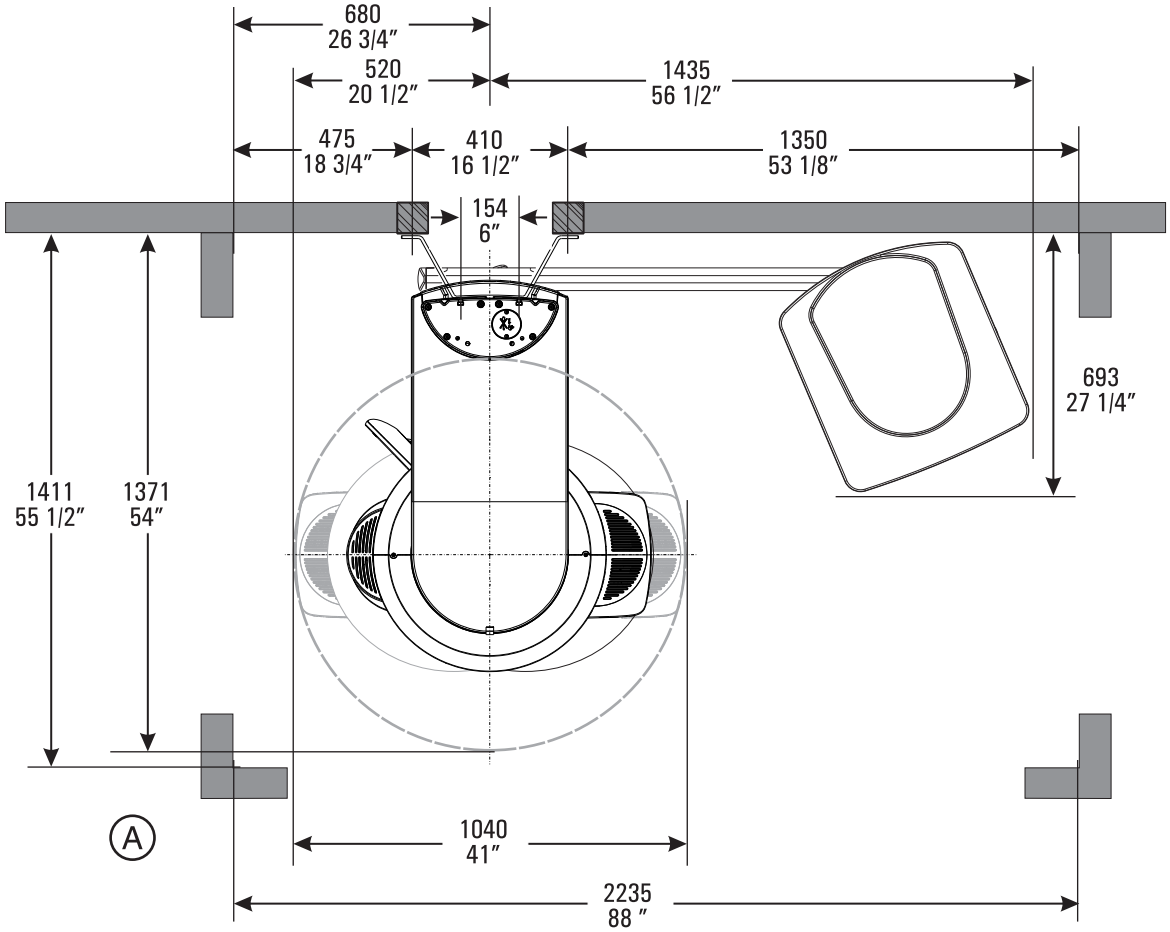
A	Recommended distances from cabinet or wall

3.3.6 Front view with Ceph left



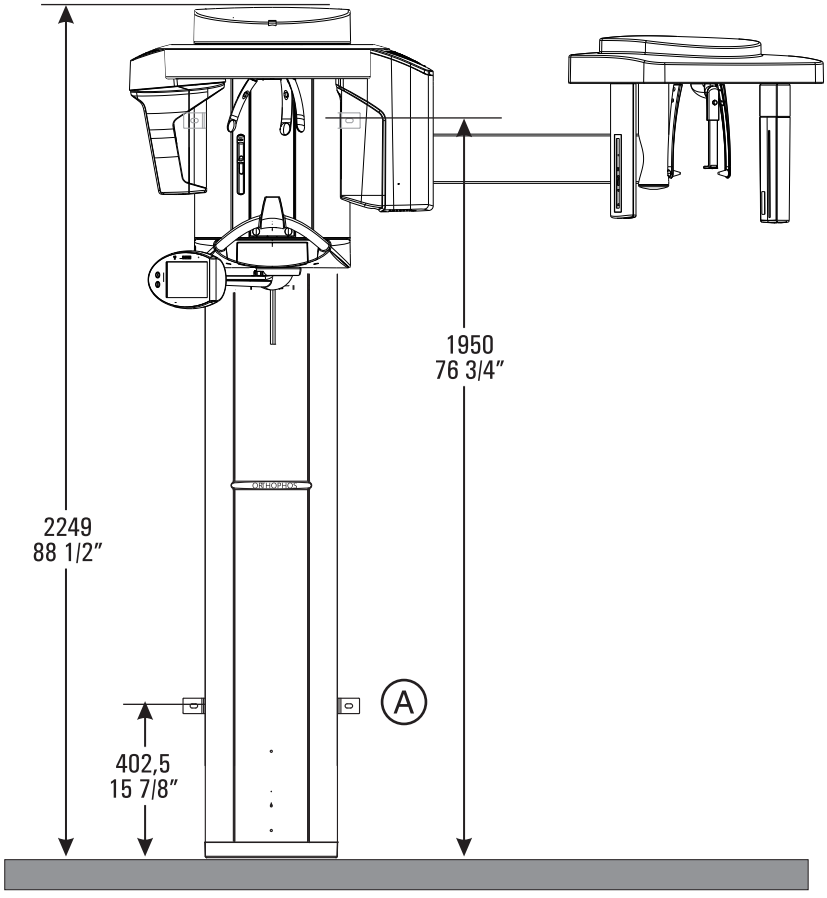
A	Alternative fastening if it is not possible to screw the unit onto the floor. Order bracket separately.

3.3.7 Top view with Ceph right



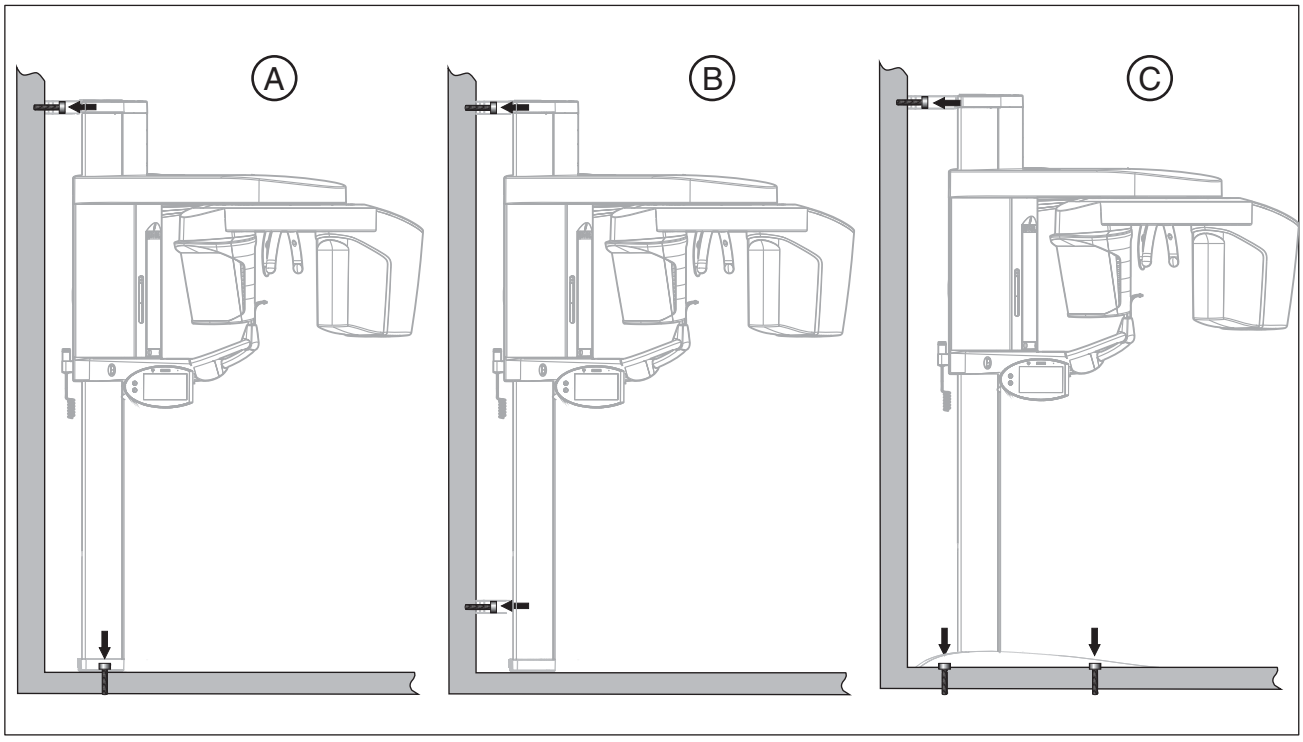
A	Recommended distances from cabinet or wall

3.3.8 Front view with Ceph right



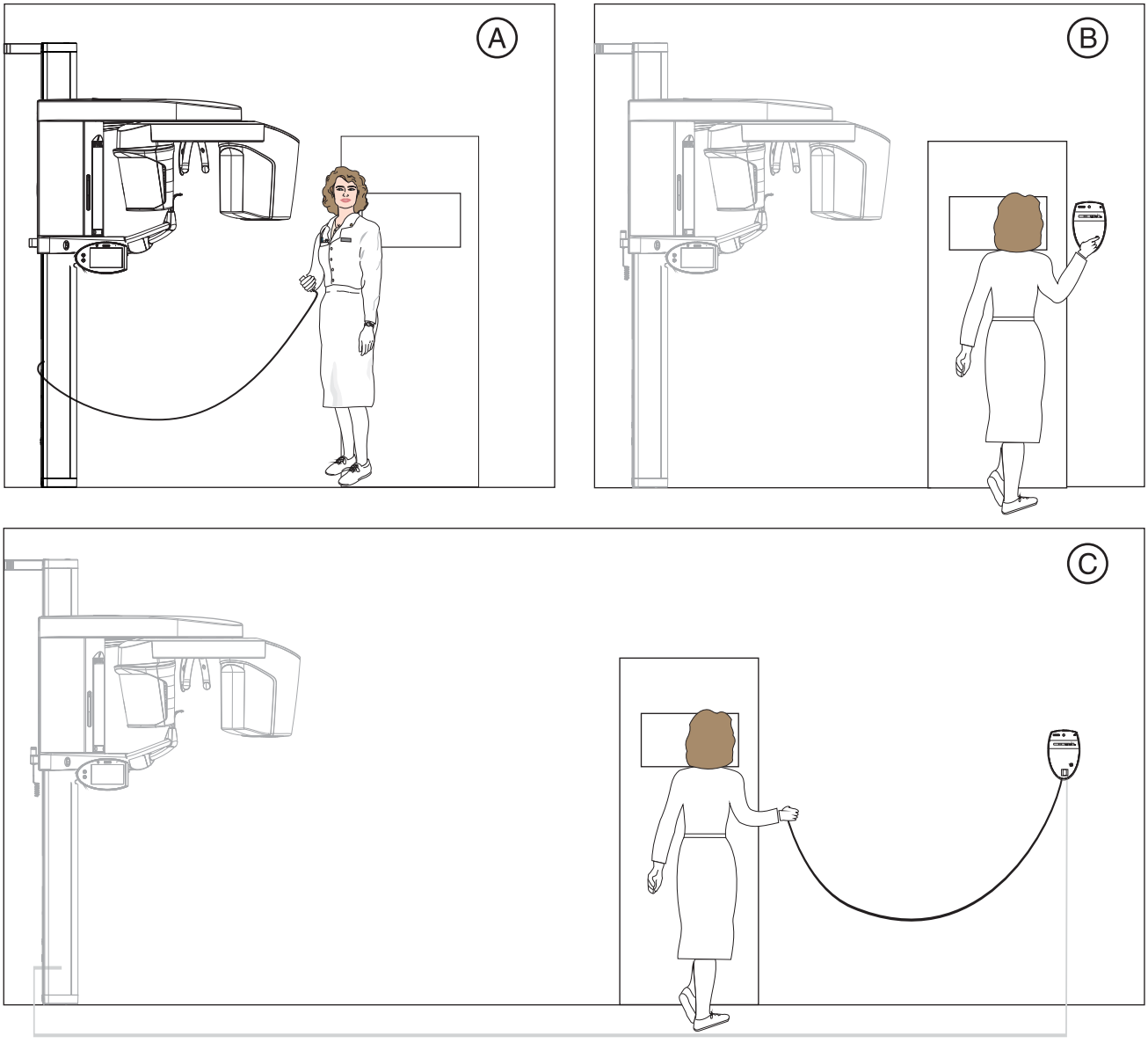
A	Alternative fastening if it is not possible to screw the unit onto the floor. Order bracket separately.

3.4 Mounting options



A	**Standard version** *Wall-mounted installation with 1 wall holder* (short) and floor fastening if both wall and floor installation are possible on-site (see section “Wall mounting (standard and option 1) [→ 49]”).
B	**Option 1** *Wall-mounted installation with 2 wall holders* (short) (and no floor fastening) if only wall installation is possible on-site (see section “Wall mounting (standard and option 1) [→ 49]”).
C	**Option 2** *Installation using a floor stand and 1 wall holder* (long) if it is possible to mount the unit on the wall and on the floor on-site and x-rays are often taken while the patient is seated on a chair → better positioning of seated patient (see section “Installing the floor stand (option 2) [→ 55]”).

3.5 Installation versions



A	**Standard installation** Unit *without remote control with release button on the coiled cable* in the treatment room.
B	**Installation version 1** Unit *with remote control* outside the X-ray room *without release button on the coiled cable.* (see section “Installation version 1: Without coiled cable [→ 76]”).
C	**Installation version 2** Unit *with remote control* outside the X-ray room *with release button on the coiled cable.* (see section “Installation version 2: With spiral cable [→ 77]”).

4 Delivery and transport

4.1 Operating and transport conditions

Transport and storage temperature:	-10 °C – +70 °C (14 °F – 158 °F)
Air humidity:	10 % – 95 %
Admissible operating temperature:	+18 °C - +31 °C (64 °F – 88 °F)
Operating altitude:	≤ 3,000 m above sea level

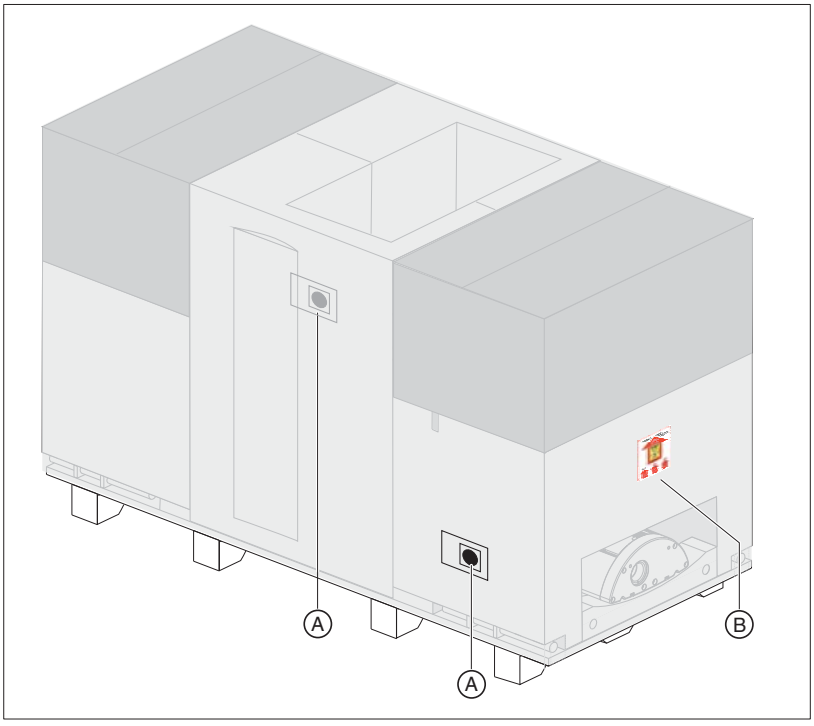
4.2 Delivery

NOTICE

Possible transport damage

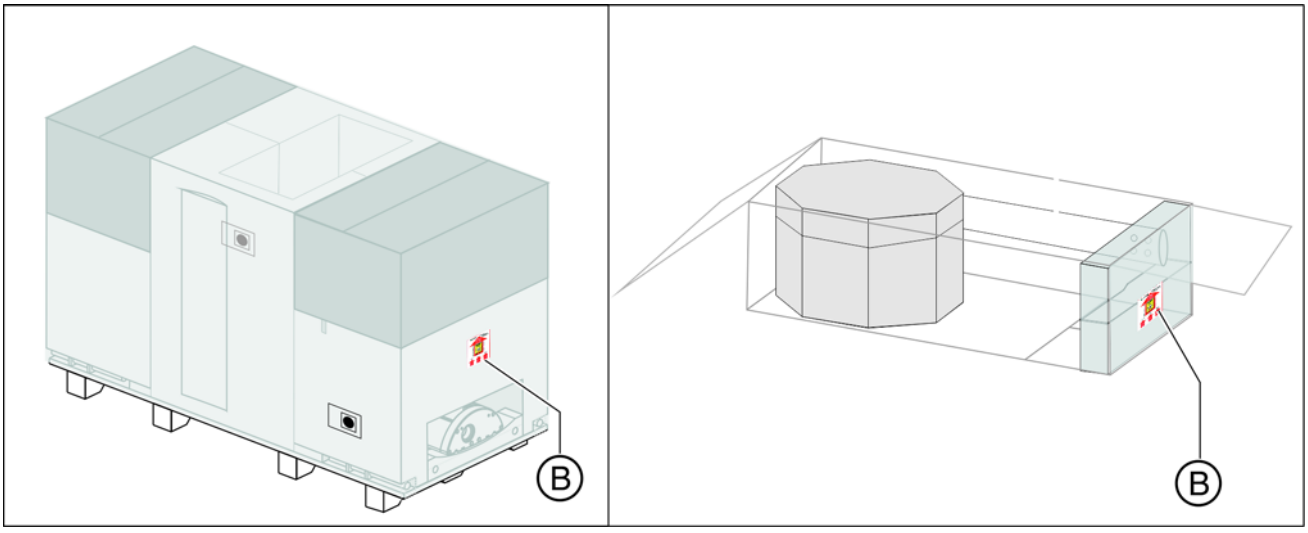
If the shipment was damaged during transport, document all damage carefully and contact the responsible carrying agent immediately.

Indicators



Two **shock indicators** (A) are attached to the side of the X-ray unit packaging to indicate whether the unit was exposed to a shock during transport.

- White indicator: No shock
- Red indicator: Shock



Tilt indicators (B) are attached to the X-ray unit and cephalometer packaging to indicate whether the units were improperly transported.

- Red indicator: Improper transport

The display of improper transport doesn't necessarily mean that the unit is damaged.

Make a note on the delivery slip that the indicator is activated. Ensure that the driver from the transport company confirms this on the delivery slip. Fax the delivery slip to the Sirona Customer Service Center (CSC).

Enter the state of the indicators in the startup report in the case of warranty claims.

Disposal of packaging materials

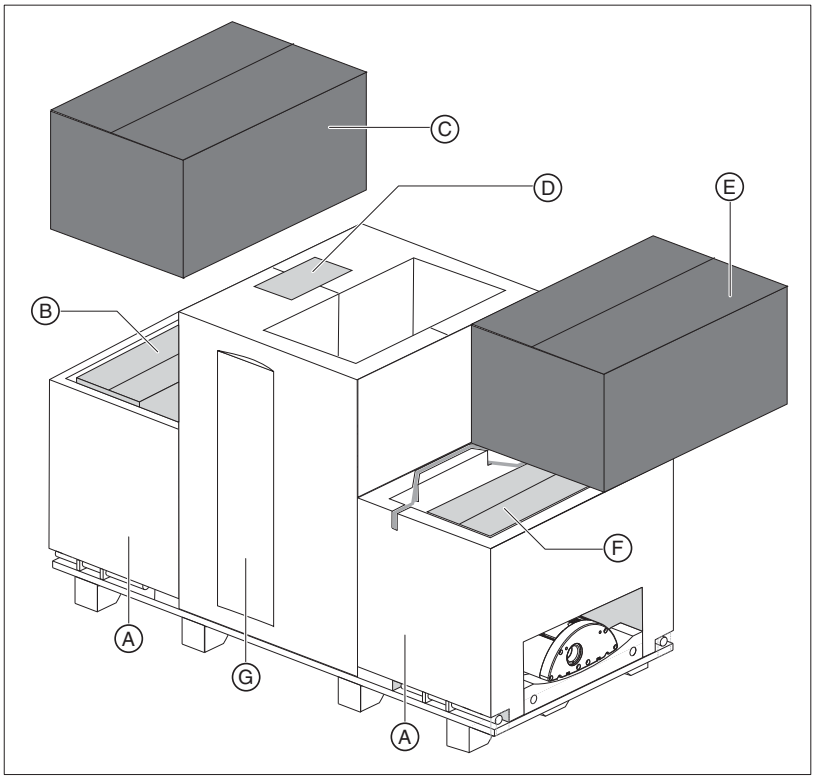
Return the packaging materials to Sirona or dispose of them in compliance with the legal regulations applicable in your country.

4.2.1 ORTHOPHOS SL

Dimensions and weight

Dimensions		Length	Width	Height
	in cm	199	69	122
	in inches	78 3/4	27 1/8	48
Weight	in kg	186		
	in lbs	410		

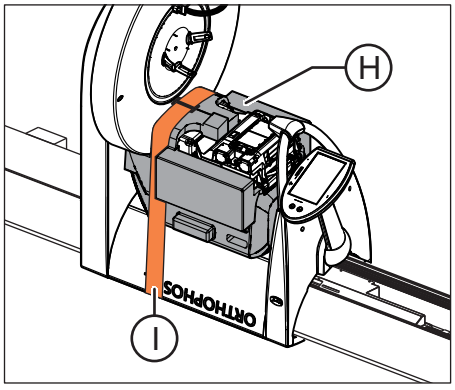
Scope of supply



The packaging of the X-ray unit is designed both for protection during transport and as an installation aid. Therefore, please remove only the surrounding packaging prior to installation. Please leave the Styrofoam packaging and transport pallet attached to the unit. Save the two lateral styrofoam packaging parts for later use as an installation aid (A).

A	Installation aid (please save the two lateral Styrofoam packaging parts)
Scope of supply:	
B	Filling piece 1
C	Filling cardboard 1
D	Pack list 1
E	Filling cardboard 2
F	Filling piece 2 including pack list 2
G	Profile cover

➢ Check the scope of delivery using pack lists 1 and 2.



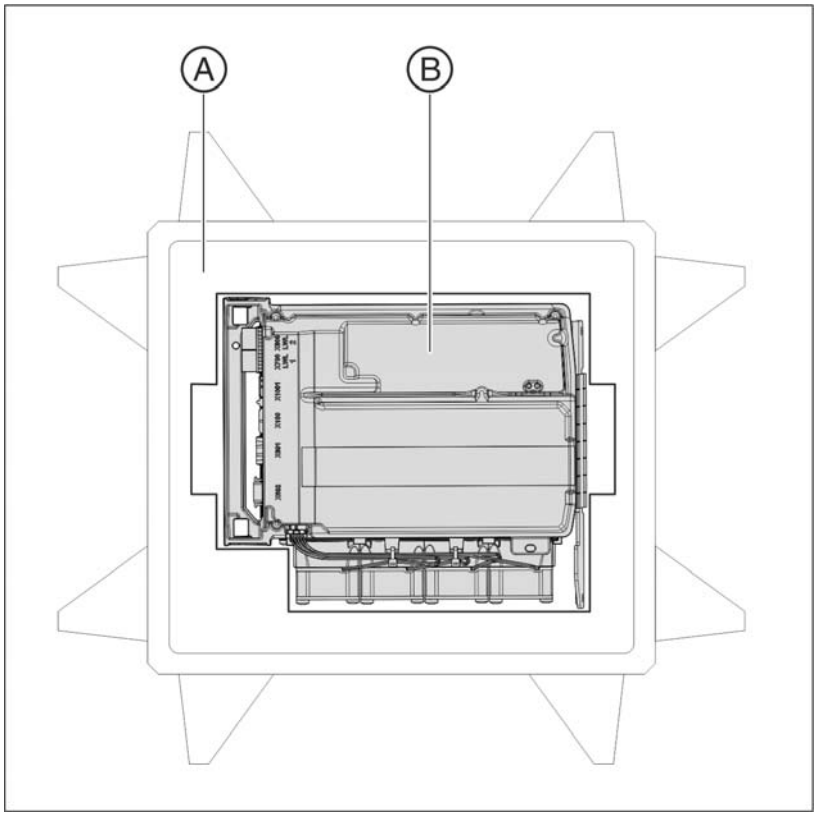
IMPORTANT

Tube assembly guard

The X-ray tube assembly is protected by a tube assembly guard (H) and a tension belt (I) in its packing position. Keep the tube assembly and the tension belt in a safe place for possible repacking.

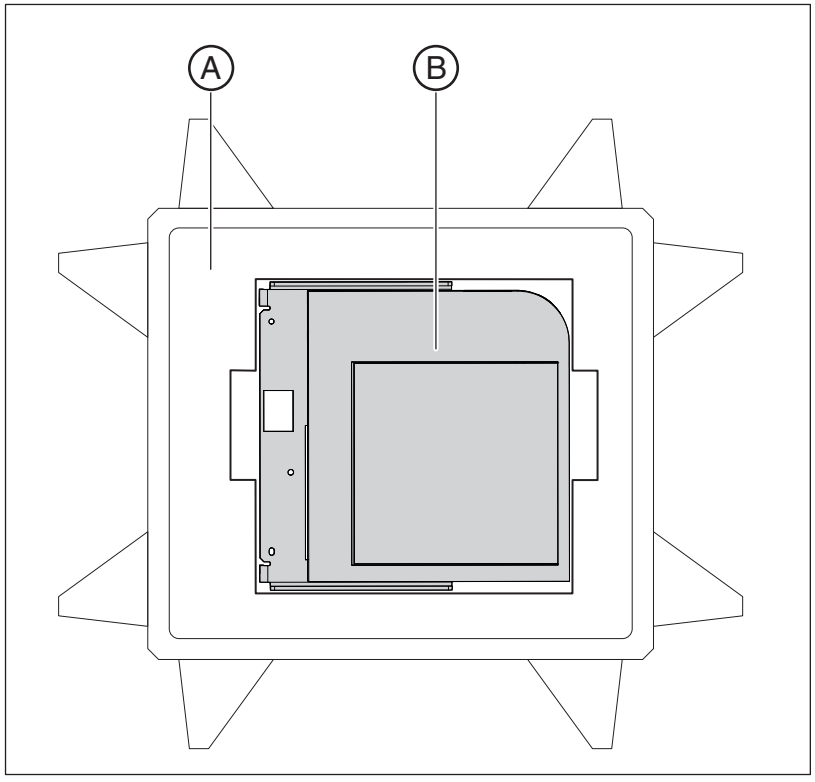
4.2.2 Sensors

DCS sensor



A	Styrofoam packaging
Scope of supply:	
B	DCS sensor

Flat Panel Detector



A	Styrofoam packaging
Scope of supply:	
B	Flat Panel Detector

4.2.3 Ceph arm

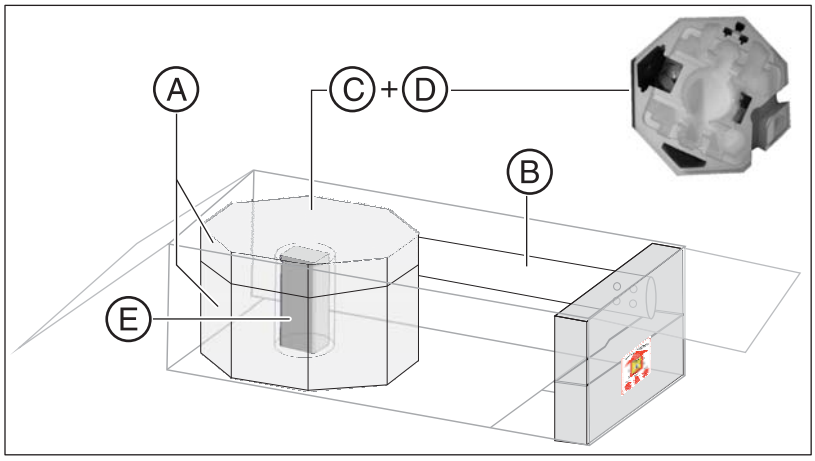
Dimensions and weight

Dimensions	(cm)	175 x 78 x 73
	(inches)	68 7/8 x 30 3/4 x 28 3/4
Weight	(kg)	40
	(lbs)	88

Scope of supply

IMPORTANT

The right-handed ceph arm is packed laterally reversed.



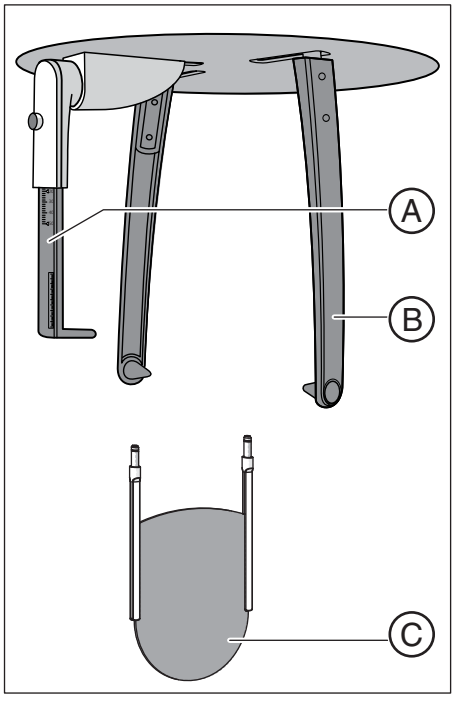
A	Styrofoam packaging
Scope of supply:	
B	Ceph arm
C	Accessories [→ 35] and hygienic protective sleeves [→ 35]
D	Installation material [→ 89]
E	Ceph sensor

NOTICE

Risk of damage to the cephalometer

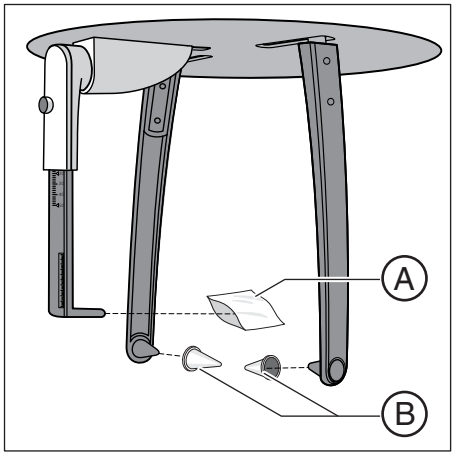
The cephalometer inside the styrofoam part (A) is a sensitive unit and is at risk of damage when mounting the ceph arm. Remove the styrofoam packaging material only following installation.

4.2.3.1 Accessories



A	Nose support	(1x)
B	Ear plug holders with ear plug fixation	(2x)
C	Carpus support plate	(1x)

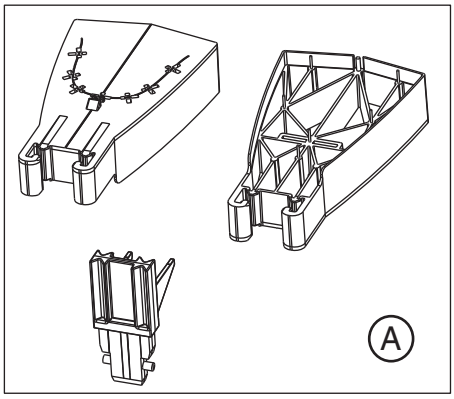
4.2.3.2 Hygienic protection



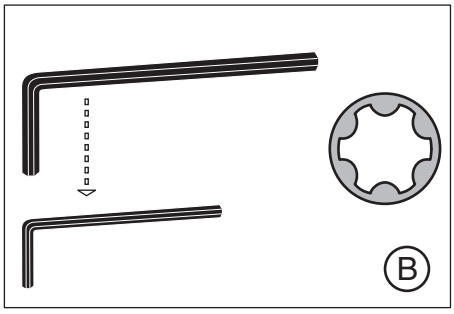
A	Hygienic protective sleeves for nose support	(100x)
B	Hygienic caps for ear plugs, sterilizable	(4x)

4.2.4 Adjustment sets

2D adjustment: Panoramic

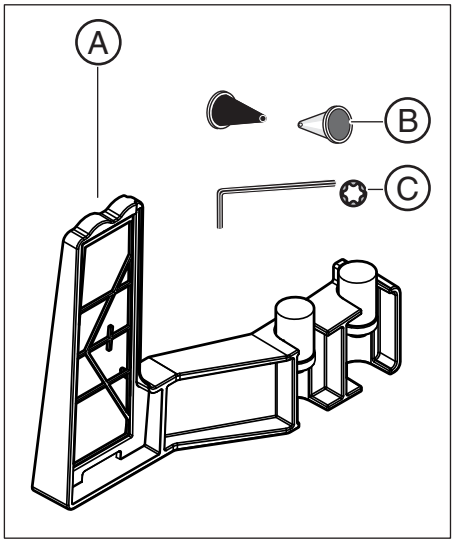


A	Needle phantom



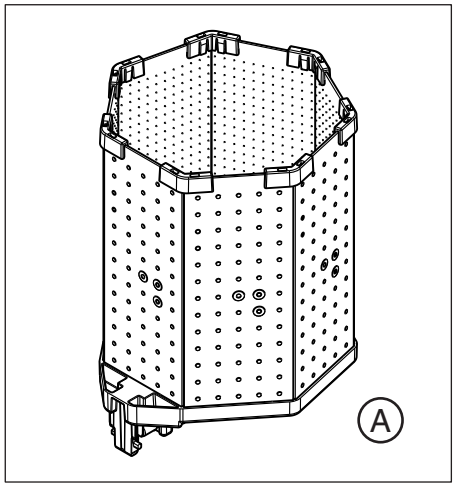
B	Set of Torx offset screwdrivers

2D adjustment: Cephalometer



A	Ceph adjustment phantom	
B	Adjusting caps	(1x black, 1x transparent)
C	Torx offset screwdriver	

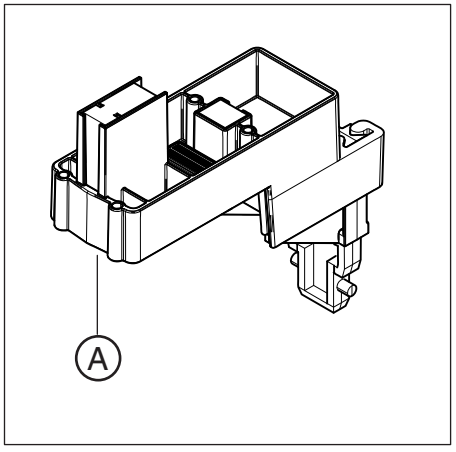
3D adjustment/calibration



A	Geometry phantom

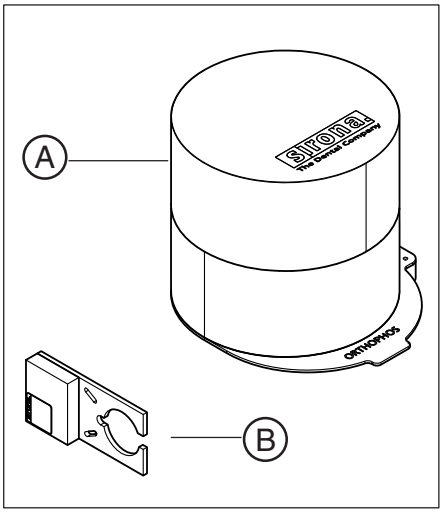
Acceptance and constancy test

Worldwide

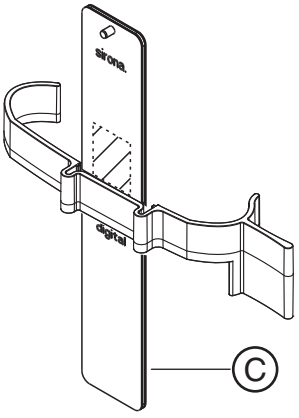


A	Constancy test unit
B	Contrast element

For Germany only



A	DVT test phantom - DIN
B	Contrast element



C	Test phantom 0.8mm CU Ceph

4.3 Transport to the installation site

4.3.1 ORTHOPHOS SL

NOTICE

Possible transport damage

Leave the packaging attached to the unit during the entire transport to the installation site.

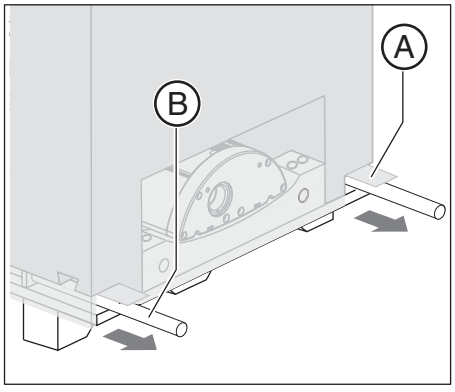
4.3.1.1 Transport with packaging attached (normal case)

NOTICE

Unit can tilt

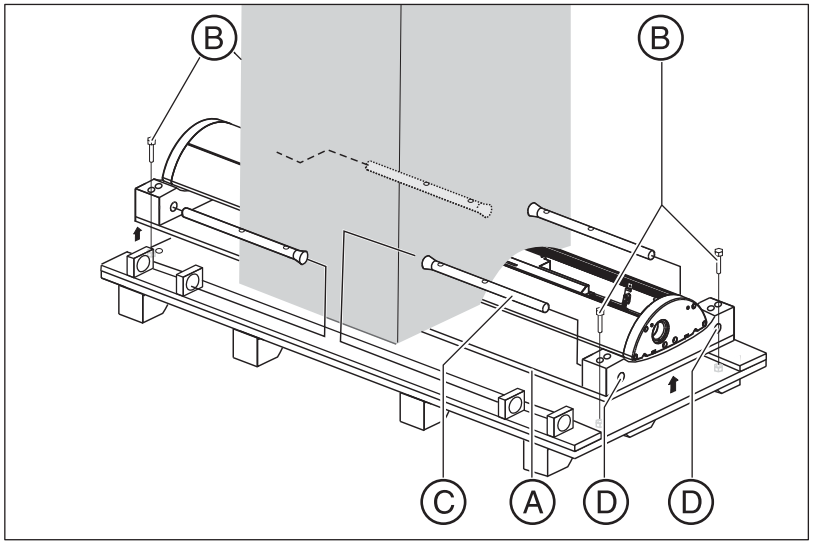
In its transport position, the center of gravity of the unit is very high.

➢ Take care that the unit does not tip over during transport.



1. Open the surrounding packaging using the straps provided (A).
2. Pull out the carrying handles (B).
3. Transport the unit to the installation site.

4.3.1.2 Transport without pallet (exception)



If the pallet is too wide for transport to the installation site, you may unscrew the pallet from the wooden support (A) and transport the unit by means of the wooden supports without the pallet.

NOTICE

Possible transport damage

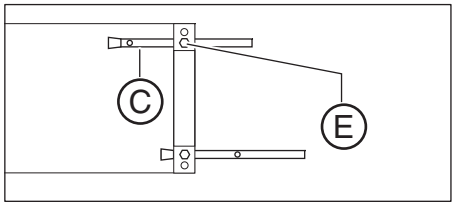
Leave the center styrofoam packaging attached to the unit for protection.

If this is not possible, secure the position of the tube assembly prior to further transport.

➢ Secure the position of the tube assembly using the strap provided (see label on the styrofoam packaging).

➢ Tighten the strap only gently. Do not tension the strap.

1. Remove the surrounding packaging.
2. Take the remote control (if supplied) out of the center styrofoam packaging and store everything in a safe place.
3. Remove the two lateral styrofoam packaging parts.
4. Loosen the four screws (B).
5. Pull the carrying handles (C) out of their holders and insert them through the drillings (D) of the wooden support (A) from the inside.
6. Insert screws (B) through drillings (E) and into the drillings of the carrying handles to attach them firmly. The handles can be made short or long.
   The carrying handles have rims which prevent them from slipping out of the holes.



4.3.2 Sensors

NOTICE

Possible transport damage

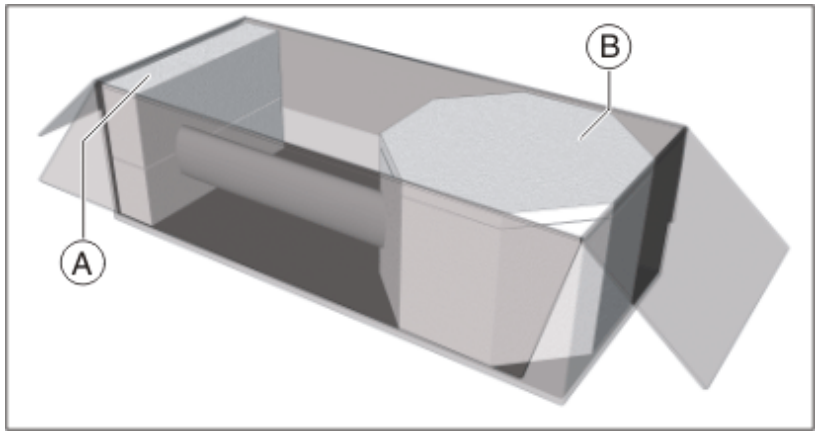
The pan sensor and flat panel detector are sensitive instruments. Only remove the packaging immediately prior to installing the sensors on the unit.

4.3.3 Ceph arm

NOTICE

Risk of damage to the cephalometer

The cephalometer inside the styrofoam part (B) is a sensitive unit and is at risk of damage when mounting the ceph arm. Remove the styrofoam packaging material only following installation.



IMPORTANT

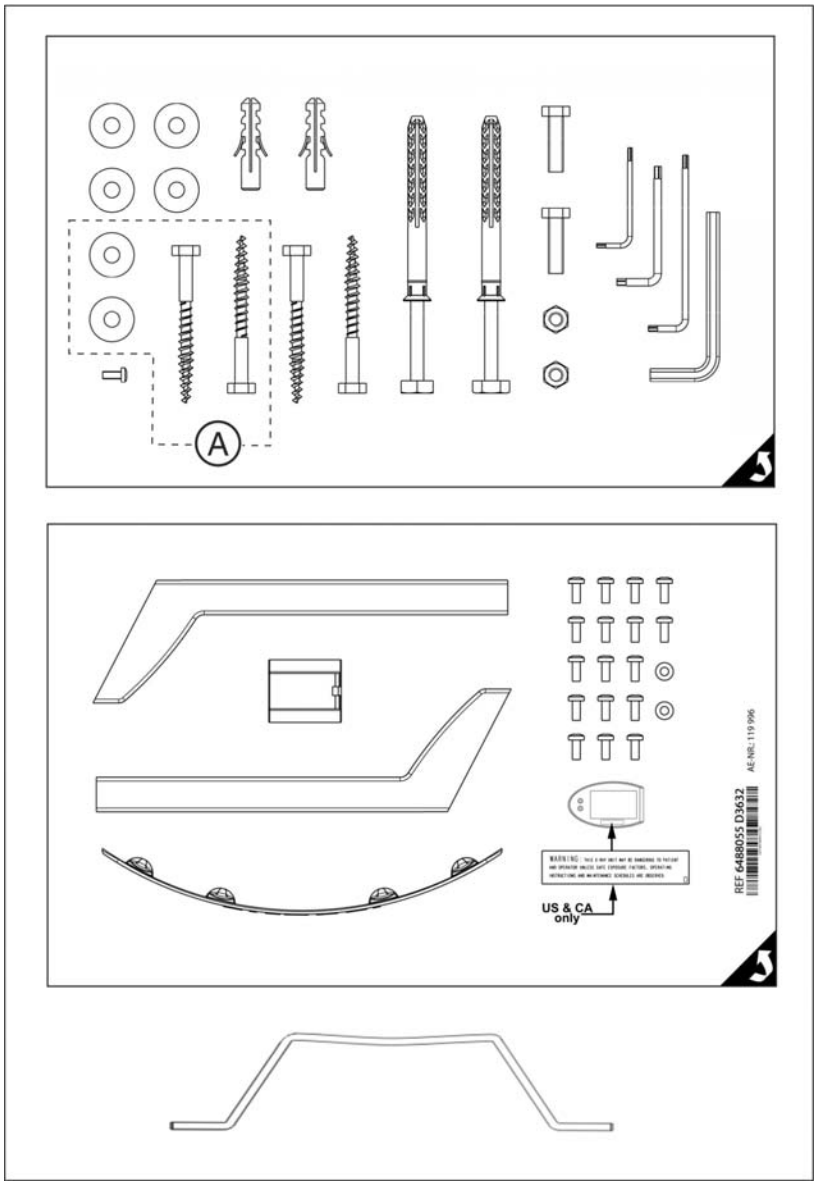
The right-handed ceph arm is packed laterally reversed.

1. Open the cardboard case and remove the styrofoam part (B).
2. Lift the ceph arm out of the cardboard packaging and transport it to the installation site.

5 Installation: X-ray unit

5.1 Installation material

5.1.1 Standard version

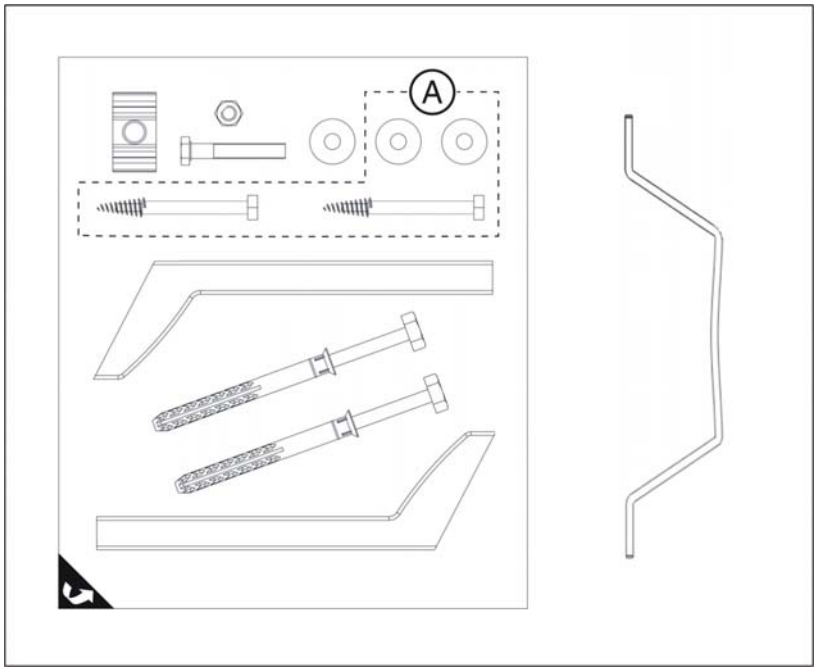


A	For installation on wooden stud frame structures

Wall/floor mounting

Hexagon wood screw 8x80 (5/16x3")	4 pc.
Plastic wall plug S10	2 pc.
Screw M8x30	2 pc.
Washer Ø 8.4	6 pc.
M8 nut	2 pc.
Screw M4x10	18 pc
Washer Ø 4.3	2 pc.
Mounting kit Ø 10 SXR	2 pc.
TORX offset screwdrivers TX10, TX20, TX25	1 pc. each
Allen wrench (size 6)	1 pc.
Wall holder (long):	1 pc.
Wall holder cover (long)	2 pc.
Intermediate piece	1 pc.
Release button holder	1 pc.

5.1.2 Option 1: with second wall holder

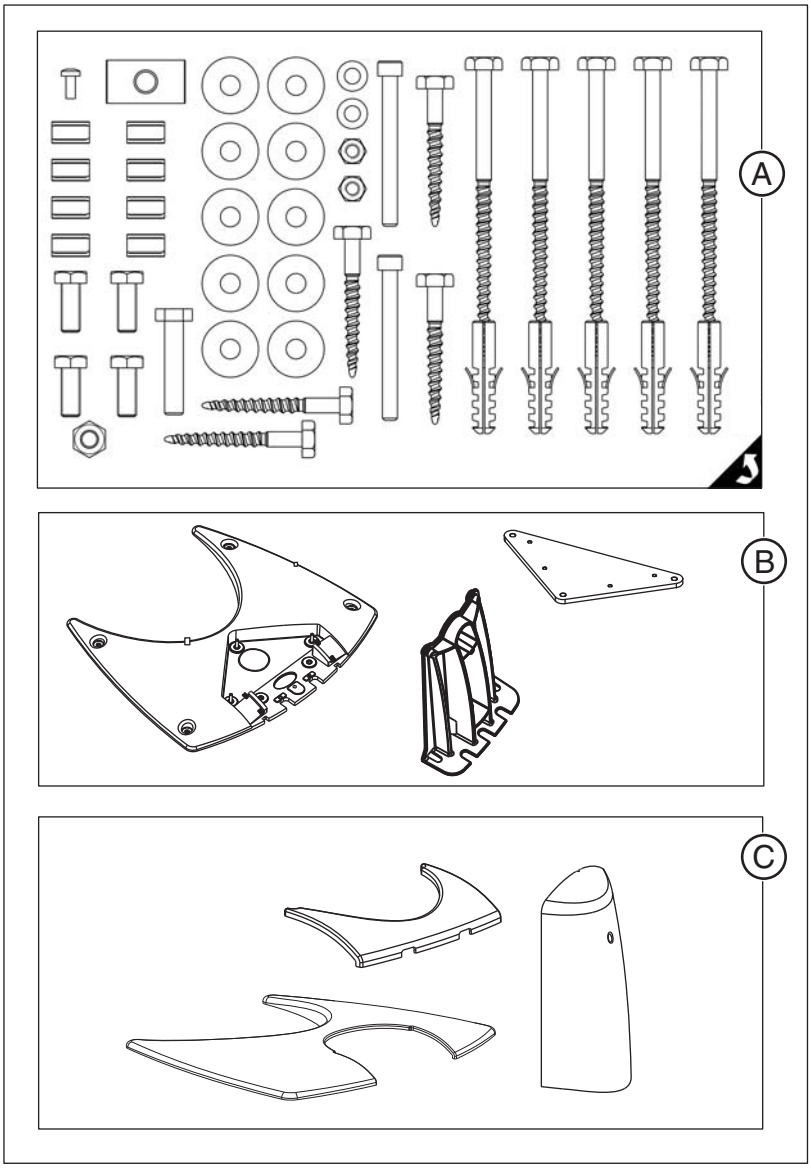


A	For installation on wooden stud frame structures

Additional wall holder (for bottom wall mounting)

Wall holder (long):	1 pc.
Hexagon wood screw 8x80 (5/16x3")	2 pc.
Washer Ø 8.4	3 pc.
Hexagon head screw M8x50	1 pc.
M8 nut	1 pc.
Mounting kit Ø 10 SXR	2 pc.
Profile clamp	1 pc.
Wall holder cover (long)	2 pc.

5.1.3 Option 2: Floor stand installation



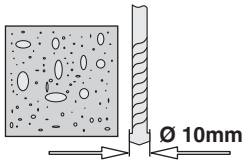
A	Mounting hardware
B	Floor stand
C	Floor stand covers

Installation with floor stand

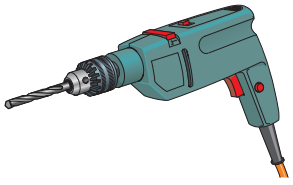
Floor stand	1 pc.
Floor stand cover	1 pc.
Wood screw 10x160 (3/8x6")	5 pc.
Plastic wall plug S12	5 pc.
Screw M8x80	2 pc.
Washer Ø 8.4	2 pc.
M8 nut	2 pc.
Screw M10x50	1 pc.
Profile clamp	1 pc.
Screw M5x12	1 pc.
Washer Ø 10.5	10 pc.
M10 nut	1 pc.
Spring steel clamp	8 pc.
Screw M10x25	4 pc.
Wood screw M10x80 (3/8x3)	5 pc.

5.2 Tools, materials, and measurement tools you will need

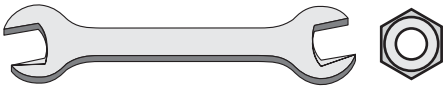
5.2.1 Tools and materials



- Masonry drill bit 10mm (3/8")

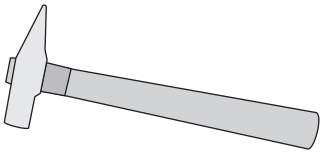


- Drill or drill hammer, depending on the ground

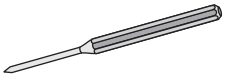


- Open-end wrench, 13 mm A/F

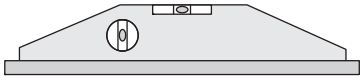
- Socket wrench
  - Wrench insert 13



- Hammer



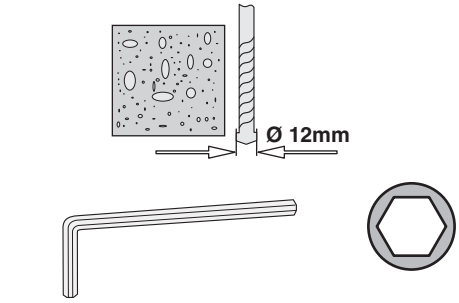
- Center punch



- Spirit level
- Adhesive tape

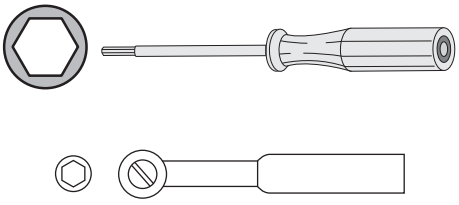
Included in the scope of supply:

- Offset screwdriver, Torx
  - TX10
  - TX20
  - TX25



Additional requirements for installation with floor stand:

- Masonry drill bit 12mm (1/2")



- Allen key 2 mm

- Socket wrench and extension
  Wrench insert 17

5.2.2 Measurement tools

- Multimeter or ammeter
- Test unit to measure unit leakage current
  e.g. Bender tester or line-frequency, high-resistance measurement voltage source (isolation transformer) and measuring circuit (MD) that meets the requirements of IEC 60 601-1.
- Current source for protective conductor test
  Technical data:
  - No-load voltage min. 4 V - max. 24 V
  - Short-circuit current min. 0.2 A

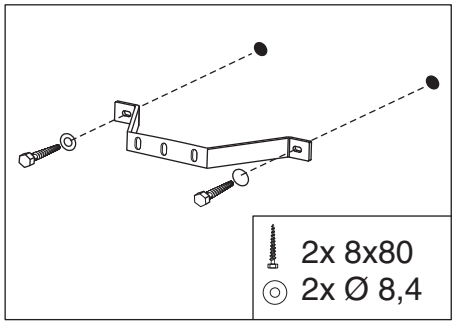
5.3 Wall mounting (standard and option 1)

NOTICE

Reduced image quality

Note the wall and ground conditions. If a carpet is present at the unit installation site, it must be removed.
Each wall plug must support a tensile force of 700 N.
The wall construction must be suitable for the installation of the unit.

In case of mounting on weight-bearing wood structures



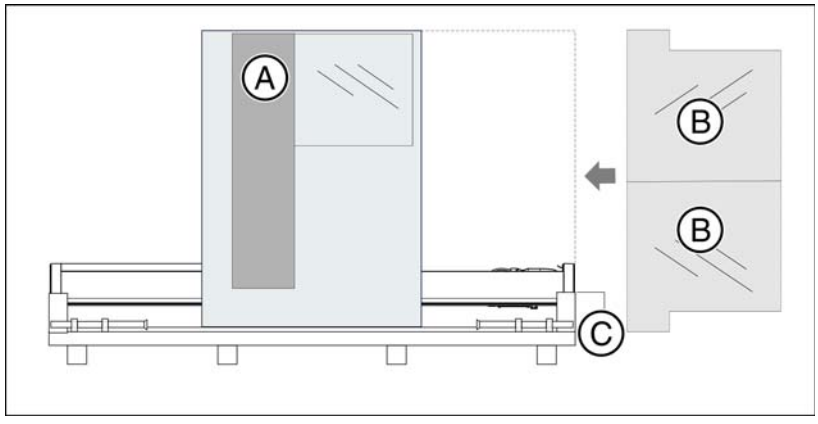
Use the enclosed wood screws and washers from the mounting kit for mounting the unit on weight-bearing wood structures.

Setting up the unit

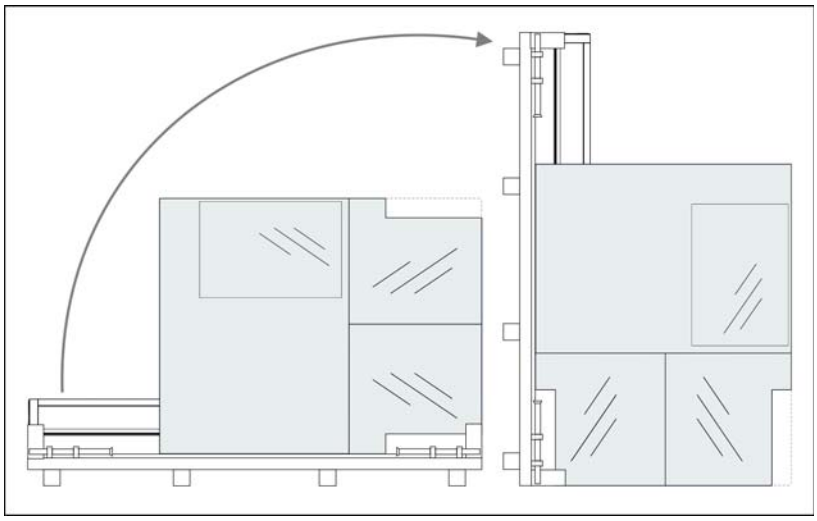
NOTICE

Possible transport damage

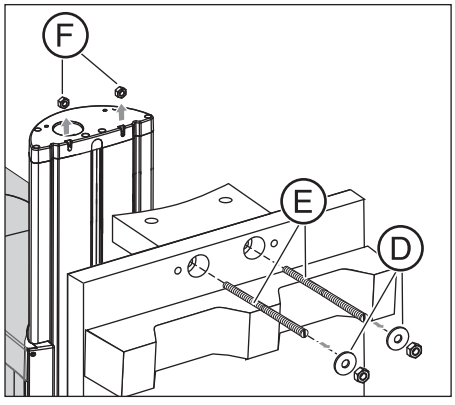
Leave the center styrofoam packaging attached to the unit for protection.



1. Remove the profile cover (A).
2. Position the two installation aids (B) at the foot (C) of the unit and secure their position with adhesive tape.
   CAUTION! The installation aids must be placed on top of each other in such a way that their openings lie on top of each other.

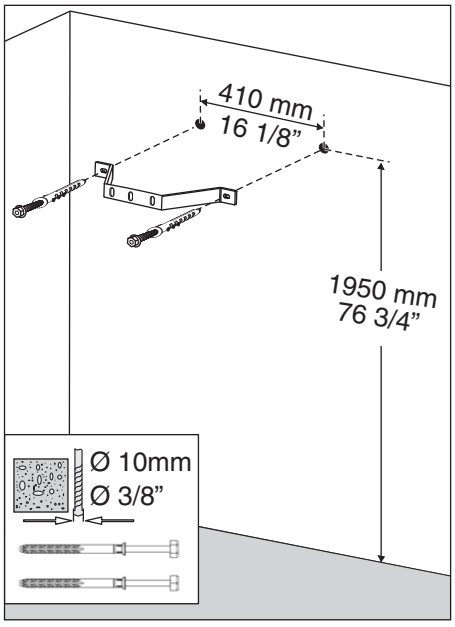


3. Set up the unit by tilting the transport pallet upward.
   Tip: If you have transported the unit on the wooden support without a pallet, set the unit upright with the wooden support. You can also use the lateral styrofoam packaging as a support with this variation.



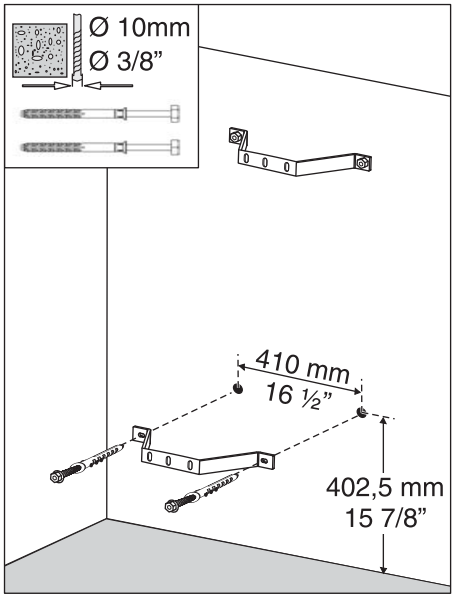
4. Loosen the nuts with washers (D) on both sides of the pallet (or wooden support).
5. Take off the pallet (or wooden support).
6. Remove the threaded bolts (E).
   Tip: Remove the lower bolts first, then the upper bolts.
   The nuts (F) on the unit may remain inside the unit when the threaded rods are removed. Remove the upper nuts. The lower nuts may remain in the unit.

Mounting the first (upper) wall holder (standard)



➢ Mount the upper wall holder.

Mounting the second (lower) wall holder (option 1)



➢ Mount the lower wall holder.

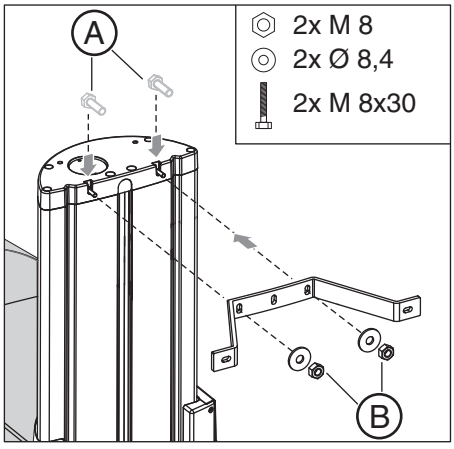
Mounting the unit on the wall holder (standard and option 1)

NOTICE

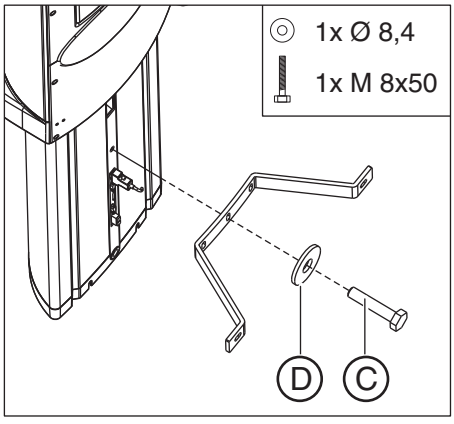
Possible transport damage

Leave the middle styrofoam packaging on the unit throughout the entire installation.
If, due to on-site conditions, it is necessary to remove the styrofoam packaging at this point, move the unit *carefully* by grasping the bite block bar and the stand.

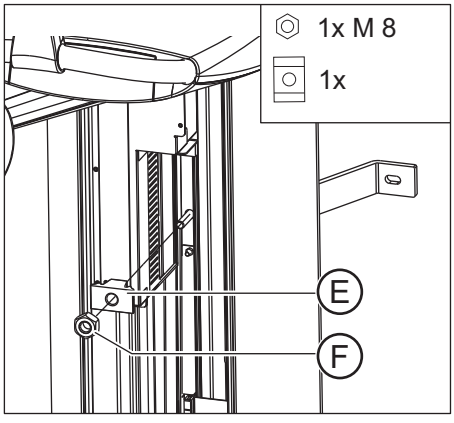
1. Move the unit into its installation position against the wall. Hold the unit laterally at the styrofoam packaging to do this.
2. Place screws (A) in the grooves.
3. Screw the unit firmly onto the wall holder using nuts and washers (B). The wall holder must be flush with the upper edge of the unit.
   ↳ The unit is now mounted on the upper wall holder.



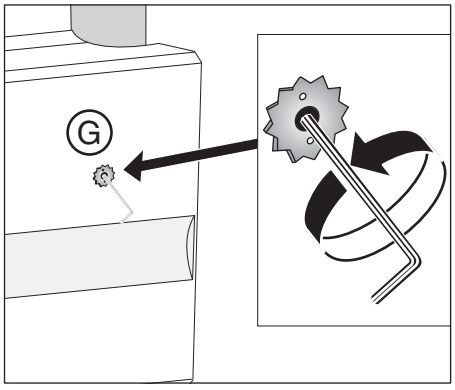
4. Insert screw (C) through washer (D) and then through the wall holder and into the stand from behind.



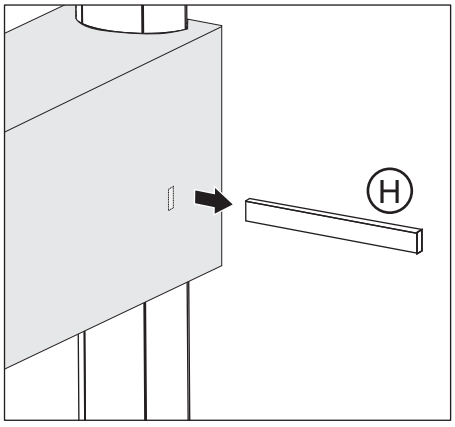
5. Fit the profile clamp (E) onto the screw (C) from the other (front) side and screw the nut (F) onto the screw.
6. Tighten nut (F) firmly.



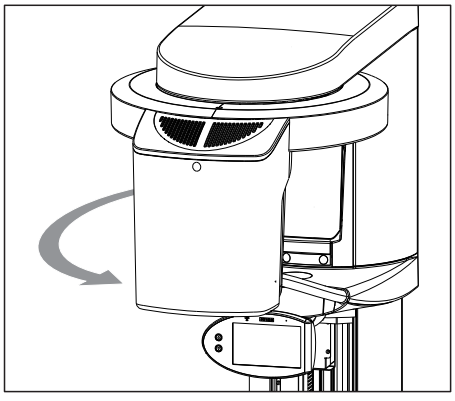
Leveling the unit and fastening it to the floor (standard and option 1)



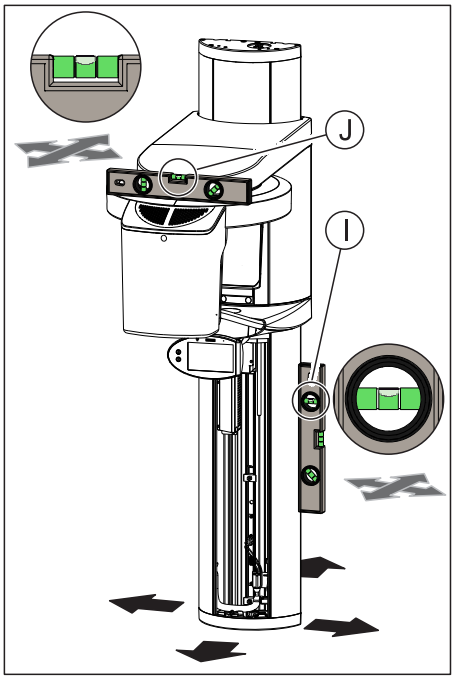
1. Remove the transport safety device (G).

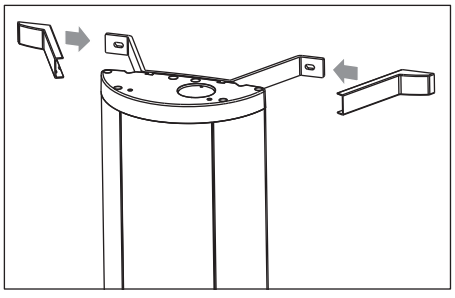


2. Pull wooden board (H) out of the styrofoam packaging and remove all styrofoam packaging.

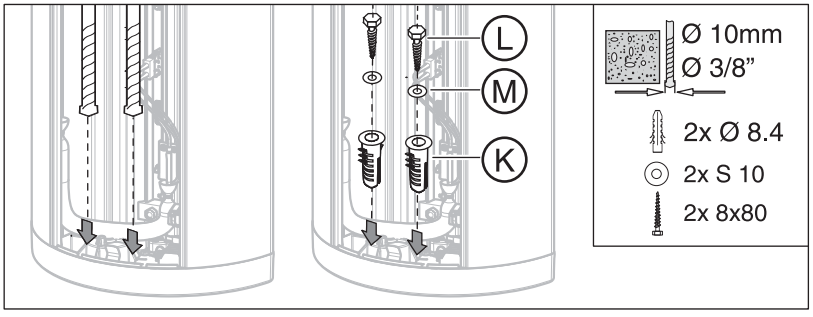


3. Rotate the X-ray tube assembly counterclockwise to the front side of the unit.





4. Level the unit in both directions with the help of the spirit level by adjusting the unit base:
   Align the stand by placing the spirit level on the side and rear of the stand (I).
   Check the ring in both directions using the spirit level (J).



5. Drill through the recesses of the stand into the floor.
6. Insert plugs (K) and check the alignment of the stand again.
7. Screw the stand to the floor with the two wood screws (L) and washers (M).

8. Attach the covers of the wall holder(s).

5.4 Installing the floor stand (option 2)

NOTICE

Reduced image quality

Even when the unit is installed using the floor stand it must be secured with the upper wall holder.

NOTICE

Reduced image quality

Note the wall and ground conditions. If a carpet is present at the unit installation site, it must be removed.
Each wall plug must support a tensile force of 700 N.
The wall construction must be suitable for the installation of the unit.

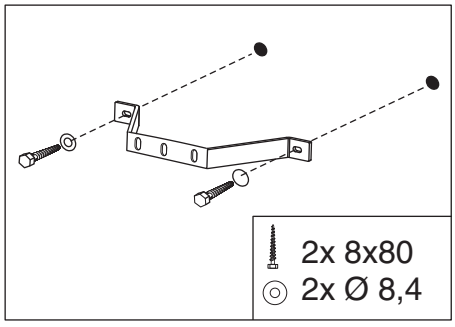
IMPORTANT

The unit must remain on the pallet until the floor stand has been fully installed. Only then may the unit be installed. For enhanced representation, some of the following drawings are shown in the standing state.

IMPORTANT

The floor stand version is 30 mm (1 3/16") higher than the standard version.

In case of mounting on weight-bearing wood structures



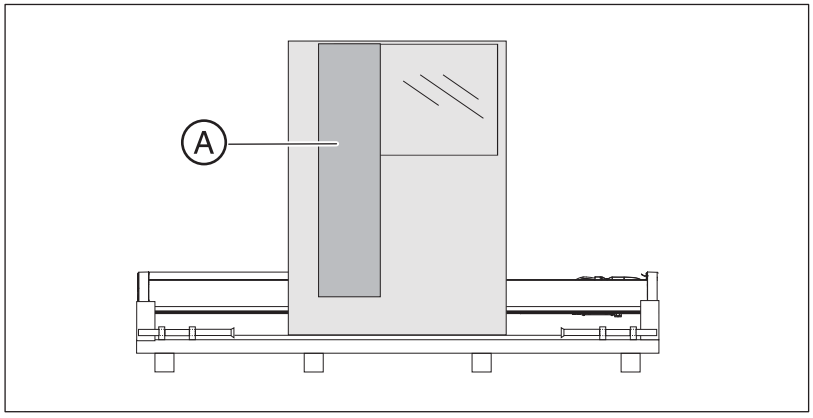
Use the enclosed wood screws and washers from the mounting kit for mounting the unit on weight-bearing wood structures.

Installing the floor stand

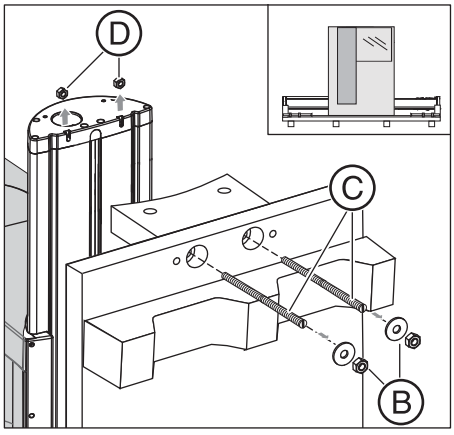
NOTICE

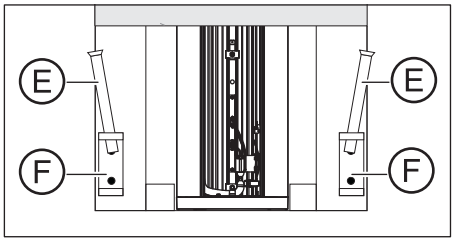
Possible transport damage

Leave the center styrofoam packaging attached to the unit for protection.

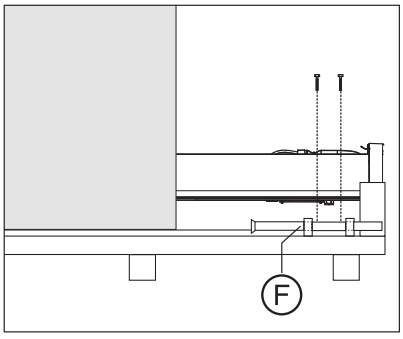


1. Transport the unit as close as possible to the ultimate installation location.
2. Remove the surrounding packaging, the two lateral styrofoam parts, and the profile cover (A).
3. Loosen the nuts with washers (B) on both sides of the pallet (or wooden support).
4. Take off the pallet (or wooden support).
5. Remove the threaded bolts (C).
   The nuts (D) on the unit may remain inside the unit when the threaded rods are removed. Remove the nuts.

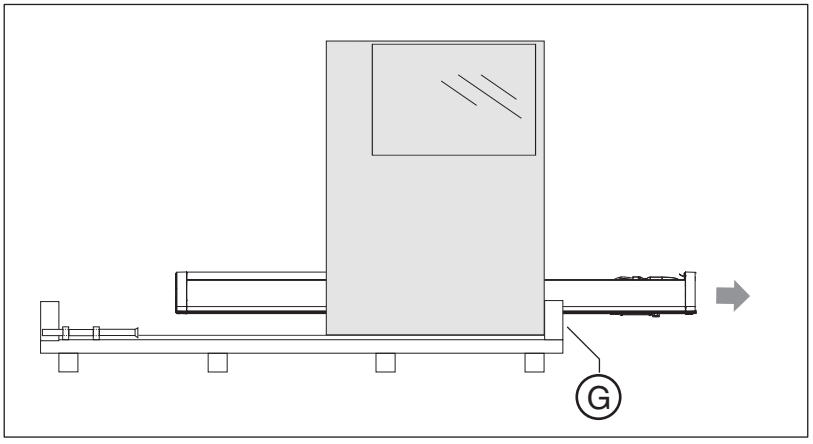




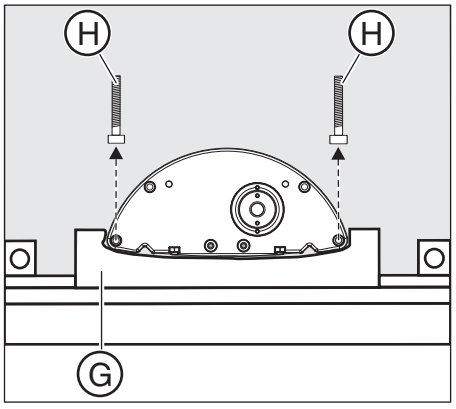
6. Remove the carrying handles (E) from the holders (F) on the underside of the pallet.



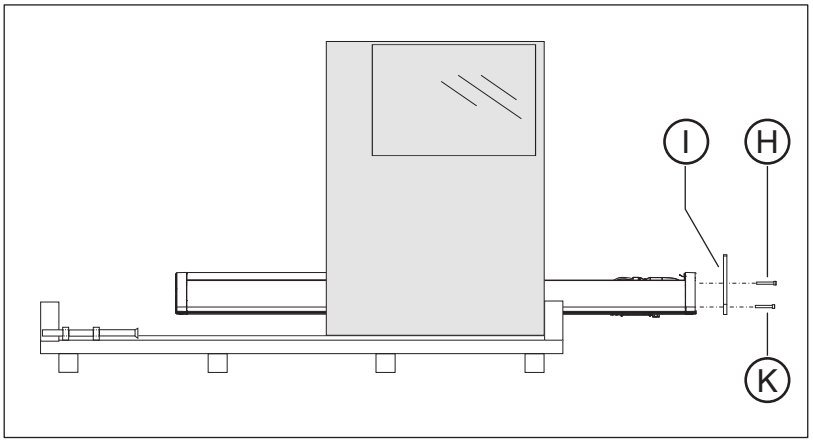
7. Loosen the screws and remove the holder (F).
8. Remove the cables from the stand and pull them out toward the rear.

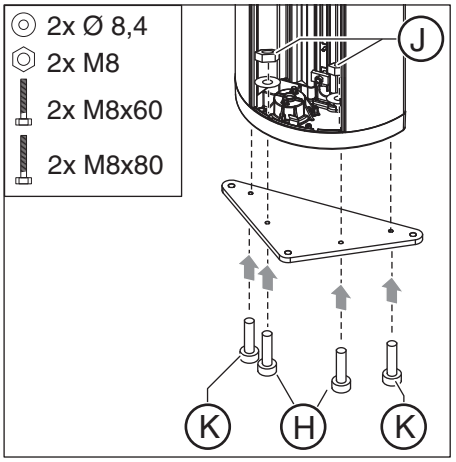


9. Carefully push the unit toward the base just far enough so that the center styrofoam part nudges the lower supporting block (G).
NOTICE! Do not damage the interfaces or cables. Make sure that the interfaces and cables do not bear on the supporting block (G) and are not damaged when you push the unit.



10. Remove the two screws (H) from the bottom of the stand.

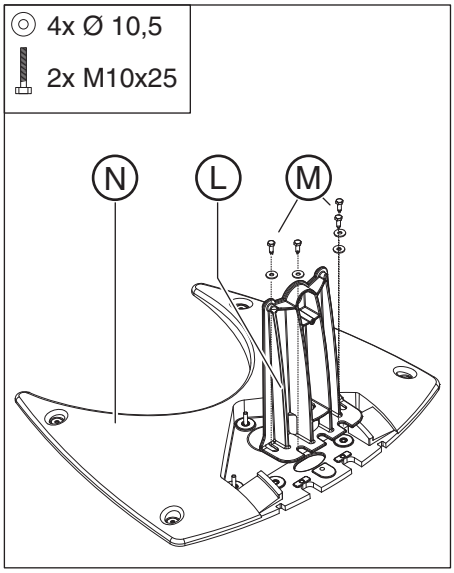




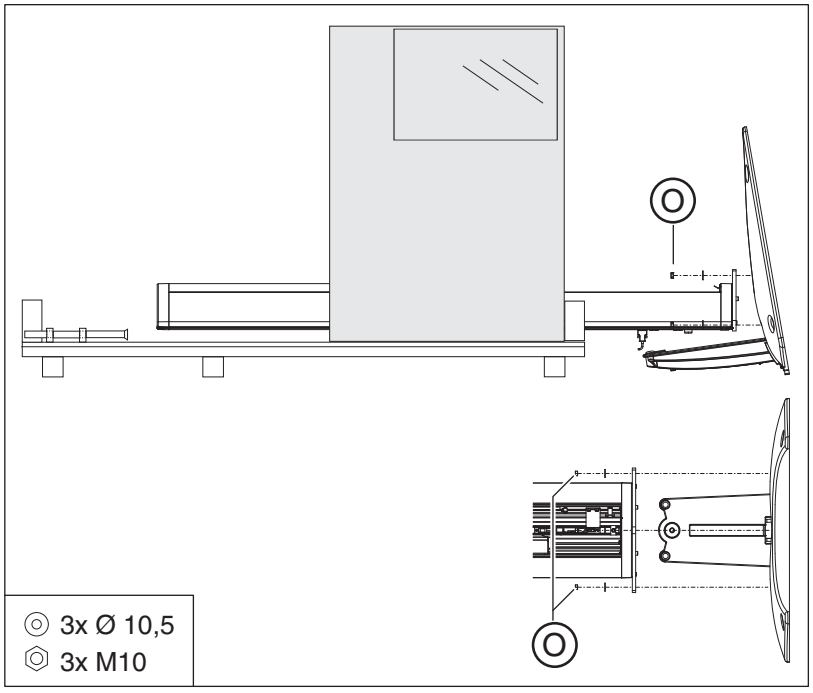
IMPORTANT

The countersunk drill holes of the adjustment plate must point downward.

11. Screw the adjustment plate (I) firmly onto the stand.
Use the M8x60 screws (H) for the front two holes. Secure the two screws with the accompanying nuts and washers (J) (included in the installation material). Use two new M8x80 screws (K) for the rear holes.

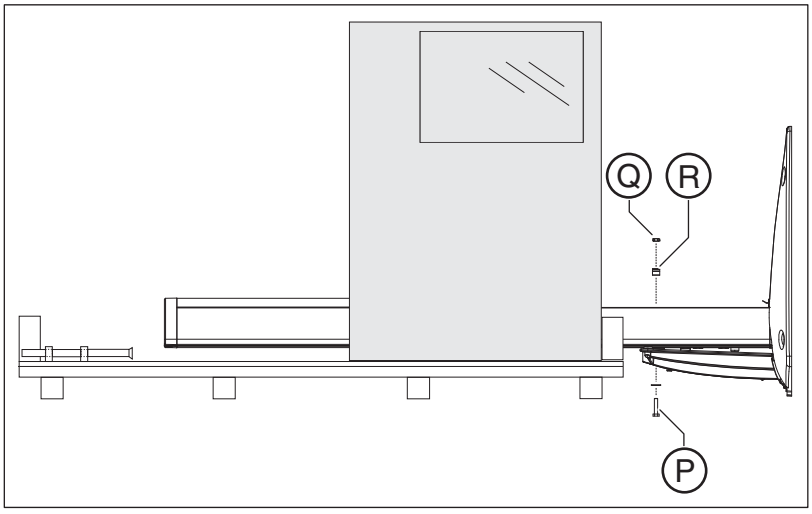


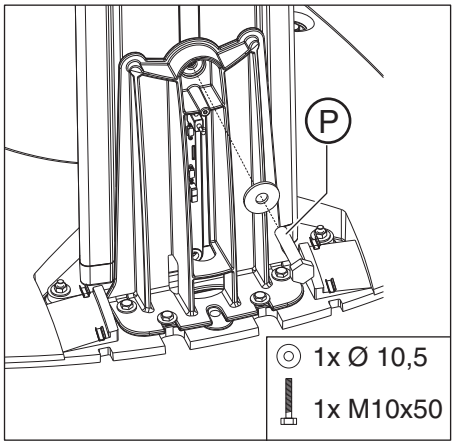
12. Screw the support (L) firmly onto the base plate (N) using the 4 screws and washers (M).



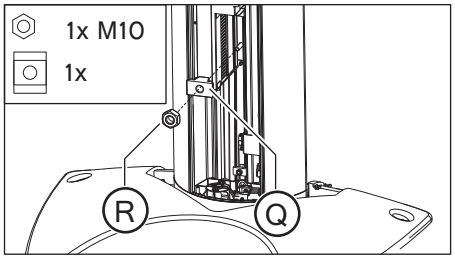
13. **NOTICE!** Do not damage the cables. Ensure that the cables are correctly routed through the support and are not crushed.
Position the base plate (N) on the adjustment plate with the set screws (incl. mounted support (**L**)) and affix the base plate loosely with the 3 adjusting nuts and washers (O).

Setting up and leveling the unit





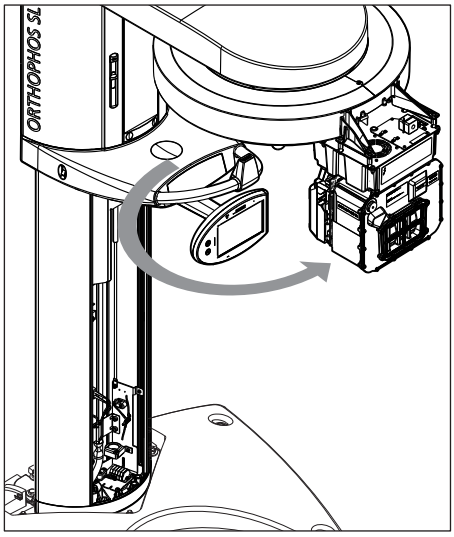
1. Remove the transport safety device (see section “Remove the transport safety device [→ 63]”).
2. Insert screw (P) through the washer and then from the rear through the support and into the stand.



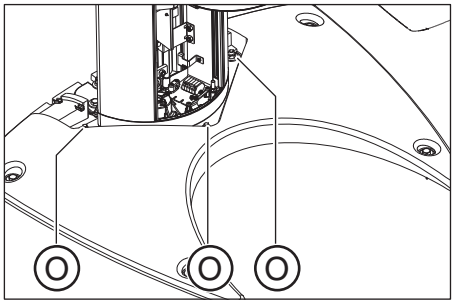
3. Fit the profile clamp (Q) onto the screw (P) from the other (front) side and screw the nut (R) onto the screw (P).
4. Tighten adjusting nuts (O) and screw (P) firmly.

IMPORTANT
Observe the required movement range of the unit during installation.

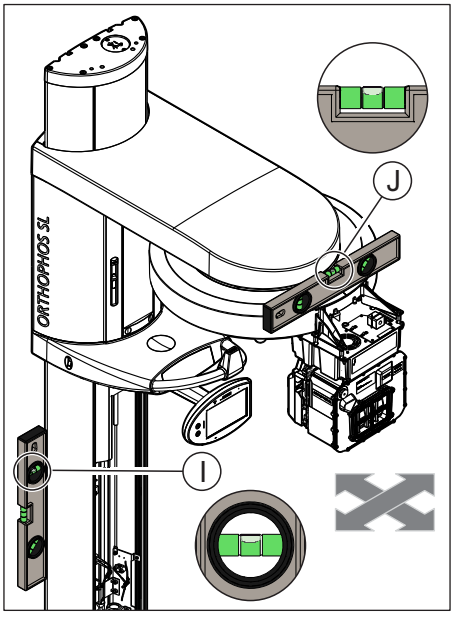
5. Set up the unit including the central styrofoam packaging and position it in its ultimate location.



6. Remove the styrofoam packaging and rotate the X-ray tube assembly counterclockwise to the front side of the unit.

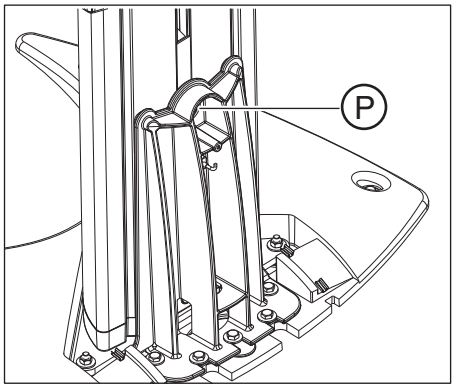


7. Loosen screws (P) and adjusting nuts (O) again slightly.



8. Level the unit in both directions with the help of the spirit level by adjusting the adjusting nuts (O):
   Align the stand by placing the spirit level on the side and rear of the stand (I).
   Check the ring in both directions using the spirit level (J).

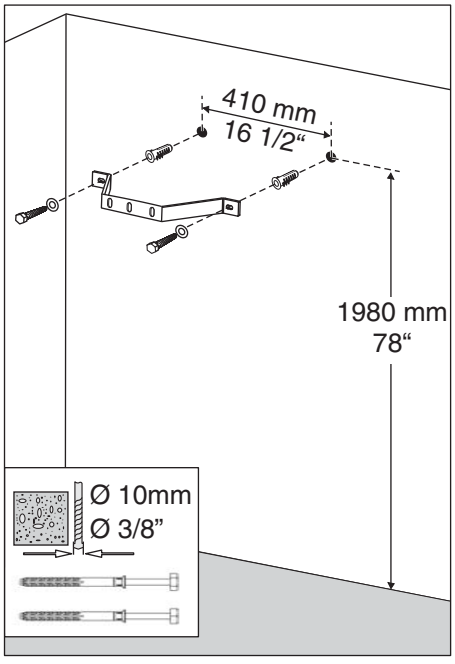
IMPORTANT
Be sure to tighten all adjusting nuts equally (to the same torque) after leveling.



9. Retighten screw (P) firmly.

Attaching to the wall and floor

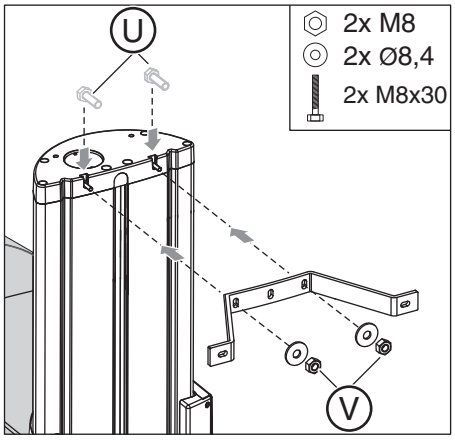
IMPORTANT
Use the long wall holder for the floor stand installation.



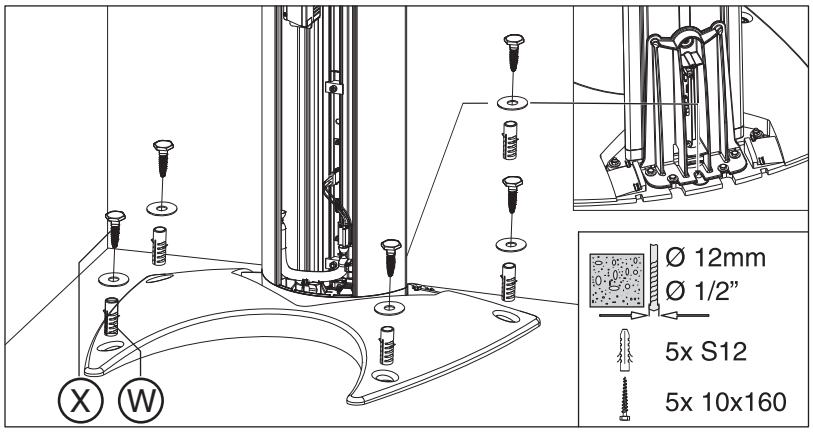
1. Mount the upper wall holder.

IMPORTANT
Observe the required movement range of the unit during installation.

2. Slide the unit with the assembled floor stand up to the wall.

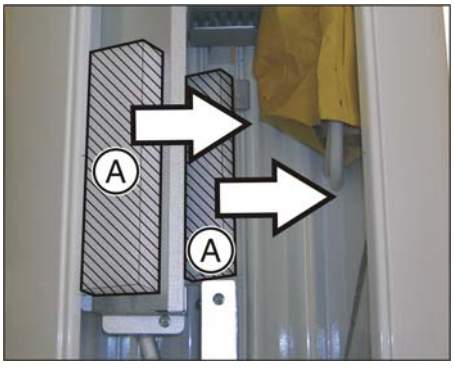


3. Attach the unit *loosely* to the upper wall holder:
   Place the screws (U) in the grooves.
   Screw the unit onto the wall holder *loosely* using nuts and washers (V).
   NOTICE! Do not tighten the screws firmly.
4. Level the unit again in both directions with the help of the spirit level and tighten the screws on the wall holder firmly.



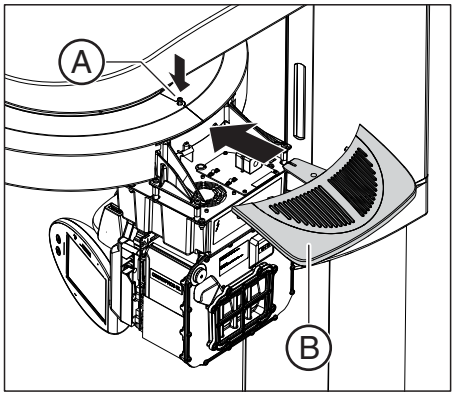
5. Drill the fastening holes in the floor through the holes in the base plate. Remove the drilling dust with a vacuum cleaner.
6. Slide the wall plugs (W) through the base plate and into the drillings.
7. Use the five screws and washers (X) to screw the base plate to the floor.

5.5 Remove the transport safety device

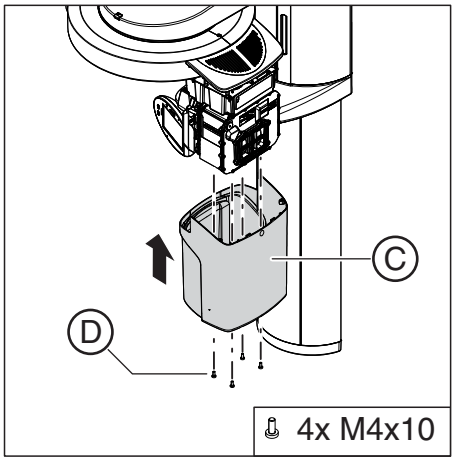


1. Remove transport safety devices (A) on board DX32 before starting up the unit.
2. Keep transport safety devices (A) in a safe place. You will need them should the unit be moved again.

5.6 Installing tube assembly cover

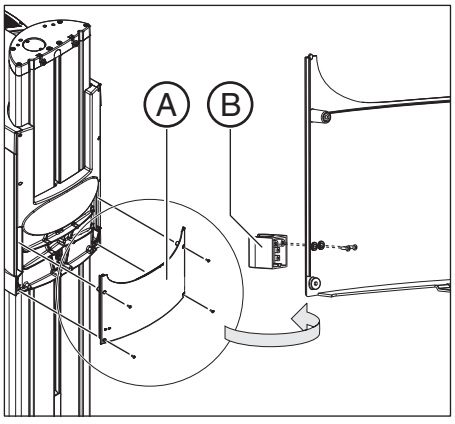


1. Loosen screw (A) on the unit's swivel (approx. 3-4 turns).
2. Fit the "Top tube assembly cover" (B) under the cover of the swivel onto the screw (A).



3. Slide the "Bottom tube assembly cover" (C) from below onto the tube assembly and secure it with the 4 screws (D) (supplied with the unit).
4. Clip the "Top tube assembly cover (B) into the "Bottom tube assembly cover" (C) and re-secure the "Top tube assembly cover" (B) with the screw (A).

5.7 Installing the release button holder



IMPORTANT

Only attach the holder to the unit if you are *not using remote control*. If you are using remote control, the holder is attached to the remote control.

1. Unscrew and remove the cover (A).
2. Attach the holder (B).
3. Screw the cover (A) onto the unit.

6 Installing the sensor unit

NOTICE

Damage to the Flat Panel Detector

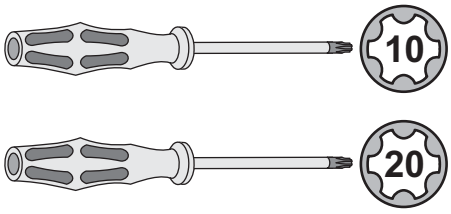
The Flat Panel Detector is a sensitive component. Be careful not to touch the detector surface during assembly.

NOTICE

Damage to the rotation unit

The sensor is rotated via a motor drive. The gearing of the rotation unit can be damaged if it is turned by hand.

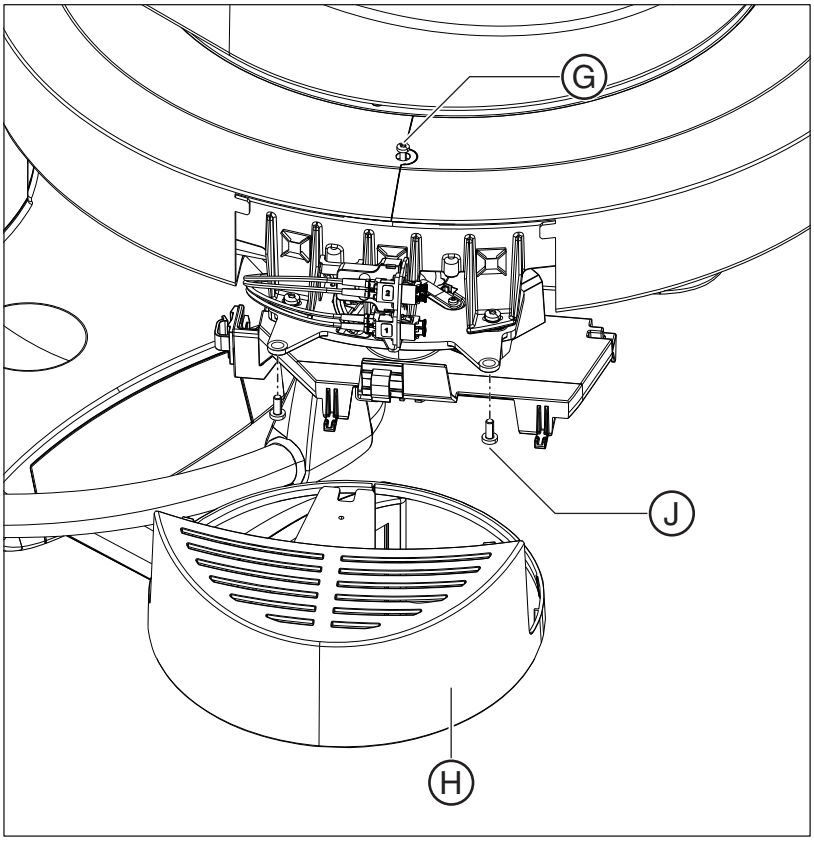
6.1 Required tools



- Screwdriver, Torx® / T10
- Screwdriver, Torx®/TX20

6.2 Installing the sensor cover on the ring

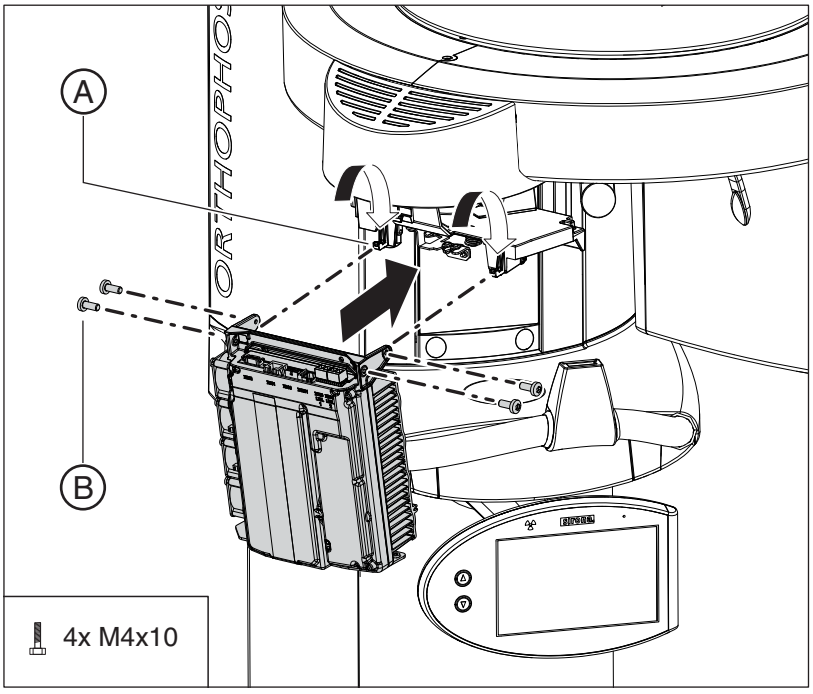
1. Loosen screw (G) (approx. 2-3 turns).



2. Insert the sensor cover (H) from below over the sensor bracket and then slide it under the ring cover.
3. Screw the sensor cover onto the rotation unit with the 2 screws (J).
4. Tighten the screw (G) firmly.

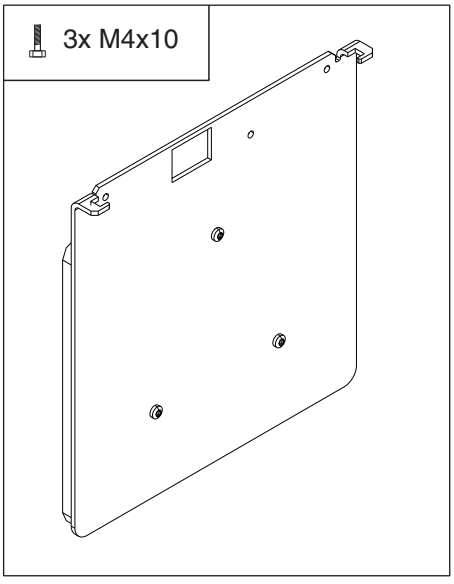
6.3 Attaching DCS sensor

1. Carefully remove the DCS sensor from the packaging.



2. Fit the DCS sensor into the holes (A) of the rotation unit and secure the sensor immediately with the 4 screws (B) (included in the scope of supply for the X-ray unit).

6.4 Attaching Flat Panel Detector or dummy weight

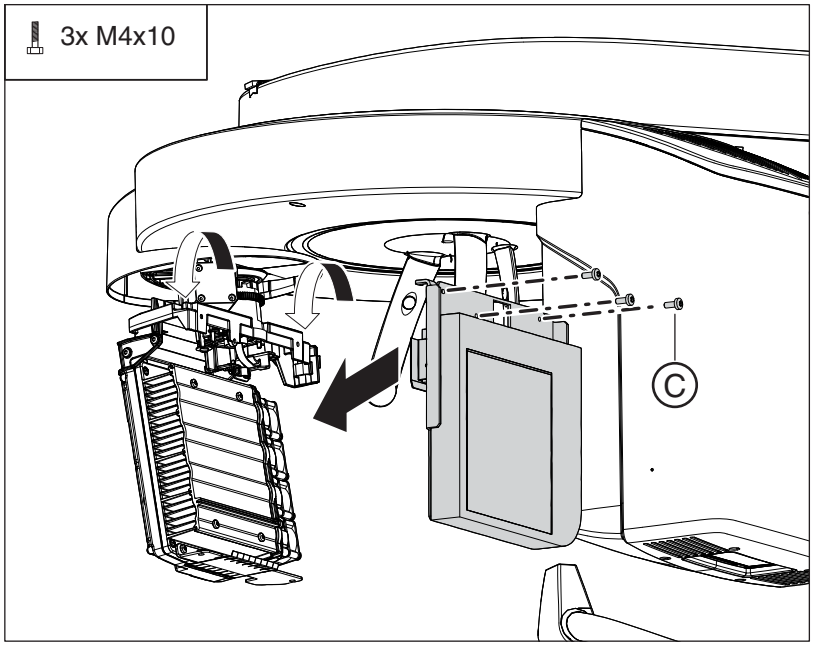


IMPORTANT

A dummy weight is attached in place of the Flat Panel Detector on the "ORTHOPHOS SL 2D" and "ORTHOPHOS SL 2D Ceph" unit versions. The dummy weight is attached the same way as the Flat Panel Detector.

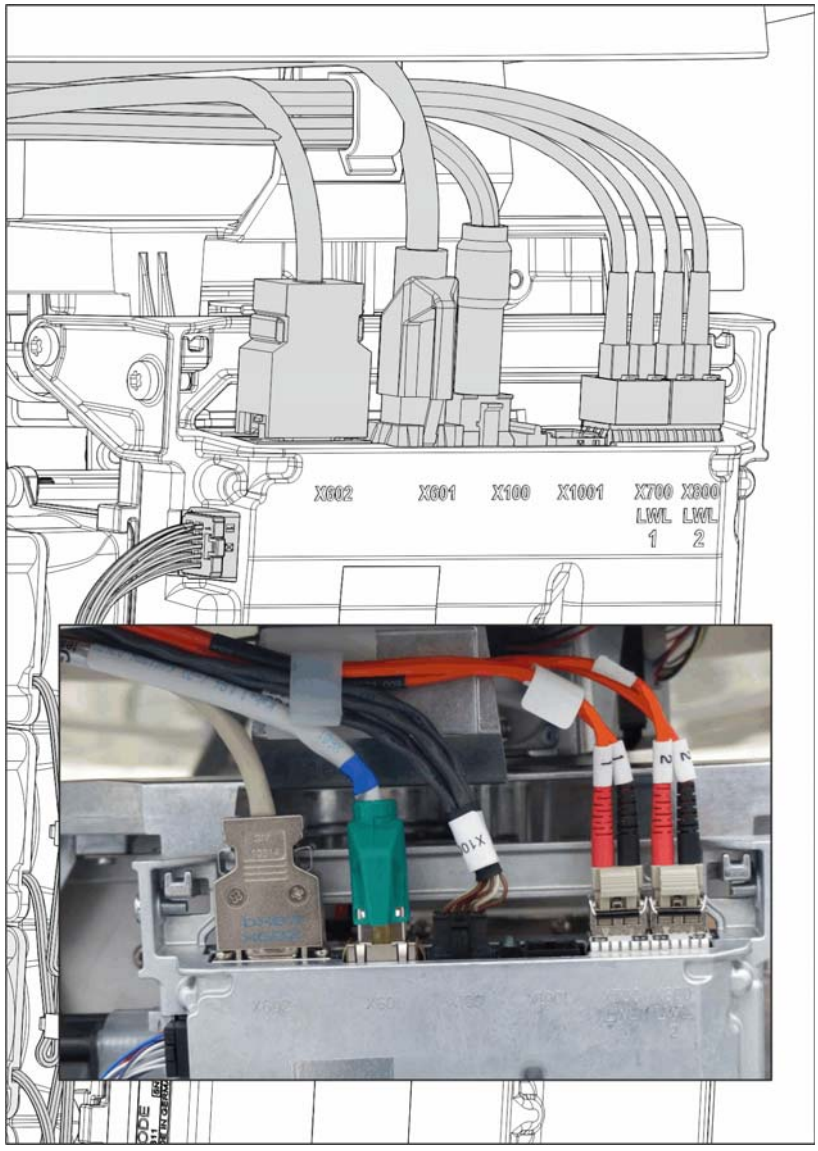
Installing the Flat Panel Detector

1. Carefully remove the Flat Panel Detector from the packaging.

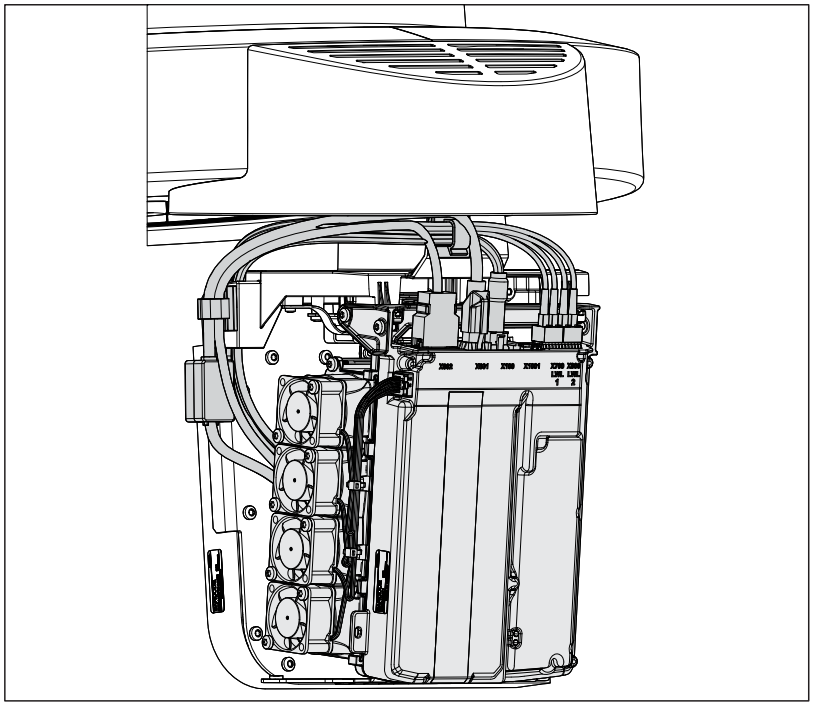


2. Fit the Flat Panel Detector from above into the guide of the rotation unit and secure the detector immediately with the 3 screws (C).

6.5 Connecting a sensor unit

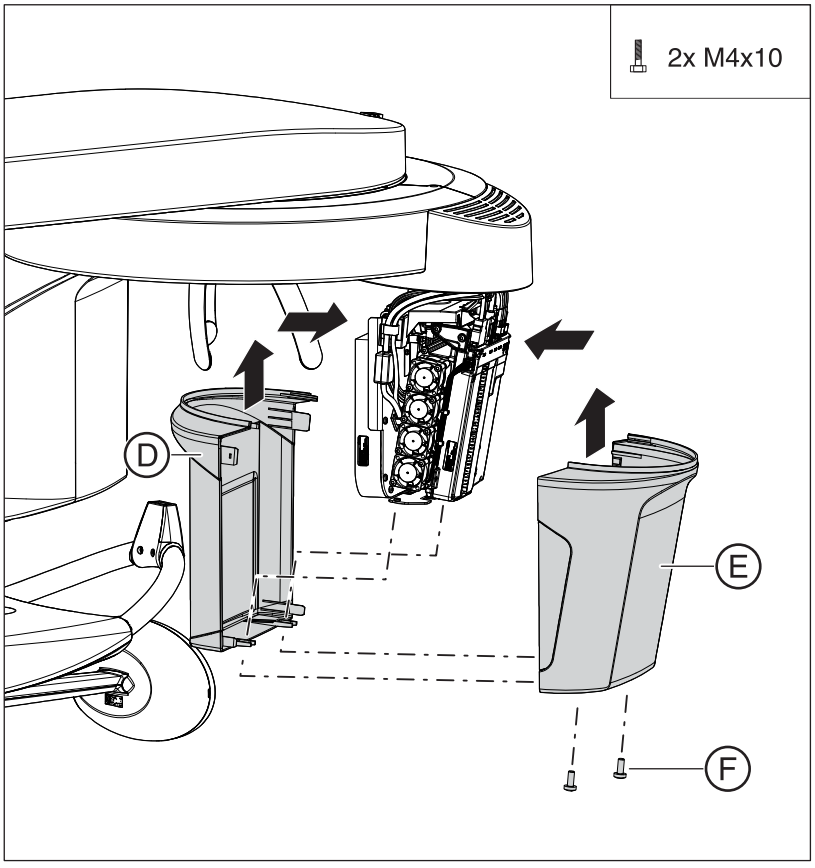


1. Insert leads **1 (L83A)** and **2 (L83B)** from the rotation unit, as shown in the illustration, into plugs **X100**, **X700** and **X800** on board **DX83**.
2. *If a Flat Panel Detector is present:*
   Insert lead **L84** from the Flat Panel Detector, as shown in the illustration, into plugs **X601** and **X602** on board **DX83**.



3. Lay the leads as shown in the illustration.

6.6 Final installation work



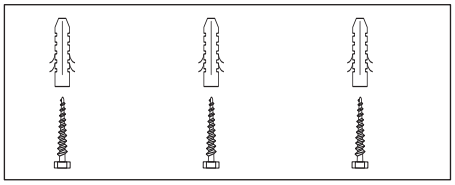
➢ Connect the sensor covers (D and E) together over the sensor and secure them with the two screws (F).

↳ The installation of the sensor is now complete.

7 Installation: Remote control

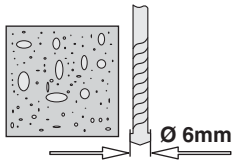
IMPORTANT
For operation with a remote control, the unit must be configured accordingly. Check the configuration after startup via the service routine S017: Test step 6.

7.1 Installation material

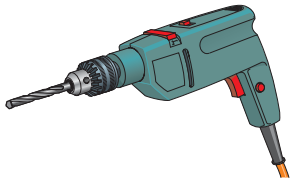


Wood screw 4x30 (3/16x1 1/4)	3 pc.
Plastic wall plug S6	3 pc.

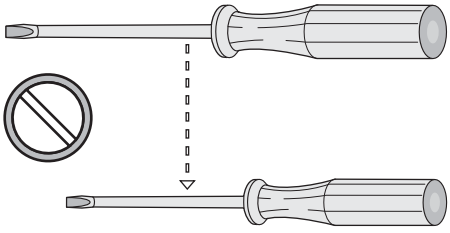
7.2 Required tools



- Masonry drill bit 6 mm (1/4")

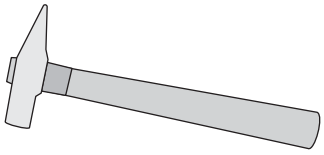


- Drill or drill hammer, depending on the ground

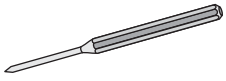


- Slot screwdriver

- Torx offset screwdriver TX20



- Hammer

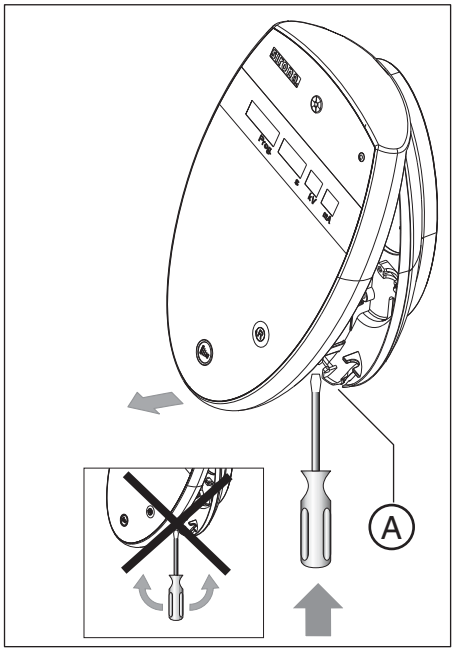


- Center punch/awl

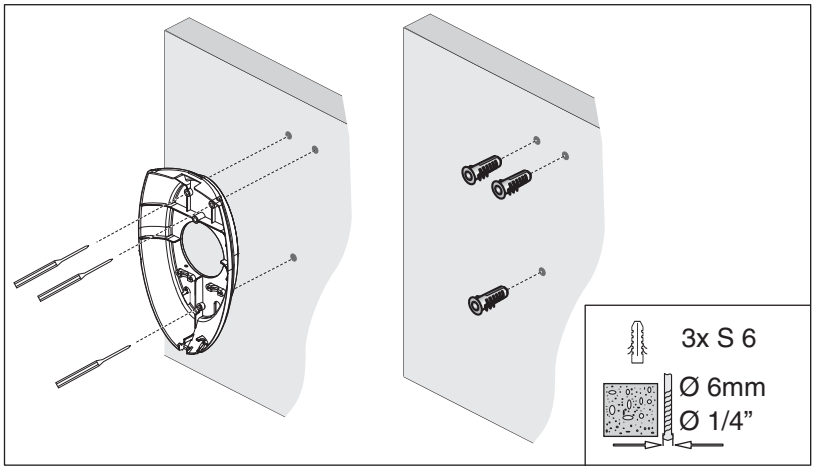
7.3 Installation

The cable for the remote control can be installed on the surface or beneath the surface (concealed). For *concealed installation*, the control cable is drawn into the chassis from the rear. For *surface installation*, the control cable is drawn into the chassis from underneath.

Preparations

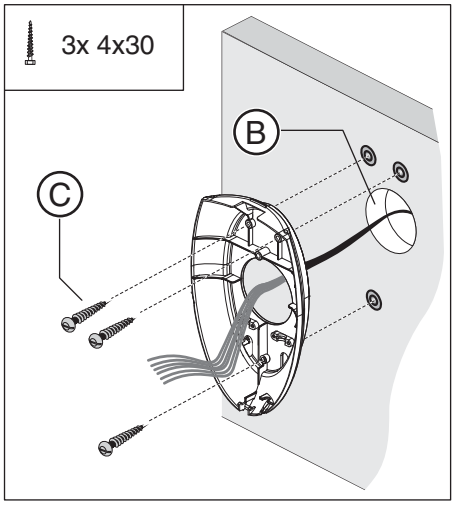


1. Press carefully into the groove (A) from below with the slotted screwdriver (do not lever).
2. Remove the lid from the chassis.



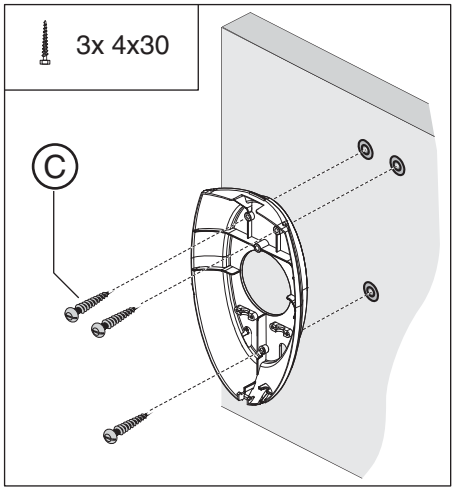
3. Hold the chassis against the wall in its mounting position and mark the positions for the three drill holes with an awl.
4. Drill the holes and insert the wall anchors.

Concealed installation



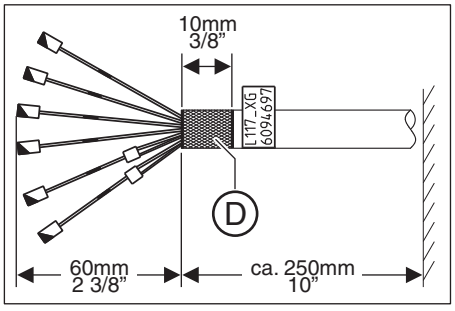
1. Feed the control cable from the wall into the chassis through the rear opening (B). The cable length between the wall outlet and the stripped wire ends should be 250 mm (10").
2. Fasten the chassis firmly to the wall with the three screws (C).

surface installation



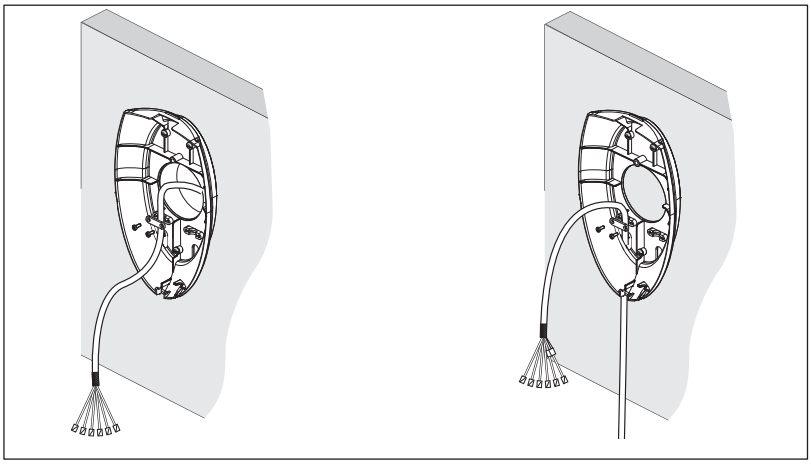
➢ Fasten the chassis firmly to the wall with the three screws (C).

Shortening the cable

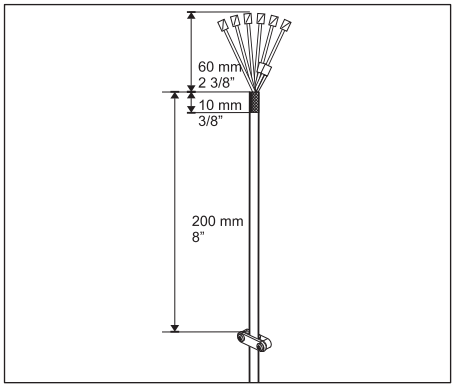


1. Shorten cable **L117** to the desired length.
2. Expose the cable shield (D) (see condition on delivery). The length of the wires should be approx. 60 mm (2 3/8").
3. Place the shortened shielding over the insulation and wrap the shielding with 3 layers of self-adhesive copper foil.
4. Strip the wire ends to 5 mm (1/5").
5. Crimp on the end sleeves. Crimp the orange with white/blue and blue with white/orange wires each into an end sleeve.

Attaching the strain relief



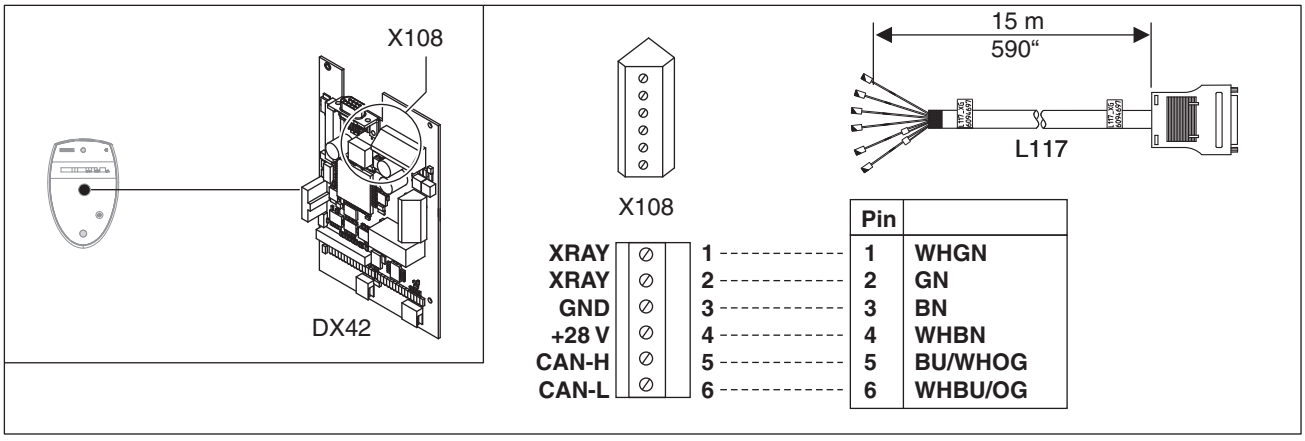
Left: concealed installation; right: surface installation



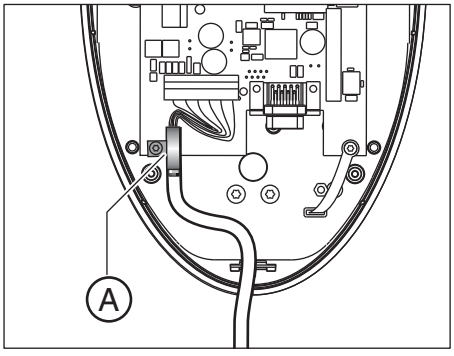
➢ Attach cable **L117** to the strain relief in the chassis. The cable length between the strain relief and the stripped wire ends should be 200 mm (8").

7.4 Connecting the control cables (REMOTE)

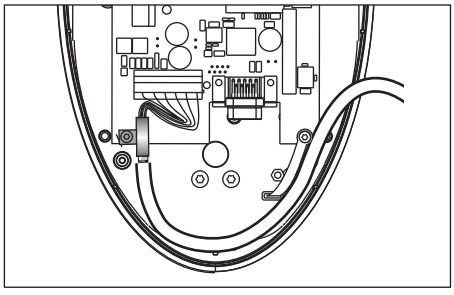
7.4.1 Installation version 1: Without coiled cable



PIN	Code	Color
1	WHGN	White/green
2	GN	Green
3	BN	Brown
4	WHBN	White/brown
5	BU/WHOG	Blue / white/orange
6	WHBU/OG	White/blue / orange



1. Unscrew clamp (A) from the board.
2. Place cable **L117** in the clamp so that the turned up cable shield is completely enclosed.
3. Re-attach the clamp to the board.
4. Connect control cable **L117** to terminal **X108** (board **DX42**) as shown in the connection diagram. Shorten control cable **L117** as required.



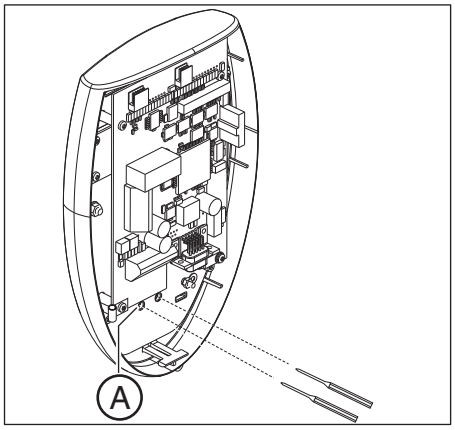
5. Lay cable **L117** in a loop following the bottom edge of the chassis.
6. Close the housing.

For information on how to connect a door contact switch, refer to the section entitled “Connecting a door contact switch [→ 80]”.

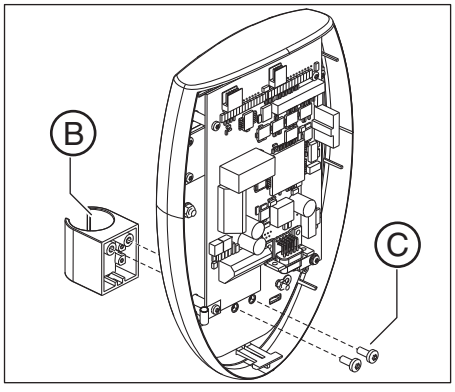
7.4.2 Installation version 2: With spiral cable

⚠ CAUTION

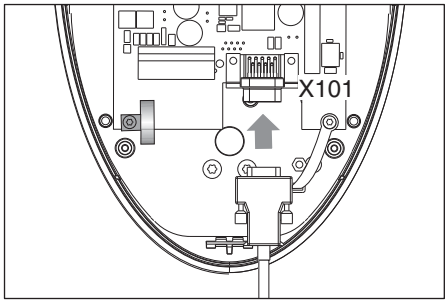
Operation of the remote control via the membrane keyboard is prohibited when installing the remote control with release button.



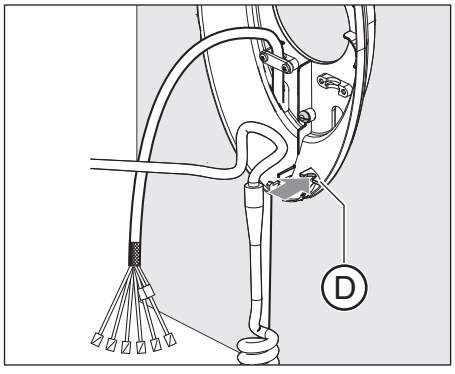
1. Use an awl to puncture the membrane keyboard at the prepared points (A) from the rear.



2. Using the two screws (C), fasten the release button holder (B) to the keyboard.



3. Plug the connector of the coiled cable into socket **X101** on board **DX42** and screw the connector down tight.



4. Hook the coiled cable onto the strain relief (D) of the assembled chassis.
5. Connect control cable **L117** (see section “Installation version 1: Without coiled cable [→ 76]”).

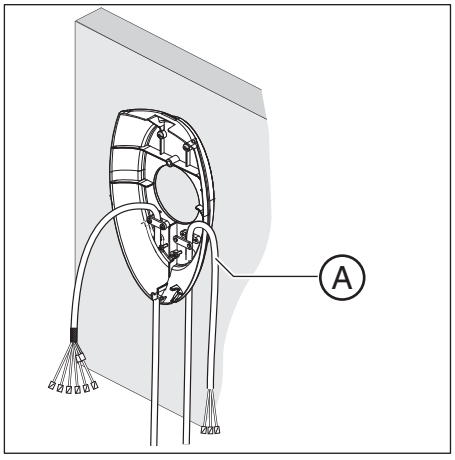
7.5 Connecting the X-ray warning lamp

You can activate an X-ray warning lamp via the remote control.

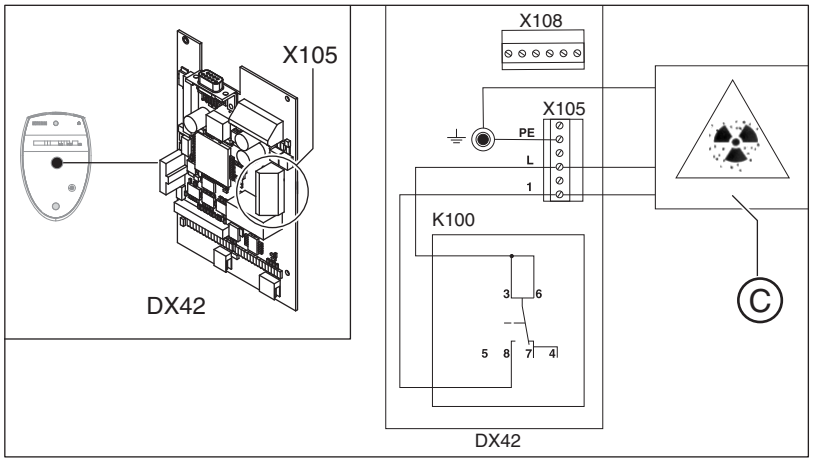
NOTICE

A maximum load of 50W is permissible. No additional circuit may be connected.

Use a 3-wire cable (1.5mm²) to connect the X-ray warning lamp.

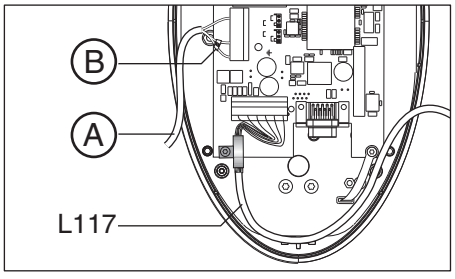


1. Guide the cable (A) for connecting the X-ray warning lamp into the chassis (concealed or surface installation).
2. Attach the cable to the still exposed strain relief.

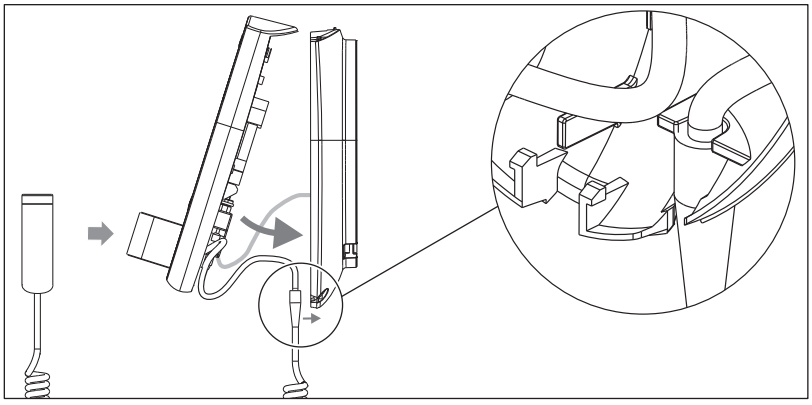


C	X-ray warning lamp

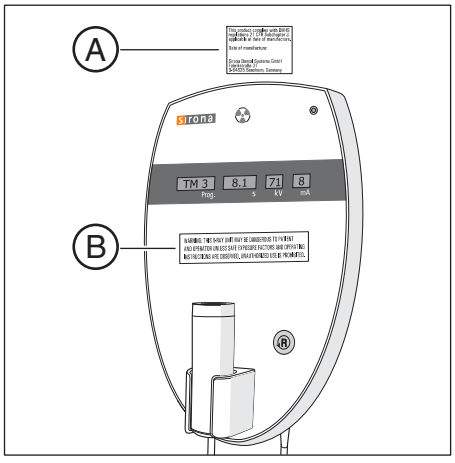
3. Connect the current-carrying cables and the ground wire to terminal **X105** (board **DX42**) as shown in the connection diagram.
4. Secure the current-carrying cables with a cable tie (B) to prevent them from slipping out.
5. Lay the cable (A) parallel to control cable **L117** and close the housing.



7.6 Final installation work



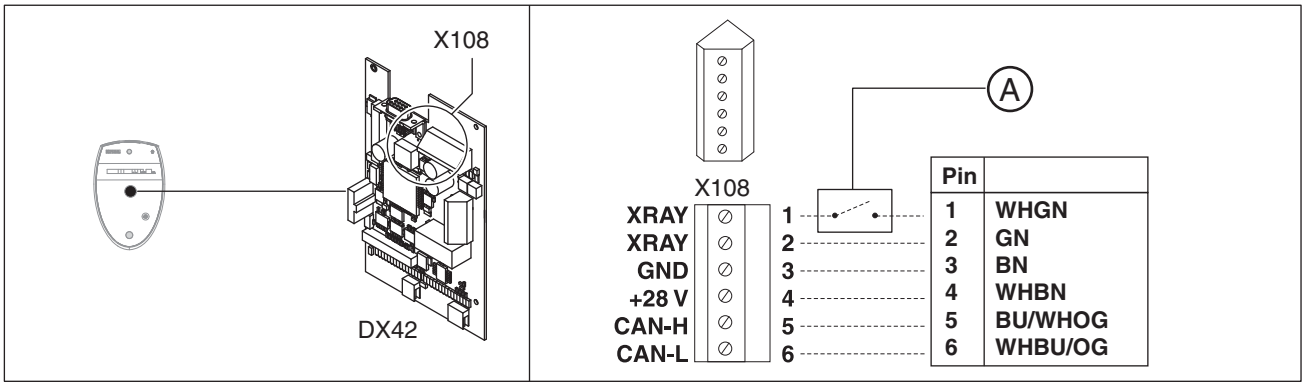
1. Reassemble the remote control.
2. **NOTICE!** Make sure that no cables are pulled off when you clip the cover on. Hang the release button (if available) in the holder.



For the USA/Canada only

Affix DHHS label (A) and warning label (B).

7.7 Connecting a door contact switch



A	Door contact switch

PIN	Code	Appearance
1	WHGN	White/green
2	GN	Green
3	BN	Brown
4	WHBN	White/brown
5	BU/WHOG	Blue / white/orange
6	WHBU/OG	White/blue / orange

➢ Connect the door contact switch between terminal **X108 pin 1** (board DX42) and control cable **L117 pin 1** (BU).

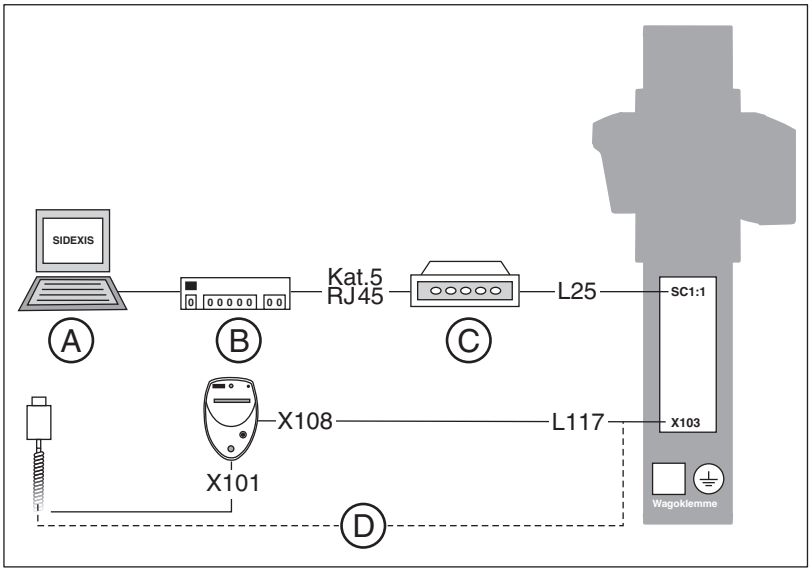
8 Electrical connection

8.1 Connecting the control cables

⚠ CAUTION

Potentially lethal shock hazard!

For PCs which are connected to an X-ray unit and are in the same room as the unit, an **additional protective ground wire** is required (4 mm^2 with cable lug 4 - 6 DIN 46234 CU) in accordance with IEC 60601-1 (see also *"Installation Requirements ORTHOPHOS SL"* (REF 64 95 183)).



1. Use the media converter to connect the PC to the **SC:SC** socket on the unit (see Operating Instructions of the media converter).

IMPORTANT

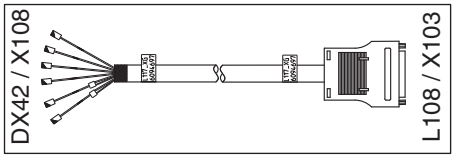
Use a duplex patch cable (L25), 1:1 connection, SC/SC 50/125 µm.

2. Install the media converter at a suitable location using fastening screws or the Velcro strap supplied for this purpose. Do *not* attach the media converter to the X-ray unit.

Installation version without remote control

➢ Connect the coiled cable of the release button to socket **X103** of the unit.

Installation version with remote control



1. Use cable **L117** to connect the remote control to socket **X103** on the unit.
2. Secure the connector on socket **X103**.

8.2 Connecting the line voltage

IMPORTANT

When operating the unit at exhibitions and trade fairs, read the chapter entitled “Using demo mode – operation without radiation release”.

8.2.1 Connecting the unit

⚠ DANGER

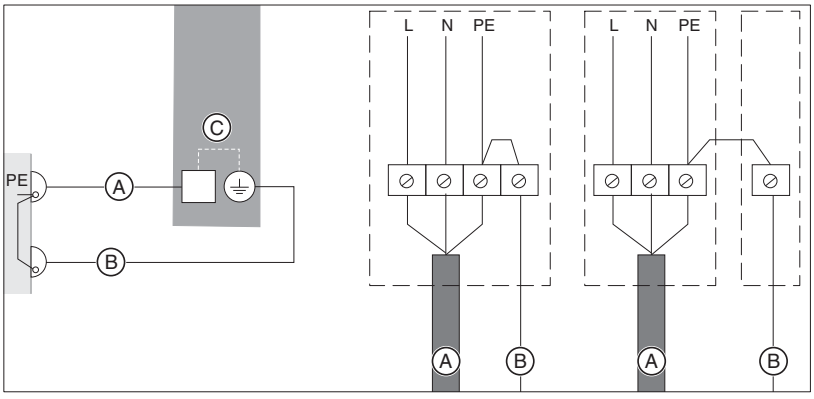
Perilous shock hazard!

Switch off the power supply connection before connecting the line voltage.

⚠ DANGER

Perilous shock hazard!

Fixed connection!
Installing a mains plug instead of the specified fixed connection infringes international medical regulatory actions and is prohibited. In case of error, this puts patients, users, and other parties seriously at risk.



A	Power cable to the unit
B	Second protective ground wire
C	Device

IMPORTANT

The unit is suitable for connection to networks of 200-240 V and 50-60 Hz, ±10%.

Connect the unit to the central distributor of the building installation, preferably using a 3-wire power cable (N, L, PE, at least 3x2.5 mm² or 3x4 mm² (14 AWG or 12 AWG)). *25 A circuit breaker B*.

⚠ WARNING

Potentially lethal shock hazard!

Be sure to connect the second protective ground wire to ground.

1. Check the protective ground wires and the unit leakage current according to IEC 62353: 2007 (see sections “Checking the protective ground wires [→ 84]” and “Checking the leakage current of the unit [→ 88]”.
2. Record the measured values in the document titled “Inspection and maintanance and safety-related checks” (REF 64 95 100).
3. Now connect the power supply as shown.

8.2.2 Connecting the media converter

➢ Insert the media converter's power supply connector into the plug socket.

9 Safety checks

9.1 Checking the protective ground wires

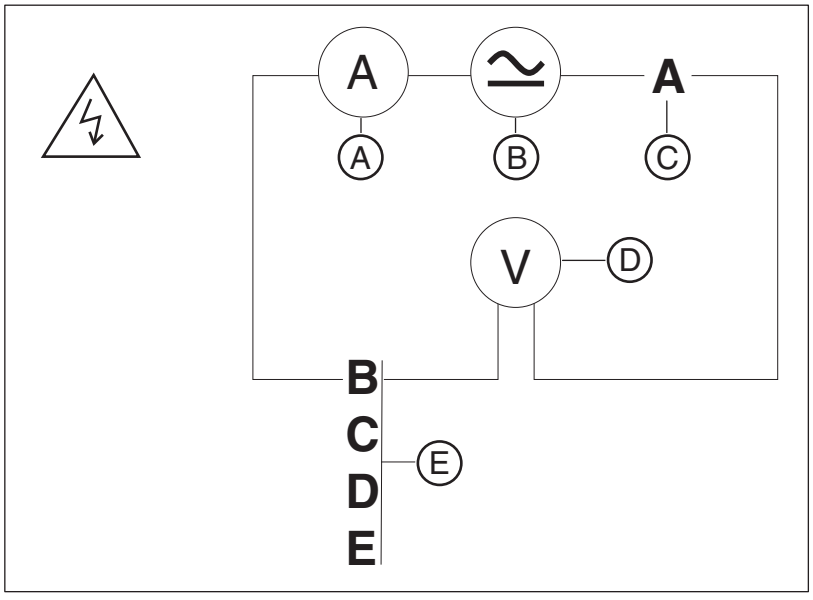
⚠ DANGER

Perilous shock hazard!

It is essential to switch the unit off and to wait at least one more 1 minute before beginning the check!

1. Switch the line voltage off at the main switch of the building installation.
2. Disconnect the power cable and the second protective ground wire from the building installation.
3. Remove the "bottom profile", "front tube assembly", and "rear tube assembly" covers.

Measuring setup for protective ground wire test



A	Ammeter
B	Power source
C	Measuring point **A**, central protective ground wire
D	Voltmeter
E	Measuring points **B** - **E**

Check whether the protective ground wire resistance complies with the specifications

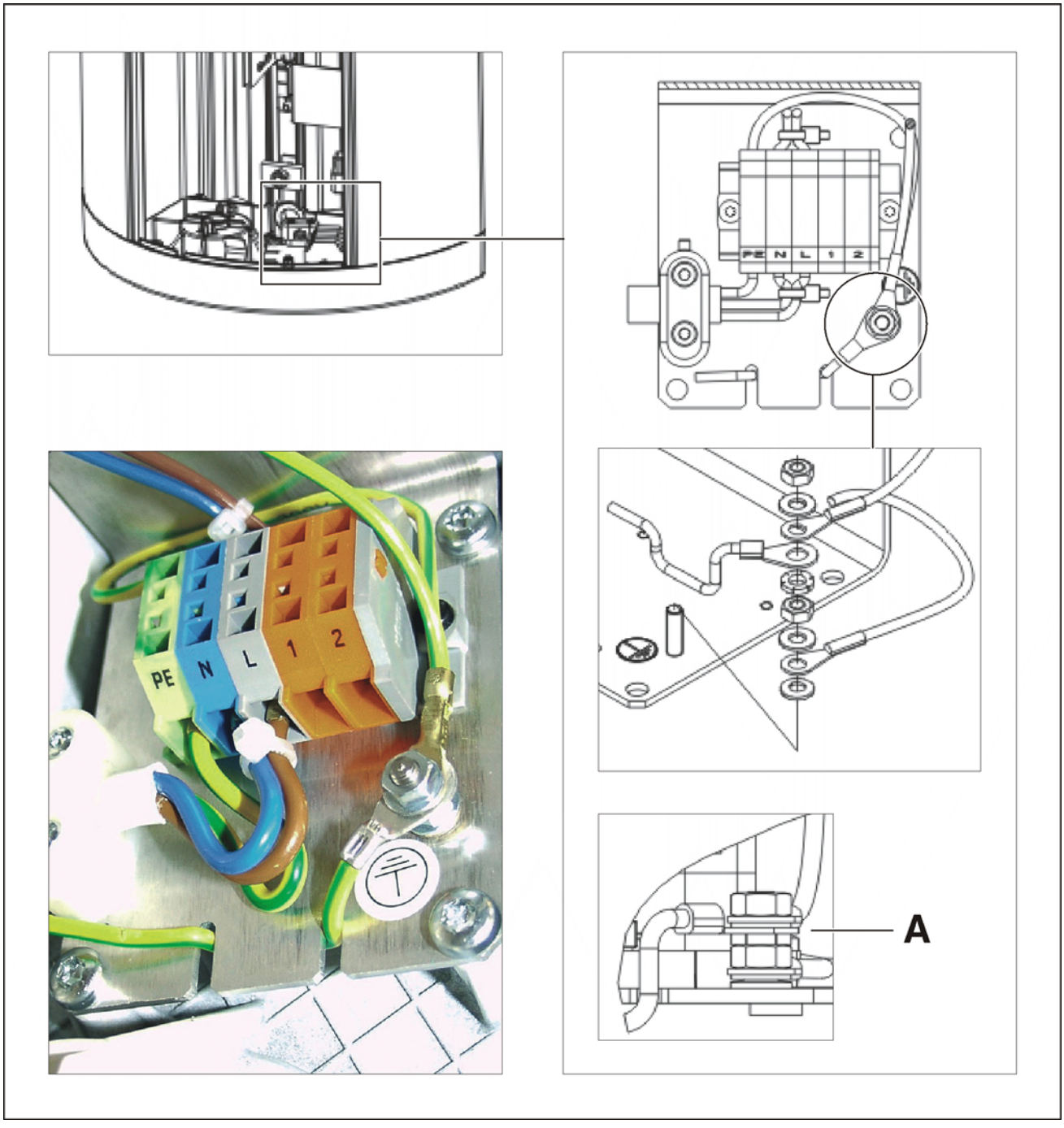
A and **B**	GNYE wire	0.1 Ω
A and **C**	2. Protective ground wire	0.1 Ω
A and **D**	Housing DX32	0.2 Ω
A and **E**	Tube assembly housing	0.2 Ω

✓ A power source with a current of at least 0.2 A, a no-load voltage of 24 V max. and 4 V min. is required.

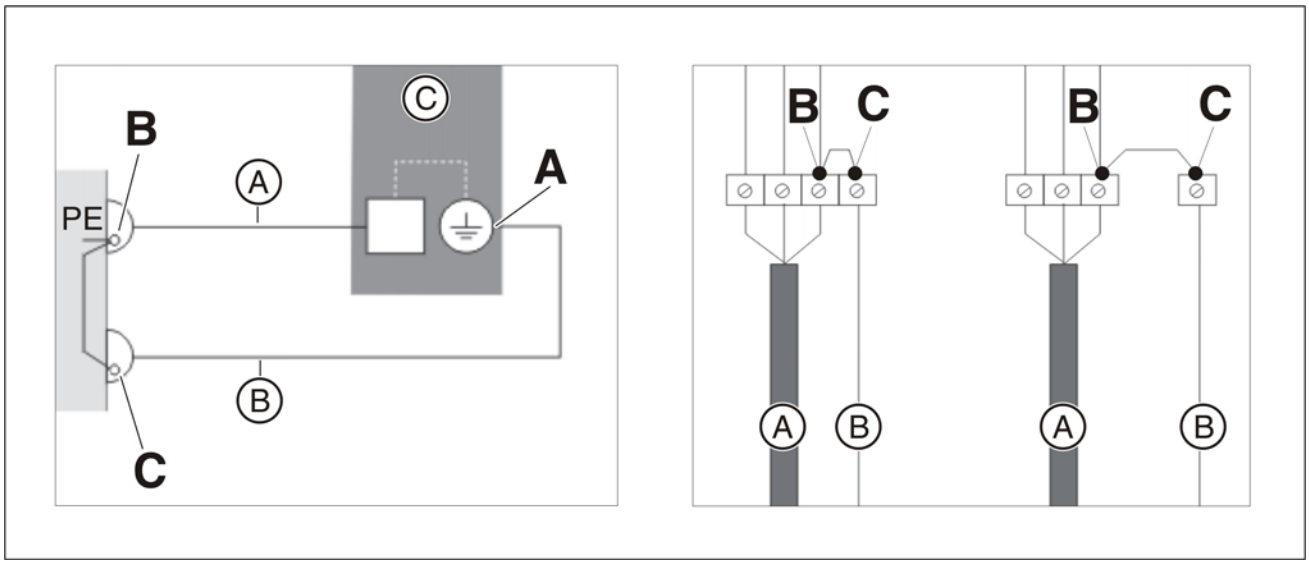
1. Connect the power source between the measuring points specified in the table for at least 5 s.
2. Measure the voltage drop with the voltmeter, measure the current with the ammeter, and calculate the resistance using the formula **R = U / I**.
   - If the resistance value is greater than indicated in the adjacent table, check whether the protective ground wires are fastened according to the specifications.
     Check whether plain washer, tooth lock washer and cable lug are installed on the protective ground wire in the correct order and whether the nuts of the protective ground wire connections are firmly tightened.
     If the fastening of the protective ground wires does not meet the specifications, fasten the protective ground wires correctly.

Tip: Do not connect the power cable and the second ground wire to the building installation yet. Check the unit leakage current first.

Measuring point A: central ground wire

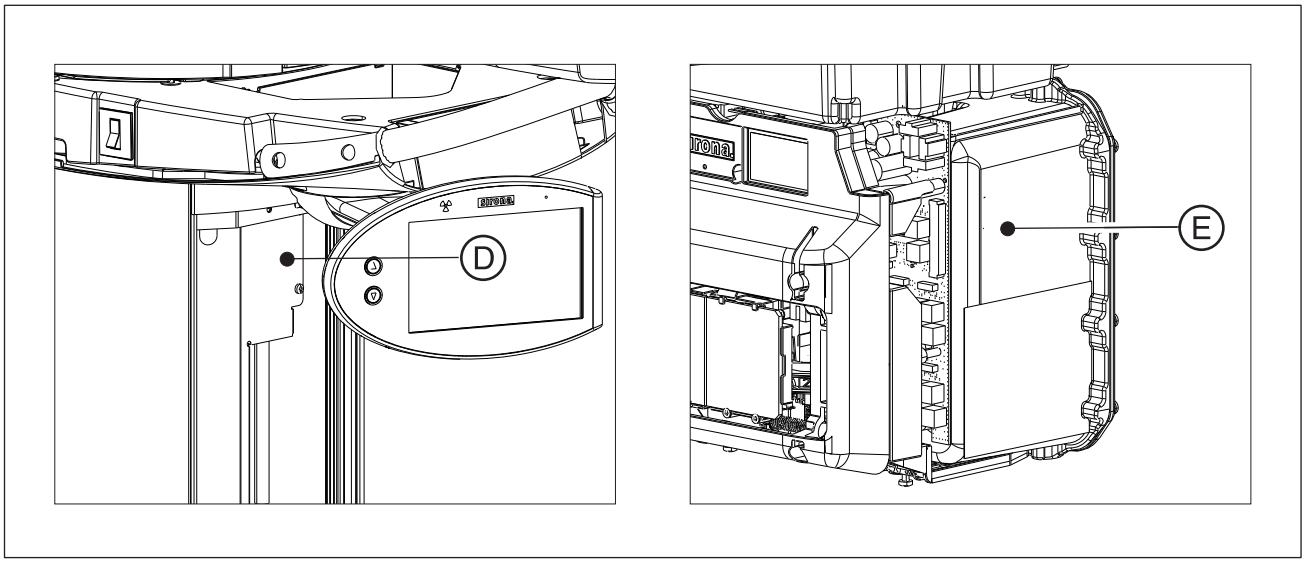


Measuring points B and C: GNYE power connection and 2nd protective ground wire



A	Power cable to the unit
B	Second protective ground wire
C	Device

Measuring points D and E: Board cage DX32 and tube assembly housing



D	Board cage DX32
E	Tube assembly housing

9.2 Checking the device leakage current

⚠ DANGER

Perilous shock hazard!

It is essential to switch the unit off and to wait at least one more 1 minute before beginning the check!
Ensure that the unit is not unintentionally turned back on.

NOTICE

Important information on building installation

The connection and disconnection of the unit (power cable) to/from the building installation must be performed by a qualified expert in compliance with the national regulations. DIN VDE 0100-710 applies in Germany.

For measurements, Sirona recommends an automatic tester (example illustration) which complies with standard IEC 62353. If you do not use an automatic tester, please pay attention to the specifications in the standard IEC 62353.

1. Switch the line voltage off at the main switch of the building installation.
2. **DANGER! Note the electrical safety rules without fail.**
   Disconnect the power cable and the second protective ground wire from the building installation.
3. Attach a connector compatible with the tester (see the user's manual for the tester) to the unit's power cable.
4. Plug the connector of your power supply unit into the intended socket on the tester in accordance with the user's manual for the tester.
5. Check whether the unit power switch is turned on.

IMPORTANT

According to Note 2 below Table 2 of standard IEC 62353, the maximum device leakage current permitted by the manufacturer is 2 mA for permanently connected units. Make sure that the automatic tester is programmed for 5 mA (not 1 mA).

6. Perform the measurements according to the operating instructions of the tester.
7. Document the measured value of the leakage current in the technical document *"Inspection and maintenance and safety-related checks"* (REF 64 95 100) to identify changes from the original value.
   ↳ A maximum deviation of ±20% from the original value is permitted for the measured leakage current.
8. *If a deviation from the original value is >±20%:*
   Perform troubleshooting according to chapter "Unit leakage current too high" (see service manual for the unit).
9. Reconnect the unit to the building installation (fixed connection) (see the installation instructions for the unit).

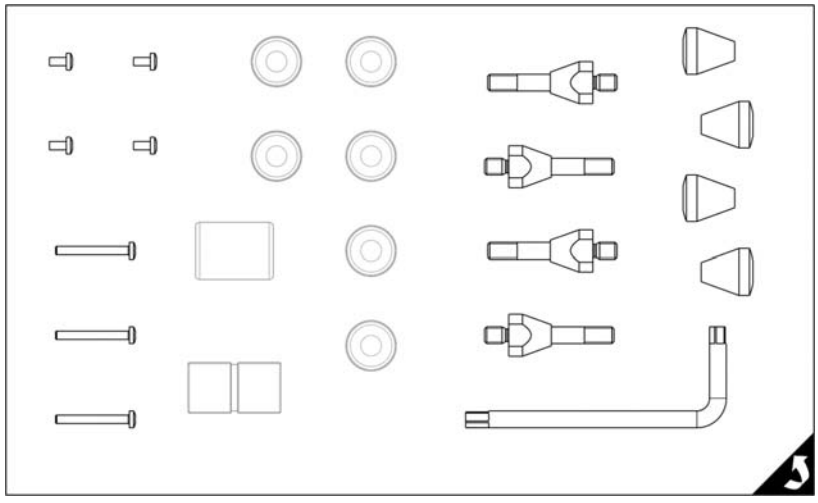
10 Installation: Ceph arm

NOTICE

Reduced image quality

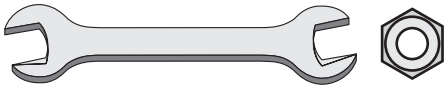
For operation of the unit with floor stand and Ceph, an additional mounting using the upper wall holder is absolutely necessary.
No Ceph installation is allowed for free-standing assembly of the unit with floor stand.

10.1 Installation material

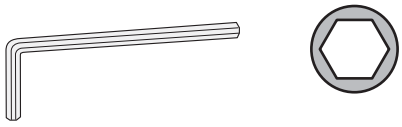


Conical nut	4 pc.
Bearing bolt	4 pc.
Screw M4x8	4 pc.
Screw M4x35	3 pc.
Torx offset screwdriver TX50	1 pc.

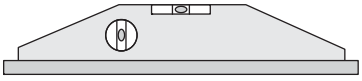
10.2 Required tools



- Open-end wrench, 8 mm A/F
- Open-end wrench, 10 mm A/F



- Allen wrench 2.5



- Spirit level

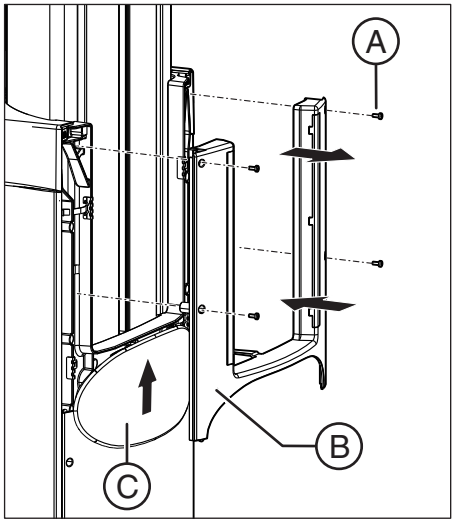
Included in the scope of supply:

- Torx offset screwdriver TX50

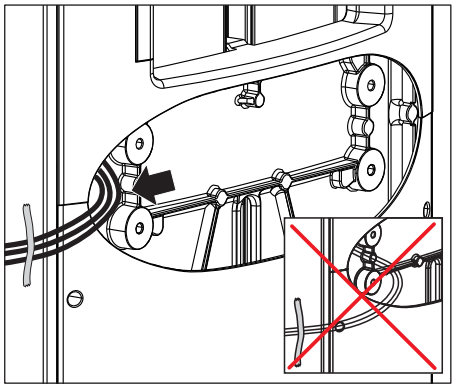
10.3 Installation

10.3.1 Ceph arm mounted on left-hand side

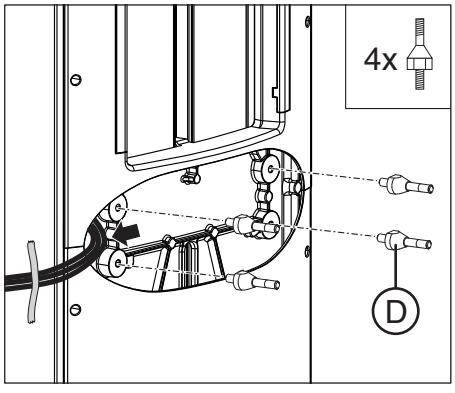
Preparing the unit



1. Loosen the screws (A).
2. **CAUTION! Do not yank out the ambient light cable!**
   Remove the cover (B).
   Tip: You can even leave the cover (B) on the unit and push it upwards a little.
3. Remove the cover (C) by pulling it upwards.
4. Reattach the cover (B).
5. Detach the cable fastening.
6. Unpack the cables.
7. Pull the cable a short way behind the cover.

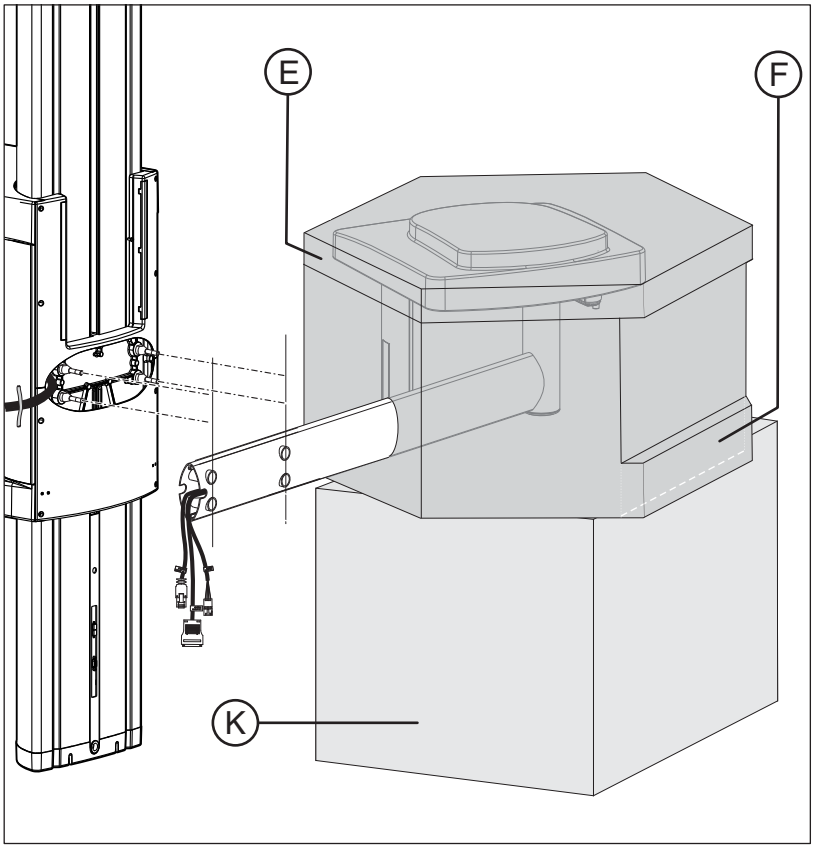


8. Run out the cable (as shown in the adjacent image) and fasten it with adhesive tape.



9. Screw the four bearing bolts (D) into the unit.

Positioning the ceph arm



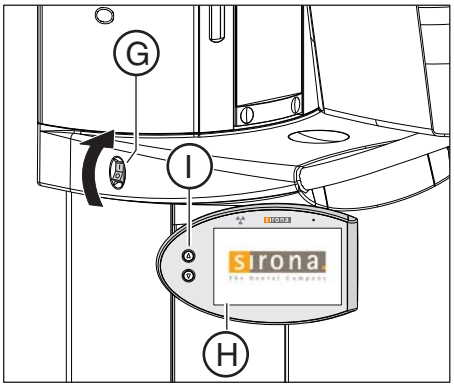
1. Position the CEPH cardboard packaging (K) next to the unit as a cardboard support.
2. Position the ceph arm with the styrofoam packaging on top.
3. Remove the adhesive tape and the cover (E) from the ceph packaging.
4. Break off the wall part (F) of the packaging at the perforation.
5. Slide the cardboard support with the ceph arm up to the wall so that the drill holes of the support arm are horizontally aligned with the positions of the threaded bolts.

⚠ CAUTION

X-rays

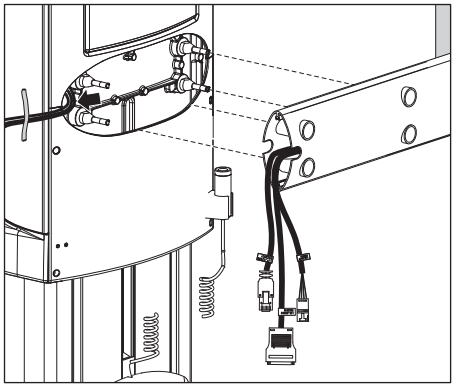
Be sure to observe the radiation protection regulations applicable in your country.

➢ No person may be positioned in the unit when it is switched on.



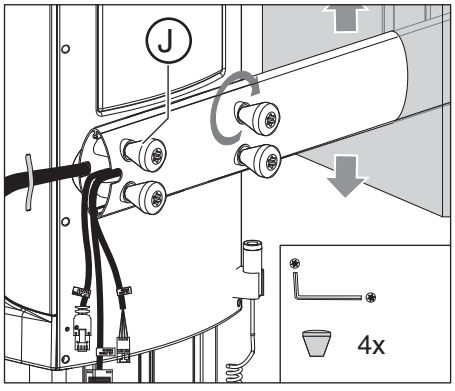
6. Switch on the unit (G).
   - During the unit startup phase, the start screen appears on the control panel.
   - The unit's self-adjustment routine begins.
7. Acknowledge the error messages that appear using the R key (H) on the control panel.
   - The main menu and help message **H301** appear. You are requested to move the unit to its starting position.
8. Press the R key (H) on the control panel.
   - The unit moves to its starting position.
9. Use the arrow keys (I) on the control panel to lower the unit until the bearing bolts on the unit are at the same height as the drill holes on the ceph support arm.
   NOTICE! Check the room height before you raise the unit. If the room height is less than 2.27 m (89 3/8") or 2.30 m (90 1/2") for installation with the floor stand, you must limit the maximum travel height (S018: Test step 2 [→ 149]).

Installing the ceph arm



1. Attach the support arm to the four bearing bolts.
   NOTICE! The connecting cables must not be crushed. Make sure that the connecting cables lie in the groove of the support arm and are not crushed.

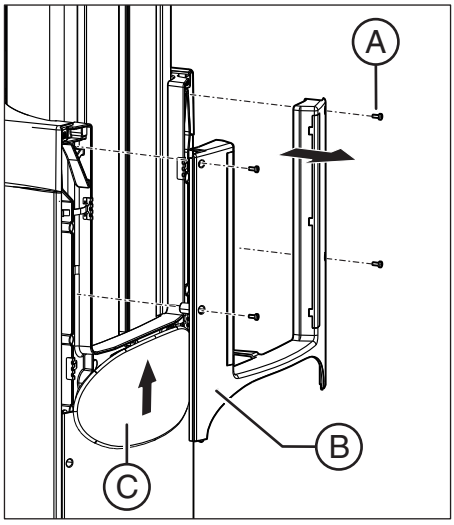
IMPORTANT
The support arm may get tilted while you are tightening the conical nuts. You can avoid this by lifting and moving the support arm gently while you are tightening the nuts.



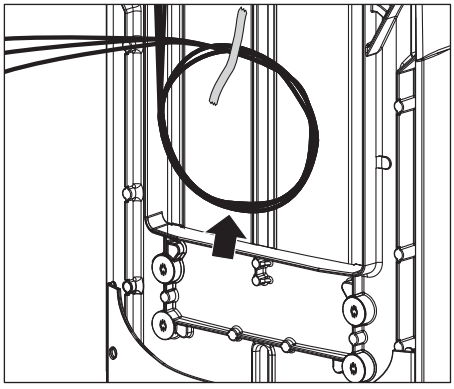
2. Screw in the conical nuts (J) and tighten them firmly.
3. Remove the styrofoam packaging from the ceph.
4. Follow the instructions in the section entitled “Installing the secondary diaphragm [→ 98]”.

10.3.2 Ceph arm mounted on right-hand side

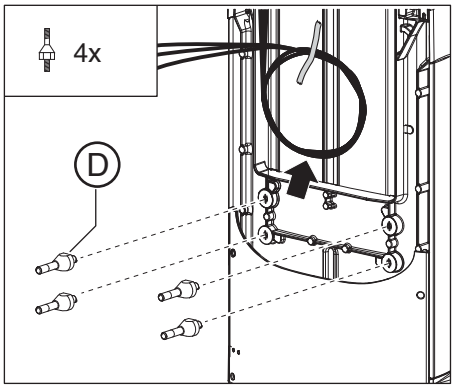
Preparing the unit



1. Loosen the screws (A).
2. **CAUTION! Do not yank out the ambient light cable!**
   Remove the cover (B).
   Tip: You can even leave the cover (B) on the unit and push it upwards a little.
3. Remove the cover (C) by pulling it upwards.

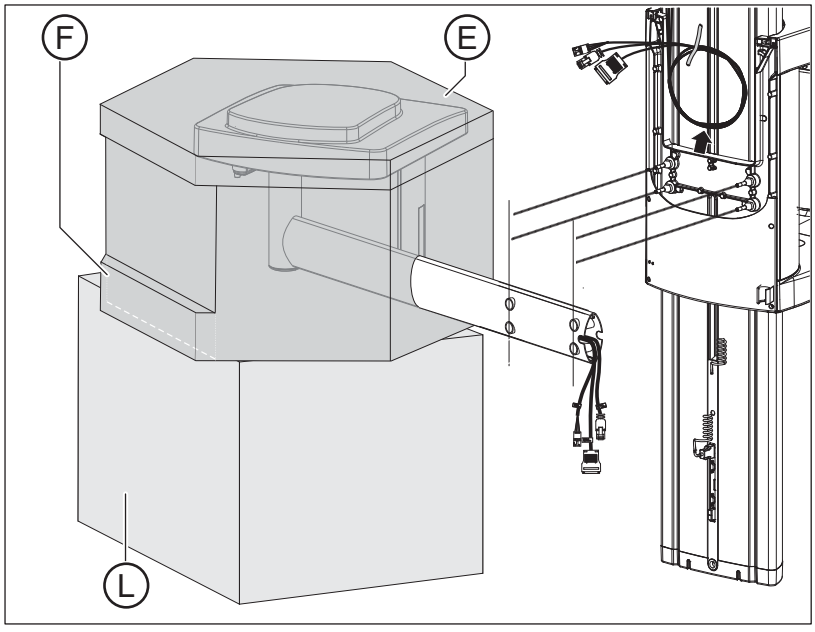


4. Detach the cable fastening.
5. Unpack the cables.
6. Roll the cables up and fasten the cable roll above the bearing bolts with adhesive tape.



7. Screw the four bearing bolts (D) into the unit.

Positioning the ceph arm



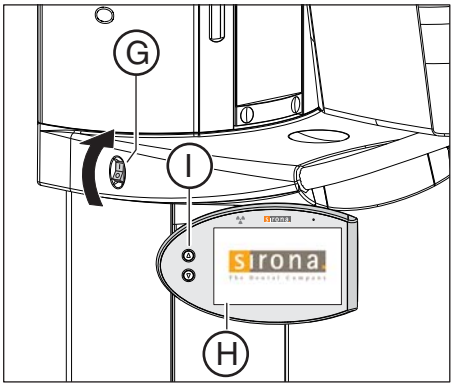
1. Position the CEPH cardboard packaging (L) next to the unit as a cardboard support.
2. Position the ceph arm with the styrofoam packaging on top.
3. Remove the adhesive tape and the cover (E) from the ceph packaging.
4. Break off the wall part (F) of the packaging at the perforation.
5. Slide the cardboard support with the ceph arm up to the wall so that the drill holes of the support arm are horizontally aligned with the positions of the threaded bolts.

⚠ CAUTION

X-rays

Be sure to observe the radiation protection regulations applicable in your country.

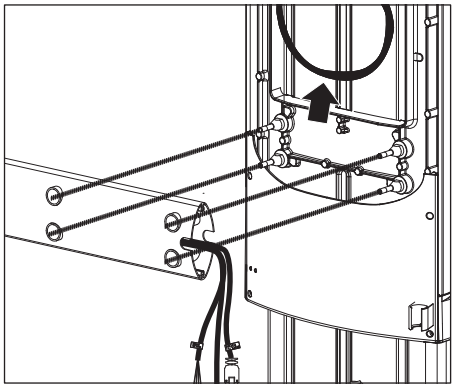
➢ No person may be positioned in the unit when it is switched on.



6. Switch on the unit (G).
   - During the unit startup phase, the start screen appears on the control panel.
   - The unit's self-adjustment routine begins.
7. Acknowledge the error messages that appear using the R key (H) on the control panel.
   - The main menu and help message **H301** appear. You are requested to move the unit to its starting position.
8. Press the R key (H) on the control panel.
   - The unit moves to its starting position.

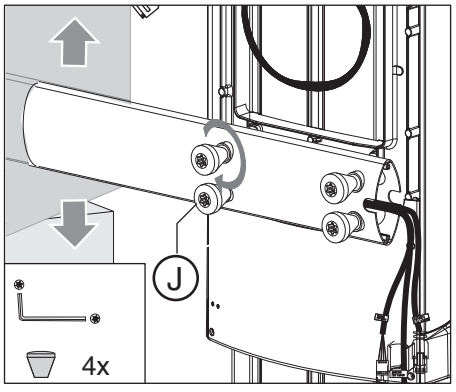
9. Use the arrow keys (I) on the control panel to lower the unit until the bearing bolts on the unit are at the same height as the drill holes on the ceph support arm.
NOTICE! Check the room height before you raise the unit. If the room height is less than 2.27 m (89 3/8") or 2.30 m (90 1/2") for installation with the floor stand, you must limit the maximum travel height (S018: Test step 2 [→ 149]).

Installing the ceph arm

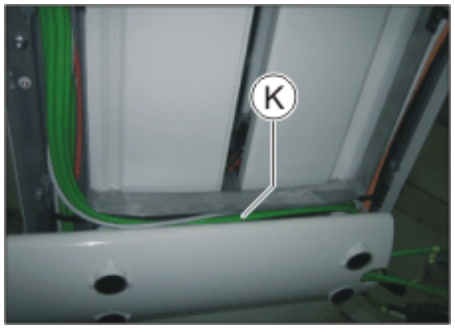


1. Attach the support arm to the four bearing bolts.
   NOTICE! The connecting cables must not be crushed. Make sure that the connecting cables lie in the groove of the support arm and are not crushed.

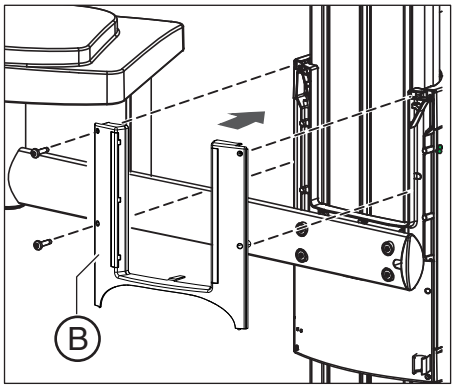
IMPORTANT
The support arm may get tilted while you are tightening the conical nuts. You can avoid this by lifting and moving the support arm gently while you are tightening the nuts.



2. Screw in the conical nuts (J) and tighten them firmly.



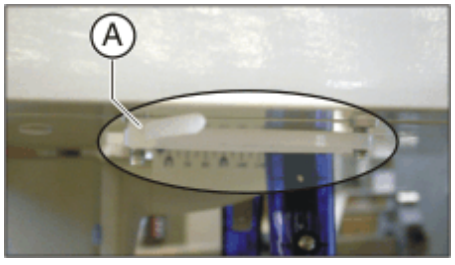
3. Detach the cables from the holder. Lay the cables over the support arm in the groove between the slide and the support arm (from left to right toward the opening (K)).



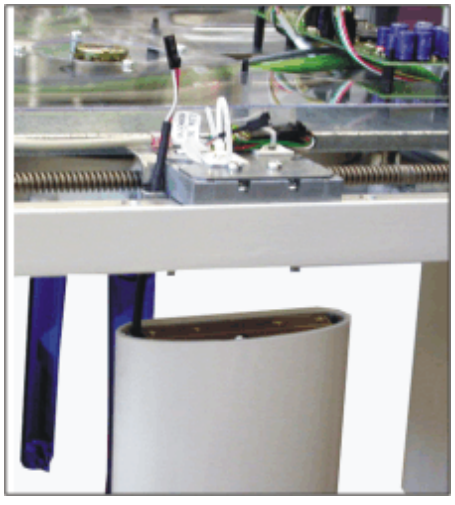
4. **NOTICE! Never crush the cables. Please ensure that the cover can be attached easily. Reattach the cover (B).**
5. Remove the styrofoam packaging from the ceph arm.
6. Follow the instructions in the section entitled “Installing the secondary diaphragm [→ 98]”.

10.3.3 Installing the secondary diaphragm

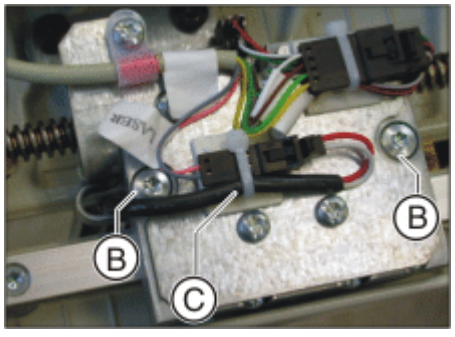
1. Remove the secondary diaphragm from the packaging.



2. Remove the safety cable tie (A) for the screws.

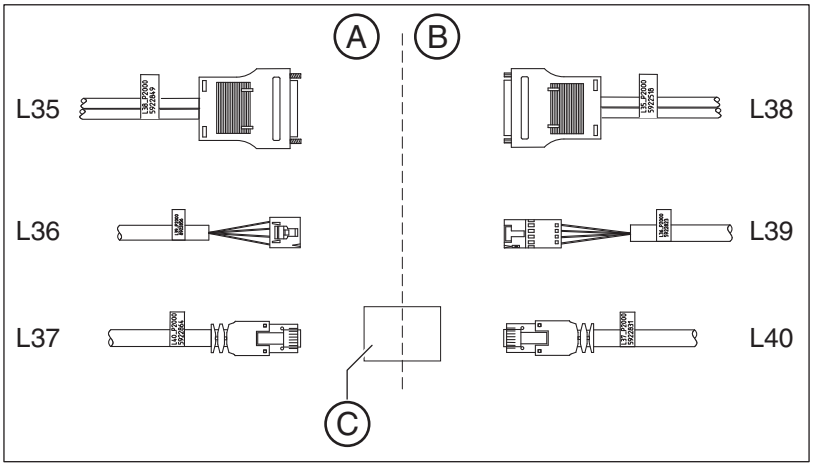


3. Guide the secondary diaphragm beneath the ceph arm and slide the connector upward through the opening.



4. Attach and secure the secondary diaphragm with the 2 screws (B).
5. Establish the plug connection with the connector of the laser (C).
6. Secure the plug connection with the cable tie.

10.4 Connecting control cables

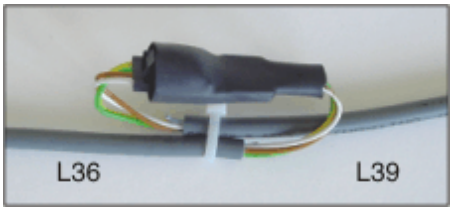


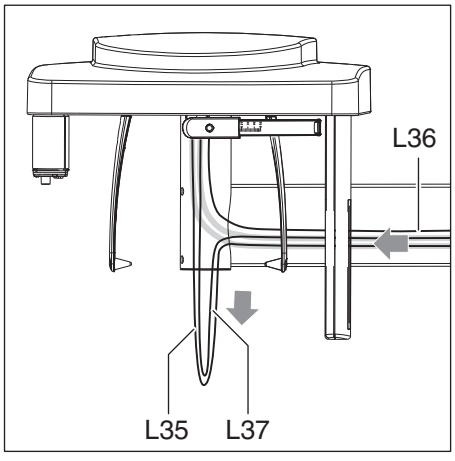
A	Device
B	Ceph arm
C	LAN coupling

IMPORTANT

Use the LAN coupling supplied (C) to connect cables **L37** and **L40**.

1. Connect the unit and the Ceph arm as shown in the connection diagram above.
2. Screw in place the plug connections **L35/L38**.
3. Roll the plug connection **L36/L39** into a loop and secure it with a cable tie.

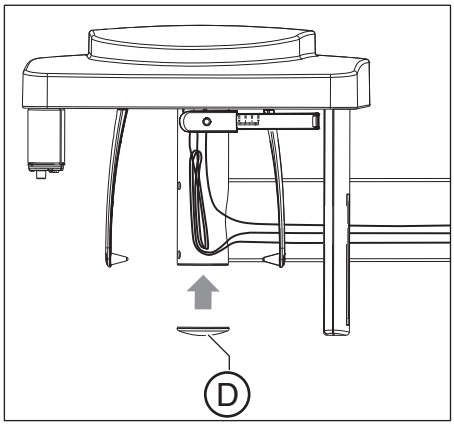




IMPORTANT

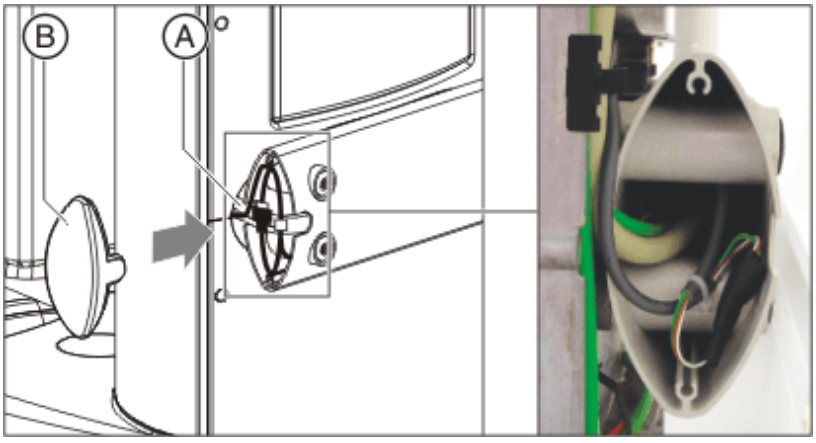
Do *not* remove cable **L36**.

4. Grasping inside the ceph arm tube from below, carefully pull cable **L35** (two green Cat5 cables) and then cable **L37** (green Cat5 cable) downward and out of the support arm.



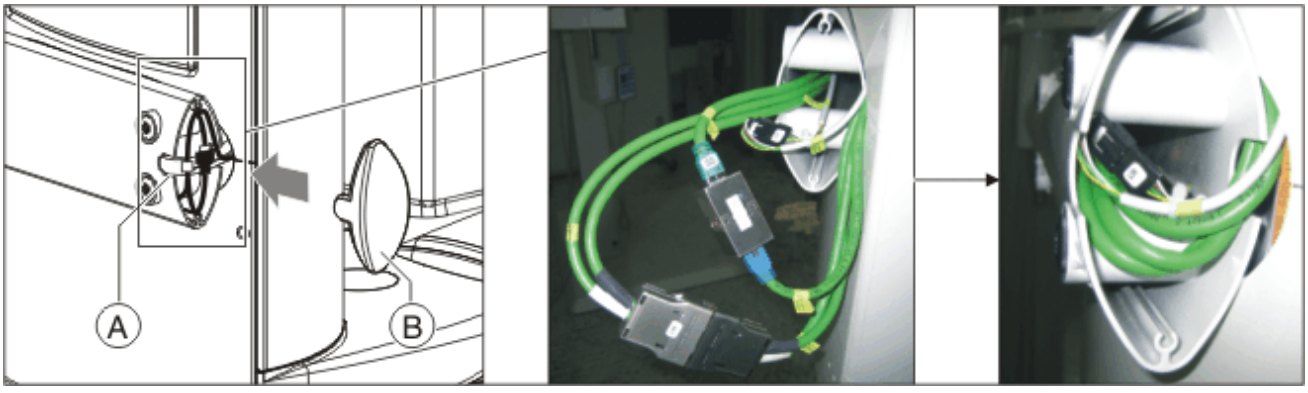
5. Roll the cable into a loop and stow it away in the tube.
6. Close the tube by attaching the cover (D).

10.4.1 Running the cables for the left-hand arm



1. Guide the cable on the unit through the groove (A).
2. Lay the cable and the cable loop (**L36/L39**) as illustrated.
3. **NOTICE!** Ensure that you do not crush or kink the cables. Attach the cover (B).

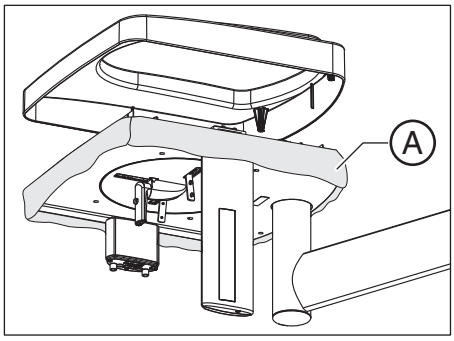
10.4.2 Running the cables for the right-hand arm



1. Guide the cable on the unit through the groove (A).
2. Lay the cable and the cable loop (**L36/L39**) as illustrated.
3. **NOTICE!** Ensure that you do not crush or kink the cables. Attach the cover (B).

10.5 Final installation work

The following steps apply to both left-handed and right-handed arms.

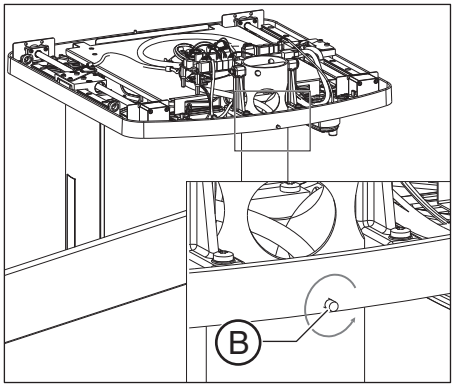


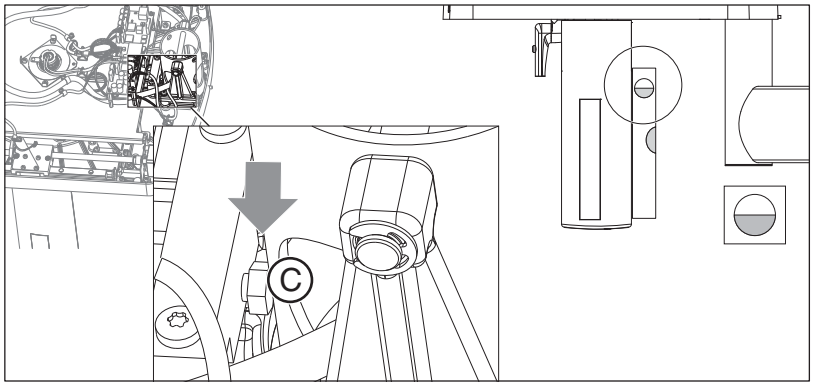
1. Use the spirit level to check that the secondary diaphragm is vertical. To ensure this, place the spirit level on the side of the secondary diaphragm.

IMPORTANT

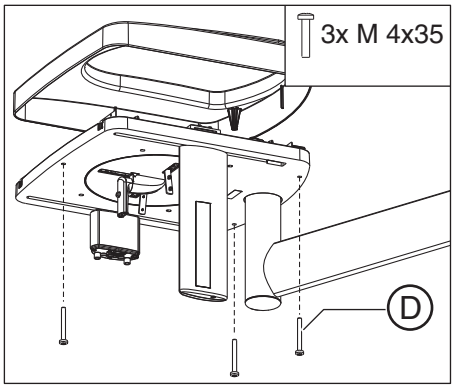
Only perform the following steps if the secondary diaphragm is not included in the batch.

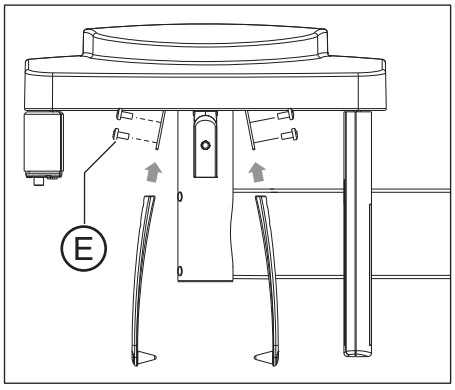
2. **NOTICE!** Do not damage the unit. Do not move the secondary diaphragm or sensor adapter by hand or apply any force. Remove the top cover.
3. Remove the protective canvas (A).
4. Loosen the stud screw (B) (2-3 turns).



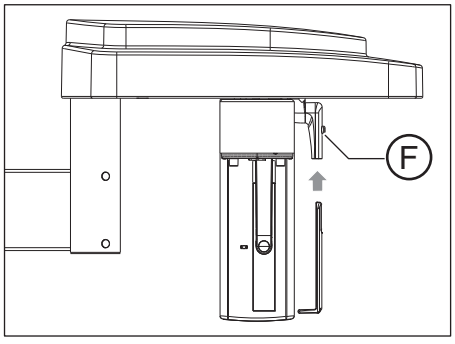


5. Set the tilt of the ceph arm on the screw (C). The secondary diaphragm must stand upright. To ensure this, place the spirit level on the side of the secondary diaphragm.
6. Retighten the stud screw firmly.
7. Attach the cover with the 3 screws (D).





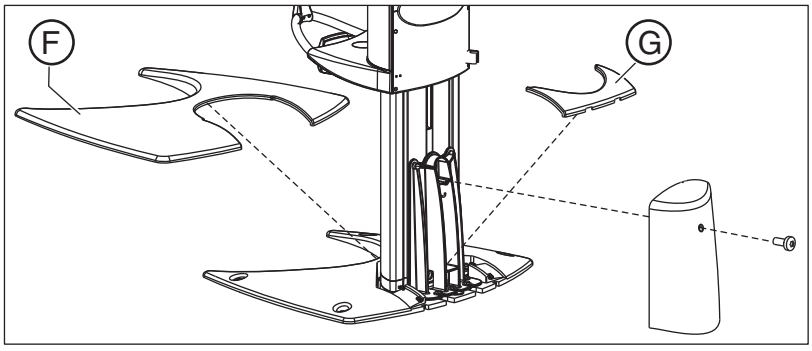
8. Insert both ear plug holders and fasten them securely using the screws (E).

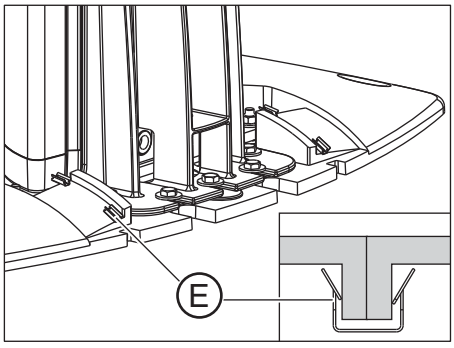


9. Press the button (F) and insert the nose support.
10. Swivel the nose support upward.

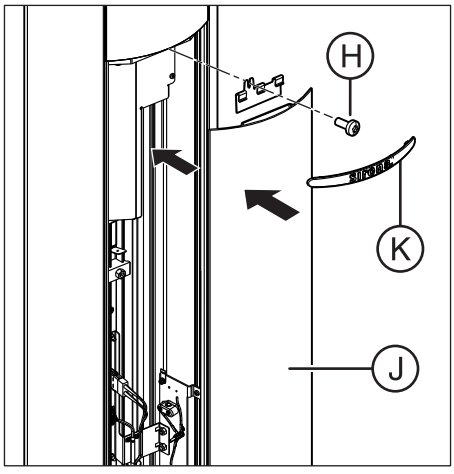
11 Commissioning, demo mode and repacking

11.1 Attaching the covers



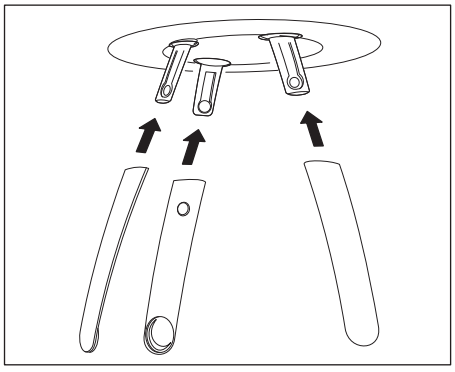


1. *For installation with floor stand only:* Place the four spring clips (E) on the base plate. The two covers (F) and (G) must hold together after they have been attached.



2. Attach the profile cover (J).
   To do this insert it into the guide at the bottom and fasten it to the middle bracket on the unit stand using the screw (H).
3. **NOTICE! Make sure that intermediate piece (K) lies flush on the stand surface.**
   Insert intermediate piece (K) in the gap.

11.2 Inserting the forehead and temple supports



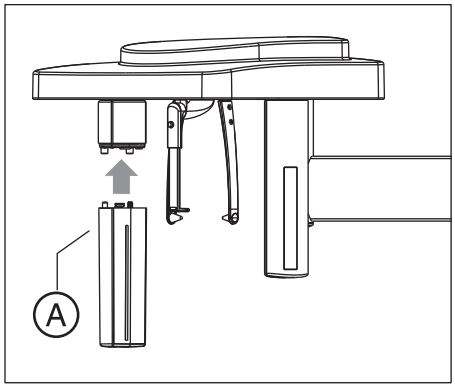
➢ Insert the forehead and temple supports until they lock in place.

11.3 Inserting the ceph sensor (for ceph versions)

NOTICE

Damage to the sensor

The sensor is a sensitive component, and therefore must be handled with special care.



➢ **NOTICE!** Ensure that the correct sensor for cephalometry (ceph sensor) is plugged in.Insert the ceph sensor (A) carefully upward into the holder until it audibly clicks into place.

11.4 Installing the IT package

Information on the connection of the Reconstruction and Control Unit (RCU) and the software installations can be found in the separate *"ORTHOPHOS SL Software Installation"* (REF 65 44 287) instructions.

11.5 Switching the unit on

⚠ WARNING

X-rays

Be sure to observe the radiation protection regulations applicable in your country.

➢ No person may be positioned in the unit when it is switched on.

NOTICE

Damage to the unit

Check the room height before you raise the unit.

➢ If the room height is less than 2.27 m (89 3/8") or 2.30 m (90 1/2") for installation with the floor stand, you must limit the maximum travel height.

NOTICE

Damage to the unit

Make sure that no objects are in the movement range of the device when it moves (exception: Calibration block and positioning aids).

NOTICE

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.
Also note the operating temperature specified for this device.

NOTICE

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.

NOTICE

The surface of the touchscreen is sensitive.

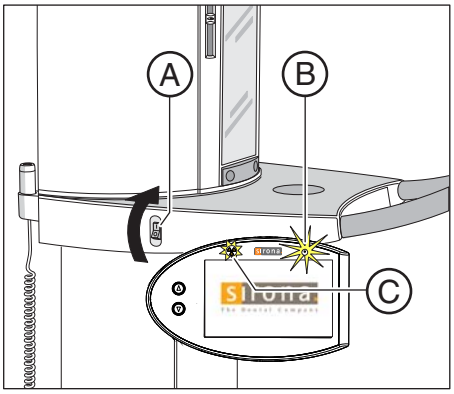
The touchscreen can be damaged or its surface scratched.

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

➢ Only use your fingertips to operate the touchscreen.

IMPORTANT

After switch-on, the unit requires approx. 1 min. of warm-up time.
At the same time, the self-adjustment routine for the mechanics and the electronics of the unit is performed. If a key is pressed during the self-adjustment routine, an error message will display on the control panel.



1. Turn the main switch (A) to position **I**.
2. Wait for approx. 1 minute.
   - The radiation indicator X-ray (C) lights up for approx. one second as a functional check.
   - For a number of seconds the height adjustment keys light up blue, then quickly change to green.
   - After approx. 2 seconds, the green LED B in the upper part of the control panel lights up. This LED remains lit as long as the unit is on.
   - The start screen is displayed on the touchscreen for several seconds.
   - The program selection is then displayed on the touchscreen.
   - The forehead support and temple supports are completely open.
3. Check whether the patient symbols on the touchscreen can be selected in exactly the right position.
   If problems occur during selection, adjust the touchscreen [→ 272].

11.5.1 Factory setting after switch-on

The unit has the following factory configuration on delivery:

- The acoustic signal for end of exposure is activated.
- English is preconfigured as the unit language.
- The preview image is switched on.
- The welcome screen is switched on.
- The first name, last name and date of birth lines are displayed on the welcome screen.
- Ambient light (background lighting) is set to "white".

If the customer requires a different configuration, this can be implemented via service routine S017 or the Web service [→ 123] (ambient light).

11.6 Performing a mechanical function test

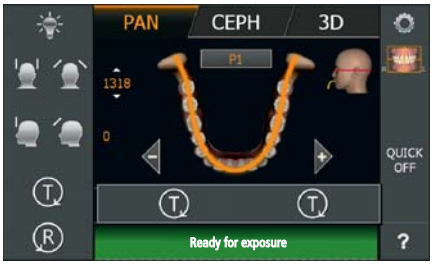
The mechanical function of the rotation unit is checked via a test cycle. The test cycle is executed without radiation. The test cycle is used to check that the unit is functioning correctly and to ensure that a complete, uninterrupted cycle is possible. The rotating unit stops automatically if the resistance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

If any untypical noises occur during the test cycle or the rotation unit stops due to increased resistance, the assembly of the sensor must be checked again.

11.6.1 Starting the test cycle

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

✓ The unit is in its starting position.



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

11.6.2 Checking the height adjustment mechanics

1. Use the Up/Down keys on the control panel to move the unit up and down through its entire adjustment range.
2. Check the height adjustment mechanics:
   - Does the height adjustment function correctly?
   - Are there any unusual noises during the adjustment?
3. If the height adjustment does not function correctly or unusual noises can be heard during the adjustment (e.g. a hammering noise which changes with the speed), the mechanics of the height adjustment or the height adjustment motor are defective.
4. Inform the operator of any deficiencies.

11.7 Configuring the unit

Room and travel height

1. Check the room height before you raise the unit using the UP/DOWN keys.
2. If the room height is less than 2.27 m (89 3/8") or 2.30 m (90 1/2") for installation with the floor stand, you must limit the maximum travel height using service routine S018.2.

Unit variants

For unit orders with the ceph arm, the unit version must be configured through service routine S017.2 [→ 138].

Remote control

All units ordered with or without remote control are preconfigured for this version at the factory. You should still check the unit configuration using service routine S017.6.

Occlusal bite block

All units ordered with or without occlusal bite block are preconfigured for this version at the factory. You should still check the unit configuration using service routine S017.18.

Set up the occlusal bite block in accordance with customer requirements using service routines S018.7 through S018.10.

11.8 Setting up the X-ray component

Since it is addressable via the network, the X-ray component can in principle be activated for X-ray image acquisition by any of the PCs connected to the network.

IMPORTANT: In order to avoid IP address conflicts, you should never operate several networkable X-ray components in the network using the same IP address. Each X-ray component must be assigned a unique IP address and the name of the X-ray component must also be unique.

Factory setting of the TCP/IP address of the unit:

192.168.15.240 (subnet mask: 255.255.255.0)

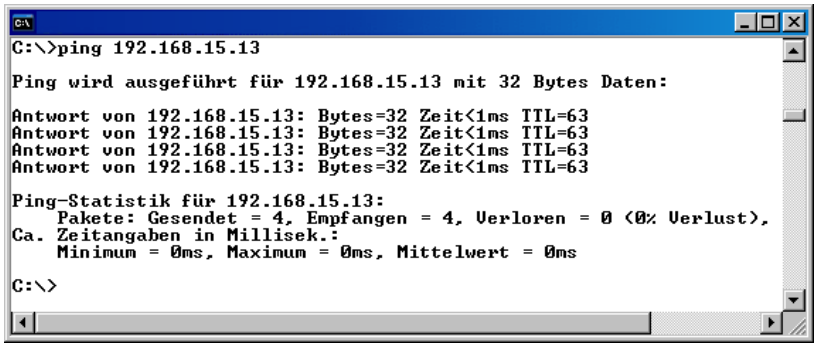
NOTE: The network configuration can be set via service routine S037.

Checking existing IP addresses

To find out whether an IP address already exists in the network, enter the "PING" function in the input prompt (e.g. in MS-Windows “CMD.EXE”).

1. Switch on *all* network devices (computers, printers, X-ray components) which have been operated to date.
2. Invoke the input prompt (DOS window) from a network computer.
3. At the prompt, enter "ping" followed by the address to be checked and then press the Enter key.
   Example: “ping 192.168.15.13”

↳ If a network device responds, then this address has already been assigned.



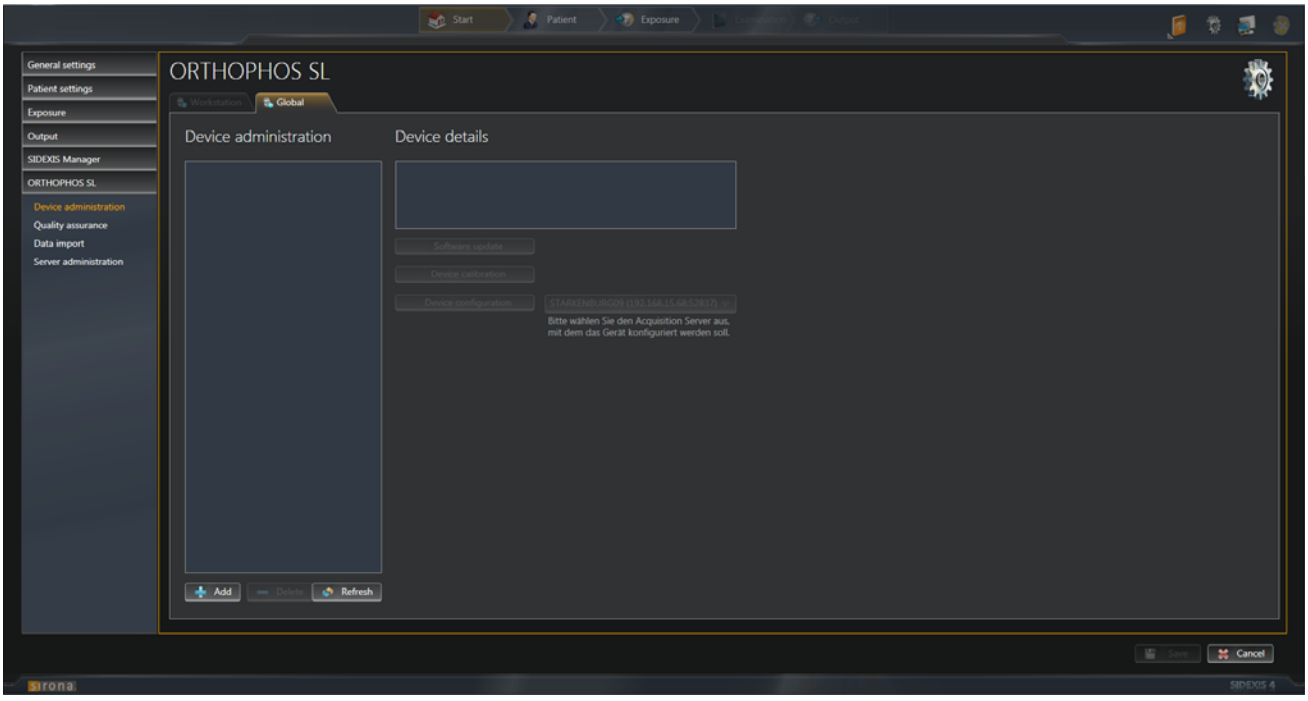
Adding an X-ray component

✓ SIDEXIS 4 is installed.

✓ The *"Sirona AcquisitionServer"* software is installed.

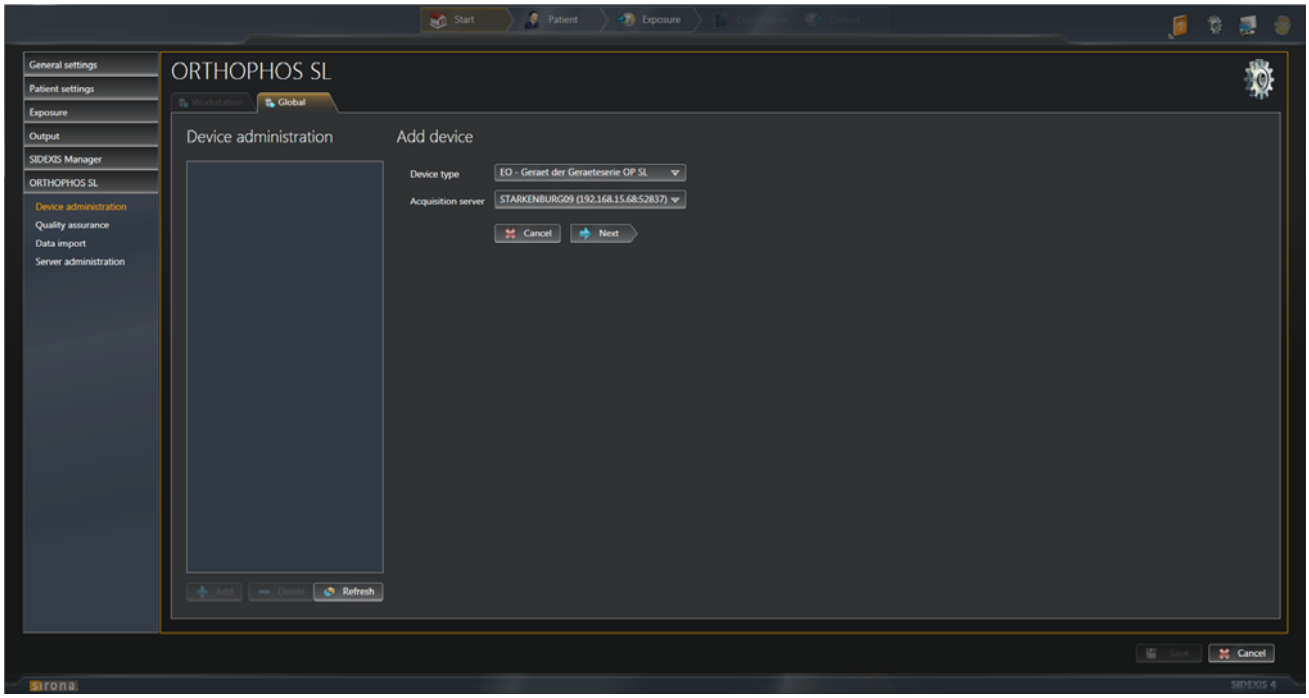
✓ The workstation/plug-in software for the corresponding X-ray component or sensor is installed on the workstation.

1. Start SIDEXIS 4.
2. In SIDEXIS 4, call the *"ORTHOPHOS SL"* / *"Device Administration"* configuration menu.



Call up the "ORTHOPHOS SL" /"Device Administration" configuration menu

3. Click on the *"Add (+)"* button.



Open the menu for adding X-ray components

4. *If necessary:* Select the acquisition server from the *"Acquisition Server"* list field.
5. Click on the *"Next"* button.
   ↳ A password dialog box appears.
6. Enter the service password and confirm your input by clicking the *"OK"* button.

Menu for adding X-ray components

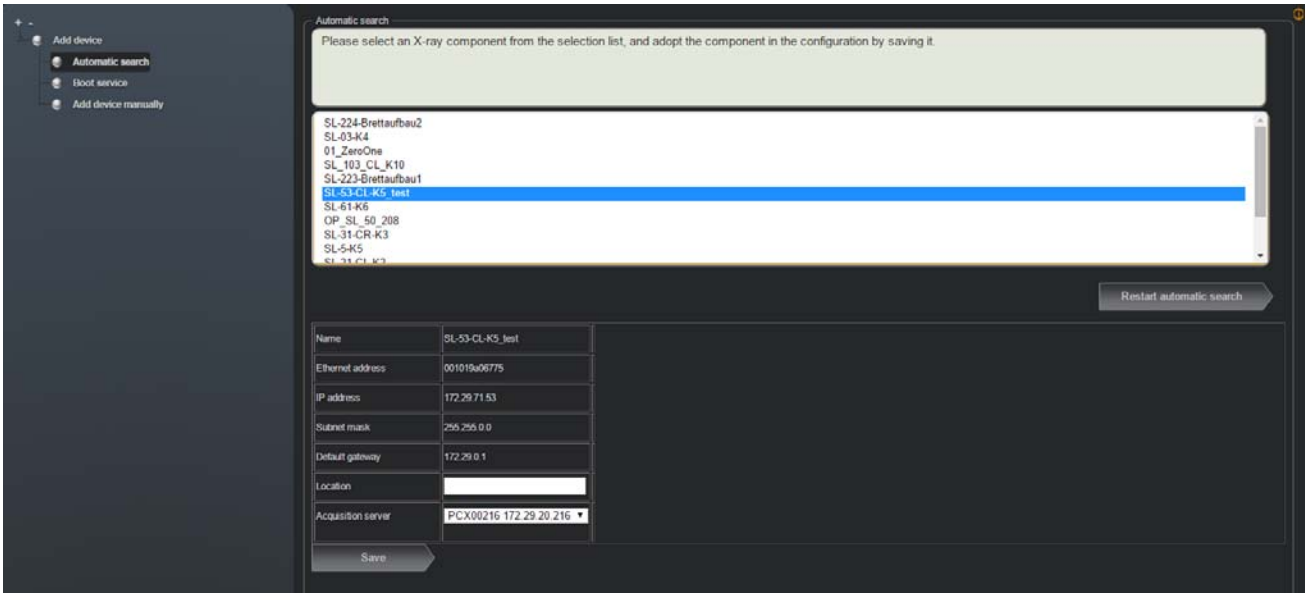
↳ The menu for adding X-ray components opens.

↳ There are three options for adding X-ray components:
- *"Automatic search"*
- *"Boot service"*
- *"Add device manually"*

Automatic search

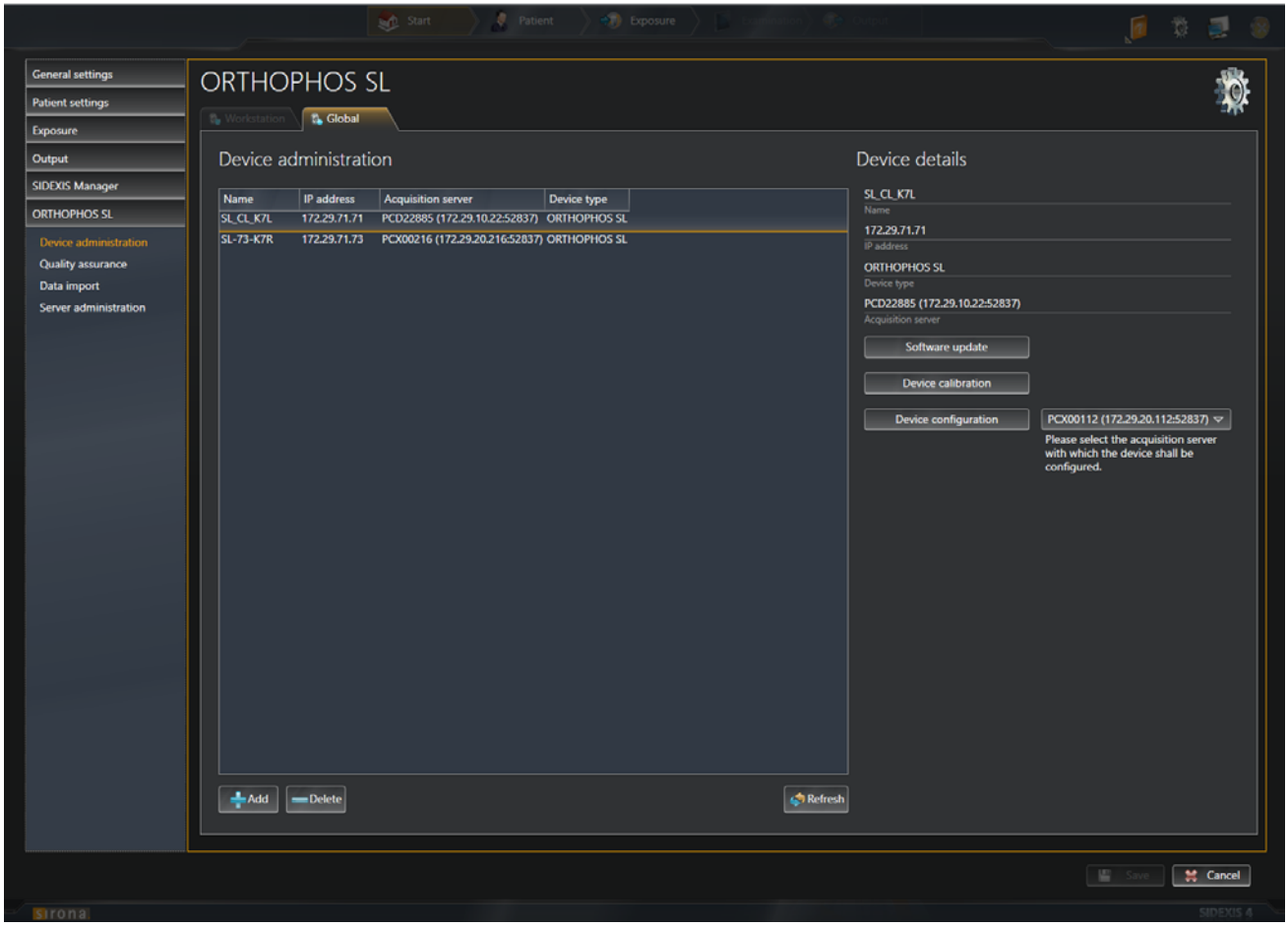
✓ The menu for adding X-ray components opens.

1. Click the *"Automatic search"* button in the structure tree.
   - ↳ The network is searched for available X-ray components.
   - ↳ The X-ray components found on the network are displayed in list form.
     NOTE: If no X-ray component is found, check the availability of the unit and repeat the *"Automatic search"* or use the *"Add device manually"* function.



Selecting an X-ray component

2. Select the preferred X-ray component and enter *"Location"* in the text box in the location of the X-ray component.
3. Click the *"Save"* button to save the settings.
4. Wait until the saving operation has been completed.
5. Then click the button marked *"Exit"*.
   - ↳ The menu closes.



Added X-ray components in the window "Device Administration"

↳ The X-ray component appears in the device list of the configuration menu *"ORTHOPHOS SL" | "Device Administration"* .

6. Click on the *"Cancel"* button.
7. Reboot the SIDEXIS 4.
8. Register a patient and change to the work phase *"Acquisition"* (see technical document *"SIDEXIS 4 Operator´s Manual"* (REF 64 47 028).

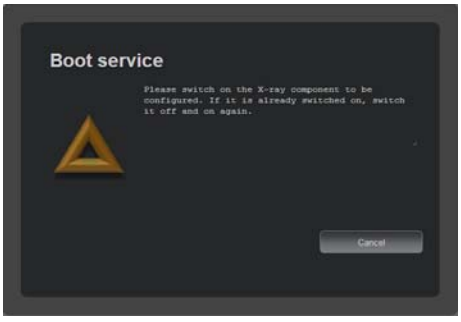
↳ The X-ray component is now available in the work phase *"Acquisition"* in SIDEXIS 4 below the previously entered location.

Boot service

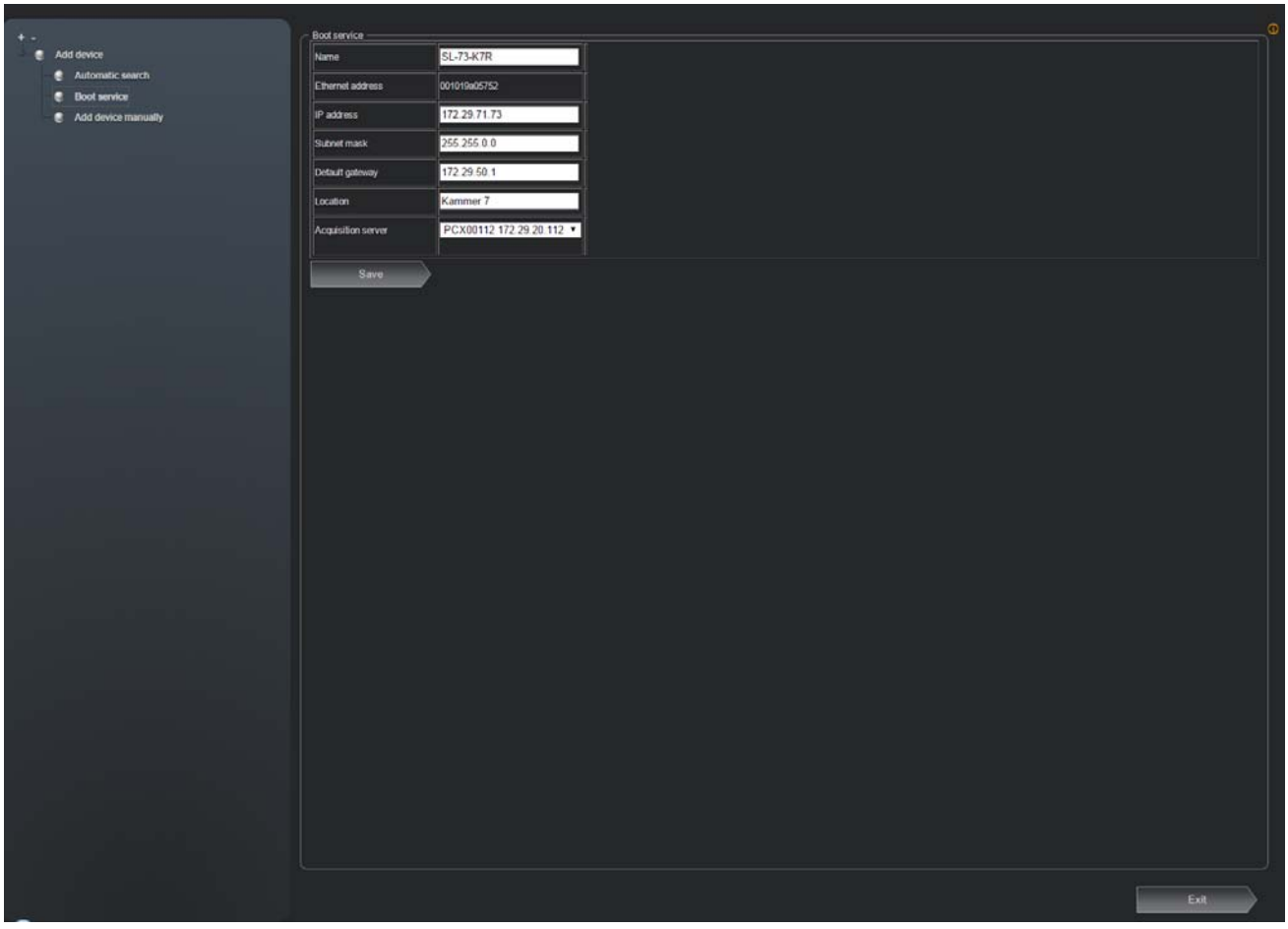
IMPORTANT
The X-ray component can only be detected via the boot service if the default network data is set on the unit (see section “S037: Test step 2 [→ 169]”).

✓ The menu for adding X-ray components opens.

"Boot service"

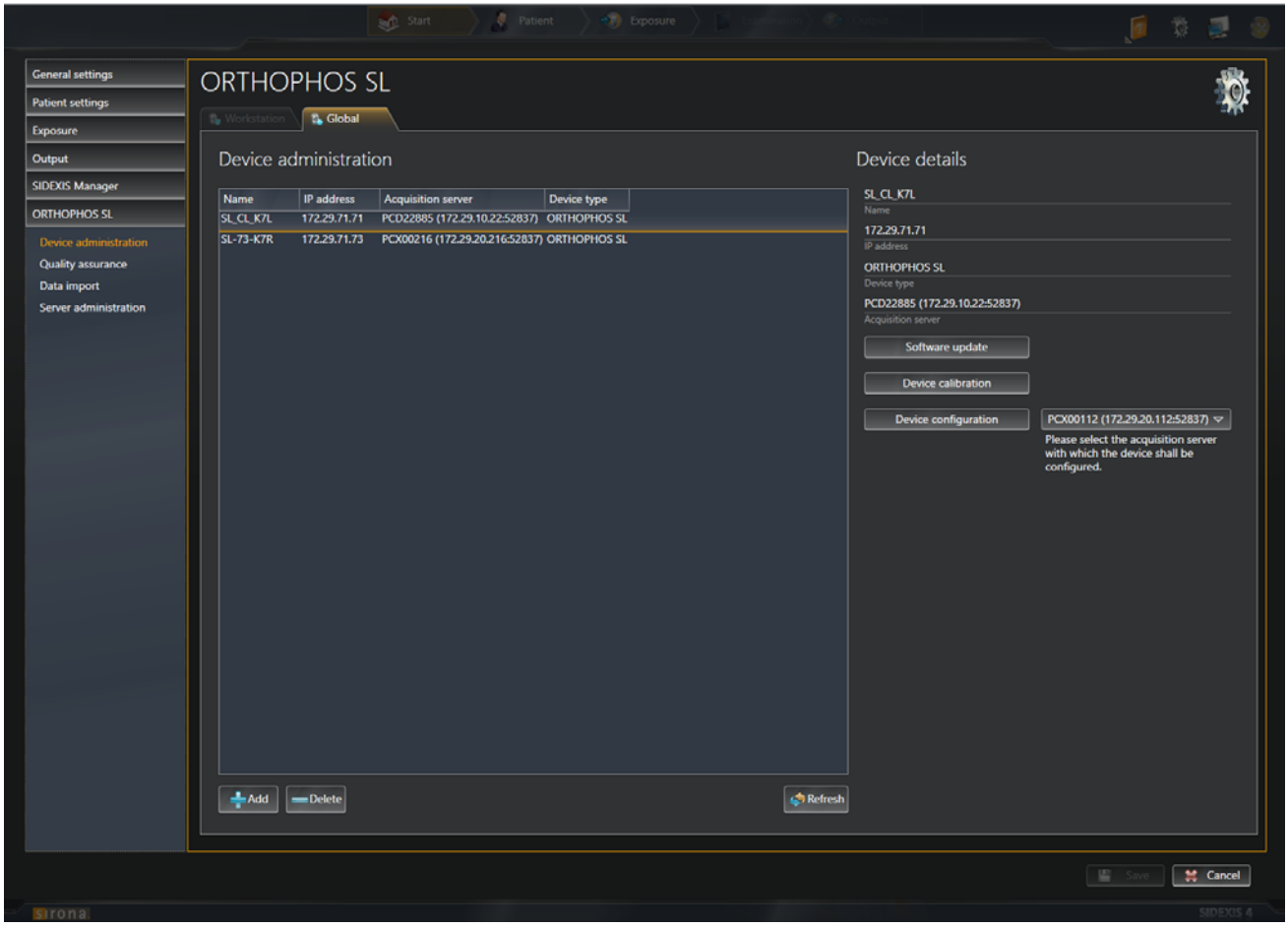


1. Click the *"Boot service"* button in the structure tree.
2. A message window prompts you to switch the new X-ray component back on (to reboot).
   - ↳ The network is searched for the "booting" X-ray component.
   - ↳ The X-ray component found in the network is displayed with the network data.



Adjusting the network data

3. Adjust the network configuration (IP address, subnet mask and standard gateway) to your network.
4. Click the *"Save"* button to save the settings.
5. Wait until the saving operation has been completed.
   NOTICE! If you receive an error message when saving the network configuration then the network data entered is probably invalid. Repeat the entire procedure with valid network data.
6. Then click the button marked *"Exit"*.
   ↳ The menu closes.



Added X-ray components in the window "Device Administration"

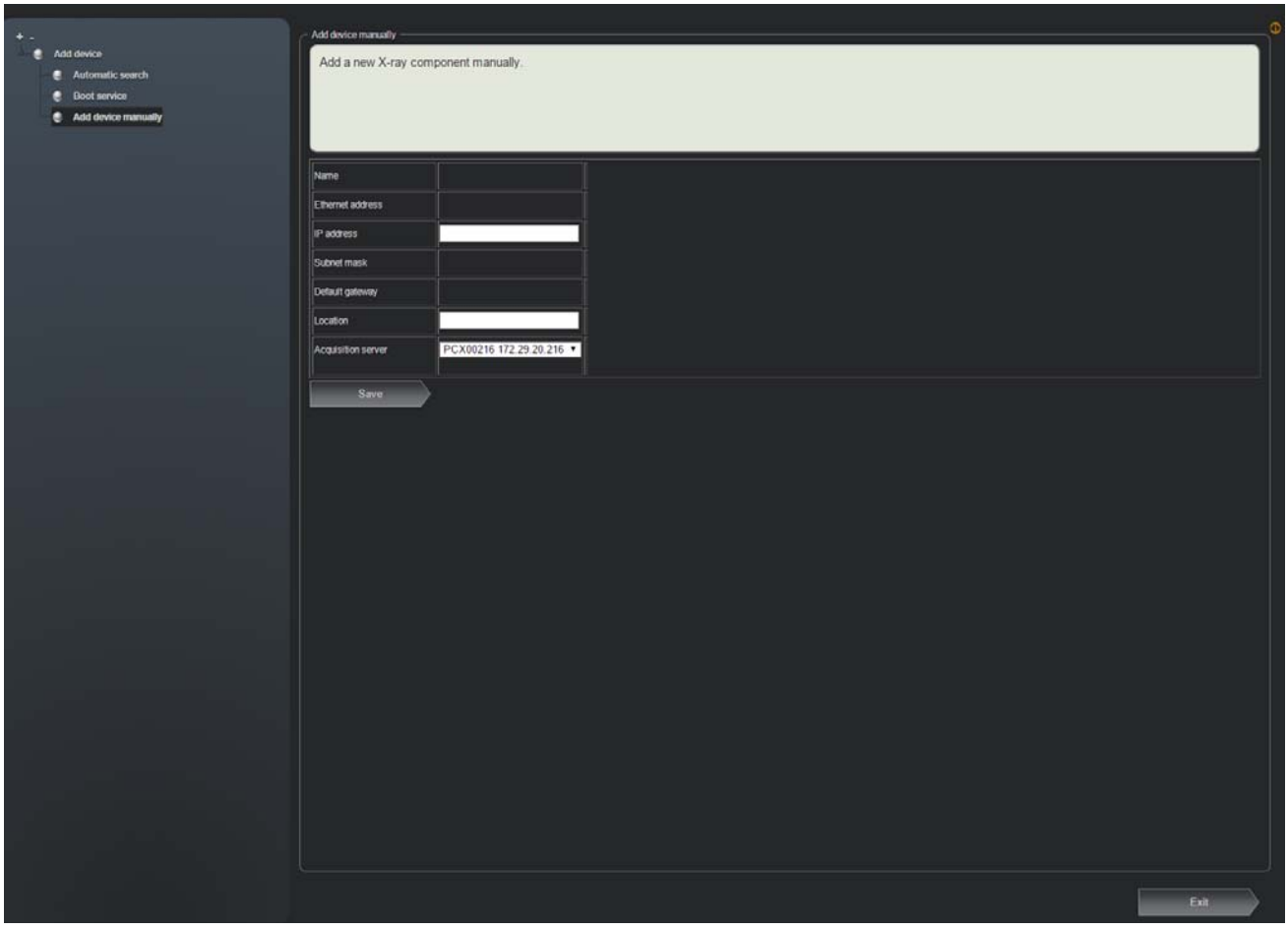
↳ The X-ray component appears in the device list of the configuration menu *"ORTHOPHOS SL"* | *"Device Administration"* .

7. Click on the *"Cancel"* button.
8. Reboot the SIDEXIS 4.
9. Register a patient and change to the work phase *"Acquisition"* (see technical document *"SIDEXIS 4 Operator´s Manual"* (REF 64 47 028).

↳ The X-ray component is now available in the work phase *"Acquisition"* in SIDEXIS 4 below the previously entered location.

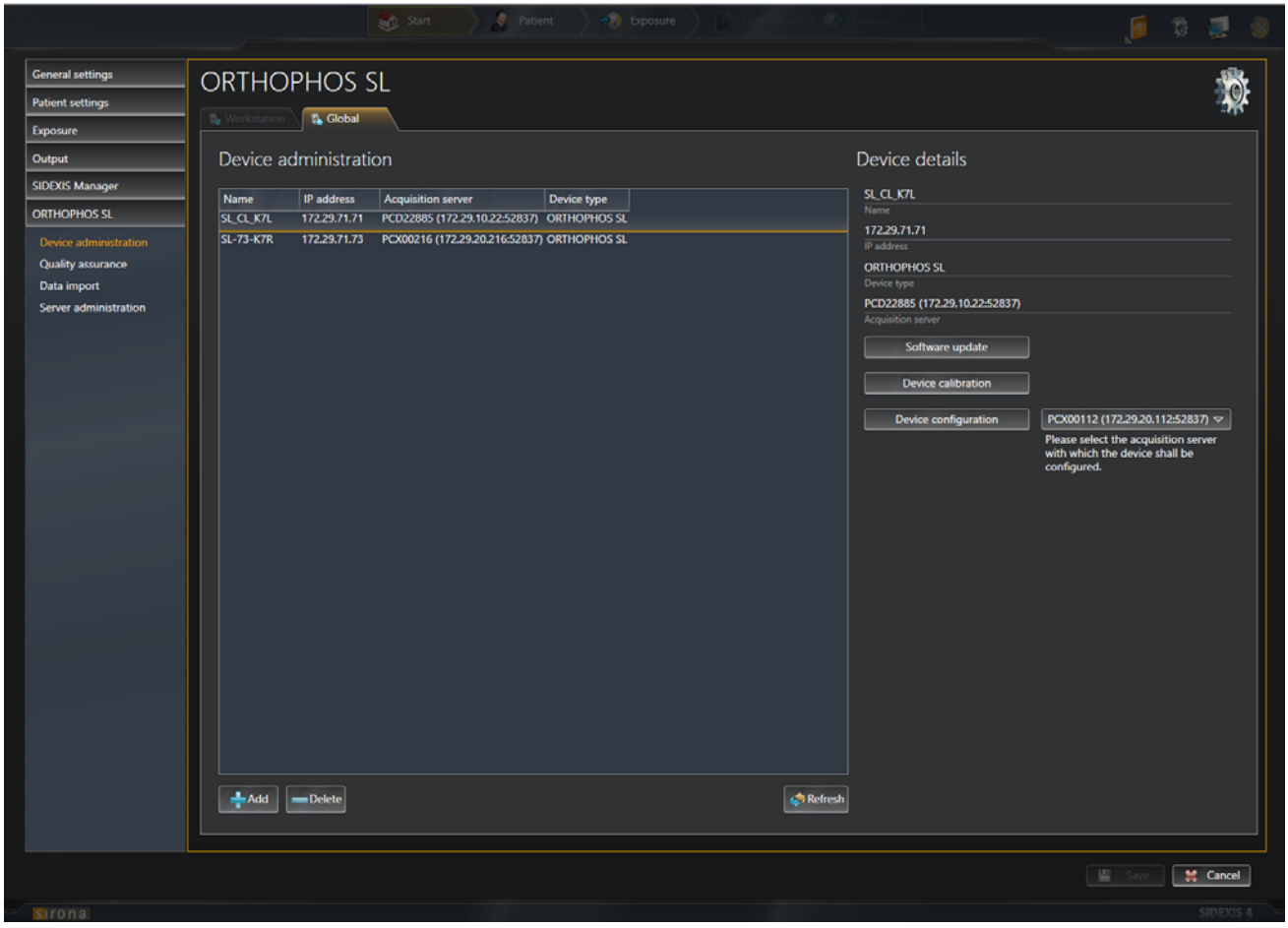
Add device manually

✓ The menu for adding X-ray components opens.



"Add device manually"

1. Click the *"Add device manually"* button in the structure tree.
2. Enter the IP address and the location of the desired X-ray components in the input fields *"IP adress"* and *"Location"*.
3. Click the *"Save"* button to save the settings.
4. Wait until the saving operation has been completed.
5. Then click the button marked *"Exit"*.
   ↳ The menu closes.



Added X-ray components in the window "Device Administration"

↳ The X-ray component appears in the device list of the configuration menu *"ORTHOPHOS SL"* | *"Device Administration"* .

6. Click on the *"Cancel"* button.
7. Reboot the SIDEXIS 4.
8. Register a patient and change to the work phase *"Acquisition"* (see technical document *"SIDEXIS 4 Operator´s Manual"* (REF 64 47 028).

↳ The X-ray component is now available in the work phase *"Acquisition"* in SIDEXIS 4 below the previously entered location.

11.9 Checking the data paths

Checking the 2D and 3D data paths is possible through the service routines S032.10 (DCS sensor) and S032.50 (flat panel detector).

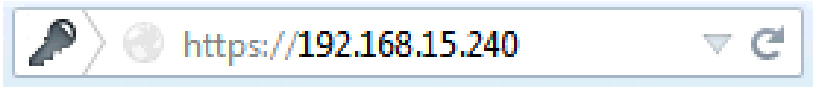
11.10 Setting ambient light via the Web service

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

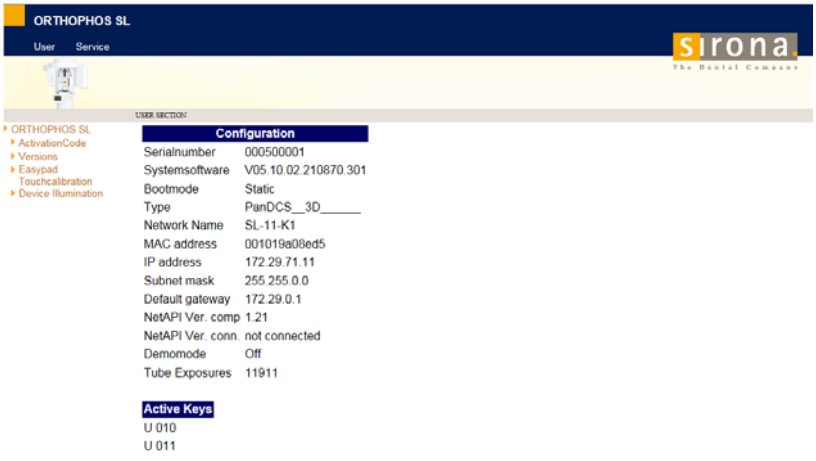
✓ The unit and computer are turned on.

✓ The unit is logged into the network as an X-ray component.

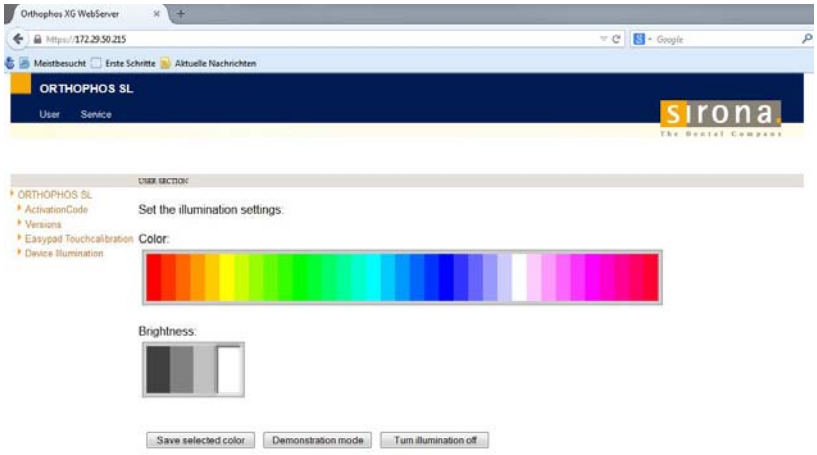
1. Start an Internet browser such as Internet Explorer or Firefox.



2. In the address line, enter "https://" and the IP address of your unit.
   Example: https://192.168.15.240
   NOTICE! The IP address of your unit can be found on the Info screen. Calling the Info screen
3. Confirm your input with the "Enter" key.
   ↳ The Sirona Web service is loaded.
   ↳ The sub menus of the *"User"* menu are displayed as a structure tree.



4. Click on the *"Device Illumination"* button.
   ↳ The settings options will be displayed.



5. Change the color by clicking the color scale and brightness by clicking on the brightness scale.
6. Click the *"Save selected colour"* button to save the settings.
7. Exit the web service again.

11.11 Using demo mode – operation without radiation release

If the unit is to be presented as a demo unit at trade fairs or exhibitions, it must be ensured that radiation release is blocked.

11.11.1 Switching on demo mode

When operated in demo mode, the unit must not release any radiation.

For this reason, you must take the following safety measures:

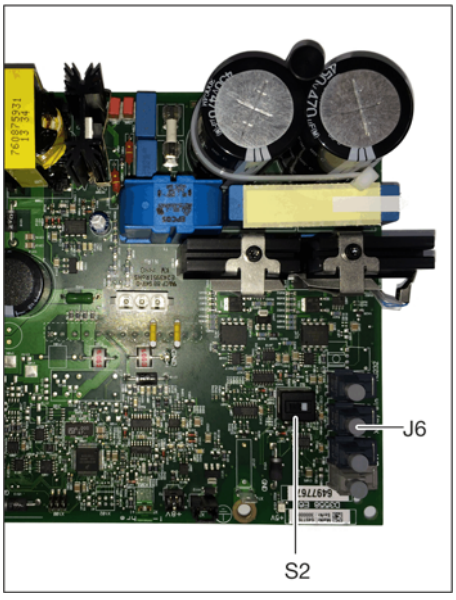
1. Turn the device off.

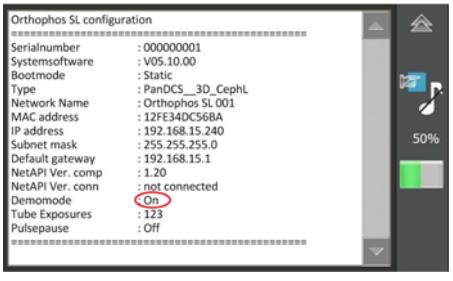
⚠ DANGER

Perilous shock hazard!

It is essential to switch off the unit and to wait at least another 4 minutes before taking off the covers of the X-ray tube assembly.

2. Remove the "Rear tube assembly" cover.
3. Remove the cover plate of board DX6.
4. Set dip switch **S2** (DX6) to **position 2**.
   IMPORTANT: If switch **S2** is not set to position 2 in demo mode before switching off the unit, various error messages will display when the unit is turned back on.
5. Pull cable **L5** (XRAY) off connector **J6** / **J103** (DX6).
   ↳ Radiation release is now no longer possible.





6. Switch on the unit and check the mode on the info screen (see Operating Instructions).
   Demo mode: ON means that: Demo mode is switched on (radiation release is not possible)
   Demo mode: OFF means that: Demo mode is switched off (radiography, X-ray radiation are possible!)
7. Switch the unit off again and reattach the cover plate and the tube assembly cover by following the dismantling procedure in reverse order.

11.11.2 Switching off demo mode

1. Switch off the unit.

⚠ DANGER

Perilous shock hazard!

It is essential to switch off the unit and to wait at least another 4 minutes before taking off the covers of the X-ray tube assembly.

2. Remove the "Rear tube assembly" cover.
3. Remove the cover plate of board DX6.
4. Set the dip switch **S2** (DX6) to **position 1**.
5. Connect cable **L5** (XRAY) to connector **J6**/**J103** (DX6).
   ↳ Radiation release is now once again possible.
6. Switch on the unit and check the mode on the info screen.
   Demo mode: ON means that: Demo mode is switched on (radiation release is not possible)
   Demo mode: OFF means that: Demo mode is switched off (radiography, X-ray radiation are possible!)
7. Switch the unit off again and reattach the cover plate and the tube assembly cover by following the dismantling procedure in reverse order.

11.11.3 Important information for repacking and transport

IMPORTANT

If a used carton on which one of the shockwatch or tiltwatch indicators has already been tripped is used to package the unit, please make an entry to that effect on the delivery note.

Packing the ORTHOPHOS SL

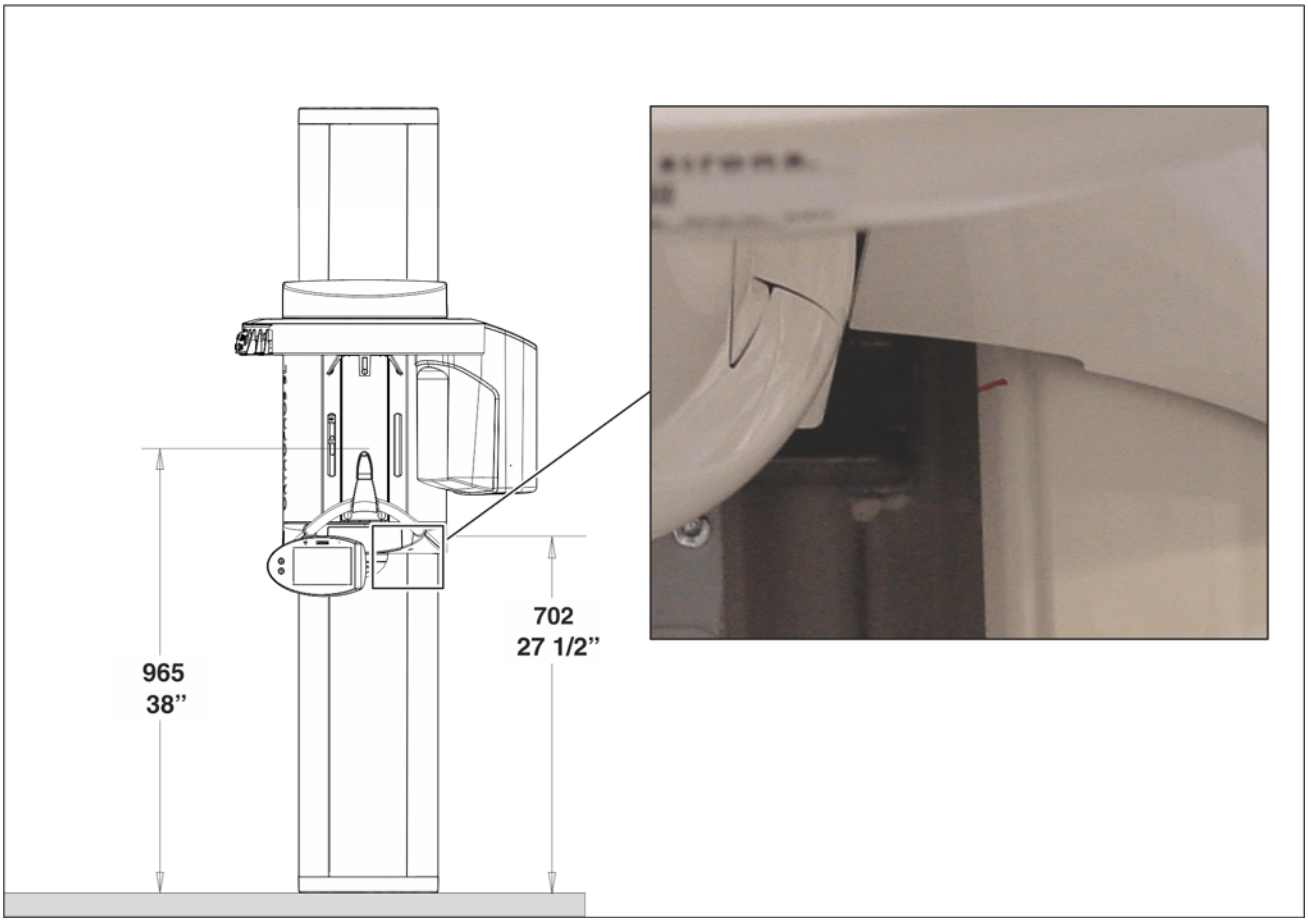
IMPORTANT

The bottom edge of the slide cover must be at the same height as the marking in the column.

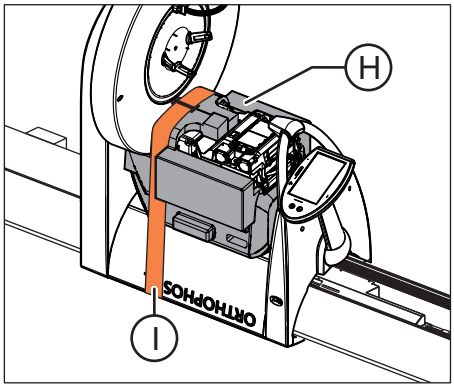
⚠ DANGER

Shock hazard!

Be sure to switch off the line power supply before connecting the line voltage!



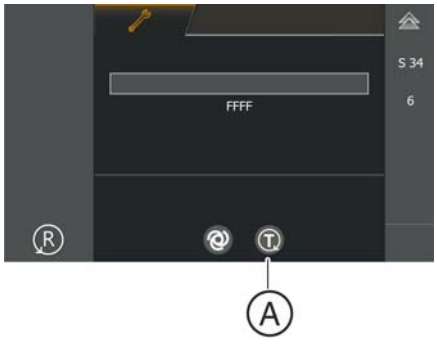
1. Switch the unit on and move it to its packing height by actuating the up/down keys on the control panel.
   - Bite block height = 965 mm (displayed as height on the control panel)
   - Bottom edge of slide cover = 702 mm
2. Move the diaphragm and the sensor unit to the packing position [→ 161] via the service routines S021.3 and S021.4.
3. Turn the rotation unit to the packing position (see section "Delivery [→ 28]" / "ORTHOPHOS SL [→ 30]".



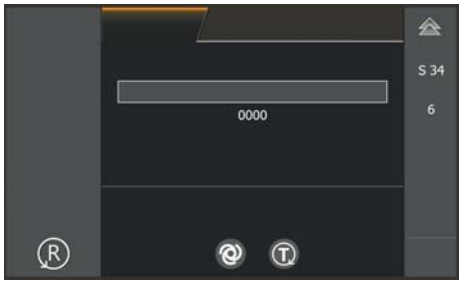
4. **IMPORTANT:** Attach the tube assembly guard (supplied in the package) to the X-ray tube assembly and secure the packing position of the tube assembly with the tension belt (supplied in the package).
5. Attach the transport safety device.
   The transport safety device is attached in reverse sequence to how it is detached [→ 63].
6. Pack the panoramic X-ray unit
   (Packing condition - see section Delivery [→ 28]).

Packing the cephalometer

1. Call service routine S034.6 [→ 133].
   - After calling the service routine, an inactive progress indicator is displayed in selection field 1. Selection field 2 shows the characters "FFFF".
2. Touch the T key (A).
   - The cephalometer moves to the packing position. The procedure is visualized by an active progress indicator in selection field 1.



   - When the cephalometer has reached its packing position, "0000" is displayed in selection field 2.
3. Exit the service routine [→ 136].



11.12 Service routines for commissioning and repacking

NOTE: This section describes how to perform the service routines via the service menu of the control panel.

The service routines S008.3, S017.2 - S017.18 and S037.4 can also be run via the Sirona web service (see section Running service routines via the web service [→ 174]).

Service routines S017 and S037 must sometimes be performed with security access (see section “Service routines with security access [→ 134]”).

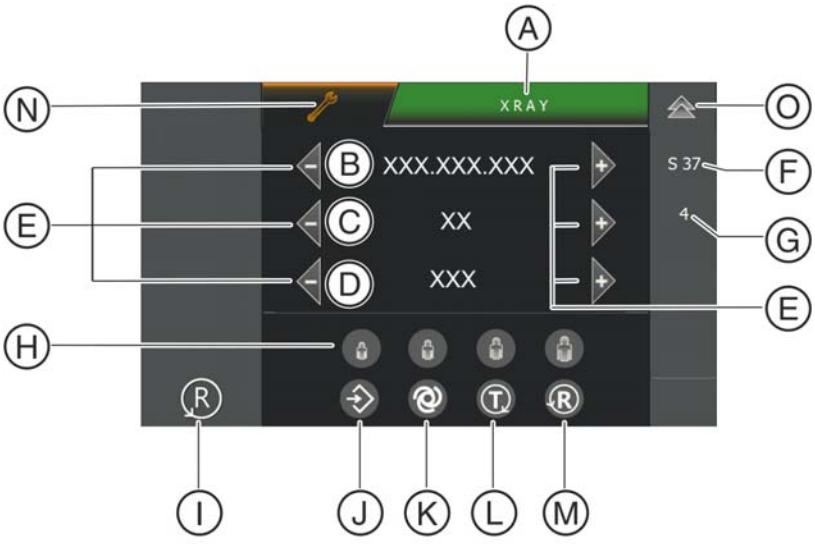
IMPORTANT
Service routines that are displayed on the unit control panel but are not described in the technical documentation are purely for Sirona-internal purposes and **may not be executed under any circumstances**. Executing these service routines may result in a malfunction in the unit or parts of the unit.

11.12.1 Service menu and service routines

You can use the service routines to check the function of certain unit components and modules, as well as to set important unit parameters.

11.12.1.1 Displays and symbols in the service menu

There are many different control symbols and display fields on the touchscreen; these are activated on a context-sensitive basis depending on the procedure step.

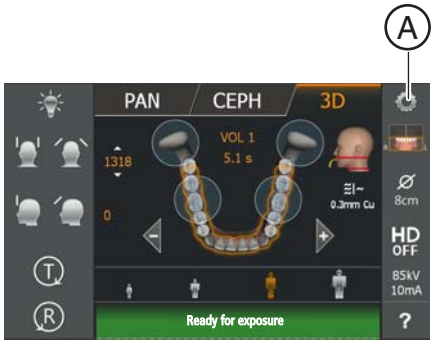


A	X RAY	Radiation can be released.
	X RAY Active!	Caution! Radiation is being released.
B	Selection field 1	Display fields for service routines, test steps, values, unit parameters, etc.
C	Selection field 2	
D	Selection field 3	
E	Arrow keys	Touch the "+" and "-" arrow keys to select unit parameters in the selection fields.
F	S1 - S37	Selected service routine.
G	1 - n	Selected test step.
H	Patient symbol keys	Different functions, depending on service routine.
I	R(eturn) key	Acknowledgment of error messages/ unit return run
J	Memory key	Save selection.
K	Service key	Different functions, depending on service routine. Most, however, confirm a selection or the activation of the next test step.
L	T(est rotation) key	Start a test.
M	R(eturn) key	Move the unit to the starting position or confirm a save operation.
N	Wrench symbol	Displayed if level 4 (service menu) is activated.
O	Double arrow key	Return to the main menu.

11.12.2 Basic operating procedures in the service menu of the control panel

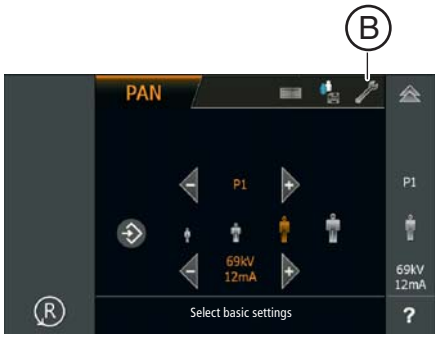
11.12.2.1 Calling the service menu

The service menu is intended exclusively for service engineers. Service routines can be activated and unit settings incl. tests and calibrations can be performed in this menu.

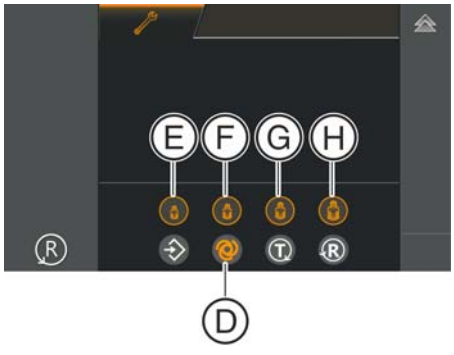


✓ The touchscreen display is located on level 1.

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



2. Touch the wrench symbol (B).
   ↳ The display for entering the service password appears.

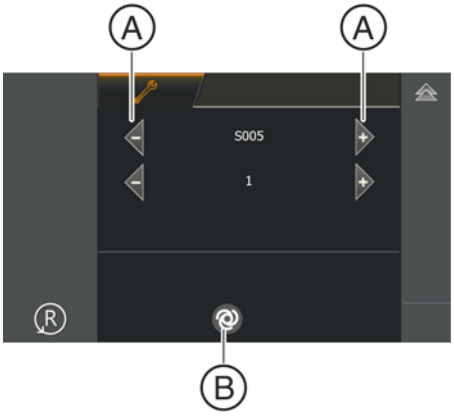


3. Switch to the service menu:
   Press and hold down the Service key (D) until the patient symbol keys light up (E-H) (approx. 2 s). Then press the patient symbol keys in the sequence **F** – **H** – **E** within the next 4 s.

↳ The service menu is opened.

11.12.2.2 Selecting service routines and test steps

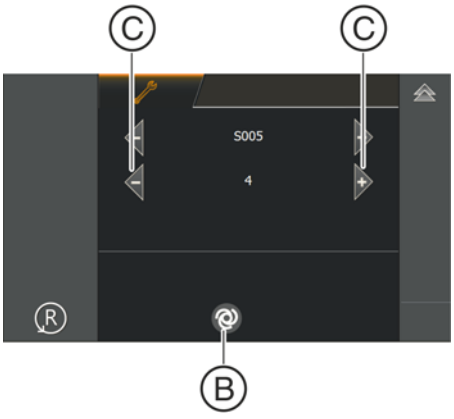
11.12.2.2.1 Selecting a service routine



✓ The service menu must be selected.

➢ Select the desired service routine via the arrow keys in the selection field 1 (A) and confirm the selection via the service key (B).
If the selected service routine has several test steps, the first selectable test step is displayed in selection field 2 (test step 1 in the example).

11.12.2.2.2 Selecting a test step



✓ The required service routine must be selected [→ 133].

➢ Select the required test step in selection field 2 with arrow keys (C) and confirm your selection by pressing Service key (B).

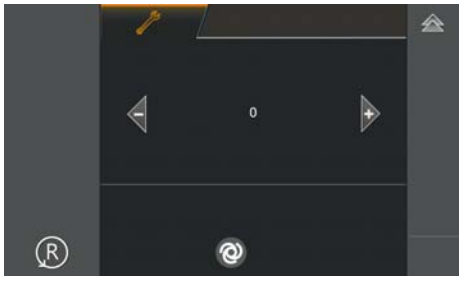
↳ The selected service routine as well as the selected test step are displayed in the right-hand column (S005.4 in the example).

11.12.2.2.3 Service routines with security access

A security code is required for accessing service routines involving functions such as radiation release or editing of configuration data or stored values. This procedure prevents the inadvertent selection or activation of these service routines.

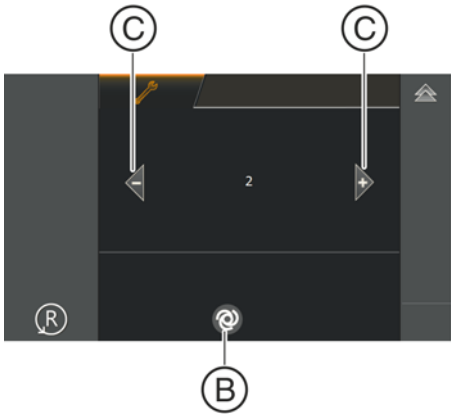
To select a service routine or test step with security access, proceed as follows:

1. Select the service routine or the test step, and confirm your selection with the Service key [→ 133].



   ↳ After you have confirmed your selection, a "0" appears in selection field 2.

2. Confirm security access by once again selecting the number of the main routine (2 in the example) with the arrow keys in selection field 2 (C) and press the Service key (B) to confirm your selection.



   ↳ Following this double selection and confirmation via the Service key, the service routine is activated.

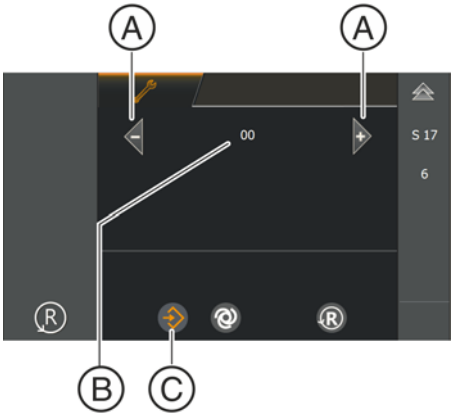
11.12.2.3 Select parameters

If arrow keys are displayed in the selection fields once the required service routine has been selected, you can use these arrow keys to choose between different parameters.

Example

You want to run service routine S017.6 to activate the remote control.

✓ Once you have selected service routine S017.6, the code "01" is pre-selected for the "Remote control enabled" option.



➢ Press the + or - arrow keys (A) to select code 00 (B) for the "Remote control disabled" option.

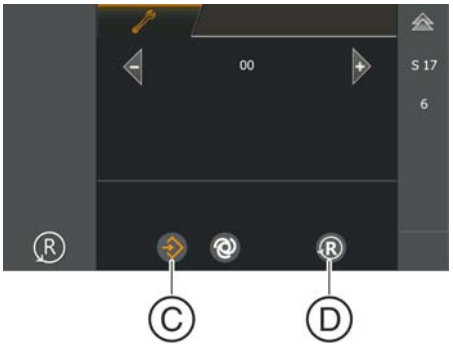
↳ Once the selected parameter has been changed (in this case the code for disabling remote control), the Memory key (C) lights up.

11.12.2.4 Saving parameters

Once one or a number of parameters have been selected via a service routine, the current selection must be saved so that it is applied in the unit.

Example

You want to run service routine S017.6 to save the selected option "Remote control disabled".



✓ The Memory key (C) lights up.

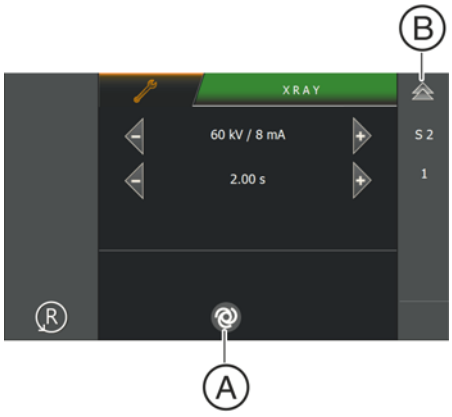
1. Touch the Memory key (C).

↳ The R key (D) lights up.

2. Touch the R key (D).

↳ The selected setting is saved to non-volatile memory.

11.12.2.5 Exiting the test step and service routine



Touch the Service key (A) or the double arrow key (B) to go back to the menu for selecting service routines.

Touch the double arrow key (B) in the service menu to go back to the main menu.

11.12.3 S017: Configuration service

NOTE: The unit can also be configured via the web service via service routine [→ 174] S017.

IMPORTANT

After making changes to the unit configuration, error message E71130 appears on the control panel's touchscreen. Additional service routines can be performed.
Before a patient exposure can be performed, the error message must be acknowledged with the "R" button and the unit must be restarted.

SR*	SA**	Function
S017		Unit configuration
S017.2	yes	Configuring the hardware version
S017.3	yes	Enter the country group code
S017.4	yes	Select a language
S017.6	yes	Enable/disable the remote control
S017.8	yes	Selecting the kV/mA level series
S017.13	yes	Enable/disable the welcome screen
S017.14	yes	Enable/disable certain lines of the welcome screen
S017.15	yes	Activate/deactivate the acoustic signal for end of exposure
S017.18	yes	Activation of occlusal bite block function

* SR=service routine, ** SA=security access

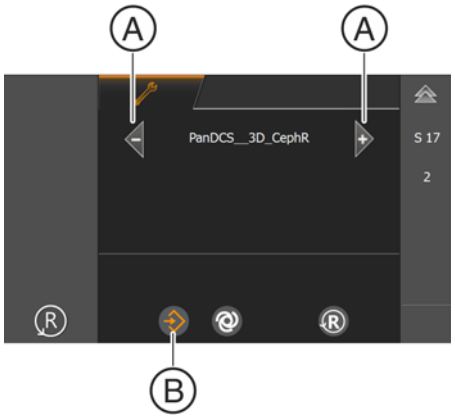
11.12.3.1 S017: Test step 2

Configuring the hardware version

Selection field	Unit variants	Function
1	PanDCS__3D_____	Panoramic digital, 2D/3D-Sensor
	PanDCS__3D_CephL	Panoramic digital, 2D/3D-Sensor, Ceph left digital
	PanDCS__3D_CephR	Panoramic digital, 2D/3D-Sensor, Ceph right digital
	PanDCS_____	Panoramic digital, 2D-Sensor
	PanDCS_____CephL	Panoramic digital, 2D-Sensor, Ceph left digital
	PanDCS_____CephR	Panoramic digital, 2D-Sensor, Ceph right digital

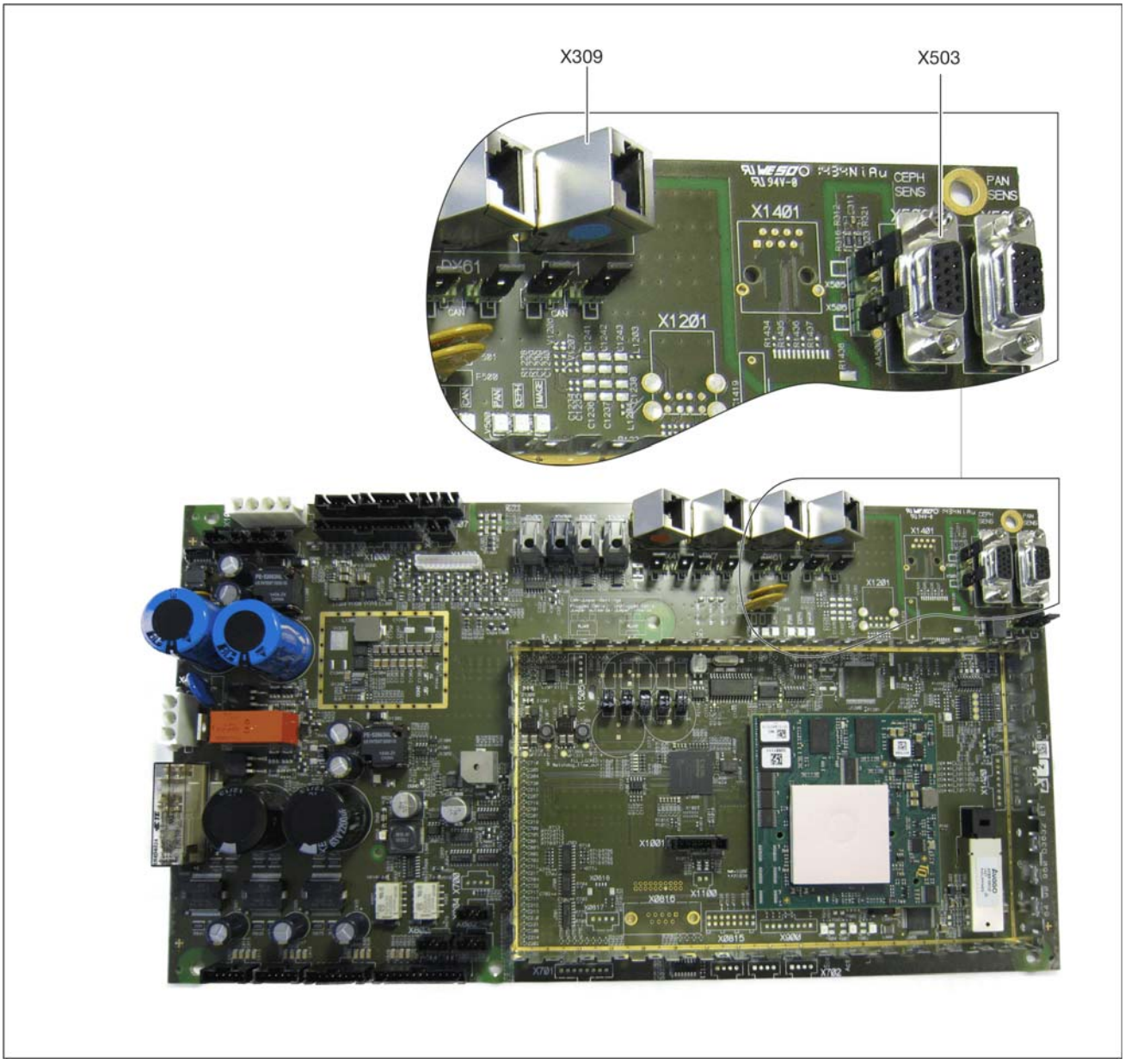
* factory settings

1. Call service routine S017.2.
   ↳ Once the service routine has been selected, the current selected unit variant is displayed in selection field 1.



2. Use arrow keys (A) to select the required unit variants in selection field 1 (see table).
   ↳ Once the unit variant has been selected, the Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.

Checking the jumper position on board DX1



➢ Check the jumper positions of the sockets on board DX1:
X309 (DX91, ceph sensor) and
X503 (DX81, ceph sensor)

Without ceph — Jumper inside: Cephalometer not connected, i.e. connector not plugged in.

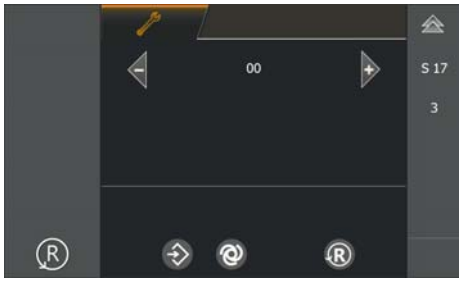
Ceph left or Ceph right — Jumper outside: Cephalometer connected, i.e. connector plugged in.

11.12.3.2 S017: Test step 3

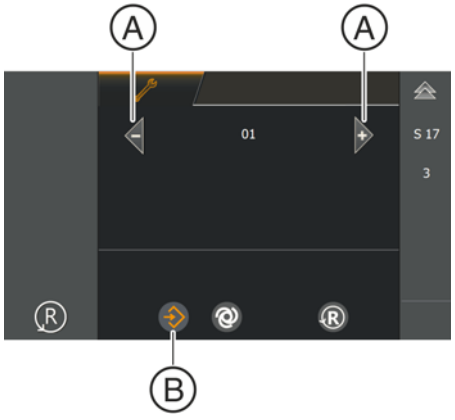
Enter the country group code

Selection field	Code	Function
1	00	Worldwide*
	01	Asia
	02	USA

* Factory setting



1. Call service routine S017.3.
   ↳ Once the service routine has been selected, the code for the current setting is displayed in selection field 1.



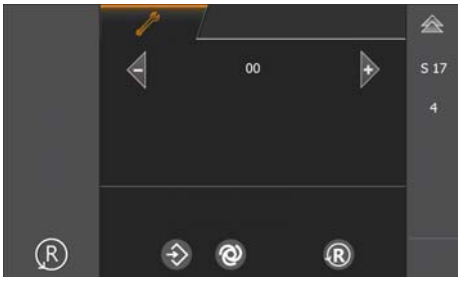
2. Use arrow keys (A) to select the required group code in selection field 1 (see table).
   ↳ Once the country group code has been selected, the Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.

11.12.3.3 S017: Test step 4

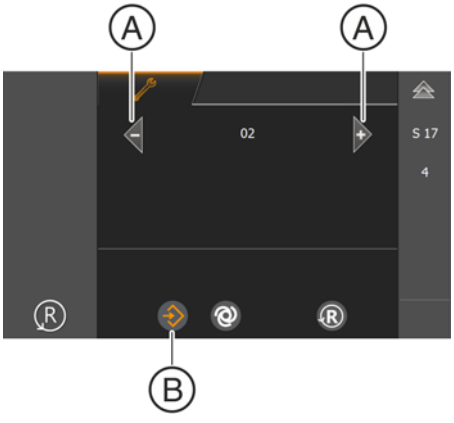
Select a language

Selection field	Code	Function*
1	00	English*
	01	German
	02	French
	03	Italian
	04	Dutch
	05	Spanish
	06	Russian
	08	Portuguese
	10	Chinese (PRC)
	11	Korean
	12	Japanese
	13	Chinese (Taiwan)

* Factory setting



1. Call service routine S017.4.
   - Once the service routine has been selected, the code for the current setting is displayed in selection field 1.



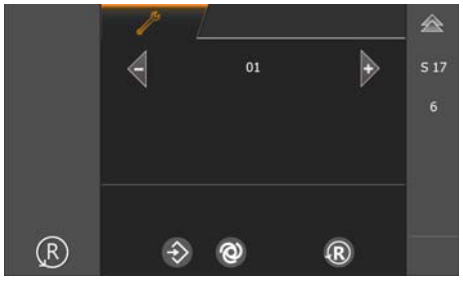
2. Use the arrow keys (A) to select the code for the required language in selection field 1 (see table).
   - Once the language has been selected, the Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.

11.12.3.4 S017: Test step 6

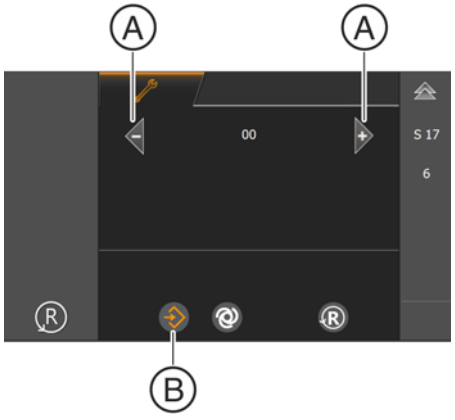
Activate / deactivate the remote control display

Selection field	Code	Function
1	00	Display inactive*
	01	Display active

* factory settings



1. Call service routine S017.6.
   ↳ Once the service routine has been selected, the code for the current setting is displayed in selection field 1.



2. Use the arrow keys (A) to select the code for the required setting in selection field 1 (see table).
   ↳ Once the required setting has been selected, the Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.

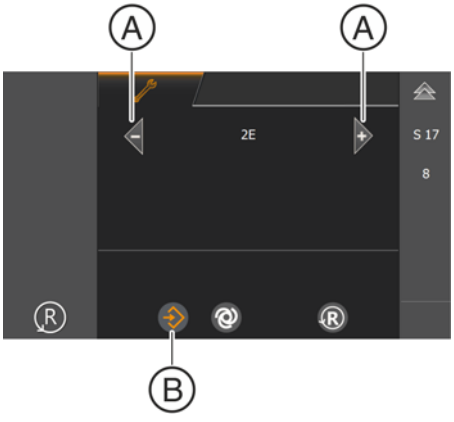
11.12.3.5 S017: Test step 8

Selecting the kV/mA level series

Selection field	Code	Function
1	1E	16 mA series for pan 16 mA series for Ceph
	2E	8 mA series for pan 16 mA series for Ceph

* Factory setting

1. Call service routine S017.8.
   - Once the service routine has been selected, the code for the current setting is displayed in selection field 1.



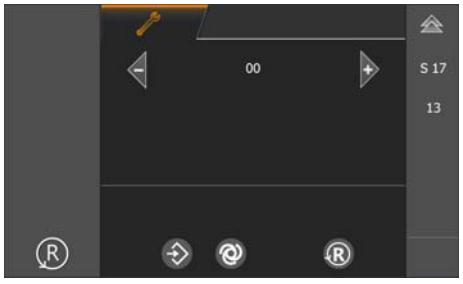
2. Use arrow keys (A) to select the required setting in selection field 1 (see table).
   - Once the required setting has been selected, the Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.

11.12.3.6 S017: Test step 13

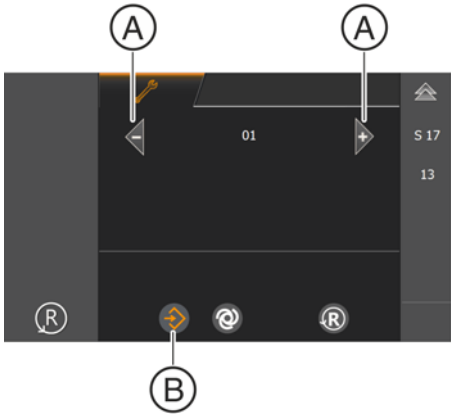
Enable/disable the welcome screen

Selection field	Code	Function
01	00	Welcome screen disabled
	01	Welcome screen enabled*

* Factory setting



1. Call service routine S017.13.
   - Once the service routine has been selected, the code for the current setting is displayed in selection field 1.



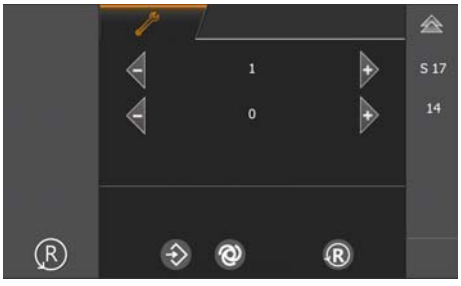
2. Use arrow keys (A) to select the required setting in selection field 1 (see table).
   - Once the required setting has been selected, the Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.

11.12.3.7 S017: Test step 14

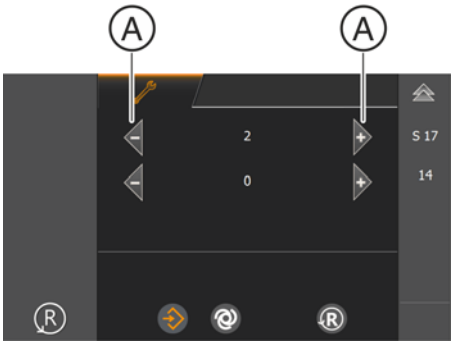
Enable/disable certain lines of the welcome screen

Selection field	Code	Meaning/Function
1	1	First name
	2	Surname
	3	Date of birth
	4	Patient number
2	0	Inactive*
	1	Active

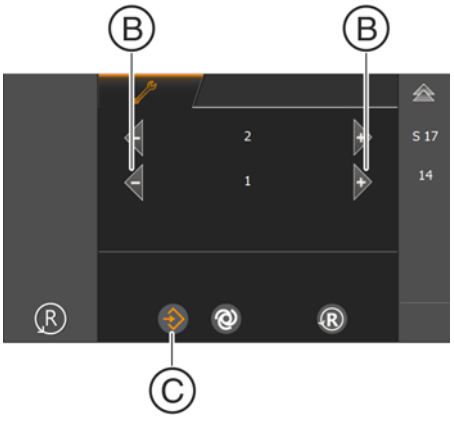
* Factory setting



1. Call service routine S017.14.
   - Once the service routine has been selected, the code for the line currently selected is displayed in selection field 1.



2. Use arrow keys (A) to select the required line in selection field 1 (see table).
   - The activation status code is displayed in selection field 2.



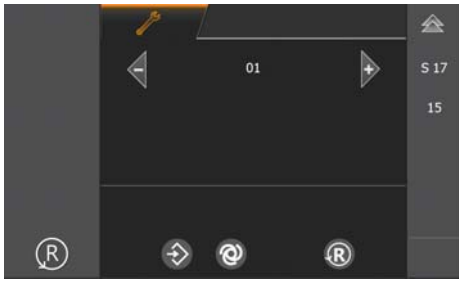
3. Use the arrow keys (B) to select the code for the required state of the line selected in selection field 1 in selection field 2 (see table).
   - Once the required setting has been selected, the Memory key (C) lights up.
4. Save the setting.
5. Exit the service routine.

11.12.3.8 S017: Test step 15

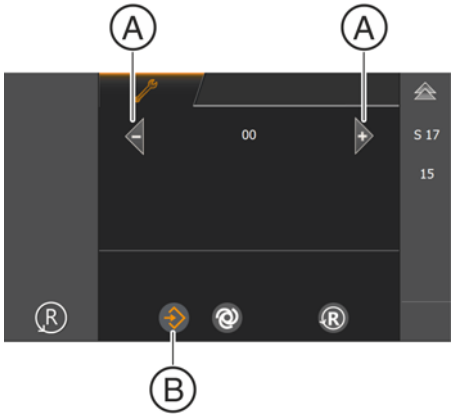
Selection field	Code	Function
1	00	Acoustic signal indicating the end of the exposure is disabled
	01	Acoustic signal indicating the end of the exposure is enabled*

* Factory setting

Activate/deactivate the acoustic signal for end of exposure



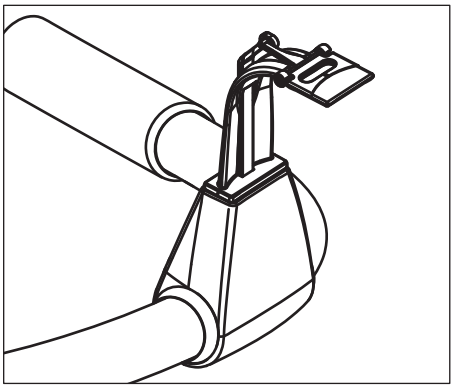
1. Call service routine S017.15.
   ↳ Once the service routine has been selected, the code for the current setting is displayed in selection field 1.



2. Use arrow keys (A) to select the required setting in selection field 1 (see table).
   ↳ Once the required setting has been selected, the Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.

11.12.3.9 S017: Test step 18

Occlusal bite block function

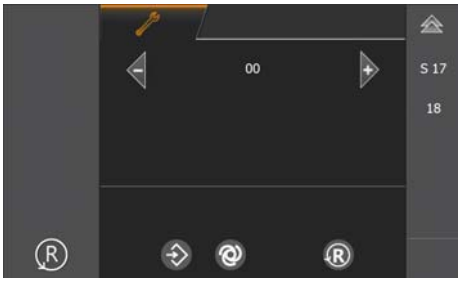


The occlusal bite block function can be activated or deactivated via service routine S017.18.

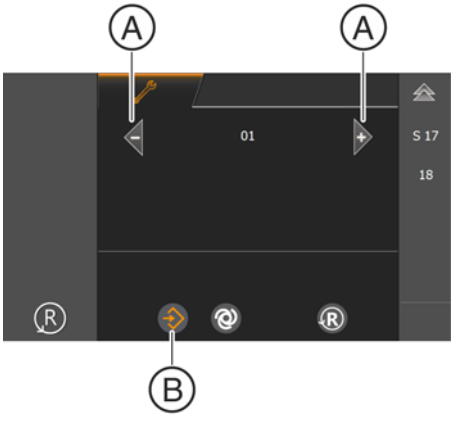
Should the customer wish to set a nominal angle deviating from the factory setting (7°), make the corresponding configuration settings via service routine S018.7).

Selection field	Code	Function
1	00	Occlusal bite block function deactivated*
	01	Occlusal bite block function activated

* factory settings



1. Call service routine S017.18 [→ 147].
   - Once the service routine has been selected, the code for the current setting is displayed in selection field 1.



2. Use arrow keys (A) to select the required setting in selection field 1 (see table).
   - Once the required setting has been selected, the Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.

11.12.4 S018: Service for height adjustment

SR*	SA**	Function
S018		Service for height adjustment
S018.2	No	Set the maximum travel height
S018.3	No	Undo the maximum travel height setting
S018.4	No	Check the height adjustment sensor system
S018.5	No	Setting the minimum travel height
S018.6	No	Undoing the minimum travel height setting
S018.7	No	Nominal angle setting for the occlusal bite block (as required by the customer)
S018.8	No	Functional test of the occlusal bite block
S018.9	No	Calibrating the occlusal bite block
S018.10	No	Setting the PWM values for the height adjustment creep speed (PWM = Pulse Width Modulation)

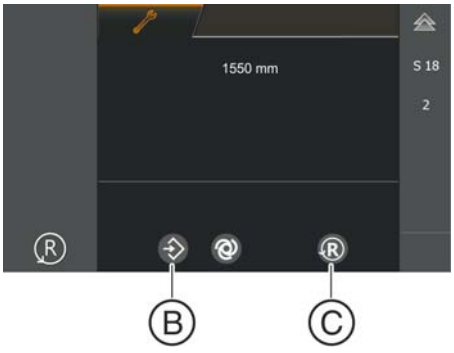
* SR=service routine, ** SA=security access

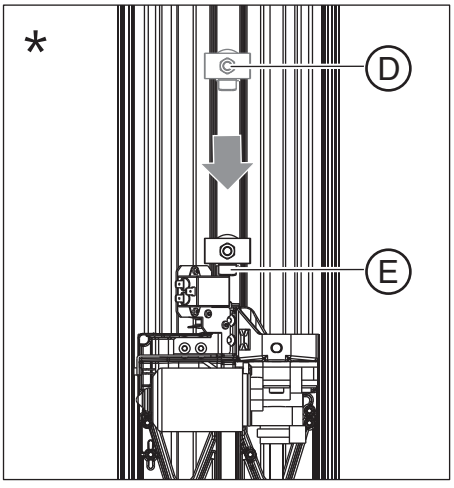
11.12.4.1 S018: Test step 2

NOTE: Limiting the max. travel height is only possible from a position value of >1500.

Set the maximum travel height

1. Move the unit to the required maximum travel height by pressing the Up/Down keys in the user mode on the control panel.
2. Call service routine S018.2.
   - Once the service routine has been selected, the current height position is displayed in selection field 1.
   - The Memory key (B) lights up.
3. To save the maximum travel height, touch the Memory key (B) (R key (C) lights up) followed by the R key (C).

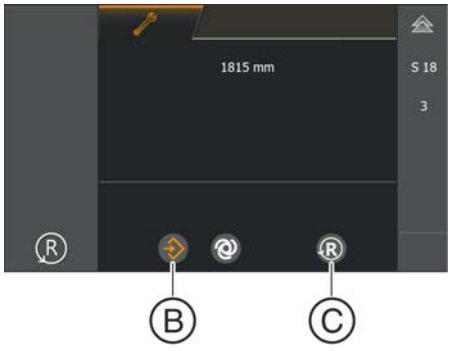




4. *For greater clarity the unit is shown in the adjacent image without a cover.
   Set the mechanical limit stop on the unit:
   Loosen the nut (D) and move mechanical limit stop (E) for the limit switch until it engages. Tighten nut (D) again.
   The next time the UP key is pressed, the unit stops 10 mm below the limit switch.
5. Exit the service routine.

11.12.4.2 S018: Test step 3

Undo the maximum travel height setting



1. Call service routine S018.3.
   - Once the service routine has been selected, the current height position is displayed in selection field 1.
   - The Memory key (B) lights up.
2. To increase the limit for the maximum travel height, first touch the Memory key (B) (R key (C) lights up) followed by the R key (C).
3. Exit the service routine.

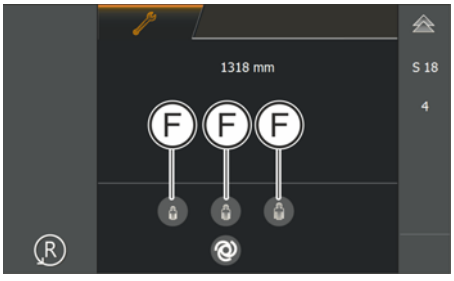
11.12.4.3 S018: Test step 4

Check the height adjustment sensor system

This service routine is used to move the unit up or down as far as the limit switches using the Up/Down keys on the control panel. The "soft limit positions" set by the software are ignored in this case.

Display on the control panel	Status	Meaning
Patient symbol key 1	lit	Correction switch activated
	not lit	Correction switch not activated
Patient symbol key 2	lit	Lower limit switch activated
	not lit	Lower limit switch not activated
Patient symbol key 3	lit	Upper limit switch activated
	not lit	Upper limit switch not activated

1. Call service routine S018.4.
   - Once the service routine has been selected, the current height position is displayed in selection field 1.
   - Patient symbol keys 1 to 3 (F) show the switching state of the limit switches (see table)
     If the RESPECTIVE patient symbol key is lit, the corresponding switch is activated.



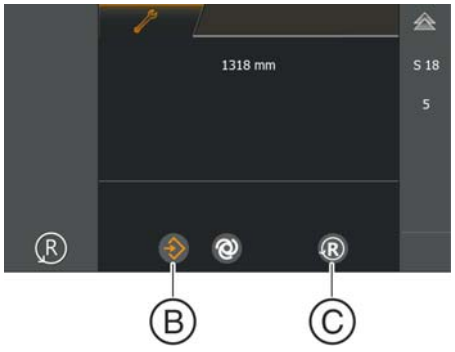
2. Use the UP/DOWN keys on the control panel to move the unit up and down and use the patient symbol keys (F) to check the switching states.
3. Exit the service routine.

11.12.4.4 S018: Test step 5

Setting the minimum travel height

Setting the minimum travel height is possible only for a unit height that is below the lower correction switch level (< position value of 1500)!

1. In user mode, move the unit to the required minimum travel height by pressing the Up/Down keys (A).
2. Call service routine S018.5.
   - ↳ Once the service routine has been selected, the current height position is displayed in selection field 1.
   - ↳ The Memory key (B) lights up.



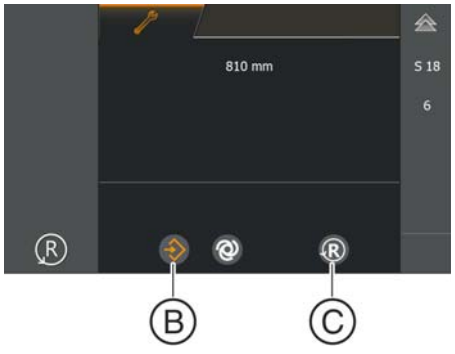
3. To save the minimum travel height, touch the Memory key (B) (R key (C) lights up) followed by the R key (C).
4. Exit the service routine.

The limitation of the minimum travel height is purely software based. The lower limit switch is not mechanically adapted to the new minimum travel height!

11.12.4.5 S018: Test step 6

Undoing the minimum travel height setting

1. Call service routine S018.6.
   - ↳ Once the service routine has been selected, the current height position is displayed in selection field 1.
   - ↳ The Memory key (B) lights up.



2. To increase the limit for the minimum travel height, first touch the Memory key (B) (R key (C) lights up) followed by the R key (C).
3. Exit the service routine.

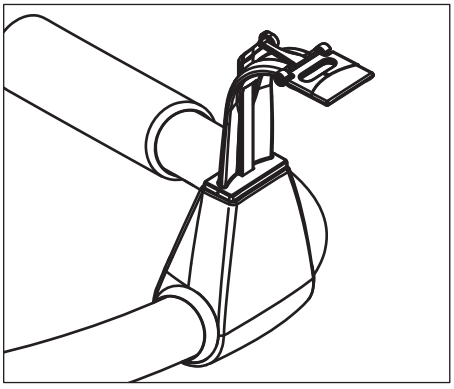
11.12.4.6 S018: Test step 7

NOTE: In order to execute this service routine, the occlusal bite block function must be activated via service routine S017.18 [→ 147].

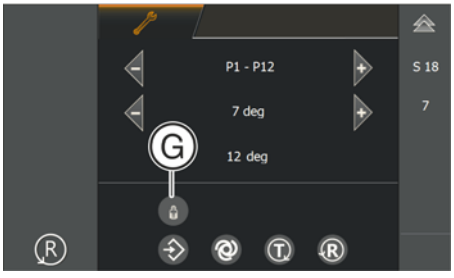
Setting the nominal angle for the occlusal bite block (as required by the customer)

Symbol on the control panel	Status	Meaning
Patient symbol key 1 (G)	visible	Occlusal bite block connected
	not visible	Occlusal bite block not connected

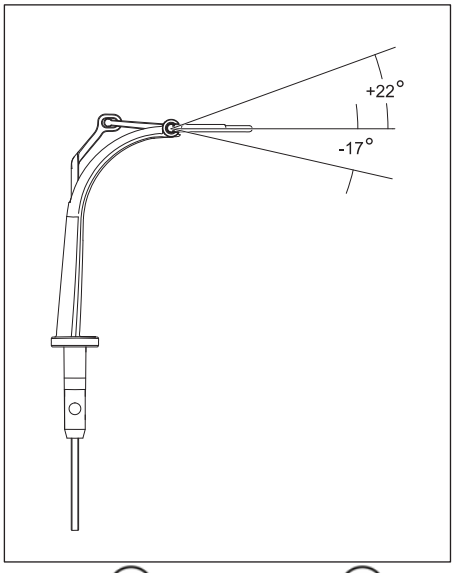
Selection field	Parameter/Display	Range of values
1	Program groups	P1 - P12 BW1 - BW2 VOL1 - VOL3
2	Nominal angle of the bite block plate	-13° to +18°
3	Measured deflection of the bite block plate	-17° to +18°

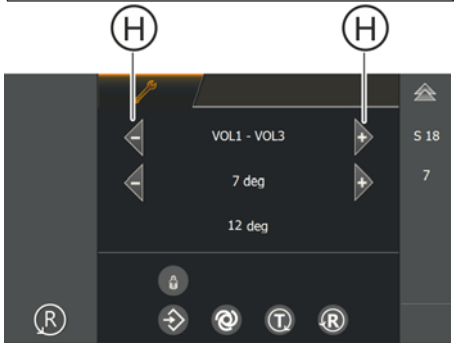


1. Call service routine S018.7.

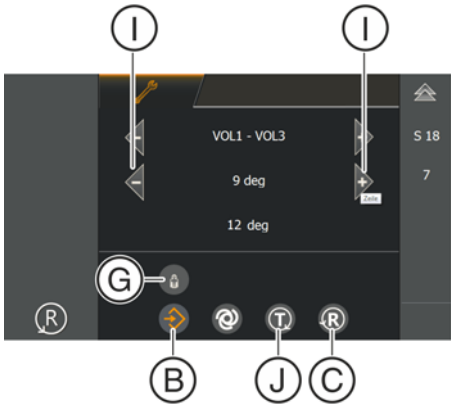


- The selected program group is displayed in selection field 1 (to which the nominal value displayed in selection field 2 applies).
- The nominal value (for the program group selected in selection field 1) is displayed in selection field 2.
- The currently measured angle of the bite block plate is displayed and permanently updated in selection field 3 (possible deflection: -17° to +22°).
- The display of patient symbol key 1 (G) indicates whether or not the bite block is connected (see table).





2. Use the arrow keys (H) in selection field 1 to select the required program group.



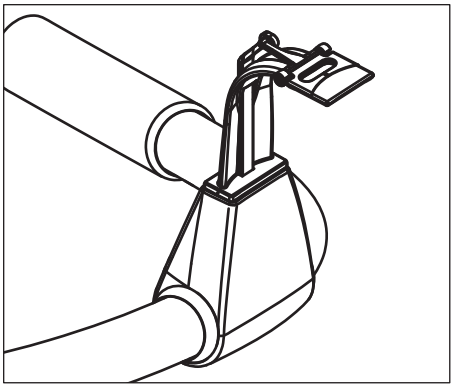
3. Use the arrow keys (I) to select the required nominal angle (possible range: -17° to +22°).
   Tip: You can also set the required angle manually on the occlusal bite block and transfer this angle to selection field 2 by pressing the T key (J).
   By pressing patient symbol key 1 (G) you can activate and deactivate the laser light localizer. You can use the laser light as a reference for the angle adjustment. When the laser light localizer is activated, the patient symbol key 1 is lit.
   ↳ The Memory key (B) lights up.
4. To save the nominal value, touch the Memory key (B) (R key (C) lights up) followed by the R key (C).
5. Exit the service routine.

11.12.4.7 S018: Test step 8

Functional test of the occlusal bite block

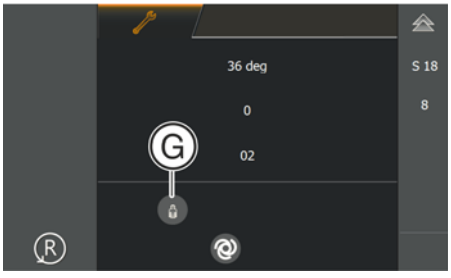
Symbol on the control panel	Status	Meaning
Patient symbol key 1 (G)	visible	Occlusal bite block connected
	not visible	Occlusal bite block not connected

Selection field	Display
1	Angle of the bite block plate calculated on the basis of the calibration
2	Measured AD value providing the basis for the angle calculation
3	Codes for possible error modes [→ 156]



All of the monitoring functions of the bite block electronics are active in this service routine. Any error states are displayed as a code in selection field 3.

1. Call service routine S018.8.



- The current angle of the bite block plate or the one calculated based on the calibration is displayed in selection field 1.
- The currently measured AD value leading to the angle calculation is displayed in selection field 2.
- The codes of the possible error modes of the acquisition electronics are displayed in selection field 3 (see section "Codes of possible error modes [→ 156]").
- The display of patient symbol key 1 (G) indicates whether or not the bite block is connected (see table).

2. Exit the service routine.

11.12.4.7.1 Codes of possible error modes

Display	Error	Troubleshooting measures
01	Normal state	No action
02	Plug X1000 is not plugged in on board DX1	Check plug for occlusal bite block on board DX1.
03	Persistent ADC values	Check cabling and plug connections on board DX1 and occlusal bite block electronics.
04	Interruption of the 5 V line	
05	Interruption of V_{ref-} line	
06	Interruption of V_{out-} line	
07	Interruption of V_{GND} line	
08	Interruption of "Connect" line	
09	Defective choke, pin 3 detached	Replace occlusal bite block electronics (board DX51).
10	Defective choke, pin 1 detached	
11	Defective clock generator	
12	Resistor R11 not soldered	
13	Plug on occlusal bite block not inserted	Check plug for occlusal bite block on occlusal bite block electronics (board DX51).
14	Composite error	Check cabling and plug connections on board DX1 and occlusal bite block electronics.
15	Calculated angle too small	Perform a readjustment via service routine S018.9.
16	Calculated angle too large	
17	Error on ADC channel 2	Replace occlusal bite block electronics (board DX51); check cabling and plug connections on board DX1 and occlusal bite block electronics.

You can draw conclusions concerning the correctness of the angle acquisition based on the plausibility of these displays. A plausible constellation (reference unit) would be:

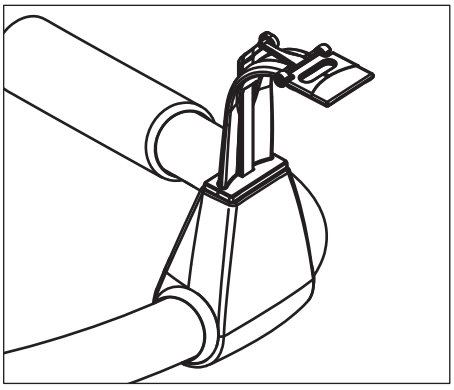
+22° → AD = 1273

-17° → AD = 3124

The settings may differ unit specifically.

11.12.4.8 S018: Test step 9

Calibrating the occlusal bite block



When calibrating the occlusal bite block, three positional values ZP, U and L must be adjusted and saved:

- *ZP (zero point):* Zero point: applied whenever no bite block is plugged in.
- *U (upper):* Upper value; applied whenever the bite block is plugged in and the bite block plate is deflected all the way up.
- *L (lower):* Lower value; applied whenever the bite block is plugged in and the bite block plate is deflected all the way down.

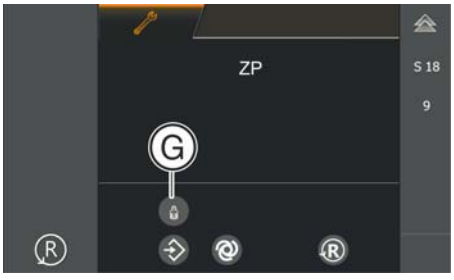
Symbol on the control panel	Status	Meaning
Patient symbol key 1 (G)	visible	Occlusal bite block connected
	not visible	Occlusal bite block not connected

Selection field	Display	Meaning
1	ZP	Zero point
	U	Upper value
	S	Lower value

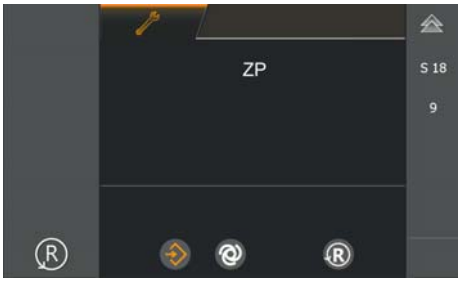
➢ Call service routine S018.9.

↳ The data type intended for the next storage function is displayed in selection field 1.

↳ The display of patient symbol key 1 (G) indicates whether or not the bite block is connected (see table).

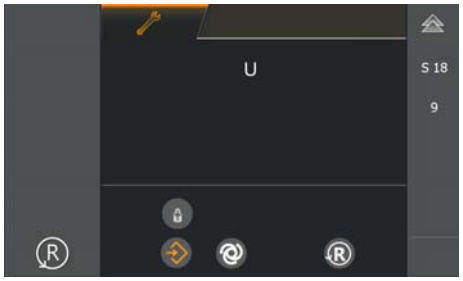


ZP: Adjusting and saving the zero point



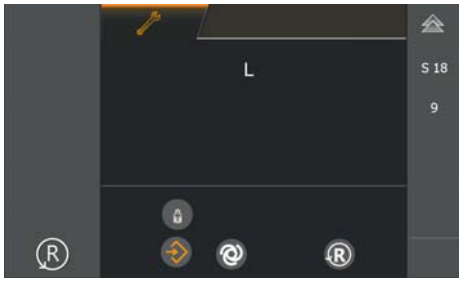
1. Take the occlusal bite block out of the bite block holder.
   ↳ "ZP" (for zero point) is displayed in selection field 1.
   ↳ The Memory key lights up.
2. To save the zero point "ZP", first press the Memory key (the R key lights up) and then the R key.
   ↳ The value for the zero point "ZP" is accepted.

U: Adjusting and saving the upper value



1. Insert the occlusal bite block into the bite block holder and deflect the bite block plate all the way up (up to the stop).
   - ↳ "U" (for upper value) is displayed in selection field 1.
   - ↳ The Memory key lights up.
2. To save the upper value "U", first press the Memory key (the R key lights up) and then the R key.
   - ↳ The value for the upper value "U" is accepted.

L: Adjusting and saving the lower value



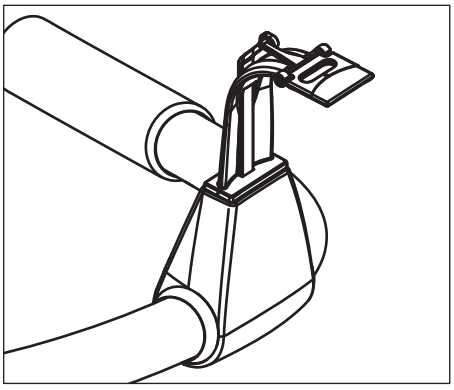
1. Deflect the bite block plate all the way down (up to the stop).
   - ↳ "L" (for lower value) is displayed in selection field 1.
   - ↳ The Memory key lights up.
2. To save the lower value "L", first press the Memory key (the R key lights up) and then the R key.
   - ↳ The value for the lower value "L" is accepted.
   - ↳ The adjustment of the AD values is now finished.

Checking the adjustment

1. Check the adjustment via service routine S018.7 [→ 153]. To do this, move the bite block plate and check whether the adjustment range is between -17° and +22°.
2. Exit the service routine.

11.12.4.9 S018: Test step 10

Setting the PWM values for the height adjustment creep speed



In user mode, check whether a correction is required for the speed for upward and downward movement (creep speed). Here the bite block must be deflected in such a way that the creep speed is effective in the relevant direction (observe green arrows). The PWM index values are set correctly if:

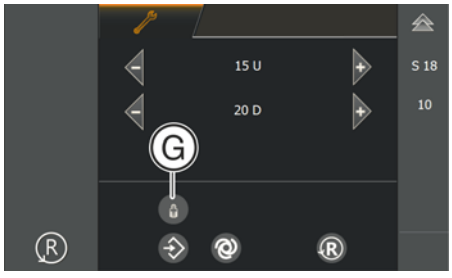
- the drive runs at approximately the same speed in both directions
- the drive spontaneously starts without jolting and concurrent to key actuation
- the travel speed does not exceed 5 mm/s.

Symbol on the control panel	Status	Meaning
Patient symbol key 1 (G)	visible	Occlusal bite block connected
	not visible	Occlusal bite block not connected

Selection field	Parameters	Range of values
1	U (upward travel)	1U – 15U* – 35U
2	D (downward travel)	1D – 20D* – 35D

* factory settings

Adjusting and saving the PWM index values



1. Call service routine S018.10.
   - The PWM index for upward travel "U" (up) is displayed in selection field 1.
   - The PWM index for downward travel "D" (down) is displayed in selection field 2.
   - The display of patient symbol key 1 (G) indicates whether or not the occlusal bite block is connected (see table).
2. Select the desired index values using the arrow keys in selection fields 1 and 2 (see table).
3. To save the index values, first press the Memory key (the R key lights up) and then the R key.
4. Exit the service routine.

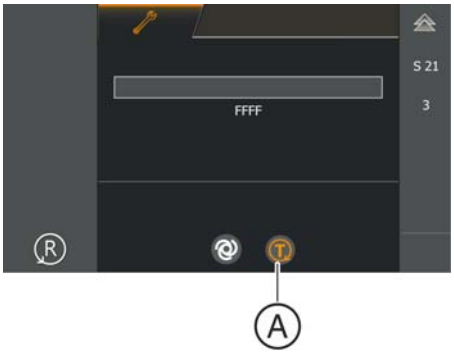
11.12.5 S021: Service for the packing position

SR*	SA**	Function
S021		Service for packing position
S021.3	No	Initiate the packing position for the diaphragm
S021.4	No	Initiate the packing position for the sensor unit

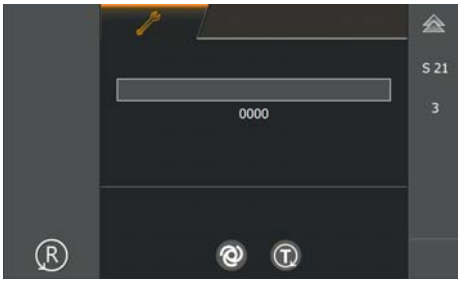
* SR=service routine, ** SA=security access

11.12.5.1 S021: Test step 3

Initiate the packing position for the diaphragm



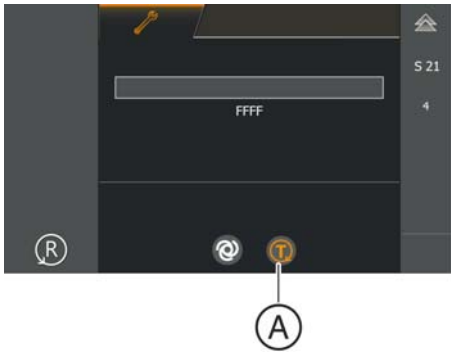
1. Call service routine S021.3 [→ 133].
   - An inactive progress indicator in selection field 1 and the message FFFF in selection field 2 signal that the system is ready to move the diaphragm.
2. Touch the T key (A).



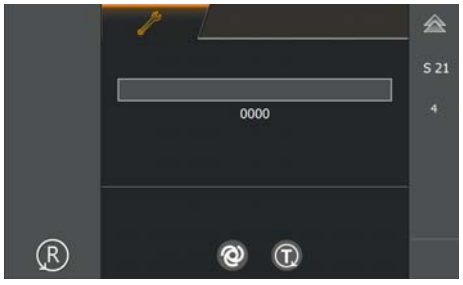
   - The diaphragm is moved to the packing position. During this time, a progress indicator is displayed.
   - When the packing position is reached, "0000" is displayed in selection field 2.
3. Exit the service routine [→ 136].

11.12.5.2 S021: Test step 4

Initiate the packing position for the sensor unit



1. Call service routine S021.4 [→ 133].
   ↳ An inactive progress indicator in selection field 1 and the message FFFF in selection field 2 signal that the system is ready to move the sensor unit.
2. Touch the T key (A).



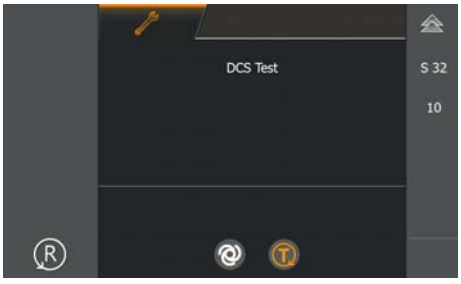
   ↳ The sensor unit is moved to the packing position.
   During this time, a progress indicator is displayed.
   ↳ When the packing position is reached, "0000" is displayed in selection field 2.
3. Exit the service routine [→ 136].

11.12.6 S032: Sensor test

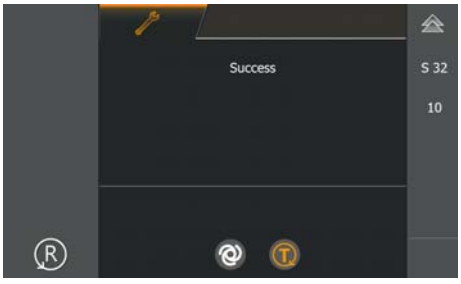
SR*	SA**	Function
S032		Sensor test
S032.10	No	Self-test of the DCS image data path
S032.50	No	Self-test of the FP image data path

11.12.6.1 S032: Test step 10

Self-test of the DCS image data path



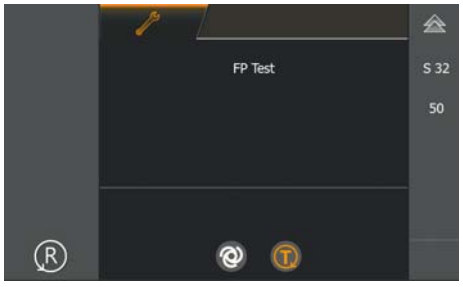
1. Call service routine S032.10 [→ 133].
   ↳ Once the service routine has been selected, "DCS test" is displayed in selection field 1.
2. Press the T key.
   ↳ The DCS image data path is tested.



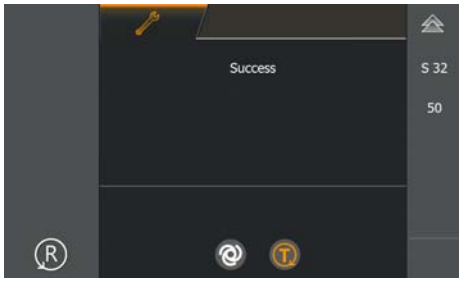
   ↳ If the image data path is OK, "Success" is displayed in the selection field 1.
3. Exit the service routine [→ 136].

11.12.6.2 S032: Test step 50

Self-test of the FP image data path

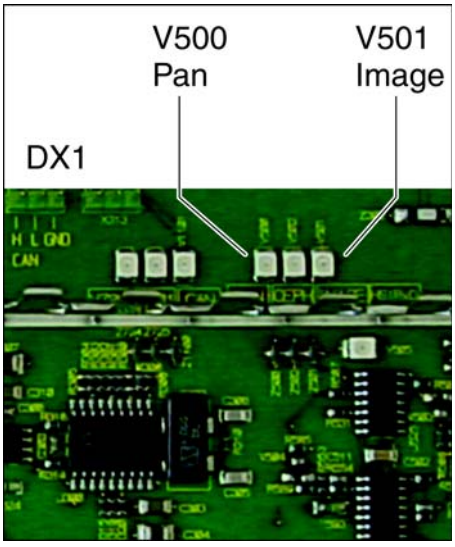


1. Call service routine S032.50 [→ 133].
   ↳ Once the service routine has been selected, "FP test" is displayed in selection field 1.
2. Touch the T key (B).
   ↳ The FP image data path is tested.



   ↳ If the image data path is OK, "Success" is displayed in the selection field 1.
3. Exit the service routine [→ 136].

11.12.6.3 Explanations on the test procedure



The synchronized readout sequence of the sensor is performed with real data transmissions and CAN bus commands.

The image data are analyzed in the memory of the DX11.

It is possible to evaluate the LEDs on DX1 (image, pan) during the synchronized readout sequence.

Image LED V501

LED is lit	Synchronized readout sequence active
LED not lit	Standby mode

Pan LED V500

LED is lit	Sensor unit available / standby mode
LED not lit	Sensor unit not available / standby mode
LED not lit	Sensor unit available / synchronized readout sequence active

In addition, "wiggle tests" of cables or ring rotation tests can also be performed.

11.12.6.4 Possible results of self-test and troubleshooting measures

"Success"

The self-test was successfully executed. No errors were detected in the image data path.

"Timeout"

The self-test could not be completed within 20 seconds.

"Unknown"

The self-test was canceled with an error that could not be localized.

"Prep"

An error occurred during the activation of the exposure for the self-test. If no further error messages (see title bar of Easypad) occur, please implement the following tests and measures:

- Check connecting cable **L83** between board **DX1** and the sensor unit.
- Replace board **DX11**
- Replace sensor unit

If error messages are present, please implement the measures according to the displayed error message.

"Transfer"

Minimal image data was received by the sensor unit during the self test. If no further error messages (see title bar of Easypad) occur, please implement the following tests and measures:

- Check connecting cable **L83** between board **DX1** and the sensor unit.
- Replace board **DX11**
- Replace sensor unit

If error messages are present, please implement the measures according to the displayed error message.

"Command"

A timeout occurred at the sensor unit during a command on the DX11 exposure. If no further error messages (see title bar of Easypad) occur, please implement the following tests and measures:

- Restart unit perform self test once again.

If the error re-occurs:

- Check connecting cable **L83** between board **DX1** and the sensor unit.
- Replace board **DX11**
- Replace sensor unit

If error messages are present, please implement the measures according to the displayed error message.

11.12.7 S037: Network service

SR*	SA**	Function
S037		Network service
S037.1	No	Displaying the network data
S037.2	yes	Setting the default IP address, default gateway address and default subnet mask
S037.3	yes	Configuring boot mode: DYNAMIC (DHCP/AutoIP) / STATIC (fixed address)
S037.4	yes	Manual input of static network settings (IP address, default gateway address, and subnet mask)

* SR=service routine, ** SA=security access

11.12.7.1 S037: Test step 1

Displaying the network data

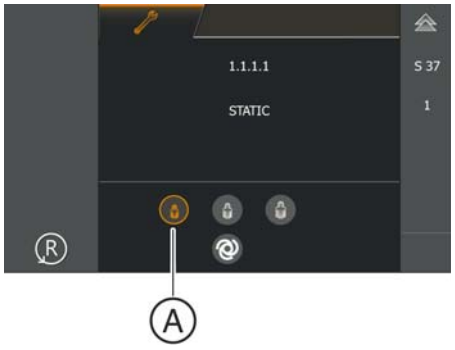
If all network data is set to default, the system is in UDP boot mode.

Symbol on the control panel	Status	Meaning
Patient symbol key 1 (A)	lit	The IP address is displayed in selection field 1*
Patient symbol key 2 (B)	lit	The default gateway is displayed in selection field 1
Patient symbol key 3 (C)	lit	The subnet mask is displayed in selection field 1

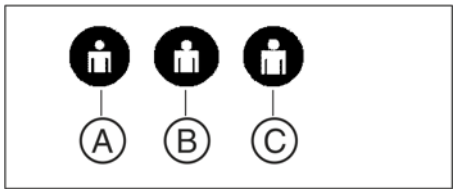
* factory settings

Selection field	Parameter/Display	Meaning
1	IP address, default gateway, or subnet mask of the unit	
2	default	Fixed address*
	static	Fixed address, modified setting
	dynamic	Automatic address assignment

* factory settings



1. Call service routine S037.1.
   - Once the service routine has been selected, the IP address of the unit is displayed in selection field 1 (see table).
   - "Default", or "static" or "dynamic" is displayed in selection field 2 (see table).



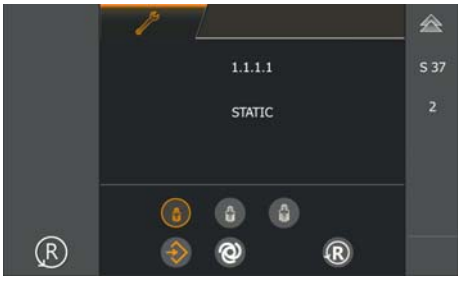
2. You can display various items of network data in selection field 1 by pressing the patient symbol keys (A, B, or C) (see table).
   - The patient symbol key selected in each case lights up.
3. Exit the service routine.

11.12.7.2 S037: Test step 2

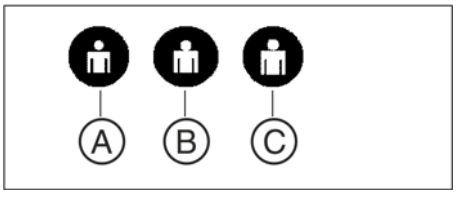
Setting the default IP address, default gateway address and default subnet mask

IMPORTANT
The network address can only be restored to the factory setting (default value) in fixed address boot mode (STATIC or no DHCP).

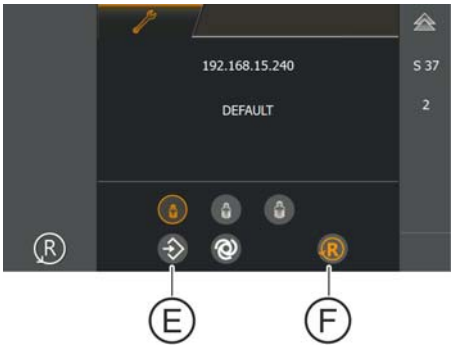
Symbol on the control panel	Status	Meaning
Patient symbol key 1 (A)	lit	The IP address is displayed in selection field 1*
Patient symbol key 2 (B)	lit	The default gateway is displayed in selection field 1
Patient symbol key 3 (C)	lit	The subnet mask is displayed in selection field 1



1. Call service routine S037.2.
   - Once the service routine has been selected, the network data is displayed as in test step 1 [→ 167].
   - The Memory key and the R key also become visible.
   - The Memory key lights up.



2. Use the patient symbol keys (A, B, or C) to check the network data existing in the system prior to the restore operation (see table).
   - The patient symbol key selected in each case lights up.



3. To reset the network data, press the Memory key (E) (R key lights up) followed by the R key (F).
   - The default network data (factory default setting) is displayed. To toggle the display of the various items of network data, proceed as in test step 1 [→ 167].
4. Exit the service routine.
5. Perform a restart of the unit.

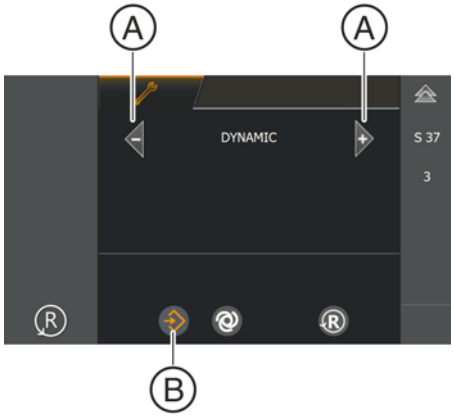
11.12.7.3 S037: Test step 3

Configuring boot mode

Selection field	Parameters	Meaning
1	DYNAMIC	Automatic address assignment (DHCP/AutoIP)
	STATIC	Fixed address*

* Factory setting

1. Call service routine S037.3.
   ↳ Once the service routine has been selected, the current boot mode of the unit is displayed in selection field 1.



2. Use arrow keys (A) to select the required boot mode "automatic address assignment" (DYNAMIC) or "fixed address" (STATIC) in selection field 1 (see table).
   ↳ The Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.

11.12.7.4 S037: Test step 4

Manual input of static network settings (IP address, default gateway address, and subnet mask)

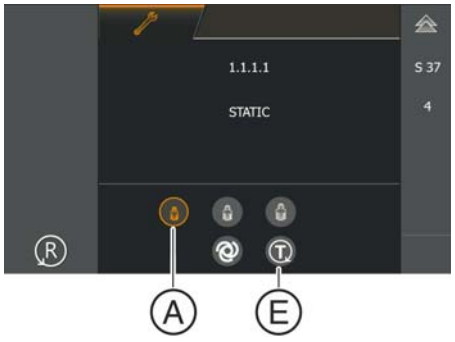
This service routine cannot run in DYNAMIC mode (T key is blocked).

Symbol on the control panel	Status	Function
Patient symbol key 1 (A)	lit	The IP address is displayed in selection field 1*
		or - after pressing the T key - number pad B1 is selected
Patient symbol key 2 (B)	lit	The default gateway is displayed in selection field 1
		or - after pressing the T key - number pad B2 is selected
Patient symbol key 3 (C)	lit	The subnet mask is displayed in selection field 1
		or - after pressing the T key - number pad B3 is selected
Patient symbol key 4 (D)		or - after pressing the T key - number pad B4 is selected

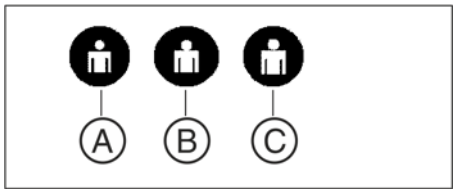
* factory settings

Selection field	Parameter/Display	Meaning
1	IP address, default gateway, or subnet mask of the unit	
	or - after pressing the T key - selected digit	
2	default	Fixed address*
	static	Fixed address, modified setting
	dynamic	Automatic address assignment

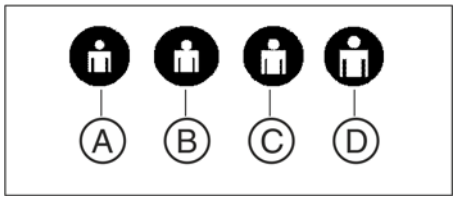
* factory settings



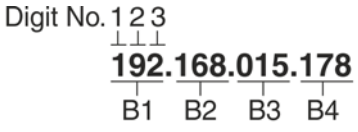
1. Call service routine S037.4.
   - Once the service routine has been selected, the IP address of the unit is displayed in selection field 1.
   - "DEFAULT", or "STATIC" or "DYNAMIC" is displayed in selection field 2 (see table).

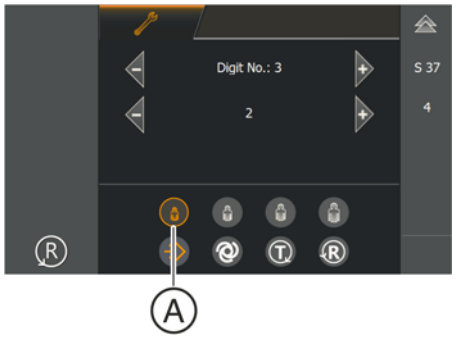


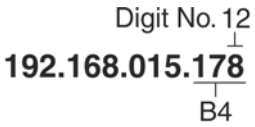
2. You can display various items of network data in selection field 1 by pressing the patient symbol keys (A, B, or C) (see table).
   - The patient symbol key selected in each case lights up.
3. To change the selected parameter, first press the T key (E).

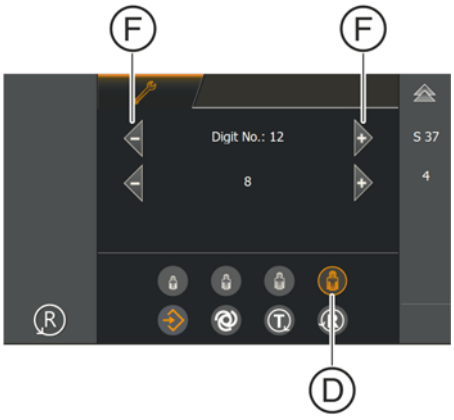


4. Now use the patient symbol keys to select the required number pad 1-4 (A-D) (see also table):
   A = Number pad B1
   B = Number pad B2
   C = Number pad B3
   D = Number pad B4
   - The patient symbol key selected in each case lights up.
   - The digit currently selected for changing is displayed in selection field 1 ("Digit No. 3" in the example).
     Important: The number of the digit always refers to the currently selected number pad.
   - The current value of the corresponding digit is displayed in selection field 2 ("2" in the example).

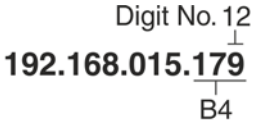


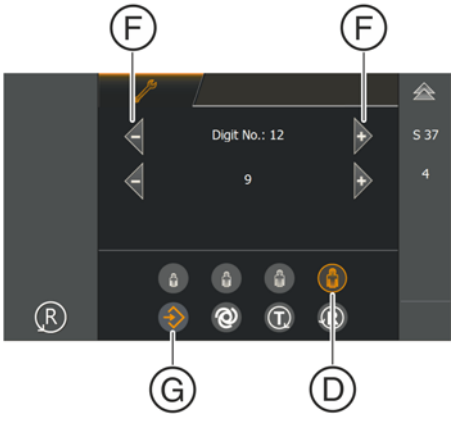






5. Use the arrow keys (F) to select the digit to be changed in selection field 1 ("Digit No. 12" in the example).
   - The corresponding patient symbol key (D) lights up.
   - Selection field 2 displays the value of the currently selected digit.





6. To change the value for the digit, use arrow keys (F) in selection field 2.
   - The Memory key (G) lights up.
7. Save the setting.
8. Exit the service routine.
9. Perform a restart of the unit.

11.12.8 Running service routines via the web service

NOTE: The web service is only available in English

NOTE: The following service routines can be run using the Sirona Web service:

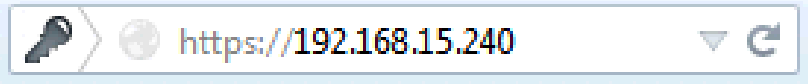
In the main menu *"Service"*

- S008.2: Overview of module software versions
- S008.3: Confirming the unit serial number
- S017.2: Configuring the hardware version
- S017.3: Enter the country group code
- S017.4: Select a language
- S017.6: Activating / deactivating the remote control
- S017.8: Selecting the kV/mA level series
- S017.13/S017.14: Enable/disable the welcome screen or the lines in the welcome screen
- S017.15: Activate/deactivate the acoustic signal for end of exposure
- S017.18: Activation/deactivation of occlusal bite block function
- S037: Manual input of static network settings (IP address, default gateway address, and subnet mask)

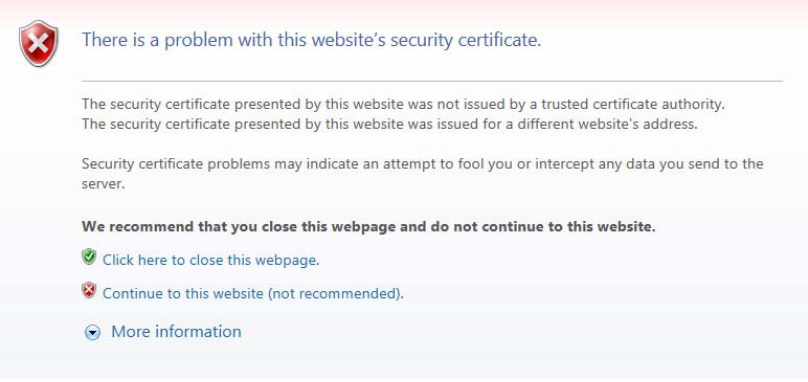
✓ The unit and computer are turned on.

✓ The unit is logged into the network as an X-ray component.

1. Start an Internet browser such as Internet Explorer or Firefox.



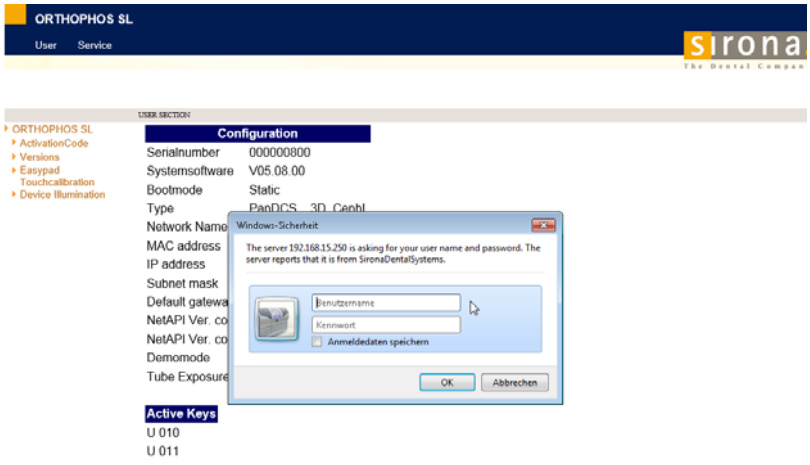
2. In the address line, enter "https://" and the IP address of your unit.
   Example: https://192.168.15.240
   NOTICE! The IP address of your unit can be found on the Info screen.
3. Confirm your input with the "Enter" key.



↳ A security prompt appears.

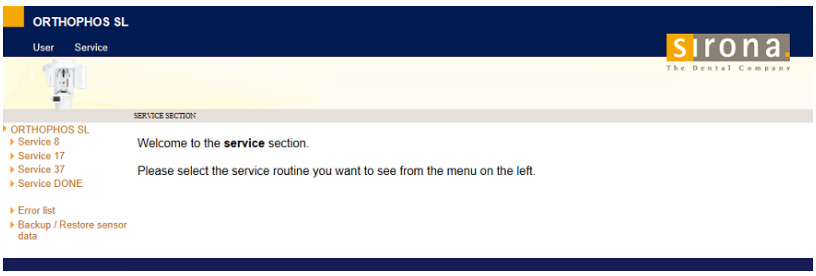
4. Click on the link *"Continue to this Website"*.
   ↳ The Sirona Web service is loaded.
   ↳ The sub menus of the *"User"* menu are displayed in the structure tree.

5. Click on the *"Service"* button in the header line of the main menu.



   ↳ The dialog box for entering the access data opens.

6. Enter the following access data:
   Username: “service”
   Password: "sirona"
7. Confirm your entry by clicking the *"OK"* button.
   NOTE: As long as you are logged in to the web service, the operation of the unit via the control panel is locked.



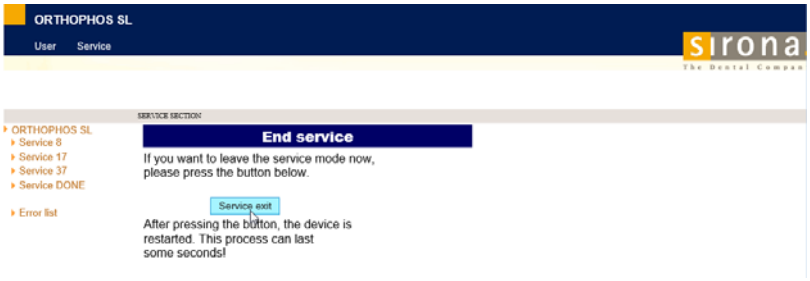
↳ The sub menus of the *"Service"* menu are displayed in the structure tree.

8. Select the desired service routine in the structure tree, e.g. S008.3.

↳ The service routine, e.g. S008.3 is displayed.
NOTE: In terms of entry or setting options, the service routines of the Web service correspond to the service routines that can be called using the control panel (see chapter “Perform service routines via the control panel”).

9. Enter the desired parameters in the service menu and confirm the entries by clicking the *"Submit Changes"* button.
↳ The settings are accepted.

10. Follow the same approach for the next service routine.



11. Once you have made all of the necessary settings, exit the Web service again.
To do this, click on the *"Service DONE"* button in the structure tree and then on the *"Service Exit"* button in the following menu.

IMPORTANT
Until the connection to the web service is removed using the *"Service Exit"* button, the operation of the unit with the user interface remains blocked.

12 Startup, measurements and tests (for USA/ Canada only)

12.1 Safety

NOTICE

Qualifications of service personnel

Installation and startup may be carried out only by personnel specifically authorized by Sirona.

⚠ WARNING

Perilous shock hazard!

You must switch off the unit and then wait at least 1 minute, for measurements at the tube assembly at least 4 minutes, before you start to connect test cables or remove a cover!
For measurements in the area of the power supply terminal, the unit must be disconnected from the junction box of the building installation before you start to connect test cables!

⚠ DANGER

X-rays

When performing the following tests, be sure to observe the radiation protection regulations applicable in your country (see Operating Instructions).

⚠ DANGER

X-rays

"Radiation" is signaled by the message "X-RAY active!", a beep, and an X-ray LED.

NOTICE

Risk of damage to boards

Please observe the usual precautionary measures for handling printed circuit boards (ESD). Touch a ground point to discharge static electricity before touching any boards.

IMPORTANT

It is essential that you also observe the notes about the operation of the unit in the Operating Instructions.

12.2 Operation notes

Nominal line voltage

The unit operates in the following nominal line voltage ranges:

- 200 – 240 V
- 50/60Hz

The permissible line voltage fluctuation is ±10%.

The internal line impedance must not exceed 0.8 Ω.

Only permanent electrical connection of the unit is allowed.

IMPORTANT
The regulation "Federal Performance Standard for Diagnostic X-ray Units, Code of Federal Regulations, Title 21 CFR, Subchapter J" requires a corresponding power supply connection.

Cooling period

The cooling period between two exposures is maintained by an automatic exposure blocking function according to the pulse/pause ratio (see Operating Instructions). The decrementing waiting time count is displayed on the control panel.

Measurements

Always switch the unit off before connecting a measuring instrument.

For safety reasons, the power supply should be switched off at the junction box of the building installation when performing measurements in the vicinity of the power supply unit.

Select the correct current/voltage type and adjust the measuring range to match the expected readings.

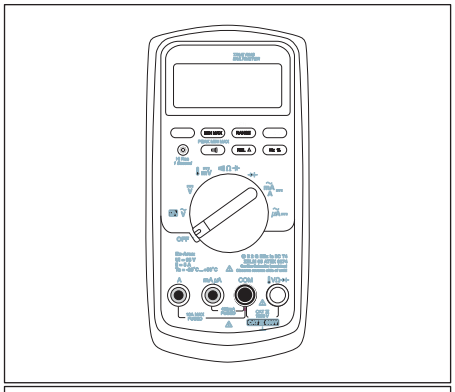
Perform continuity tests only on units which are switched off.

If several exposures with radiation must be taken to check a measurement, make sure that the prescribed cool-down intervals are observed. They are maintained by an automatic exposure blocking function (see Operating Instructions).

The pulse/pause ratio is 1:20, i.e. a 20-second pause is maintained for each second of radiation cycle. The pulse/pause ratio is automatically maintained (automatic exposure blocking).

It is essential that you observe the radiation protection regulations applicable in your country prior to radiation release.

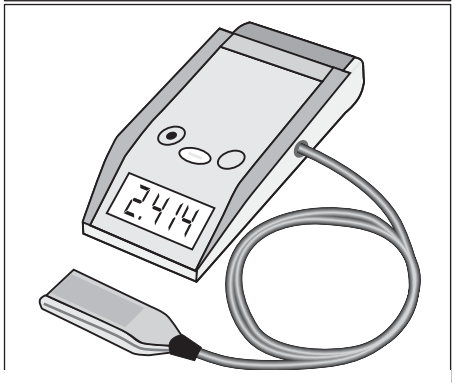
12.3 Auxiliary devices required



⚠ CAUTION

Only use a battery-operated digital multimeter with safety sockets.
It is essential that you observe the safety and operating notes provided in the operating instructions of the multimeter.

- Battery-operated digital multimeter of type:
  - Fluke 8000 A
  - Philips PM 2816 rms
  - or similar



⚠ CAUTION

It is essential that you observe the safety and operating notes provided in the operating instructions of the dosimeter.

- Dosimeter for pulsed radiation of type:
  - Mult-O-Meter 512L
  - or similar

⚠ CAUTION

Use exclusively fully insulated measuring wires.
Check the measuring wires for damages before use.

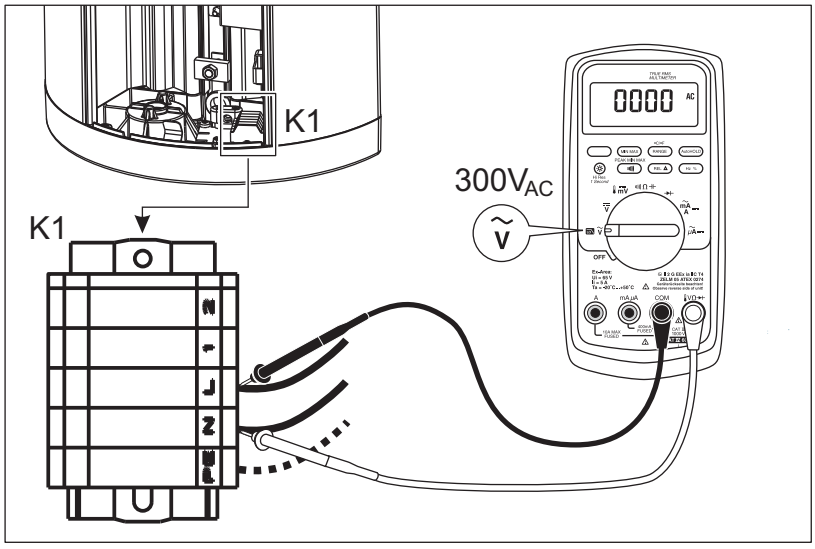
- Measuring wires with the following properties:
  - dielectric strength > 1000V

12.4 Checking the power supply connection

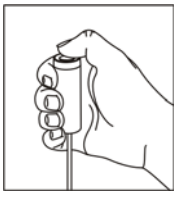
To check the line voltage, the *line voltage drop* must be determined while creating an X-ray. To do this, proceed as follows:

Preparing the measurement

1. **DANGER! After disconnecting the unit from the junction box of the building installation, wait at least 1 minute before starting to check the line voltage!**
   Disconnect the unit from the junction box of the building installation.
2. Remove the "Bottom profile" cover (see Service Manual).



3. **CAUTION! Only use fully insulated measuring wires.**
   Connect the measuring wires as shown in the illustration to the connectors **L** and **N** of the power supply terminal **K1**.
4. On the multimeter, select the voltage measuring range "300 V_{AC}".
5. Re-attach the unit to the junction box of the building installation.
6. **DANGER! Do not touch any live components!**
   Set the main switch (A) to I (see also Operating Instructions).
7. Wait for approx. 1 minute.
8. Press the R key.
   ↳ The unit moves to its starting position.



Performing and analyzing a measurement

1. Set the highest kV/mA level, e.g. **90kV/12mA** (see Operating Instructions).
2. Make the SIDEXIS 4 ready for exposure.
3. **CAUTION! Activating the release button triggers X-rays.**
   Activate the release button and take the voltage drop reading on the multimeter display.
   - If the measured voltage drop does *not fall within the permissible tolerance range* (see the following table), notify the customer that a suitable line voltage (according to the notes listed in the Installation Requirements) must be installed.

IMPORTANT
In such a case, the unit must be switched off immediately and disconnected from the junction box of the building installation. It must not be placed in operation!

   - If the measured voltage drop falls within the permissible tolerance range (see the following table), finalize the measurement.

Permissible voltage drop:

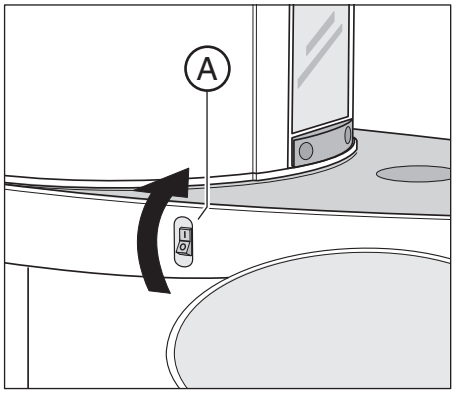
Line voltage, with zero load	Max. permissible line voltage drop
180-208 V	9 V
208-230 V	8 V
230-240 V	7.5 V
240-264 V	7 V

Concluding the measurement

1. Switch the unit on via switch (A) (see also Operating Instructions).
2. Disconnect the unit from the junction box of the building installation.
3. **DANGER! Wait at least 1 minute after disconnecting the unit from the junction box of the building installation before removing the measuring wires!**
   Remove the measuring units from the unit.
4. Re-attach the "Bottom profile" cover to the unit.

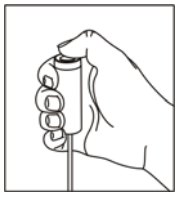
12.5 Checking the tube voltage

Preparing the measurement



1. Attach the Mult-O-Meter sensor in the middle of the sensor unit (DCS-side).
2. Set the main switch (A) to **I** (see also Operating Instructions).
3. Wait for approx. 1 minute.
4. Press the R key.
   ↳ The unit moves to its starting position.

Performing measurements



1. Select the **P1** program (see Operating Instructions).
2. Set the kV/mA level **62 kV/8 mA** (see Operating Instructions).
3. Make ready for exposure in SIDEXIS 4 (see Operating Instructions).
4. **CAUTION! Activating the release button triggers X-rays.**
   Start the exposure by pressing the release button. Hold down the release button until image acquisition is completed and the acoustic signal that indicates the end of the exposure can be heard.

Analyzing measurements

➢ Read the voltage values on the display of the Mult-O-Meter.

IMPORTANT
The measured tube voltage must correspond with the tube voltage set of 62 kV. The permissible tolerance is ± 10 %.

↳ If the measured values *do not fall within the permissible tolerance range*, replace the *tube assembly* (see Service Manual).

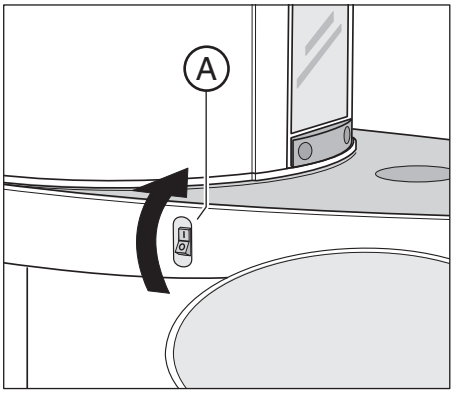
↳ If the measured values are within the permissible tolerance range, finalize the measurement.

Concluding the measurement

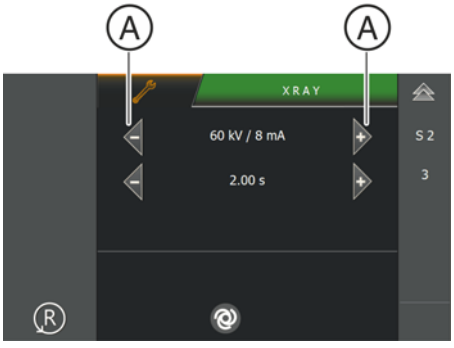
➢ Switch the unit on via switch (A) (see also Operating Instructions).

12.6 Checking the radiation time

Preparing the measurement

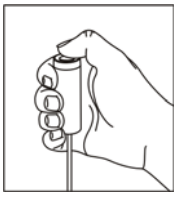


1. Attach the Mult-O-Meter sensor in the middle of the sensor unit (DCS-side).
2. Set the main switch (A) to **I** (see also Operating Instructions).
3. Wait for approx. 1 minute.
4. Press the R key.
   - The unit moves to its starting position.



5. Call the Service menu and the Service routine S002.3 (see Service Manual).
6. Use the arrow keys (A) in *selection field 1* to select the kV/mA level **60 kV/8 mA**.
7. Use the arrow keys (A) in *selection field 2* to select the radiation time **0.5 s**.

Performing measurements



➢ Initiate the radiation. Hold the release button pressed until the set radiation time has expired.

Analyzing measurements

➢ Read the radiation time on the Mult-O-Meter.
- The value for the radiation time displayed on the Mult-O-Meter must correspond to the radiation time of **0.5s** selected in the service routine. The permissible tolerance is ± 10 %.
- If the measured radiation time does *not* fall within the permissible tolerance, replace the *tube assembly* (see Service Manual).
- If the measured radiation time falls within the permissible tolerance, finalize the measurement.

Concluding the measurement

1. Exit the service routine.
2. Switch the unit on via switch (A) (see also Operating Instructions).

12.7 Checking the tube current

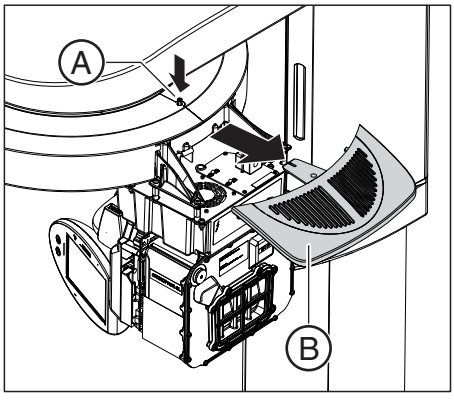
NOTICE

Damage to the measuring unit

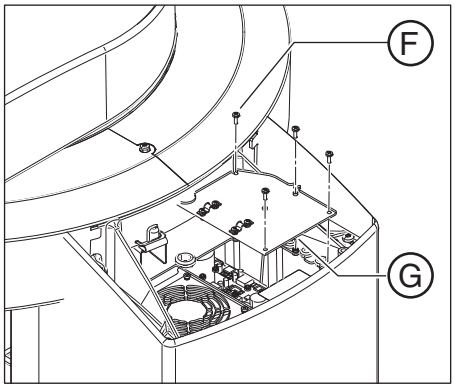
The ring assembly and the tube assembly move during the measurement.
Make sure that the measuring wires are sufficiently long to allow for the ring movement and that the measuring unit is in a secure position so that it will not fall down.

Preparing the measurement

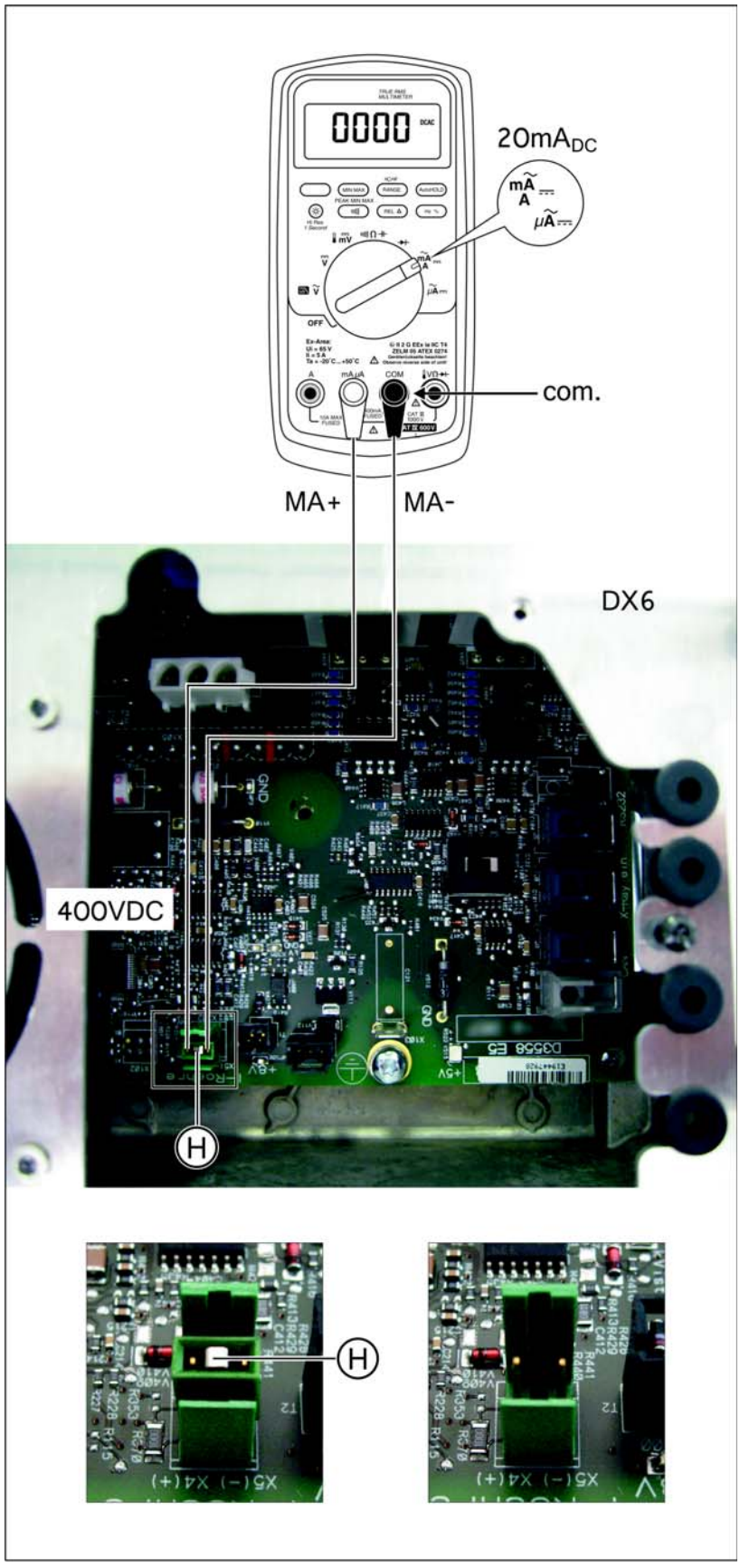
1. Switch off the unit (see Operating Instructions).
   DANGER! After switching off the unit, wait at least 4 minutes (LED V500 on the DX6 must no longer be on) before removing the cover on the tube assembly.



2. Loosen the screw (A) and remove the lid of the tube assembly cover (B).



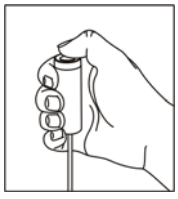
3. Loosen the 4 screws (F) and remove the cover plate (G).


0000
20mA DC
com.
MA+
MA-
DX6
400VDC
H
H

4. **DANGER! After switching off the unit, wait at least 4 minutes (LED V500 on the DX6 must no longer be on) before removing jumper H from the DX6 board.**
   Remove the jumper (H) from connector **X302** on the **DX6** board.
5. **DANGER! Only use fully insulated measuring wires.**
   Connect the digital multimeter with the measuring wires to test points **MA-** (X5-) and **MA+** (X4+) at connector **X302** on the **DX6** board.
6. On the multimeter, select the **current measuring range 20 mA DC**.
7. **NOTICE! If the lid of the tube assembly cover is not attached, the ring circulation is impeded and the unit can be damaged.**
   Temporarily install the lid of the tube assembly cover on the unit using the screw.
8. **DANGER! Do not touch any live components!**
   Set the main switch (A) to **I** (see also Operating Instructions).
9. Wait for approx. 1 minute.
10. Press the R key.
    ↳ The unit moves to its starting position.

Performing measurements

1. Select the **P1** program (see Operating Instructions).
2. Set the highest kV/mA level, **66 kV/8 mA** (see Operating Instructions).
3. Make ready for exposure in SIDEXIS 4 (see Operating Instructions).



4. **CAUTION! Activating the release button triggers X-rays.**
   Start the exposure by pressing the release button. Hold down the release button until image acquisition is completed and the acoustic signal that indicates the end of the exposure can be heard.

IMPORTANT
1 mA corresponds to a tube current of 1 mA. The permissible tolerance is ± 20 %.

Analyzing measurements

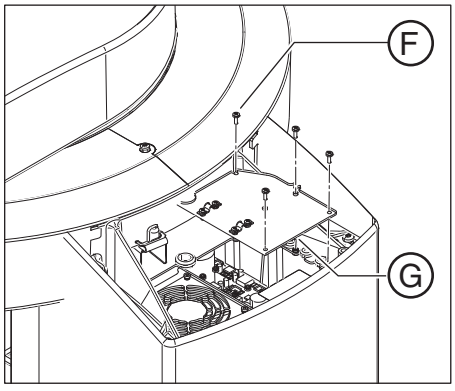
➢ Read the voltage value on the display of the multimeter.

↳ The tube current must be **8 mA ± 1.6 mA**.

↳ If the measured value does *not* fall within the permissible tolerance, replace the *tube assembly* (see Service Manual).

↳ If the measured value falls within the permissible tolerance, conclude the measurement.

Concluding the measurement



1. Switch the unit on via switch (A) (see also Operating Instructions).
2. Loosen the screw and remove the lid of the tube assembly cover.
3. **DANGER! After switching off the unit, wait at least 4 minutes before removing the measuring wires or reinserting the jumper!**
   Remove the measuring wires and bridge with the **test points MA+/ MA-** on the **DX6** board again with the jumper (H).
4. Reattach the cover plate (G) to the tube assembly with the 4 screws (F).
5. Reattach the lid of the tube assembly cover to the unit and secure it with the screw.

12.8 Checking the laser light localizers

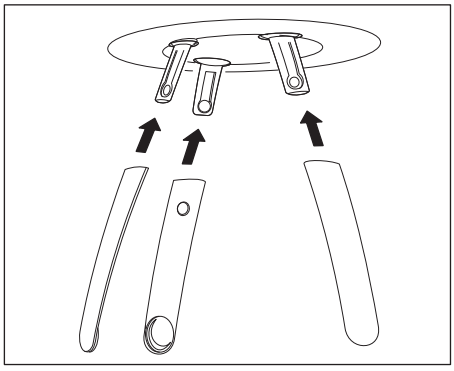
⚠ CAUTION

Risk of injury to eyes.

The unit contains lasers of Class 1.
Keep a distance of at least 4" (10 cm) between eye and laser. Do not look into the laser beam.

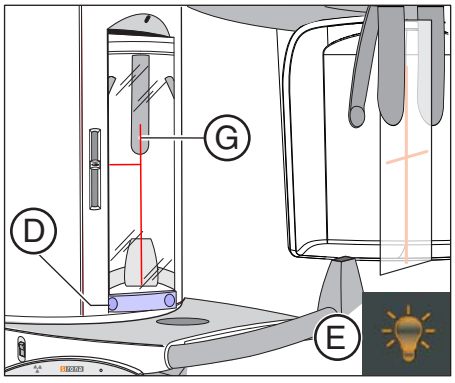
Checking the laser light localizers

Preparing the test



1. Insert the forehead and temple supports.
2. Set the main switch (A) to **I** (see also Operating Instructions).
3. Wait for approx. 1 minute.

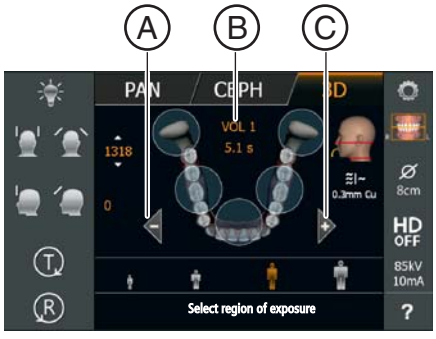
4. Touch the R key on the touchscreen.
   ↳ The unit moves to its starting position.



Checking the PAN laser beam

1. Affix a piece of white cardboard between the temple supports.
2. Rotate the mirror by pressing into the left depression (D) of the toolbar.
3. Touch the light localizer key (E) on the touchscreen.
   - ↳ The light localizers are switched on.
   - ↳ The laser beam is displayed on the cardboard by a red line.
   - ↳ The vertical laser beam (G) must be displayed in the center of the forehead support and the bite block holder. If this is not the case, adjust the laser light localizer.
   - ↳ The horizontal laser beam must be displayed horizontally. If this is not the case, adjust the laser light localizer.
4. Press on the light localizer key again.
   - ↳ The light localizer is switched back off again.

Checking the 3D laser beam



1. Touch the 3D symbol at the top of the touchscreen.
   - ↳ The 3D program group is selected.
2. Select the exposure program. Press the arrow keys **+** (C) and **-** (A).
   - ↳ The exposure program is displayed in the program display (B).

3. Touch the R key on the touchscreen.
   - ↳ The diaphragm and the sensor move into the starting position for volume exposures.

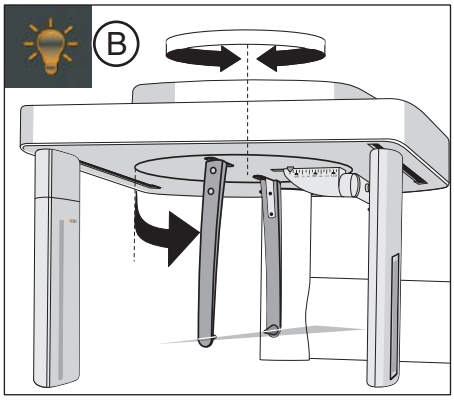
4. Touch the light localizer key on the touchscreen.
   - ↳ The light localizers are switched on.
   - ↳ Depending on a preselected program and collimation, the light beams show the upper and lower edges of the volume.

VOL1 VOL1 HD	Volume exposure with a diameter of approx. 8 cm and a height of approx. 8 cm or 5.5 cm collimated.
VOL2 VOL2 HD	Volume exposure with a diameter of about 5 cm and a height of about 5.5 cm for upper **or** lower mandible
VOL3 VOL3 HD	Volume exposure with a diameter of about 11 cm and a height of about 10 cm or selection of upper quadrant collimated to 7.5 cm and selection lower quadrant collimated to 8.0 cm

5. Select the different volume programs one after the other with different collimations and measure the distance of the light beams.
   - Minimum and maximum distances apply between the laser localizers.
   - Replace any light localizer that does not respond as desired.
6. Press on the light localizer key again.
   - The light localizer is switched back off again.

Checking the horizontal laser beam ceph (FH)

Tip: When checking or adjusting the light localizer, you may use a PA or AP position on the ear plugs to assess the light beam.



1. Touch the light localizer key (B) on the touchscreen.
   - The light localizers are switched on.
2. Check the position of the horizontal laser beam at the ceph.
   - The laser beam must run horizontally at the level of the ear plug position between the template supports. If this is not the case, adjust the laser localizer.
3. Press on the light localizer key again.
   - The light localizer is switched back off again.

13 Unit adjustment and calibration

⚠ DANGER

X-rays

When performing the following tests, be sure to observe the radiation protection regulations applicable in your country (see Operating Instructions).

⚠ DANGER

X-rays

"Radiation" is signaled by the message "X-RAY active!", a beep, and an X-RAY LED.

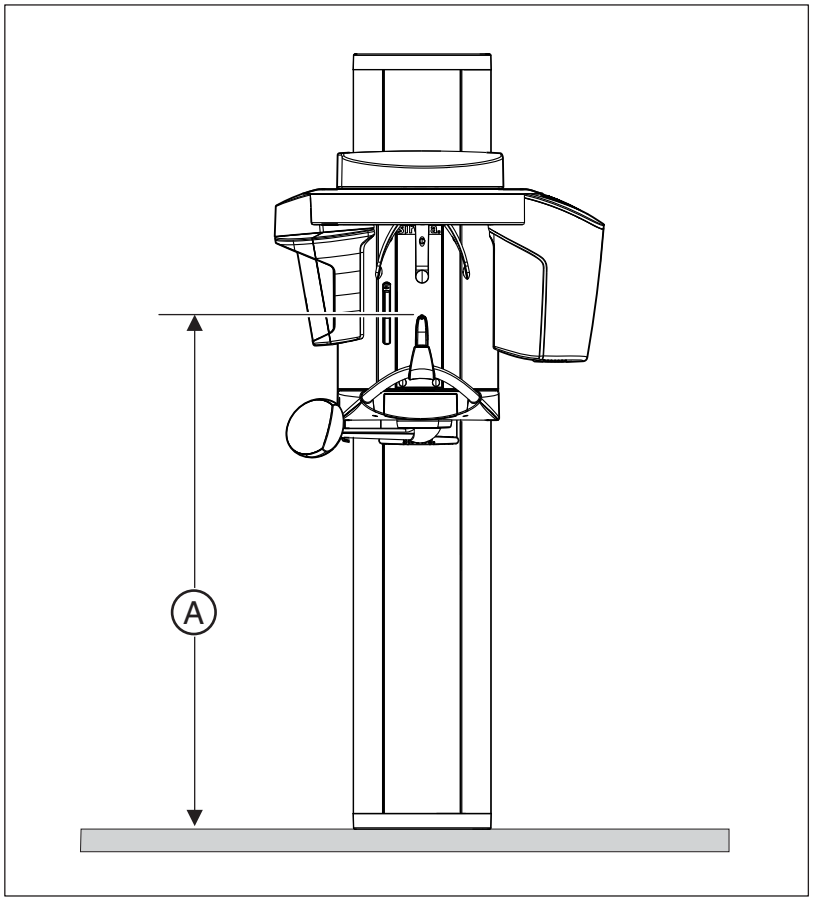
IMPORTANT

If you encounter problems with unit calibration, check whether the required EMC conditions have been met. No other heavy-duty electric equipment (e.g. air conditioning systems, fan motors, etc.) should be present in the vicinity of the unit.

IMPORTANT

After each unit adjustment and calibration a constancy check **must** be performed.

Tip: Move the unit to a typical working height (bite block height (A) = approx. 1,520 mm (60")) with the Up/Down keys on the control panel before commencing calibration.


A

13.1 General information on unit adjustment and calibration

Please adhere to the following order when adjusting and calibrating the system:

2D adjustment (panoramic)

- *"Sensor adjustment"*
- *"Diaphragm adjustment"*
- *"Symmetrie adjustment"*
- *"Sensor calibration (DCS)"*

If a cephalometer is installed:

- *"Adjustment of Ceph primary diaphragm"*
- *"Adjustment of Ceph secondary diaphragm"*
- *"Adjustment of Ceph secondary diaphragm (Quickshot)"*
- *"Adjustment of Ceph main beam direction"*
- *"Adjustment of earplug alignment"*

3D adjustment/calibration (volume)

- *"Sensor adjustment"*
- *"Diaphragm adjustment"*
- *"Sensor calibration"*
- *"Diaphragm calibration"*
- *"Geometry calibration"*
- *"Dose measurement"*

Tip: It may be helpful to use the coloring function on the calibration menu to evaluate exposures.

13.1.1 Displays and help messages during adjustment and calibration

The most frequent help and status messages during calibration are listed below.

Help messages

H3 01: Move unit to starting position, press the R key.

H3 07: Remove the occlusal bite block.

H3 21: Close the door

H4 02: Plug the sensor into the ceph slot (sensor missing).

H4 03: SIDEXIS 4 is not ready for exposure, make unit ready for exposure.

H4 04: Plug the sensor into the ceph slot (incorrect sensor plugged in).

Status messages

- *"Ready for exposure"*
- *"Exposure not possible"*
- *"Please wait"*
- *"Ready for exposure in XXs"*
- *"X RAY Active!"*
- *"Exposure is performed"*

If error message E1 11 20 is displayed on the control panel and/or the remote control during the calibration process, this does not necessarily indicate an equipment error. This error message only indicates that the adjustment or calibration data of the unit is incomplete at this point. Acknowledge the error message with the R key, if applicable, and continue the adjustment or calibration procedure.
For assistance with other help messages or error messages displayed during the adjustment or calibration process, please refer to the section of these instructions entitled “Messages”.

13.1.2 Calibration menu

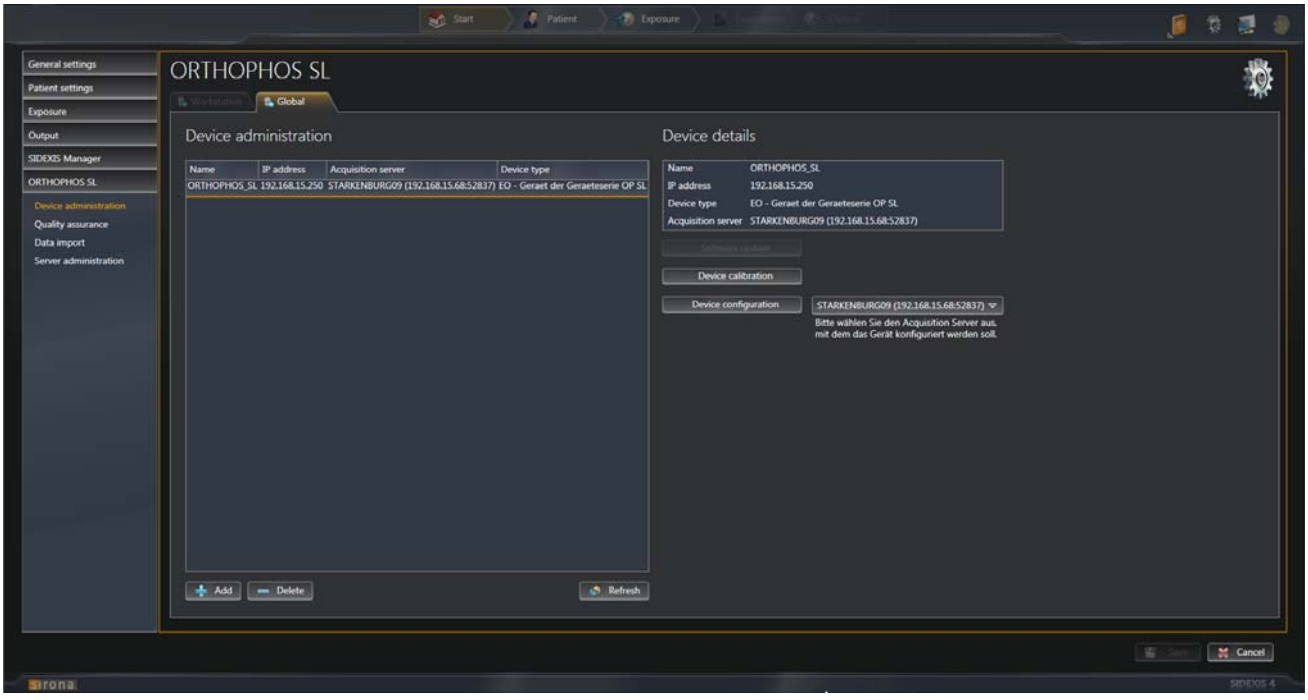
The menu guides you through the procedure to adjust and calibrate the unit.

13.1.2.1 Opening the calibration menu

✓ IT package is installed.

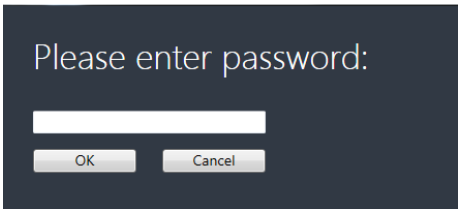
✓ is installed.

1. Start SIDEXIS 4.
2. In SIDEXIS 4, call the *"ORTHOPHOS SL"* / *"Device administration"* configuration menu.



Configuration menu "ORTHOPHOS SL" /"Device administration"

3. Select the desired X-ray component from the unit list.
4. Click on the *"Device calibration"* button.
   ↳ A dialog box to enter the service password opens.



5. Enter the service password (see section "Password protection") and confirm by pressing *"OK"*.
   ↳ The calibration menu opens.

Password protection

The calibration menu is password-protected. For the password, enter the first four digits of the current system date (PC) in reverse order. Example: On 25.03.2016, the service password is 3052.

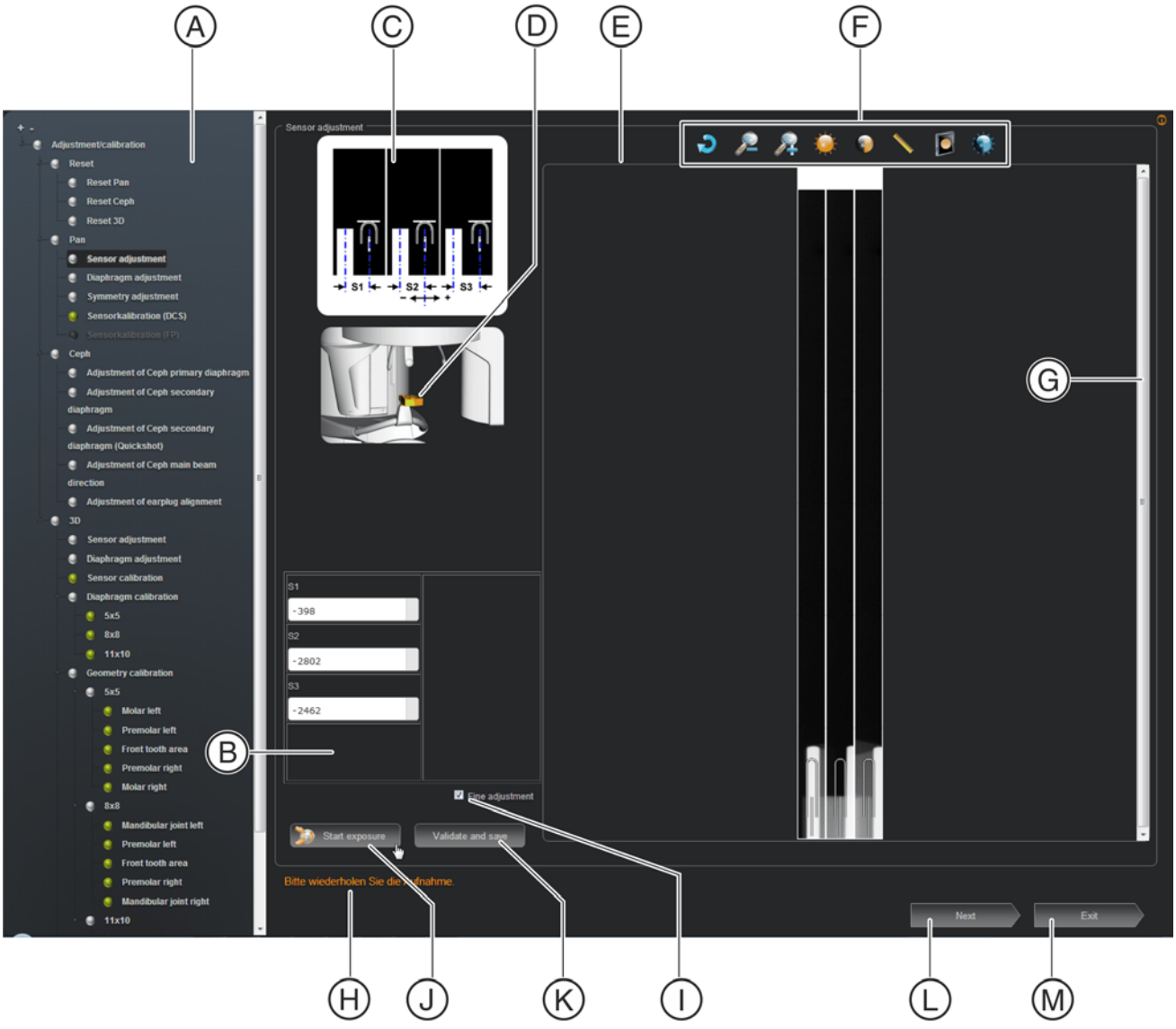
Service mode

When you open the calibration menu, the unit switches from user mode to the PC service mode blocked by the PC. In PC service mode, the control options that are available on the control panel are determined by SIDEXIS 4 and the service routine currently selected. General control of the unit by means of the control panel (as in the user mode) is not possible in this mode.

Service mode is displayed on the Easypad via the PC service image.

13.1.2.2 Menu structure

The menu is divided into different functional areas.



A	Navigation area	Structure tree for adjustment and calibration [→ 201]
B	Action area	Data entry and display window.
C	Preview image	Shows the exposure to be taken in this stage of the adjustment/ calibration procedure.
D	Tools pictograph	Shows which (if any) test phantom must be used for this stage of the adjustment/ calibration procedure.
E	Exposure window	Displays X-ray exposure
F	Toolbar	Tools to edit the X-ray exposure
G	Scroll bar	Scrolls within the exposure window
H	Message window	Shows messages and information about this stage of the adjustment/calibration procedure

In addition to the different areas, the menu also contains the following buttons:

I	*"Fine adjustment"*	Before the fine adjustment, and with the check box unchecked, a coarse adjustment is performed [→ 203].
J	*"Start acquisition"*	Creates exposure readiness [→ 209].
G	*"Validate and save"*	Saves the current adjustment/ calibration values.
H	*"Next"*	Switches to the next stage of the adjustment/calibration procedure.
I	*"Exit"*	Exits adjustment/calibration and closes the menu.

Toolbar functions

Button	Function
	Rotate exposure 90° clockwise.
	Reducing size of section
	Increasing size of section
	Adjusting the brightness
	Adjusting the contrast
	Measuring ruler
	Invert
	Color (false color)

13.1.2.2.1 Navigation area

The navigation area contains a structure tree similar to the one you will be familiar with from your Windows interface. The structure tree contains all stages of the adjustment and calibration procedure you need to complete in order to adjust and calibrate your system.

IMPORTANT: You must perform adjustment and calibration of the unit in the order as described in the section “General information on unit adjustment and calibration [→ 193]”.

Structure tree

Resetting adjustment/calibration and data backup

- *"Reset Pan"*
- *"Reset Ceph"*
- *"Reset 3D"*

2D adjustment (panoramic)

- *"Sensor adjustment"*
- *"Diaphragm adjustment"*
- *"Symmetrie adjustment"*
- *"Sensor calibration (DCS)"*

If a cephalometer is installed:

- *"Adjustment of Ceph primary diaphragm"*
- *"Adjustment of Ceph secondary diaphragm"*
- *"Adjustment of Ceph secondary diaphragm (Quickshot)"*
- *"Adjustment of Ceph main beam direction"*
- *"Adjustment of earplug alignment"*

3D adjustment/calibration (volume)

- *"Sensor adjustment"*
- *"Diaphragm adjustment"*
- *"Sensor calibration"*
- *"Diaphragm calibration"*
- *"Geometry calibration"*
- *"Dose measurement"*

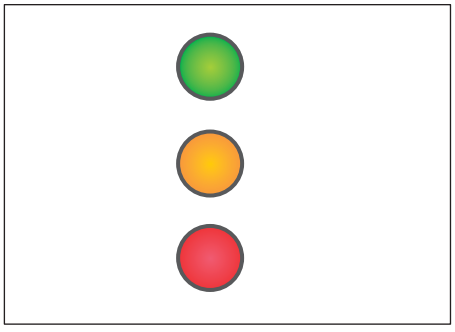
Validity of existing adjustment and calibration

The elements of the structure tree used for adjusting (calibrating) the unit are prefixed by status indicators indicating the current status of the corresponding adjustment or calibration operation.

Adjustment

Not checked	Invalid data record or no record present	Adjustment necessary
Checked	Valid data record, adjustment performed and saved (up to date)	No adjustment necessary

Calibration



Green	Valid data record; calibration is in progress.	No calibration required
Orange	Data record available, but not yet saved	Data record must be saved
Red	Invalid data record or no record present	Calibration required

13.1.2.2.2 Coarse and precision adjustment

The pan adjustment menus *"Sensor adjustment"* and *"Diaphragm adjustment"* and the Ceph adjustment menu *"Adjustment of Ceph secondary diaphragm"* support coarse and precision adjustment (precision adjustment is preset. Always try to use precision adjustment first when adjusting the unit. In most cases, previous coarse adjustment is not necessary.

A message window indicates that a coarse adjustment is required if necessary.

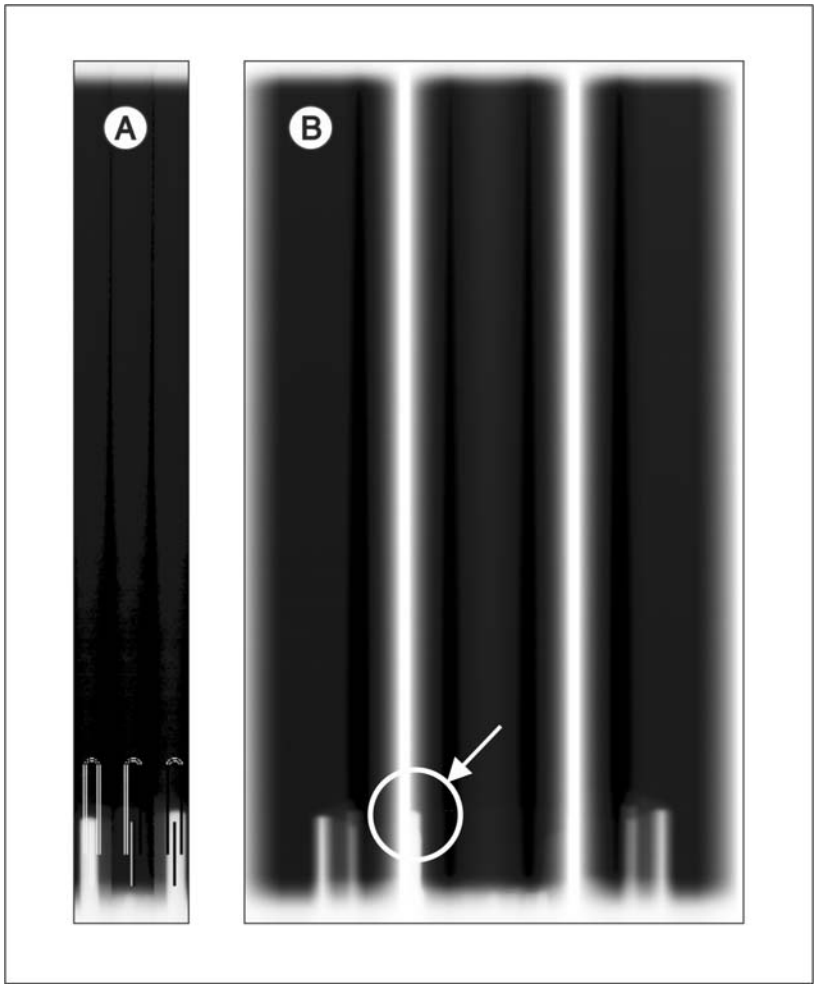
To perform coarse adjustment, uncheck the *"Fine adjustment"* box and complete the adjustment procedure in the same way as for precision adjustment.

The correction procedure required for coarse adjustment is identical to that for precision adjustment. The only difference between the two modes is the size of the image field considered. Furthermore, there are fewer auxiliary lines in the coarse adjustment mode.

Examples of image acquisition with precision and coarse adjustment

"Sensor adjustment"
(Pan - adjustment)

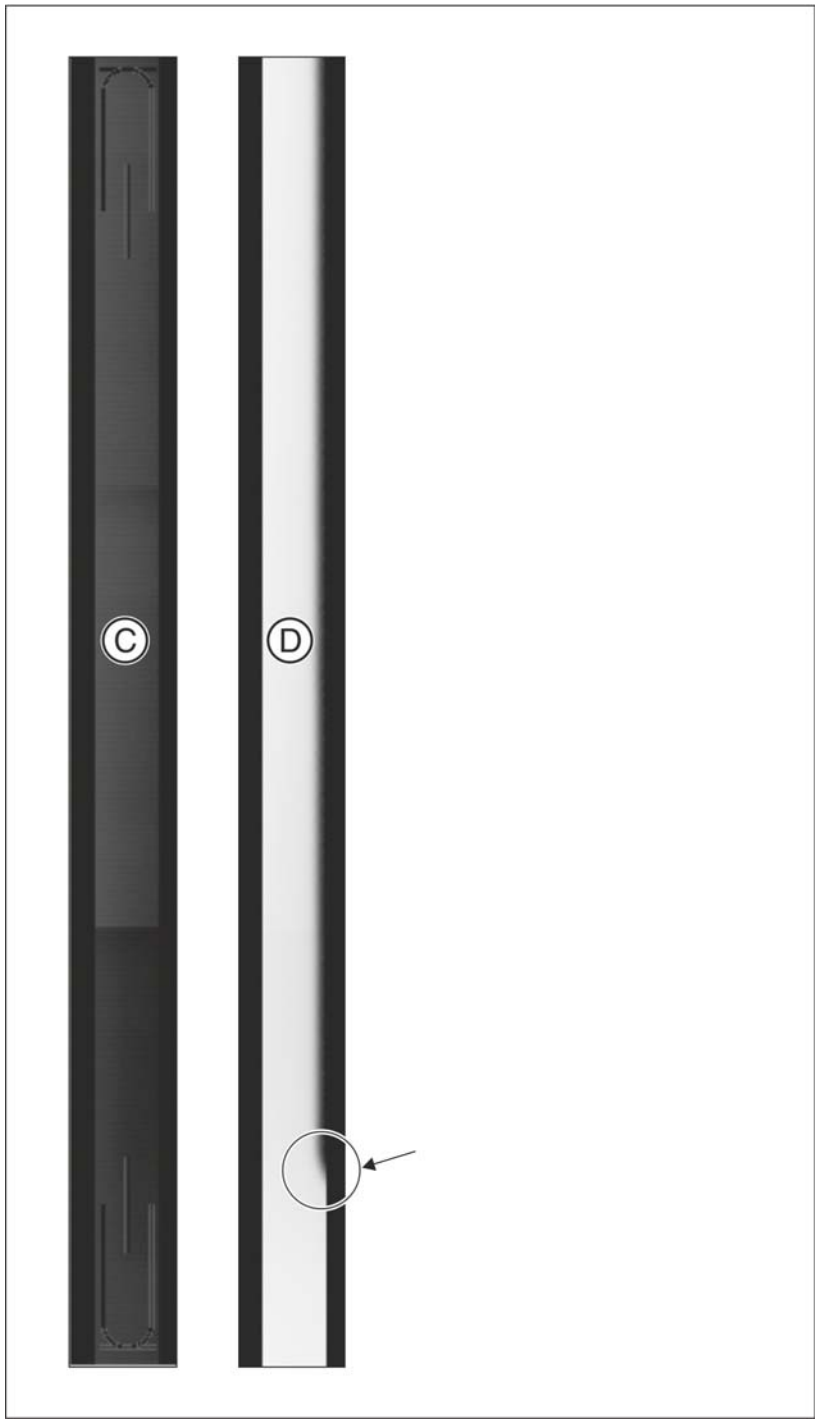
Sensor adjustment can usually be performed directly via precision adjustment. Only in exceptional cases, e.g. if one or several needles are completely outside of the image section in an image acquired with the *"Fine adjustment"* presetting (A), is it necessary to perform coarse adjustment prior to precision adjustment (B).



On the exposure with coarse adjustment (B), the center pin is just barely visible on the left margin of the image section in the middle. Even in this extreme case, an adjustment would still be possible.

"Diaphragm adjustment"
(Pan - adjustment)

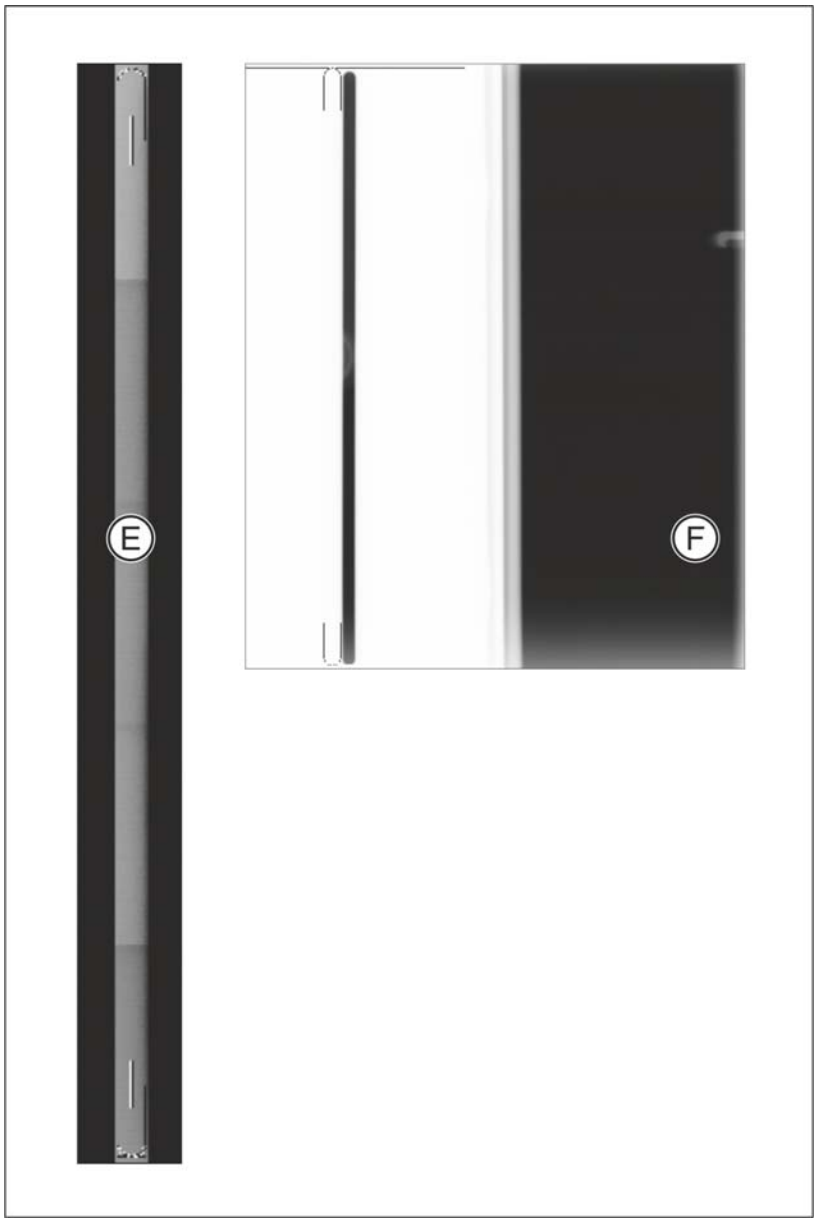
Diaphragm adjustment can usually be performed directly via precision adjustment. Only in exceptional cases, e.g. if the exposed image area is completely outside the image section in an image acquired with the *"Fine adjustment"* setting (C), is it necessary to perform coarse adjustment prior to precision adjustment (D).



On the exposure with coarse adjustment (D), the exposed area is just barely visible at the right margin of the image field. Even in this extreme case, an adjustment would still be possible.

"Adjustment of Ceph secondary diaphragm"
(Ceph - adjustment)

In most cases the ceph secondary diaphragm can be performed directly via precision adjustment. Only in exceptional cases, e.g. if the exposed image area is completely outside the image section in an image acquired with the *"Fine adjustment"* setting (E), is it necessary to perform coarse adjustment prior to precision adjustment (F).

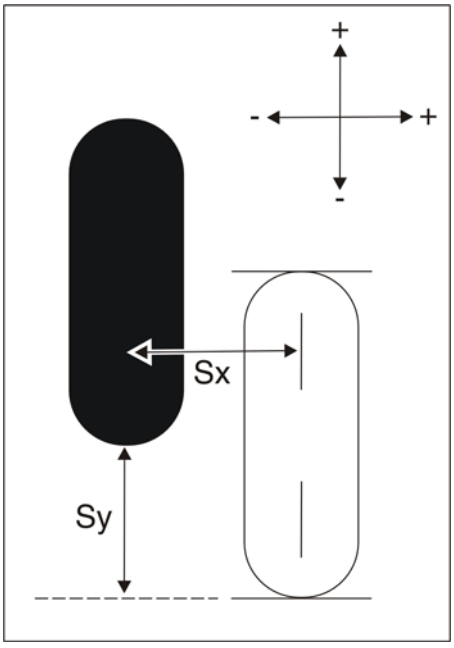


On the exposure with coarse adjustment (F), the exposed area is still visible in the image field. Even in this extreme case, an adjustment would still be possible.

13.1.2.2.3 Shifting direction of the exposed image area

The menus contain a pictographic representation of the expected adjustment image to help you perform software-based adjustment and calibration. The shifting direction indicated by the plus and minus signs located below and next to the pictograph refers to shifting of the exposed image section in the direction of the stationary auxiliary lines (see the example).

Example:



In the example, the exposed image section is offset to the left by the value **Sx** and upward by the value **Sy**. In order to shift the image field so that it comes to lie inside the auxiliary lines, you must enter …

- **Sx** (shift to the right) with a **positive sign**
- **Sy** (shift downward) with a **negative sign**

in the text boxes on the tab.

Generally speaking, the exposed image area must always be shifted toward the auxiliary lines:

- **Shift to the right** or upward: Enter the value (measured offset from the auxiliary line) with a **positive sign**.
- **Shift to the left** or downward: Enter the value (measured offset from the auxiliary line) with a **negative sign**.

13.1.2.2.4 Automatic adjustment

2D adjustment/calibration

During the automatic 2D adjustment via the calibration menu, default values for adjustment are displayed in the menu's text boxes after every exposure. Repeat automatic adjustment until the default values in the text boxes are equal to "zero". (This means that adjustment has been successful.)

If the values do not converge toward "zero" despite repeating the adjustment procedure several times, calculate the adjustment values manually by measuring the exposure with the toolbar measuring ruler and overwrite the default values in the menu. This procedure is described in the following sections.

3D adjustment/calibration

During the automatic 3D adjustment via the calibration menu, whether the adjustment was successful or must be repeated again is displayed in the message window in plain text.

13.1.3 Enabling exposure readiness

To take an exposure, the system must first be made ready for exposure.

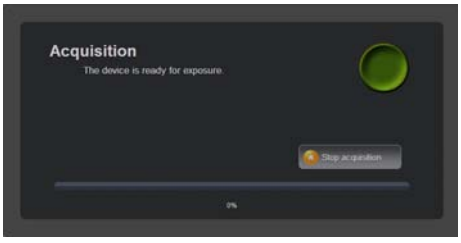
✓ The calibration menu must be opened [→ 195].

✓ Select the corresponding element in the structure tree.

➢ Click the *"Start acquisition"* button in the calibration menu.

↳ Exposure readiness will be established. A dialog window displays the status of readiness to exposure.

↳ The service routine used for the corresponding exposure is displayed on the control panel, along with the specific exposure parameters.



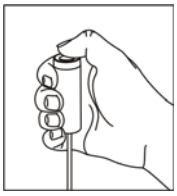
13.1.4 Taking an exposure

✓ The calibration menu must be opened.

✓ Select the corresponding element in the structure tree.

✓ The unit must be made ready for exposure [→ 209].

➢ Press the release button. Press and hold down the button until the exposure is complete, the X-ray image is displayed in the exposure window, and the acoustic signal indicating the end of the exposure (double beep) sounds (if configured [→ 146]).



13.1.5 Save values

✓ The adjustment and calibration must have been performed correctly.

➢ To save the adjustment and calibration values, click the *"Validate and save"* button in the calibration menu.

↳ The adjustment and calibration is saved.

↳ The saved adjustment and calibration is identified in the structure tree by a check mark (adjustment) or a green traffic light (calibration).

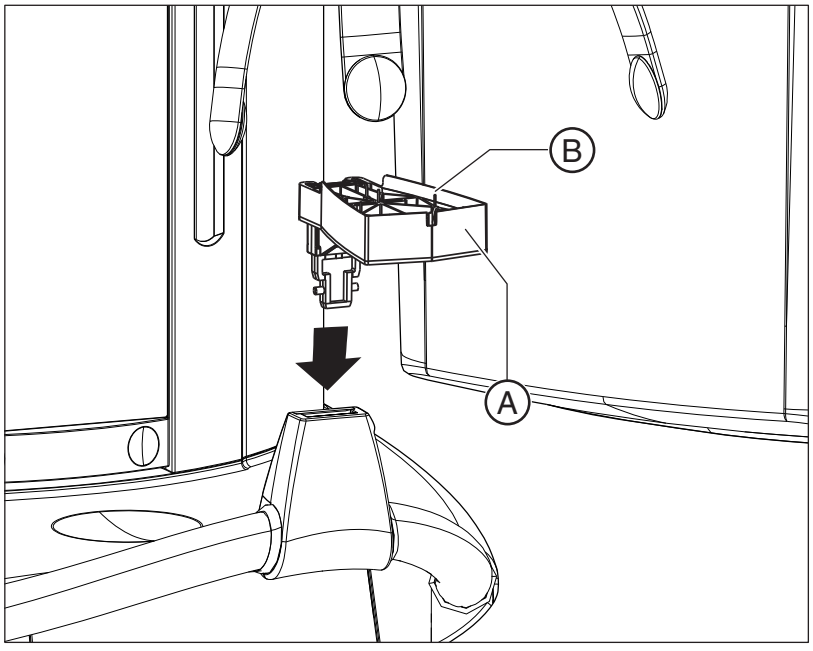
13.1.6 Test phantom for adjustment and calibration

13.1.6.1 Needle phantom for panoramic adjustment

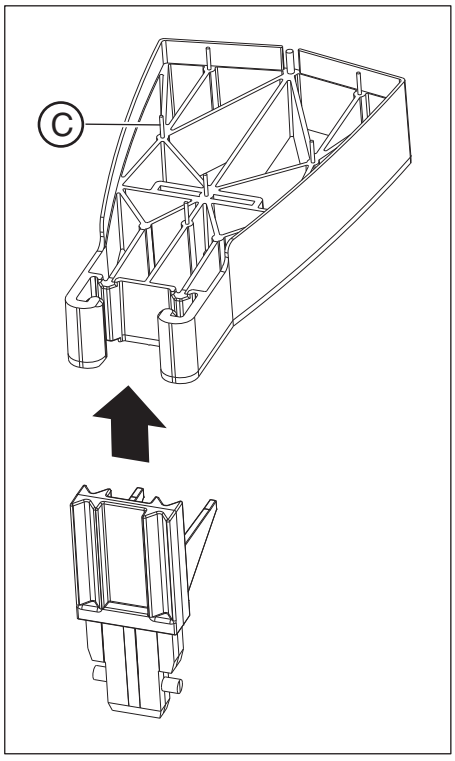
NOTICE

Risk of damage to unit

Make absolutely sure that the needle phantom is inserted into the bite block holder of the unit in such a way that the front needle (B) of the phantom points *away from the unit in the direction of the patient* (see figure). Otherwise, this can result in a collision between the sensor and the needle phantom and thereby damage the unit.

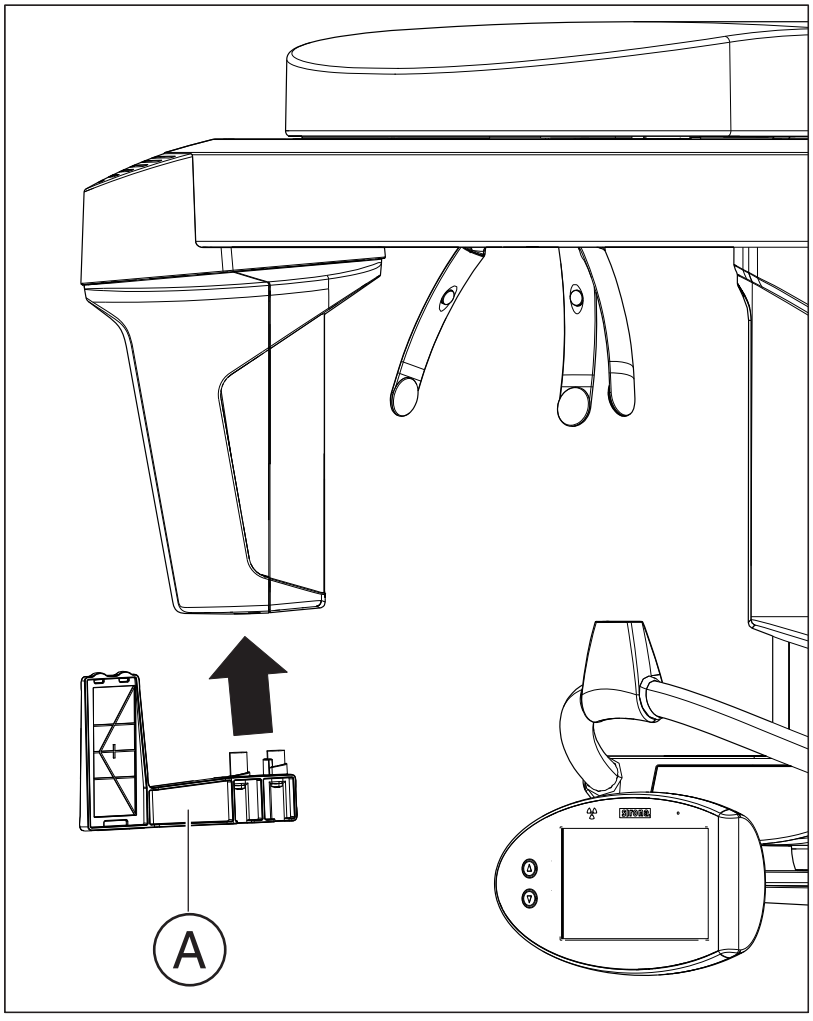


For *"Sensor adjustment"* and *"Symmetrie adjustment"* panorama adjustments, the needle phantom (A) must be inserted into the pan bite block holder of the unit. For *"Diaphragm adjustment"* panorama adjustment, the needle phantom must be taken out of the bite block holder.



When fitting the needle phantom, make sure that it is correctly oriented. For the panorama adjustment of the unit, the phantom must be fitted so that the needles (C) point upward.

13.1.6.2 Adjustment phantom for adjustment of the cephalometer



For *"Adjustment of Ceph primary diaphragm"* and *"Adjustment of Ceph main beam direction"* ceph adjustments, the ceph adjustment phantom (A) must be inserted into the sensor unit cover.

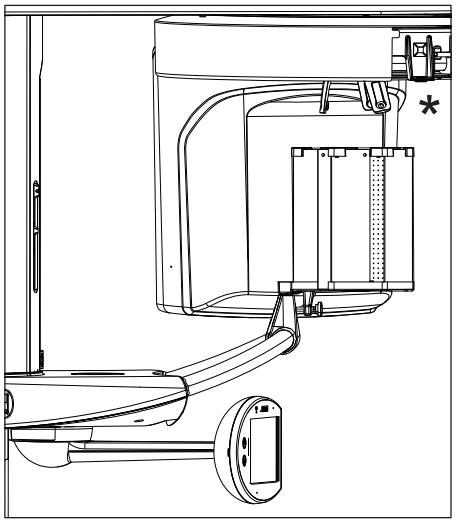
For the *"Adjustment of Ceph secondary diaphragm"* ceph adjustment, the ceph adjustment phantom must be removed from the sensor unit cover once again.

13.1.6.3 Geometry phantom for volume calibration

NOTICE

Risk of damage to unit

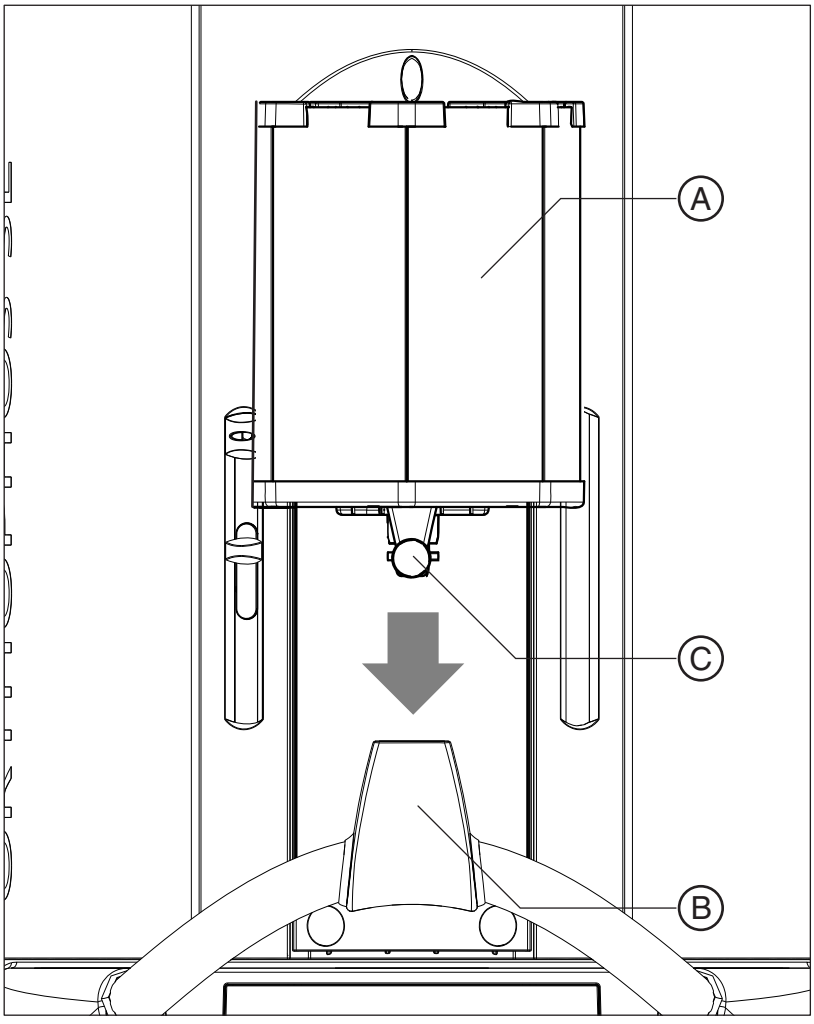
Make absolutely sure that the geometry phantom is inserted in the bite block holder of the unit in such a way that the body of the phantom and the screw (C) point *away from the unit in the direction of the patient* (see figure). Otherwise, this can result in a collision between the sensor unit and the geometry phantom and thereby damage the unit.

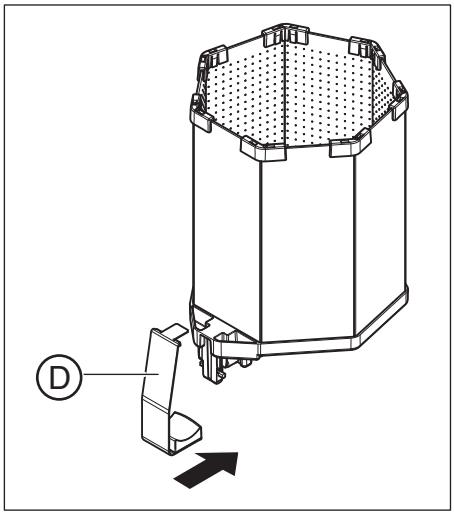


* For greater clarity, the unit is shown in the left-hand image without sensor.

For *"Sensor adjustment"* 3D adjustment and *"Geometry calibration"* 3D calibration, you must insert the geometry phantom (A) into the pan bite block holder (B) on the unit.

For *"Diaphragm adjustment"* 3D adjustment, as well as for *"Sensor calibration (DCS)"* and *"Diaphragm calibration"* 3D calibrations, you must take the geometry phantom back out of the bite block holder.





NOTICE

For correct calibration, the geometry phantom must be aligned horizontally and vertically using a spirit level after insertion in the bite block holder.

1. Insert the geometry phantom (A) into the pan bite block holder (B) on the unit and align the geometry phantom correctly with the screw (C).
2. Attach the clip (D) for better stability.

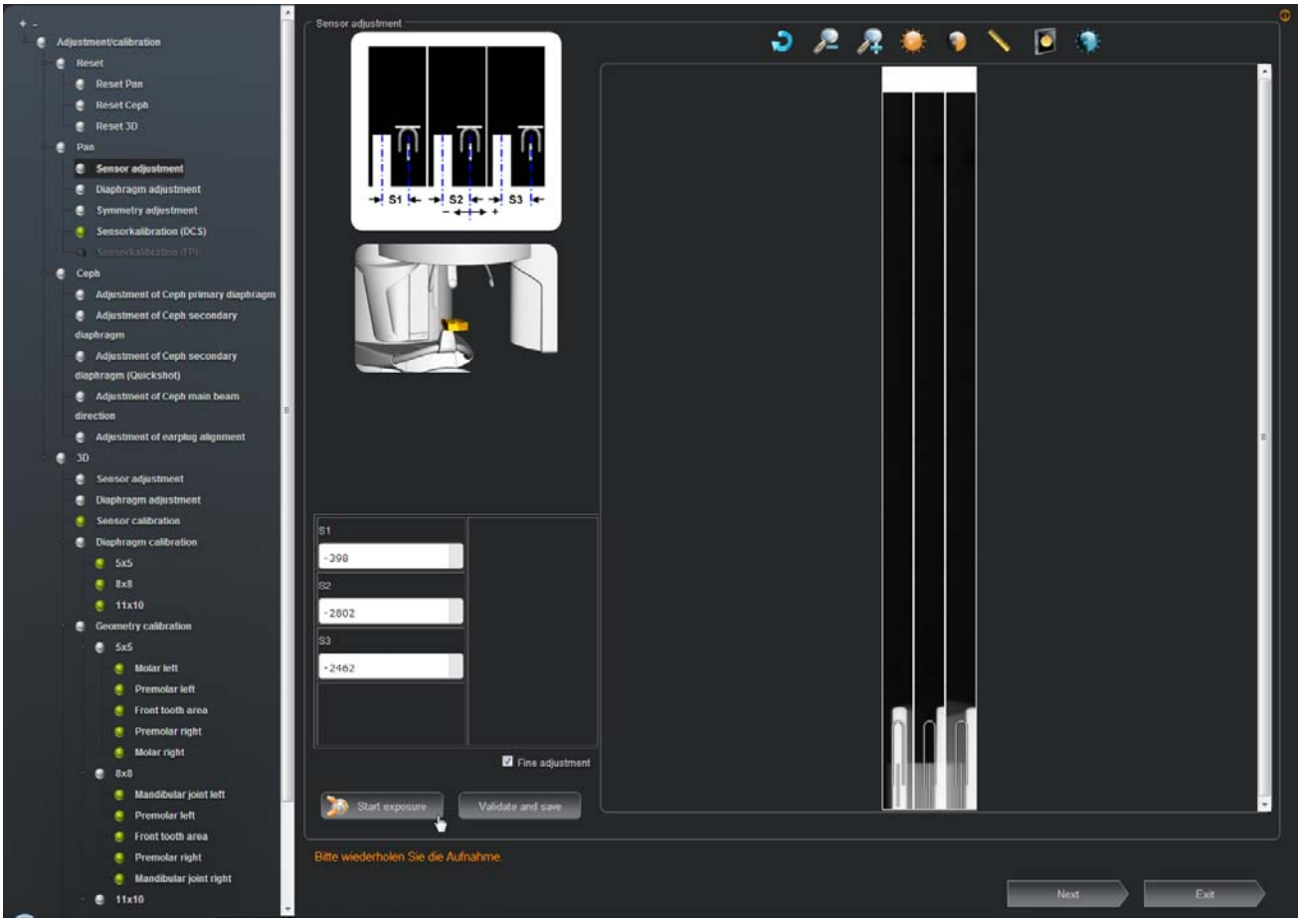
13.2 Adjustment and calibration via the calibration menu

Only for Germany

IMPORTANT
After every adjustment and calibration of the unit, the reference values for the constancy measurement must be recalculated and entered in the "Test results" form, "Reference value" column (see technical document *"ORTHOPHOS SL 2D/3D Acceptance test DIN 6868 Part 151 / Part 161"* (REF 65 61 059).

13.2.1 2D adjustment/calibration

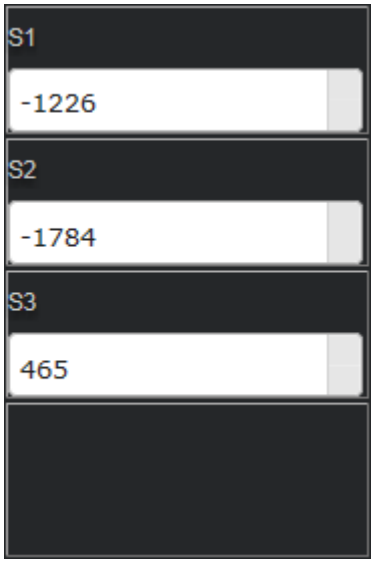
13.2.1.1 Pan sensor adjustment

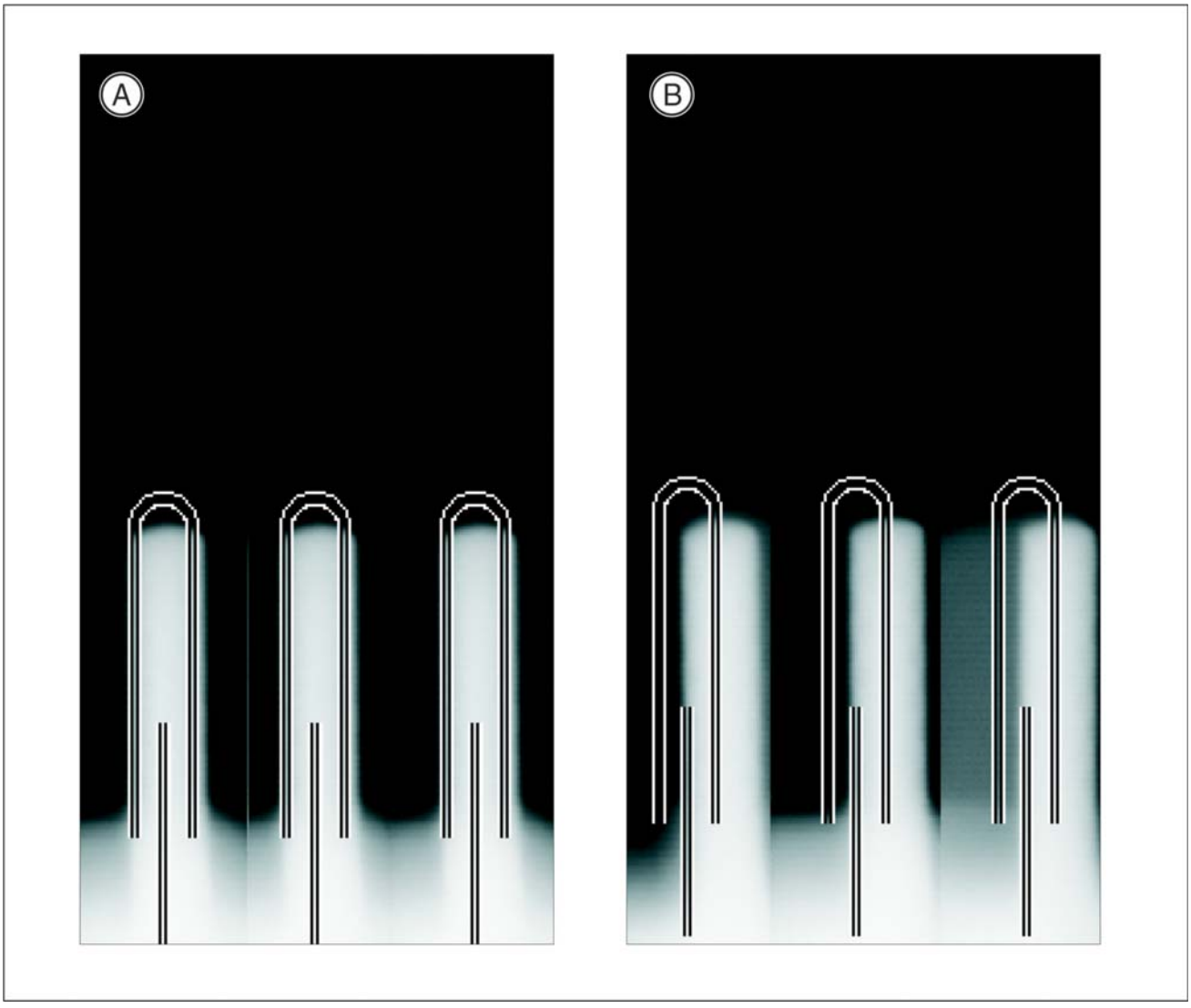


13.2.1.1.1 Automatic adjustment: Panoramic sensor (standard)

✓ The needle phantom is in the bite block holder on the unit [→ 210].

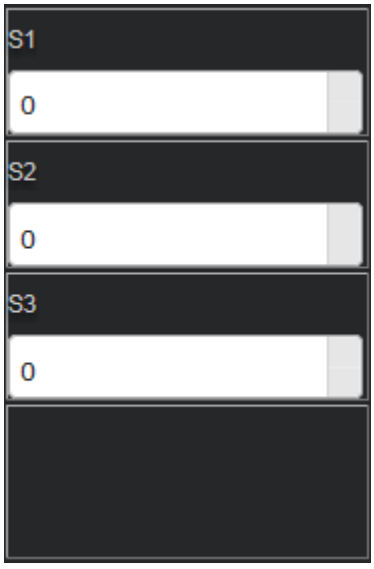
1. Open the calibration menu [→ 195].
2. At the bottom of the structure tree, click on the *"Sensor adjustment"* element (S010.1) under *"Pan"*.
   - The *"Sensor adjustment"* menu is displayed in the action area. The menu supports precision adjustment and coarse adjustment (precision adjustment is pre-selected). Perform a precision adjustment first. In most cases, previous coarse adjustment is not necessary. [→ 203]
3. Establish receptivity [→ 209].
4. Create an exposure (60 kV / 3 mA; 0.7 s). [→ 209]
   - The adjustment values **S1**, **S2** and **S3** are automatically determined from the exposure and entered in the text boxes of the *"Sensor adjustment"* menu.
   - The exposure is displayed in the exposure window.





A	Adjustment OK	The three needle images must lie in the center and inside the auxiliary lines.
B	Adjustment not OK	

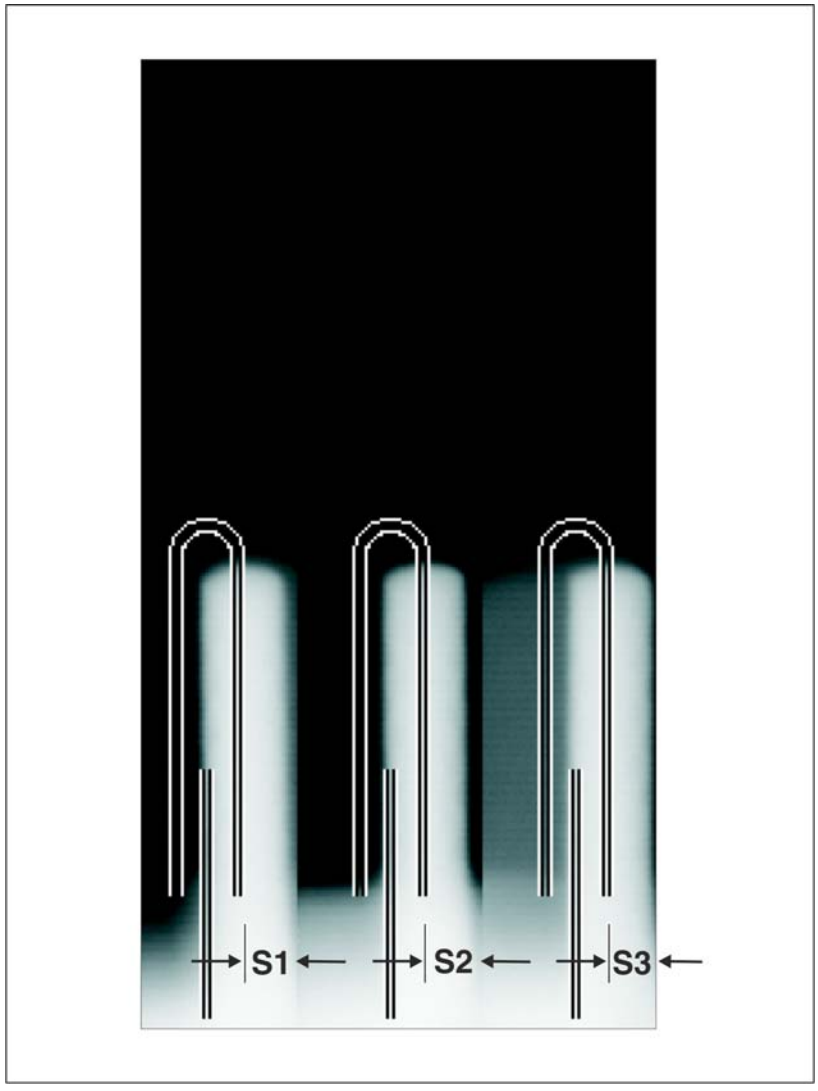
5. Repeat the procedure starting at Step 3 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.
IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 219].



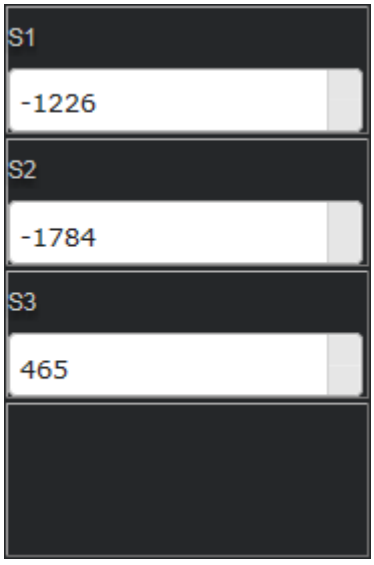
6. If adjustment is OK (the adjustment values in the text boxes are equal to zero), save the values. [→ 209]
   ↳ The status indicator that prefixes the *"Sensor adjustment"* element is checked.
7. Remove the needle phantom from the bite block holder of the unit.
8. Continue with the next stage of the adjustment procedure. [→ 221]

13.2.1.1.2 Manual adjustment: Panoramic sensor

1. Start the adjustment procedure as described in the chapter entitled "Automatic adjustment: Panoramic sensor (standard) [→ 216]".

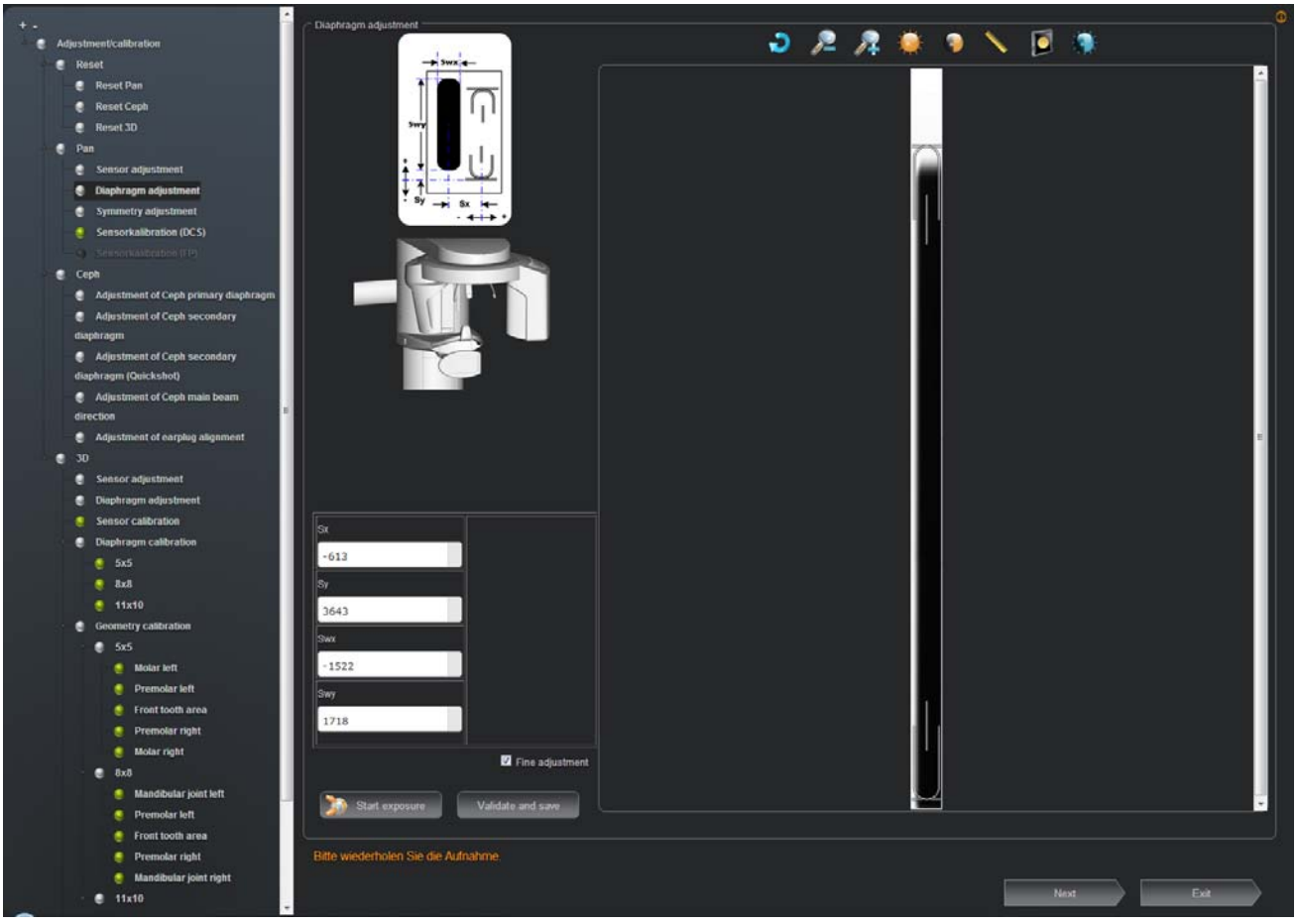


2. After taking the exposure, measure the distances **S1**, **S2** and **S3** with the toolbar measuring ruler [→ 197].
   To measure **S1**, **S2**, and **S3**, estimate where the horizontal center of the displayed needles is located. Take the measurement in the lower area of the needles if possible, since they may have become slightly bent after repeated use.
   Tip: For better measurement, you can also edit [→ 197] the exposure using the toolbar functions.



3. Overwrite the adjustment values for **S1**, **S2** and **S3** in the text boxes of the *"Sensor adjustment"* menu with the measured values.
   For information about the shifting direction (input of +/- sign in the menu), see the chapter entitled "Shifting direction of the exposed image area [→ 207]".
   NOTICE! Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Panoramic sensor (standard) [→ 216]".

13.2.1.2 Pan aperture adjustment



13.2.1.2.1 Automatic adjustment: Pan diaphragm (standard)

IMPORTANT

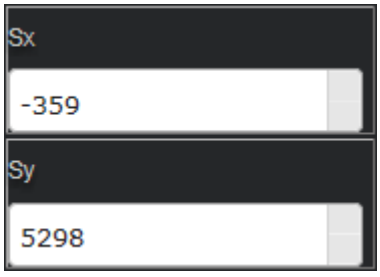
If a message window indicating that the diaphragm is tilted appears in the menu during *"Diaphragm adjustment"*, the primary diaphragm is mechanically maladjusted in the vertical axis. In this case, adjust the diaphragm [→ 237] and repeat after the exposure.

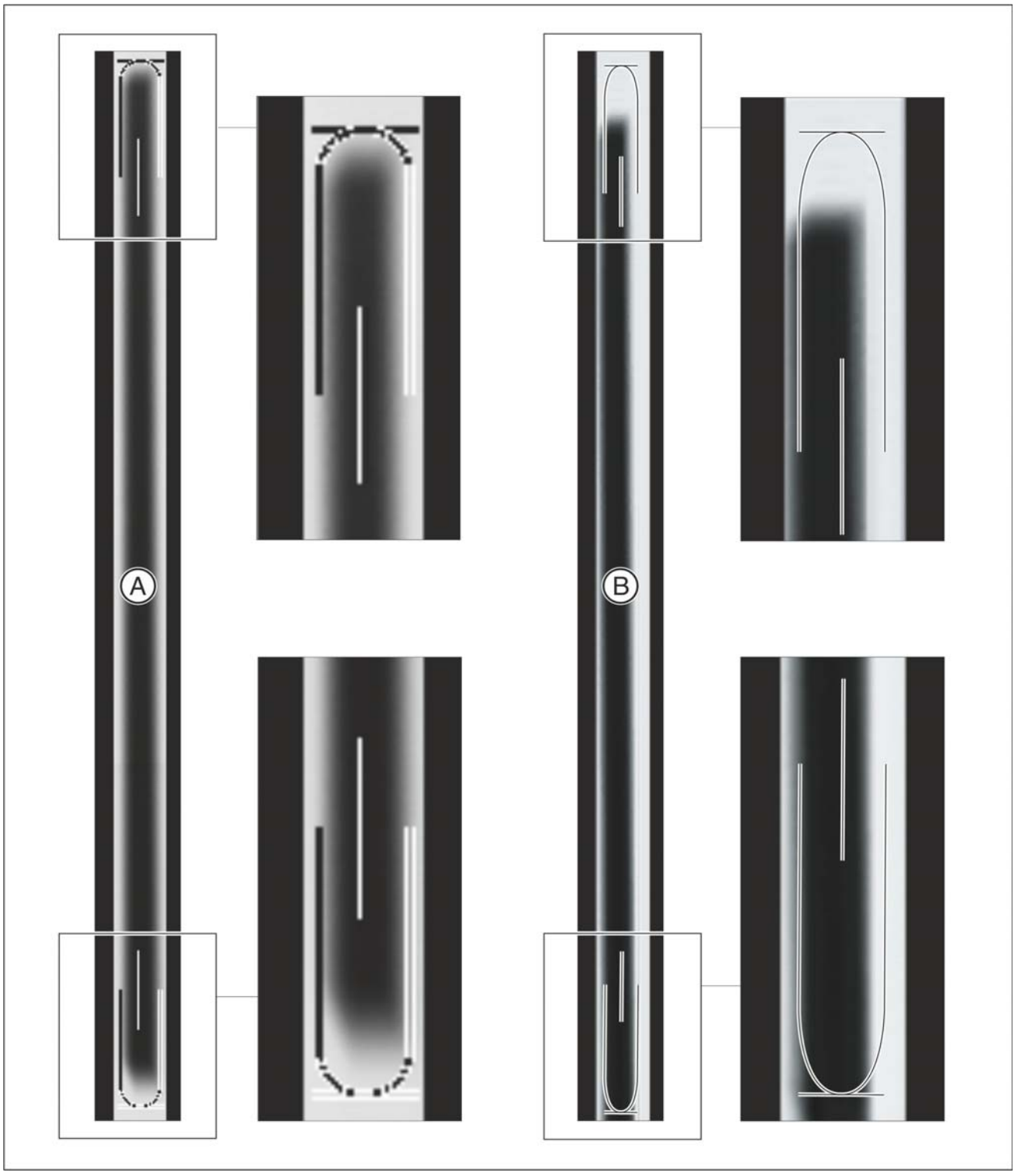
IMPORTANT

If a message window indicating that another X-ray has to be taken appears in the menu during *"Diaphragm adjustment"*, repeat the procedure starting at Step 2, even if the values in the menu's text boxes are equal to zero. This additional exposure ensures that the diaphragm gap width offset is also adjusted correctly.

✓ The needle phantom is *not* in the bite block holder on the unit.

1. In the structure tree, under *"Pan"*, click on the *"Diaphragm adjustment"* element (S030.2).
   ↳ The *"Diaphragm adjustment"* menu is displayed in the action area. The menu supports precision adjustment and coarse adjustment (precision adjustment is pre-selected). Perform a precision adjustment first. In most cases, previous coarse adjustment is not necessary. [→ 203]
2. Establish receptivity [→ 209].
3. Create an exposure (60 kV / 3 mA; 0.3 s) [→ 209].
   ↳ The adjustment values **Sx** and **Sy** are calculated automatically from the exposure and entered in the text boxes of the *"Diaphragm adjustment"* menu.
   ↳ The exposure is displayed in the exposure window.




A
B

A	Adjustment OK	• The exposed diaphragm area must lie horizontally centered in the image section as well as inside the auxiliary lines. • A surrounding white border must be present. • The maximum density must lie in the center of the diaphragm area.
B	Adjustment not OK	

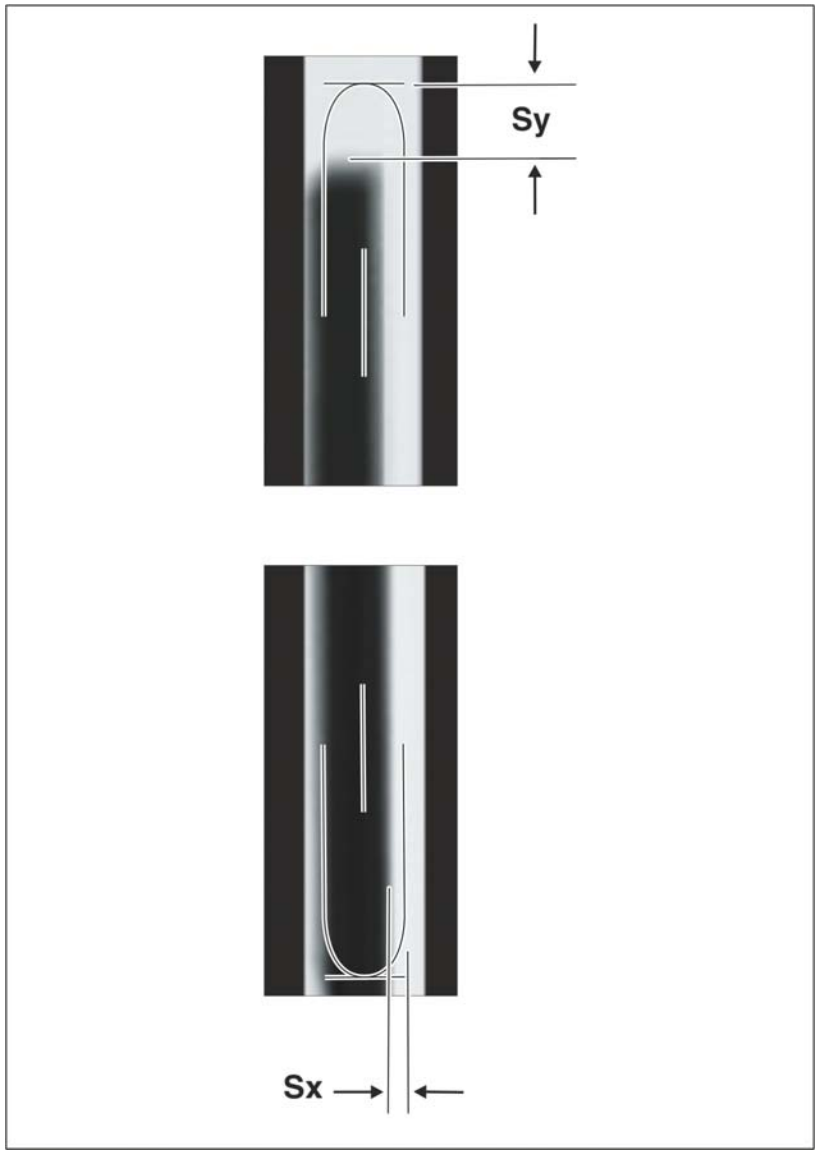
4. Repeat the procedure starting at Step 2 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.
   IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 225].

5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [→ 209]
   ↳ The status indicator that prefixes the *"Diaphragm adjustment"* element is checked.
6. Continue with the next stage of the adjustment procedure [→ 227].

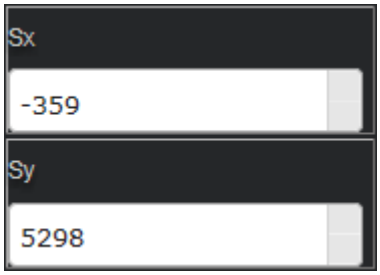
13.2.1.2.2 Manual adjustment: Pan - Diaphragm

The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment values calculated automatically in the *"Diaphragm adjustment"* menu are overwritten by adjustment values calculated manually.

1. Start the *"Diaphragm adjustment"* adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan diaphragm (standard) [→ 221]".

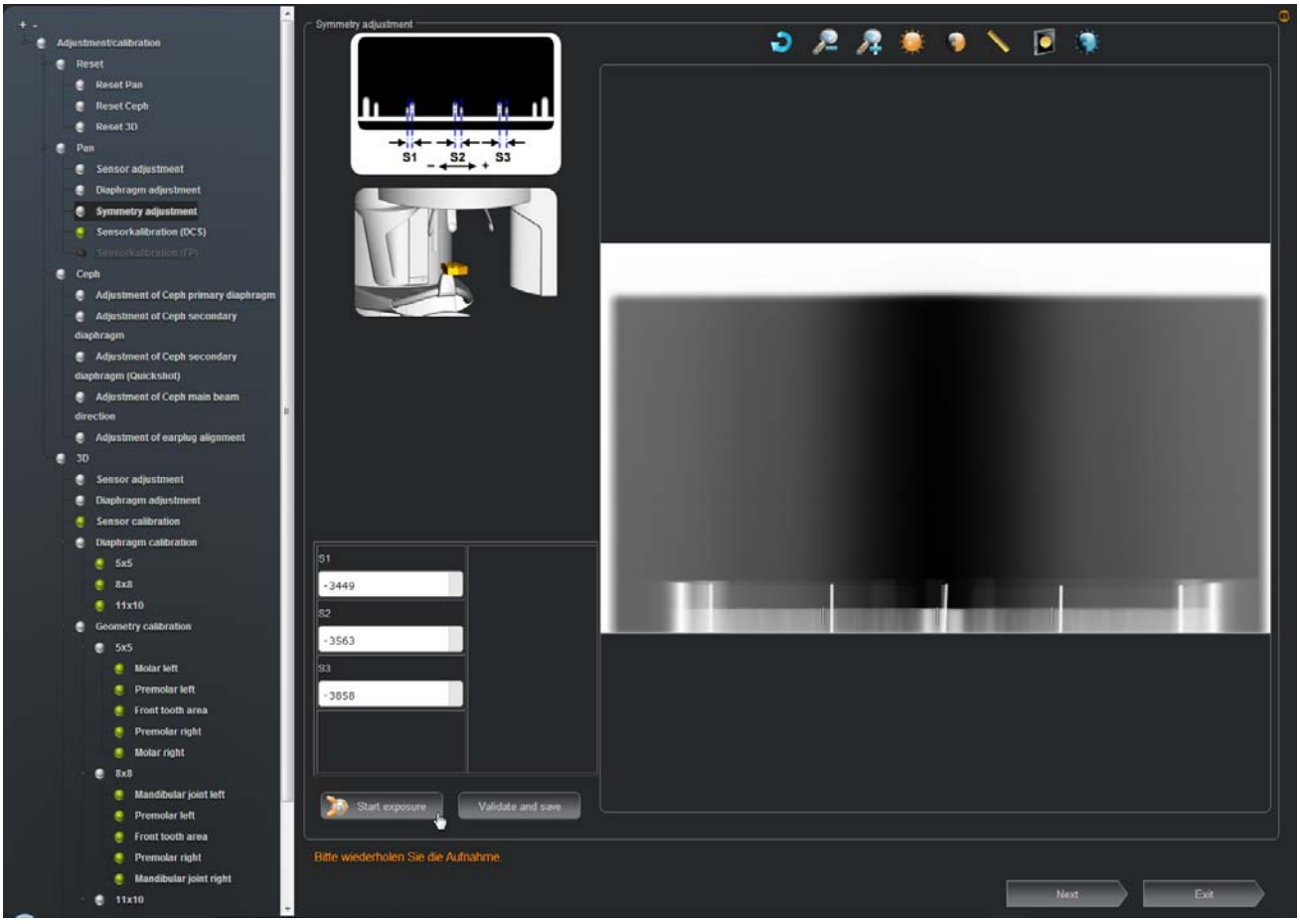


2. Once you have taken the exposure, measure distances **Sx** and **Sy** with the toolbar measuring ruler [→ 197].
   Tip: For better measurement, you can also edit [→ 197] the exposure using the toolbar functions.



3. Overwrite the adjustment values for **Sx** and **Sy** in the text boxes of the *"Diaphragm adjustment"* menu with the measured values.
   For information about the shifting direction (input of +/- sign in the menu), see the chapter entitled "Shifting direction of the exposed image area [→ 207]".
   NOTICE! Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan diaphragm (standard) [→ 221]".

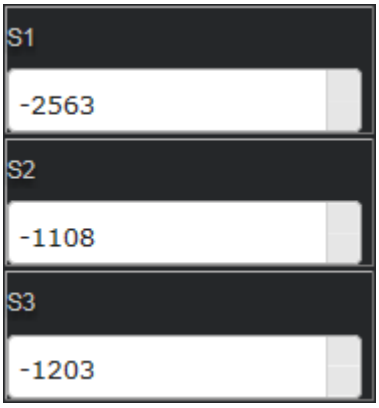
13.2.1.3 Pan symmetry adjustment

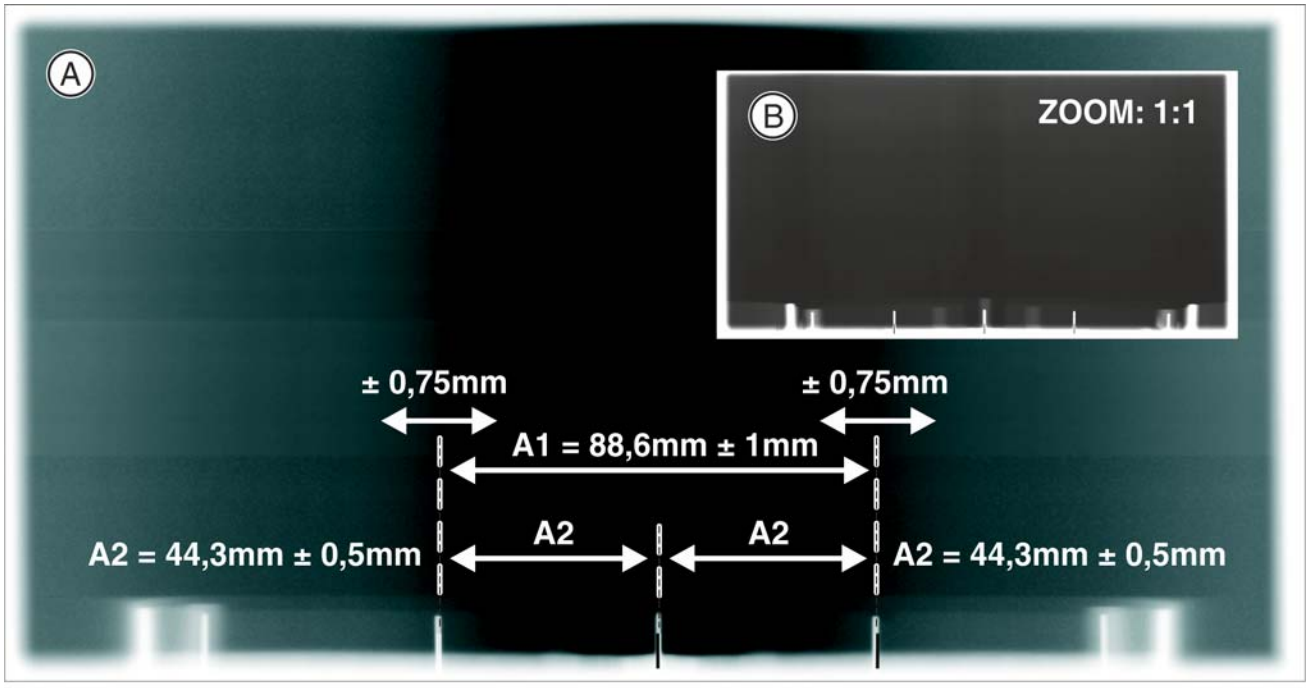


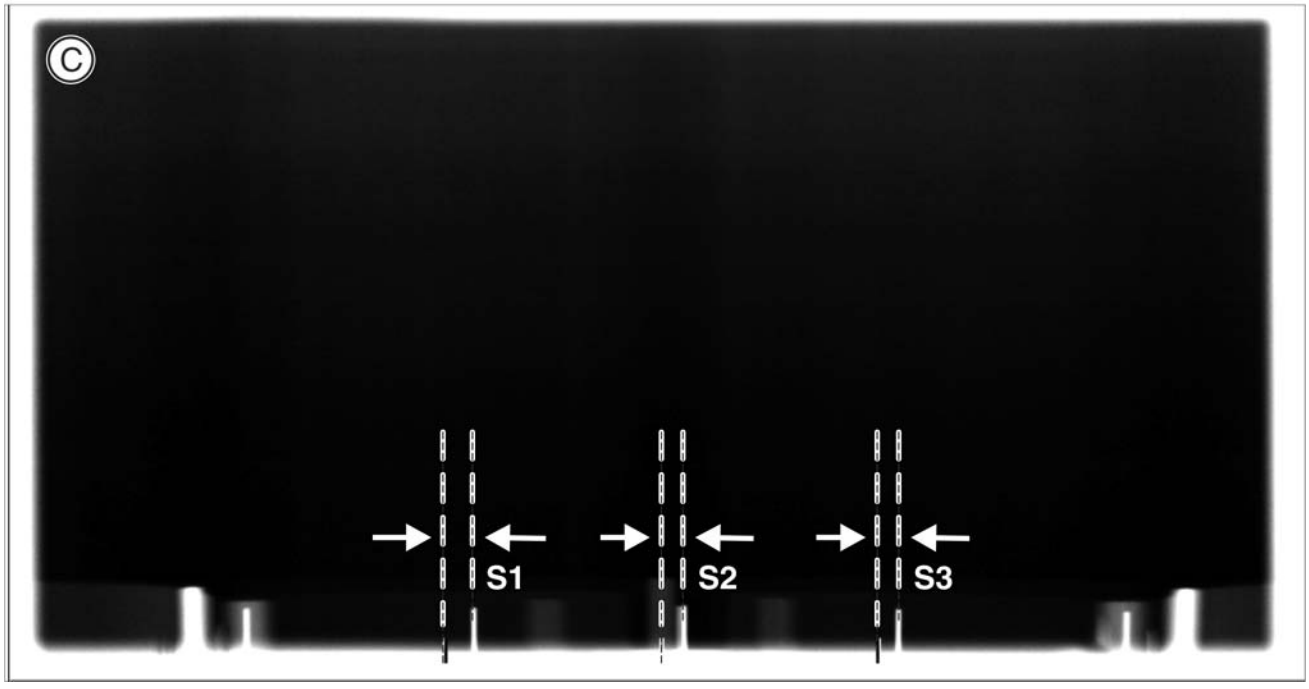
13.2.1.3.1 Automatic adjustment: Pan - Symmetry

✓ The needle phantom is in the bite block holder on the unit [→ 210].

1. In the structure tree, under *"Pan"*, click on the *"Symmetrie adjustment"* element (S010.2).
   ↳ The *"Pan - Symmetrie"* menu is displayed in the action area.
2. Establish [→ 209] receptivity.
3. Create an exposure (60 kV / 3 mA; 14.1 s) [→ 209].
   ↳ The adjustment values **S1**, **S2** and **S3** are automatically determined from the exposure and entered in the text boxes of the *"Symmetrie adjustment"* menu.
   ↳ The exposure is displayed in the exposure window.

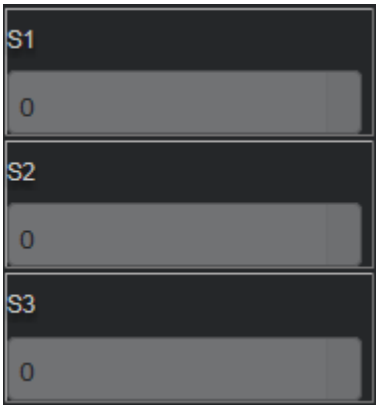



A
B
ZOOM: 1:1
± 0,75mm
± 0,75mm
A1 = 88,6mm ± 1mm
A2 = 44,3mm ± 0,5mm
A2
A2
A2 = 44,3mm ± 0,5mm


C
S1
S2
S3

A	Adjustment OK	• The shadow of the center needle, the needle image, and the auxiliary lines must be coincident and located one behind the other. A tolerance (offset of needle from the central auxiliary line) of ± 0.75 mm is admissible. • Distance A1 must be 88.6 ± 1 mm. • Distances A2 must be identical, each being 44.3 ± 0.5 mm.
B		• A surrounding white border must be present.
C	Adjustment not OK	

4. Repeat the procedure starting at Step 2 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.
IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 230].

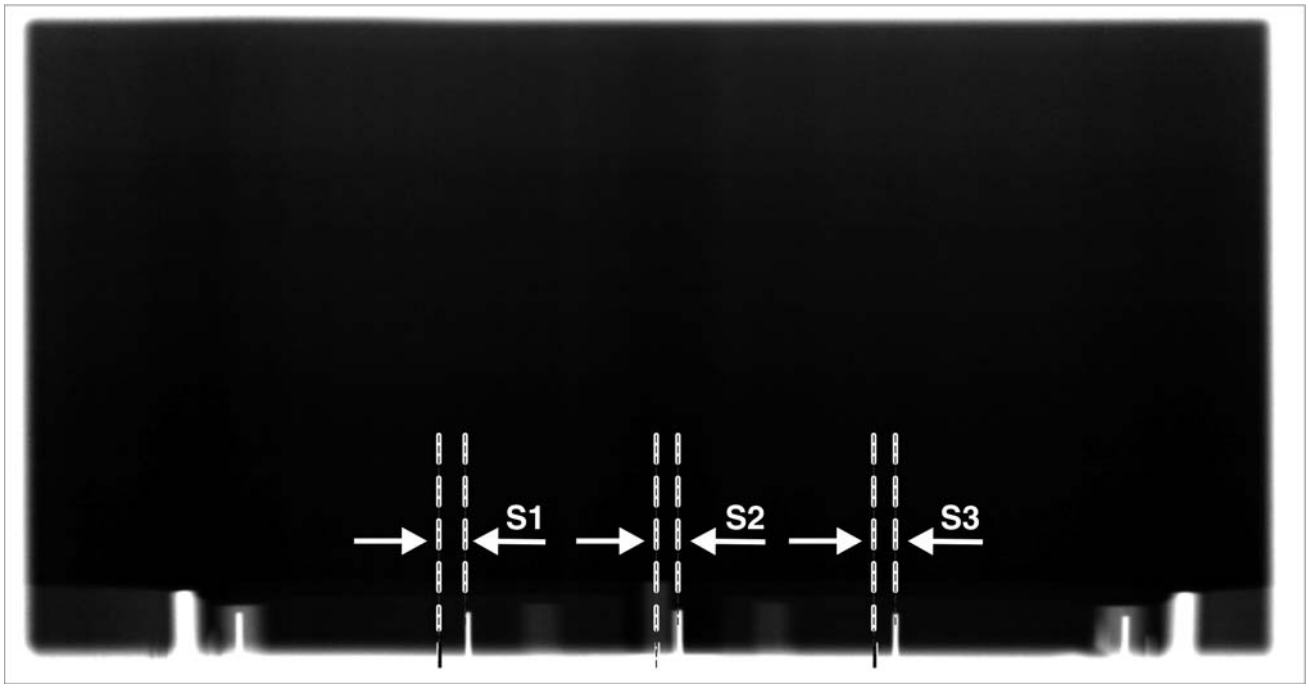


5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [→ 209]
   ↳ The status indicator that prefixes the *"Symmetrie adjustment"* element is checked.
6. Remove the needle phantom from the bite block holder of the unit.
7. Continue with the next calibration point. [→ 231]

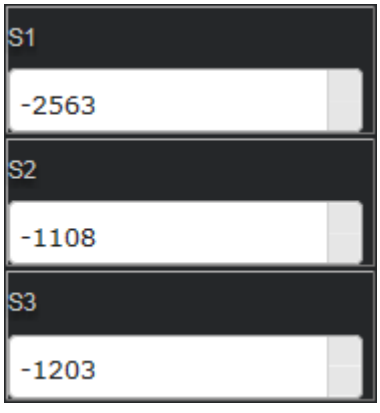
13.2.1.3.2 Manual adjustment: Pan - Symmetry

The manual adjustment procedure is similar to the one for automatic adjustment [→ 216]. The only difference is that the default adjustment values calculated automatically in the *"Symmetrie adjustment"* menu are overwritten by adjustment values calculated manually.

1. Start the *"Symmetrie adjustment"* adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan - Symmetry [→ 227]".



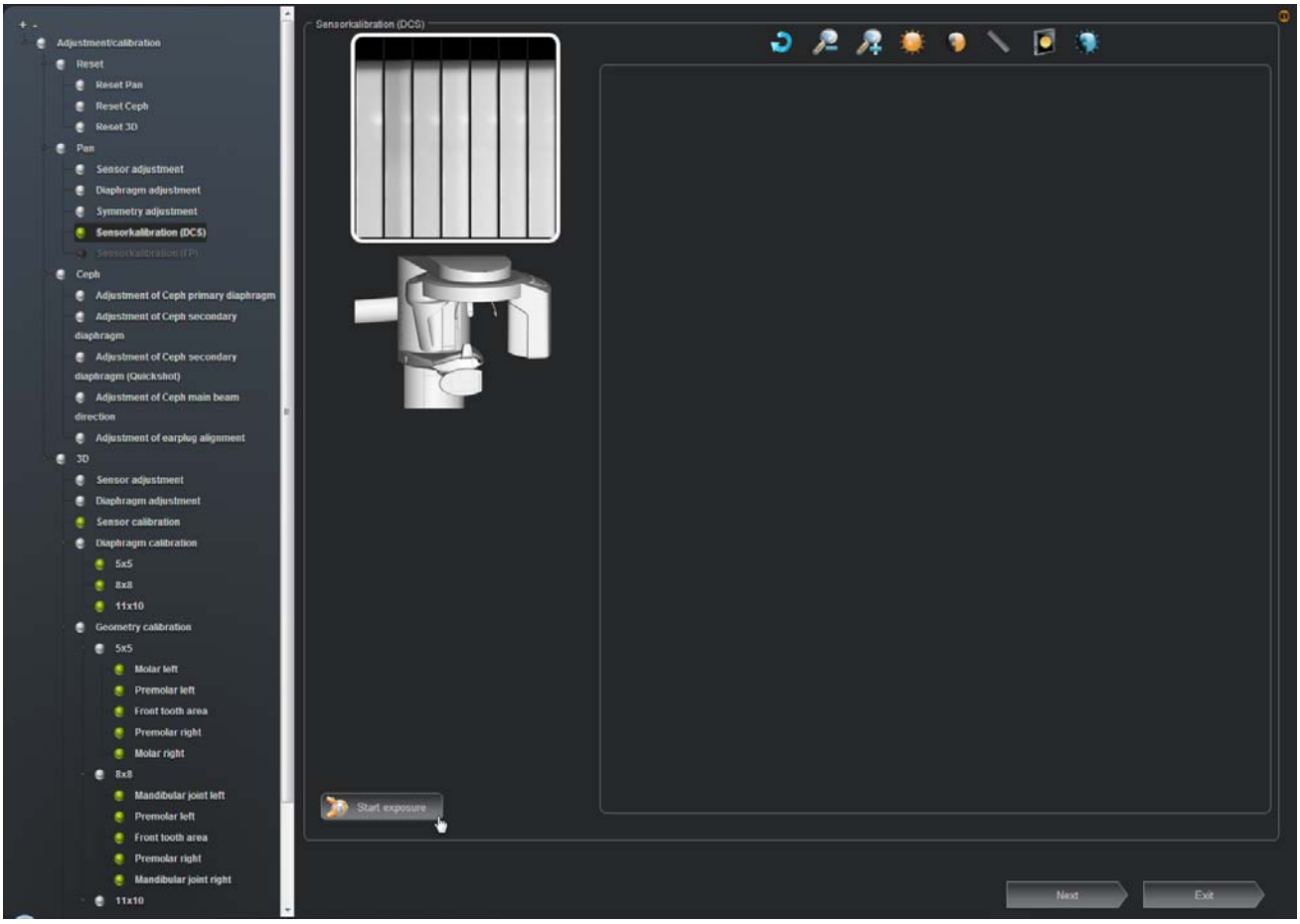
2. After taking the exposure, measure the distances **S1**, **S2** and **S3** with the toolbar measuring ruler [→ 197].
   If possible, measure in the lower area of the needles since they may be slightly bent after several uses.
   Tip: For better measurement, you can also edit [→ 197] the exposure using the toolbar functions.



3. Overwrite the adjustment values for **S1**, **S2** and **S3** in the text boxes of the *"Symmetrie adjustment"* menu with the measured values.
   For information about the shifting direction (input of +/- sign in the menu), see the chapter entitled "Shifting direction of the exposed image area [→ 207]".
   NOTICE! Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan - Symmetry [→ 227]".

13.2.1.4 Pan sensor calibration (DCS)

NOTE: For sensor calibration, 7 exposures are taken (for the different kV/mA combinations). The exposure is only displayed in the exposure window at the end of the calibration procedure.



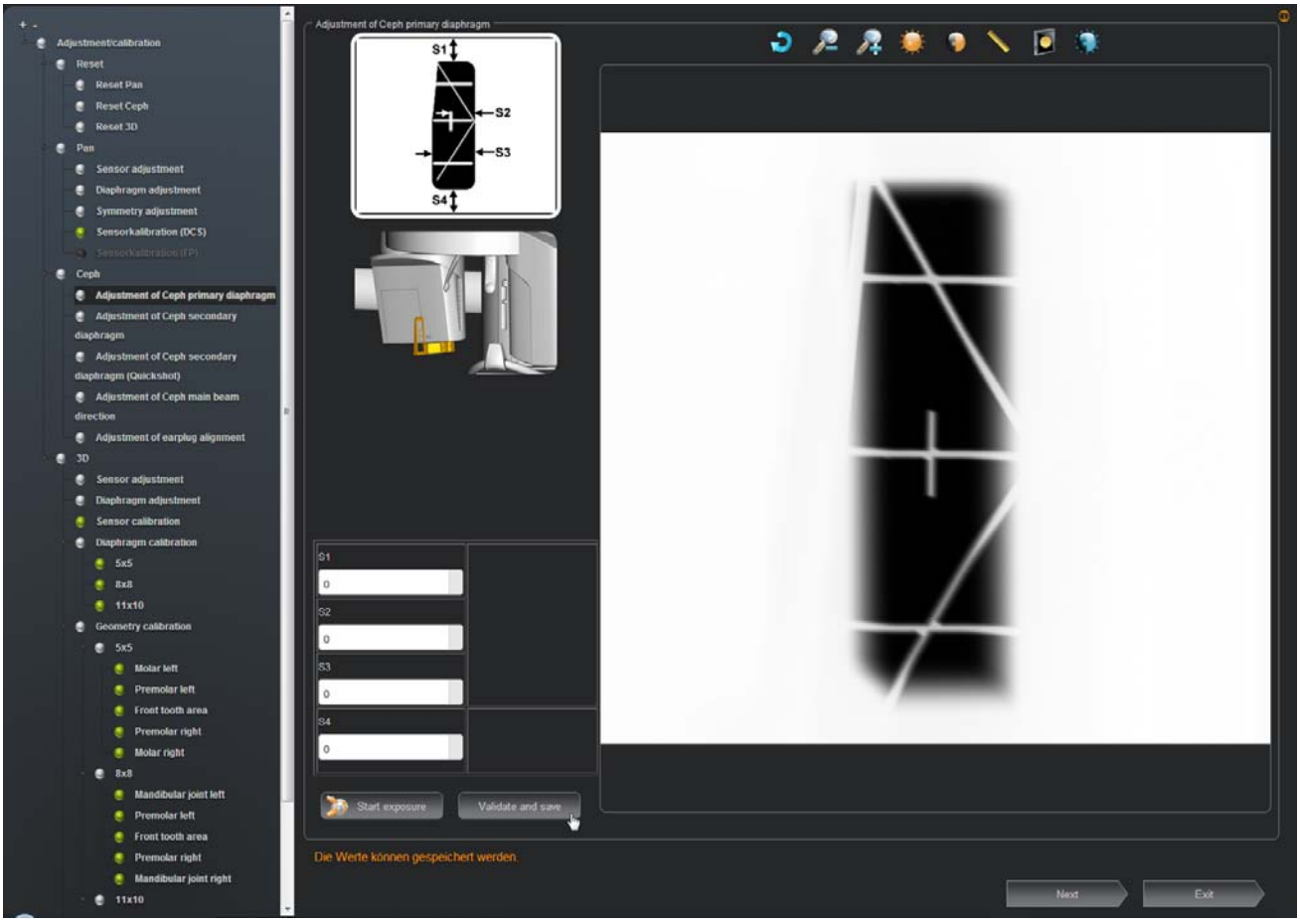
1. Open the calibration menu [→ 195].
2. In the structure tree under *"Pan"*, click on the *"Sensor calibration (DCS)"* element (S010.10).

IMPORTANT
For the *"Sensor calibration (DCS)"*, a total of 7 exposures must be taken (for the applicable kV/mA combinations). After taking the first exposure, receptivity is automatically established again by the unit. This is repeated until the last exposure has been taken.

3. Establish [→ 209] receptivity.
4. Take the exposure for the first kV/mA combination (60 kV / 5 mA; 15.1s) [→ 209].
   - ↳ After taking the exposure, the unit automatically re-establishes receptivity.
5. Take the exposure for the second Kv/mA combination [→ 209].
   - ↳ After taking the exposure, the unit automatically re-establishes receptivity.

6. Repeat the procedure from point 5 for all other kV/mA combinations.
   ↳ After the last exposure has been taken, a message in the action window indicates whether calibration has been successful and the status indicator at the start of the element *"Sensor calibration (DCS)"* in the structure tree responds accordingly:
   Calibration not OK = status indicator stays red
   Calibration OK = status indicator turns green
   NOTE: The calibration values are automatically saved.
7. Continue with the next stage of the adjustment procedure [→ 233].

13.2.1.5 Adjustment of the ceph primary diaphragm



13.2.1.5.1 Automatic adjustment: Ceph - Primary diaphragm (standard)

NOTICE

Risk of damage to unit

It is essential that the needle phantom is removed from the bite block holder on the unit **before** a ceph exposure is taken; otherwise, the sensor could collide with the phantom.

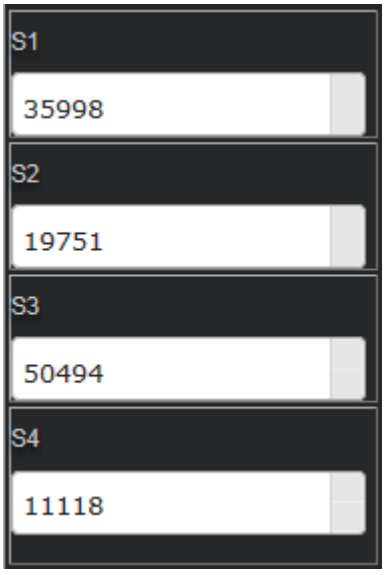
✓ The needle phantom is *not* in the bite block holder on the unit.

✓ The ceph test phantom connects to the cover of the sensor unit [→ 212].

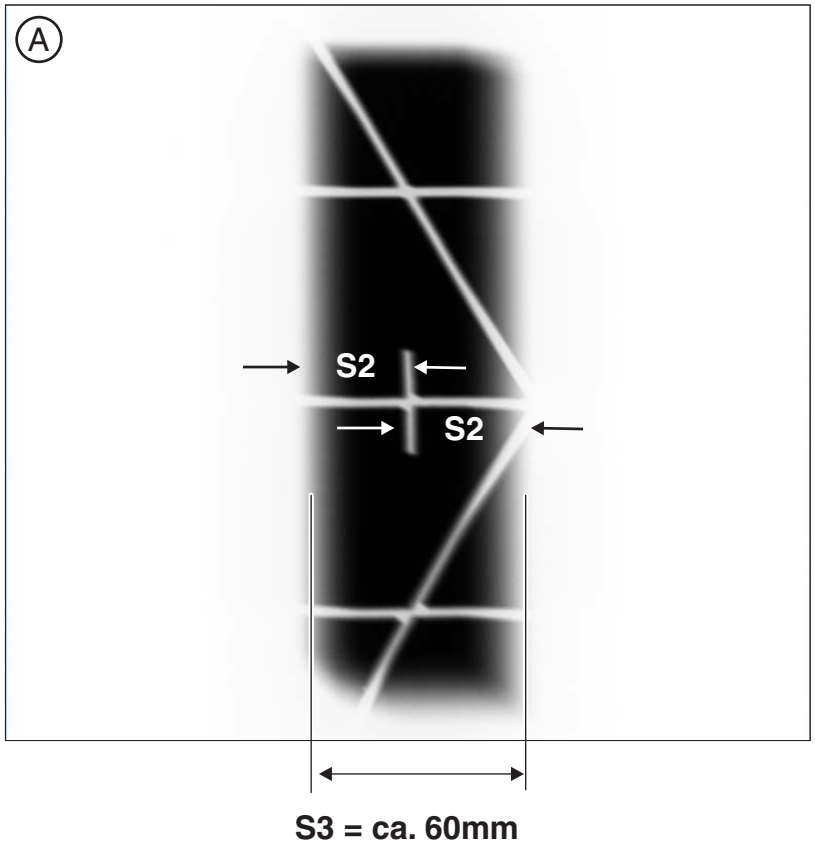
✓ The ceph sensor is plugged into the ceph slot on the unit.

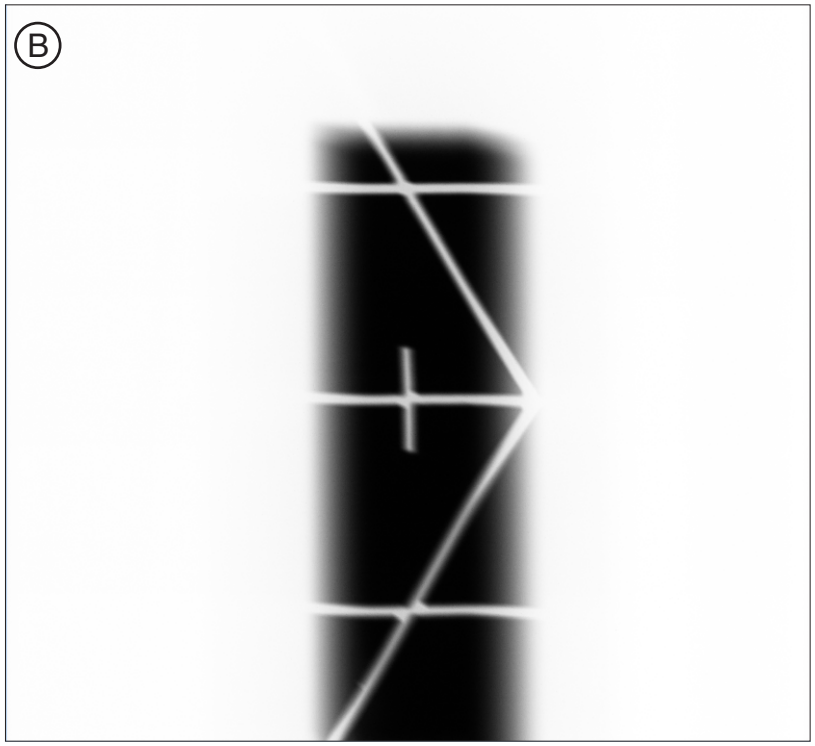
✓ The ear plug holders on the ceph arm have been moved completely apart and swung out of the beam direction (ap).

1. In the structure tree, under *"Ceph"*, click on the *"Adjustment of Ceph primary diaphragm"* element (S010.3).
   ↳ The *"Adjustment of Ceph primary diaphragm"* menu is displayed in the action area.
2. Establish [→ 209] receptivity.



3. Create an exposure (64 kV / 16 mA; 6.1 s) [→ 209].
   - The adjustment values **S1**, **S2 S3** and **S4** are automatically determined from the exposure and entered in the text boxes of the *"Adjustment of Ceph primary diaphragm"* menu.
   - The exposure is displayed in the exposure window.


A
S2
S2
S3 = ca. 60mm


B

A	Adjustment OK	• The vertical pin must be horizontally centered in the exposed image section. A slight vertical offset of the grid is permissible. • A uniform white border surrounding the image on all sides must be visible. • Distance S3 must be approx. 60 mm.
B	Adjustment not OK	**IMPORTANT:** If S3 is > 70 mm, please contact the Sirona Customer Service Center:

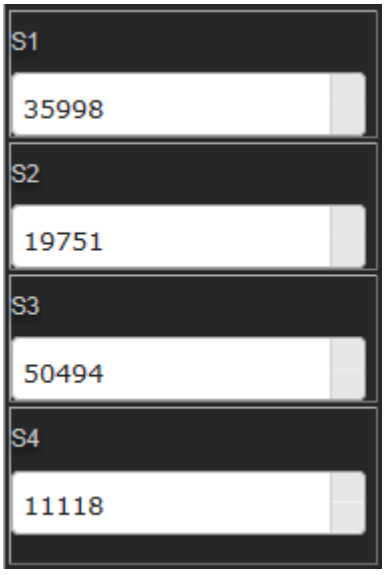
4. Repeat the procedure starting at Step 2 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.
   IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 237].

5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [→ 209]
   ↳ The status indicator that prefixes the *"Adjustment of Ceph primary diaphragm"* element is checked.
6. Remove the ceph test phantom from the sensor unit cover.
7. Continue with the next stage of the adjustment procedure. [→ 238]

13.2.1.5.2 Manual adjustment: Ceph - Primary diaphragm

The manual adjustment procedure is similar to the one for automatic adjustment [→ 233]. The only difference is that the default adjustment values calculated automatically in the *"Adjustment of Ceph primary diaphragm"* menu are overwritten by adjustment values calculated manually.

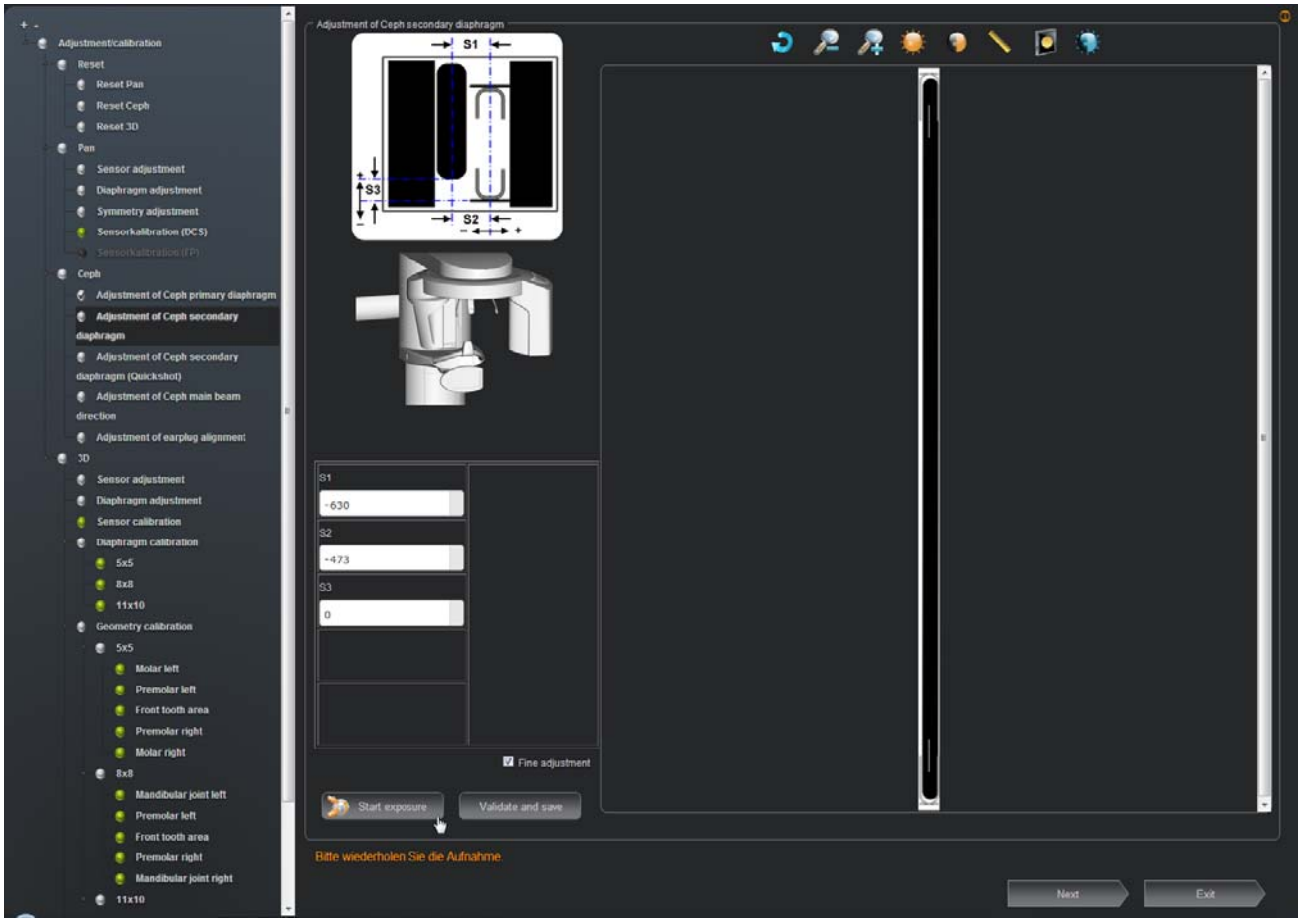
1. Start the *"Adjustment of Ceph primary diaphragm"* adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Primary diaphragm (standard) [→ 233]".
2. Once you have taken the exposure, measure distances **S1**, **S2**, **S3**, and **S4** with the toolbar measuring ruler [→ 197].
   S1: distance to the top edge of the image
   S2: distance from the right edge of the radiation-exposed surface to the middle of the center pin
   S3: width of radiated area
   S4: distance to the bottom edge of the image
   Tip: For better measurement, you can also edit [→ 197] the exposure using the toolbar functions.
3. Overwrite the adjustment values for **S1**, **S2**, **S3** and **S4** in the text boxes of the *"Adjustment of Ceph primary diaphragm"* menu with the measured values.
   NOTICE! Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Primary diaphragm (standard) [→ 233]".



13.2.1.6 Adjustment of the ceph secondary diaphragm

IMPORTANT

If you cannot correctly adjust the ceph secondary diaphragm via the calibration menu, the Ceph secondary diagram must first be readjusted mechanically [→ 245].
After mechanical readjustment has been completed, repeat adjustment via the calibration menu.



13.2.1.6.1 Automatic adjustment: Ceph secondary diaphragm (standard)

NOTICE

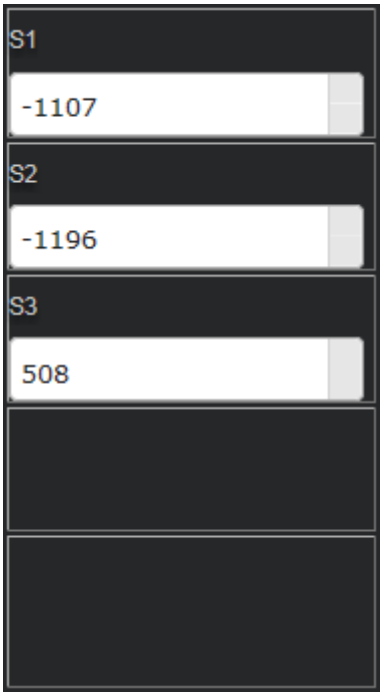
Risk of damage to unit

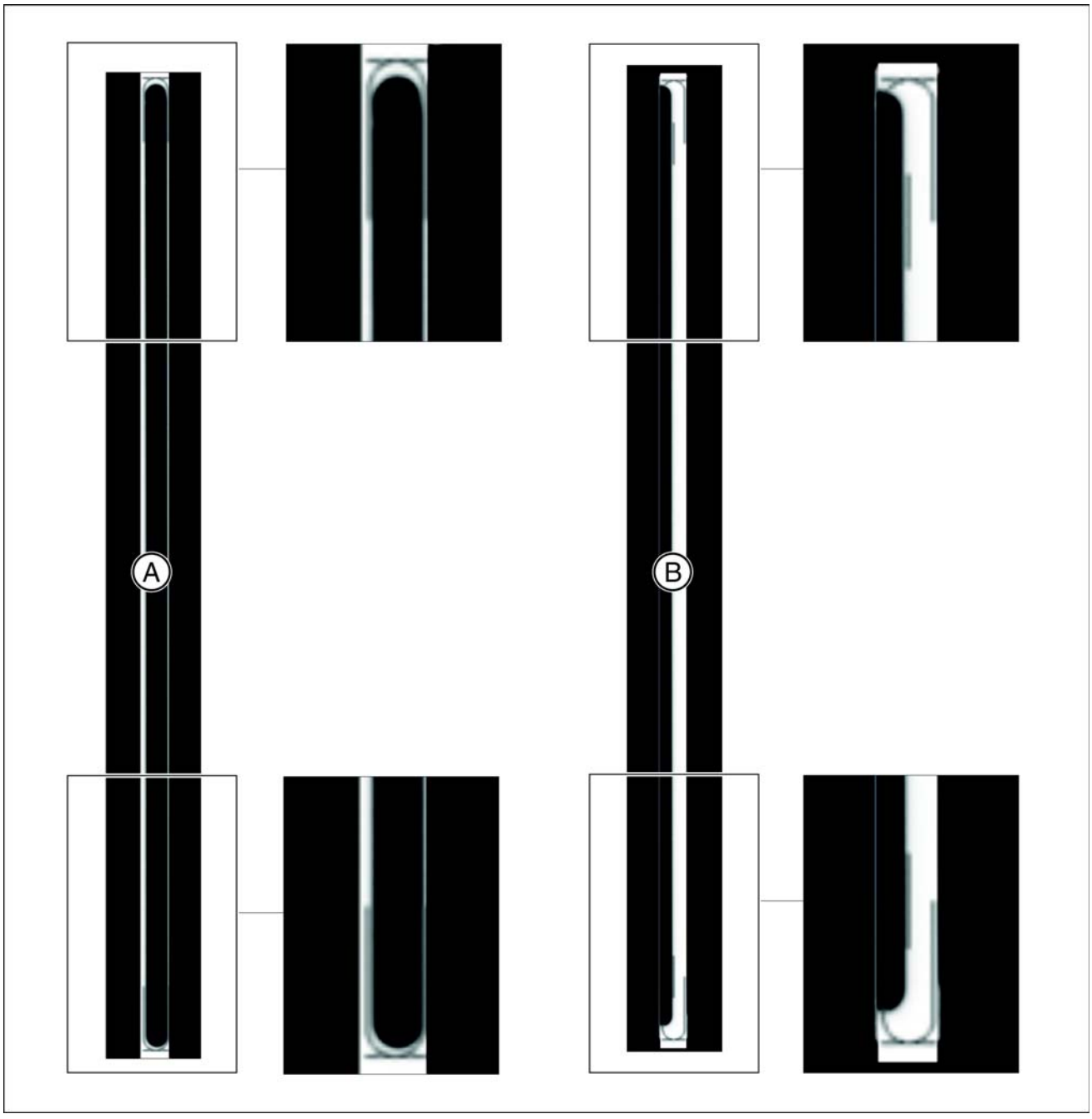
It is essential that the needle phantom is removed from the bite block holder on the unit **before** a ceph exposure is taken; otherwise, the sensor could collide with the phantom.

✓ The pan needle phantom is *not* in the pan bite block holder on the unit.

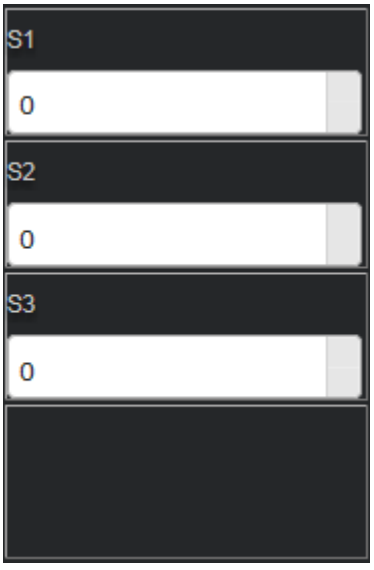
✓ The ceph test phantom does *not* connect to the cover of the sensor unit.

1. In the structure tree, under *"Ceph"*, click on the *"Adjustment of Ceph secondary diaphragm"* element (S010.5).
   - The *"Adjustment of Ceph secondary diaphragm"* menu is displayed in the action area. The menu supports precision adjustment and coarse adjustment (precision adjustment is pre-selected). Perform a precision adjustment first. In most cases, previous coarse adjustment is not necessary. [→ 203]
2. Establish readiness for exposure [→ 209].
3. Create an exposure (80kV / 14 mA; 0.6 s) [→ 209].
   - The adjustment values **S1**, **S2** and **S3** are automatically determined from the exposure and entered in the text boxes of the *"Adjustment of Ceph secondary diaphragm"* menu.
   - The exposure is displayed in the exposure window.





A	Adjustment OK	• The exposed diaphragm area must lie centered and straight in the image section as well as inside the superimposed auxiliary lines. • A surrounding white border must be present. • The maximum density must lie in the center of the diaphragm area.
B	Adjustment not OK	

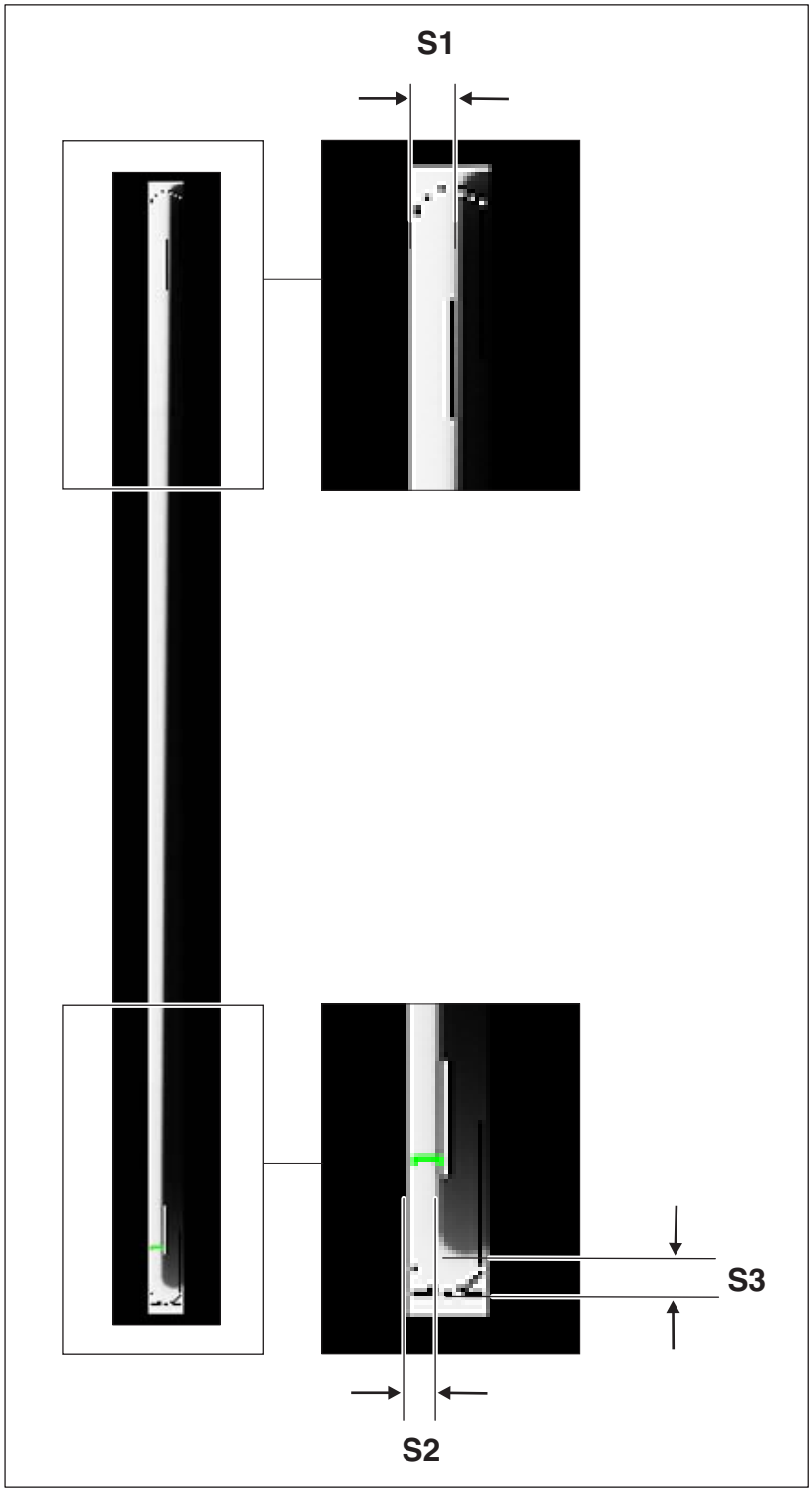


4. Repeat the procedure starting at Step 2 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.
IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 242].
5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [→ 209]
   ↳ The status indicator that prefixes the element *"Adjustment of Ceph secondary diaphragm"* is checked.
6. Continue with the next stage of the adjustment procedure [→ 253].

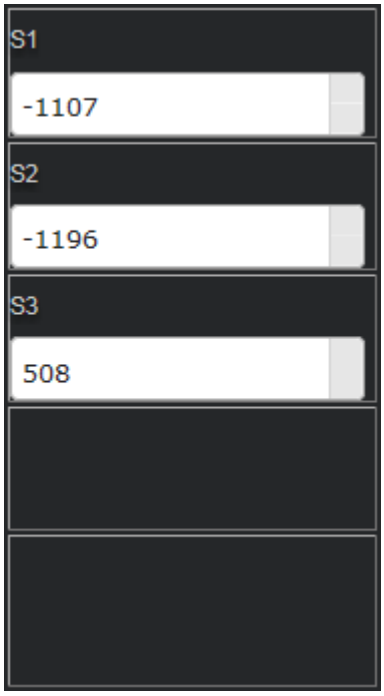
13.2.1.6.2 Manual adjustment: Ceph secondary diaphragm

The manual adjustment procedure is similar to the one for automatic adjustment [→ 238]. The only difference is that the default adjustment values calculated automatically in the *"Adjustment of Ceph secondary diaphragm"* menu are overwritten by adjustment values calculated manually.

1. Start the *"Adjustment of Ceph secondary diaphragm"* adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph secondary diaphragm (standard) [→ 238]"

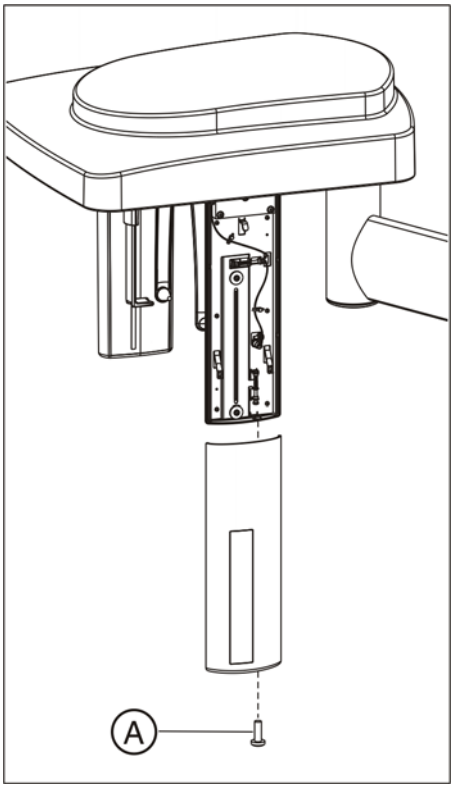


2. Once you have taken the exposure, measure distances **S1**, **S2** and **S3** with the toolbar measuring ruler [→ 197].

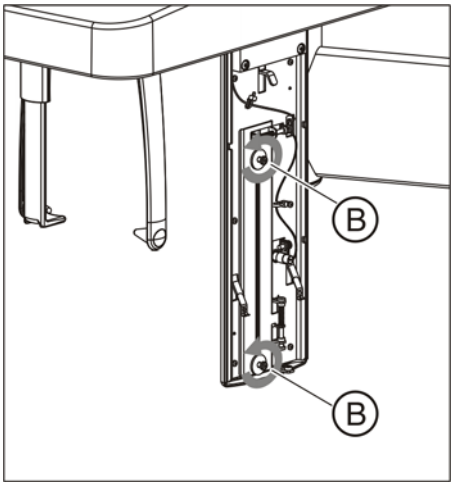


3. Overwrite the adjustment values for **S1**, **S2** and **S3** in the text boxes of the *"Adjustment of Ceph secondary diaphragm"* menu with the measured values. For information about the shifting direction (input of +/- sign in the menu), see the section entitled "Shifting direction of the exposed image area [→ 207]".
   NOTICE! Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph secondary diaphragm (standard) [→ 238]"

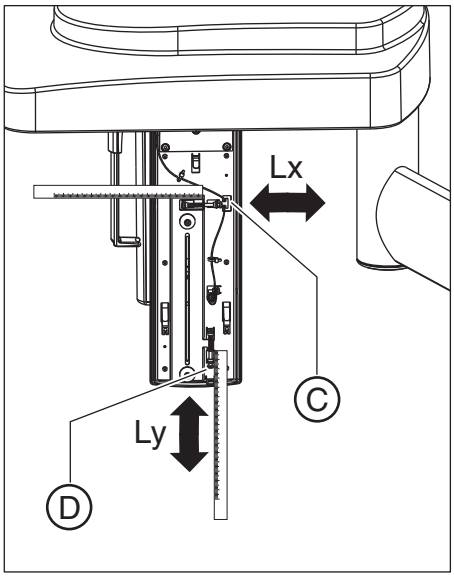
13.2.1.6.3 Mechanical adjustment: Ceph secondary diaphragm



1. Loosen screw (A) and remove the cover of the secondary diaphragm by pulling it downward.

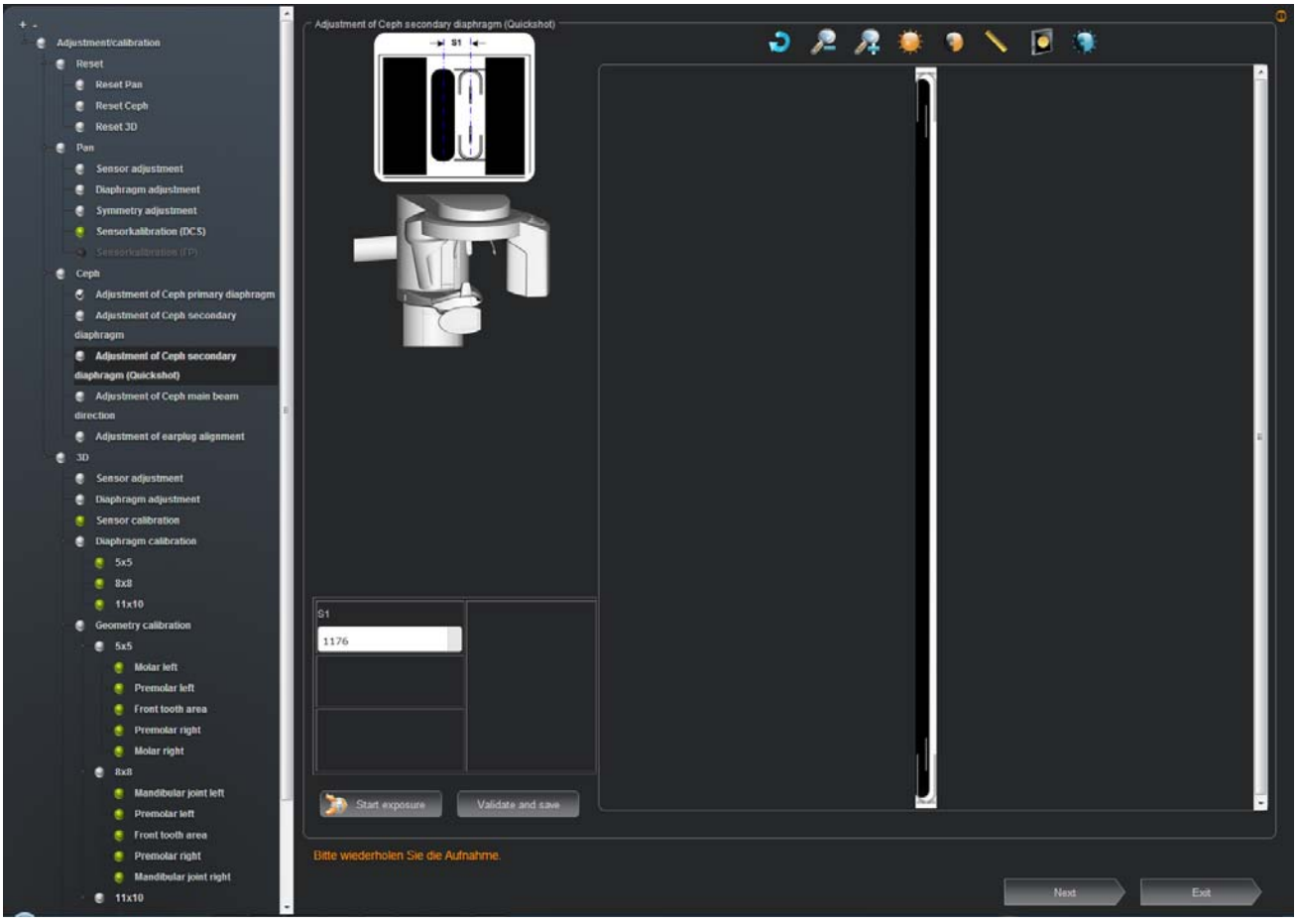


2. Loosen screws (B) slightly (approx. 2-3 turns).



3. Set the diaphragm tilt via screw (C) (**Lx** in mm) and the diaphragm height via screw (D) (**Ly** in mm).
   Screw (C):
   Turn counterclockwise = adjusts the diaphragm to the right
   Turn clockwise = adjusts the diaphragm to the left
   Screw (D):
   Turn counterclockwise = adjusts the diaphragm downward
   Turn clockwise = adjusts the diaphragm upward
   To measure the adjustment, use a gauge.
   The above-mentioned directions of rotation for the screws apply to both left-arm and right-arm versions.
4. Retighten screws (B) firmly.
5. Once adjustment is complete, put the secondary diaphragm cover back again and fix it in place with the screw (A).

13.2.1.7 Adjustment of the ceph secondary diaphragm (QuickShot)



13.2.1.7.1 Automatic adjustment: Ceph secondary diaphragm (QuickShot) (standard)

NOTICE

Risk of damage to unit

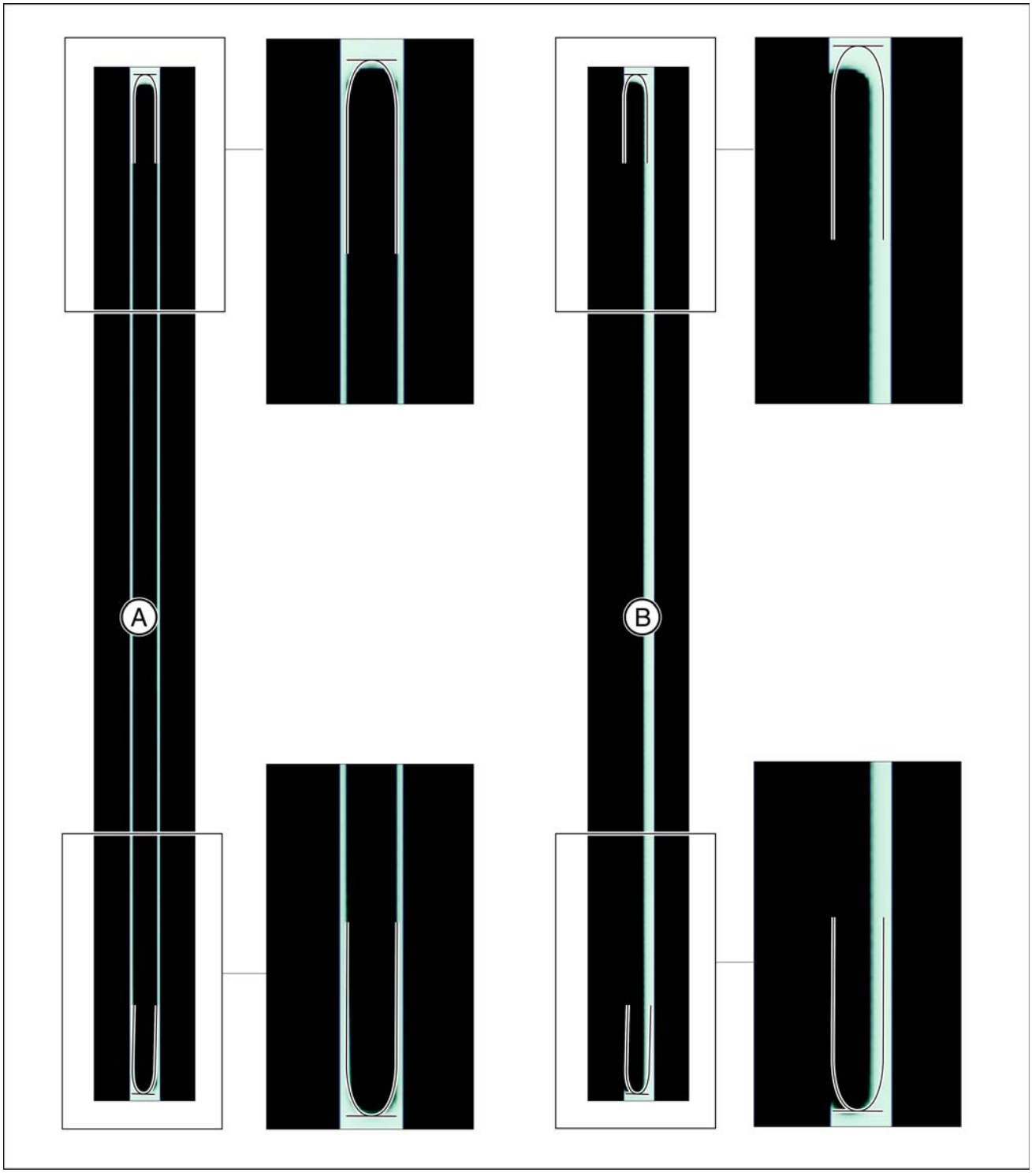
It is essential that the needle phantom is removed from the bite block holder on the unit **before** a ceph exposure is taken; otherwise, the sensor could collide with the phantom.

✓ The pan needle phantom is *not* in the pan bite block holder on the unit.

✓ The ceph test phantom does *not* connect to the cover of the sensor unit.

1. In the structure tree, under *"Ceph"*, click on the *"Adjustment of Ceph secondary diaphragm (Quickshot)"* element (S010.8).
   ↳ The *"Adjustment of Ceph secondary diaphragm (Quickshot)"* menu is displayed in the action area.
2. Establish [→ 209] receptivity.

3. Create an exposure (80kV / 14 mA; 0.3 s) [→ 209].
   - Adjustment value **S1** is calculated automatically from the exposure and entered in the text box of the *"Adjustment of Ceph secondary diaphragm (Quickshot)"* menu.
   - The exposure is displayed in the exposure window.



A	Adjustment OK	• The exposed image section must lie centered and straight in the image section as well as inside the superimposed auxiliary lines. • A surrounding white border must be present. • The maximum density must lie in the center of the diaphragm area.
B	Adjustment not OK	

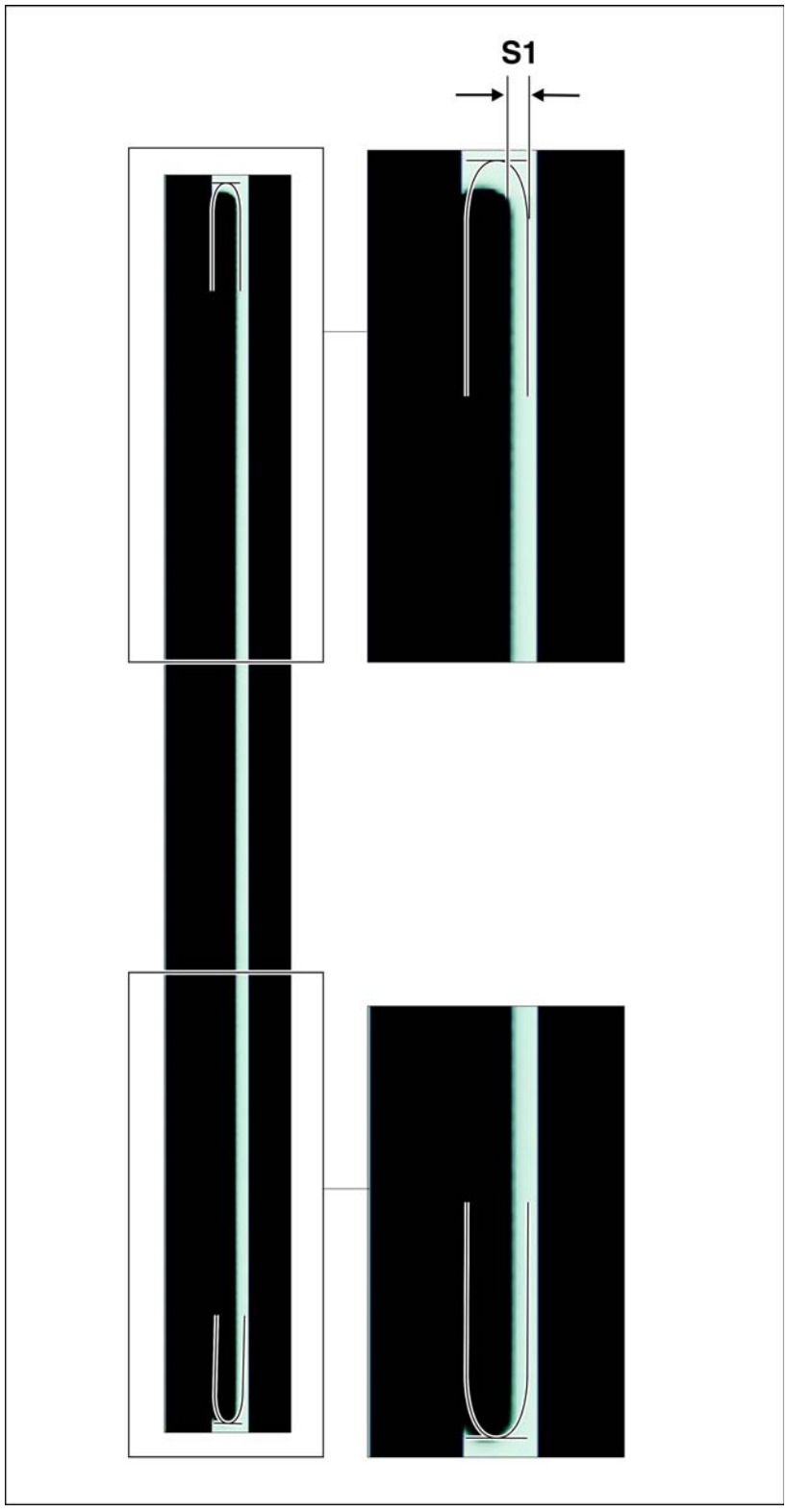
4. Repeat the procedure starting at Step 2 until the value in the menu's text box is equal to "zero". This means that adjustment was performed successfully.
IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 242].

5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [→ 209]
   ↳ The status indicator that prefixes the *"Adjustment of Ceph secondary diaphragm (Quickshot)"* element is checked.
6. Continue with the next stage of the adjustment procedure. [→ 253]

13.2.1.7.2 Manual adjustment: Ceph secondary diaphragm (QuickShot)

The manual adjustment procedure is similar to the one for automatic adjustment [→ 247]. The only difference is that the default adjustment values calculated automatically in the *"Adjustment of Ceph secondary diaphragm (Quickshot)"* menu are overwritten by adjustment values calculated manually.

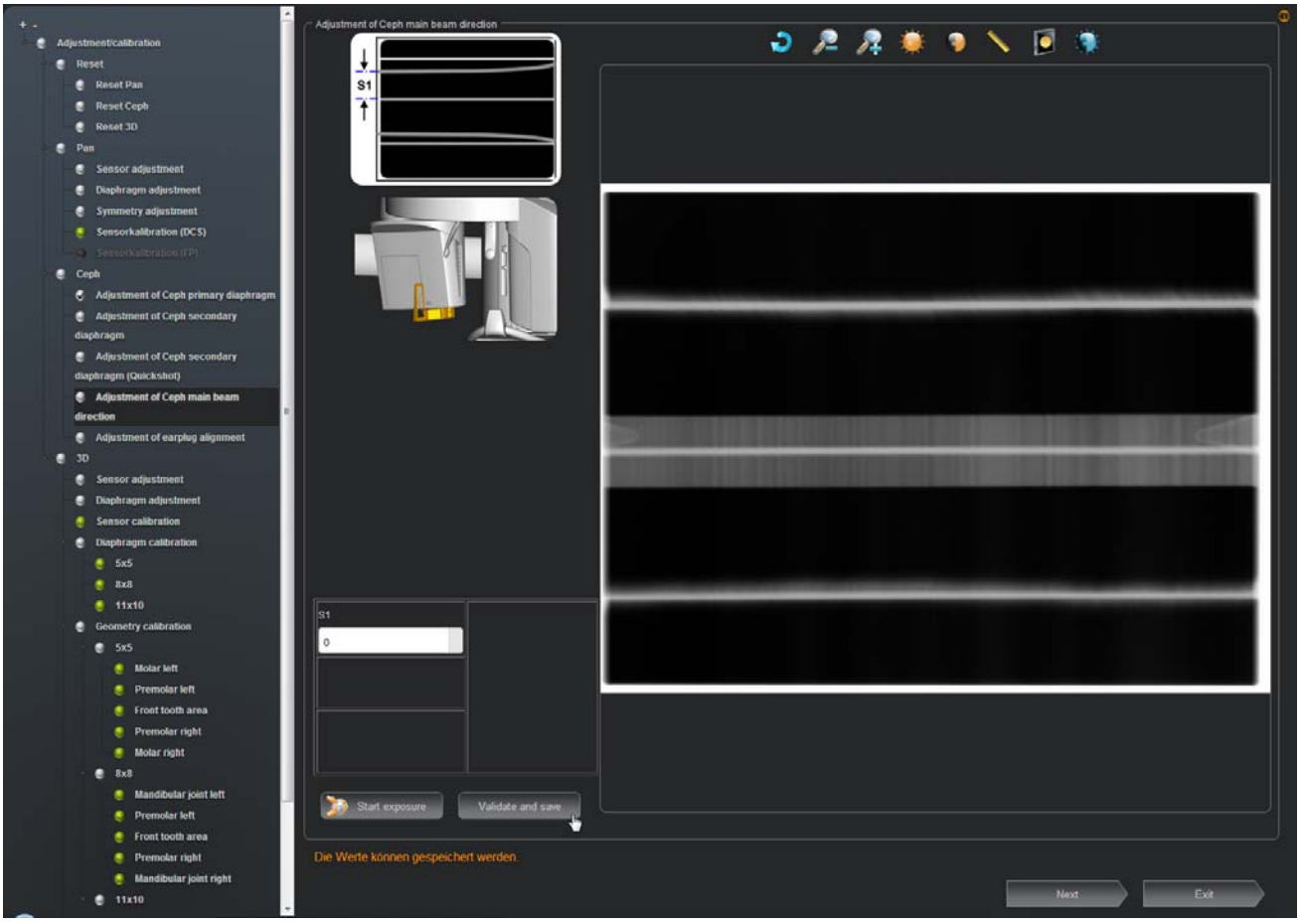
1. Start the *"Adjustment of Ceph secondary diaphragm (Quickshot)"* adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - QuickShot fixed point of rotation (standard) [→ 247]".



2. Once you have taken the exposure, measure distance **S1** with the toolbar measuring ruler [→ 197].

3. Overwrite the adjustment value for **S1** in the text box of the *"Adjustment of Ceph secondary diaphragm (Quickshot)"* menu with the measured value.
   For information about the shifting direction (input of +/- sign in the menu), see the chapter entitled "Shifting direction of the exposed image area [→ 207]".
   NOTICE! Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph secondary diaphragm (QuickShot) (standard) [→ 247]"

13.2.1.8 Adjustment of the ceph main X-ray beam



13.2.1.8.1 Automatic adjustment: Ceph main X-ray beam direction (standard)

NOTICE

Risk of damage to unit

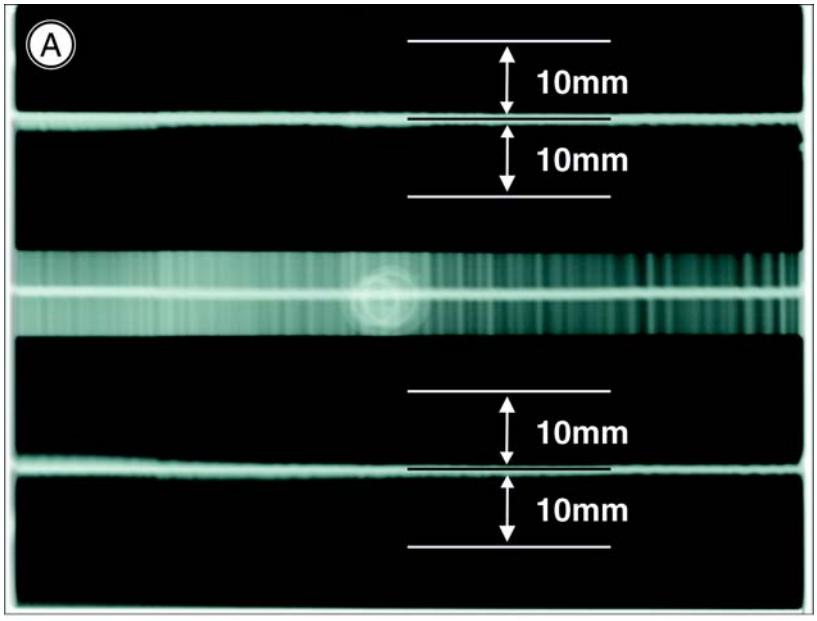
It is essential that the needle phantom is removed from the pan bite block holder on the unit **before** a ceph exposure is taken; otherwise, the sensor unit could collide with the phantom.

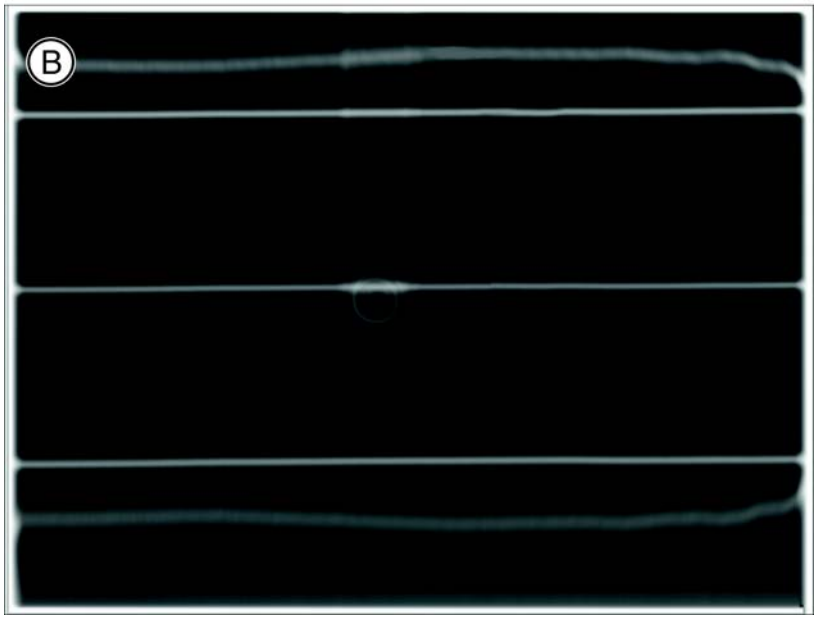
✓ The ceph test phantom connects to the unit's sensor unit [→ 212].

✓ The ear plug holders on the ceph arm have been swung out of the beam direction (ap).

1. In the structure tree, under *"Ceph"*, click on the *"Adjustment of Ceph main beam direction"* element (S010.6).
   ↳ The *"Adjustment of Ceph main beam direction"* menu is displayed in the action area.
2. Establish [→ 209] receptivity.

3. Create an exposure (80 kV / 14 mA; 14.9 s) [→ 209].
   ↳ Adjustment value **S1** is calculated automatically from the exposure and entered in the text box of the *"Adjustment of Ceph main beam direction"* menu.





A	Adjustment OK	• A horizontal bar must be visible in the center of the image. If this bar is visible, the exposure is OK, and the two beams on the image are within the tolerance range of ±10 mm.
B	Adjustment not OK	

↳ The exposure is displayed in the exposure window.

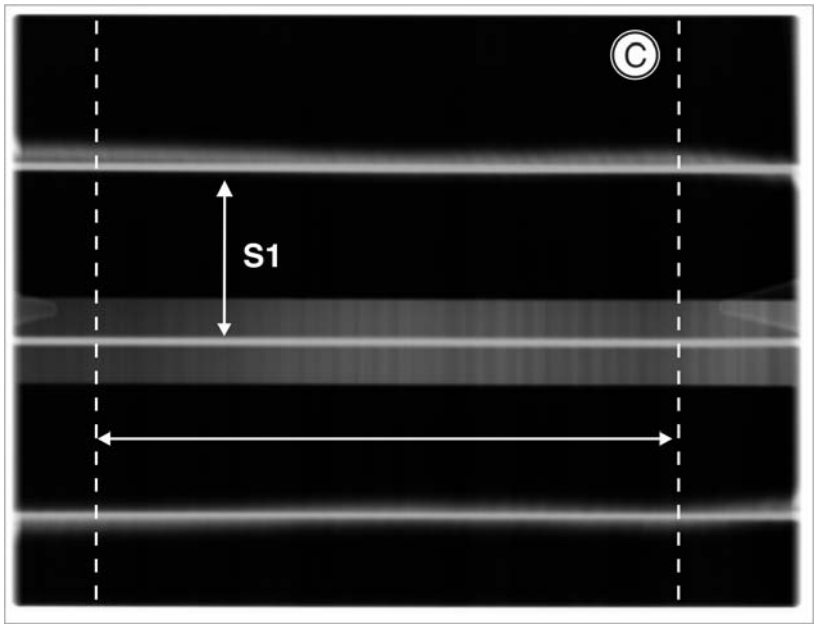
4. Repeat the procedure starting at Step 2 until the value in the menu's text box is equal to "zero". This means that adjustment was performed successfully.
IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 256].

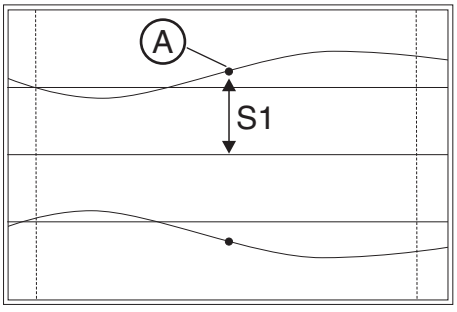
5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [→ 209]
↳ The status indicator that prefixes the *"Adjustment of Ceph main beam direction"* element is checked.
6. Remove the ceph test phantom from the sensor unit cover.
7. Continue with the next stage of the adjustment procedure. [→ 257]

13.2.1.8.2 Manual adjustment: Ceph - Main X-ray beam direction

The manual adjustment procedure is similar to the one for automatic adjustment [→ 253]. The only difference is that the default adjustment values calculated automatically in the *"Adjustment of Ceph main beam direction"* menu are overwritten by adjustment values calculated manually.

1. Start the *"Adjustment of Ceph main beam direction"* adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Main X-ray beam direction (standard) [→ 253]".

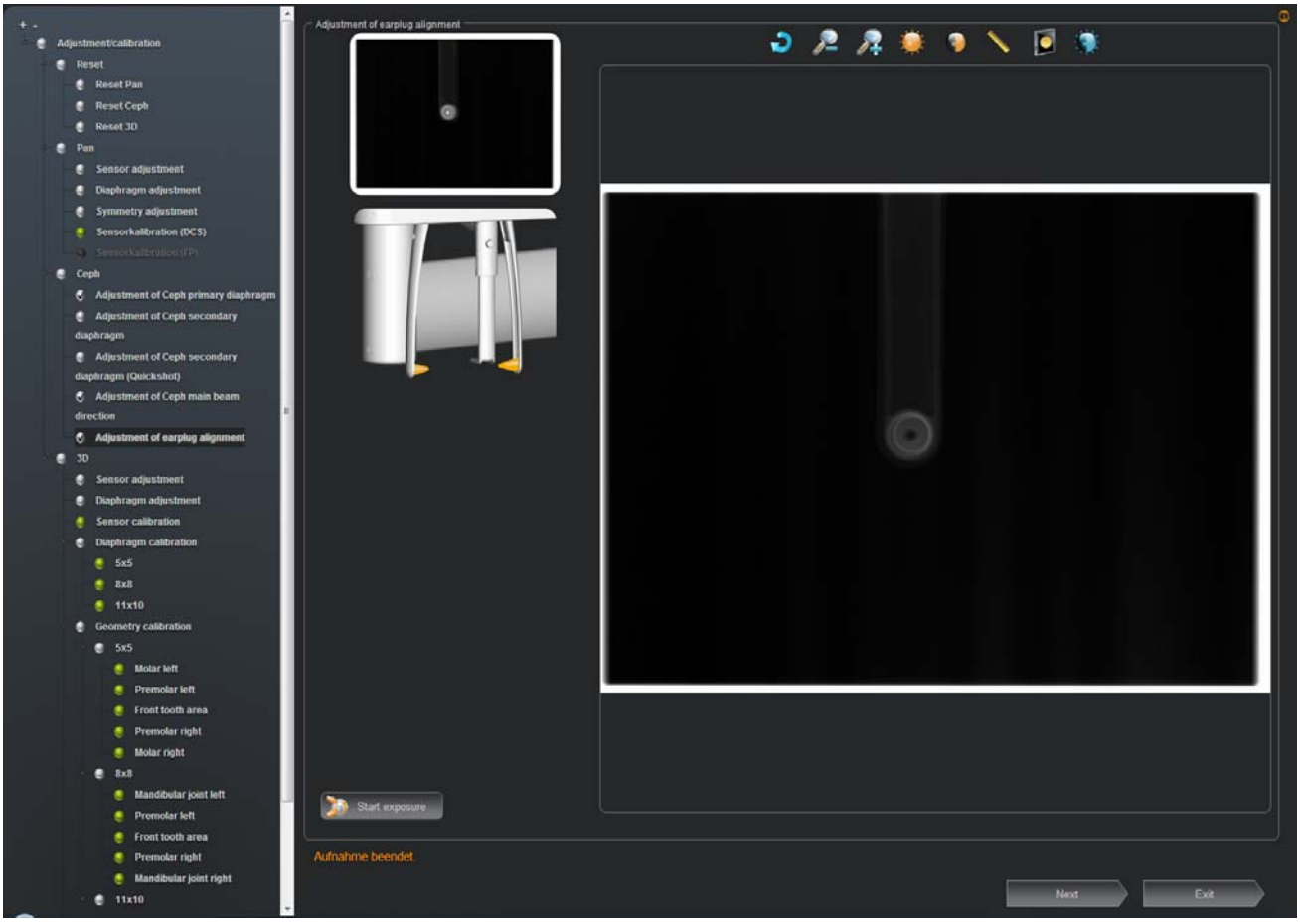




2. Once you have taken the exposure, measure the distance **S1** with the toolbar measuring ruler [→ 197].
   Measure within the measuring range shown in (C).
   Measure the maximum distance **S1**. If the X-ray beam is imaged in the form of an S curve, measure **S1** at the inflection point of the curve (A), but always within the measuring range shown.

3. Overwrite the adjustment value for **S1** in the text box of the *"Adjustment of Ceph main beam direction"* menu with the measured value.
   For information about the shifting direction (input of +/- sign in the menu), see the chapter entitled "Shifting direction of the exposed image area [→ 207]".
   NOTICE! Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Main X-ray beam direction (standard) [→ 253]".

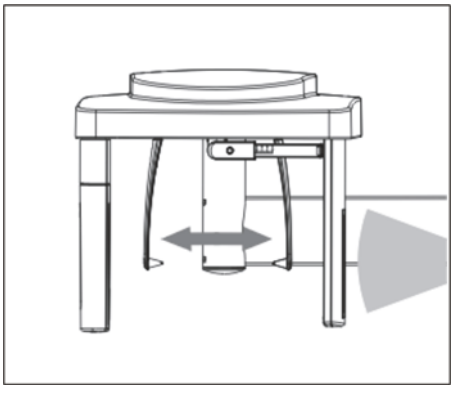
13.2.1.9 Adjusting the earplug alignment



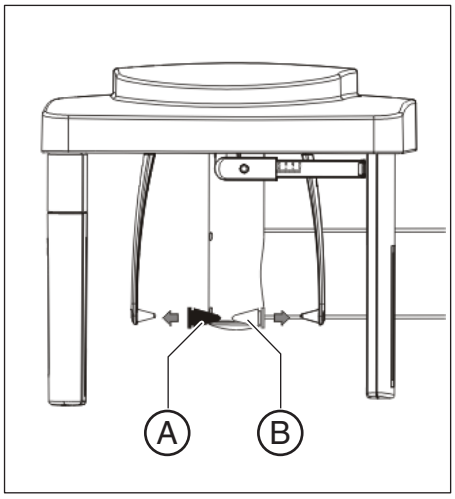
13.2.1.9.1 Checking the ear plug alignment

✓ The ceph sensor is plugged into the ceph slot on the unit.

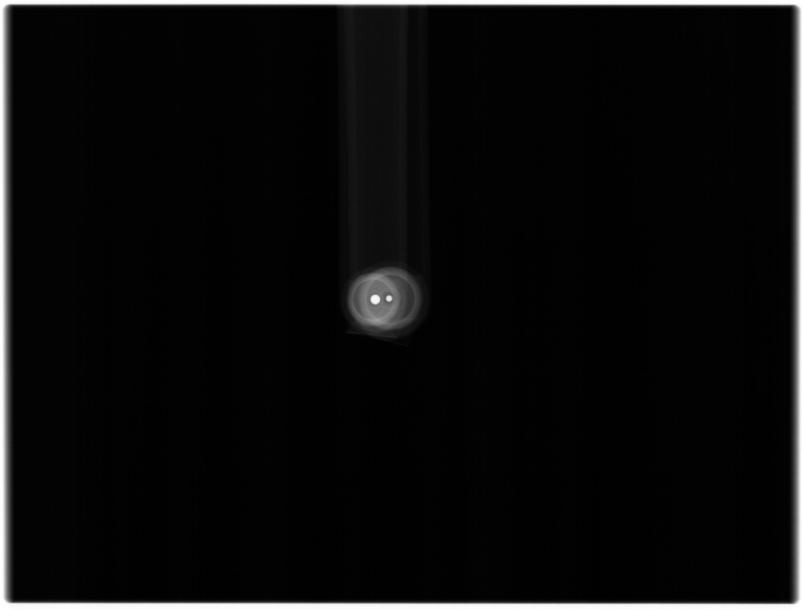
1. In the structure tree, under *"Ceph"*, click on the *"Adjustment of earplug alignment"* element (S010.17).
   ↳ The *"Adjustment of earplug alignment"* menu is displayed in the action area.
   ↳ The unit is moved into the ceph exposure position.



2. Move the ear plug holders completely apart and swing them into the beam direction.

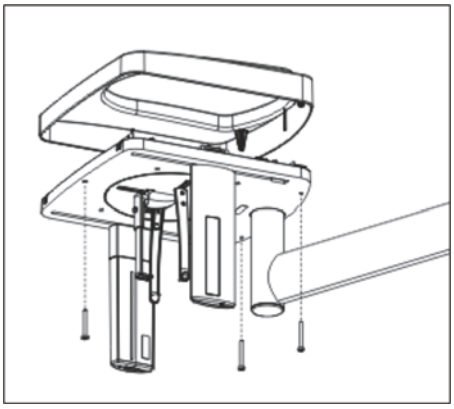


3. Fit the adjusting caps (A+B) to the ear plugs and secure them with adhesive tape.
   Black adjusting cap: on the outside (sensor side)
   Transparent adjusting cap (B): on the inside (tube assembly side)
4. Establish [→ 209] receptivity.
5. Create an exposure (80 kV / 14 mA; 14.9 s) [→ 209].
   - ↳ The exposure is displayed in the exposure window.
   - ↳ The lead balls in the adjusting caps appear as dots on the image.
   - ↳ The two dots must be coincident.

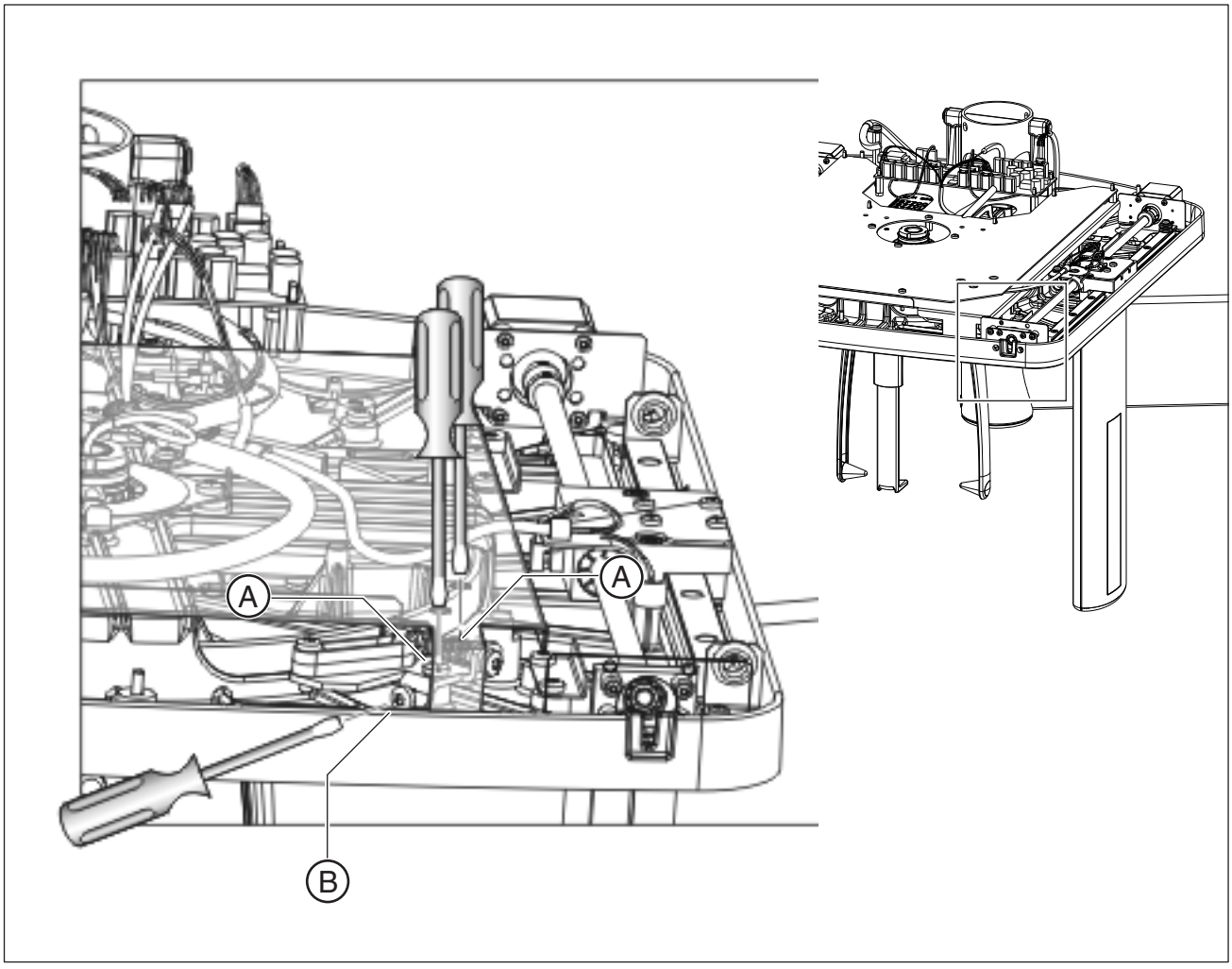


6. *If the two dots are not coincident,* adjust the earplug alignment as described in the section “Adjusting the ear plug alignment [→ 259]” and repeat the scan.
7. Continue with the next stage of the adjustment procedure [→ 262].

13.2.1.9.2 Adjusting the ear plug alignment

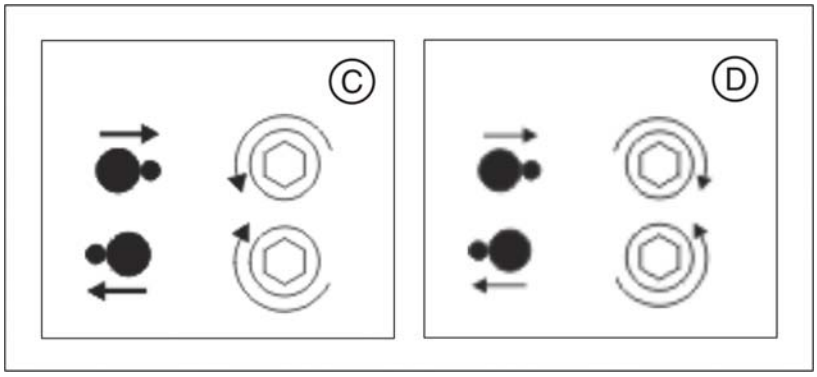


➢ Unscrew and remove the cover from the cephalometer.



Horizontal correction

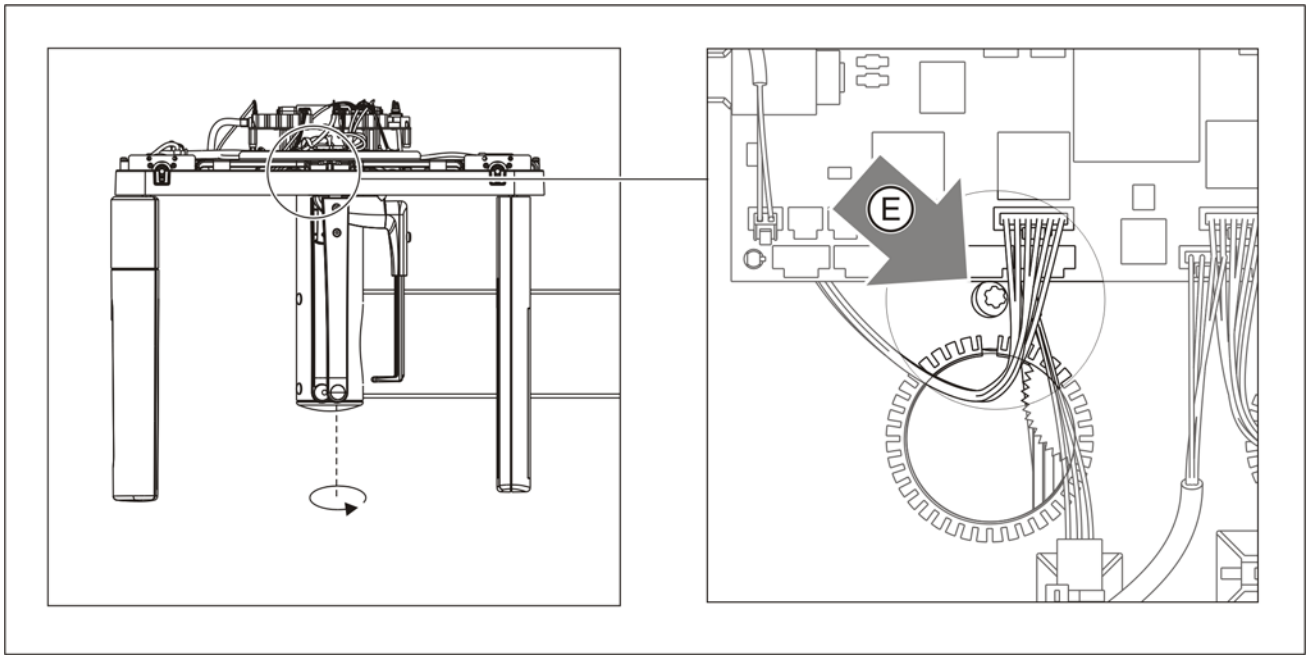
1. Loosen the screws (A) slightly (approx. 2 - 3 turns).
   Tip: Do not unscrew them fully!
2. Adjust the ear plugs in the horizontal direction by turning the screw (B) counterclockwise or clockwise. The direction of rotation for left-arm (C) and right-arm (D) versions is shown in the drawing below.



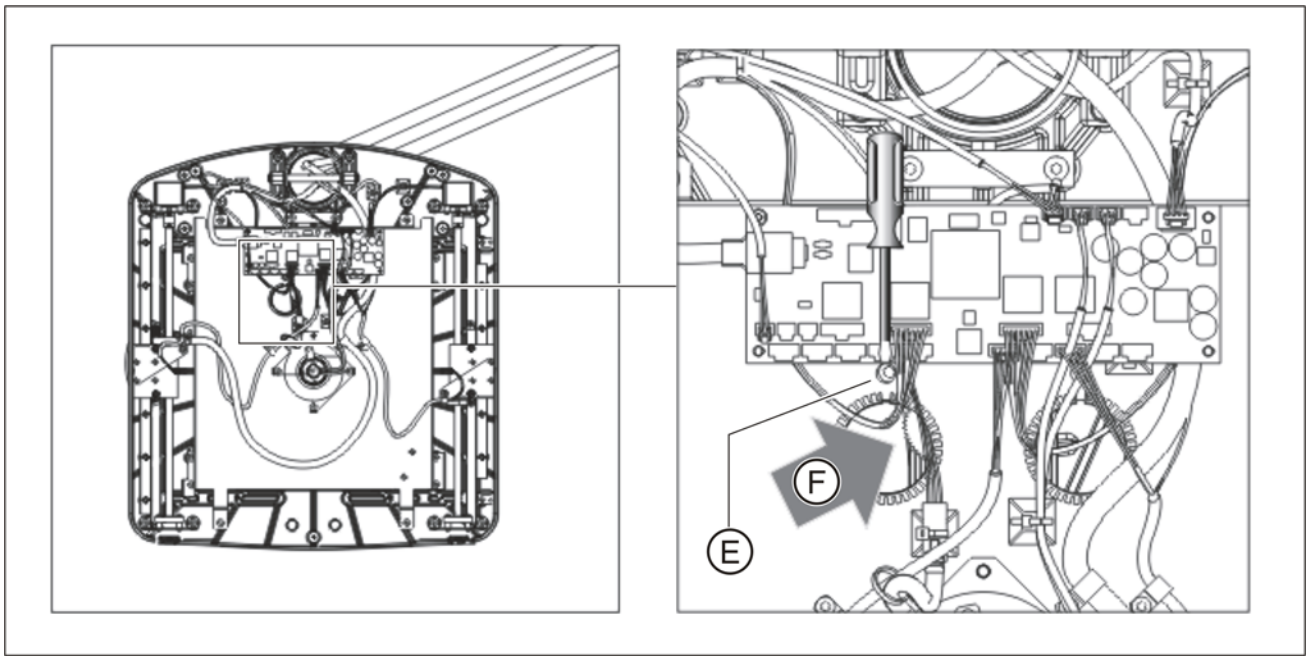
3. Tighten the screw (A).

Vertical correction

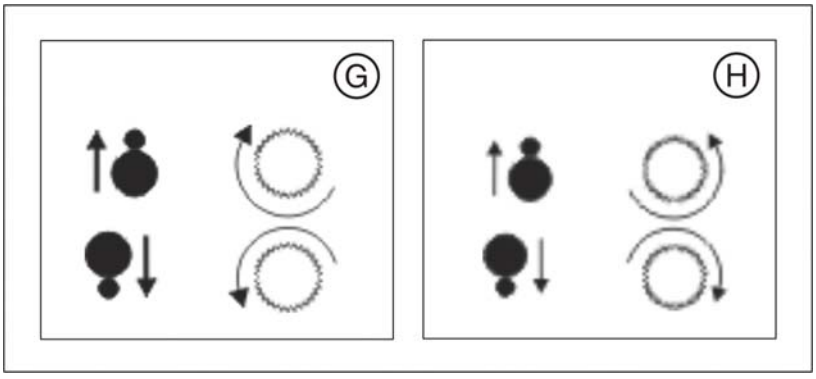
1. Turn the rotary table counterclockwise approx. 100 degrees until you can see the screw (**E**) through the opening in the cover plate.



2. Loosen the screws (E) slightly (approx. 2 - 3 turns).
   Tip: Do not unscrew them fully!



3. Adjust the ear plugs in the vertical direction by turning the knurled nut (**F**). The direction of rotation for left-arm (G) and right-arm (H) versions is shown in the drawing below.



4. Tighten the screw (E) firmly.

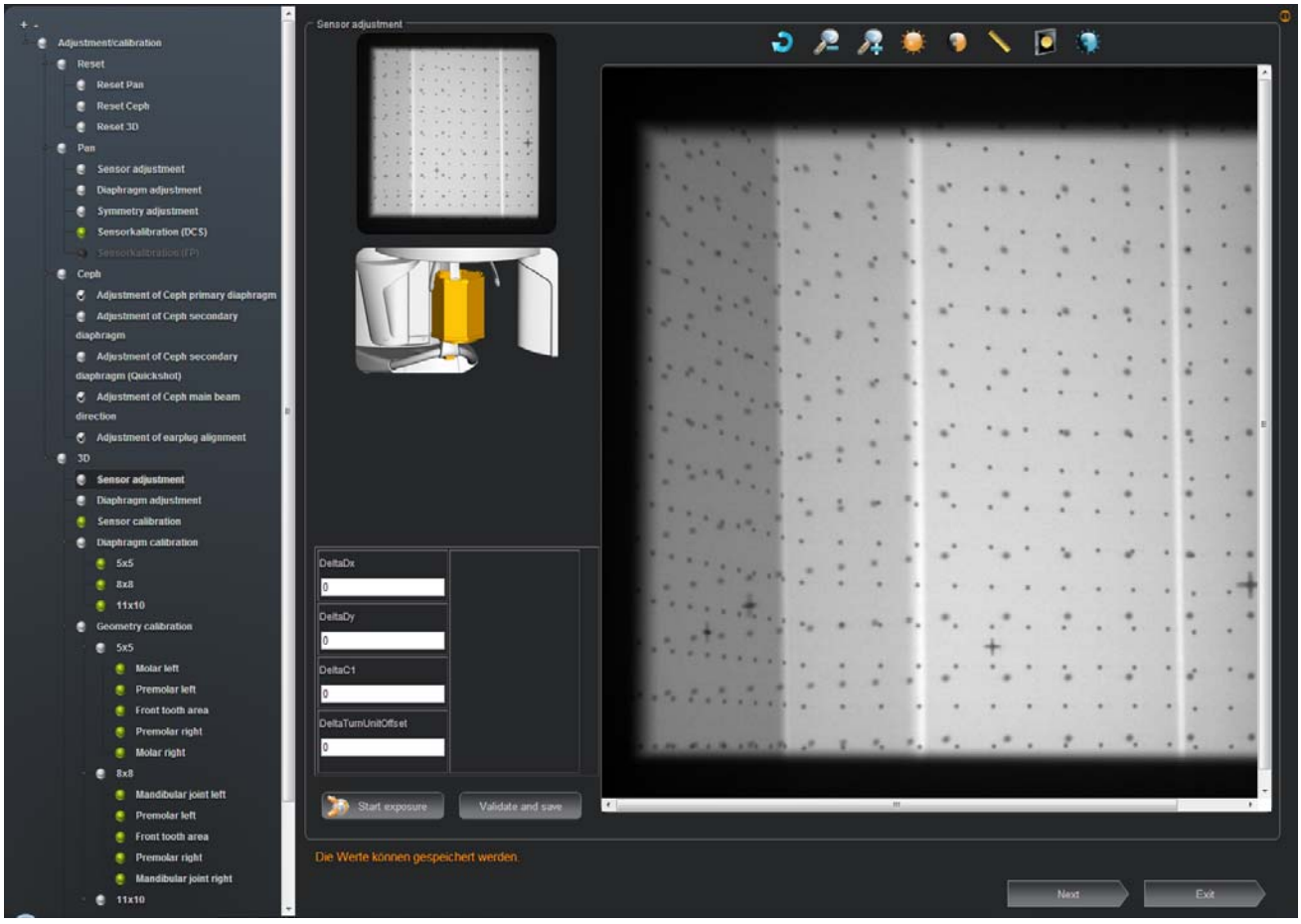
Following adjustment

1. Swing the ear plug holders back into the beam direction (**black adjusting cap on the outside**).
2. Check the adjustment of the ear plug alignment [→ 257].

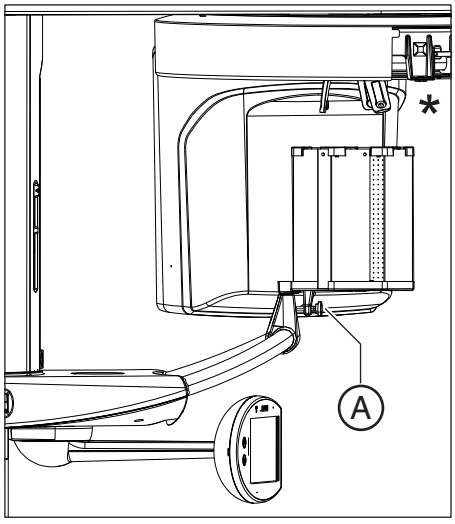
13.2.2 3D adjustment/calibration

IMPORTANT
For the 3D adjustment and calibration, the values in the input fields do not have to be equal to zero. Confirmation of a successful adjustment and calibration is the message in the calibration menu action window; e.g. "Adjustment successful", "Values can be adopted", etc.

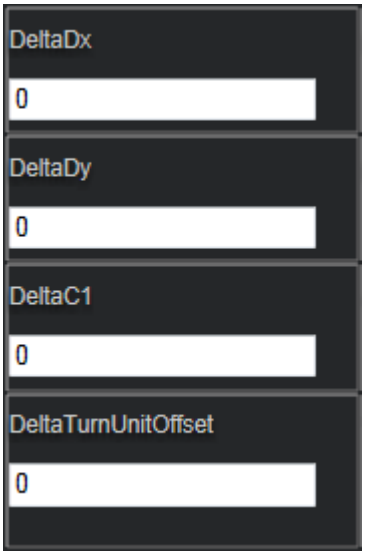
13.2.2.1 Sensor adjustment



1. Insert the 3D calibration block into the bite block holder on the unit. [→ 213]

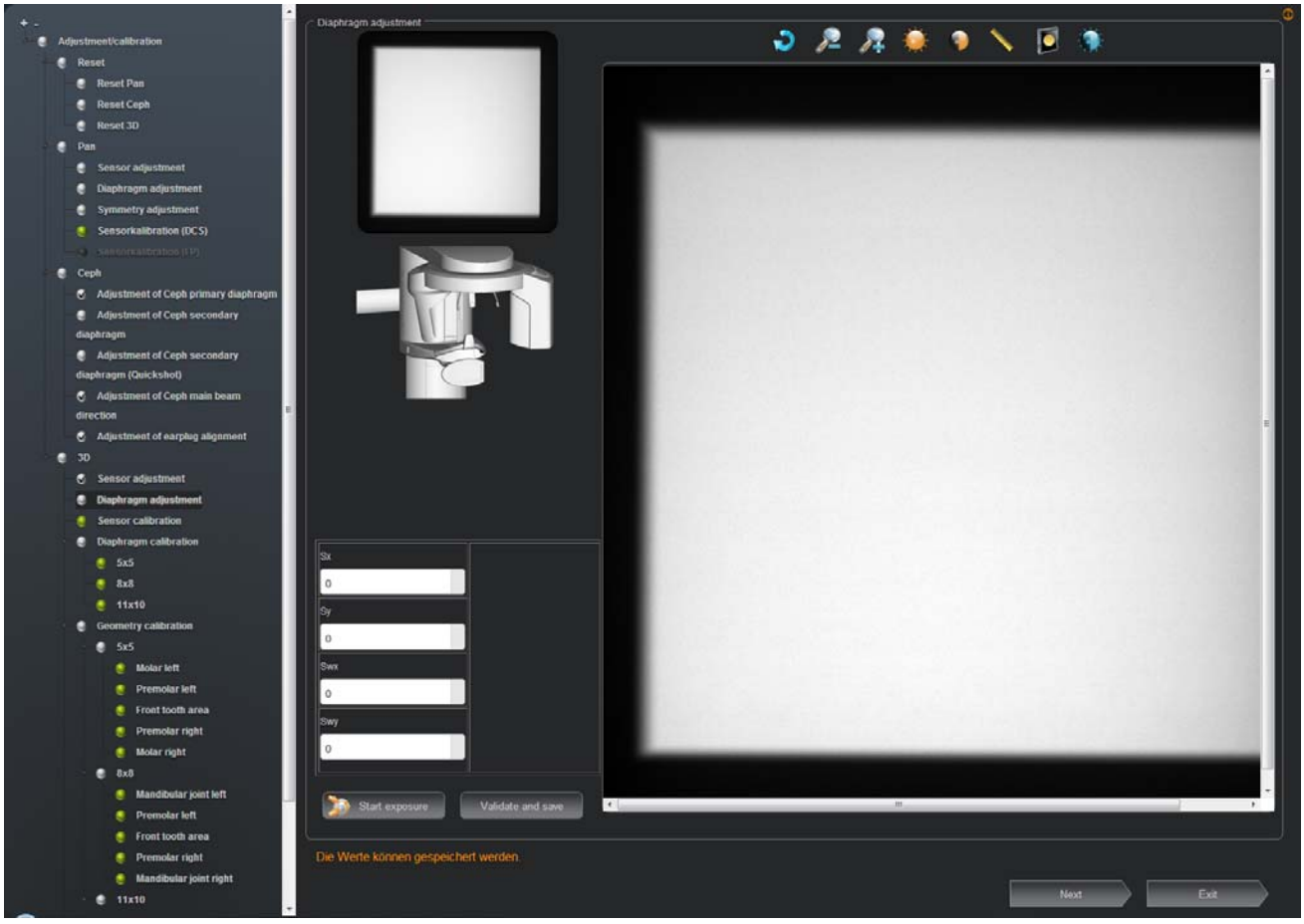


2. Align the calibration block with the spirit level by adjusting the screw (A).
   * For greater clarity, the unit in the left image is displayed without sensor unit.
3. Open the calibration menu [→ 195].
4. In the structure tree, under *"3D"*, click on the *"Sensor adjustment"* element (S010.20).
5. Establish readiness for exposure [→ 209].
6. Create an exposure (85 kV / 22 mAs) [→ 209].
   - A message is displayed in the action window to indicate whether adjustment has been successful and the values can be applied.
7. Repeat the procedure starting at Step 5 until adjustment is successful.



8. When adjustment is OK, save the values [→ 209].
   - A message is displayed in the action window to indicate that the values have been successfully saved.
   - The status indicator that prefixes the element *"Sensor adjustment"* is checked.
9. Remove the 3D calibration block from the pan bite block holder on the unit.
10. Continue with the next stage of the adjustment procedure [→ 264].

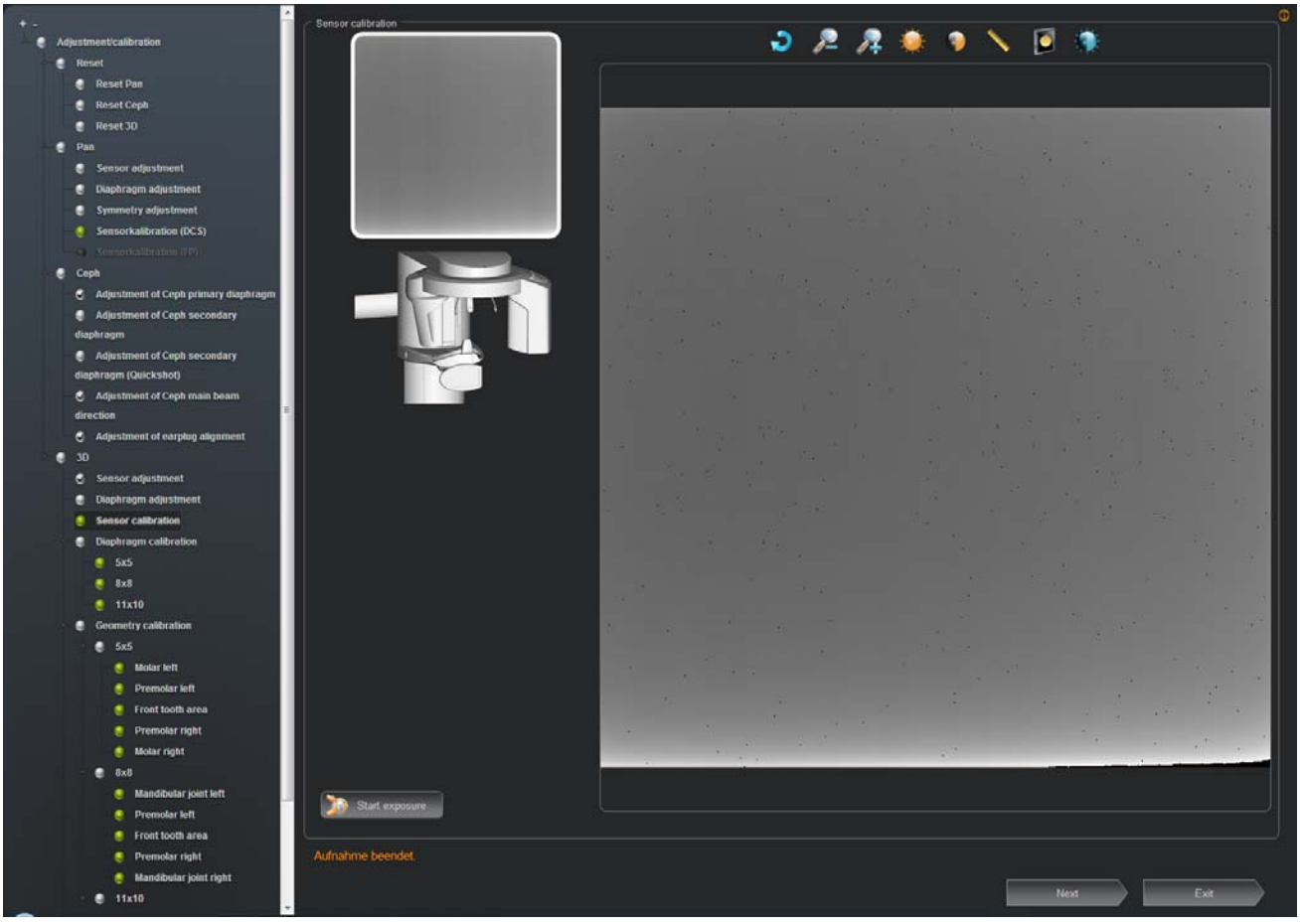
13.2.2.2 Diaphragm adjustment



✓ The 3D calibration block *is not* in the bite block holder on the unit.

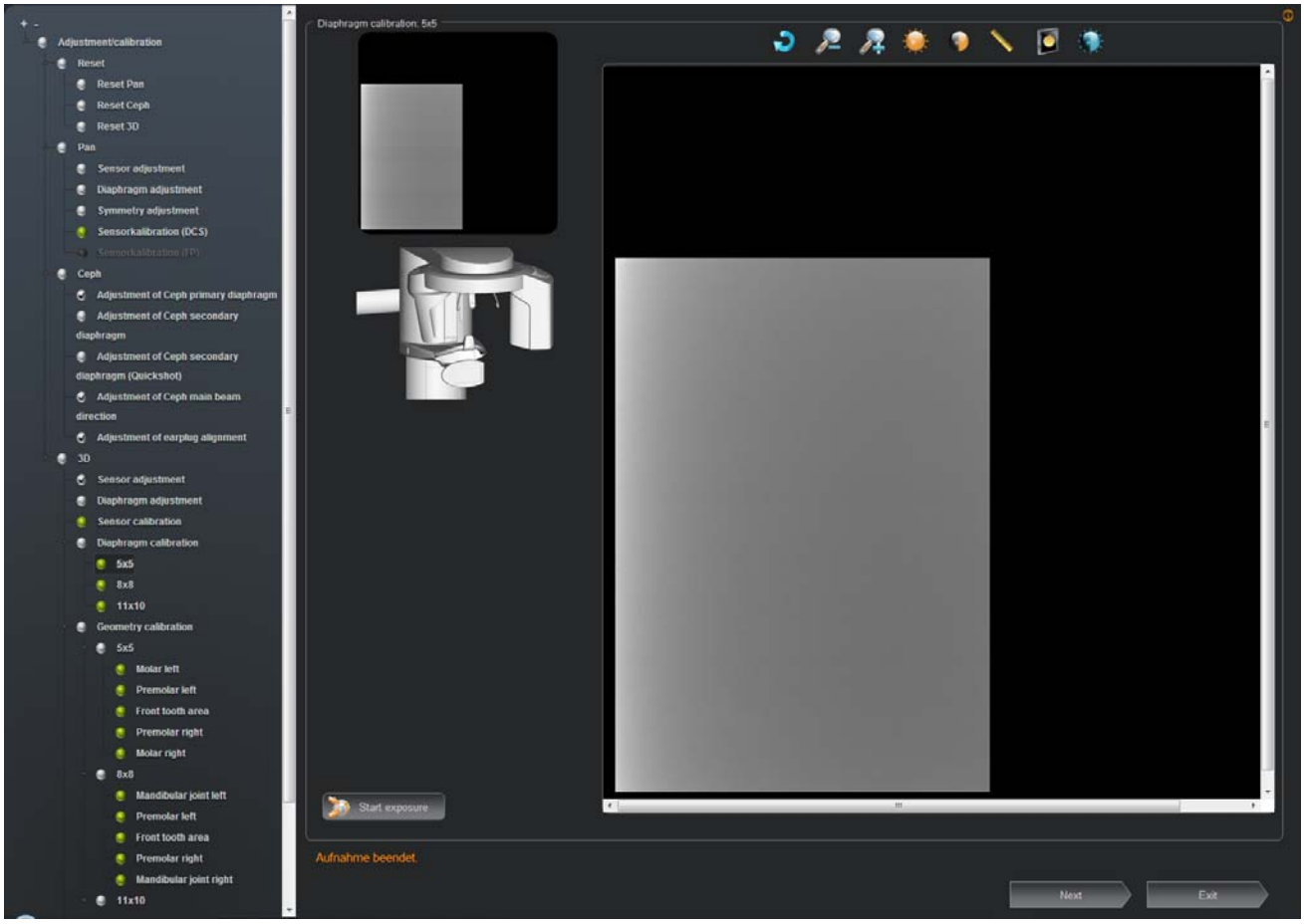
1. In the structure tree, under *"3D"*, click on the *"Diaphragm adjustment"* element (S030.10).
2. Establish readiness for exposure [→ 209].
3. Create an exposure (85 kV / 0.34 mAs) [→ 209].
   ↳ A message is displayed in the action window to indicate whether adjustment has been successful and the values can be applied.
4. Repeat the procedure starting at Step 2 until adjustment is successful.
5. When adjustment is OK, save the values. [→ 209]
   ↳ A message is displayed in the action window to indicate that the values have been successfully saved.
   ↳ The status indicator that prefixes the element *"Diaphragm adjustment"* is checked.
6. Continue with the next stage of the calibration procedure. [→ 265]

13.2.2.3 Sensor calibration



1. In the structure tree, under *"3D"*, click on the *"Sensor calibration"* element (S010.64).
2. Establish [→ 209] receptivity.
3. Create an exposure (85 kV / 22 mAs) [→ 209].
   ↳ A message is displayed in the action window to indicate that the exposure is complete and the status indicator in front of the *"Sensor calibration"* element in the structure tree responds accordingly:
   Calibration not OK = status indicator stays red
   Calibration OK = status indicator turns green
   NOTE: The calibration values are automatically saved.
4. Continue with the next stage of the calibration procedure [→ 266].

13.2.2.4 Diaphragm configuration

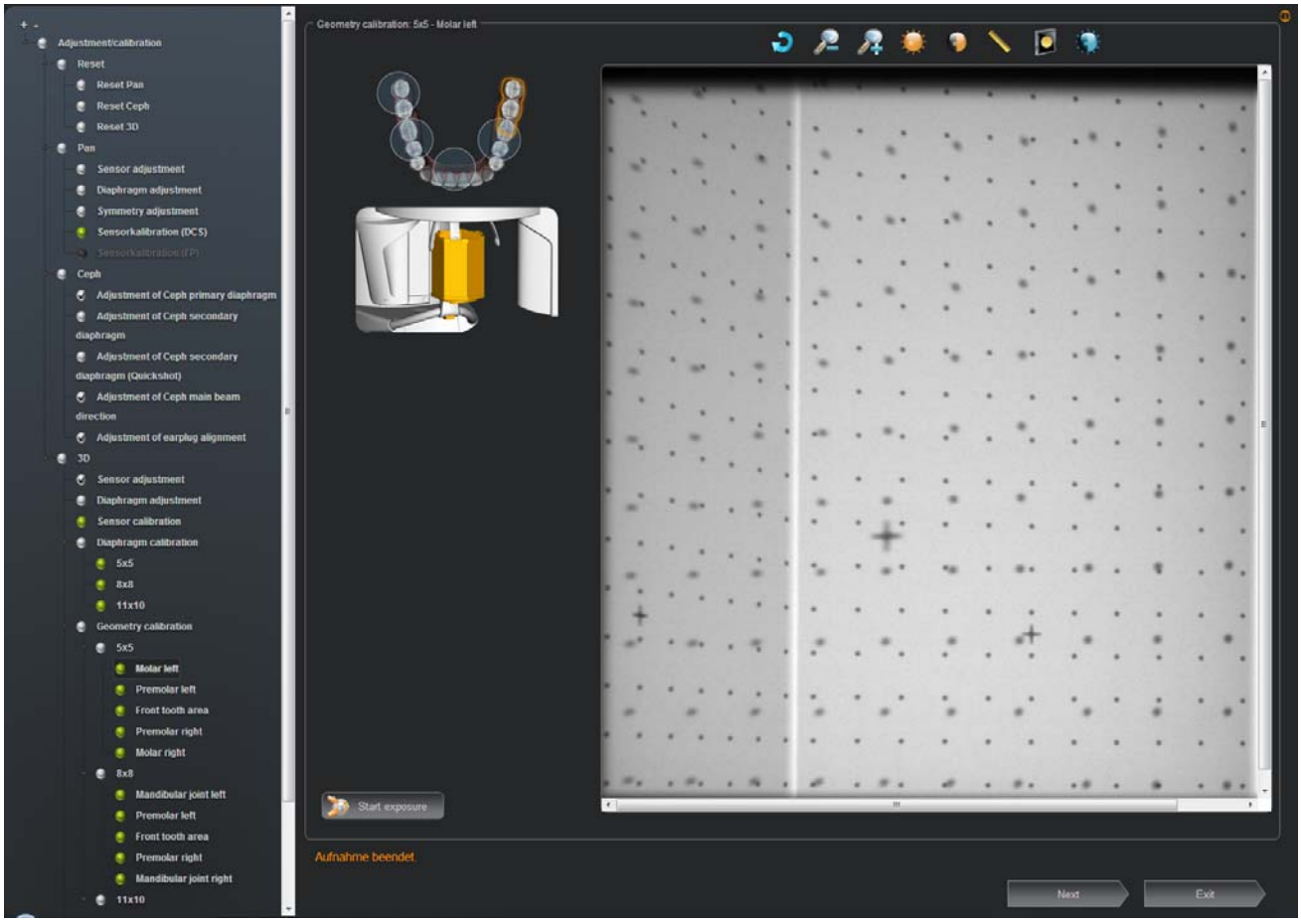


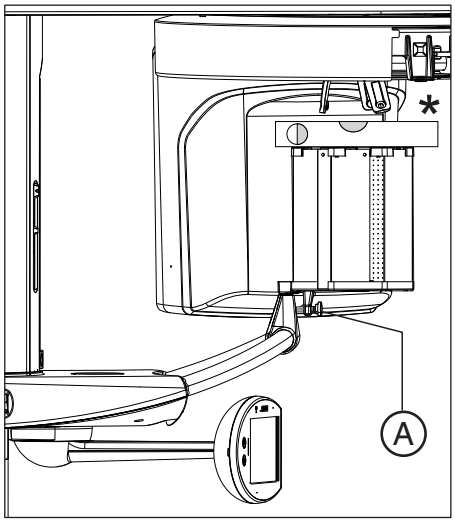
✓ The 3D calibration block *is not* in the bite block holder on the unit.

1. In the structure tree, under *"3D"* / *"Diaphragm calibration"*, click on the *"5x5"* element (S030.11).
   ↳ The *"5x5"* volume is selected.
2. Establish [→ 209] receptivity.
3. Create an exposure (85 kV / 0.34 mAs) [→ 209].
   ↳ A message is displayed in the action window to indicate whether adjustment has been successful and the status indicator in front of the *"5x5"* element in the structure tree responds accordingly:
   Calibration not OK = status indicator stays red
   Calibration OK = status indicator turns green
   NOTE: The calibration values are automatically saved.
4. Click on the *"Next"* button or select the volume *"8x8"* in the structure tree (S030.12).
   ↳ The *"8x8"* volume is selected.
5. Establish [→ 209] receptivity.

6. Take an exposure (85 kV / 0.34 mAs) [→ 209].
   ↳ A message is displayed in the action window to indicate whether adjustment has been successful and the status indicator in front of the *"8x8"* element in the structure tree responds accordingly:
   Calibration not OK = status indicator stays red
   Calibration OK = status indicator turns green
   NOTE: The calibration values are automatically saved.
7. *If volume "11x10" is available:*
   Click on the *"Next"* button or select the volume *"11x10"* in the structure tree (S030.13).
   ↳ The *"11x10"* volume is selected.
8. Establish [→ 209] receptivity.
9. Take an exposure (85 kV / 0.34 mAs) [→ 209].
   ↳ A message is displayed in the action window to indicate whether adjustment has been successful and the status indicator in front of the *"11x10"* element in the structure tree responds accordingly:
   Calibration not OK = status indicator stays red
   Calibration OK = status indicator turns green
   NOTE: The calibration values are automatically saved.
10. Continue with the next stage of the calibration procedure. [→ 268]

13.2.2.5 Geometry calibration



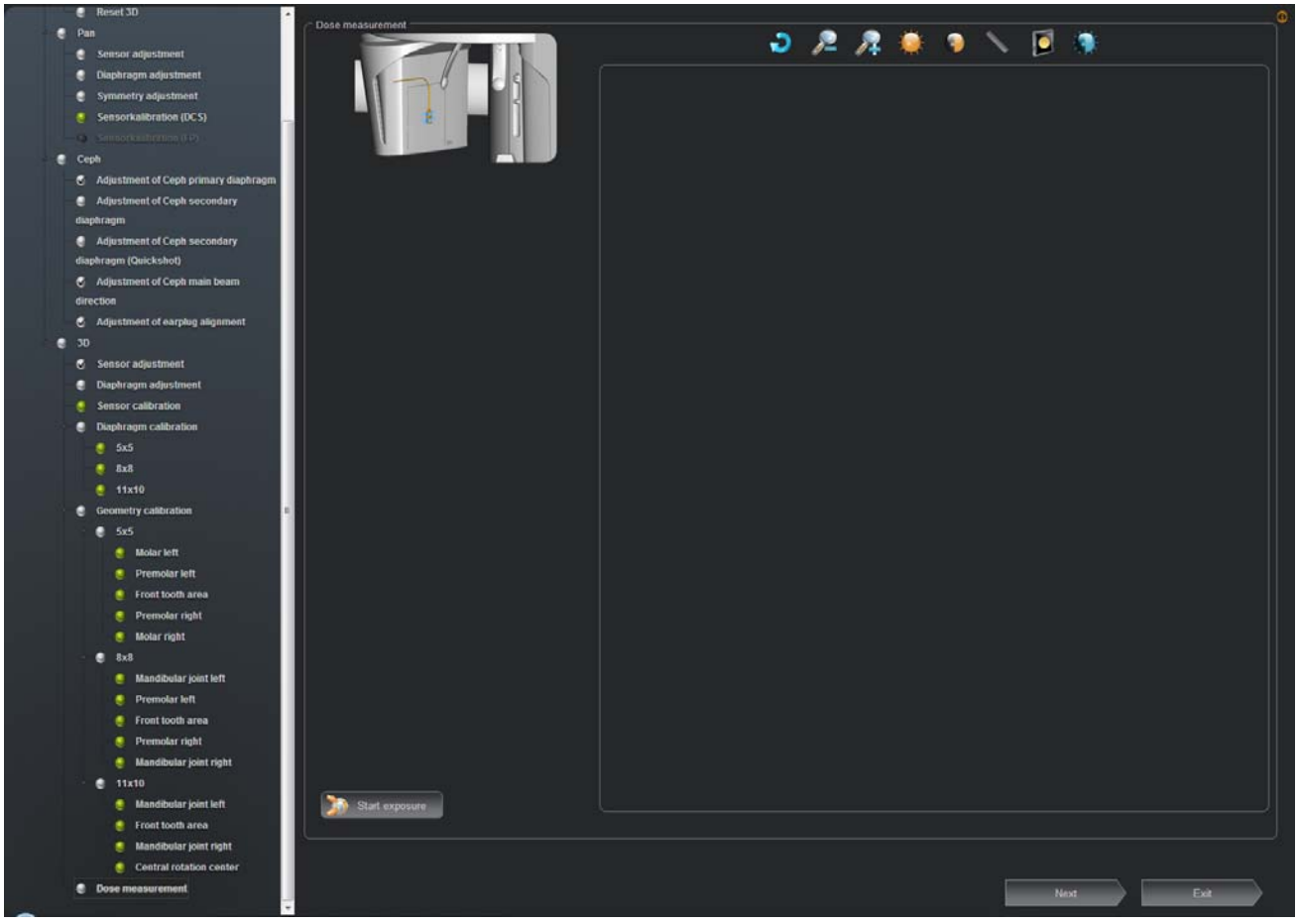


1. Insert the 3D calibration block into the bite block holder on the unit. [→ 213]
2. Align the 3D calibration block with the spirit level by adjusting the screw (A).
   * For greater clarity, the unit in the left image is displayed without sensor unit.
3. In the structure tree, under *"3D"* / *"Geometry calibration"* / *"5x5"*, click on the *"Molar left"* / element (S010.25 - S010.39).
   ↳ The *"Molar left"* element is selected.
4. Establish [→ 209] receptivity.
5. Create an exposure (85 kV / 22 mAs) [→ 209].
   ↳ A message is displayed in the action window to indicate whether adjustment has been successful and the status indicator in front of the *"5x5"* / *"Molar left"* element in the structure tree responds accordingly:
   Calibration not OK = status indicator stays red
   Calibration OK = status indicator turns green
   NOTE: The calibration values are automatically saved.
6. Repeat the procedure starting at Step 4 until calibration is successful.
7. Click on the *"Next"* button or select the next center of rotation of volume *"5x5"*.

8. Establish [→ 209] receptivity.
9. Take an exposure (85 kV/22 mAs) [→ 209].
   ↳ A message is displayed in the action window to indicate whether adjustment has been successful and the status indicator in front of the *"5x5"* / *"Premolar left"* element in the structure tree responds accordingly:
   Calibration not OK = status indicator stays red
   Calibration OK = status indicator turns green
   NOTE: The calibration values are automatically saved.
10. Repeat the procedure starting at Step 8 until calibration is successful.
11. Repeat calibration for all centers of rotation of volume *"5x5"* and for all other volumes and their centers of rotation.
12. Remove the 3D calibration block from the pan bite block holder on the unit.

13.2.2.6 Dosimetry

A dosimeter for pulsed radiation (e.g. Mult-O-Meter 512L) is required for dosimetry.



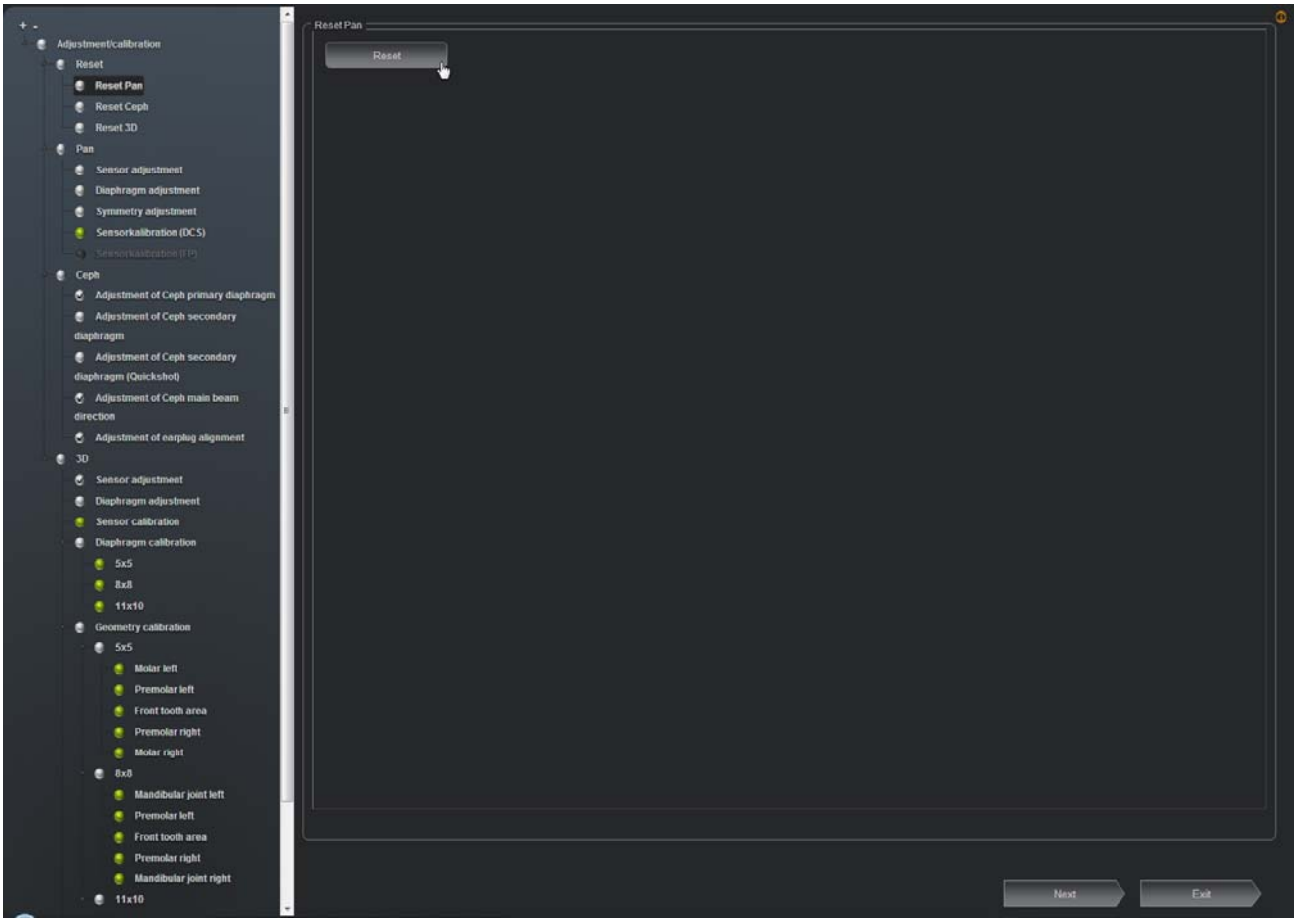
1. In the structure tree, under *"3D"*, click on the *"Dose measurement"* element (S011.21).
2. Attach the Mult-O-Meter sensor in the middle of the sensor unit (flat panel detector side).
3. Select a program from the 3D program group on the control panel.
   ↳ The unit moves to the 3D exposure position.
4. Establish [→ 209] receptivity.
5. Create an exposure (85 kV / 35 mAs).
   ↳ The status indicator that prefixes the *"Dose measurement"* element is checked.
6. Read the dose shown on the Mult-O-Meter.
   ↳ The dose value must be between 1.2 and 2.3 mGy.
7. Note down the dose for later recording.
8. Remove the Mult-O-Meter from the sensor unit again.
9. Click the *"Exit"* button to close the calibration menu.

13.2.3 Resetting adjustment/calibration

In an **absolute emergency**, the settings made for adjustment and calibration can be reset in full or in part to the factory settings and/or modified manually in the *"Adjustment/calibration"* menu.

NOTICE

Create a data backup of the adjustment/calibration data in all cases before you reset the adjustment and calibration.



1. To reset adjustment and calibration data, click in the structure tree under *"Reset"* on the element *"Reset Pan"*, *"Reset Ceph"* or *"Reset 3D"* (depending on what data you would like to reset).
2. To start resetting the adjustment and calibration data, click on the *"Reset"* button.

IMPORTANT

With the *"Reset 3D"* function, only the *"Sensor adjustment"* and *"Diaphragm adjustment"* adjustments are reset. The calibration values from the *"Sensor calibration"*, *"Diaphragm calibration"* and *"Geometry calibration"* menus are retained.

After resetting the values

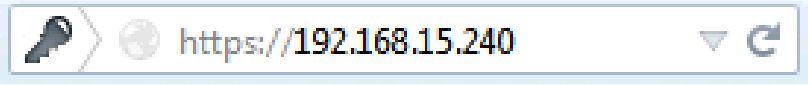
If the adjustment and calibration has been reset, the unit must be readjusted and recalibrated.

13.3 Adjusting the touchscreen via the web service

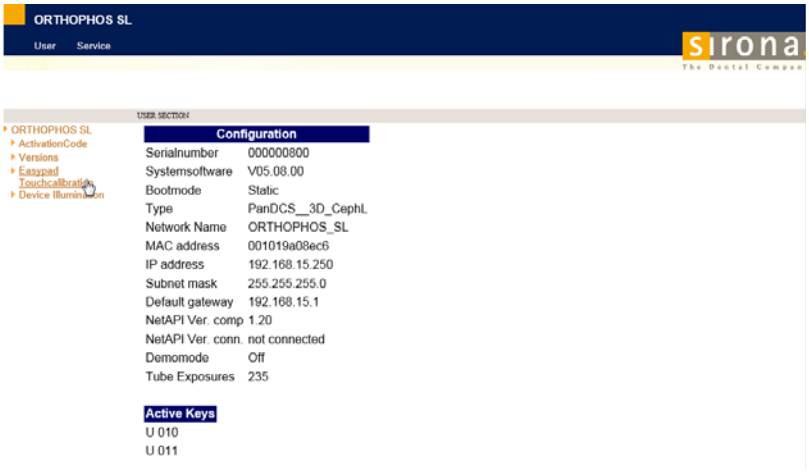
✓ The unit and computer are turned on.

✓ The unit is logged into the network as an X-ray component.

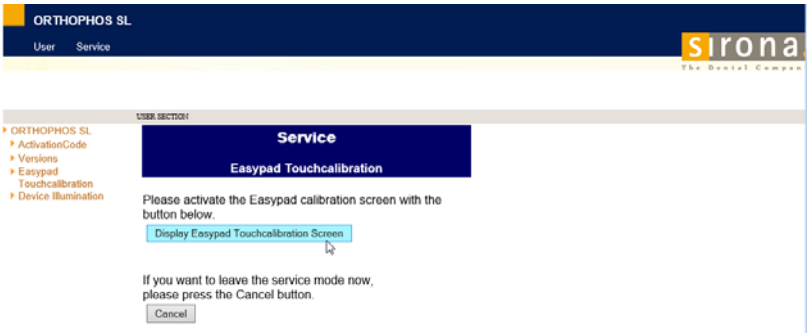
1. Start an Internet browser such as Internet Explorer or Firefox.



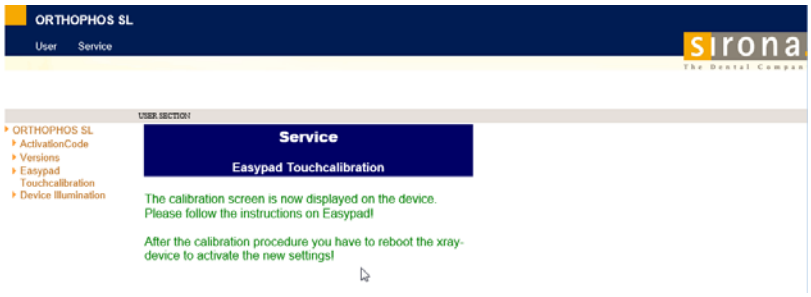
2. In the address line, enter "https://" and the IP address of your unit.
   Example: https://192.168.15.240
   Tip: The IP address of your unit can be found on the info screen.
3. Confirm your input with the "Enter" key.
   ↳ The Sirona Web service is loaded.
   ↳ The sub menus of the *"User"* menu are displayed in the structure tree.



4. Click on the *"Easypad Touchcalibration"* button.

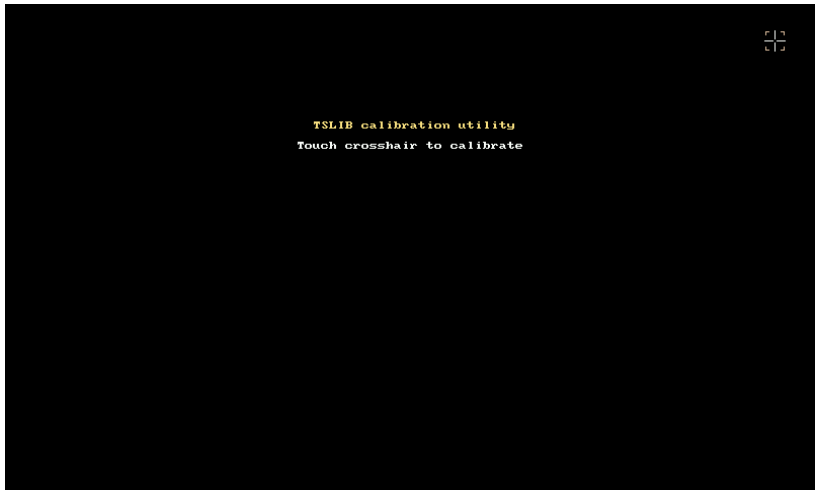


   ↳ The service routine for touchscreen calibration is opened.
   ↳ You can abort the adjustment procedure at any time by clicking on the *"Cancel"* button in the Web browser.
5. Click on the *"Display Easypad Touchcalibration Screen"* button.



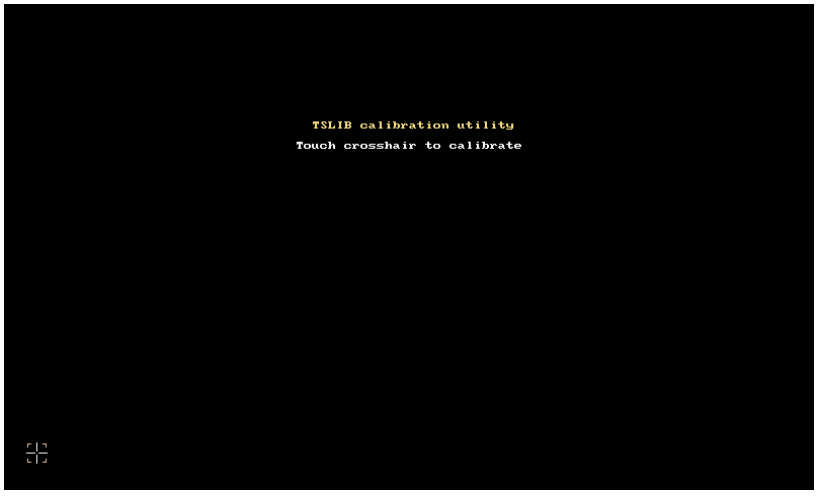
- A message is displayed in the web browser to indicate that the adjustment screen has been opened on the display.
- The **first adjustment screen** appears on the control panel.

6. Touch the center of the square in the **top left** corner of the screen.

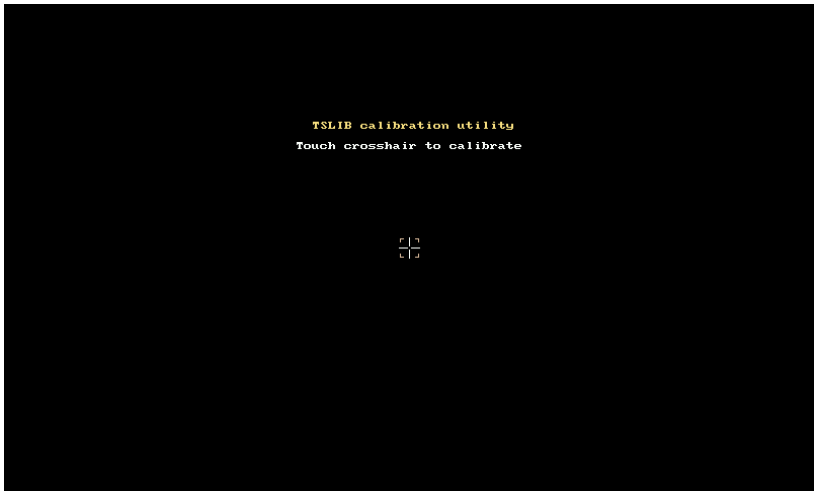


7. Touch the center of the square in the **top right** corner of the screen.

8. Touch the center of the square in the **bottom right** corner of the screen.



9. Touch the center of the square in the **bottom left** corner of the screen.



10. Touch the center of the square in the **center** of the screen.

↳ The unit switches to PC service mode. Service mode is displayed on the Easypad via the PC service image.

11. Exit the web service again.
12. Restart the unit.
    ↳ The touchscreen is now adjusted.

14 Final work

14.1 Save sensor data

You can use the *"Backup sensor data"* menu to load the sensor data (factory calibration of the sensor) from the DX83 board and save it as a Zip file.

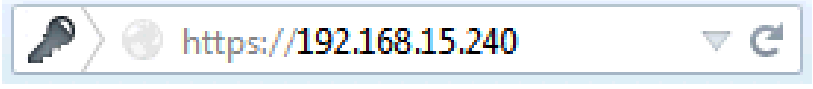
NOTE: Since the sensor data is saved on the DX83 board, this is required e.g. before exchanging the DX83 board. The saved sensor data must then be resaved on the new DX83 board following replacement of the board. This is possible via the *"Restore sensor data"* menu (see the Service Manual).

Open the *"Backup / Restore sensor data"*

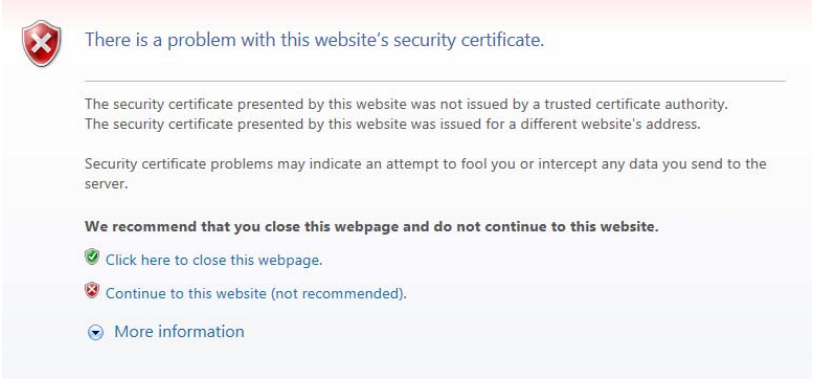
✓ The unit and computer are turned on.

✓ The unit is logged into the network as an X-ray component.

1. Start an Internet browser such as Internet Explorer or Firefox.



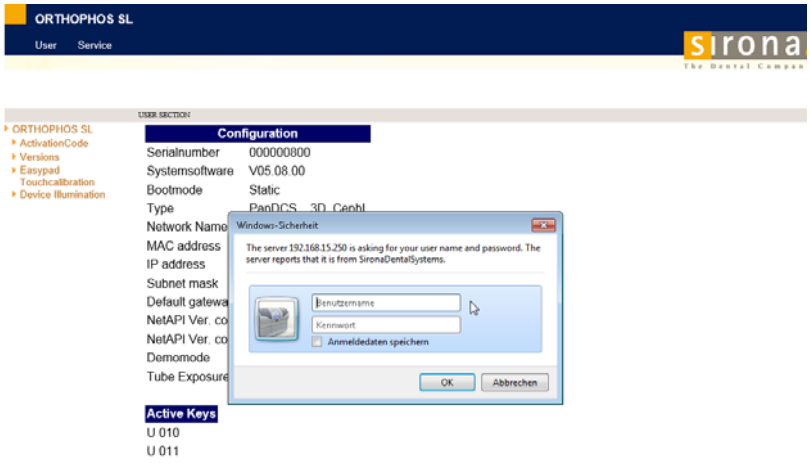
2. In the address line, enter "https://" and the IP address of your unit.
   Example: https://192.168.15.240
   NOTICE! The IP address of your unit can be found on the Info screen.
3. Confirm your input with the "Enter" key.



↳ A security prompt appears.

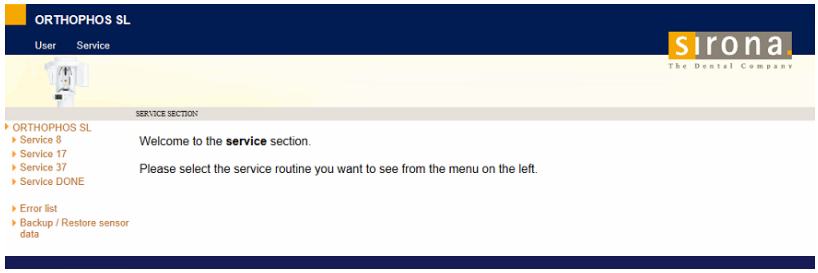
4. Click on the link *"Continue to this Website"*.
   ↳ The Sirona Web service is loaded.
   ↳ The sub menus of the *"User"* menu are displayed in the structure tree.

5. Click on the *"Service"* button in the header line of the main menu.



↳ The dialog box for entering the access data opens.

6. Enter the following access data:
   Username: “service”
   Password: "sirona"
7. Confirm your entry by clicking the *"OK"* button.



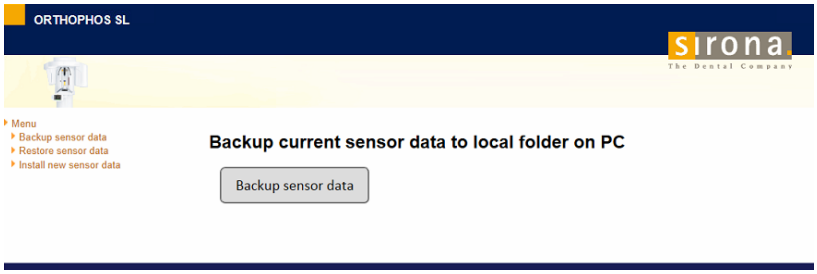
↳ The sub menus of the *"Service"* menu are displayed in the structure tree.

8. In the structure tree, select the menu *"Backup / Restore sensor data"*.
   ↳ The following submenus are displayed in the structure tree:
   – *"Backup sensor data"*
   – *"Restore sensor data"*
   – *"Install new sensor data"*
   The *"Backup sensor data"* submenu is preselected.

✓ The *"Backup / Restore sensor data"* menu is opened.

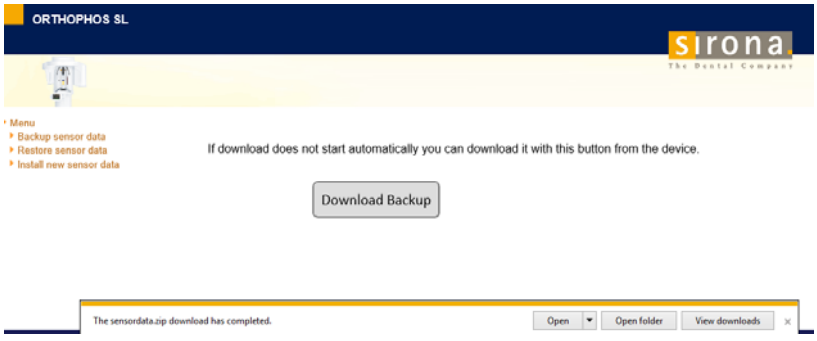
Back up the sensor data (factory calibration)

1. In the structure tree, click on the *"Backup sensor data"* element.



   ↳ The *"Backup sensor data"* menu is displayed.

2. Click on the *"Backup sensor data"* button.



   ↳ The *"Download Backup"* menu opens.

   ↳ A selection dialog box opens in your browser.

3. In the selection dialog box, click the *"Save"* / *"Save as"* button and select the central image data directory *"PDATA"* (...\PDATA\sensordata) as the storage location.
4. Confirm the selection by clicking the *"OK"* button.
   ↳ The sensor data is downloaded from the DX83 board and saved as a Zip file in the central image data directory *"PDATA"*.

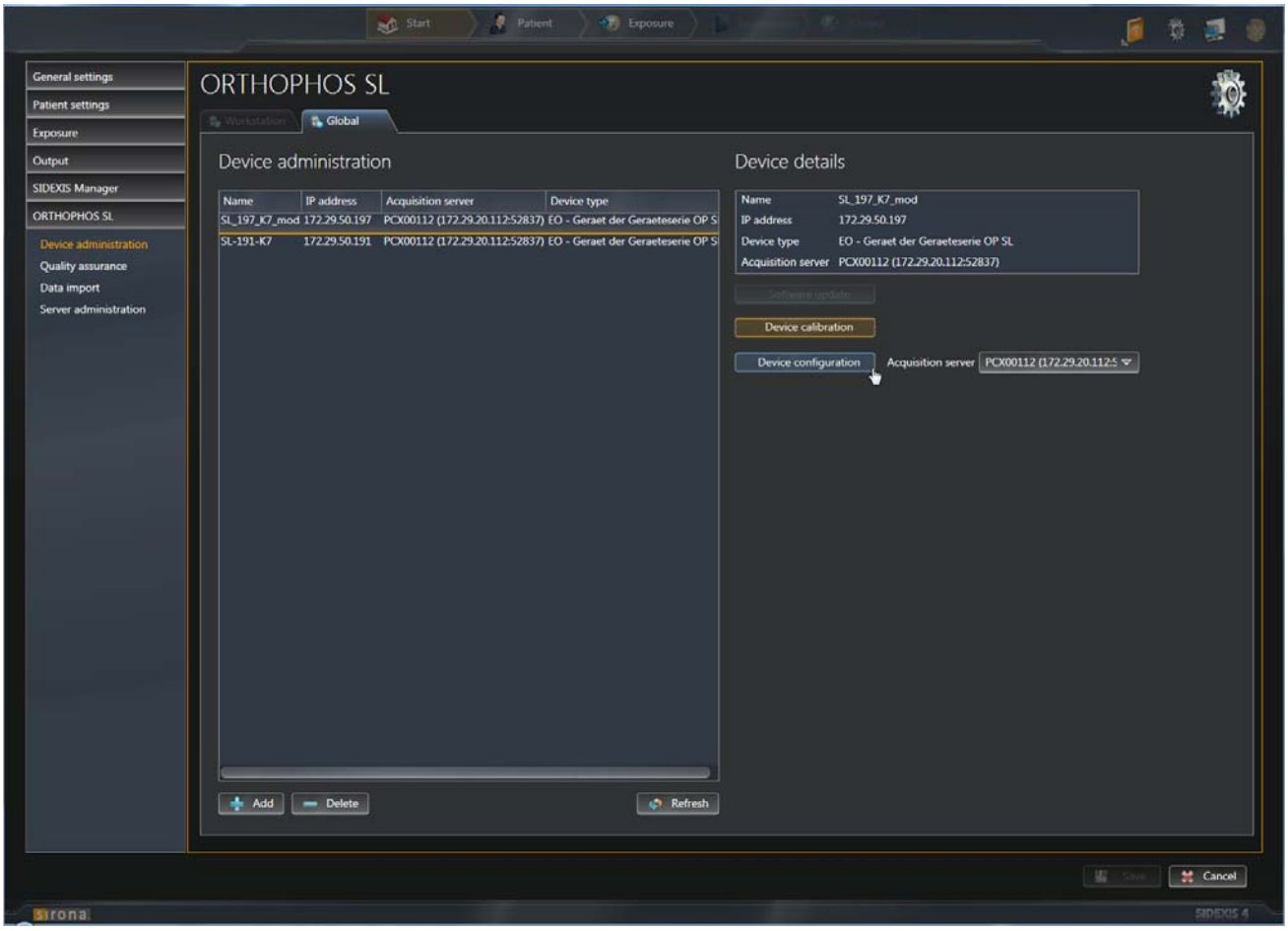
IMPORTANT
Sensor data must be stored in the central image data directory *"PDATA"*. If no selection dialog box appears in your browser, copy the Zip file manually from the download directory of your browser to the central image data directory *"PDATA"*.

14.2 Opening "Unit information"

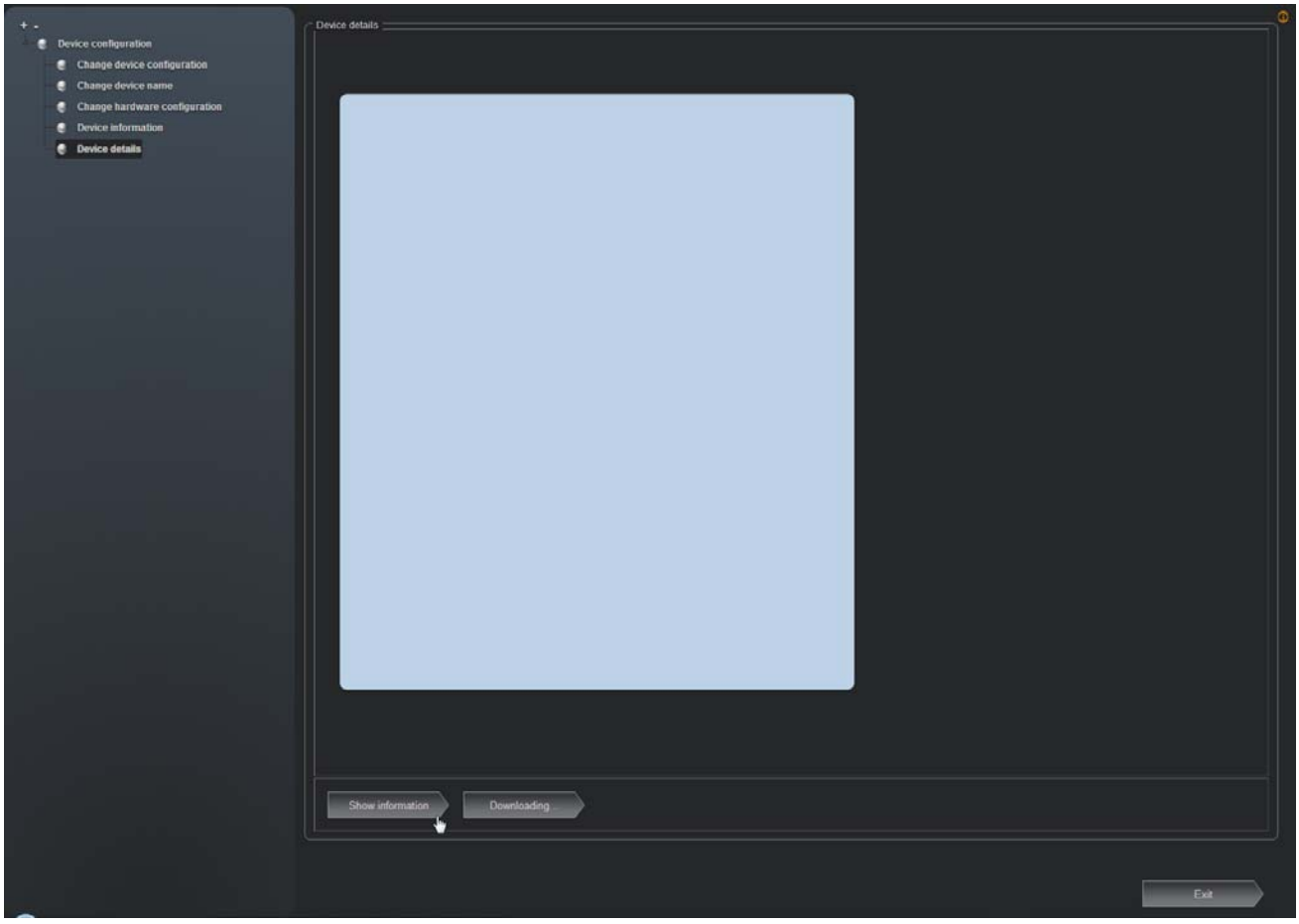
✓ SIDEXIS 4 is installed.

✓ The workstation software for the corresponding X-ray component or sensor is installed on the workstation.

1. Start SIDEXIS 4.
2. In SIDEXIS 4, call the *"Orthophos SL"* | *"Device Administration"* configuration menu.

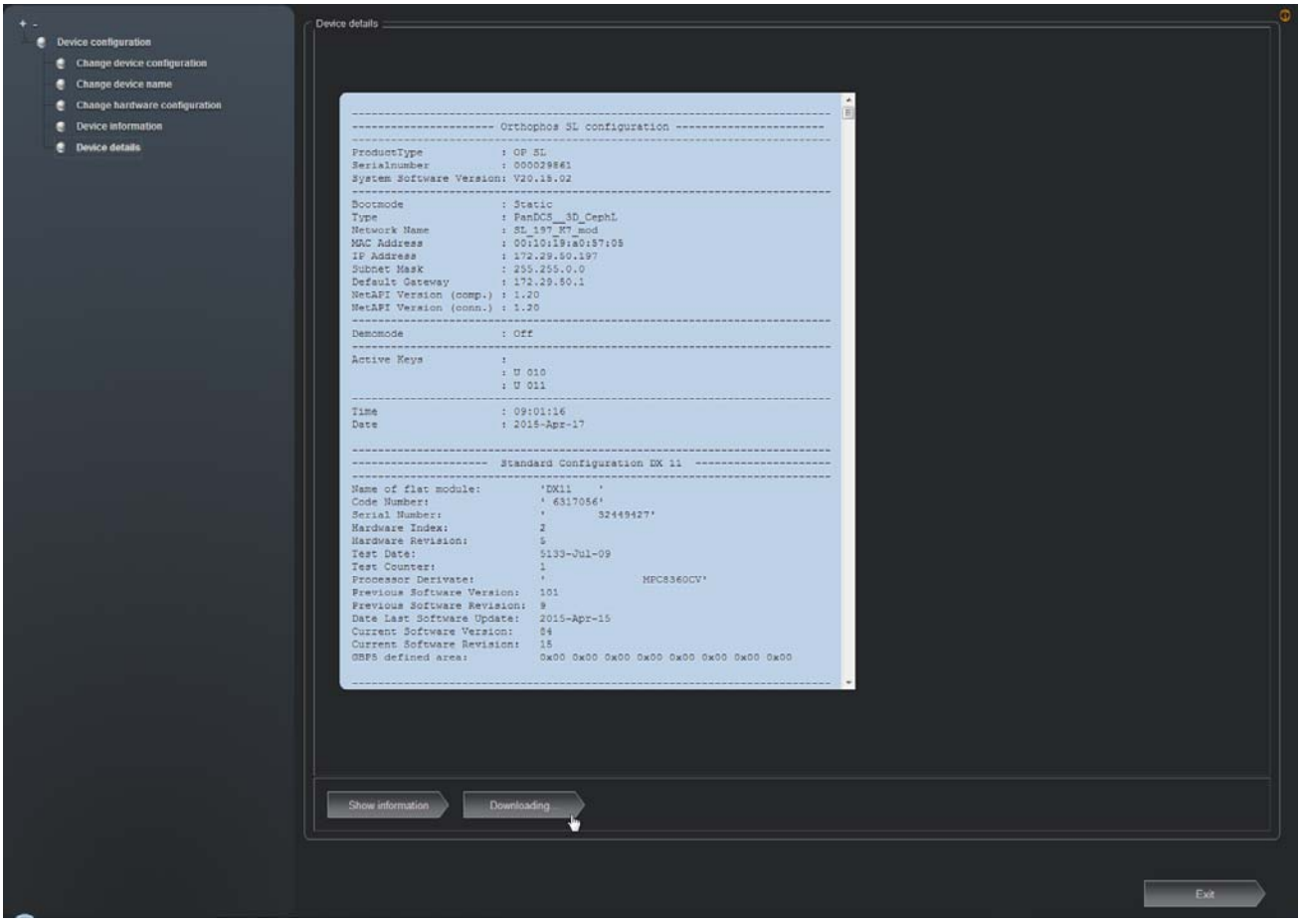


3. Click on the *"Device configuration"* button.



↳ The *"Device configuration"* menu opens.

4. Click on the *"Device details"* button in the structure tree and then on the *"Show Information"* button.



↳ The Unit information (Advanced information) is displayed.

5. Click on the *"Downloading…"* button to load and save the current unit information for the unit.

14.3 Filling in the certificate of conformity

ORTHOPHOS SL 2D / Ceph,
ORTHOPHOS SL 3D / Ceph

sirona
The Dental Company

Compatibility list / Declaration of conformity by system integrator
for digital radiography with SIDEXIS

System integrator (system installer)	
Company, address	

Operator	
Name, address	

Component			Requirement / Approval	fulfilled? ☒=yes	Technical characteristics	fulfilled? ☒=yes	Inst. regulations Function test	fulfilled? ☒=yes
PC unit	Manuf.		IEC 60 950-1 and CE marking according to Council Directive 89/336/EEC	❍	IBM compatible **PC** with **DualCore 2 GHz**, RAM ≥ 4GB, Windows 7 Professional/Ultimate/8.1 Professional (64bit) ≥ 500GB free storage space	❍	For the Federal Republic of Germany: On-site installation according to DIN VDE 0100-710	❍
	Type				**Graphics card** ≥1280 x 1024, ≥ 16,7 Mio colors (True Color), ≥ 512 MB Refresh rate > 70Hz	❍		
	No.				**Operating system:** according to the op. systems approved in the installation instructions	❍		❍
					Removable disk drive[1] **:** DVD-ROM DVD-RAM	❍		❍
Monitor	Manuf.		IEC 60 950-1 and CE marking according to Council Directive 89/336/EEC	❍	Min. screen diagonal 15" with flatscreen, 17 " with CRT	❍ ❍	Display quality tested with SMPTE test image according to the enclosed instructions	❍
	Type				Min. resolution 1280 x 1024 Refresh rate > 70Hz			
	No.				CRT: Dot mask min. 0,28 mm flat-screen monitor: Pixel pitch 0,30 mm x 0,30 mm			
ORTHOPHOS SL 2D / Ceph, ORTHOPHOS SL 3D / Ceph	Manuf.	Sirona Dental Systems	CE marking in compliance with Council Directive 93/42/EEC	☒	see Installation instructions	☒	For the FRG: Acceptance test according to DIN V 6868-151; for all countries: Acquisition generation with image storage and display successful	❍
	Type							
	No.							
	Manuf.	Sirona Dental Systems	CE marking in compliance with Council Directive 93/42/EEC	☒	see Installation instructions	☒	For the FRG: Acceptance test according to DIN V 6868-151; for all countries: Acquisition generation with image storage and display successful	❍
	Type							
	No.							
	Manuf.	Sirona Dental Systems	CE marking in compliance with Council Directive 93/42/EEC	☒	see Installation instructions	☒	For the FRG: Acceptance test according to DIN V 6868-151; for all countries: Acquisition generation with image storage and display successful	❍
	Type							
	No.							
	Manuf.	Sirona Dental Systems	CE marking in compliance with Council Directive 93/42/EEC	☒	see Installation instructions	☒	For the FRG: Acceptance test according to DIN V 6868-151; for all countries: Acquisition generation with image storage and display successful	❍
	Type							
	No.							
Other devices optionally connected to the PC (printer, LAN...)	Manuf.		IEC 60 950-1 and CE marking according to Council Directive 89/336/EEC	❍			Device installed according to manufacturer's instructions	❍
	Type							
	No.							
	Manuf.		IEC 60 950-1 and CE marking according to Council Directive 89/336/EEC	❍			Device installed according to manufacturer's instructions	❍
	Type							
	No.							
	Manuf.		IEC 60 950-1 and CE marking according to Council Directive 89/336/EEC	❍			Device installed according to manufacturer's instructions	❍
	Type							
	No.							

1. supported by SIDEXIS, function required only if not performed by an additional server

Declaration acc. to Medical Devices Directive (MDD) 93/42/EEC and IEC 60 601-1 item 16.1
The undersigned herewith certifies that the above system consisting of CE-marked medical devices has been assembled in accordance with the present manufacturer's instructions, that it has been tested for its intended use and that all relevant user information including pertinent information provided by the corresponding manufacturers has been provided for placing it on the market, and that this declaration shall be kept on hand for the competent authorities for a period of five years.

Place, date | Name of system integrator (in block letters) | Signature

Operator's copy

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➢ Fill in the certificate of conformity.
The system integrator uses the compatibility list as evidence of the installed system's EC conformity.
The list is structured in such a way that only the white fields need to be completed. The original list remains in the practice, the copy is given to the system integrator.

Only for Germany

➢ Perform the acceptance test prescribed in the X-ray Ordinance §16. Use the test phantom, plug-in plate, contrast elements, needle phantom and relevant instructions included in delivery for this purpose.

14.4 Unit handover

➢ Give the customer all of the patient positioning aids, test phantoms and special tools included in delivery, including packaging. These are important components of the unit and must be stored carefully.

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

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