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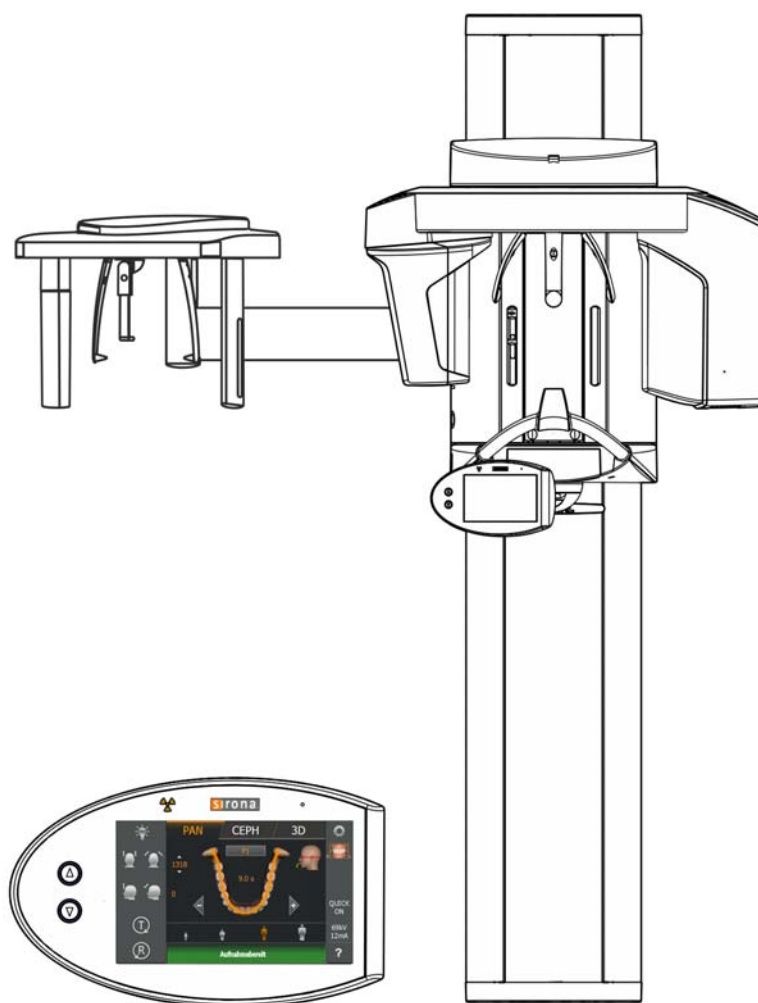
09.2016

**sirona**  
The Dental Company

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

Service Manual

**English**









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# 1 About this Service Manual

## 1.1 Other relevant documents

In addition to this manual, you need the following documents:

### **Spare parts list**

- ORTHOPHOS XG/SL List of Spare Parts: REF 59 38 423

### **Wiring diagrams**

- ORTHOPHOS SL Wiring References: REF 64 95 233

### **Installation Instructions**

- ORTHOPHOS SL Software Installation: REF 65 44 287
- SIDEXIS 4 Installation Instructions: REF 64 47 200

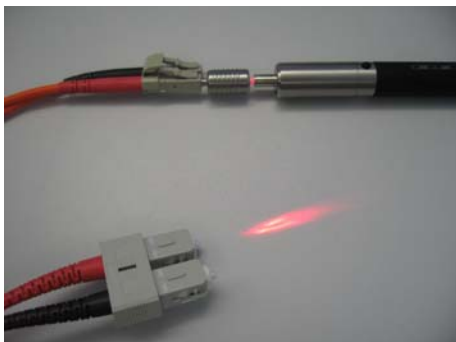
Current Service Documentation, such as the Service Manual, can be downloaded from the Sirona dealer website.

## 1.2 Scope

This Service Manual describes the servicing of the ORTHOPHOS SL digital volume tomograph. It is intended for use exclusively by trained and authorized distributors and service technicians.

## 1.3 Tools and auxiliary materials

- Screwdriver set (slot and Phillips)
- Torx offset screwdrivers TX10, TX20, TX25 (included in the scope of supply)
- Open-end wrench, SW13
- Socket wrench, SW13
- Side cutting pliers
- Caliper gage
- Spirit level
- Digital Multimeter, Accuracy Class 1
- Mult-O-Meter 512L
- Fiber test device [e.g. Fiberpoint®250MD]
- Soldering tool for repairing cables
- Cable ties
- Teflon tape
- Loctite








## 1.4 Structure of the document

### 1.4.1 Identification of the danger levels

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

 <b>DANGER</b>
An imminent danger that could result in serious bodily injury or death.

 <b>WARNING</b>
A possibly dangerous situation that could result in serious bodily injury or death.

 <b>CAUTION</b>
A possibly dangerous situation that could result in slight bodily injury.

<b>NOTICE</b>
A possibly harmful situation which could lead to damage of the product or an object in its environment.

<b>IMPORTANT</b>
Application instructions and other important information.

**Tip:** Information on making work easier.

### 1.4.2 Formats and symbols used

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

<ul style="list-style-type: none"> <li>✓ Prerequisite</li> <li>1. First action step</li> <li>2. Second action step</li> <li>or</li> <li>➤ Alternative action</li> <li>↩ Result</li> <li>➤ Individual action step</li> </ul>	Prompts you to do something.
See "Formats and symbols used [ → 14]"	Identifies a reference to another text passage and specifies its page number.
• List	Designates a list.
"Command / menu item"	Indicates commands, menu items or quotations.



## 2 Safety instructions

### 2.1 Potentially lethal shock hazard



#### **DANGER**

##### **Perilous shock hazard!**

When replacing parts or in the event of extensions in the power supply line, power switch, board DX32, or X-ray tube assembly area, there is danger to life due to a potentially lethal shock hazard.

##### **Before you start:**

- It is essential to ensure the unit is not supplied with voltage.
- Always disconnect the unit from the junction box of the building installation.

### 2.2 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.

### 2.3 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.

### 2.4 Electromagnetic compatibility

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

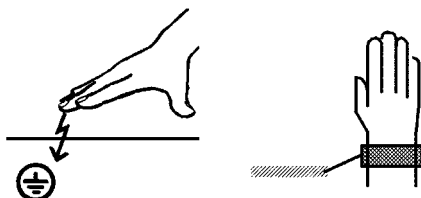
Medical electrical equipment is subject to special EMC-related precautions. It must be installed and operated as specified in the document "Installation Requirements".

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.



## 2.5 Electrostatic discharge



Electrostatic discharge (abbreviated: ESD – **ElectroStatic Discharge**)

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.

## 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 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 the chapter "Technical details"

## 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 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.

## 2.10 Qualifications of service personnel

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



## 2.11 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.

## 2.12 Safety checks

Once repairs are completed, the circuit breaker test and unit leakage current test must be carried out (see chapter "Checking the circuit breaker" and "Checking the unit leakage current").

## 2.13 Functional check

### CAUTION

Be sure to observe the descriptions and safety information given in the chapter titled "Switch on the unit" and "Test exposures / test images".

Following any form of service and maintenance work, a functional check must be performed on the device.

Perform the following test steps:

1. Perform a restart of the unit:
  - Switch the unit off.
  - Wait 1 minute.
  - Switch the unit on.
  - Wait for the self-test.
2. Perform a 2D test exposure using the needle phantom included in the scope of supply.
3. Perform a 3D test exposure using the constancy test phantom / DIN DVT test phantom included in the scope of supply.



## 3 Unit description

### 3.1 Hardware

#### 3.1.1 Information on the unit

The following symbols are applied to the unit:

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

Meaning: Observe the Operating Instructions when operating the unit.



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

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

#### Electrostatic discharge (ESD)



Connector pins or sockets bearing ESD warning labels must not be touched or interconnected without ESD protective measures. See also "Electrostatic Discharge" and "Electromagnetic Compatibility" [ → 15].

#### Identification of single use devices

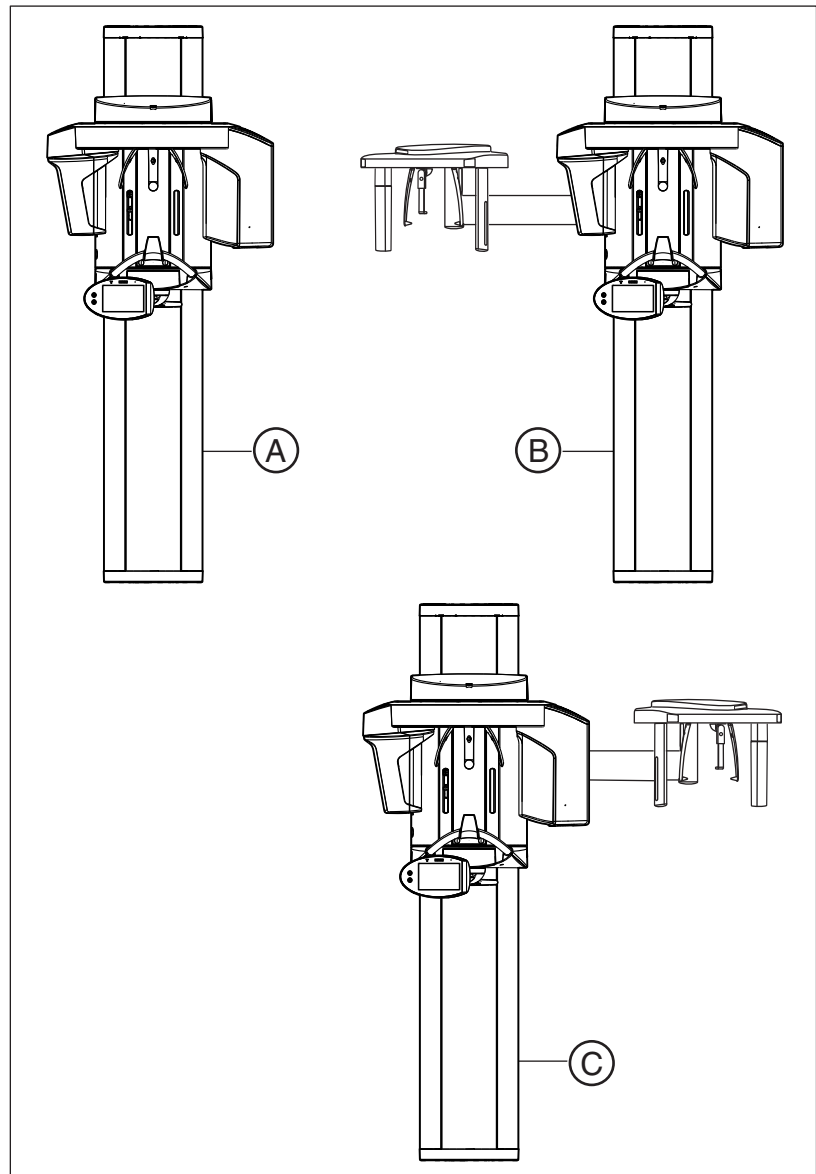


Prior to each exposure, the hygienic protective sleeves (single use devices) must be fitted.

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



### 3.1.2 System version

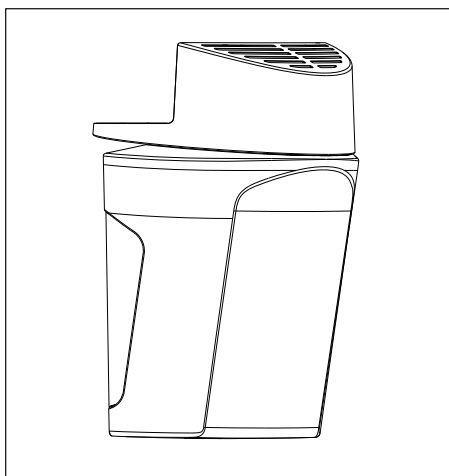


	Version	Description
A	ORTHOPHOS SL 2D	<i>Digital X-ray unit with DCS sensor</i> Pan sensor: Digital CdTe sensor with direct converter technology for panoramic exposure technology
	ORTHOPHOS SL 3D	<i>Digital X-ray unit with digital Flat Panel Detector and DCS sensor</i> Flat Panel Detector: Digital Flat Panel Detector with a-Si technology (amorphous silicon) Pan sensor: Digital CdTe sensor with direct converter technology for panoramic exposure technology



	Version	Description
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

### 3.1.3 Sensor versions

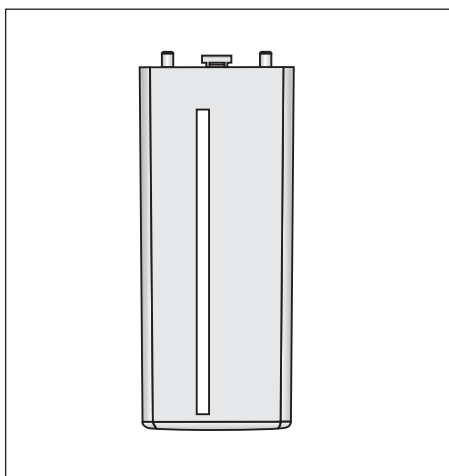


#### 2D sensor unit:

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

#### 2D/3D sensor unit:

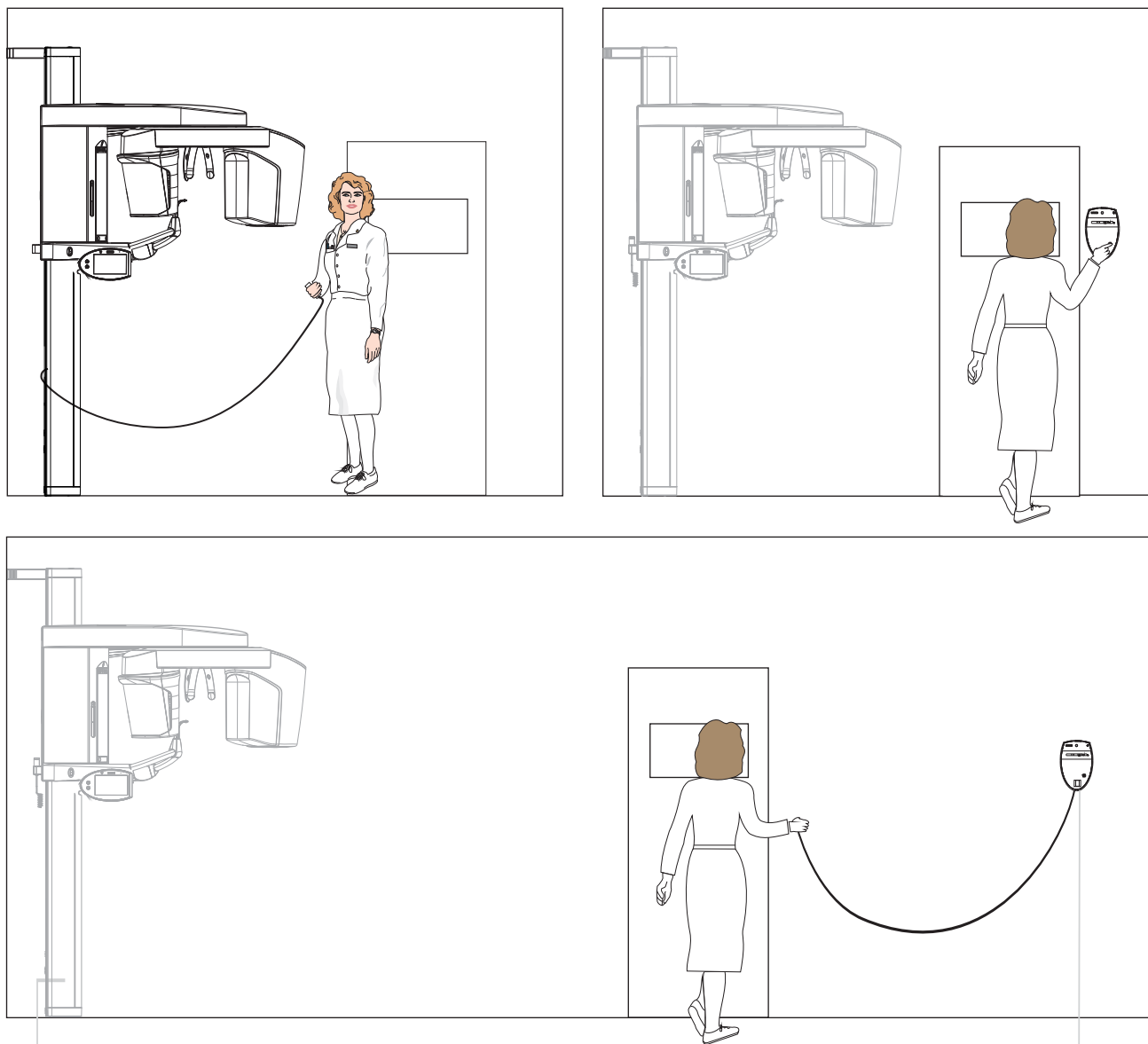
Sensor unit for panoramic X-ray (PAN) and volume exposures (3D):  
DCS sensor (2D) and flat panel detector (3D)



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



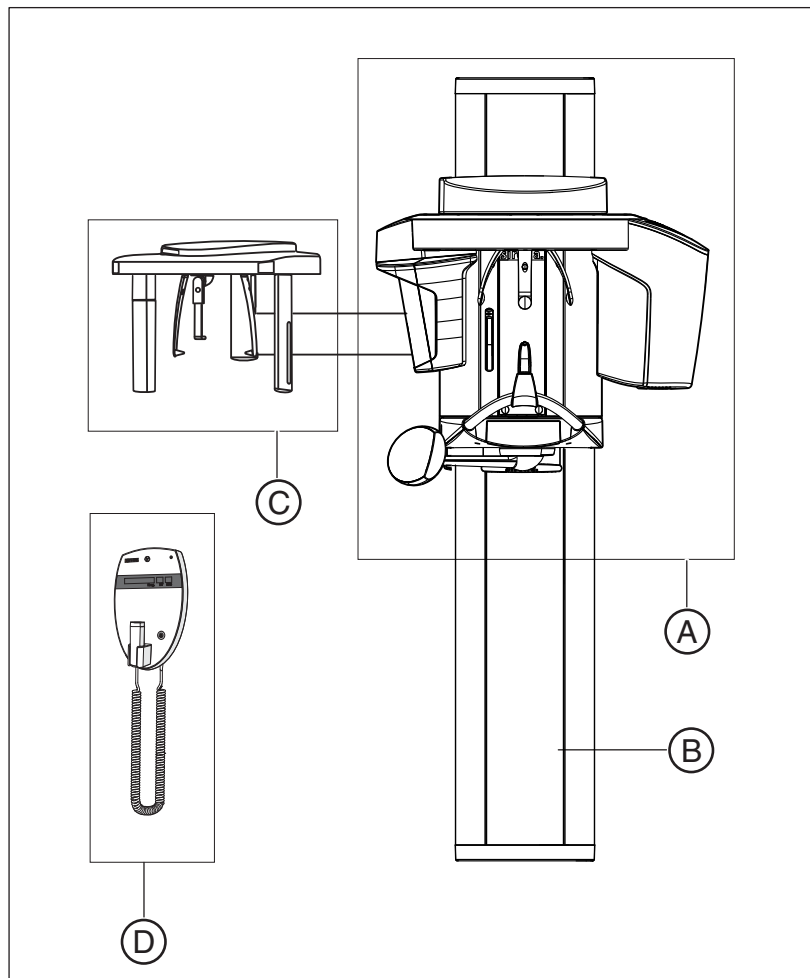
### 3.1.4 Installation versions



A	<b>Standard installation</b> Unit <i>without</i> remote control with release button on the coiled cable in the treatment room.
B	<b>Installation version 1</b> Unit <i>with</i> remote control outside the X-ray room <i>without</i> release button on the coiled cable.
C	<b>Installation version 2</b> Unit <i>with</i> remote control outside the X-ray room <i>with</i> release button on the coiled cable.



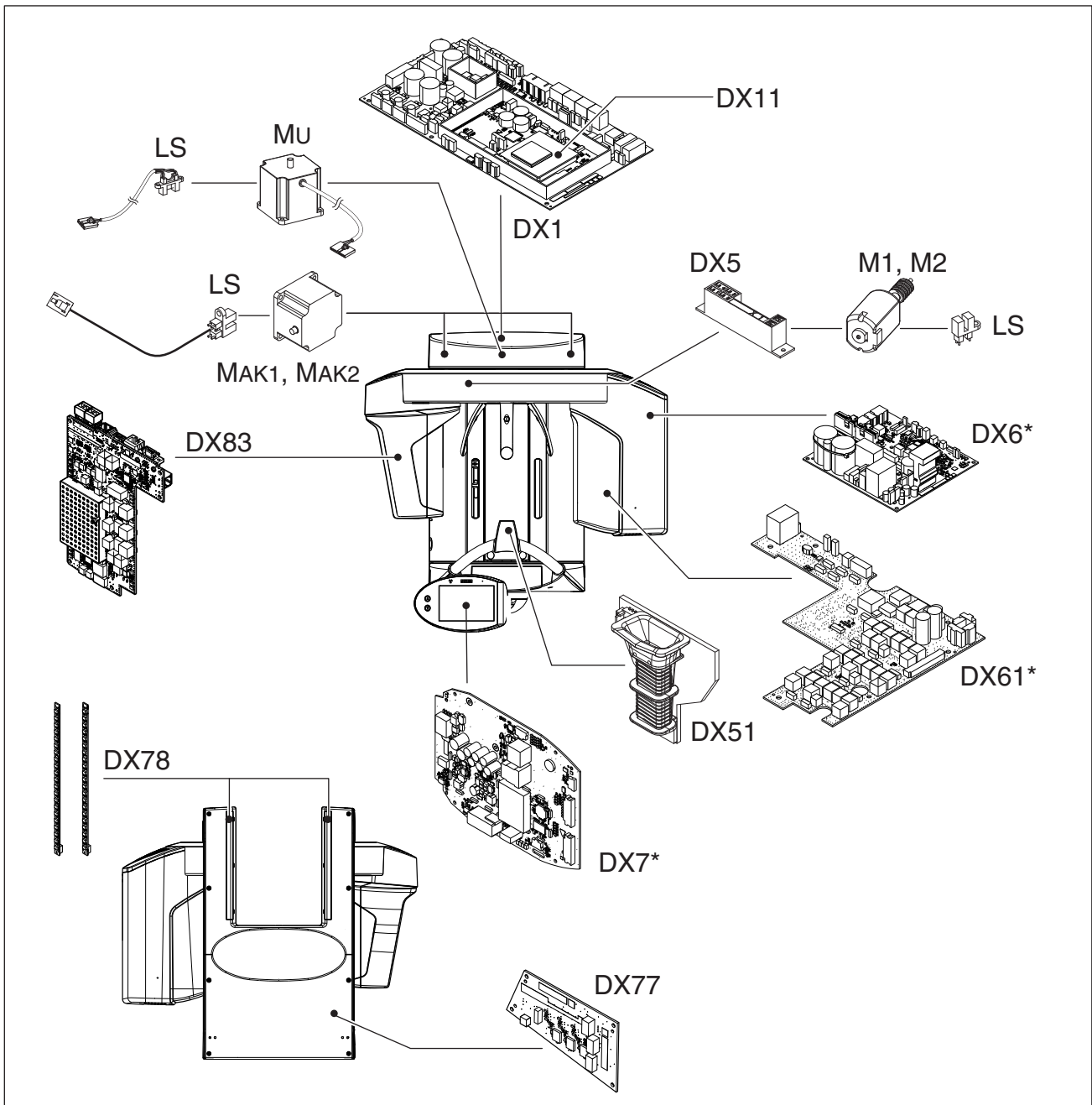
### 3.1.5 Modules and components



A	Slide [ → 23]
B	Stand [ → 24]
C	Cephalometer [ → 25]
D	Remote control [ → 25]



### 3.1.5.1 Slide



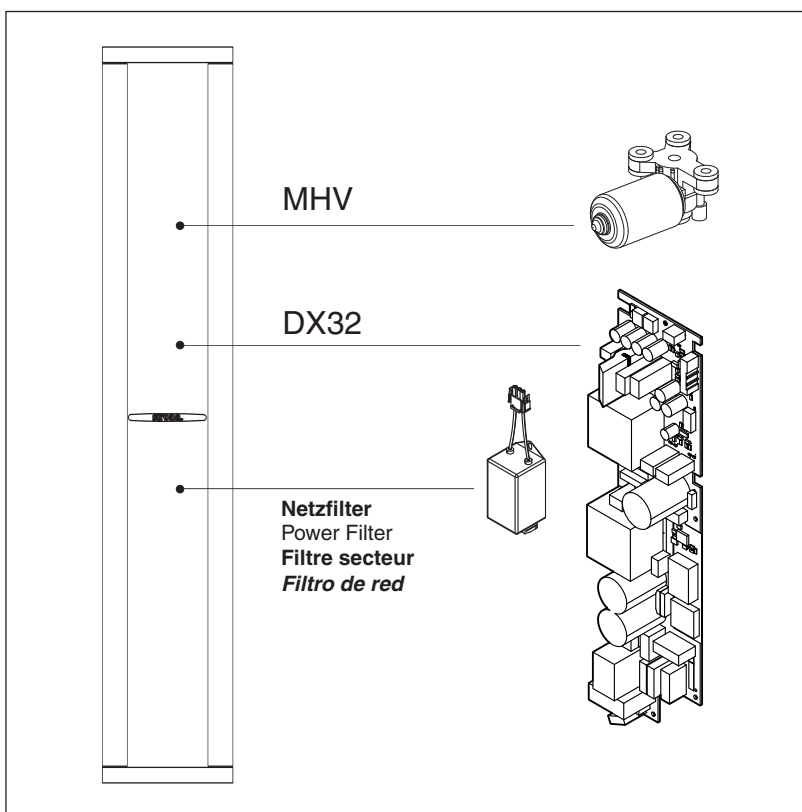
Component	Designation	Function
Boards	DX1	Open loop/closed loop control in general
	DX11	Controller board
	DX5	Headrest adapter
	DX51	Occlusal bite block
	DX6	Open loop/closed loop tube assembly
	DX7*	Easypad touchscreen



Component	Designation	Function
	DX61*	Diaphragm control
	DX77	Control board ambient light
	DX83	Control board sensor unit
Motor	MU	Rotary movement of rotating element
	MAK1, MAK2	Linear movement of rotating element
	M1, M2	Linear movement of headrest
Light barriers	LS	Position control of the ring cycle

\*) not available as individual repair part (see spare parts list).

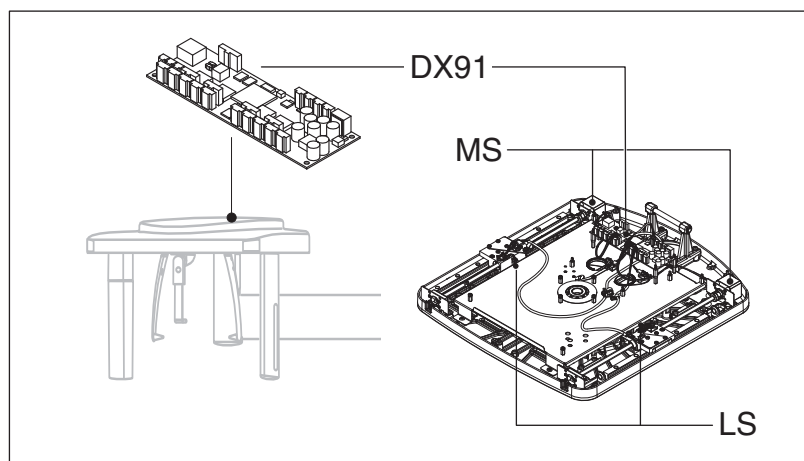
### 3.1.5.2 Stand



Component	Designation	Function
Boards	DX32	Power supply board
Motor	MHV	Linear movement of height adjustment
Line filter		

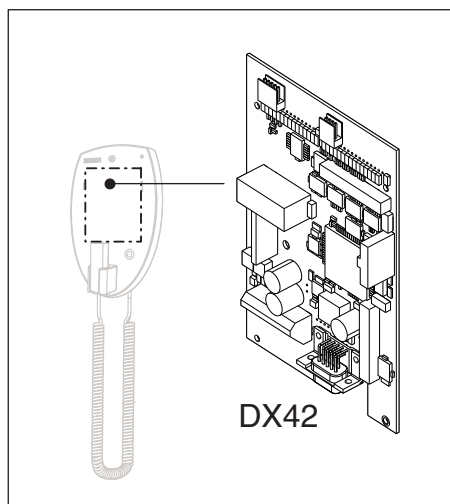


### 3.1.5.3 Cephalometer



Component	Designation	Function
Boards	DX91	Cephalometer control
Motors	MS	Stepping motors: linear movement of secondary diaphragm and sensor
Light barriers	LS	Position check

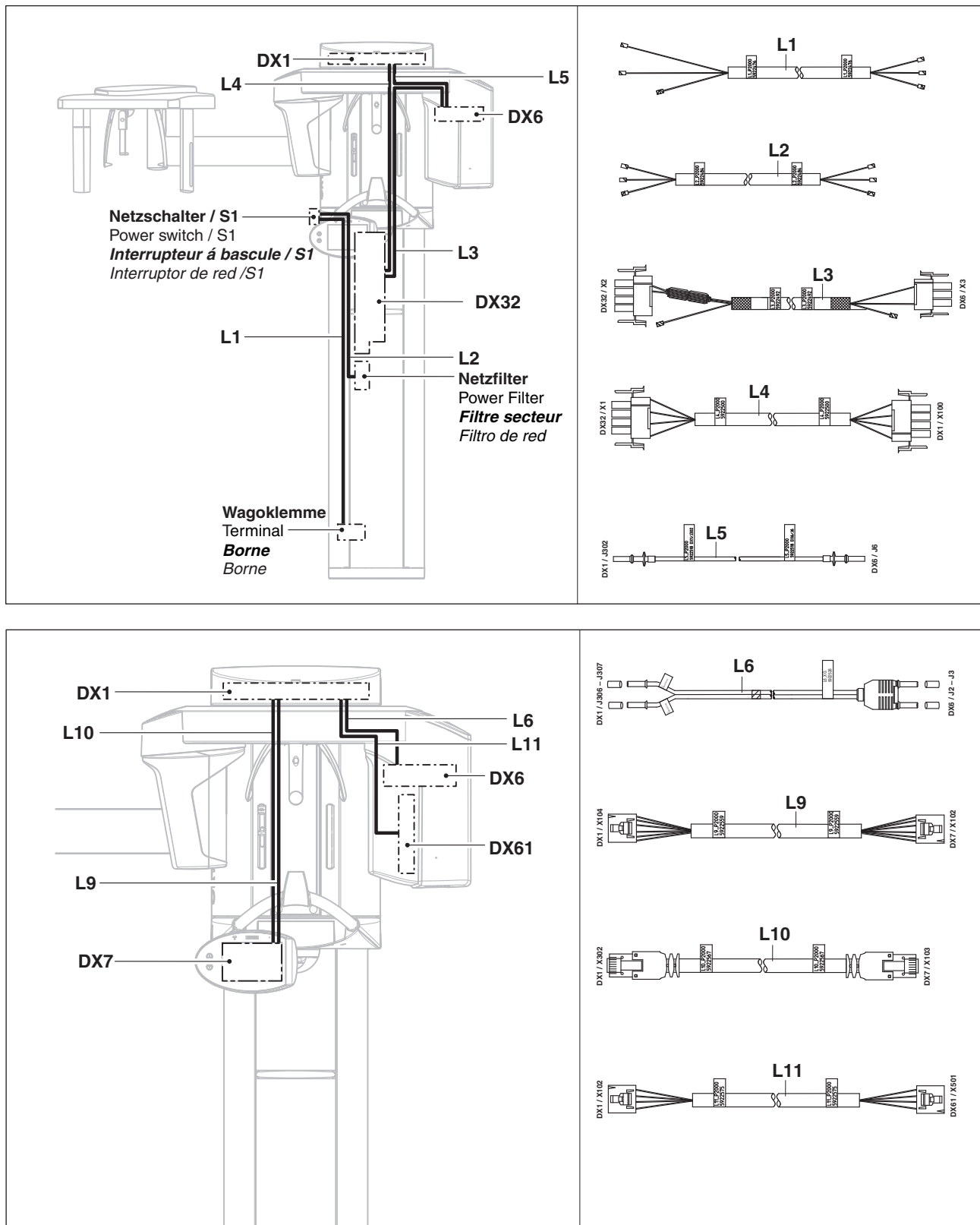
### 3.1.5.4 Remote control



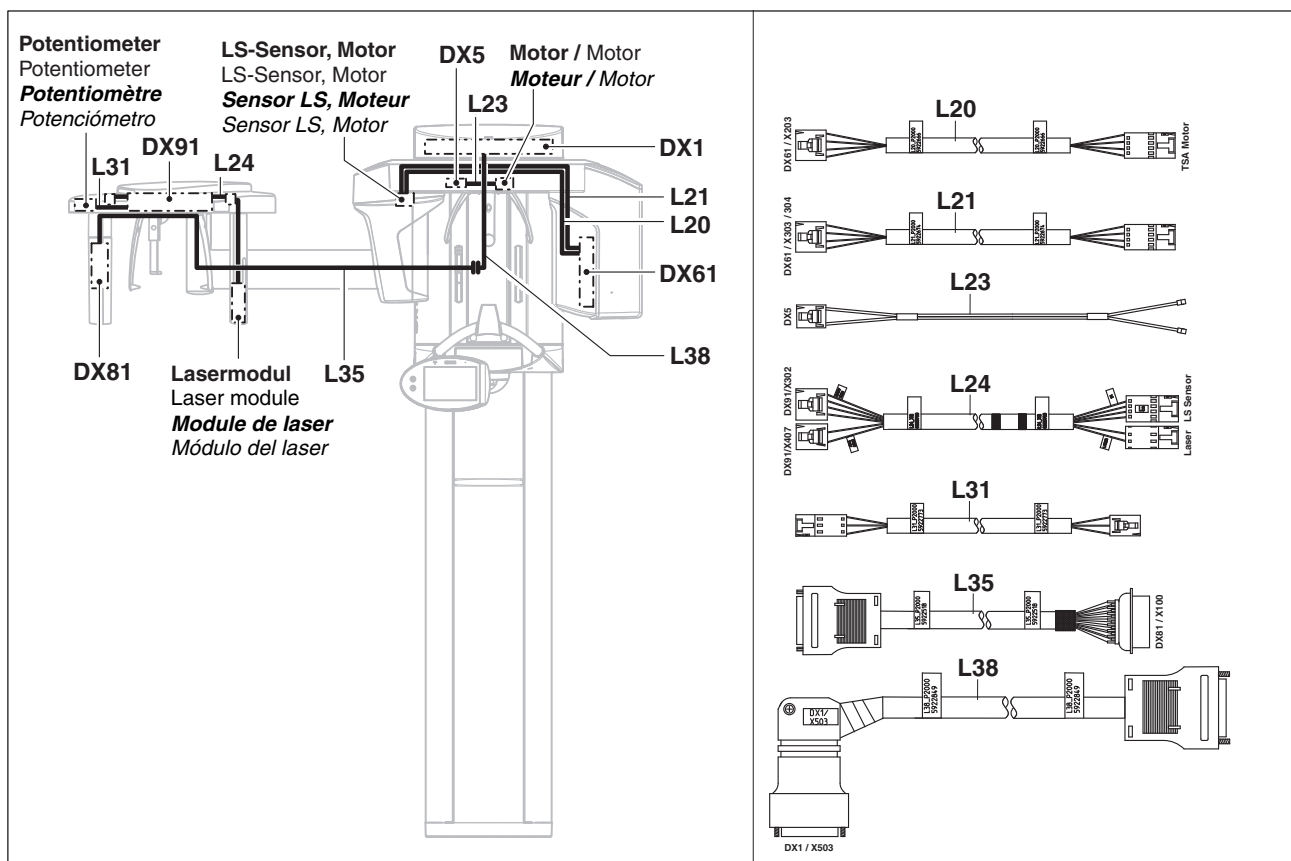
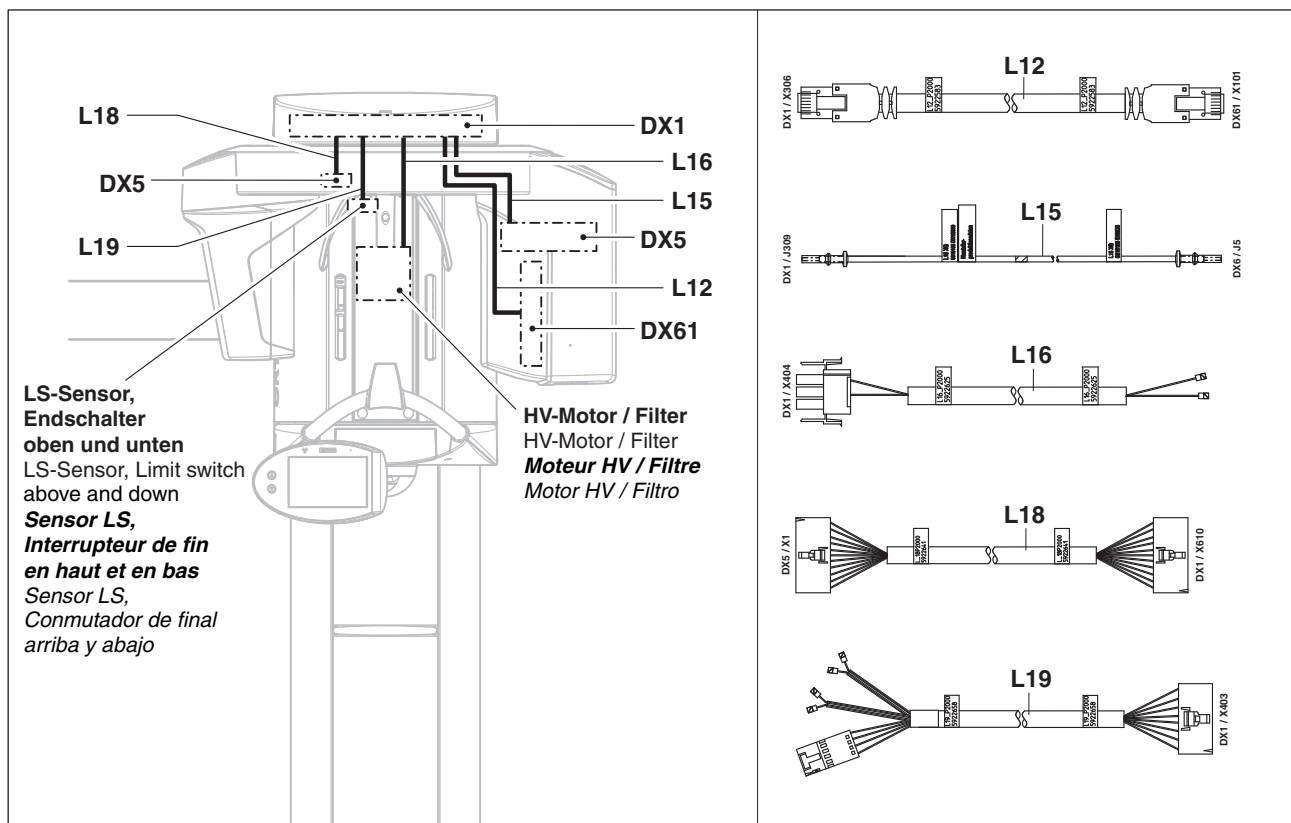
Component	Designation	Function
Board	DX42	Display board for remote control



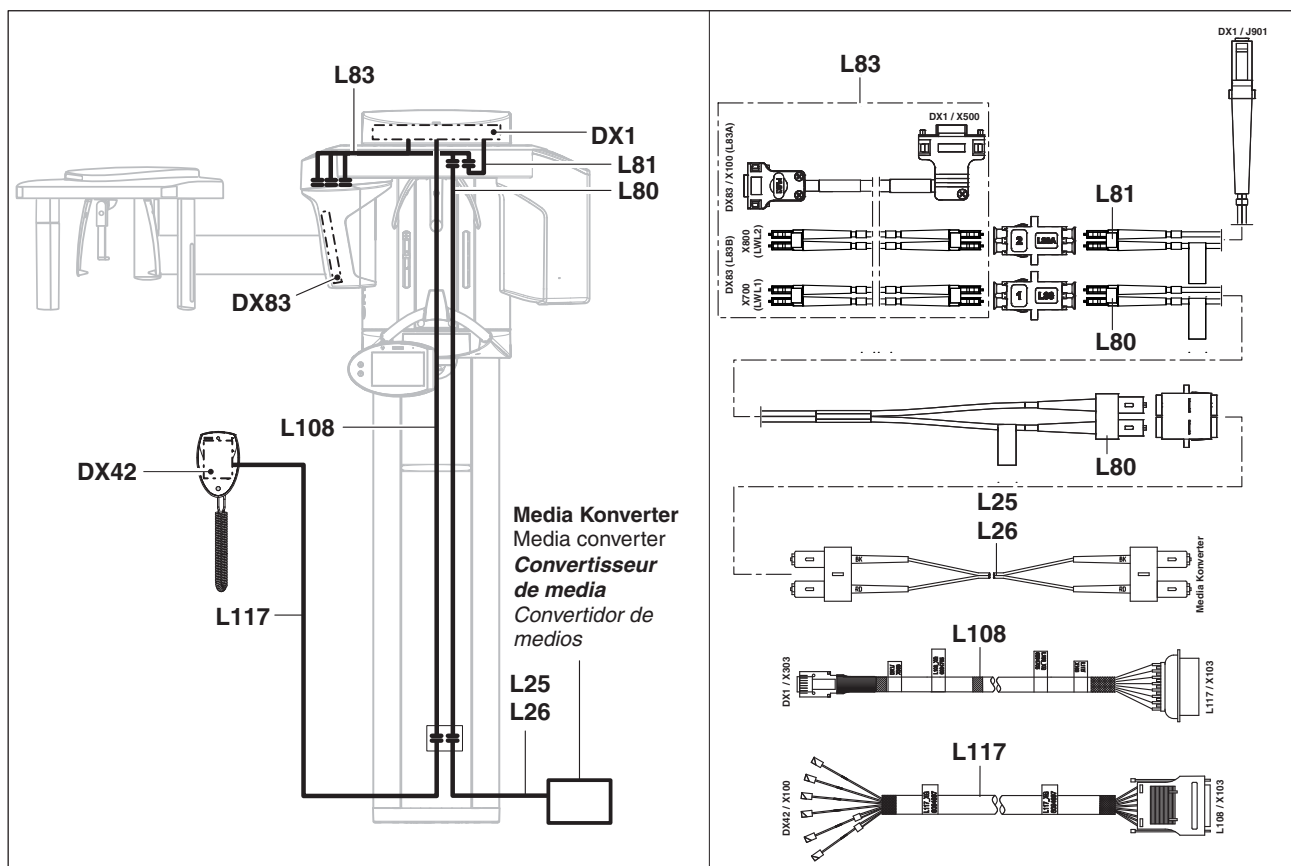
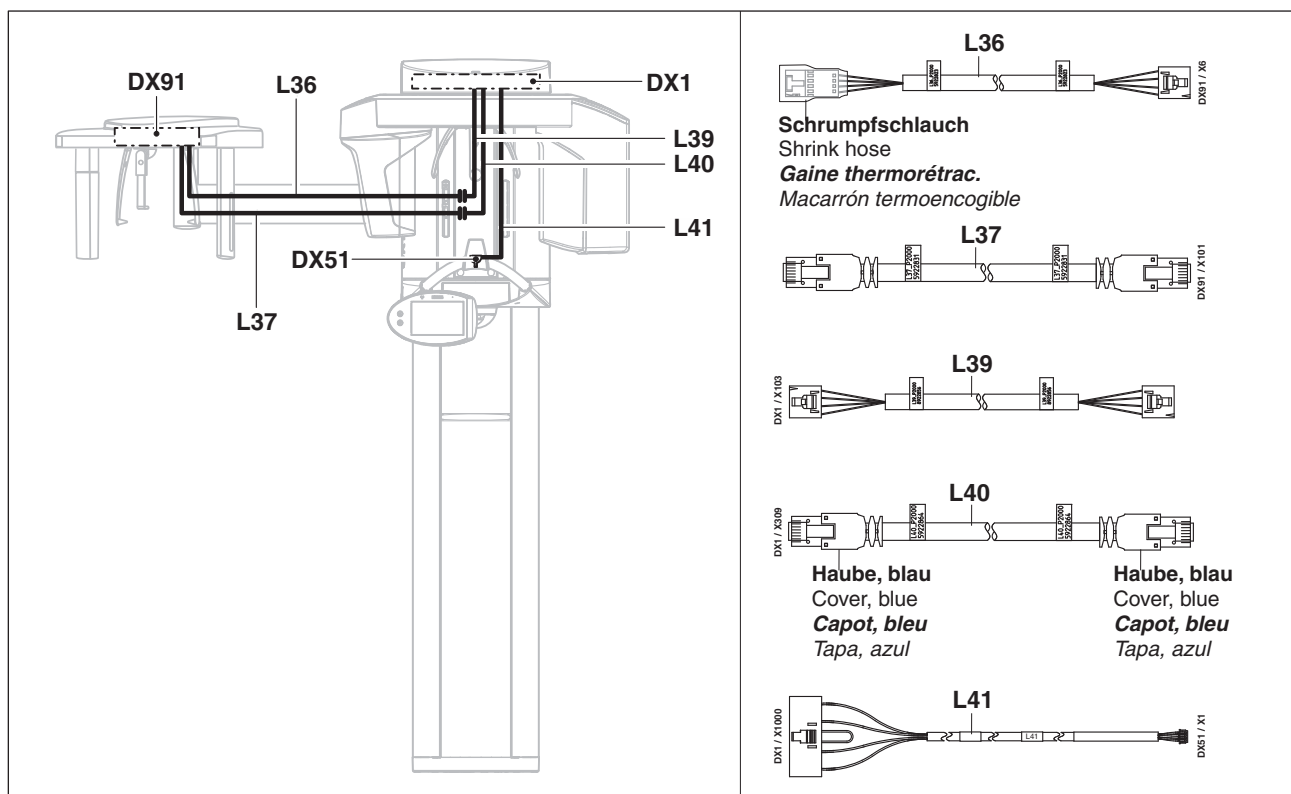
## 3.1.6 Cabling overview



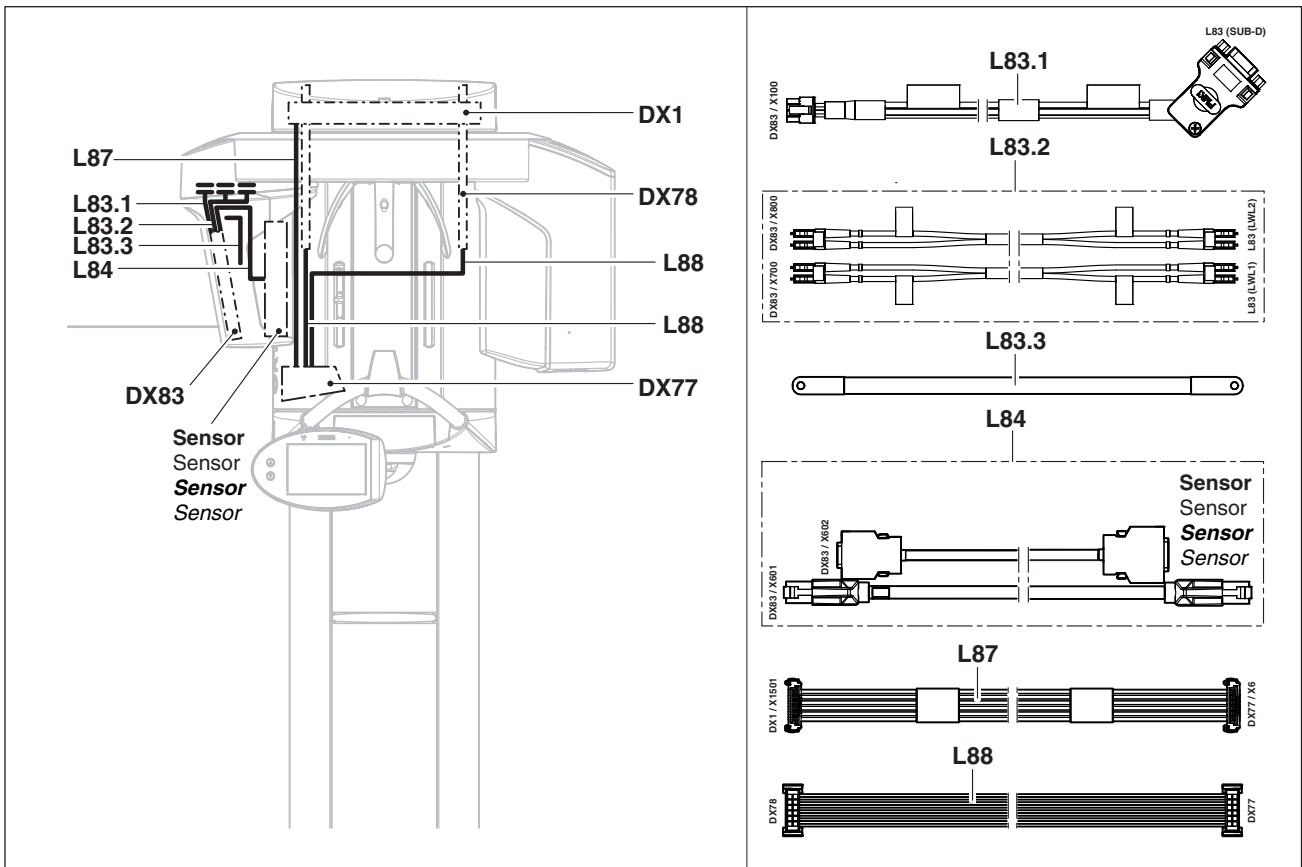










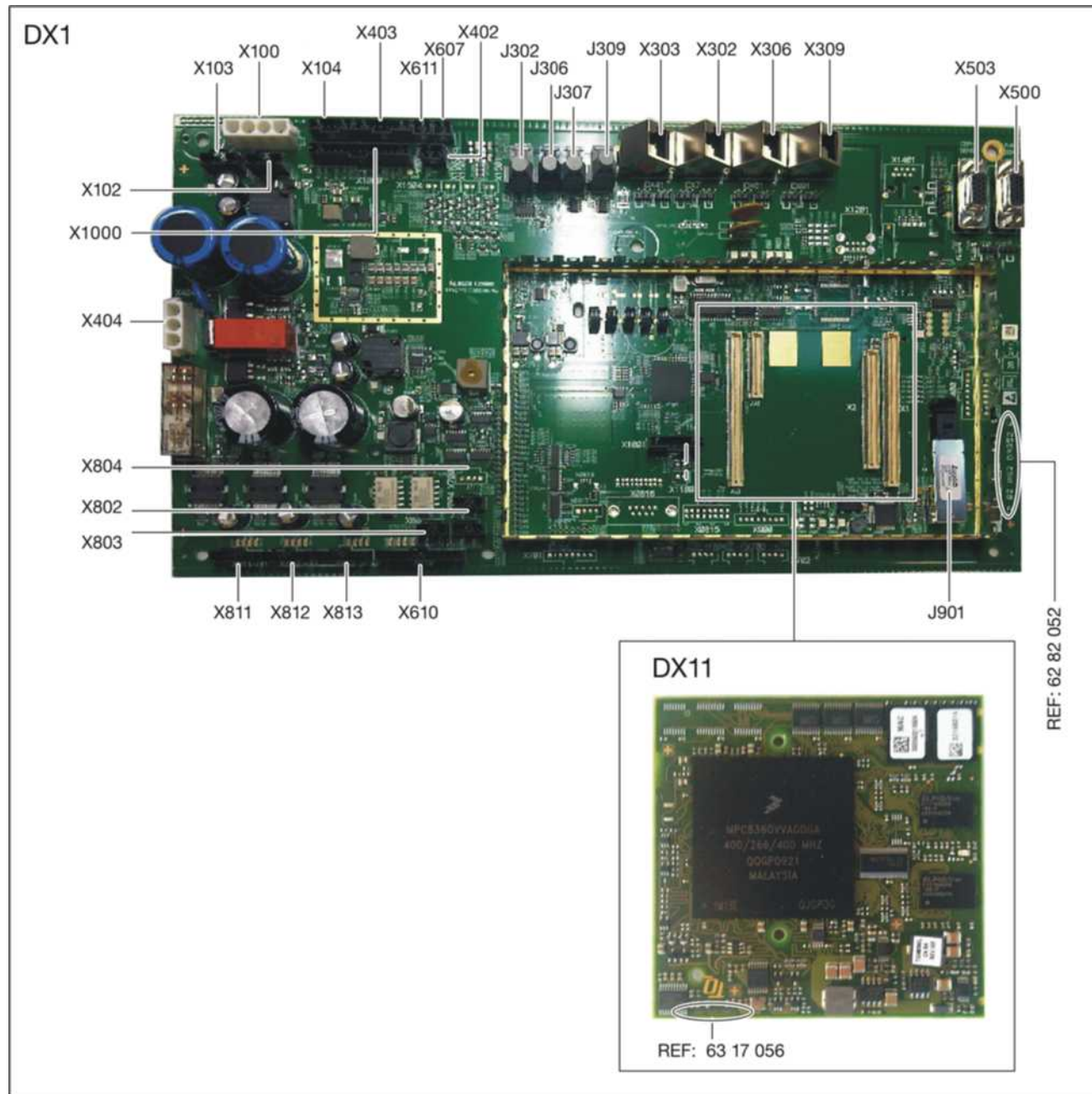




### 3.1.7 Board photos

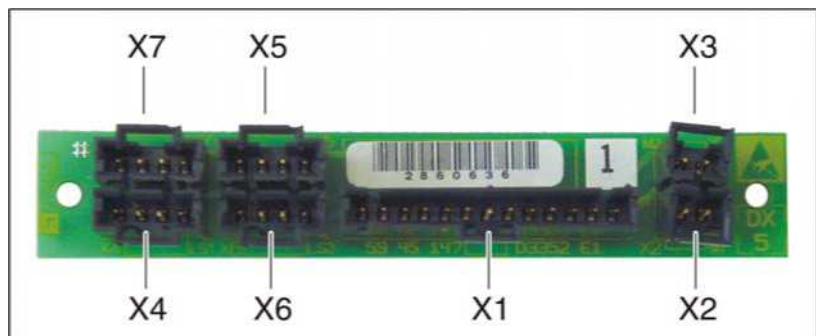
#### 3.1.7.1 Boards in the slide

##### DX1/DX11 boards

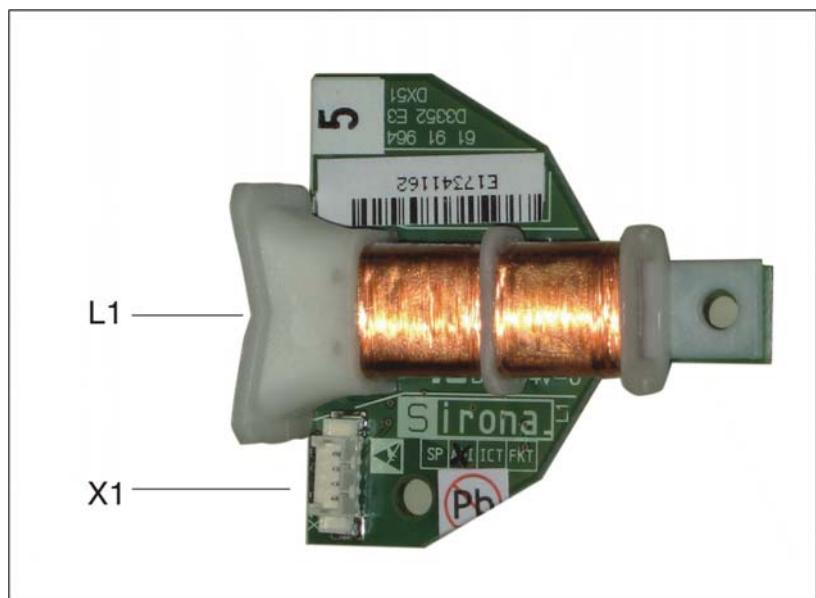




### Board DX5



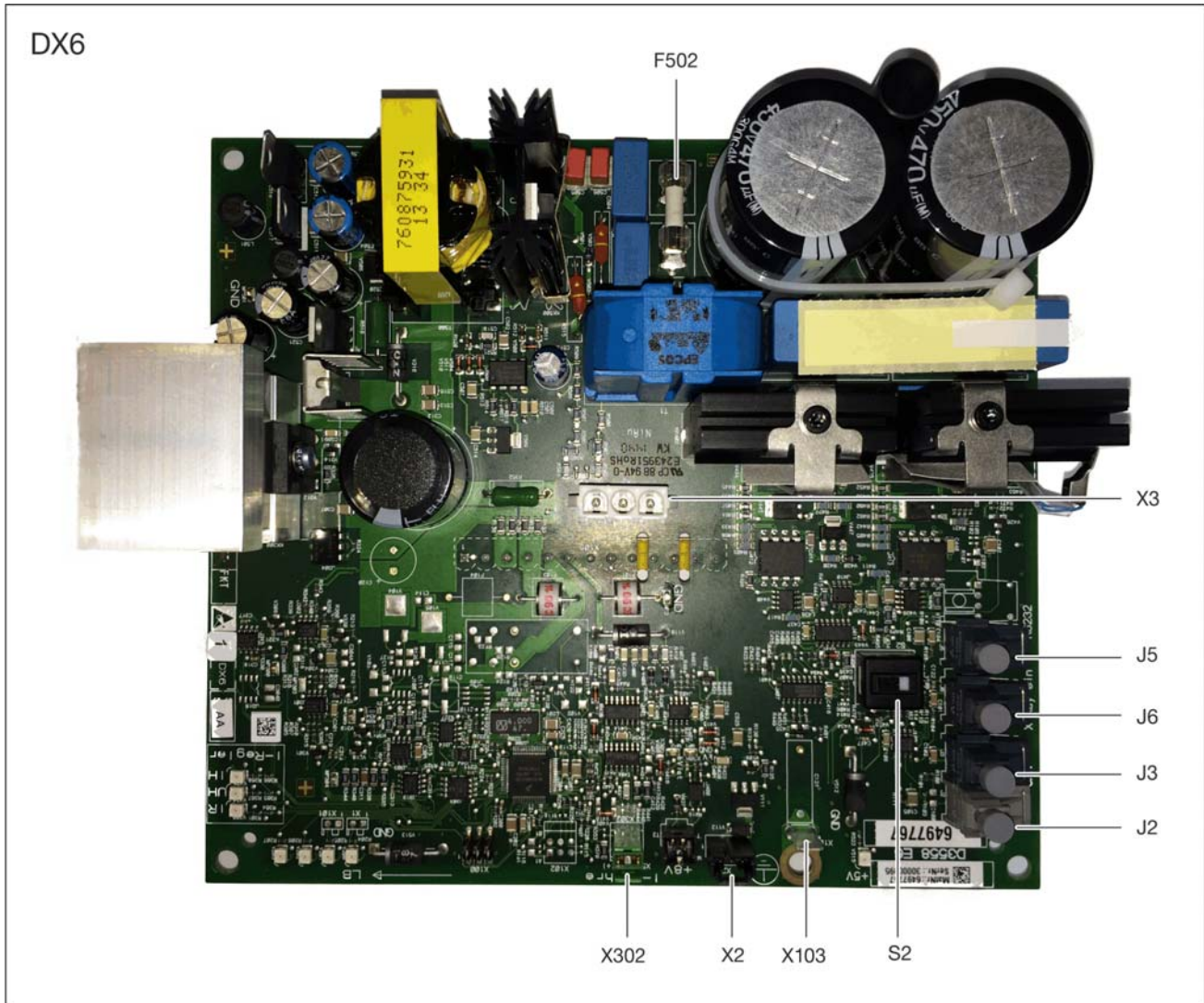
### Board DX51





## Board DX6

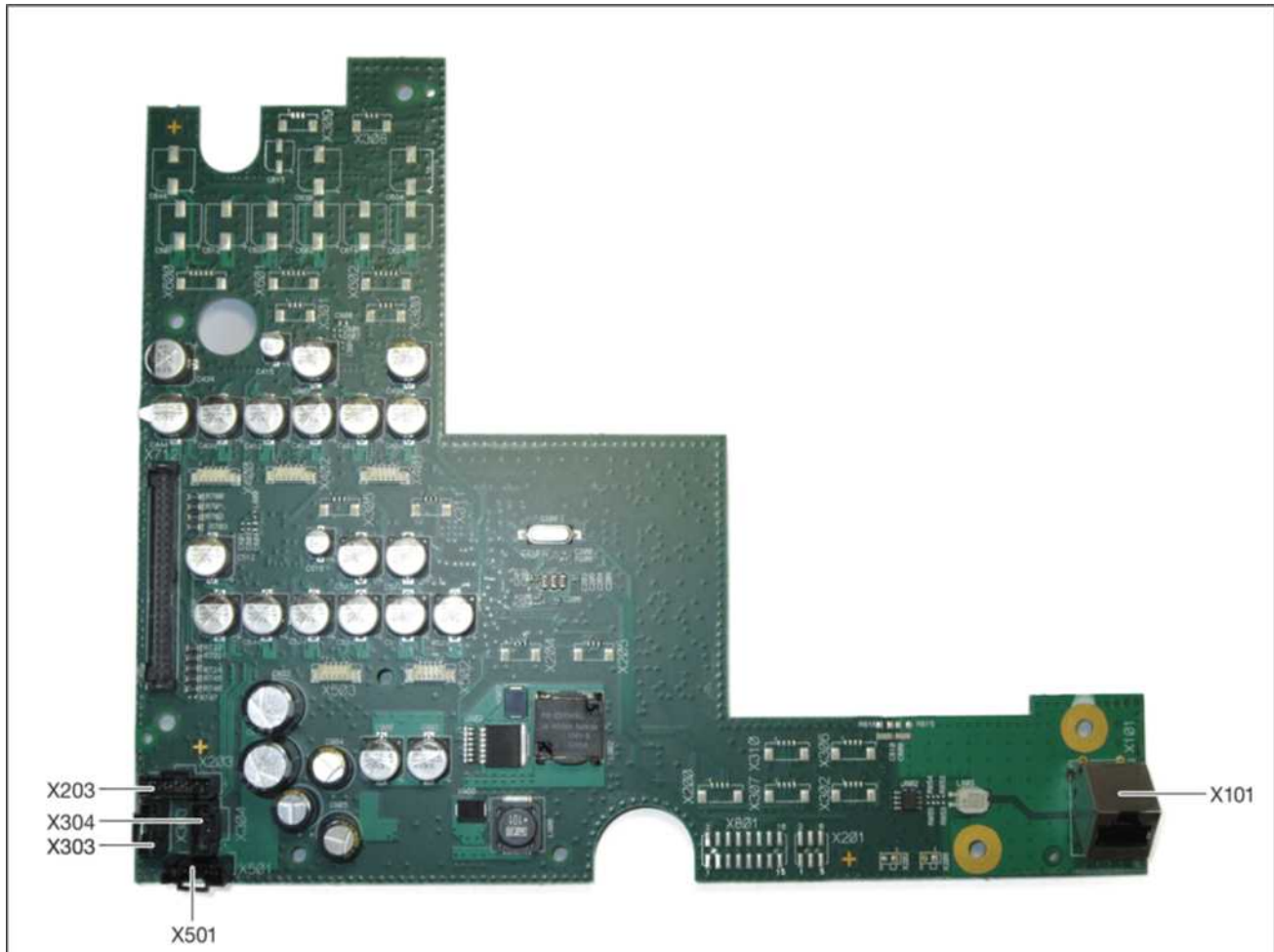
This board is not available as a spare part or a repair part. X-ray tube assemblies can only be ordered as complete units.





## DX61

This board is not available as a spare part or a repair part. The diaphragm unit can only be ordered as a complete unit.



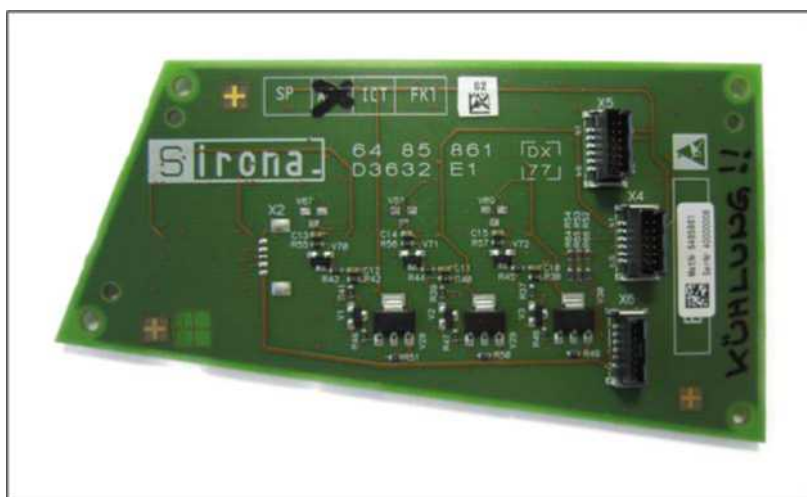


## Board DX7

The board is not available as a spare part or a repair part. The Easypad can only be ordered as a complete unit.

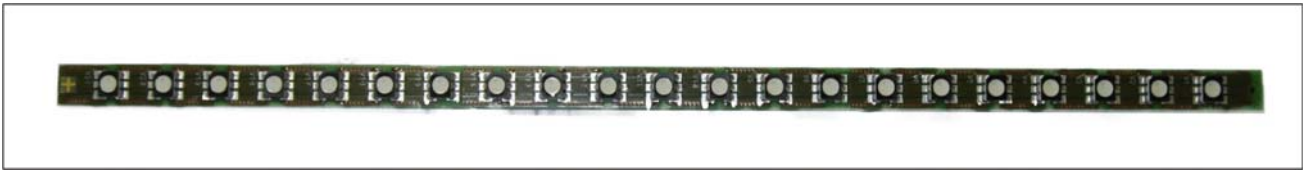


## Board DX77

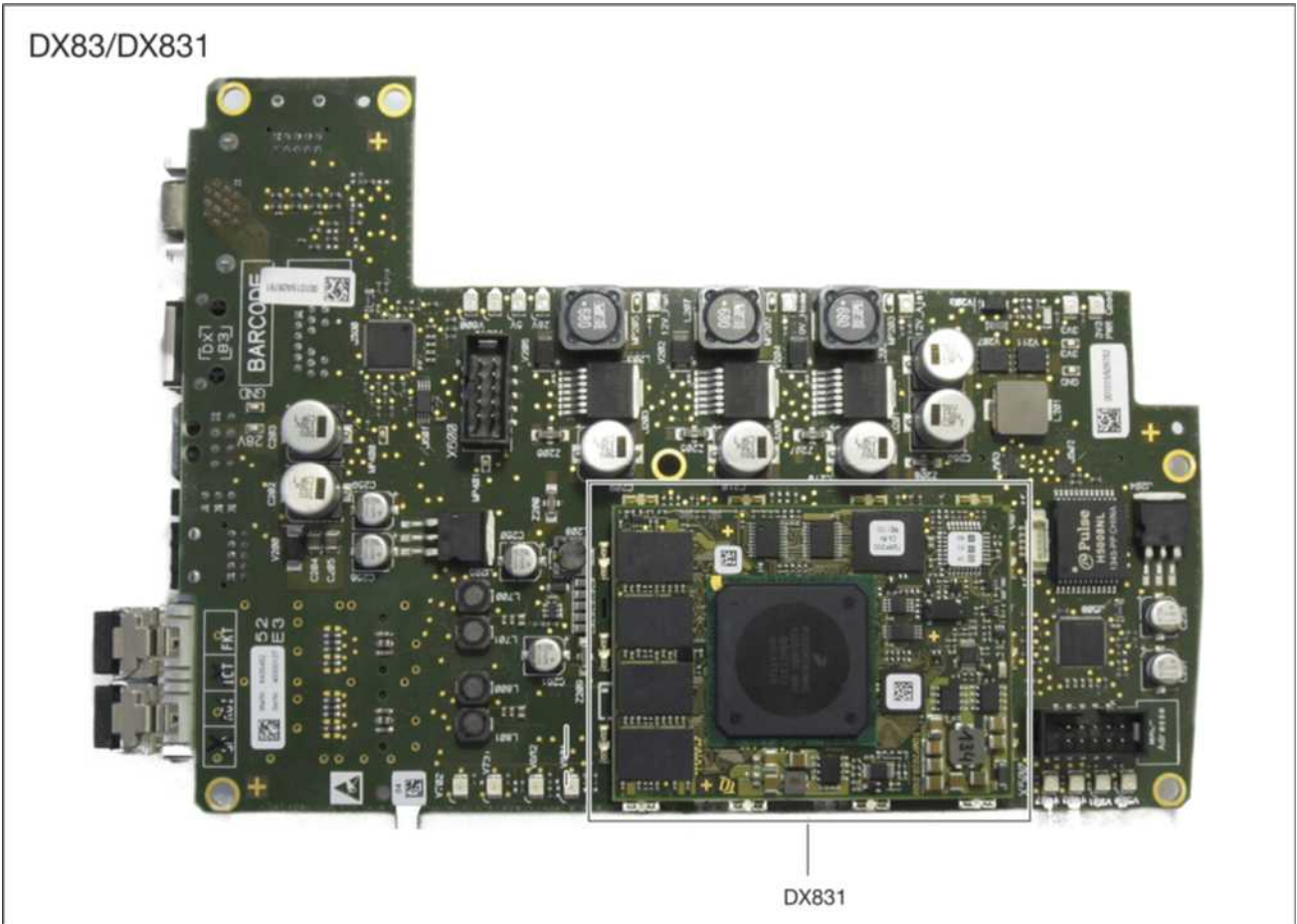




## Board DX78



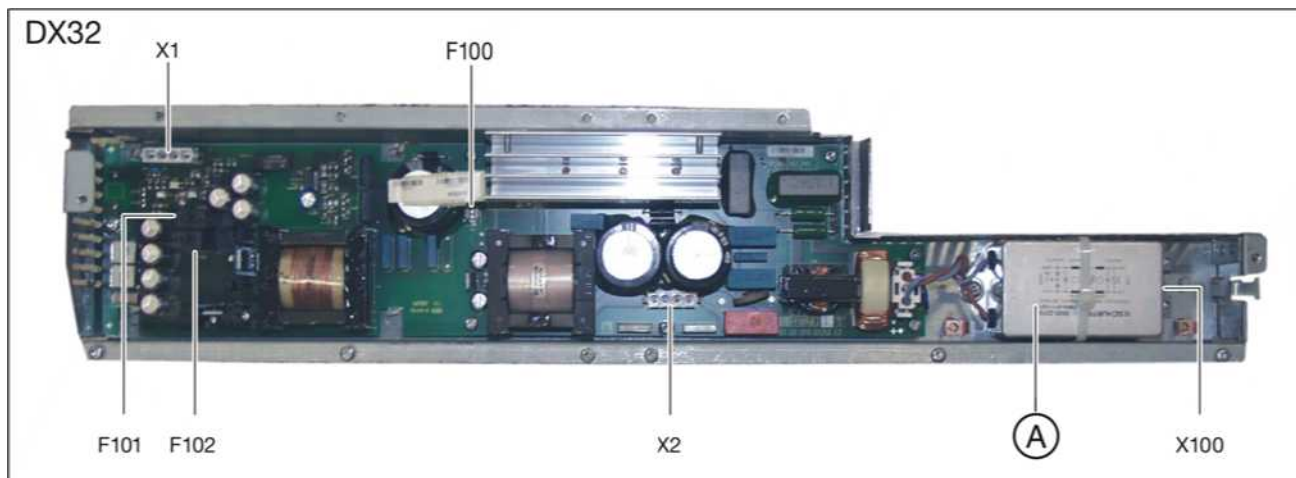
## Board DX83 / DX831





## 3.1.7.2 Boards in the stand

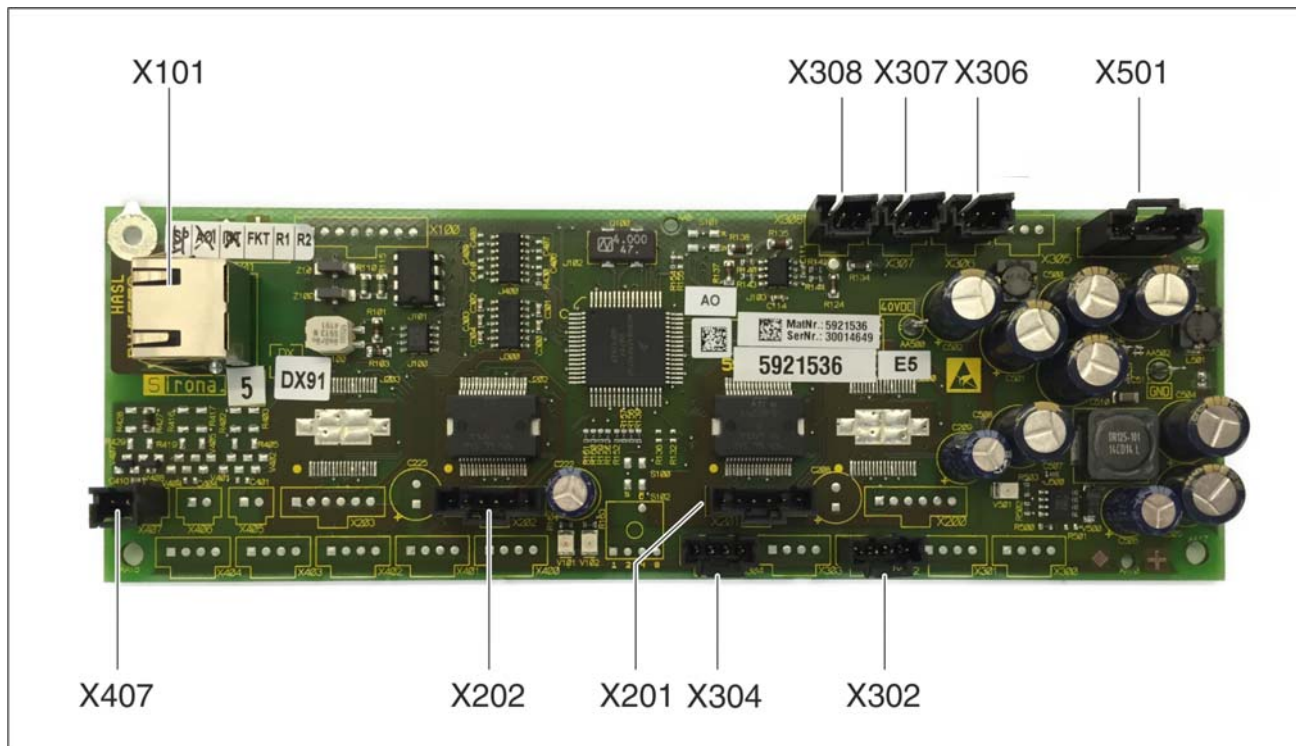
## Board DX32



A	Line filter
---	-------------

## 3.1.7.3 Boards in the cephalometer (left- and right-arm versions)

## Board DX91

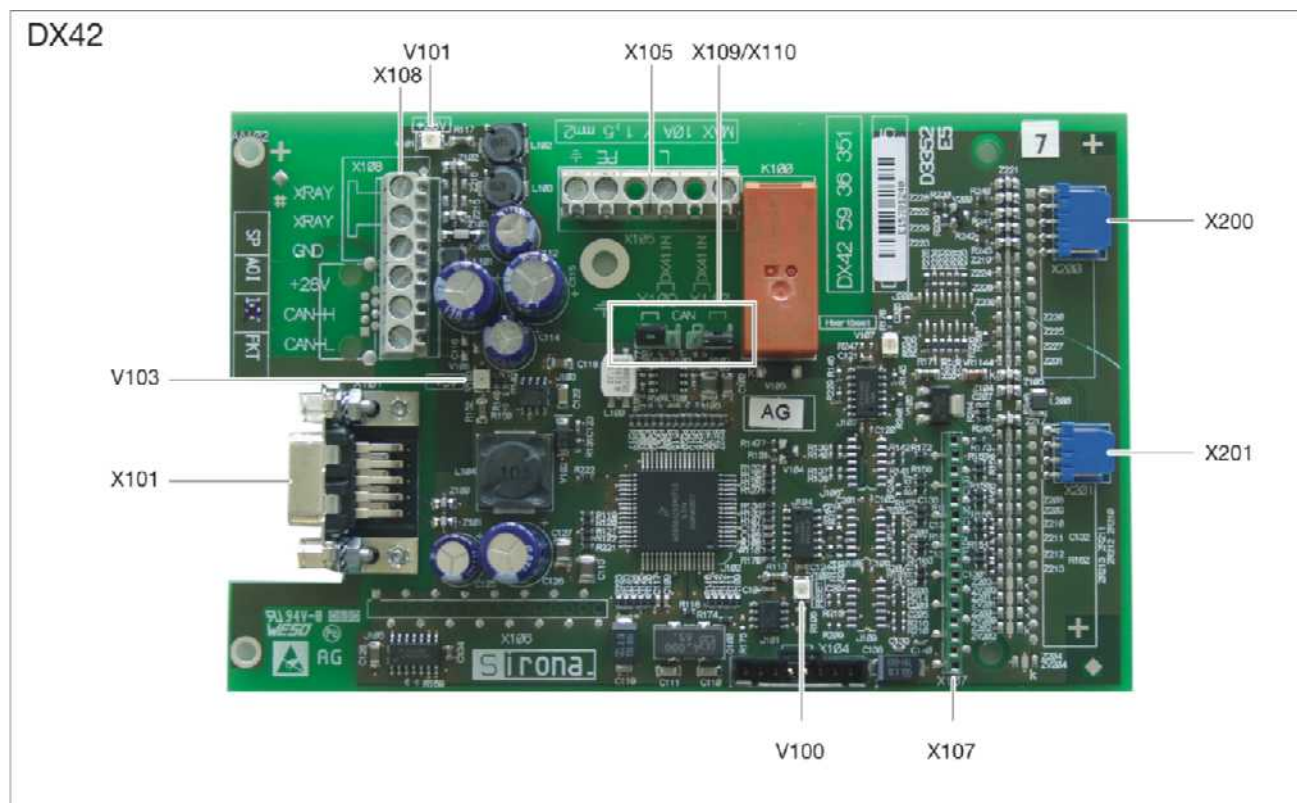




### 3.1.7.4 Board in the remote control

#### Board DX42

This board is not available as a spare part or a repair part.



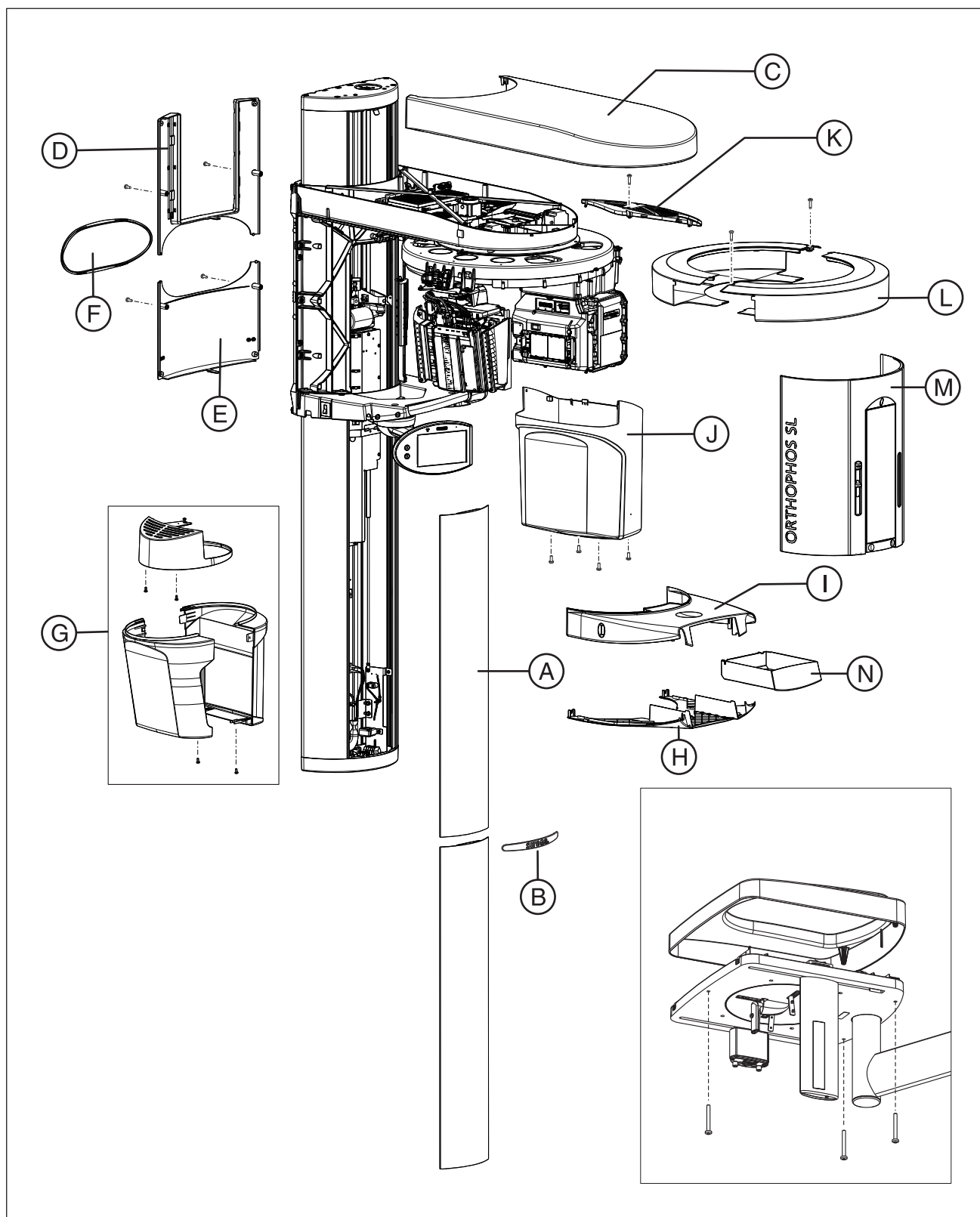
### 3.1.8 Covers

When removing covers, always remember that direct sunlight or bright room lighting can cause system malfunctions due to activated light barriers. Therefore: avoid direct sunlight and bright room lighting above the unit!

Reattach all covers. When attaching the covers: be sure to screw the sheet metal cover back on.

**IMPORTANT:** For reasons of electromagnetic compatibility, be sure to fasten all screws.







A	Profile covers, top and bottom
B	Intermediate piece
C	Arm cover, top
D	Slide cover, top rear
E	Slide cover, bottom rear
F	Slide cover, center rear
G	Sensor cover, complete
H	Support cover, bottom
I	Support cover, top
J	Tube assembly cover
K	Tube assembly, cover
L	Ring cover
M	Slide cover, complete
N	Drawer
O	Cover, Ceph



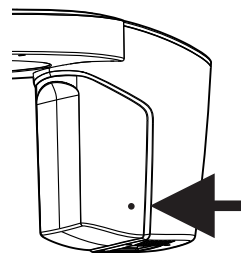
### 3.1.9 Technical data

#### 3.1.9.1 Unit data

Model designation:	ORTHOPHOS XG 3D/Ceph
Nominal voltage:	200 – 240 V
Permissible fluctuation:	± 10%
Permissible drop under load:	10%
Rated current:	12 A
Nominal power output:	2 kW at 90 kV/12 mA with any radiation time
Nominal frequency:	50 Hz / 60 Hz
Mains resistance:	max. 0.8 ohms
Main building fuse:	25 A slow-blow (16 A for single line)
Power consumption:	2 kVA
Power output of tube assembly:	69 kV / 16 mA = 1104 W with any radiation time
Tube voltage:	60 – 90 kV (for 90 kV max. 12 mA)
Tube current:	3 – 16 mA (for 16 mA max. 69 kV)
Maximum setting range:	60 kV / 3 mA to 90 kV / 12 mA
High-voltage waveform:	High-frequency multipulse Residual ripple ≤ 4 kV
High voltage generation frequency:	40 – 120 kHz
Program duration:	See "Program values".
Exposure time:	See "Program values".
Image acquisition scale:	For P1, normal dental arch (slice center) approx. 1:1.19, i.e. the acquired image is magnified by approx. 19% on average compared to reality.
Exposure time for a cephalometric image:	14.9 s max.
Image acquisition scale for a cephalometric image:	approx. 1:1.1, i.e. the acquired image is magnified by approx. 10% on average compared to reality.
Total filtration of X-ray tube assembly:	> 2.5 mm Al / 90 IEC 60522 0.3 mm Cu for volume exposures
Focal spot size as specified in IEC 60336, measured in the central X-ray beam:	0.5 mm



Marking of focal spot:



Source-skin distance

> 200 mm (8")

Automatic exposure  
blocking:

The duration of automatic exposure blocking (cooling period) depends on the set kV/mA level and the actual exposure time. Depending on the tube load, interval times of 8 s to 300 s are automatically set by the system.


Example: For program P1 with exposure data of 84 kV / 12 mA and a radiation time of 14.1 s, the pause duration is 150 s.

Equipment class:

IPX0

Class I device


Degree of protection against  
electric shock:

Type B device 

Degree of protection against  
ingress of water:

Ordinary equipment (without protection  
against ingress of water)

Year of manufacture:

 **20XX** (on the rating plate)

Operating mode:

Continuous operation

Long-term power output:

200 W

Anode material:

Tungsten

Exposure parameters for  
determining leakage  
radiation:

2mA / 90 kV

### X-ray tube

Siemens SR 90/15 FN



**DCS panorama sensor (optional)**

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

Active sensor area, Pan type: 146 x 6 mm

Pixel size: 0.1 mm

Focus-sensor distance: 497 mm

**Flat Panel Detector**

Digital Flat Panel Detector with a-Si technology (amorphous silicon)

**With 3D exposure technology:**

Active sensor area 160 mm x 160 mm

Pixel size: 0.12 mm

Focus-sensor distance: 524 mm

Max. filtration in front of sensor: < 1.2 mm Al

**Ceph sensor**

Digital line sensor with CCD technology

Active sensor area, Ceph type: 230 mm x 6.48 mm

Pixel size: 0.027 mm

Focus-sensor distance: 1,714 mm

**3.1.9.2 Operating and transport conditions**

Transport and storage temperature: -10 °C – +70 °C (14 °F – 158 °F)

Air humidity: 10% – 95%

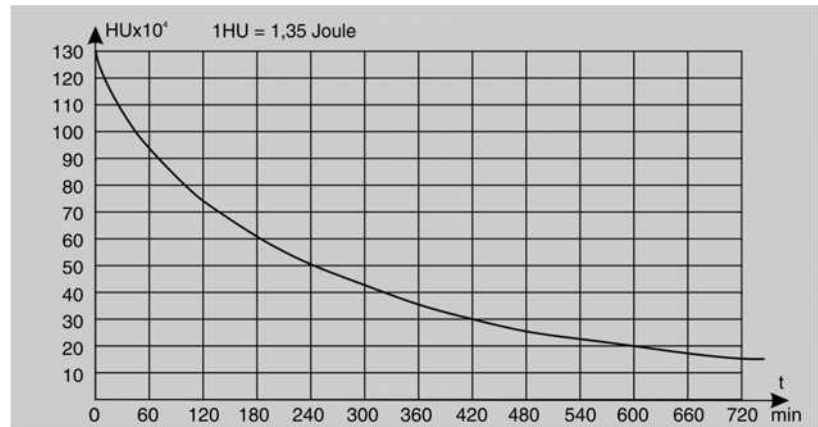
Admissible operating temperature: +18 °C - +31 °C (64 °F – 88 °F)

Operating altitude: ≤ 3,000 m above sea level

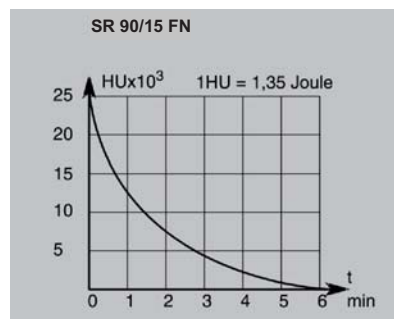


### 3.1.9.3 Diagrams

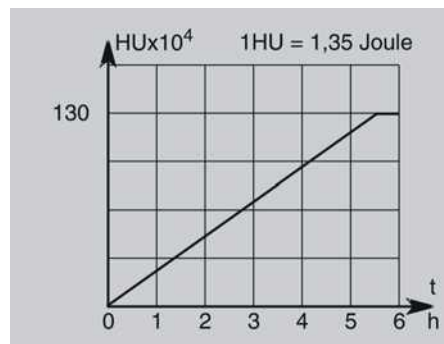
#### Cooling curve for tube housing



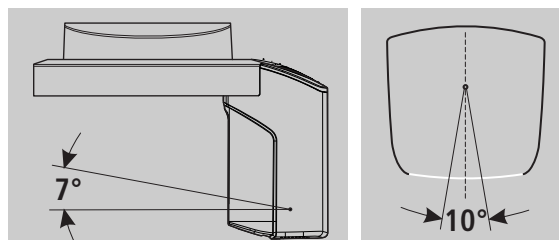
#### Cooling curve of X-ray tube



#### Heating curve of tube housing



#### Central X-ray beam and anode angle





### 3.1.9.4 Requirements for the PC system

#### Requirements on workstation PCs when using a separate RCU

	Requirements for 2D workstation	Requirements for 3D workstation	Requirements for 2D/3D workstation with panorama editor	Fulfilled
Operating system:	<ul style="list-style-type: none"> <li>Windows 7 Professional/Ultimate (64 bit)</li> <li>Windows 8.1 Professional (64 bit)</li> <li>Windows 10</li> </ul> <b>IMPORTANT:</b> An Internet connection is required from Windows 8.			<input checked="" type="checkbox"/>
Processor	≥ 2.3 GHz DualCore with SSE3 support	≥ 2.3 GHz QuadCore with SSE3 support	≥ 2.3 GHz QuadCore with SSE3 support	<input checked="" type="checkbox"/>
Main memory	≥ 4 GB	≥ 8 GB	≥ 8 GB (16 GB recommended)	<input checked="" type="checkbox"/>
Hard disk	≥ 500 GB free hard disk space			<input checked="" type="checkbox"/>
Graphics card	DirectX 9.0c graphics card (512 MB RAM dedicated or Intel Onboard graphics)	DirectX 10 graphics card (1GB RAM dedicated or Intel Onboard graphics) with WDDM driver 1.0 or higher	DirectX 10 graphics card (1GB RAM dedicated or Intel Onboard graphics) with WDDM driver 1.0 or higher	<input checked="" type="checkbox"/>
Screen resolution	Minimum 1280x1024 pixels Recommended 1600x1200 pixels			<input checked="" type="checkbox"/>
Drive	<ul style="list-style-type: none"> <li>DVD ROM</li> <li>DVD RAM (to use Wrap &amp; Go)</li> </ul>			<input checked="" type="checkbox"/>
Screen	Suitable for diagnosis applications			<input checked="" type="checkbox"/>
Software	<ul style="list-style-type: none"> <li>Acrobat Reader, contained on DVD (required for the PDF test report function)</li> </ul>			<input checked="" type="checkbox"/>

#### Requirements on RCU hardware

	Requirements	Fulfilled
Operating system:	<ul style="list-style-type: none"> <li>Windows 7 Professional/Ultimate (64 bit)</li> <li>Windows 8.1 Professional (64 bit)</li> <li>Windows 10</li> </ul> <b>IMPORTANT:</b> An Internet connection is required from Windows 8.	<input checked="" type="checkbox"/>
Processor	≥ 2.3 GHz QuadCore with SSE3 support, only intel ≥ i73xx	<input checked="" type="checkbox"/>
Main memory	≥ 16 GB	<input checked="" type="checkbox"/>
Hard disk	≥ 2 TB of free hard disk space	<input checked="" type="checkbox"/>
Graphics card	Only for combined use as workstation on one PC, see above.	<input checked="" type="checkbox"/>
Drive	<ul style="list-style-type: none"> <li>DVD ROM</li> <li>DVD RAM (to use Wrap &amp; Go)</li> </ul>	<input checked="" type="checkbox"/>



## 3.2 Firmware

Any software combinations other than those listed here are not allowed. If a module software version does not match the main software version, the main software version is identified with an asterisk on the info screen (e.g. 05.08.02\*).

### Main software V05.08.02

ORTHOPHOS SL		Cephalometer		Remote control	
Board	Module software	Board	Module software	Board	Module software
DX11	V05.08.02	DX91	V02.45.00	DX42	V02.52.04
DX11-FPGA	V02.02.00				
DX6NG	V05.11.01				
DX61B20	V05.62.07				
DX7E20	V03.05.06				
DX7E20SYS	V03.05.06				
DX7-L0	–				
DX7-L1	V03.05.06				
DX81	V02.33.00				
DX81-FPGA	V03.08.00				
DX831	V05.08.01				

SIDEXIS 4	ORTHOPHOS SL workstation software	RCU acquisition server software	GALAXIS	GALILEOS Implant
V4.1.1	V1.0.2	V1.0.2	V1.9 SP1	V1.9 SP1

### Main software V05.10.00

ORTHOPHOS SL		Cephalometer		Remote control	
Board	Module software	Board	Module software	Board	Module software
DX11	V05.10.00	DX91	V02.45.00	DX42	V02.59.01
DX11-FPGA	V02.02.00				
DX6NG	V05.12.00				
DX61B20	V05.63.02				
DX7E20	V03.07.04				
DX7E20SYS	V03.05.06				
DX7-L0	–				
DX7-L1	V03.07.04				
DX81	V02.33.00				
DX81-FPGA	V03.08.00				
DX831	V05.10.00				



SIDEXIS 4	ORTHOPHOS SL workstation software	RCU acquisition server software	GALAXIS	GALILEOS Implant
V4.1.2	V1.0.3	V1.0.2	V1.9 SP1	V1.9 SP1

#### Main software V 05.10.02

ORTHOPHOS SL		Cephalometer		Remote control	
Board	Module software	Board	Module software	Board	Module software
DX11	V05.13.03	DX91	V02.45.00	DX42	V02.59.03
DX11-FPGA	V02.03.00				
DX6NG	V05.12.02				
DX61B20	V05.63.02				
DX7E20	V03.08.06				
DX7E20SYS	V03.05.06				
DX7-L0	–				
DX7-L1	V03.08.00				
DX81	V02.33.00				
DX81-FPGA	V03.08.00				
DX831	V05.13.02				

SIDEXIS 4	ORTHOPHOS SL workstation software	RCU acquisition server software	GALAXIS	GALILEOS Implant
V4.1.3	V1.0.3	V1.0.2	V1.9 SP1	V1.9 SP1



## 4 General operating procedures

### 4.1 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.**

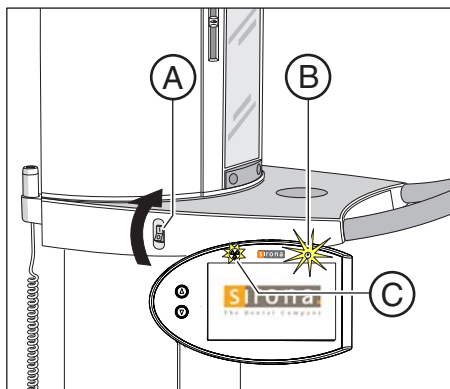
The touchscreen can be damaged or its surface scratched.

- 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 [ → 236].

#### 4.1.1 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 (ambient light).



## 4.2 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.



```
C:\>ping 192.168.15.13

Ping wird ausgeführt für 192.168.15.13 mit 32 Bytes Daten:

Antwort von 192.168.15.13: Bytes=32 Zeit<1ms TTL=63
Antwort von 192.168.15.13: Bytes=32 Zeit<1ms TTL=63
Antwort von 192.168.15.13: Bytes=32 Zeit<1ms TTL=63
Antwort von 192.168.15.13: Bytes=32 Zeit<1ms TTL=63

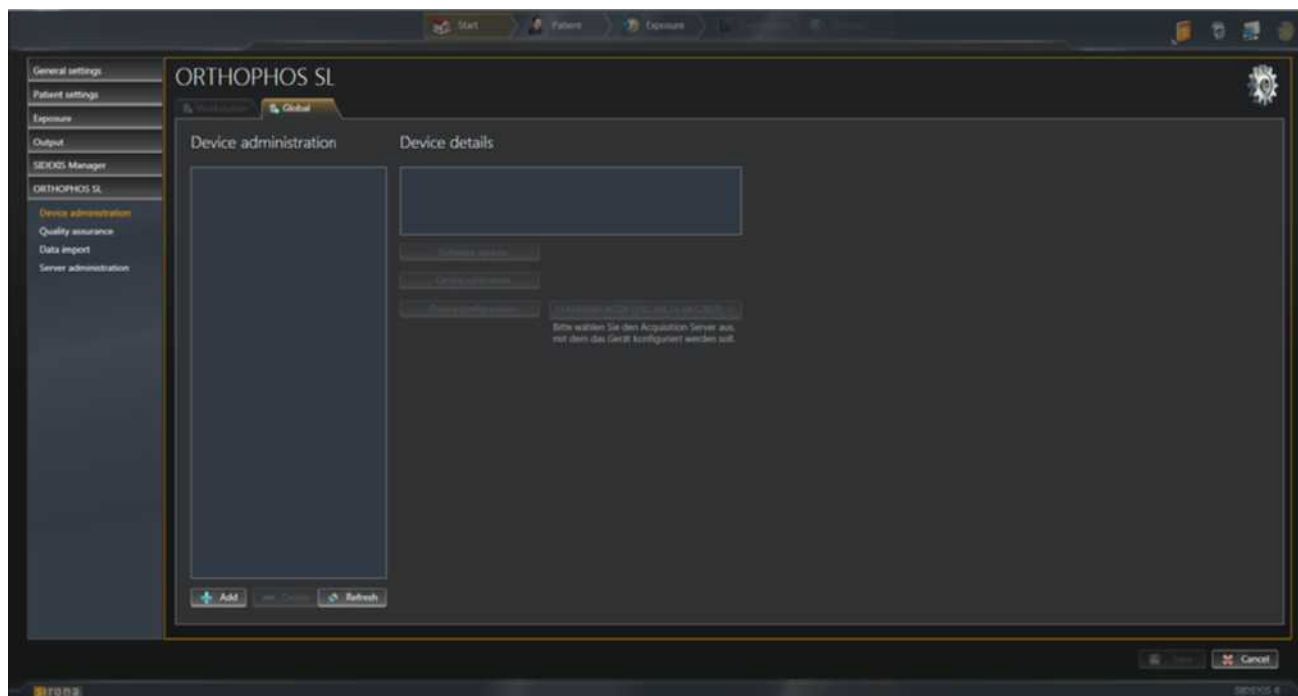
Ping-Statistik für 192.168.15.13:
    Pakete: Gesendet = 4, Empfangen = 4, Verloren = 0 (0% Verlust),
    Ca. Zeitangaben in Millisek.:
        Minimum = 0ms, Maximum = 0ms, Mittelwert = 0ms

C:\>
```



### Adding an X-ray component

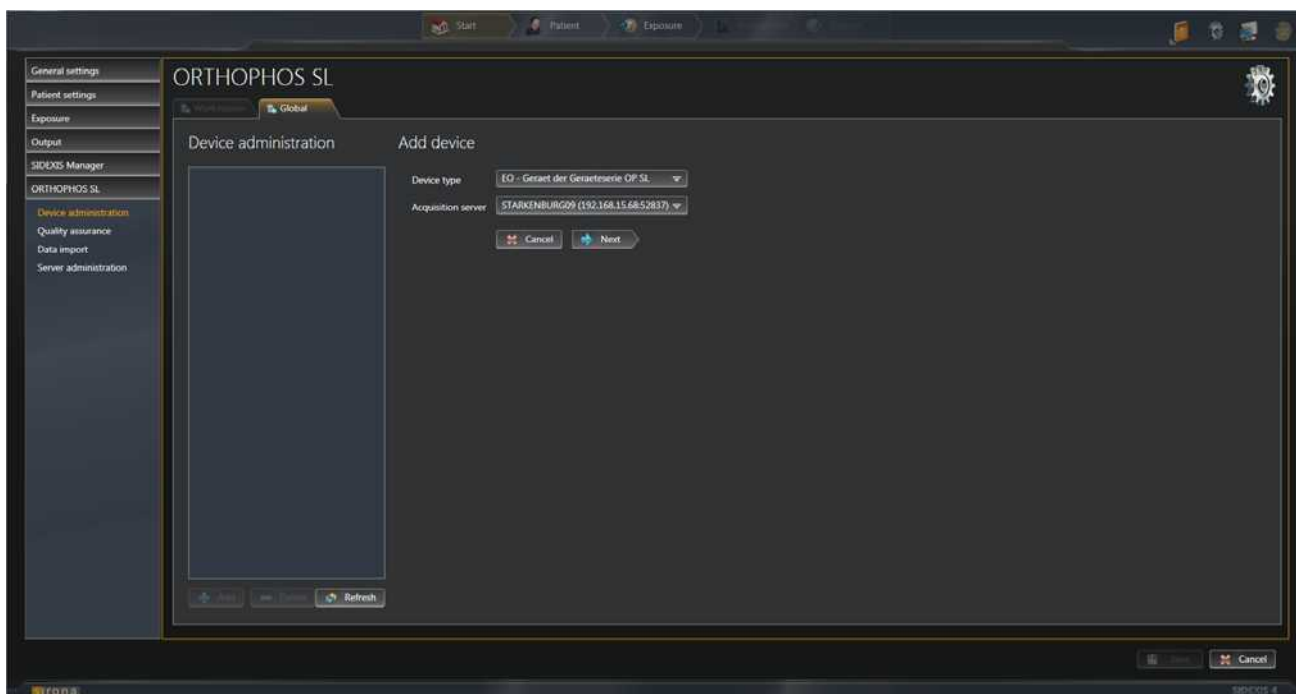
- ✓ SIDEXIS 4 is installed.
  - ✓ The *"Sirona AcquisitionServer"* software is installed.
  - ✓ The workstation/plugin software for the corresponding X-ray component or sensor is installed on the workstation.
1. Start SIDEXIS 4.
  2. In SIDEXIS 4, call the *"ORTHOPHOS SL" / "Device Administration"* configuration 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.



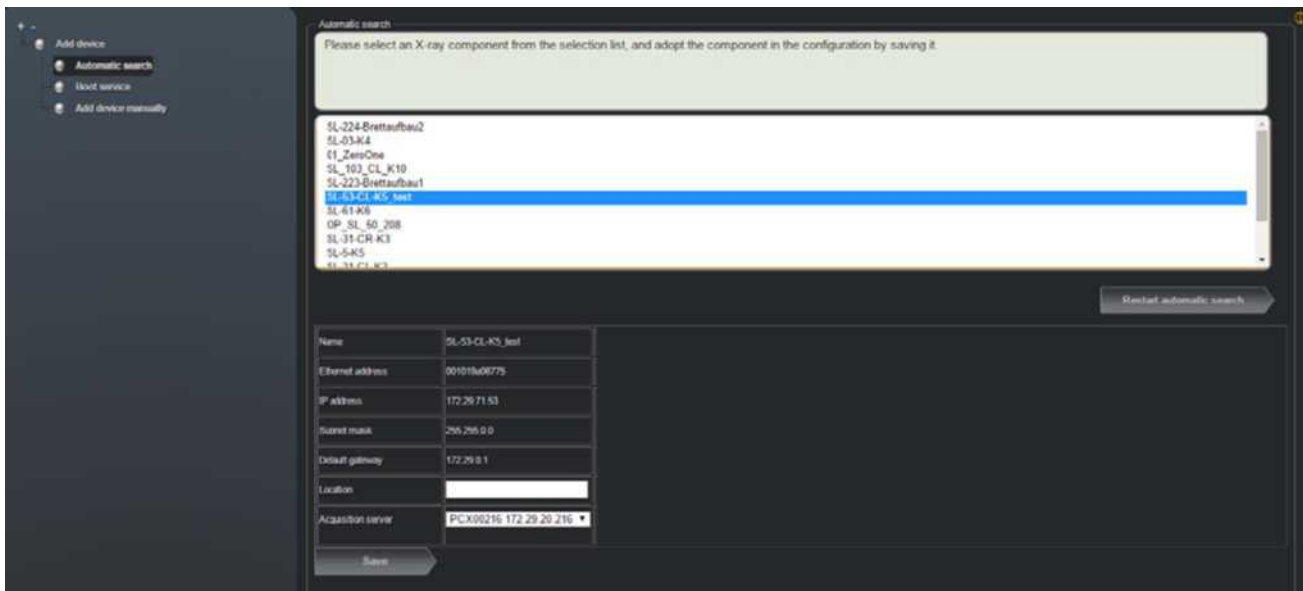
Menu for adding X-ray components

- ↳ 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

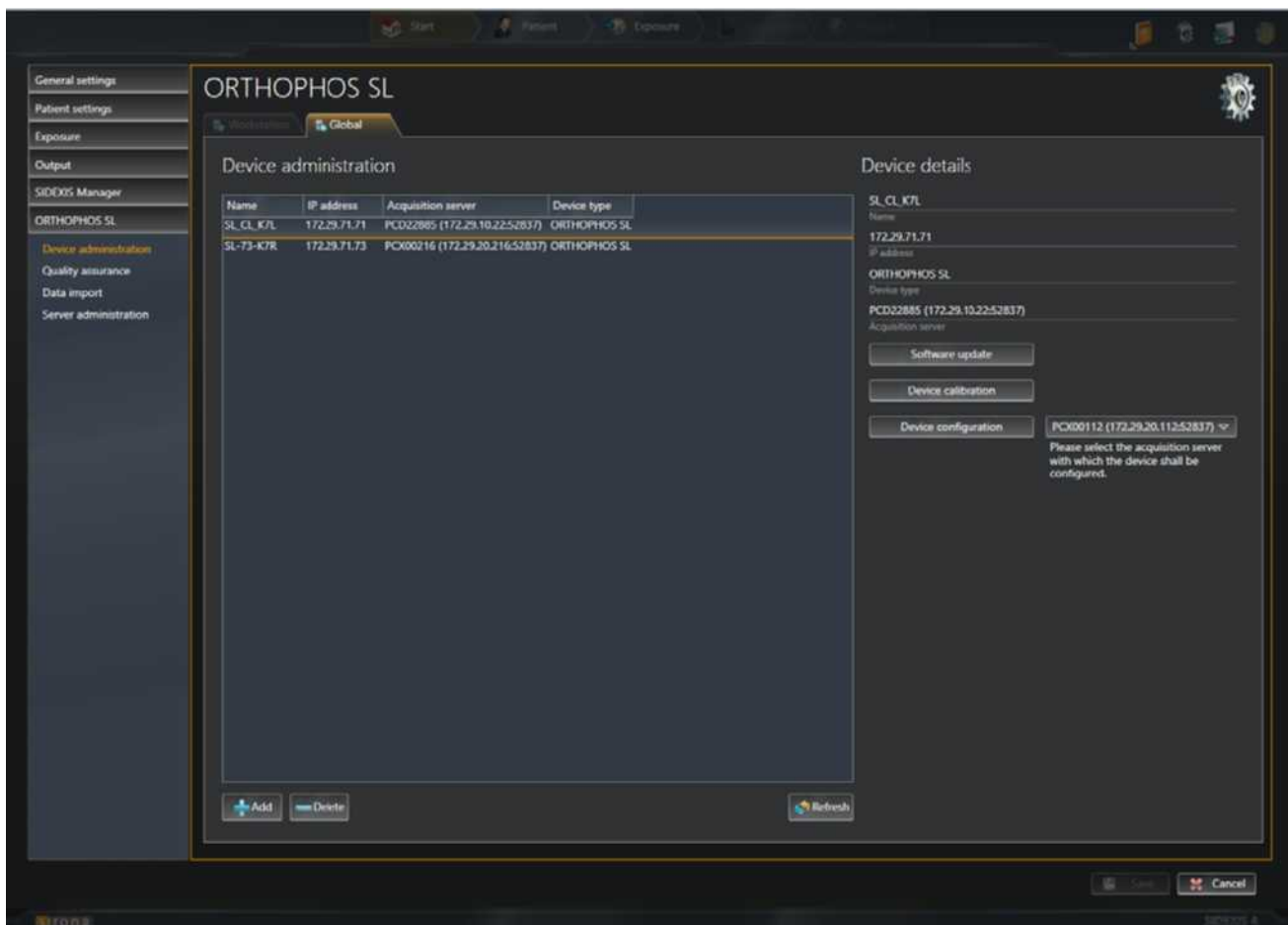
- ✓ The menu for adding X-ray components opens.
  - 1. Click the *"Automatic search"* button in the structure tree.
    - ↳ The network is searched for available X-ray components.
    - ↳ The X-ray components found on the network are displayed in list form.
- NOTE: If no X-ray component is found, check 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 SDEXIS 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

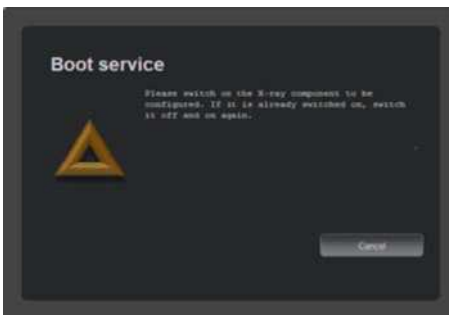
### IMPORTANT

The X-ray component can only be detected via the boot service if the default network data is set on the unit (see chapter "S037: Test step 2 [→ 322]").

✓ 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 components found in the network is displayed with their network data.



Boot service

Name: SL-73-K7R

Ethernet address: 001010a05752

IP address: 172.29.71.73

Subnet mask: 255.255.0.0

Default gateway: 172.29.50.1

Location: Kammer 7

Acquisition server: PCX00112 172.29.20.112

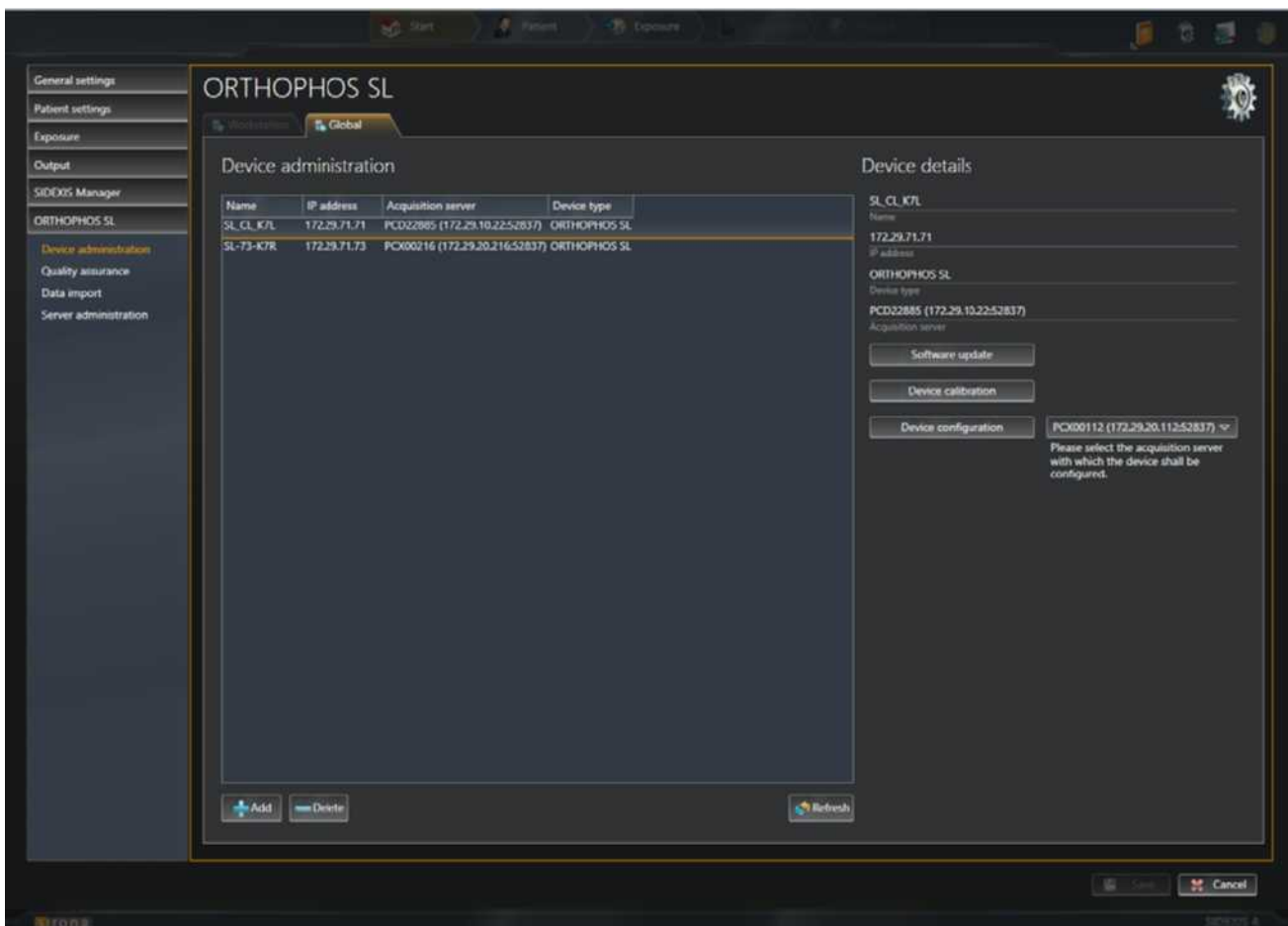
Save

Exit

#### Adapting the network data

3. Adapt the network configuration (IP address, subnet mask and the 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, the network data entered are 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 SIOXIS 4.
  9. Register a patient and change to the work phase "Acquisition" (see technical document "SIOXIS 4 Operator's Manual" (REF 64 47 028).
- ✎ The X-ray component is now available in the work phase "Acquisition" in SIOXIS 4 below the previously entered location.



### Add device manually

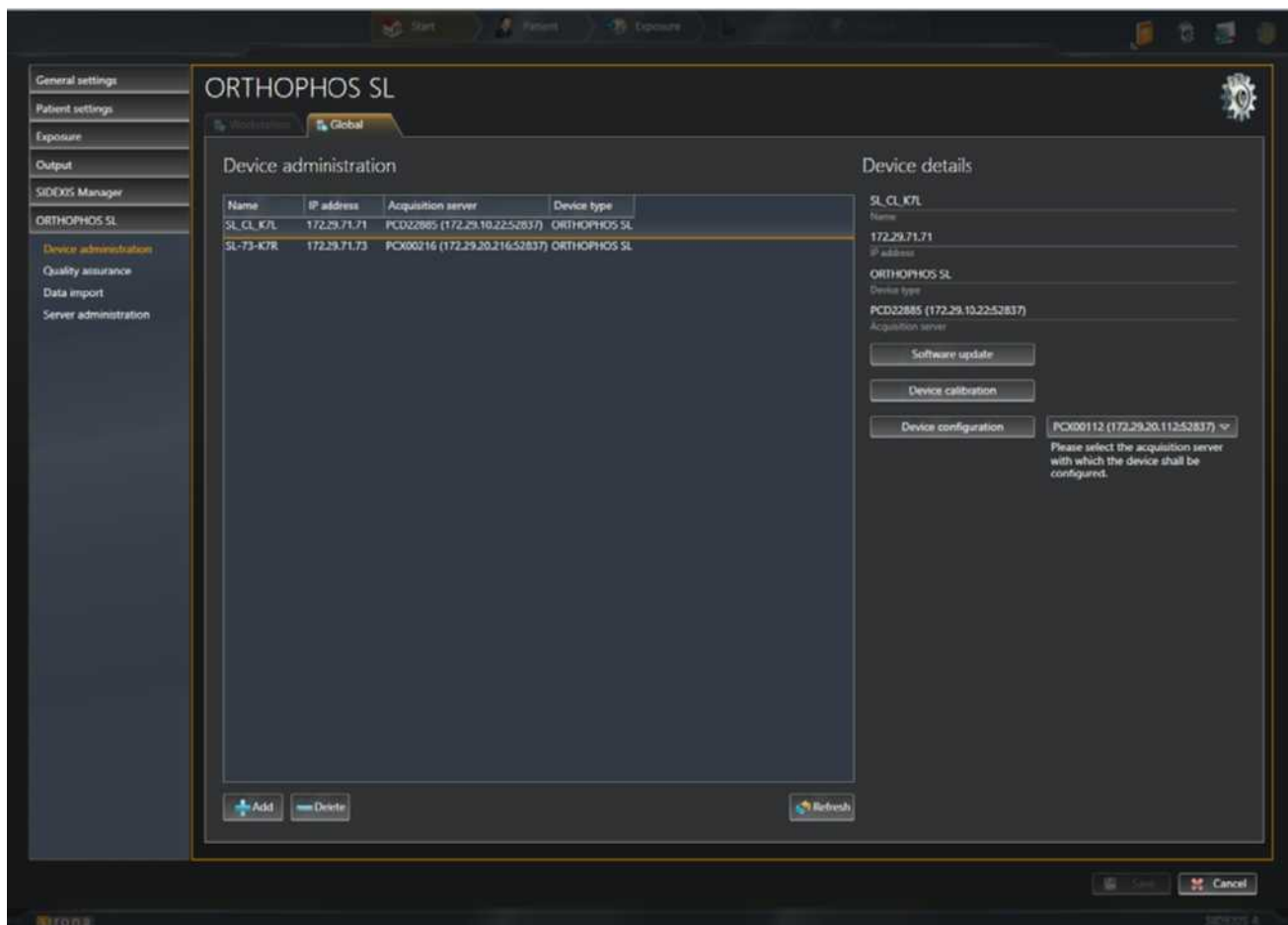
- ✓ The menu for adding X-ray components opens.

The screenshot shows a software window titled "Add device manually". Inside, there's a subtitle "Add a new X-ray component manually." followed by a large empty text box. To the left of this text box is a form with several input fields: "Name", "Ethernet address", "IP address", "Subnet mask", "Default gateway", "Location", and "Acquisition server". The "Acquisition server" field is a dropdown menu currently showing "PCX00216 172.29.20.216". Below the form is a "Save" button. At the bottom right of the window is an "Exit" button. On the far left, there's a sidebar with a tree view containing "Add device", "Automatic search", "Boot service", and "Add device manually" (which is highlighted).

*"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"

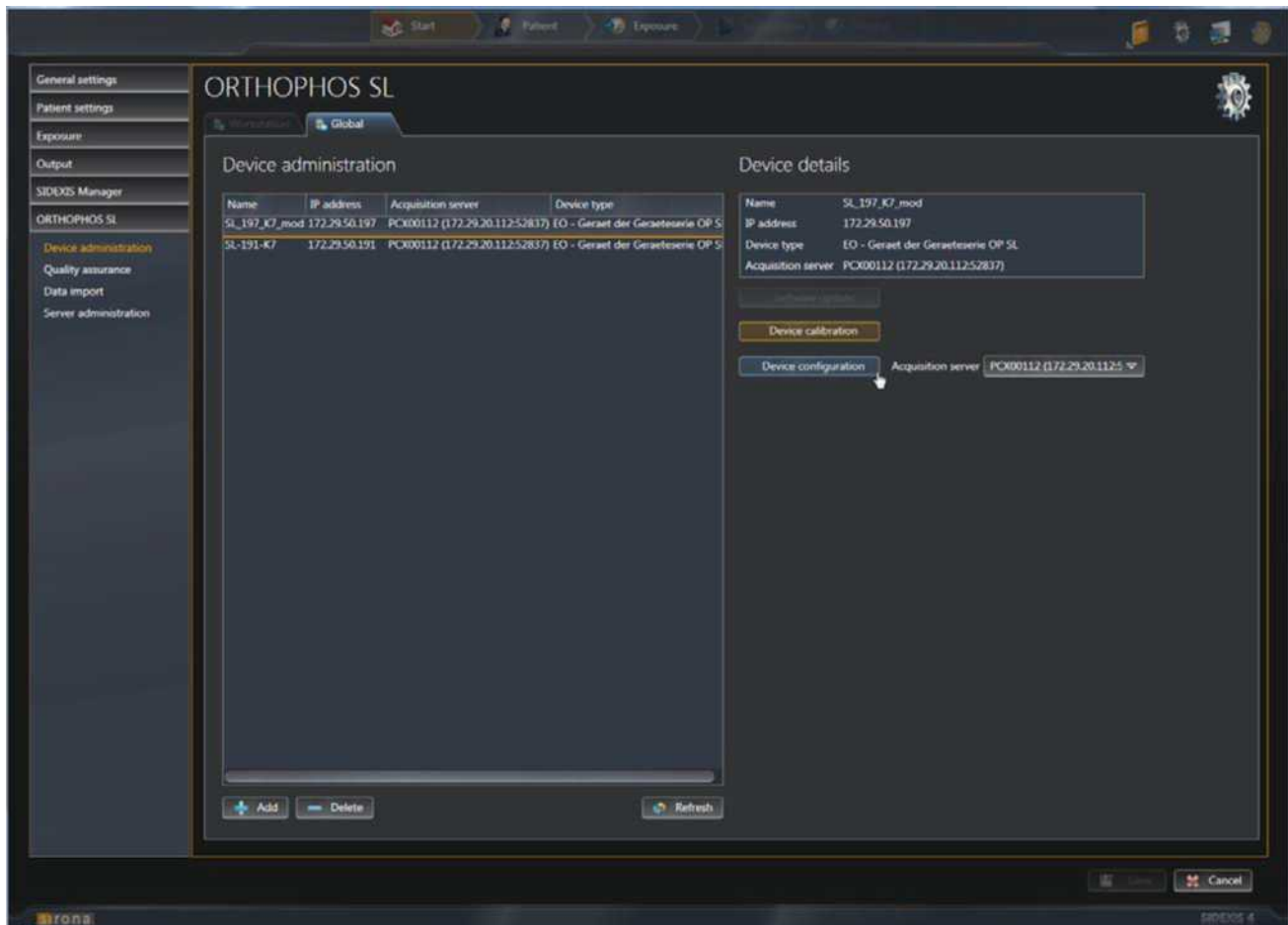
✎ The X-ray component appears in the device list of the configuration menu "ORTHOPHOS SL"/"Device Administration"

6. Click on the "Cancel" button.
  7. Reboot the SIOXIS 4.
  8. Register a patient and change to the work phase "Acquisition" (see technical document "SIOXIS 4 Operator's Manual" (REF 64 47 028).
- ✎ The X-ray component is now available in the work phase "Acquisition" in SIOXIS 4 below the previously entered location.



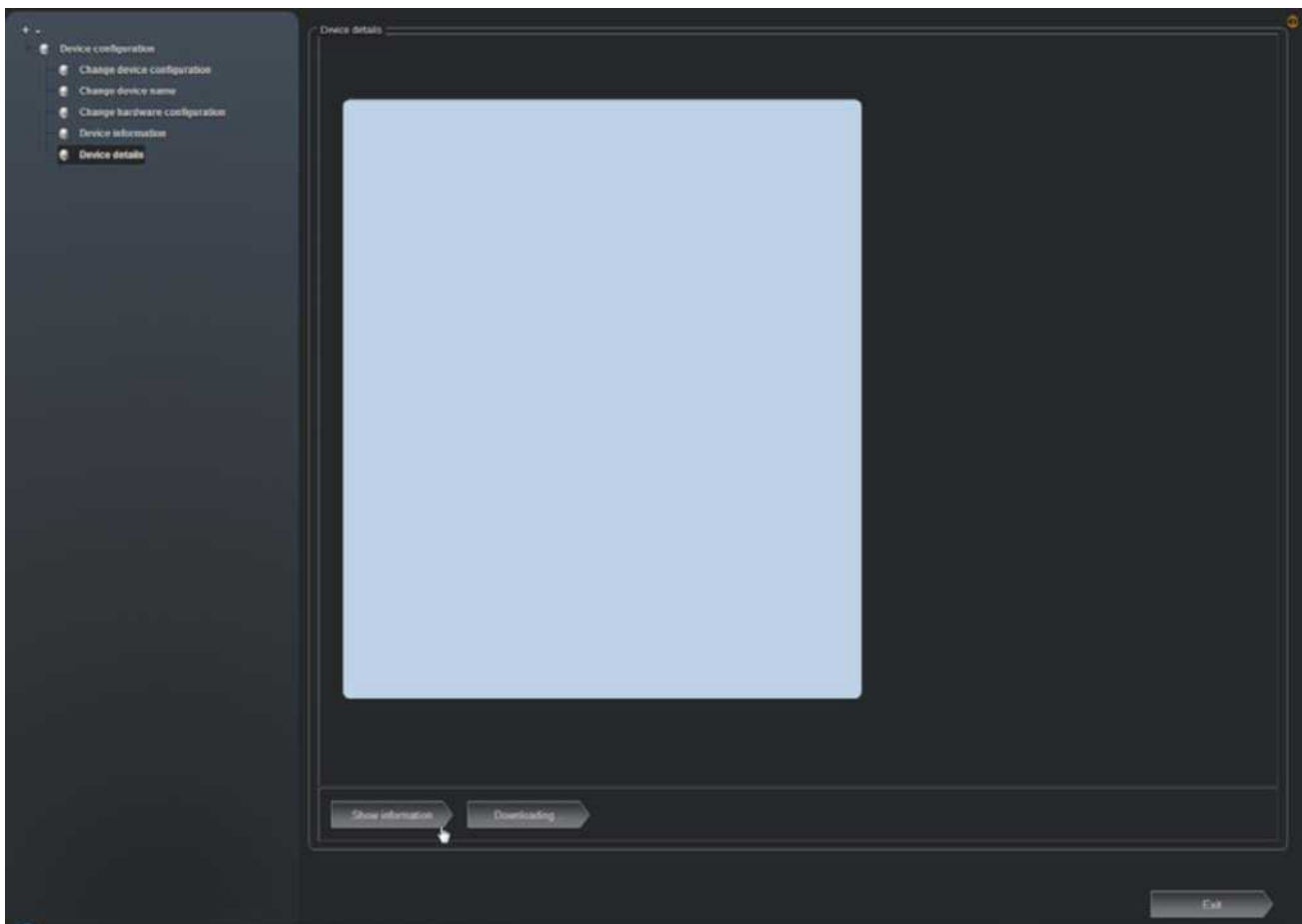
## 4.3 Opening / saving "Unit information"

- ✓ 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.

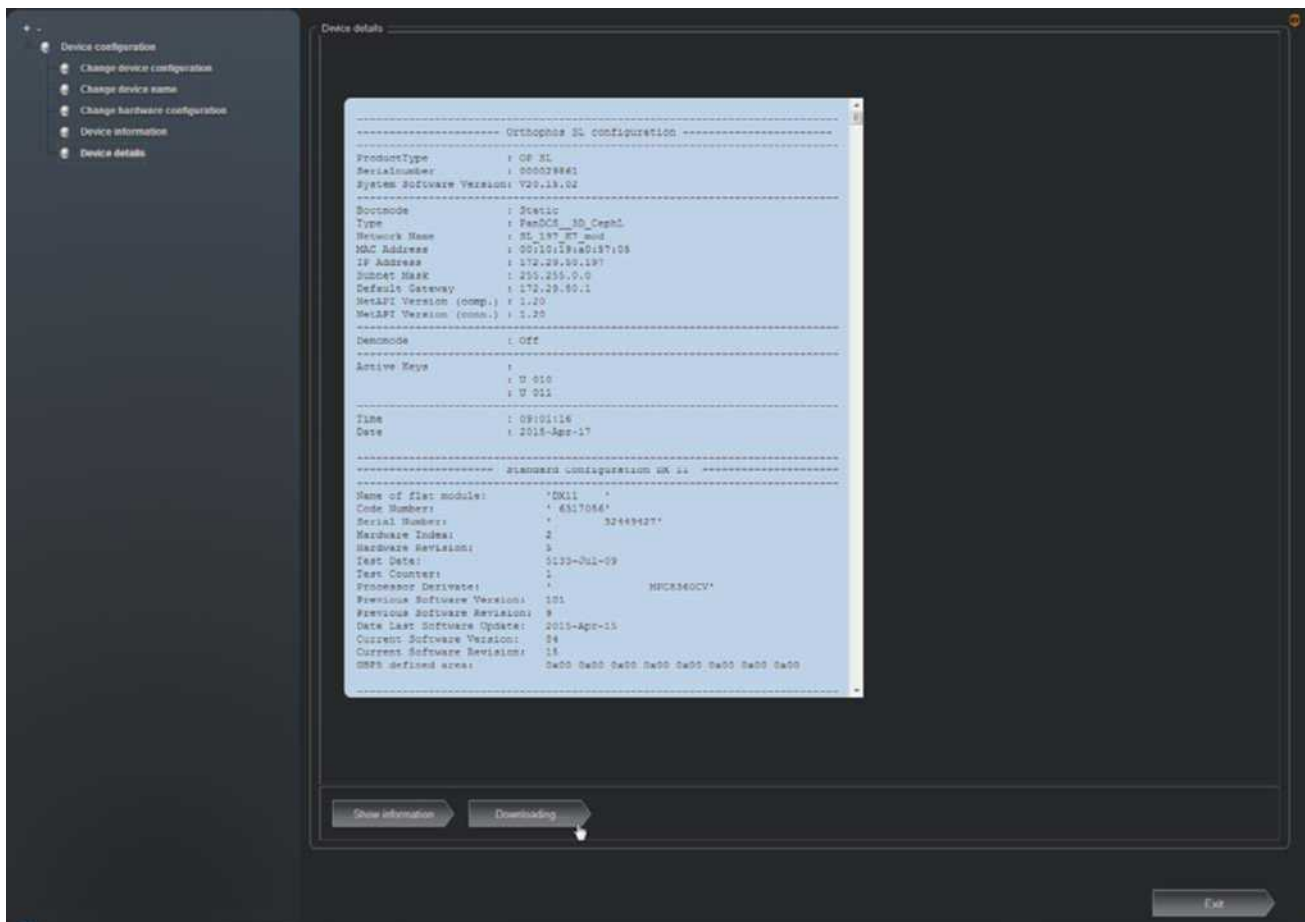




↳ The *"Device configuration"* menu opens.

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.



## 4.4 Activating functions

### 4.4.1 Activation via Easypad

#### Function enhancements

If you have purchased a certificate with a corresponding activation key code, you can extend the functionality of your ORTHOPHOS SL system.

- ✓ You have a certificate containing a valid activation key code.
- ✓ Level 1 is displayed on the touchscreen.

1. Touch the toothed wheel (A) in the selection image.
  - ✎ Level 2 is displayed.



2. Touch the keyboard icon (B).
  - ✎ A keyboard then appears.

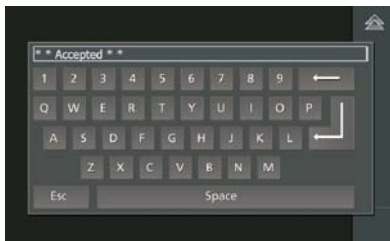
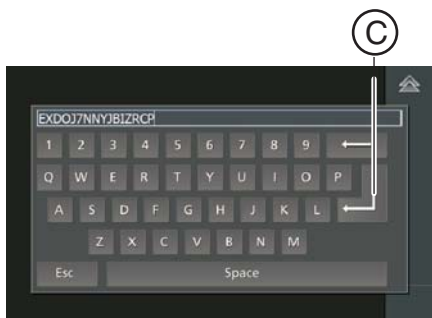


3. Enter the activation key from the certificate via the keyboard.
  - ✎ Once the final character is entered, the enter key (C) appears.

**Tip:** The activation key code consists of 16 characters.

4. Confirm your input with the Enter key (C).
  - ✎ If the entry is correct, \*\* Accepted \*\* appears on the display. The function enhancement is activated.
  - ✎ If the entry contains errors, !! Failed !! is displayed, alternating with the activation key code entered. The function enhancement has failed.

Compare the activation key code displayed with the activation key code on the certificate. If you cannot detect an input error, contact the responsible sales partner.

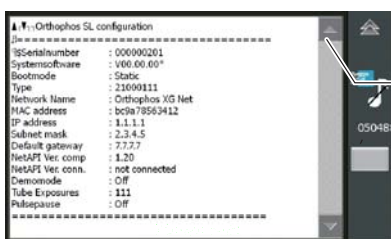
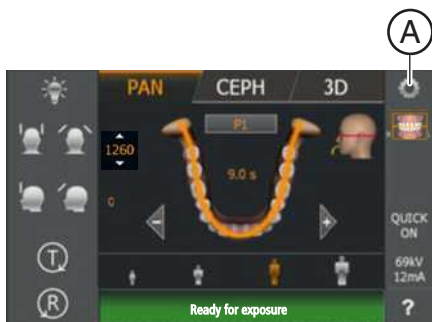




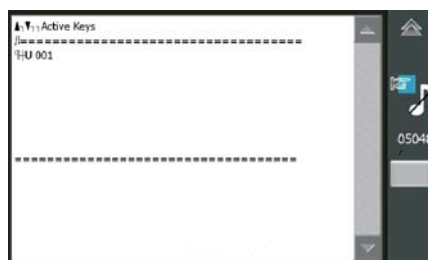
### Checking the function enhancement

- ✓ Level 1 is displayed on the touchscreen and the message “H403 – Switch SIDEXIS to ready for exposure state” is displayed in the comment line.

1. Touch the toothed wheel (A) in the selection image.  
↳ Level 2 is displayed.
2. Touch the question mark in the bottom right corner.  
↳ The Info screen ORTHOPHOS SL configuration is displayed.



3. Touch the field (G).  
↳ The Info screen Active Keys is displayed.  
↳ The name of the function enhancement is displayed.





## 4.4.2 Activation via PC

### Function enhancements

As an alternative to entering the access code via the Easypad, the activation key code can also be entered via an internet browser.

**Tip:** If you do not know the IP address of the X-ray unit, you can read it from the Easypad (service routine S037.1 [→ 320] or Info screen [→ 76]).

- ✓ 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
3. Confirm your input with the "Enter" key.



↪ A security prompt appears.

4. Click on the link "*Continue to this Website*".  
NOTE: Javascript must be enabled.

↪ The Sirona Web service is loaded.

↪ The sub menus of the "*User*" menu are displayed in the structure tree.





5. In the structure tree, click on the *"ActivationCode"* element.



↪ A page with an input field is opened.

6. Enter the activation key code from the certificate in the field *"ActivationCode"*.

**Tip:** The activation key code consists of 16 characters.

7. Confirm your entry with the *"Enter ActivationCode"* button.

↪ If the entry is correct, the *"ACCEPTED"* display appears in green letters. The function enhancement is activated.

↪ If the entry is incorrect, the *"FAILED"* display appears in red letters. The function enhancement has failed. Compare the activation key code displayed with the activation key code on the certificate. If you cannot detect an input error, contact the responsible sales partner.

**Tip:** In the internet browser, you can create a desktop shortcut or a link to the homepage of the X-ray device in your Favorites directory or by choosing *Favorites | Add to Favorites*.



## Certificate check

The first time you establish contact with the X-ray device, a certificate check (operating system function) should be performed. If no certificate check has been performed, the *"Security Alert"* dialog box is displayed every time a connection is established to the X-ray device.

✓ The *"Security Alert"* dialog box is opened.

1. Click on the *"View Certificate"* button.

✎ The *"Certificate"* dialog box opens.



2. Click on the *"Install Certificate"* button.

✎ The *"Certificate Import Wizard"* opens.



3. Click on the *"Next"* button.







4. Select the "Automatically select the certificate store based on the type of certificate" option panel. Click on the "Next" button.
  - ↳ In the "Certificate Import Wizard", the "Completing the Certificate Import Wizard" dialog box opens.



5. Click on the "Finish" button.
  - ↳ The "Security Warning" window then opens.



6. Check whether the following fingerprint is displayed in the "Security Warning" window: **1C206FE7 369C10A8 1EF2FB4B 348D9D8B EAE6E3DB**. If the fingerprint matches, click on the "Yes" button. If the fingerprint does not match, contact your local sales partner.
  - ↳ The confirmation window opens with the message "The import was successful".



7. Click on the "OK" button.
  - ↳ The certificate check has been performed.



## 4.5 Updating the unit firmware

### NOTICE

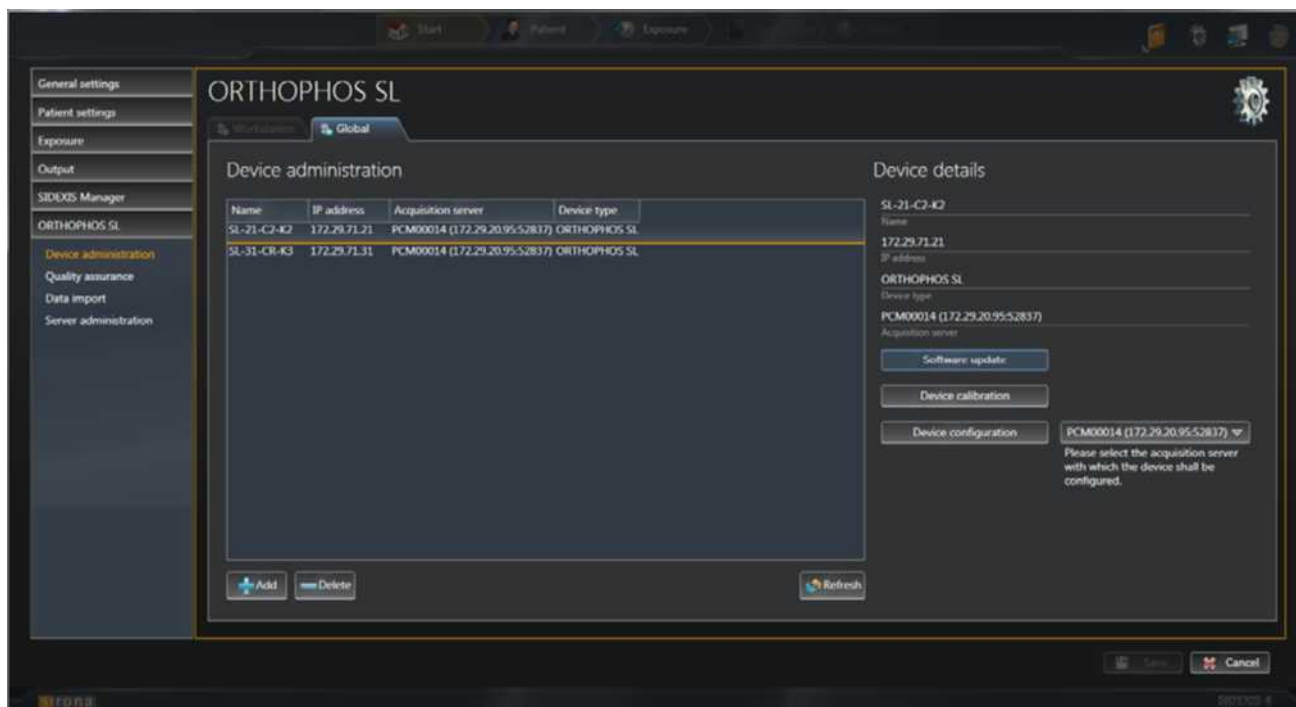
#### Unit inoperability!

Before starting the firmware update, make sure that no unit movements are active. Otherwise the system may become inoperable in rare cases. The sensor unit must be installed as part of the update. Exposure readiness must be deselected in SIDEXIS 4 and the unit must not already be in service mode.

### IMPORTANT

Read the information provided on the firmware CD supplied with the unit and on the SIRONA dealer page on the Internet very carefully. These sources always contain the latest information on software updates.

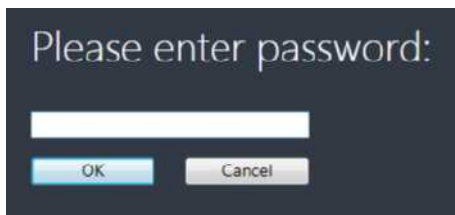
- ✓ SIDEXIS 4 is installed.
  - ✓ The workstation software for the corresponding X-ray component or sensor is installed on the workstation.
1. Start SIDEXIS 4.
  2. In SIDEXIS 4, call the "Orthophos SL" / "Device Administration" configuration menu.



Starting the software update

3. Select the desired X-ray component in the list marked "Device administration".
4. Then click on the "Software update" button.





- ✎ The dialog box for entering the service password opens.  
Enter the first 4 digits of the current system date in reverse order (e.g. on 01/11/2016, enter "1011") as the service password.

5. Enter the service password. Click the "OK" button to confirm the entry.

- ✎ The connection to the Acquisition Server is established.

- ✎ The update menu opens.

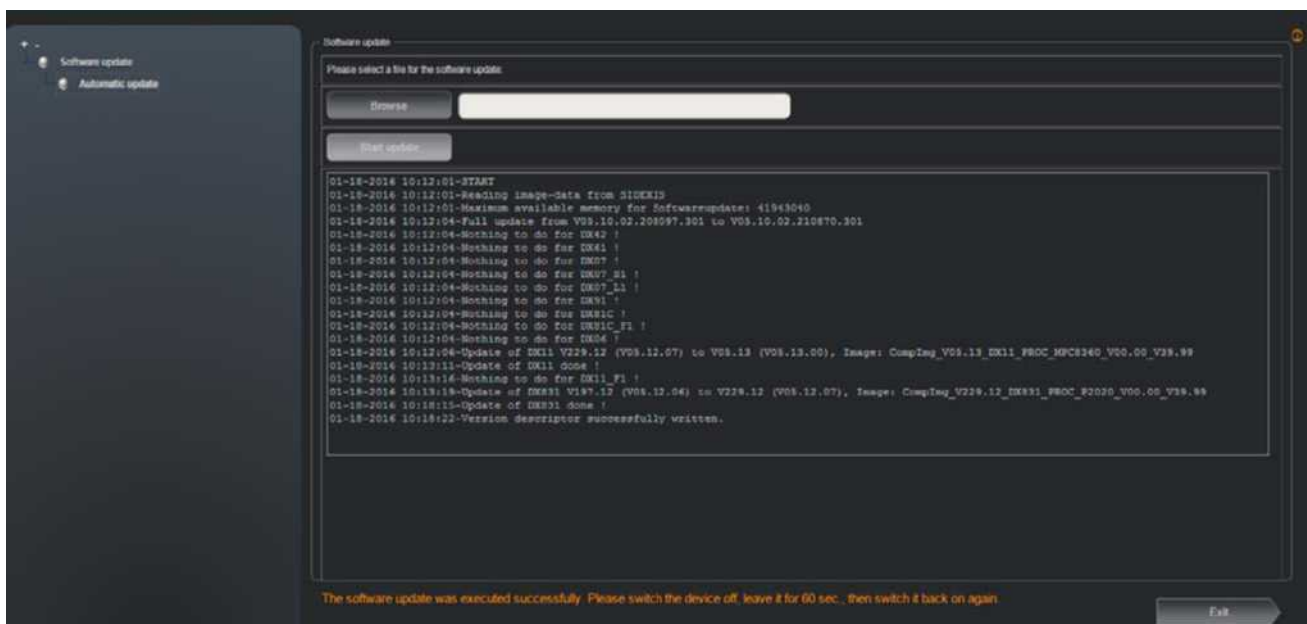


6. Click on the "Browse" button and select the desired update file.  
The update file is located on the unit software CD. It is delivered with each DX11 replacement board and also included in the country set. The contents of the CD can be downloaded from the Dealer domain of the SIRONA Internet home page (under Products/Imaging systems): [www.sirona.com](http://www.sirona.com)

7. Click on the "Update starten" button to start the firmware update

- ✎ The firmware update is started.

A dialog window showing the progress tells you the status of the upload.





- ✎ After the firmware update, the message window in the update menu shows whether the update was successful or not. In addition, a message in the software manager notifies you that a unit restart is required to activate the firmware update you performed.

## NOTICE

### Effectiveness of the firmware update

The unit must be restarted after every firmware update. A new DX11 or DX83 version will run only after the unit has been rebooted (see also chapter "Measures following replacement of boards [ → 398]").

Any errors with the consecutive numbers 01, 03, 04, 06, or 07 displayed immediately following the firmware update may be ignored. If these messages appear again after the system is rebooted, please carry out troubleshooting as described in the "List of error messages [ → 84]" section.

If any conspicuous problems occur in connection with system handling after the firmware update and unit reboot has been completed, please repeat the firmware update immediately.

- ✎ After a successful firmware update, the log file produced by the unit is displayed in the update menu. In addition, the log file is stored on the PC, on which the "Acquisition Server" is installed under the device name in the following directory:  
"ProgramData → Sirona → AcquisitionServer → SWLog"
8. Check the log file to make sure that the update was completed successfully. If the log file contains entries such as "Update of DXxx failed!", please repeat the update. Repeat this procedure as often as necessary until the "failed messages" no longer appear.
  9. Restart the unit now.
  10. Use the "Device details" or service routine S008.2 to test whether all modules have the current program version (see section "Firmware [ → 45]").
  11. If you want to save the "Device details":
    - Open the "Device details" [ → 59].
    - Click on the "Show Information" button.
    - Click on the "Download" button.
    - Select the storage location you desire.
    - Click on the "Save" button.
- ✎ The "Device details" are stored as txt files.

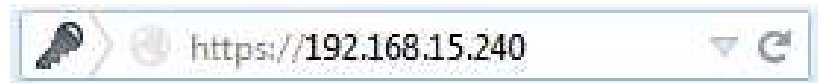


## 4.6 Backing up / restoring / installing sensor data

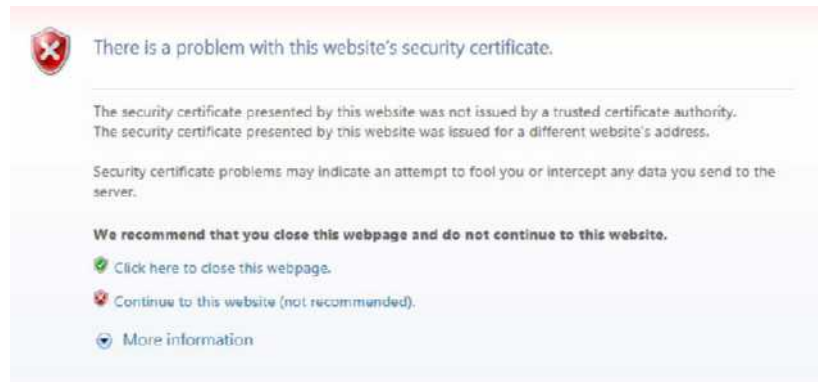
The sensor data can be saved, resaved and installed using the Sirona Web service.

### 4.6.1 Access the "Backup / restore sensor data" menu

- ✓ 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".

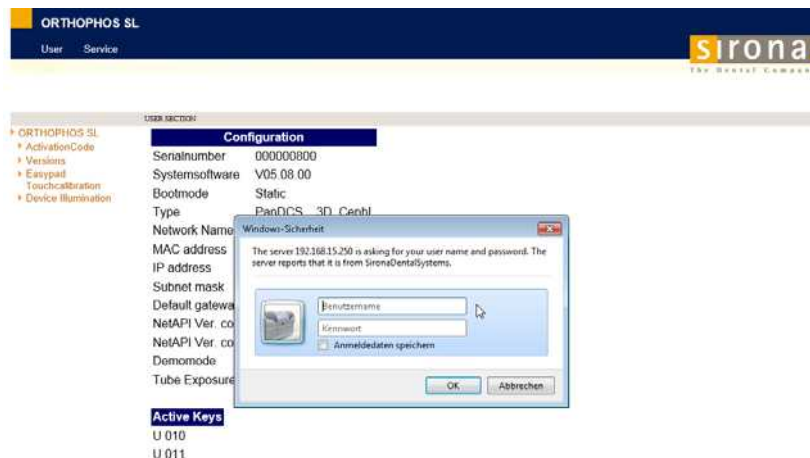
↪ The Sirona Web service is loaded.

↪ 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 submenus and their functions are explained in more detail in the chapters below.



## 4.6.2 Backing up 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: As the sensor data is stored on the DX83 board, this is necessary, for example, before changing the DX83 board. The stored sensor data must then be restored on the new DX83 board after replacing the board. This can be done [ → 74] via the menu *"Restore sensor data"*.

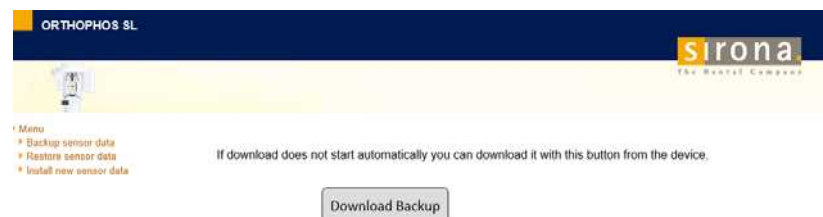
✓ The *"Backup / Restore sensor data"* menu is opened.

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"*.



### 4.6.3 Restoring sensor data

Previously saved sensor data (factory calibration of the sensor) can be restored on the DX83 board using the *"Restore sensor data"* menu.

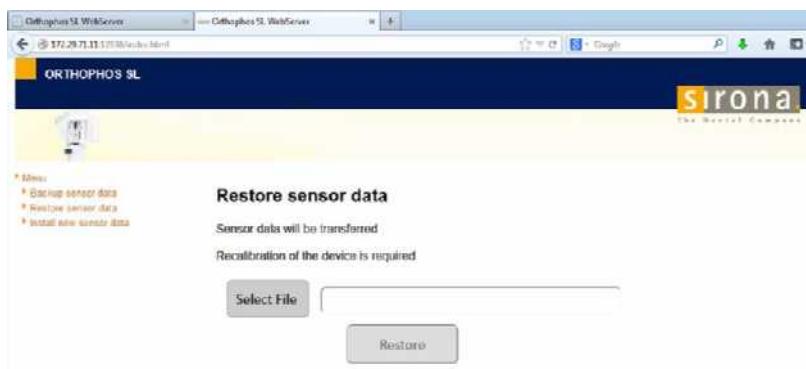
#### IMPORTANT

After the sensor data has been restored, the unit adjustment and calibration must be performed [ → 160] in full.  
If no complete unit adjustment and calibration has been performed, no patient images are possible.

NOTE: As the sensor data is stored on the DX83 board, this is necessary, for example, after changing the DX83 board. To that end, the sensor data must have been backed up [ → 73] before replacing the DX83 board using the *"Backup sensor data"* menu.

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

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



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

2. Click on the *"Select File"* button and select the desired Zip file in the directory (refer to chapter "Backing up sensor data [ → 73]").

3. Click on the *"Restore"* button.

↳ The sensor data stored in the Zip file is restored on the DX83 board.

4. Perform a complete unit adjustment and calibration [ → 160].



#### 4.6.4 Installing sensor data

Sensor data (factory calibration of the sensor) of a new sensor can be installed on the DX83 board using the *"Install new sensor data"* menu.

##### IMPORTANT

After the sensor data has been installed, the unit adjustment and calibration must be performed [ → 160] in full.  
If no complete unit adjustment and calibration has been performed, no patient images are possible.

NOTE: As the sensor data is stored on the DX83 board, this is necessary, for example, after changing the flat panel detector. The corresponding Zip file is included in the scope of supply of the new flat panel detector.

- ✓ The *"Backup / Restore sensor data"* menu is opened.
- 1. In the structure tree, click on the *"Install new sensor data"* element.



- ✎ The *"Install new sensor data"* menu is displayed.
- 2. Click on the *"Select File"* button and select the desired Zip file that contains the sensor data for the new flat panel detector in the directory.
- 3. Click on the *"Install"* button.
  - ✎ The sensor data stored in the Zip file is installed on the DX83 board.
- 4. Perform a complete unit adjustment and calibration [ → 160].



## 4.7 Calling the Info screen

The Info screen lists device data that is useful for any discussions with your service engineer.

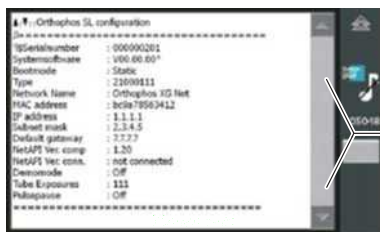
✓ The touchscreen display is located on level 1.

1. Touch the toothed wheel **A** in the upper right corner of the touchscreen.

↳ The touchscreen display is located on level 2.

2. Touch the question mark **(B)** in the lower right corner of the touchscreen.

↳ The info screen is displayed.



3. Touch the arrows **C** in the scroll bar to the right of the list.

↳ The next or previous page of the list is displayed.

4. Touch the double triangle in the upper right corner of the touchscreen.

↳ The display changes to level 1.



## 4.8 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.

### 4.8.1 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:

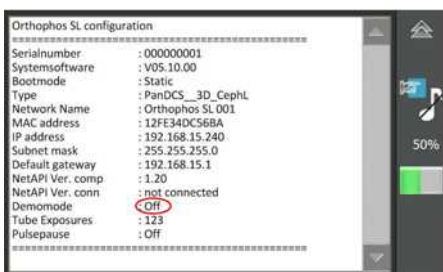
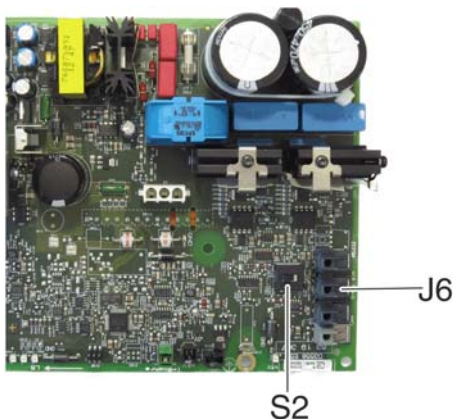
1. Turn the unit off.

#### **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 "Tube assembly, cover" cover [ → 37].
3. Remove the cover plate of board DX6 [ → 372].
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.  
**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.



### 4.8.2 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 [ → 37].
3. Remove the cover plate of board DX6 [ → 372].
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.



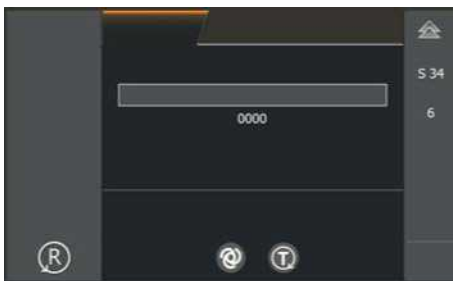
### 4.8.3 Important information for repacking and transport

#### 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 cephalometer

1. Call service routine S034.6 [ → 316].  
 ↳ 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. [ → 252]



#### Packing the cephalometer

#### IMPORTANT

There are markings on the column of the unit. The bottom edge of the slide cover must be at the same height as the markings 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. Pack the panoramic X-ray unit  
 (For packing condition, refer to the "Delivery" section of the installation manual).

#### Attaching the transport safety device

- Install the transport safety device by following the same procedure as Dismantling in reverse order.



## 5 Messages

The different message texts are displayed ...

- on the touchscreen of the Easypad
- On the display of the remote control

There are 3 groups of message texts:

### Help messages (Hx xx):

- Auxiliary messages request an action, e.g. H3 20 (acknowledge exposure data).

### Error messages (Ex yyxx):

- Error messages indicate unit faults.
- The user must take action to eliminate the fault(s).

## 5.1 Help messages

Help messages are displayed as help codes (Hxxx) on the Easypad touchscreen or on the remote control display (if available). The codes tell you how to operate the system if radiation release is not possible.

The following list provides you with an overview of all help codes, their meaning and the action required to eliminate the corresponding problems.

**IMPORTANT:** The measures listed only clear help messages that result from operator errors. If it is not possible to clear a message by taking the measures listed, another type of error is the cause. In such cases, you should run an error diagnosis [ → 139].

Help code	Description	Actions required
H3 01	<i>"R button, move into starting position"</i>	<ul style="list-style-type: none"> <li>• Press the Return key.</li> <li>• Unit moves to starting position.</li> </ul>
H3 07	<i>"Change bite block"</i>	Remove the occlusal bite block.
H3 20	<i>"R button, confirm exposure data"</i>	<ul style="list-style-type: none"> <li>• Press the Return key.</li> <li>• Exposure data are confirmed.</li> </ul>
H3 21	<i>"Close the door"</i>	<ul style="list-style-type: none"> <li>• Close door or check door contact. Then press R key to acknowledge the message.</li> </ul>
H3 22	<i>"Select quadrant"</i>	<ul style="list-style-type: none"> <li>• Select quadrant</li> </ul>
H3 25	<i>"Select region of exposure"</i>	<ul style="list-style-type: none"> <li>• Select the center of rotation.</li> </ul>
H4 02	<i>"Plug sensor into Ceph slot"</i>	<ul style="list-style-type: none"> <li>• Check the ceph sensor or plug it into the cephalometer. If this message does not disappear even after the ceph sensor has been plugged in, this indicates a system error. Perform error diagnosis as described in the section titled Troubleshooting [ → 139] .</li> </ul>



Help code	Description	Actions required
H4 03	<i>"Switch SIDEXIS to ready for exposure state"</i>	<ul style="list-style-type: none"> <li>Establish readiness for exposure in SIDEXIS 4.</li> </ul>
H4 04	<i>"Plug in Ceph sensor"</i>	<ul style="list-style-type: none"> <li>Plug the ceph sensor into the cephalometer.</li> </ul>
H4 20	<i>"Get existing exposure"</i>	<p><b>IMPORTANT:</b> Do not switch the system off until the help message has disappeared.</p> <ul style="list-style-type: none"> <li>Obtain the exposure using "Device rescue" (see <i>"ORTHOPHOS SL Operating Instructions"</i> (REF 64 94 947)).</li> </ul>

## 5.2 Status displays

Status display on the Easypad	Description
<i>"Ready for exposure"</i>	System is ready for exposure.
<i>"X RAY"</i>	
<i>"X RAY Active!"</i>	Exposure in progress.
<i>"Please wait"</i>	Unit waiting for operational readiness.
<i>"Ready for exposure in XXs"</i>	The cooling time countdown is running.
<i>"Exposure is performed"</i>	Exposure in progress.



## 5.3 Error messages

Error messages are displayed as error codes (Ex yy zz) on the Easypad touchscreen and on the remote control display (if there is one).

The codes provide you with error type, error location and troubleshooting information.

### 5.3.1 Error code: Ex yy zz

The error messages are encoded according to the following pattern:

<b>Ex</b>	Error type	"Troubleshooting" classification for the user
<b>yy</b>	Location	Module, subsystem or logical function unit
<b>zz</b>	Consecutive number	Identification of error

### 5.3.2 Ex - Error type

Identifier **x** is intended to help you reach a decision quickly on how to proceed with the corresponding error.

x	Description	Error group	Actions required
1	System warning System message	This error group includes all errors that indicate still acceptable tolerance variations, or messages about states which do not directly affect system operation.	<ul style="list-style-type: none"> <li>Acknowledge the error message.</li> </ul> <p>If the error occurs again ...</p> <ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure</li> </ol> </li> </ul> <p>If the error occurs again ...</p> <ul style="list-style-type: none"> <li>Run an error diagnosis [ → 84].</li> </ul>
2	Errors caused by system overload	This error group includes states that indicate temporary overtemperatures or similar, for example. The cause of the error disappears automatically after a certain waiting time.	<ul style="list-style-type: none"> <li>Acknowledge the error message.</li> <li>Repeat the procedure step after a certain waiting time.</li> </ul> <p>If the error occurs again ...</p> <ul style="list-style-type: none"> <li>Extend the waiting time.</li> </ul> <p>If the error occurs again ...</p> <ul style="list-style-type: none"> <li>Run an error diagnosis [ → 84].</li> </ul>
3	The system detects that a key was pressed during power-on.	This error group includes all errors that indicate invalid signal states of keys and safety signals during power-on.	<ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure</li> </ol> </li> </ul> <p>If the error occurs again...</p> <ul style="list-style-type: none"> <li>Run an error diagnosis [ → 84].</li> </ul>



x	Description	Error group	Actions required
4	Malfunction or mechanical obstruction of unit movements	This error group includes all errors that indicate problems with the motor-controlled movements on the outside of the unit.	<ul style="list-style-type: none"> <li>Acknowledge the error message and make sure that the movements of the unit are not obstructed.</li> <li>Repeat the last procedure step or exposure.</li> </ul> <p>If the error occurs again ...</p> <ul style="list-style-type: none"> <li>Run an error diagnosis [ → 84].</li> </ul>
5	Malfunction during the exposure or during exposure preparation.	This error group includes all errors resulting from a certain system action triggered by the user which could not be performed because a required (internal) partial function (software or hardware) is not ready or fails.	<ul style="list-style-type: none"> <li>Acknowledge the error message.</li> <li>Repeat the last procedure step or exposure.</li> </ul> <p>If the error occurs again ...</p> <ul style="list-style-type: none"> <li>Run an error diagnosis [ → 84].</li> </ul>
6	Error during system self-test.	This error group includes all errors which may occur spontaneously and without any related operator action. They may be caused by system self-tests.	<ul style="list-style-type: none"> <li>Acknowledge the error message.</li> <li>Run an error diagnosis [ → 84].</li> </ul> <p>Further operation of the unit is possible.</p>
7	Unrecoverable system error.	This error group includes all errors which may occur spontaneously and without any related operator action. They may be caused by system self-tests. In this case it is absolutely certain that continued system operation is not possible.	<ul style="list-style-type: none"> <li>Run an error diagnosis [ → 84].</li> </ul>

### 5.3.3 yy - Location

Identifier **yy** defines the location or logical function unit where the error has occurred.

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

### 5.3.4 General handling of error messages

Error messages must generally be acknowledged with the R key on the touchscreen.

If trouble-free operation is possible after the error is acknowledged, then no further action is necessary.

If error messages occur again or frequently, or if fault-free operation is not possible, run an error diagnosis (see chapter "Troubleshooting [ → 139]"). In some cases, it may make sense to obtain more information on the history and frequency of errors via the *"Device details"* function (see the section entitled "Opening / saving "Unit information" [ → 59]").



## 5.4 List of error messages

In the following table, the error codes are sorted by the location or function unit where the error has occurred. For enhanced clarity, the corresponding ID in the error code is printed in bold type.

### 5.4.1 Location 06: Tube assembly/DX6

Error code	Description	Actions required	see
E6 <b>06</b> 01	General error during module initialization	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace the tube assembly.</li> </ul>	S. [ → 372]

Error code	Description	Actions required	see
E6 <b>06</b> 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> <li>Run service routine S005.2.</li> </ul>	S. [ → 260]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E6 <b>06</b> 03	Invalid commanding of control data, CAN bus error  This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E6 <b>06</b> 04	Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]



Error code	Description	Actions required	see
E6 06 05	Data transfer error or dialog error to bootloader of module  Only occurs in connection with software update.	• Repeat the software update.	S. [ → 68]
		• Check the CAN bus.	S. [ → 141]
		If the error occurs repeatedly or the module is no longer addressable ... • Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E6 06 06	Module failed in TTP (detected on master side)  This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.  TTP = Time Trigger Protocol	• Check the CAN bus.	S. [ → 141]
		• Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.	S. [ → 68]

Error code	Description	Actions required	see
E6 06 07	TTP-Timeout error (detected on slave side).  The module was temporarily not addressed by the master: <ul style="list-style-type: none"> <li>• Undervoltage on the master side</li> <li>• Procedure error in the software</li> <li>• Master (DX11) receives no return commanding from the module</li> </ul> This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.  TTP = Time Trigger Protocol	• Check the CAN bus.	S. [ → 141]
		• Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams)	
		If 3.3 V is present ...	S. [ → 395]
		• Replace board DX11.	
		If 3.3 V is not present ...	S. [ → 395]
		• Replace board DX1.	
		• Check cable L6, replace if necessary.	S. [ → 146] S. [ → 400]
		• Check tube assembly (DX6), replace if necessary.	S. [ → 372]

Error code	Description	Actions required	see
E6 06 08	General fault detected locally on module (slave side). CAN controller being reinitialized.	• Check the CAN bus.	S. [ → 141]
		• Check software versions on the info screen or by running service routine S008.2, perform software update if necessary.	S. [ → 267], S. [ → 68]
		• Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.	S. [ → 68]
		• Replace the tube assembly.	S. [ → 372]



Error code	Description	Actions required	see
E7 06 12	Unit is not ready for operation  This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		If this error occurs in combination with other errors ... <ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	
		<ul style="list-style-type: none"> <li>Replace the tube assembly.</li> </ul>	S. [ → 372]

Error code	Description	Actions required	see
E6 06 13	Error when writing to EEPROM.  Stored data may be lost.	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace the tube assembly.</li> </ul>	S. [ → 372]

Error code	Description	Actions required	see
E2 06 20	Overtemperature of single tank/ power pack	<ul style="list-style-type: none"> <li>Wait until the X-ray tube assembly has cooled down.</li> </ul>	
		<ul style="list-style-type: none"> <li>Check fan function by running service routine S005.4; replace fan if necessary.</li> </ul>	S. [ → 261], S. [ → 374]
		<ul style="list-style-type: none"> <li>Check temperature sensor in single tank by running service routine S005.5, replace tube assembly if necessary.</li> </ul>	S. [ → 262], S. [ → 372]

Error code	Description	Actions required	see
E6 06 21	Hardware signal of release button not detected.	<ul style="list-style-type: none"> <li>Check cable L5 (optical fiber), replace if necessary.</li> </ul>	S. [ → 153], S. [ → 405]
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 395]
		<ul style="list-style-type: none"> <li>Replace the tube assembly.</li> </ul>	S. [ → 372]

Error code	Description	Actions required	see
E6 06 22	Broken temperature sensor	<ul style="list-style-type: none"> <li>Replace the tube assembly.</li> </ul>	S. [ → 372]



Error code	Description	Actions required	see
E3 06 23	Hardware signal of release button applied during power-on.	<ul style="list-style-type: none"> <li>Check cable L5:</li> </ul> <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Pull cable L5 off tube assembly.</li> <li>Switch unit on.</li> <li>Perform optical check of L5:</li> </ol>	
		If light is visible ...	S. [ → 395]
		If no light is visible ...	S. [ → 372]

Error code	Description	Actions required	see
E5 06 30	Total radiation time exceeded.	If a CAN bus error had been reported before ...	
		<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E5 06 31	Partial radiation time exceeded	If a CAN bus error had been reported before...	
		<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E5 06 32	Minimum preheating time not observed.	If a CAN bus error had been reported before...	
		<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E1 06 40	Tolerance exceeded VH nom.	<ul style="list-style-type: none"> <li>Run service routine S005.2.</li> </ul>	S. [ → 260]
		<ul style="list-style-type: none"> <li>Replace the tube assembly.</li> </ul>	S. [ → 372]



Error code	Description	Actions required	see
E1 06 41	Tolerance exceeded kV nom.	• Run service routine S005.2.	S. [ → 260]
		• Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E1 06 42	Tolerance exceeded mA nom.	• Run service routine S005.2.	S. [ → 260]
		• Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E1 06 43	Tolerance exceeded VH actual value	• Run service routine S005.2.	S. [ → 260]
		• Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E1 06 44	Tolerance exceeded kV actual value	• Run service routine S005.2.	S. [ → 260]
		• Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E1 06 45	Tolerance exceeded mA actual value	• Run service routine S005.2.	S. [ → 260]
		• Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E6 06 51	VHmax limit value exceedance	• Run service routine S005.2.	S. [ → 260]
		• Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E6 06 52	Limit value exceedance MAmx	• Run service routine S005.2.	S. [ → 260]
		• Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E6 06 53	Limit value exceedance KVmax	• Run service routine S005.2.	S. [ → 260]
		• Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E6 06 54	Basic heating pulses not applied.	• Replace the tube assembly.	S. [ → 372]

Error code	Description	Actions required	see
E6 06 55	Anode voltage too low.	• Replace the tube assembly.	S. [ → 372]



Error code	Description	Actions required	see
E6 06 56	Error during auto-compensation.	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		<ul style="list-style-type: none"> <li>Let the tube assembly cool down for approx. 30 mins and repeat this procedure.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace the tube assembly.</li> </ul>	S. [ → 372]

Error code	Description	Actions required	see
E6 06 60	TDI signal from board DX11 to board DX6 is disturbed.  TDI = Signal to start synchronized readout sequence and to prepare the next exposure	<ul style="list-style-type: none"> <li>Replace cable L15.</li> <li>Replace board DX1.</li> <li>Replace the tube assembly.</li> </ul>	S. [ → 406], S. [ → 395], S. [ → 372]

Error code	Description	Actions required	see
E6 06 65	Tube current or tube voltage is too high in standby mode.	<ul style="list-style-type: none"> <li>Replace the tube assembly.</li> </ul>	S. [ → 372]

Error code	Description	Actions required	see
E6 06 66	Impermissible tube type.	<ul style="list-style-type: none"> <li>Check tube type of tube assembly using extended detail query, replace tube assembly if necessary.</li> </ul>	S. [ → 372]

Error code	Description	Actions required	see
E6 06 67	Light guide input TDI is active during switch-on.  TDI = Signal to start synchronized readout sequence and to prepare the next exposure	<ul style="list-style-type: none"> <li>Check TDI signal:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Disconnect cable L15 at board DX11.</li> <li>Switch unit on.</li> <li>Perform visual check at socket J5:</li> </ol> </li> </ul>	
		<ul style="list-style-type: none"> <li>If light is visible: Replace board DX11.</li> </ul>	S. [ → 395]
		<ul style="list-style-type: none"> <li>If no light is visible: Replace the tube assembly.</li> </ul>	S. [ → 372]



### 5.4.2 Location 07: Easypad/DX7

Error code	Description	Actions required	see
E6 07 01	General error during module initialization	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace Easypad (DX7).</li> </ul>	S. [ → 349]

Error code	Description	Actions required	see
E6 07 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace Easypad (DX7).</li> </ul>	S. [ → 349]

Error code	Description	Actions required	see
E6 07 03	Invalid commanding or control data.  This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E6 07 04	Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E6 07 05	Data transfer error or dialog error to bootloader of module  Only occurs in connection with software update.	<ul style="list-style-type: none"> <li>Repeat the software update.</li> </ul>	S. [ → 68]
		<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Replace Easypad (DX7).</li> </ul>	S. [ → 349]



Error code	Description	Actions required	see
E6 07 06	<p>Module failed in TTP (detected on master side).</p> <p>This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.</p> <p>TTP = Time Trigger Protocol</p>	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		<ul style="list-style-type: none"> <li>Replace Easypad (DX7).</li> </ul>	S. [ → 349]

Error code	Description	Actions required	see
E6 07 07	<p>TTP-Timeout error (detected on slave side).</p> <p>The module was temporarily not addressed by the master:</p> <ul style="list-style-type: none"> <li>Undervoltage on the master side</li> <li>Procedure error in the software</li> <li>Master (DX11) receives no return commanding from the module</li> </ul> <p>This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.</p> <p>TTP = Time Trigger Protocol</p>	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams)</li> </ul>	
		<p>If 3.3 V is present ...</p> <ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	S. [ → 397]
		<p>If 3.3 V is not present ...</p> <ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 07 08	<p>General fault detected locally on module (slave side). CAN controller being reinitialized.</p>	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Check software versions on the info screen or the "Unit information"; perform software update, if necessary.</li> </ul>	S. [ → 59], S. [ → 68]
		<ul style="list-style-type: none"> <li>Replace Easypad (DX7).</li> </ul>	S. [ → 349]
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]



Error code	Description	Actions required	see
E7 07 12	Unit is not ready for operation  Therefore, the error can only be displayed on the remote control (DX42).	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		This error is a sequential fault. <ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	

Error code	Description	Actions required	see
E6 07 20	Contact to DX11 interrupted during operation.	<ul style="list-style-type: none"> <li>Note error message on remote control (DX42) and check log memory (via extended details).</li> </ul>	
		<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]
		<ul style="list-style-type: none"> <li>Check cable L9, replace if necessary.</li> </ul>	S. [ → 153], S. [ → 404]

Error code	Description	Actions required	see
E7 07 21	No CAN bus connection. DX11 does not start.  Occurs in the start screen after power-on.	<ul style="list-style-type: none"> <li>Checking "Unit information"</li> </ul>	S. [ → 59]
		If DX11 responds ...	S. [ → 404],
		<ul style="list-style-type: none"> <li>Check the signal path to DX7; repair or replace cables/connectors, if necessary.</li> <li>Replace board DX1.</li> </ul>	S. [ → 396]
		If DX11 does not respond ...	S. [ → 397]
		<ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	

Error code	Description	Actions required	see
E7 07 25	Adjustment of the touchscreen was set to default values.	<ul style="list-style-type: none"> <li>Adjusting the touchscreen</li> </ul>	S. [ → 236]

Error code	Description	Actions required	see
E3 07 30	Up/down keys pressed on power-on.	<ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	S. [ → 349]
E3 07 36	Touchscreen pressed during power-on.		
		If the error occurs repeatedly ...	
		<ul style="list-style-type: none"> <li>Replace Easypad (DX7).</li> </ul>	



### 5.4.3 Location 10: System hardware

Error code	Description	Actions required	see
E7 10 01	EEPROM cannot be written.	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	S. [ → 397]

Error code	Description	Actions required	see
E7 10 02	FPGA of DX1 is not addressable. FPGA = Field Programmable Gate Array	<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E1 10 03	The flash file system must be formatted. Occurs after replacement of board DX11.	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul> The flash file system is formatted and error code E1 10 04 is displayed.	

Error code	Description	Actions required	see
E1 10 04	Flash file system formatting in progress.	<ul style="list-style-type: none"> <li>Wait until the error code automatically disappears (approx. 2 - 3 mins).</li> </ul>	

Error code	Description	Actions required	see
E1 10 05	Flash file system is not ready for operation.	<ul style="list-style-type: none"> <li>Execute service routine S009.4 and format flash file system.</li> </ul> The contents of the error memory are thus lost.	S. [ → 268]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	S. [ → 397]

Error code	Description	Actions required	see
E1 10 07	General or unknown errors during sensor test.	<ul style="list-style-type: none"> <li>Pay attention to accompanying error messages (Ex yy, ....). Proceed according to the description for these error messages.</li> </ul>	



#### 5.4.4 Location 11: Power PC/Board DX11

Error code	Description	Actions required	see
E6 11 01	Program sequence error.	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	
		If the error occurs again ...	
		<ul style="list-style-type: none"> <li>Reset the entire calibration of the unit and readjust the unit.</li> </ul>	S. [ → 160]
		<ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	S. [ → 397]

Error code	Description	Actions required	see
E6 11 02	Watchdog error	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	
		If the error occurs repeatedly ...	S. [ → 397]
		<ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	

Error code	Description	Actions required	see
E6 11 03	Operating system/resource error.	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	
		If the error occurs repeatedly ...	S. [ → 397]
		<ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	

Error code	Description	Actions required	see
E7 11 04	Implausible data in EEPROM.	<ul style="list-style-type: none"> <li>Check the unit configuration via service routines S017 and S018 and reconfigure if necessary.</li> </ul>	S. [ → 277], S. [ → 289]
		<ul style="list-style-type: none"> <li>Check calibration with diaphragm test exposures.</li> </ul>	S. [ → 427]
		If calibration is not OK ...	S. [ → 160]
		<ul style="list-style-type: none"> <li>Recalibrate the unit.</li> </ul>	
		If calibration is OK ...	
		<ul style="list-style-type: none"> <li>Make the individual unit settings again (e.g. programming of the patient symbol keys; see Operating Instructions).</li> </ul>	

Error code	Description	Actions required	see
E6 11 05	RAM allocation failed.	<ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	S. [ → 397]

Error code	Description	Actions required	see
E7 11 08	The installed control panel does not match the unit.	<ul style="list-style-type: none"> <li>Installing the Easypad.</li> </ul>	S. [ → 349]



Error code	Description	Actions required	see
E5 11 09	Internal error in program sequence of board DX11.	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Perform a software update (bug fix).</li> </ul>	

Error code	Description	Actions required	see
E1 11 10	The unit is currently operating in the factory setting.  It is possible to generate exposures.	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC).</li> </ul>	

Error code	Description	Actions required	see
E7 11 11	Wrong unit configuration.	<ul style="list-style-type: none"> <li>Check the unit configuration by running service routine S017.2 and reconfigure if necessary.</li> </ul>	S. [ → 278]

Error code	Description	Actions required	see
E6 11 13	The release button was not properly detected.	<ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure.</li> </ol>	S. [ → 395]
		If the error occurs again ... <ul style="list-style-type: none"> <li>Replace release button incl. cable.</li> <li>Replace board DX1.</li> <li>Replace board DX42.</li> </ul>	

Error code	Description	Actions required	see
E7 11 14	Wrong remote control for this unit.  This error message blocks all unit functions. To continue to work with this unit, you must unplug the remote control and restart the unit.	<ul style="list-style-type: none"> <li>Install the correct remote control.</li> <li>If necessary, obtain a new remote control from the manufacturer.</li> </ul> A remote control for another Sirona unit or a third-party manufacturer unit may have been connected.	

Error code	Description	Actions required	see
E1 11 18	Calibration of the occlusal bite block is required.	<ul style="list-style-type: none"> <li>Run service routine S018.9.</li> <li>If necessary, run service routine S018.7 to make customer-specific angle settings.</li> </ul>	S. [ → 297], S. [ → 293]

Error code	Description	Actions required	see
E1 11 19	The welcome screen is not shown.	<ul style="list-style-type: none"> <li>Check compatibility with SIDEXIS 4.</li> </ul>	S. [ → 45]



Error code	Description	Actions required	see
E1 11 20	The calibration data on the unit is invalid or does not match the serial numbers of the modules.	<ul style="list-style-type: none"> <li>Perform unit adjustment and calibration.</li> <li>Check the serial numbers of the flat panel and board DX6, DX11, DX61 and frame grabber.</li> </ul>	S. [ → 160]

Error code	Description	Actions required	see
E6 11 21	The calibration data could not be determined on the unit.  Communication with the frame grabber is interrupted.		

Error code	Description	Actions required	see
E7 11 30	Occurs after service tasks in which the device configuration, calibration or adjustment were adapted.  Service functions continue to be available.	For patient exposures... <ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure</li> </ol> </li> </ul>	

Error code	Description	Actions required	see
E1 11 88	The unit is in demo mode.  Occurs when the unit is switched on.	If user mode is expressly required ... <ul style="list-style-type: none"> <li>Turn off the demo mode. <b>CAUTION! With the demo mode disabled, radiation is triggered by pressing the trigger button!</b></li> </ul>	S. [ → 78]

#### 5.4.5 Location 12: CAN bus

Error code	Description	Actions required	see
E6 12 01	CAN controller initialization error on DX1.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]

Error code	Description	Actions required	see
E6 12 02	CAN malfunction (cannot be assigned to module).	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> </ul>	S. [ → 141]



### 5.4.6 Location 13: Stand/Peripherals

Error code	Description	Actions required	see
E4 13 01	Actuator 1 has not reached pan home position.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ... <ul style="list-style-type: none"> <li>Manually reset the rotary ring to the pan home position and run a test cycle via P1.</li> </ul>	
		If the error occurs again ... <ul style="list-style-type: none"> <li>Check light barrier V1_1 (X802) with service routine S015.5, replace light barrier if necessary.</li> <li>Run service routine S015.5 (free travel) to check electronic activation and jerk-free running, replace actuators and/or spindles and board DX1 if necessary.</li> </ul>	S. [ → 276], S. [ → 330]

Error code	Description	Actions required	see
E4 13 02	Actuator 1 has not left pan home position.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ... <ul style="list-style-type: none"> <li>Manually reset the rotary ring to the pan home position and run a test cycle via P1.</li> </ul>	
		If the error occurs again ... <ul style="list-style-type: none"> <li>Check light barrier V1_1 (X802) with service routine S015.5, replace light barrier if necessary.</li> <li>Run service routine S015.5 (free travel) to check electronic activation and jerk-free running, replace actuators and/or spindles and board DX1 if necessary.</li> </ul>	S. [ → 276], S. [ → 330]

Error code	Description	Actions required	see
E5 13 03	Malfunction of actuator 1 during operation.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ... <ul style="list-style-type: none"> <li>Manually reset the rotary ring to the pan home position and run a test cycle via P1.</li> </ul>	
		If the error occurs again ... <ul style="list-style-type: none"> <li>Check light barrier V1_1 (X802) with service routine S015.5, replace light barrier if necessary.</li> <li>Run service routine S015.5 (free travel) to check electronic activation and jerk-free running, replace actuators and/or spindles and board DX1 if necessary.</li> </ul>	S. [ → 276], S. [ → 330]



Error code	Description	Actions required	see
E4 13 04	Actuator 1; position counter error.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ... <ul style="list-style-type: none"> <li>Manually reset the rotary ring to the pan home position and run a test cycle via P1.</li> </ul>	
		If the error occurs again ... <ul style="list-style-type: none"> <li>Check light barrier V1_1 (X802) with service routine S015.5, replace light barrier if necessary.</li> <li>Run service routine S015.5 (free travel) to check electronic activation and jerk-free running, replace actuators and/or spindles and board DX1 if necessary.</li> </ul>	S. [ → 276], S. [ → 330]

Error code	Description	Actions required	see
E4 13 05	Actuator 1 is not ready for operation	This error is a sequential fault. <ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	

Error code	Description	Actions required	see
E6 13 07	Error when activating actuator 1.	<ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure.</li> </ol> </li> </ul>	
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]



Error code	Description	Actions required	see
E4 13 11	Actuator 2 has not reached pan home position.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ... <ul style="list-style-type: none"> <li>Manually reset the rotary ring to the pan home position and run a test cycle via P1.</li> </ul>	
		If the error occurs again ... <ul style="list-style-type: none"> <li>Check light barrier V1_2 (X803) with service routine S015.5, replace light barrier if necessary.</li> <li>Run service routine S015.5 (free travel) to check electronic activation and jerk-free running, replace actuators and/or spindles and board DX1 if necessary.</li> </ul>	S. [ → 276], S. [ → 330]

Error code	Description	Actions required	see
E4 13 12	Actuator 2 has not left pan home position.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ... <ul style="list-style-type: none"> <li>Manually reset the rotary ring to the pan home position and run a test cycle via P1.</li> </ul>	
		If the error occurs again ... <ul style="list-style-type: none"> <li>Check light barrier V1_2 (X803) with service routine S015.5, replace light barrier if necessary.</li> <li>Run service routine S015.5 (free travel) to check electronic activation and jerk-free running, replace actuators and/or spindles and board DX1 if necessary.</li> </ul>	S. [ → 276], S. [ → 330]

Error code	Description	Actions required	see
E5 13 13	Malfunction of actuator 2 during operation.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ... <ul style="list-style-type: none"> <li>Manually reset the rotary ring to the pan home position and run a test cycle via P1.</li> </ul>	
		If the error occurs again ... <ul style="list-style-type: none"> <li>Check light barrier V1_2 (X803) with service routine S015.5, replace light barrier if necessary.</li> <li>Run service routine S015.5 (free travel) to check electronic activation and jerk-free running, replace actuators and/or spindles and board DX1 if necessary.</li> </ul>	S. [ → 276], S. [ → 330]



Error code	Description	Actions required	see
E4 13 14	Actuator 2; position counter error.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ... <ul style="list-style-type: none"> <li>Manually reset the rotary ring to the pan home position and run a test cycle via P1.</li> </ul>	
		If the error occurs again ... <ul style="list-style-type: none"> <li>Check light barrier V1_2 (X803) with service routine S015.5, replace light barrier if necessary.</li> <li>Run service routine S015.5 (free travel) to check electronic activation and jerk-free running, replace actuators and/or spindles and board DX1 if necessary.</li> </ul>	S. [ → 276], S. [ → 330]

Error code	Description	Actions required	see
E6 13 15	Actuator 1 is not ready for operation	This error is a sequential fault. <ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	

Error code	Description	Actions required	see
E6 13 17	Error when activating actuator 1.	<ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure.</li> </ol> </li> </ul>	
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E4 13 21	Ring motor has not reached home position.	<ul style="list-style-type: none"> <li>Check the ring drive mechanism manually for smooth and easy running, replace the ring motor or mechanism if necessary.</li> </ul>	S. [ → 414], S. [ → 342]
		<ul style="list-style-type: none"> <li>Check light barrier V1_3 (X804), replace if necessary.</li> </ul>	S. [ → 151], S. [ → 393]
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]



Error code	Description	Actions required	see
E4 13 22	Ring motor has not left pan home position.	<ul style="list-style-type: none"> <li>Check the ring drive mechanism manually for smooth and easy running, replace the ring motor or mechanism if necessary.</li> </ul>	S. [ → 414], S. [ → 342]
		<ul style="list-style-type: none"> <li>Check light barrier V1_3 (X804), replace if necessary.</li> </ul>	S. [ → 151], S. [ → 393]
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E5 13 23	Malfunction of ring motor during operation.	<ul style="list-style-type: none"> <li>Acknowledge error.</li> </ul>	
		If the error occurs again ... <ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E4 13 24	Ring motor; position counter error.	<ul style="list-style-type: none"> <li>Check the ring drive mechanism manually for smooth and easy running, replace the ring motor or mechanism if necessary.</li> </ul>	S. [ → 414], S. [ → 342]
		<ul style="list-style-type: none"> <li>Check light barrier V1_3 (X804), replace if necessary.</li> </ul>	S. [ → 151], S. [ → 393]
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E4 13 25	Ring motor has not reached ceph home position.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ...	
		<ul style="list-style-type: none"> <li>Manually reset the rotary ring to the ceph home position and run a test cycle via P1.</li> </ul>	
		<ul style="list-style-type: none"> <li>Check the ring drive mechanism manually for smooth and easy running.</li> </ul>	S. [ → 414]
		In case of stiffness ... <ul style="list-style-type: none"> <li>Replace the ring motor or mechanism.</li> </ul>	S. [ → 342]
		If the error occurs again ... <ul style="list-style-type: none"> <li>Check light barrier V1_3 (X804) with service routine S014.4, replace light barrier if necessary.</li> <li>Run service routine S014.3 to check electronic activation and jerk-free running, replace board DX1 if necessary.</li> </ul>	S. [ → 275], S. [ → 393], S. [ → 275], S. [ → 396]



Error code	Description	Actions required	see
E4 13 26	Ring motor has not left ceph home position.	<ul style="list-style-type: none"> <li>Check the actuator mechanisms manually for smooth and easy running.</li> </ul>	
		In case of stiffness ...	
		<ul style="list-style-type: none"> <li>Manually reset the rotary ring to the ceph home position and run a test cycle via P1.</li> </ul>	
		<ul style="list-style-type: none"> <li>Check the ring drive mechanism manually for smooth and easy running.</li> </ul>	S. [ → 414]
		In case of stiffness ...	S. [ → 342]
		<ul style="list-style-type: none"> <li>Replace the ring motor or mechanism.</li> </ul>	
		If the error occurs again ...	S. [ → 275],
		<ul style="list-style-type: none"> <li>Check light barrier V1_3 (X804) with service routine S014.4, replace light barrier if necessary.</li> </ul>	S. [ → 393],
		<ul style="list-style-type: none"> <li>Run service routine S014.3 to check electronic activation and jerk-free running, replace board DX1 if necessary.</li> </ul>	S. [ → 275], S. [ → 396]

Error code	Description	Actions required	see
E6 13 27	Ring motor is not ready for operation.	<p>This error is a sequential fault.</p> <ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol>	

Error code	Description	Actions required	see
E6 13 28	Error when activating ring motor.	<p>This error is a sequential fault.</p> <ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure and observe causal error messages.</li> </ol>	
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]



Error code	Description	Actions required	see
E4 13 30	No height adjustment motor pulses.	• Check cable L16 (X402), replace if necessary.	S. [ → 153], S. [ → 404]
		• Check board DX1, replace if necessary.	S. [ → 146], S. [ → 396]
		• Check filter between height adjustment motor and L16 (acc. to circuit diagram on filter) (current and voltage), replace if necessary.	
		• Check height adjustment motor incl. pulse generator, replace if necessary.	S. [ → 150], S. [ → 332]
		• Replace board DX1.	S. [ → 396]

Error code	Description	Actions required	see
E5 13 31	Unit has traveled to upper limit switch.	• Check max. travel height with service routine S018.2, adjust if necessary.	S. [ → 289]
		• Run HA motor in the other direction with the Up/Down keys and reference (value approx. 1,500).	
		• Check light barriers V1_4, replace if necessary.	S. [ → 151], S. [ → 393]
		• Check height adjustment motor for overtravel, replace board DX1 if necessary.	S. [ → 412] S. [ → 396]
		If the error occurs again ... • Check the limit switch or wiring, correct or replace the limit switch as necessary.	

Error code	Description	Actions required	see
E5 13 33	Height adjustment motor position counter too small for current position.  Error may occur after replacement of board (DX11).	• Run HA motor in the other direction with the Up/Down keys and reference (value approx. 1,500).	
		• Check max. travel height with service routine S018.2, adjust if necessary.	S. [ → 289]
		• Check light barriers V1_4, replace if necessary.	S. [ → 151], S. [ → 393]

Error code	Description	Actions required	see
E5 13 34	Height adjustment motor position counter too large for current position.  Error may occur after replacement of board (DX11).	• Run HA motor in the other direction with the Up/Down keys and reference (value approx. 1,500).	
		• Check max. travel height with service routine S018.2, adjust if necessary.	S. [ → 289]
		• Check light barriers V1_4, replace if necessary.	S. [ → 151], S. [ → 393]



Error code	Description	Actions required	see
E5 13 35	Height adjustment motor; wrong direction of rotation.	<ul style="list-style-type: none"> <li>Check connector assignment on filter or in front of HA motor, correct if necessary.</li> </ul>	
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E5 13 36	Software signal from key applied but hardware signal is missing.	<ul style="list-style-type: none"> <li>Check cables L9 and L10, replace if necessary.</li> </ul>	S. [ → 153], S. [ → 404]
		<ul style="list-style-type: none"> <li>Check limit switches SE1_1 and SE1_2, replace if necessary.</li> </ul>	
		<ul style="list-style-type: none"> <li>Replace Easypad.</li> </ul>	S. [ → 349]

Error code	Description	Actions required	see
E7 13 37	Overtravel of HA motor occurs or height adjustment power transistor defective.	<ul style="list-style-type: none"> <li>Check height adjustment motor for overtravel, replace board DX1 if necessary.</li> </ul>	S. [ → 412] S. [ → 396]
		<ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and check function.</li> </ol> </li> </ul>	
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 13 38	Height adjustment motor is not ready for operation.	<p>This error is a sequential fault.</p> <ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	

Error code	Description	Actions required	see
E6 13 39	Error when activating height adjustment motor.	<ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and check function.</li> </ol> </li> </ul>	
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 45]
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]



Error code	Description	Actions required	see
E3 13 40	Release signal applied during power-on.	<ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>1. Switch off the unit.</li> <li>2. Wait 1 minute.</li> <li>3. Switch unit on.</li> <li>4. Repeat procedure and observe causal error messages.</li> </ol>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check the X-ray signal path.</li> </ul>	S. [ → 156]

Error code	Description	Actions required	see
E6 13 42	The hardware signal for radiation release is applied on board DX1 during unit operation although no actuated X-ray release button is being reported via the CAN bus.	<ul style="list-style-type: none"> <li>Check the X-ray signal path.</li> </ul>	S. [ → 283]

Error code	Description	Actions required	see
E5 13 43	The door was opened during the exposure.	<ul style="list-style-type: none"> <li>Check the X-ray signal path.</li> </ul>	S. [ → 283]

Error code	Description	Actions required	see
E5 13 50	Forehead support; has not left home position despite movement pulses.	<ul style="list-style-type: none"> <li>Check light barriers V5_1 to V5_4, replace headrest and light barrier if necessary.</li> <li>Check cable L18, replace if necessary.</li> <li>Check board DX5, replace if necessary.</li> </ul>	S. [ → 151], S. [ → 347], S. [ → 393], S. [ → 153], S. [ → 400], S. [ → 146], S. [ → 395]

Error code	Description	Actions required	see
E5 13 51	Forehead support; has not left home position and no motor movement.	<ul style="list-style-type: none"> <li>Check motor M5_1, replace headrest if necessary.</li> <li>Check light barriers V5_1 to V5_4, replace headrest and light barrier if necessary.</li> <li>Check cable L18 and replace if necessary.</li> <li>Check board DX5, replace if necessary.</li> </ul>	S. [ → 150], S. [ → 393], S. [ → 151], S. [ → 393], S. [ → 153], S. [ → 400], S. [ → 146], S. [ → 395]



Error code	Description	Actions required	see
E5 13 52	Forehead support; has left home position without detected movement pulses.	<ul style="list-style-type: none"> <li>Check light barriers V5_1 to V5_4, replace if necessary.</li> </ul>	S. [ → 151]

Error code	Description	Actions required	see
E5 13 53	Forehead support; system does not block within setting range.	<ul style="list-style-type: none"> <li>Check headrest mechanics, replace if necessary.</li> </ul>	S. [ → 347]

Error code	Description	Actions required	see
E6 13 54	Forehead support is not ready for operation.	<p>This error is a sequential fault.</p> <ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	

Error code	Description	Actions required	see
E6 13 57	Error when activating forehead support motor	<ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure and check function.</li> </ol> </li> </ul>	
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		<ul style="list-style-type: none"> <li>Check headrest mechanics, replace if necessary</li> </ul>	S. [ → 347]
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 13 58	Error when activating forehead support motor  Timeout of FPGA on board DX1.  FPGA = Field Programmable Gate Array	<ul style="list-style-type: none"> <li>Acknowledge error.</li> </ul>	
		<p>If the error occurs repeatedly...</p> <ul style="list-style-type: none"> <li>Replace board DX1.</li> <li>Replace board DX11.</li> </ul>	S. [ → 396], S. [ → 397]

Error code	Description	Actions required	see
E4 13 59	Forehead support drive defective.	<ul style="list-style-type: none"> <li>Replace the headrest.</li> </ul>	S. [ → 347]



Error code	Description	Actions required	see
E5 13 60	Temple supports; have not left home position despite movement pulses.	• Check light barriers V5_1 to V5_4, replace headrest and light barrier if necessary.	S. [ → 151], S. [ → 347], S. [ → 393]
		• Check cable L18, replace if necessary.	S. [ → 153], S. [ → 404]
		• Check board DX5, replace if necessary.	S. [ → 146], S. [ → 396]

Error code	Description	Actions required	see
E4 13 61	Temple supports; have not left home position and no motor movement.	• Check motor M5_2, replace headrest if necessary.	S. [ → 150], S. [ → 347]
		• Check light barriers V5_1 to V5_4, replace headrest and light barrier if necessary.	S. [ → 151], S. [ → 347], S. [ → 393]
		• Check cable L18, replace if necessary.	S. [ → 153], S. [ → 404]
		• Check board DX5, replace if necessary.	S. [ → 146], S. [ → 396]

Error code	Description	Actions required	see
E5 13 62	Temple supports; have left home position without detected movement pulses.	• Check light barriers V5_1 to V5_4, replace headrest/light barrier if necessary.	S. [ → 151], S. [ → 347], S. [ → 393]
		• Check cable L18, replace if necessary.	S. [ → 153], S. [ → 404]
		• Check board DX5, replace if necessary.	S. [ → 146], S. [ → 396]

Error code	Description	Actions required	see
E5 13 63	Temple supports; system does not block within setting range.	• Check headrest mechanics; replace headrest, if necessary.	S. [ → 347]

Error code	Description	Actions required	see
E6 13 64	Temple supports are not ready for operation.	This error is a sequential fault. • Restart the unit: 1. Switch off the unit. 2. Wait 1 minute. 3. Switch unit on. 4. Repeat procedure and observe causal error messages.	



Error code	Description	Actions required	see
E6 13 67	Error when activating temple support motor	<ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure and check function.</li> </ol>	
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		<ul style="list-style-type: none"> <li>Check headrest mechanics, replace if necessary.</li> </ul>	S. [ → 347]
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 13 68	Error when activating temple support motor  Timeout of FPGA on board DX1. FPGA = Field Programmable Gate Array	<ul style="list-style-type: none"> <li>Acknowledge error.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E4 13 69	Temple support drive defective.	<ul style="list-style-type: none"> <li>Replace the headrest.</li> </ul>	S. [ → 347]

Error code	Description	Actions required	see
E6 13 70	Cables for bite block electronics not connected.	<b>Tip:</b> Service routine S018.8 can be run as an aid.  <ul style="list-style-type: none"> <li>Check cabling and plug connection.</li> </ul>	S. [ → 295], S. [ → 153]

Error code	Description	Actions required	see
E1 13 71	Signal error for angle acquisition (incorrect ADC values).	<ul style="list-style-type: none"> <li>Run service routine S18.9 to readjust the values.</li> </ul>	S. [ → 297]
		<ul style="list-style-type: none"> <li>Replace board DX51 in the support piece (bite block holder).</li> </ul>	S.
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 13 72	Malfunction of the bite block electronics or wiring.	<b>Tip:</b> Service routine S018.8 can be run as an aid.	S. [ → 295]
		<ul style="list-style-type: none"> <li>Replace board DX51 in the support piece (bite block holder).</li> </ul>	S.
		<ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]



Error code	Description	Actions required	see
E5 13 73	Malfunction of height adjustment during operation.	<ul style="list-style-type: none"> <li>Acknowledge error.</li> </ul>	
		<ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure and check function.</li> </ol>	
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E5 13 83	Error while generating pulse for sensor.	<ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure and check function.</li> </ol>	
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 13 87	Error when activating pulse generation.	<ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure and check function.</li> </ol>	
		<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]



### 5.4.7 Location 14: Digital extension, SIDEXIS 4

Error code	Description	Actions required	see
E5 14 01	Abort by SIDEXIS 4.	<ul style="list-style-type: none"> <li>Check the network connection and the software version.</li> </ul>	

Error code	Description	Actions required	see
E7 14 02	Interface version not compatible with SIDEXIS 4.	<ul style="list-style-type: none"> <li>Check unit software versions (S008.2) and perform software update, if necessary.</li> </ul>	S. [ → 267], S. [ → 68]

Error code	Description	Actions required	see
E6 14 03	Inappropriate or incorrect data input from SIDEXIS 4.	<ul style="list-style-type: none"> <li>Send in Xab.ini and raw image of last exposure to the Sirona Customer Service Center (CSC) (check the binning setting) and seek advice on how to proceed from the CSC.</li> <li>Check the software versions of the unit (S008.2) and perform software update, if necessary.</li> </ul>	S. [ → 267], S. [ → 68]

Error code	Description	Actions required	see
E5 14 04	<p>The network connection was interrupted.</p> <p>This error often occurs if SIDEXIS 4 is selected before the unit is ready for selection.</p>	<ul style="list-style-type: none"> <li>Acknowledge error and quit service domain on unit and in SIDEXIS 4.</li> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure and check function.</li> </ol> </li> </ul>	
		<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>Perform network diagnosis with the support of the Sirona Customer Service Center (CSC) and check the setting of the network card if necessary, again seeking assistance from the Sirona Customer Service Center. (Checksum offload for patient names with 15 characters with several network cards (preferably for onboard systems).)</li> <li>Check and, if necessary, replace network components (PC network card, Cat5 cable, hub/switch/router, media converter, L25/26).</li> <li>Check the software versions of the unit (on the info screen or by running service routine S008.2) and perform software update, if necessary.</li> </ul>	S. [ → 267], S. [ → 68]



Error code	Description	Actions required	see
E6 14 06	The bootline of board DX11 had to be preassigned with default values.	<ul style="list-style-type: none"> <li>Re-configuration of network data required.</li> </ul>	

Error code	Description	Actions required	see
E6 14 10	Clock signals for sensor image transfer not received on board DX1/DX11 (...10).	<ul style="list-style-type: none"> <li>Acknowledge error and, if possible, check function at another slot (pan/ceph) via test image (ceph).</li> </ul>	
E6 14 11	Faulty detection of sensor image transfer data signals on board DX1/DX11; nonrecurring (...11).	If both test images indicate the error ... <ul style="list-style-type: none"> <li>Check image signal on board DX1 (does the image LED on DX1 switch on when the ring cycle starts in test image mode?), replace DX1 if necessary.</li> </ul>	S. [ → 396]
E6 14 12	Faulty detection of sensor image transfer data signals on board DX1/DX11; recurring (...12).	<p>If only the ceph test image is not OK...</p> <p><i>For E6 14 10 and ceph exposure:</i></p> <ul style="list-style-type: none"> <li>Check board DX91 and cables L34, L40, replace if necessary.</li> <li>Check 2D data path for ceph via service routine S033.10 (2D test image) and replace sensor or cable if necessary.</li> </ul> <p><i>Otherwise:</i></p> <ul style="list-style-type: none"> <li>Check cables L35, L38 for crushed spots and kinks and check connectors, repair or replace if necessary.</li> <li>Check board DX1, replace if necessary.</li> <li>Run service routine S033.10. This determines whether the fault is stationary or permanent. Replace sensor or cable if necessary.</li> </ul>	<p>S. [ → 146],</p> <p>S. [ → 153],</p> <p>S. [ → 307],</p> <p>S. [ → 404],</p> <p>S. [ → 396]</p>



### 5.4.8 Location 15: Configuration, update

Error code	Description	Actions required	see
E7 15 03	Wrong software constellation of modules.	<ul style="list-style-type: none"> <li>Check the software versions of the unit (on the info screen or by running service routine S008.2), and run or repeat software update or downgrade if necessary.</li> </ul>	S. [ → 267], S. [ → 68]

Error code	Description	Actions required	see
E6 15 04	<p>Product activation keys invalid or not available.</p> <p>Occurs after replacement of tube assembly (DX6) or board DX11 and possibly after software updates.</p> <p>See also chapter “Measures following replacement of boards [ → 398]”.</p>	<ul style="list-style-type: none"> <li>Entering the serial number</li> <li>Enter release key.</li> </ul>	see OI*

\*) OI = Operating instructions

Error code	Description	Actions required	see
E6 15 05	<p>Unit serial number invalid or not available.</p> <p>Occurs during first power-on after replacement of board DX6 or DX11.</p> <p>See also chapter “Measures following replacement of boards”.</p>	<ul style="list-style-type: none"> <li>Run service routine S008.3 and confirm or enter the unit serial number on the unit.</li> </ul>	S. [ → 267]

Error code	Description	Actions required	see
E6 15 06	Wrong or invalid manufacturer code on an module was detected.	<ul style="list-style-type: none"> <li>Replace the X-ray tube assembly.</li> </ul>	S. [ → 372]

Error code	Description	Actions required	see
E6 15 07	Wrong or invalid manufacturer code on an module was detected.	<ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	S. [ → 397]

Error code	Description	Actions required	see
E6 15 10	Update file for module is corrupt.	<ul style="list-style-type: none"> <li>Obtain latest update file from the Sirona Customer Service Center (CSC) or the Sirona home page and perform software update.</li> </ul>	S. [ → 68]



### 5.4.9 Location 20: Sensor unit, general

Error code	Description	Actions required	see
E6 20 01	Malfunction when starting the sensor unit.  Configuration does not match unit or communication problems following unit start.	<ul style="list-style-type: none"> <li>Check unit configuration (sensors) via service routine S017.2.</li> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	S. [→ 278]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check cable and plug connections on board DX831.</li> </ul>	S. [→ 153]

Error code	Description	Actions required	see
E6 20 03	Communication fault for sensor unit.	<ul style="list-style-type: none"> <li>Check plug connections of fiber-optic cables to boards DX83 (X800) and DX1 (J901).</li> </ul>	S. [→ 30]

Error code	Description	Actions required	see
E6 20 06	Communication fault for sensor unit.	<ul style="list-style-type: none"> <li>Check plug connections of fiber-optic cables to boards DX83 (X800) and DX1 (J901).</li> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure.</li> </ol> </li> </ul>	S. [→ 30]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a firmware update is possible and perform such an update if necessary.</li> </ul>	S. [→ 68]

Error code	Description	Actions required	see
E6 20 07	Communication fault for sensor unit.	Check plug connections of fiber-optic cables to boards DX83 (X800) and DX1 (J901).	S. [→ 30]



Error code	Description	Actions required	see
E7 20 20	Sensor unit communication to plugin interrupted.	<ul style="list-style-type: none"> <li>Check the version compatibility of the unit software and SIDEXIS 4, perform software update, if necessary.</li> </ul>	S. [ → 45]
		<ul style="list-style-type: none"> <li>Check network connections and topology.</li> </ul>	
		<ul style="list-style-type: none"> <li>Call the "<i>Device details</i>" and observe the entries in the "DX831" area.</li> </ul>	S. [ → 59]
		<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a firmware update is possible and perform such an update if necessary.</li> </ul>	

Error code	Description	Actions required	see
E6 20 21	No sensor is connected to the sensor unit or it is not recognized by the sensor unit.	<ul style="list-style-type: none"> <li>Check the set unit version or sensor assembly via service routine S017.2.</li> </ul>	S. [ → 278]
		<ul style="list-style-type: none"> <li>Check sensor wiring.</li> </ul>	S. [ → 384]
		<ul style="list-style-type: none"> <li>Observe causal error messages and take corresponding troubleshooting measures.</li> </ul>	
		<ul style="list-style-type: none"> <li>Replace sensor unit.</li> </ul>	S. [ → 378]

Error code	Description	Actions required	see
E6 20 22	Malfunction when starting the sensor unit or connected sensors.	<ul style="list-style-type: none"> <li>Check plug connections from flat panel detector to board DX83 (X602, X601) and the position of the DCS sensor.</li> </ul>	S. [ → 30]
		<ul style="list-style-type: none"> <li>Observe causal error messages E62201, E6 2301 or similar and take corresponding troubleshooting measures.</li> </ul>	
		<ul style="list-style-type: none"> <li>Replace sensor unit.</li> </ul>	S. [ → 378]

Error code	Description	Actions required	see
E7 20 25	Insufficient work memory on the sensor unit available for the exposure.	<ul style="list-style-type: none"> <li>Check the version compatibility of the unit software and SIDEXIS 4, perform software update, if necessary.</li> </ul>	S. [ → 45]
		<ul style="list-style-type: none"> <li>Restart the unit:</li> </ul>	
		<ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure.</li> </ol>	
		<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>Replace sensor unit.</li> </ul>	S. [ → 378]



Error code	Description	Actions required	see
E6 20 30	Image signal was not detected by the sensor module.	<ul style="list-style-type: none"> <li>Check wiring and plug connections from flat panel detector (DX83 (X101) to board DX1 (X500) and that the DCS sensor is securely attached.</li> </ul>	S. [ → 30]
		<ul style="list-style-type: none"> <li>Replace sensor unit.</li> </ul>	S. [ → 378]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>For additional diagnostics, perform service routines S032.10 or S032.50.</li> </ul>	S. [ → 304]

Error code	Description	Actions required	see
E6 20 32	TDI signal was not detected by the sensor module.	<ul style="list-style-type: none"> <li>Check wiring and plug connections from flat panel detector (DX83 (X101) to board DX1 (X500) and that the DCS sensor is securely attached.</li> </ul>	S. [ → 30]
		<ul style="list-style-type: none"> <li>Replace sensor unit, if necessary.</li> </ul>	S. [ → 378]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>For additional diagnostics, perform service routines S032.10 or S032.50.</li> </ul>	S. [ → 304]

Error code	Description	Actions required	see
E6 20 34	Exposure readiness of the sensor unit could not be determined.	<ul style="list-style-type: none"> <li>Call the <i>"Device details"</i> and observe the entries in the "DX831" area.</li> </ul>	S. [ → 59]
		<ul style="list-style-type: none"> <li>Restart the unit:               <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	

Error code	Description	Actions required	see
E6 20 35	Error when starting the sensor unit.	<ul style="list-style-type: none"> <li>Access the <i>"Device details"</i> and save it for subsequent analysis by the customer service center (KSC).</li> </ul>	S. [ → 59]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a firmware update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		<ul style="list-style-type: none"> <li>Replace sensor unit.</li> </ul>	S. [ → 378]



Error code	Description	Actions required	see
E6 20 36	Function malfunction on the sensor unit.	<ul style="list-style-type: none"> <li>Call the <i>"Device details"</i> and observe the entries in the "DX831" area.</li> </ul>	S. [ → 59]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a firmware update is possible and perform such an update if necessary.</li> </ul>	S. [ → 68]
		<ul style="list-style-type: none"> <li>Replace sensor unit.</li> </ul>	S. [ → 378]

Error code	Description	Actions required	see
E7 20 37	Exposure readiness of the sensor unit could not be determined.	<ul style="list-style-type: none"> <li>Call the <i>"Device details"</i> and observe the entries in the "DX831" area.</li> </ul>	S. [ → 59]
		Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol>	
		<ul style="list-style-type: none"> <li>Check the version compatibility of the unit software and SIDERIS 4, perform software update, if necessary.</li> </ul>	S. [ → 45]

Error code	Description	Actions required	see
E7 20 38	Error during data transmission from DCS sensor.	<ul style="list-style-type: none"> <li>Check correct positioning of the DCS sensor on board DX83.</li> </ul>	

Error code	Description	Actions required	see
E6 20 39	Overtemperature of the DCS sensor or the flat panel detector (depending on unit design). Exposures are not possible.	<ul style="list-style-type: none"> <li>Switch off the unit and let it cool.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check fans in the sensor unit or plug connection DX1001 on board DX83.</li> <li>Check correct positioning of the thermal mats in the housing of board DX83.</li> <li>Replace sensor unit, if necessary.</li> </ul>	S. [ → 378]

Error code	Description	Actions required	see
E6 20 40	A fan in the sensor unit is defective. Exposures are still possible.	<ul style="list-style-type: none"> <li>Check fans in the sensor unit or plug connection DX1001 on board DX83.</li> <li>Replace the fan package where necessary.</li> </ul>	S. [ → 390]



Error code	Description	Actions required	see
E7 20 41	Several fans in the sensor unit are defective. Exposures are <i>no longer</i> possible.	<ul style="list-style-type: none"> <li>Check fans in the sensor unit or plug connection DX1001 on board DX83.</li> <li>Replace the fan package where necessary.</li> </ul>	S. [ → 390]
E6 20 42	Malfunction of the sensor cooling. Exposures are <i>no longer</i> possible.	<ul style="list-style-type: none"> <li>Check fans in the sensor unit or plug connection DX1001 on board DX83.</li> <li>Replace the fan package where necessary.</li> </ul>	S. [ → 390]
E6 20 43	Error during installation. Restore the record in the factory calibration files.	<ul style="list-style-type: none"> <li>Check whether the record you are using is valid for the unit you are using.</li> </ul> <p><i>If the record is valid:</i></p> <ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> <li>Repeat procedure.</li> </ol> </li> </ul> <p><i>If the record is not valid:</i></p> <ul style="list-style-type: none"> <li>Perform the restoration again with the right record.</li> </ul>	



### 5.4.10 Location 22: DCS sensor

Error code	Description	Actions required	see
E6 22 01	DCS sensor could not be initialized.	<ul style="list-style-type: none"> <li>Check correct positioning of the DCS sensor on board DX83.</li> </ul>	

Error code	Description	Actions required	see
E6 22 03	Error during communication to DCS sensor.	<ul style="list-style-type: none"> <li>Check correct positioning of the DCS sensor on board DX83.</li> </ul>	

Error code	Description	Actions required	see
E6 22 10	No image data obtained from DCS sensor or interruption of the data flow.	<ul style="list-style-type: none"> <li>Check correct positioning of the DCS sensor on board DX83.</li> </ul>	

Error code	Description	Actions required	see
E6 22 15	Serial number of the DCS sensor could not be read out.	<p>If the error does <i>not</i> occur with other causal errors ...</p> <ul style="list-style-type: none"> <li>Replace the DCS sensor.</li> </ul>	S. [→ 378]

Error code	Description	Actions required	see
E6 22 16	File operation malfunction in DCS sensor mode.	<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>Replace the DCS sensor.</li> </ul>	S. [→ 378]

Error code	Description	Actions required	see
E6 22 17	Tolerance exceeded when monitoring the high-voltage of the DCS sensor.	<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>Replace the DCS sensor.</li> </ul>	S. [→ 378]



### 5.4.11 Location 23: Flat Panel Detector

Error code	Description	Actions required	see
E6 23 01	Error in initializing the digital flat panel detector.	<ul style="list-style-type: none"> <li>Check the connection of the flat panel detector to board DX83.</li> </ul>	

Error code	Description	Actions required	see
E6 23 03	Malfunction in communication with flat panel detector.	<ul style="list-style-type: none"> <li>Check wiring and plug connections from flat panel detector (DX83 (X101) to board DX1 (X500) and that the DCS sensor is securely attached.</li> </ul>	S. [→ 30]
		<ul style="list-style-type: none"> <li>Replace sensor unit, if necessary.</li> </ul>	S. [→ 378]

Error code	Description	Actions required	see
E6 23 10	No image data obtained from flat panel detector or interruption in data flow.	<ul style="list-style-type: none"> <li>Check wiring and plug connections from flat panel detector (DX83 (X101) to board DX1 (X500) and that the DCS sensor is securely attached.</li> </ul>	S. [→ 30]
		<ul style="list-style-type: none"> <li>Replace sensor unit, if necessary.</li> </ul>	S. [→ 378]

Error code	Description	Actions required	see
E6 23 15	Serial number of flat panel detector could not be read out.	<p>If the error does <i>not</i> occur with other causal errors ...</p> <ul style="list-style-type: none"> <li>Replace sensor unit.</li> </ul>	S. [→ 378]

Error code	Description	Actions required	see
E7 23 16	File operation malfunction in flat panel detector mode.	<ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit.</li> </ol> </li> </ul>	
		<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>Replace sensor unit.</li> </ul>	S. [→ 378]



### 5.4.12 Location 42: Remote control

Error code	Description	Actions required	see
E6 42 01	General module initialization error. Error generated during module self-test.	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> <li>Replace board DX42.</li> </ul>	S. [ → 68], S. [ → 395]

Error code	Description	Actions required	see
E6 42 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> <li>Acknowledge error and repeat procedure.</li> </ul>	S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace board DX42.</li> </ul>	S. [ → 395]

Error code	Description	Actions required	see
E6 42 03	Invalid commanding or control data This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.	<ul style="list-style-type: none"> <li>Run service routine S008.2 to check software version of DX42 (in relation to main software releases), perform software update if necessary.</li> <li>Check the CAN bus.</li> <li>Check the signal path from board DX1 to board DX42, replace module DX42 if necessary.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 267], S. [ → 68], S. [ → 395], S. [ → 395]

Error code	Description	Actions required	see
E6 42 04	Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141], S. [ → 68]



Error code	Description	Actions required	see
E6 42 05	Data transfer error or dialog error to bootloader of module  Only occurs in connection with a software update	<ul style="list-style-type: none"> <li>Repeat the software update.</li> <li>Check the CAN bus.</li> <li>Replace board DX42.</li> </ul>	<p>S. [ → 68],</p> <p>S. [ → 141],</p> <p>S. [ → 395]</p>

Error code	Description	Actions required	see
E6 42 06	Module failed in TTP (detected on master side).  TTP = Time Trigger Protocol	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Check the signal path from board DX1 to board DX42, replace module if necessary</li> <li>Replace board DX42.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	<p>S. [ → 141],</p> <p>S. [ → 395],</p> <p>S. [ → 395]</p>

Error code	Description	Actions required	see
E6 42 07	TTP timeout error (detected on slave side)  The module was temporarily not addressed by the master: Undervoltage on the master side  Procedure error in the software  Master (DX11) receives no return commanding from the module  This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.  TTP = Time Trigger Protocol	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Check power supply (3.3 V) of board DX11, replace board DX1 or DX11 if necessary.</li> <li>Check the signal path from board DX1 to board DX42, replace module if necessary</li> <li>Replace board DX42.</li> </ul>	<p>S. [ → 141],</p> <p>S. [ → 396],</p> <p>S. [ → 395]</p>

Error code	Description	Actions required	see
E6 42 08	General fault detected locally on module (slave side). CAN controller being reinitialized.  Occurs if software of boards is incompatible.	<ul style="list-style-type: none"> <li>Check software versions on the info screen or by running service routine S008.2, perform software update if necessary.</li> <li>Check the CAN bus.</li> <li>Replace board DX42.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	<p>S. [ → 267],</p> <p>S. [ → 68],</p> <p>S. [ → 141],</p> <p>S. [ → 395]</p>



Error code	Description	Actions required	see
E7 42 12	Unit is not ready for operation	<p>This error is a sequential fault.</p> <ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch on the unit, making sure that the release button is not pressed during booting.</li> <li>Repeat procedure and check function.</li> </ol>	
		<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>Repeat procedure and observe causal error messages.</li> <li>Check the signal path from board DX1 to board DX42, replace module if necessary</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 42 20	Contact to DX11 interrupted during operation.	<ul style="list-style-type: none"> <li>Check the signal path from board DX1 to board DX42, replace module if necessary</li> <li>Check connection of remote control, see Installation Instructions.</li> <li>Check the CAN bus.</li> <li>Check cable L17, replace if necessary.</li> <li>Check board DX42, replace if necessary.</li> </ul> <p><b>Tip:</b> If the error cannot be eliminated immediately, the unit can be temporarily reconfigured and operated with a release button located directly on it (see Installation Instructions).</p>	S. [ → 396], S. [ → 141], S. [ → 153], S. [ → 404], S. [ → 146]

Error code	Description	Actions required	see
E7 42 21	<p>No CAN bus connection. DX11 does not start.</p> <p>Occurs in the start screen after power-on.</p>	<ul style="list-style-type: none"> <li>Check the signal path from board DX1 to board DX42, replace module if necessary</li> <li>Check the CAN bus.</li> <li>Check remote control by running service routine S017.6, configure if necessary.</li> <li>Querying "Unit information"</li> </ul>	S. [ → 396], S. [ → 141], S. [ → 153], S. [ → 283], S. [ → 59]
		<p>If board DX11 responds ...</p> <ul style="list-style-type: none"> <li>Check the signal path to DX42, repair or replace cables/connectors if necessary.</li> <li>Replace DX1.</li> </ul>	S. [ → 404], S. [ → 396]
		<p>If DX11 does not respond ...</p> <ul style="list-style-type: none"> <li>If error persists: Replace board DX11.</li> </ul>	S. [ → 397]



Error code	Description	Actions required	see
E3 42 30	R key pressed during power-on.	<ul style="list-style-type: none"> <li>Restart the unit:</li> </ul> <ol style="list-style-type: none"> <li>1. Switch off the unit.</li> <li>2. Wait 1 minute.</li> <li>3. Switch on the unit, making sure that the remote control is not pressed during booting.</li> <li>4. Repeat procedure and check function.</li> </ol>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace remote control, see Installation Instructions.</li> </ul>	

Error code	Description	Actions required	see
E3 42 31	Release button pressed during power-on.  The hardware signal for radiation release is applied on board DX42 when the unit is switched on.	<ul style="list-style-type: none"> <li>See section entitled Error analysis of X-RAY control signal path [ → 156].</li> </ul>	S. [ → 156]



### 5.4.13 Location 61: Diaphragm control, board DX61

Error code	Description	Actions required	see
E6 61 01	General error during module initialization	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> <li>Check board DX61; replace the diaphragm unit.</li> </ul>	S. [ → 68], S. [ → 146], S. [ → 370]

Error code	Description	Actions required	see
E6 61 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> <li>Acknowledge error and repeat procedure.</li> </ul>	S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 146], S. [ → 370]

Error code	Description	Actions required	see
E6 61 03	Invalid commanding or control data.  This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141], S. [ → 68]

Error code	Description	Actions required	see
E6 61 04	Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141]

Error code	Description	Actions required	see
E6 61 05	Data transfer error or dialog error to bootloader of module  Only occurs in connection with software update.	<ul style="list-style-type: none"> <li>Repeat the software update.</li> <li>Check the CAN bus.</li> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 68], S. [ → 141], S. [ → 146], S. [ → 370]



Error code	Description	Actions required	see
E6 61 06	Module failed in TTP (detected on master side)  TTP = Time Trigger Protocol	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141], S. [ → 146], S. [ → 370], S. [ → 68]

Error code	Description	Actions required	see
E6 61 07	<p>TTP timeout error (detected on slave side).</p> <p>The module was temporarily not addressed by the master: Undervoltage processing error in the software on the master side. Master (DX11) receives no return commanding from the module</p> <p>This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.</p> <p>TTP = Time Trigger Protocol</p>	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams).</li> </ul>	S. [ → 141]
		<p>If 3.3 V present...</p> <ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	S. [ → 397]
		<p>If 3.3 V not present...</p> <ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 61 08	General fault detected locally on module (slave side). CAN controller being reinitialized.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Check software versions on the info screen or by running service routine S008.2, run software update if necessary.</li> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141], S. [ → 267], S. [ → 146], S. [ → 370], S. [ → 370]



Error code	Description	Actions required	see
E7 61 12	Unit is not ready for operation	<p>This error is a sequential fault.</p> <ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> <li>Check the CAN bus.</li> <li>Replace diaphragm unit.</li> </ul>	<p>S. [ → 141], S. [ → 370]</p>

Error code	Description	Actions required	see
E6 61 13	Error writing on the persistent memory of the diaphragm unit.	<ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> </ol> </li> <li>Replace diaphragm unit.</li> </ul>	S. [ → 370]

Error code	Description	Actions required	see
E7 61 14	Communication error of the motor driver on DX61.	<ul style="list-style-type: none"> <li>Replace diaphragm unit.</li> </ul>	S. [ → 370]

Error code	Description	Actions required	see
E5 61 15	Drive overtemperature.	<ul style="list-style-type: none"> <li>Allow unit to cool down.</li> </ul>	
	Can occur after frequent diaphragm travel, e.g. during demo operation at a fair.	<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	<p>S. [ → 146], S. [ → 370]</p>

Error code	Description	Actions required	see
E7 61 17	The installed diaphragm mechanics do not match the system version.	<ul style="list-style-type: none"> <li>Replacing the diaphragm unit</li> </ul>	S. [ → 370]

Error code	Description	Actions required	see
E5 61 20	Horizontal motor malfunction during operation.	<ul style="list-style-type: none"> <li>Allow unit to cool down.</li> </ul>	
	Can occur after frequent diaphragm travel, e.g. during demo operation at a fair.	<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	<p>S. [ → 146], S. [ → 370]</p>



Error code	Description	Actions required	see
E5 61 21	Horizontal motor limit switch error.	<ul style="list-style-type: none"> <li>Check light barrier V61_1 and connectors, replace if necessary.</li> <li>Perform diaphragm adjustment.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 151], S. [ → 393], S. [ → 160], S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 146], S. [ → 370]

Error code	Description	Actions required	see
E5 61 22	Horizontal motor movement error.	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 146], S. [ → 370]

Error code	Description	Actions required	see
E5 61 30	Vertical motor malfunction during operation.	<ul style="list-style-type: none"> <li>Allow unit to cool down.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 146], S. [ → 370]

Error code	Description	Actions required	see
E5 61 31	Vertical motor limit switch error.	<ul style="list-style-type: none"> <li>Check light barrier V61_2 and connectors, replace if necessary.</li> <li>Perform diaphragm adjustment.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 151], S. [ → 393], S. [ → 160], S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 146], S. [ → 370]

Error code	Description	Actions required	see
E5 61 32	Vertical motor movement error.	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 146], S. [ → 370]



Error code	Description	Actions required	see
E5 61 40	Filter motor malfunction during operation.	<ul style="list-style-type: none"> <li>Allow unit to cool down.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 146], S. [ → 370]

Error code	Description	Actions required	see
E5 61 41	Filter motor limit switch error.	<ul style="list-style-type: none"> <li>Check light barrier V61_1 and connectors, replace if necessary.</li> <li>Perform diaphragm adjustment.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 151], S. [ → 151], S. [ → 160], S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 146], S. [ → 370]

Error code	Description	Actions required	see
E5 61 42	Filter motor movement error.	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 146], S. [ → 370]

Error code	Description	Actions required	see
E5 61 50	Sensor positioning drive malfunction during operation.	<ul style="list-style-type: none"> <li>Allow unit to cool down.</li> <li>Check connector V61_4 for correct position; replug if necessary (X303, X304).</li> <li>Check the sensor unit by switching between Pan and 3D operating modes. <b>NOTICE! Do not turn the sensor unit by hand!</b></li> </ul>	

Error code	Description	Actions required	see
E5 61 51	Sensor positioning drive limit switch error	<ul style="list-style-type: none"> <li>Check light barriers V61_4; replace if necessary (X303, X304)</li> <li>Check connector of motor power supply (V61_4) for correct position, replug if necessary (X203)</li> <li>Check the sensor unit by switching between Pan and 3D operating modes. <b>NOTICE! Do not turn the sensor unit by hand!</b></li> <li>Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	S. [ → 151], S. [ → 393], S. [ → 146], S. [ → 395]



Error code	Description	Actions required	see
E5 61 55	Rotating element position not reached.	<ul style="list-style-type: none"> <li>• Check light barriers V61_4; replace if necessary (X303, X304)</li> <li>• Check connector of motor power supply (V61_4) for correct position, replug if necessary (X203)</li> <li>• Check the sensor unit by switching between Pan and 3D operating modes. <b>NOTICE! Do not turn the sensor unit by hand!</b></li> <li>• Check board DX61; replace the diaphragm unit, if necessary.</li> </ul>	<p>S. [ → 151], S. [ → 393], S. [ → 146], S. [ → 395]</p>

Error code	Description	Actions required	see
E5 61 56	Rotating element position was deflected mechanically.	<ul style="list-style-type: none"> <li>• Check the sensor unit by switching between Pan and 3D operating modes. <b>NOTICE! Do not turn the sensor unit by hand!</b></li> <li>• Check whether motor securely engages in gear rim of rotating element.</li> <li>• Check fit and cabling of light barriers (X303, X304).</li> </ul>	

Error code	Description	Actions required	see
E1 61 60	<p>Voltage error on DX61, 40 V or 28 V</p> <p>If several drives are operated simultaneously under unfavorable conditions, this may cause voltages to fall below their minimum tolerances.</p>	<p>• Acknowledge error and repeat procedure</p> <p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>• Check height adjustment (gentle start), replace board DX1 if necessary.</li> <li>• Check voltages at X501 on board DX61 according to wiring diagrams, replace diaphragm unit if necessary.</li> <li>• Check cable L11, replace if necessary.</li> <li>• Check voltage path from DX32 to DX1 (X102) according to wiring diagrams, replace component if necessary.</li> </ul>	<p>S. [ → 412], S. [ → 396], S. [ → 370], S. [ → 153], S. [ → 404]</p>



#### 5.4.14 Location 81, board DX81, ceph slot

Error code	Description	Actions required	see
E6 81 51	<b>Ceph:</b> General error during module initialization	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> <li>Check ceph sensor (replacement sensor), replace if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E6 81 52	<b>Ceph:</b> Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> <li>Acknowledge error and repeat procedure.</li> </ul>	S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check ceph sensor (replacement sensor), replace if necessary.</li> </ul>	

Error code	Description	Actions required	see
E6 81 53	<b>Ceph:</b> Invalid commanding or control data.  This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>If the error is a software error known to the Sirona Customer Service Center (CSC), a software update (bug fix) must be performed.</li> </ul>	S. [ → 141], S. [ → 68]

Error code	Description	Actions required	see
E6 81 54	<b>Ceph:</b> Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>If the error is a software error known to the Sirona Customer Service Center (CSC), a software update (bug fix) must be performed.</li> </ul>	S. [ → 141], S. [ → 68]

Error code	Description	Actions required	see
E6 81 55	<b>Ceph:</b> Data transfer error or dialog error to bootloader of module  Only occurs in connection with software update.	<ul style="list-style-type: none"> <li>Repeat the software update.</li> <li>Check the CAN bus.</li> <li>Check ceph sensor (replacement sensor), replace sensor if necessary.</li> </ul>	S. [ → 68], S. [ → 141]



Error code	Description	Actions required	see
E6 81 57	<b>Ceph:</b> TTP timeout error (detected on slave side). The module was temporarily not addressed by the master: Undervoltage on the master side Procedure error in the software Master (DX11) receives no return commanding from the module This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message. TTP = Time Trigger Protocol	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams).</li> </ul>	S. [ → 141]
		If 3.3 V present... <ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	S. [ → 397]
		If 3.3 V not present... <ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 81 58	<b>Ceph:</b> General fault detected locally on module (slave side). CAN controller being reinitialized.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Check software versions on the info screen or by running service routine S008.2, perform software update if necessary.</li> <li>Check ceph sensor (replacement sensor), replace if necessary.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141], S. [ → 267], S. [ → 68]

Error code	Description	Actions required	see
E7 81 60	<b>Ceph:</b> Module is stuck in bootloader stage.	<ul style="list-style-type: none"> <li>Check ceph sensor (replacement sensor), replace sensor if necessary.</li> </ul>	
		If the board remains in the bootloader stage... <ul style="list-style-type: none"> <li>Repeat the software update.</li> <li>Check ceph sensor (replacement sensor), replace sensor if necessary.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E7 81 62	<b>Ceph:</b> Unit is not ready for operation	This error is a sequential fault. <ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	



Error code	Description	Actions required	see
E5 81 63	<b>Ceph:</b> Error when writing to EEPROM.  Stored data may be lost.	<ul style="list-style-type: none"> <li>Acknowledge error and repeat procedure.</li> <li>Run software update.</li> </ul>	S. [ → 68]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check log memory (Unit information [ → 59]).</li> <li>Check ceph sensor (replacement sensor), replace sensor if necessary.</li> </ul>	

Error code	Description	Actions required	see
E6 81 70	<b>Ceph:</b> The sensor type on the ceph slot is not compatible with SIDEXIS 4 specifications.	<ul style="list-style-type: none"> <li>Check the SIDEXIS 4 specifications with the Sirona Customer Service Center (CSC).</li> <li>Check the version compatibility of the unit software and SIDEXIS 4, perform software update if necessary.</li> <li>Pull ceph sensor out of slot and plug it back in, repeat procedure.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E7 81 71	<b>Ceph:</b> File system error on DX81C	<ul style="list-style-type: none"> <li>Run software update.</li> </ul>	S. [ → 68]

Error code	Description	Actions required	see
E6 81 73	<b>Ceph:</b> Sensor in ceph slot active on CAN bus, but no hardware detection	<ul style="list-style-type: none"> <li>Check cable L35/L38, replace if necessary.</li> <li>Check connector X500 on board DX1, replace board DX1 if necessary.</li> <li>Check ceph sensor holder, replace if necessary.</li> </ul>	S. [ → 153], S. [ → 404], S. [ → 396], S. [ → 391]

Error code	Description	Actions required	see
E5 81 74	<b>Ceph:</b> Sensor in ceph slot not detected.	<ul style="list-style-type: none"> <li>Check cable L35/L38, replace if necessary.</li> <li>Check connector X503 on board DX1, replace board DX1 if necessary.</li> <li>Check the CAN bus.</li> <li>Check ceph sensor holder, replace if necessary.</li> </ul>	S. [ → 153], S. [ → 404], S. [ → 396], S. [ → 141], S. [ → 391]

Error code	Description	Actions required	see
E5 81 75	<b>Ceph:</b> Error while synchronizing image data	<ul style="list-style-type: none"> <li>Run software update.</li> </ul>	S. [ → 68]
		If the error occurs again... <ul style="list-style-type: none"> <li>Check ceph sensor (replacement sensor), replace sensor if necessary.</li> </ul>	



Error code	Description	Actions required	see
E5 81 77	<p><b>Ceph:</b> Voltage error detected on sensor. (CCD voltages on board DX81C).</p> <p>If this error occurs in connection with other causal error messages (e.g. E6 61 60, E6 91 50), take appropriate action.</p>	<ul style="list-style-type: none"> <li>• Check cable L35/L38, replace if necessary.</li> <li>• Check connector X503 on board DX1, replace board DX1 if necessary.</li> <li>• Run software update.</li> <li>• Check ceph sensor holder, replace if necessary.</li> <li>• Check ceph sensor (replacement sensor), replace if necessary.</li> </ul>	<p>S. [ → 153], S. [ → 404], S. [ → 396], S. [ → 68], S. [ → 391]</p>

Error code	Description	Actions required	see
E5 81 78	<p><b>Ceph:</b> Invalid data at start of exposure.</p>	<ul style="list-style-type: none"> <li>• Acknowledge error and repeat procedure.</li> </ul>	
		<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> <li>• Run software update.</li> <li>• Check the version compatibility of the unit software and SIDEXIS 4, perform software update if necessary.</li> <li>• Seek advice from the Sirona Customer Service Center (CSC) with regard to the settings/sensor information in the Xab.ini file.</li> </ul>	S. [ → 68]



### 5.4.15 Location 83: Sensor unit

Error code	Description	Actions required	see
E7 83 01	Malfunction when starting the sensor unit.  Communication problems following unit start.	<ul style="list-style-type: none"> <li>Check plug connections of fiber-optic cables to boards DX83 (X800) and DX1 (J901).</li> </ul>	S. [→ 30]

Error code	Description	Actions required	see
E6 83 03	Communication fault for sensor unit.	<ul style="list-style-type: none"> <li>Check plug connections of fiber-optic cables to boards DX83 (X800) and DX1 (J901).</li> </ul>	S. [→ 30]

Error code	Description	Actions required	see
E6 83 07	Communication fault for sensor unit.	<ul style="list-style-type: none"> <li>Check plug connections of fiber-optic cables to boards DX83 (X800) and DX1 (J901).</li> </ul>	S. [→ 30]

Error code	Description	Actions required	see
E7 83 12	Sensor unit has been taken out of operation due to malfunction.	<ul style="list-style-type: none"> <li>Check plug connections of fiber-optic cables to boards DX83 (X800) and DX1 (J901).</li> </ul>	S. [→ 30]

Error code	Description	Actions required	see
E6 83 15	The DHCP server does not provide an IP address.	<ul style="list-style-type: none"> <li>Check plug connections of fiber-optic cables to boards DX83 (X700) and media converters.</li> </ul>	S. [→ 30]

Error code	Description	Actions required	see
E6 83 16	The network configuration has been reset.	<ul style="list-style-type: none"> <li>Perform network configuration for the unit.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace sensor unit.</li> </ul>	S. [→ 378]



### 5.4.16 Location 91: Cephalometer, board DX91

Error code	Description	Actions required	see
E6 91 01	General error during module initialization	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> <li>Replace board DX91.</li> </ul>	S. [ → 68], S. [ → 396]

Error code	Description	Actions required	see
E6 91 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> <li>Acknowledge error and repeat procedure.</li> </ul>	S. [ → 68]  S. [ → 396]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Replace board DX91.</li> </ul>	

Error code	Description	Actions required	see
E6 91 03	Invalid commanding or control data.  This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141], S. [ → 68]

Error code	Description	Actions required	see
E6 91 04	Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141], S. [ → 68]

Error code	Description	Actions required	see
E6 91 05	Data transfer error or dialog error to bootloader of module  Only occurs in connection with software update.	<ul style="list-style-type: none"> <li>Repeat the software update.</li> <li>Check the CAN bus.</li> <li>Replace board DX91.</li> </ul>	S. [ → 68], S. [ → 141], S. [ → 396]



Error code	Description	Actions required	see
E6 91 06	Module failed in TTP (detected on master side) TTP = Time Trigger Protocol	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Replace board DX91.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141], S. [ → 396], S. [ → 68]

Error code	Description	Actions required	see
E6 91 07	TTP timeout error (detected on slave side). The module was temporarily not addressed by the master: Undervoltage on the master side Procedure error in the software Master (DX11) receives no return commanding from the module This error may also occur in connection with other causal error messages! Please also observe the causal error message! It appears only after you acknowledge the first error message. TTP = Time Trigger Protocol	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams).</li> </ul>	S. [ → 141]
		If 3.3 V present... <ul style="list-style-type: none"> <li>Replace board DX11.</li> </ul>	S. [ → 397]
		If 3.3 V not present... <ul style="list-style-type: none"> <li>Replace board DX1.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E6 91 08	General fault detected locally on module (slave side). CAN controller being reinitialized.	<ul style="list-style-type: none"> <li>Check the CAN bus.</li> <li>Check software versions on the info screen or by running service routine S008.2, perform software update if necessary.</li> <li>Replace board DX91.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 141], S. [ → 267], S. [ → 395], S. [ → 68]

Error code	Description	Actions required	see
E7 91 12	Unit is not ready for operation	<p>This error is a sequential fault.</p> <ul style="list-style-type: none"> <li>Restart the unit: <ol style="list-style-type: none"> <li>Switch off the unit.</li> <li>Wait 1 minute.</li> <li>Switch unit on.</li> <li>Repeat procedure and observe causal error messages.</li> </ol> </li> </ul>	



Error code	Description	Actions required	see
E3 91 13	Error when writing to EEPROM. Stored data may be lost.	<ul style="list-style-type: none"> <li>Check entire unit calibration incl. center position of ceph scan by running service routines S034.4 and S034.5, recalibrate if necessary.</li> <li>Acknowledge error and repeat procedure.</li> </ul>	S. [ → 309], S. [ → 313], S. [ → 160]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check board DX91, replace if necessary.</li> </ul>	S. [ → 146], S. [ → 396]

Error code	Description	Actions required	see
E5 91 15	Drive overtemperature.	<ul style="list-style-type: none"> <li>Allow unit to cool down.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check complete mechanics/spindle of motor M91_3 for smooth and easy running, replace if necessary.</li> <li>Replace board DX91.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E5 91 16	Motor control timeout (M91_2/3).	<ul style="list-style-type: none"> <li>Replace board DX91.</li> </ul>	S. [ → 396]

Error code	Description	Actions required	see
E5 91 20	Sensor drive malfunction during operation.	<ul style="list-style-type: none"> <li>Allow unit to cool down.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check complete mechanics/spindle of motor M91_3 for smooth and easy running, replace if necessary.</li> </ul>	S. [ → 412], S. [ → 337]

Error code	Description	Actions required	see
E5 91 21	Sensor drive, opposite light barrier reached prematurely.	<ul style="list-style-type: none"> <li>Check light barrier V91_2, replace if necessary.</li> <li>Check cable to light barrier (L21/L24), replace if necessary.</li> <li>Check board DX91, replace if necessary.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 151], S. [ → 393], S. [ → 153], S. [ → 404], S. [ → 146], S. [ → 396]

Error code	Description	Actions required	see
E5 91 22	Sensor drive timeout	<ul style="list-style-type: none"> <li>Check motor M91_3 incl. cable and connector, replace if necessary.</li> <li>Check cable to light barrier (L21/L24), replace if necessary.</li> </ul>	S. [ → 150], S. [ → 153], S. [ → 404]



Error code	Description	Actions required	see
E5 91 30	Secondary diaphragm drive malfunction during operation	<ul style="list-style-type: none"> <li>Allow unit to cool down.</li> </ul>	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> <li>Check motor M91_2 incl. cable and connector, replace if necessary.</li> <li>Check cable to light barrier (L21/L24), replace if necessary.</li> </ul>	S. [ → 150], S. [ → 153], S. [ → 404]

Error code	Description	Actions required	see
E5 91 31	Secondary diaphragm drive, opposite light barrier reached prematurely.	<ul style="list-style-type: none"> <li>Check light barrier V91_2, replace if necessary.</li> <li>Check cable to light barrier (L21/L24), replace if necessary.</li> <li>Check board DX91, replace if necessary.</li> <li>Please contact the Sirona Customer Service Center (CSC) to find out whether a bug fix by means of a software update is possible and perform such an update if necessary.</li> </ul>	S. [ → 151], S. [ → 393], S. [ → 153], S. [ → 404], S. [ → 146], S. [ → 396]

Error code	Description	Actions required	see
E5 91 32	Secondary diaphragm drive timeout	<ul style="list-style-type: none"> <li>Check motor M91_2, replace if necessary.</li> <li>Check cable to light barrier (L21/L24), replace if necessary.</li> </ul>	S. [ → 150], S. [ → 153], S. [ → 404]

Error code	Description	Actions required	see
E1 91 50	Voltage error on DX91, 40 V or 28 V.  If several drives are operated simultaneously under unfavorable conditions, this may cause voltages to fall below their minimum tolerances.	<ul style="list-style-type: none"> <li>Check height adjustment (gentle start), replace DX1 if necessary.</li> <li>Check cable L36/L39 and adapter, replace if necessary.</li> <li>Check voltages at X103 on board DX91 according to wiring diagrams, replace board DX91 if necessary.</li> <li>Check boards DX1 and DX91, replace if necessary.</li> </ul>	S. [ → 412], S. [ → 396], S. [ → 153], S. [ → 404], S. [ → 146], S. [ → 396]
		If multiple boards report errors... <ul style="list-style-type: none"> <li>Check board DX32, replace if necessary.</li> </ul>	S. [ → 146], S. [ → 397]



## 6 Troubleshooting



### DANGER

#### Potentially lethal shock hazard!

It is essential to switch off the unit and wait at least 1 minute before removing a cover.

Switch OFF the X-ray unit before connecting a measuring instrument.

Perform continuity tests only on units which are switched off.

### NOTICE

#### Risk of damage to unit

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

Keep to the prescribed cool-off periods if several exposures have to be taken to check a measured value.

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

CAN bus cable: When unplugging CAN bus cables, it is essential to unplug the power supply as well.

## 6.1 Error logging memory

The error logging memory is part of the "Device details" (see the section entitled "Opening / saving "Unit information" [ → 59]").

```
----- Error Logging Data DX 11 -----
Timestamp      Category      Message
2006-03-06, 19:57:40 [Message]: Logbook started
2006-03-06, 20:13:02 [Message]: Recording started - Value: 9000
2006-03-06, 20:13:22 [Message]: Recording stopped
2006-03-06, 20:48:34 [Message]: Recording started - Value: 9000
2006-03-06, 20:48:54 [Message]: Recording stopped
2006-03-07, 15:45:38 [Error Sidexis]: E5 14 04 (ERR_SOCKET) SidErr: ERR_SOCKET_ERROR SockErr: EPIPE
2006-03-07, 08:57:05 [Message]: Logbook started
2006-03-07, 08:58:30 [Message]: Recording started - Value: 104
2006-03-07, 08:58:49 [Message]: Recording stopped
2006-03-07, 09:03:26 [Message]: Recording started - Value: 104
2006-03-07, 09:03:45 [Message]: Recording stopped
2006-03-07, 09:05:16 [Message]: Recording started - Value: 104
2006-03-07, 09:05:35 [Message]: Recording stopped
2006-03-07, 09:07:27 [Message]: Recording started - Value: 101
2006-03-07, 09:07:35 [Message]: Recording cancelled
2006-03-07, 09:52:44 [Message]: Recording started - Value: 9641
2006-03-07, 09:52:58 [Message]: Recording stopped
```

Data which might be expected to occur in the error logging memory is explained below to aid you in interpreting it.



### 6.1.1 Example of error logging data

<b>System time</b>	2006-03-06, 20:13:02	System time (clock on DX11)
<b>Entry type</b>	[Message]	General system event
	[Message + val]	General system event with additional value
	[Error]	Error event
	[DeviceError]	Data for error event on a module
	[Error Sidexis]	Network error event
	[Stringname]	Free status texts
	[Stringsegment]	Additional data (string name)
	[RTC Date / Time Change]	Date and time of a SIDEXIS PC
	[PC Date / Time]	Date and time of the DX11 set
	[Update]	Information on the unit software update
<b>Entry data [Message]</b>	Self-test: Successful	Self-test completed successfully
	Recording started	Start of a recording
	Value: 9000	Sequence ID of the recording
	Recording stopped	End of an exposure
	Recording canceled	Exposure cancellation
	Termination state	Reason for ending exposure
	Value: 0	Exposure completed
	Value: 1	Exposure cancellation by user
	Value: 2	Exposure cancellation due to internal error
	Image transfer started	Start of image data transfer
	Image transfer stopped	End of image data transfer
	Logbook started	Corresponds to unit switch-on
	Image state switched to Released	Exposure has been delivered to SIDEXIS 4 and confirmed by SIDEXIS 4.
	<p>Other entry data which document the occurrence of a rescue event include:</p> <ul style="list-style-type: none"> <li>• Image state switched to Rescue</li> <li>• Rescue request Sidexis Error</li> <li>• Rescue request Sidexis TrackEpilogue</li> <li>• Rescue request Sidexis Timeout</li> </ul> <p>These entry data may also occur after "Recording stopped" or "Cancel" and indicate an exceptional circumstance. You can supply important information for error diagnosis in coordination with the Sirona Customer Service Center.</p>	
	E6 07 06	Error code
	ERR_DX7_TTP_LOST	Clear text error display



Entry data [DeviceError]	DEV_DX42	Name of module to which the message refers
	Byte 0-7: 0x10 0x00 0x00 0x00 0x00 0x00 0x00 0x00	Detailed error bytes for an error occurrence
Entry data [Error Sidexis]	SidErr: ERR_SOCKET_ERROR	Detail of network error (for Sirona only)
	SockErr:	Detail of network error (for Sirona only)
Entry data [Stringname]	Key Act	Activation transaction
	Key Ok	Activation transaction
Entry data [Stringsegment]	7YFWDUFV-E4MMRJ BW	E.g. activation or confirmation code (for activation transaction)
	061-00133	E.g. counter (ID counter reading)
Entry data [RTC Date / Time Change]	Tried to change to: YYYY-MM-DD, HH:MM:SS	E.g. tried to change to: 2006-Nov-30, 11:32:13
Entry data [PC Date / Time]	YYYY-MM-DD, HH:MM:SS	2006-Nov-30, 11:32:13
Entry data [Error Sidexis]	Automatic version update started, VXX.XX.XX -> VXY.XY.XY	E.g. automatic version update started, V05.07.07 -> V24.51.03
	Software update terminated, result: XXX	E.g. software update terminated, result: ok

## 6.2 Checking the CAN bus

### NOTICE

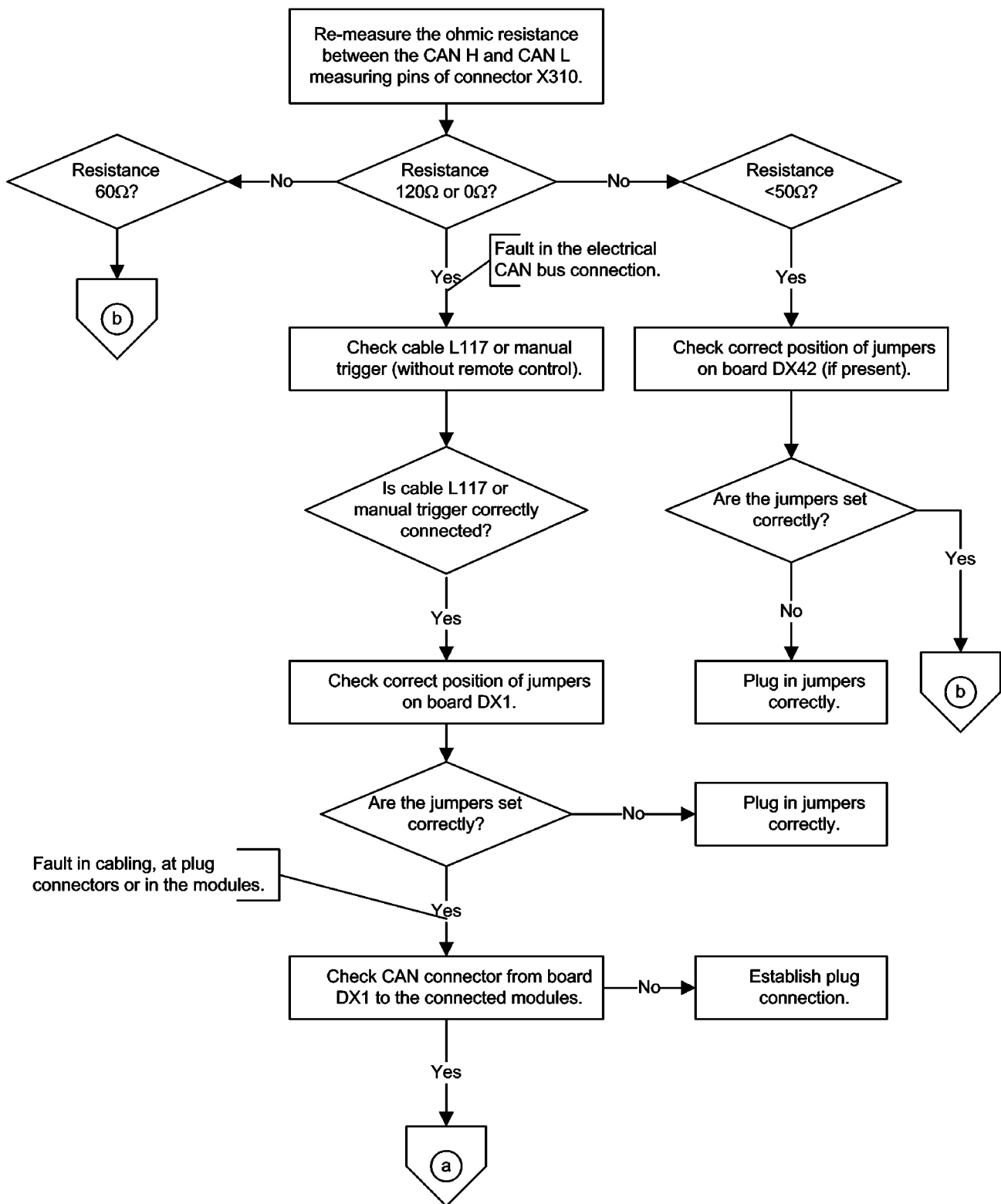
#### Risk of damage to unit

The power supply **MUST** be plugged in and switched on when cables are attached and plugged in. For example, if no power cable is connected to the DX91 ceph, the module has no ground connection to the unit and there is no potential equalization. If the CAN cable is plugged in, the CAN transceiver (IC on the DX91) can be destroyed by the voltage difference. In other words, when the unit is switched on, CAN cables may only be plugged in on modules that are connected to the power source and ground.

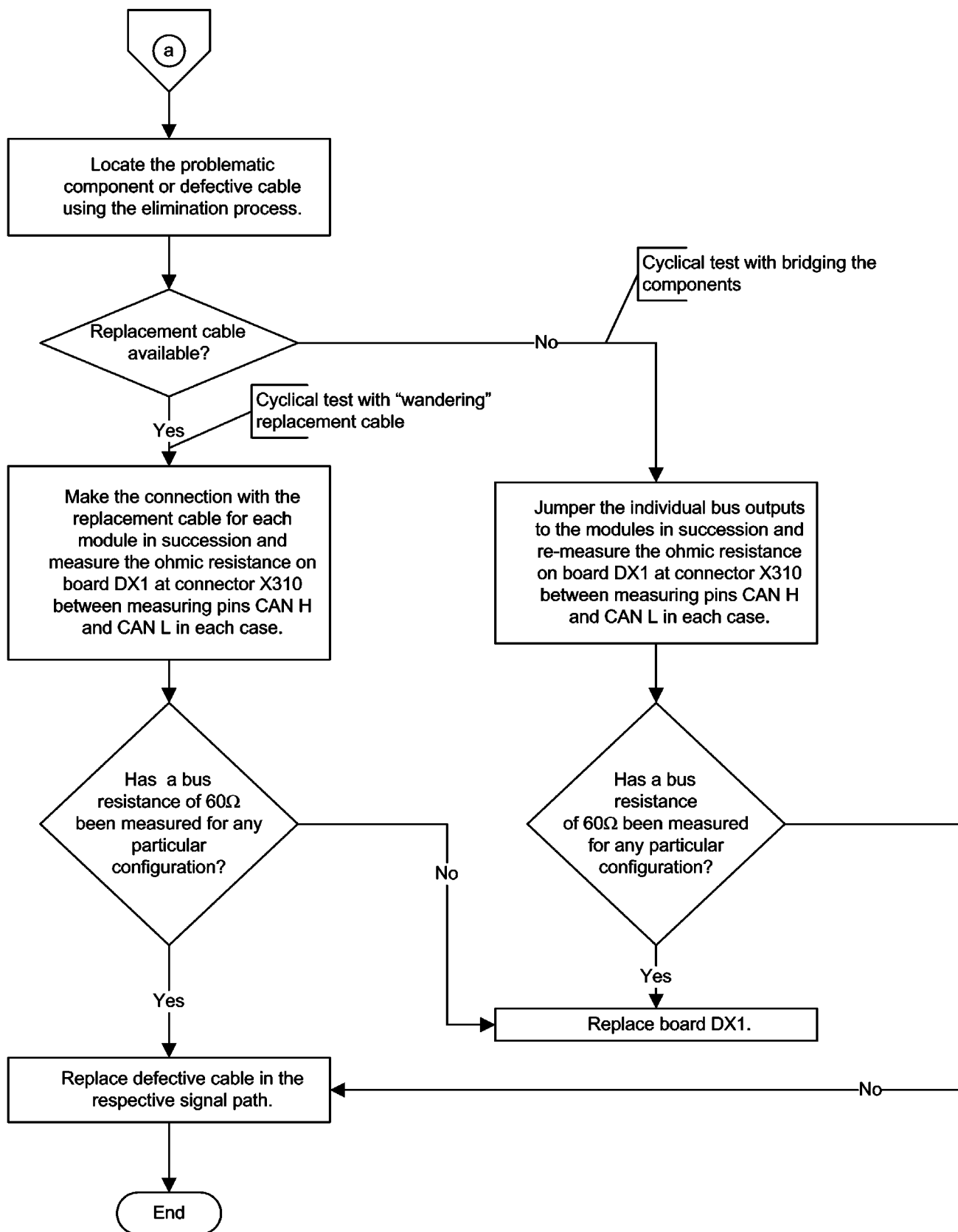
For troubleshooting, you can disconnect the CAN bus cable and/or plug it back in and observe the (unit's) behavior.

To check the fiber-optic cables, a fiber test device, e.g. Fiberpoint®250MD can be used [ → 13].

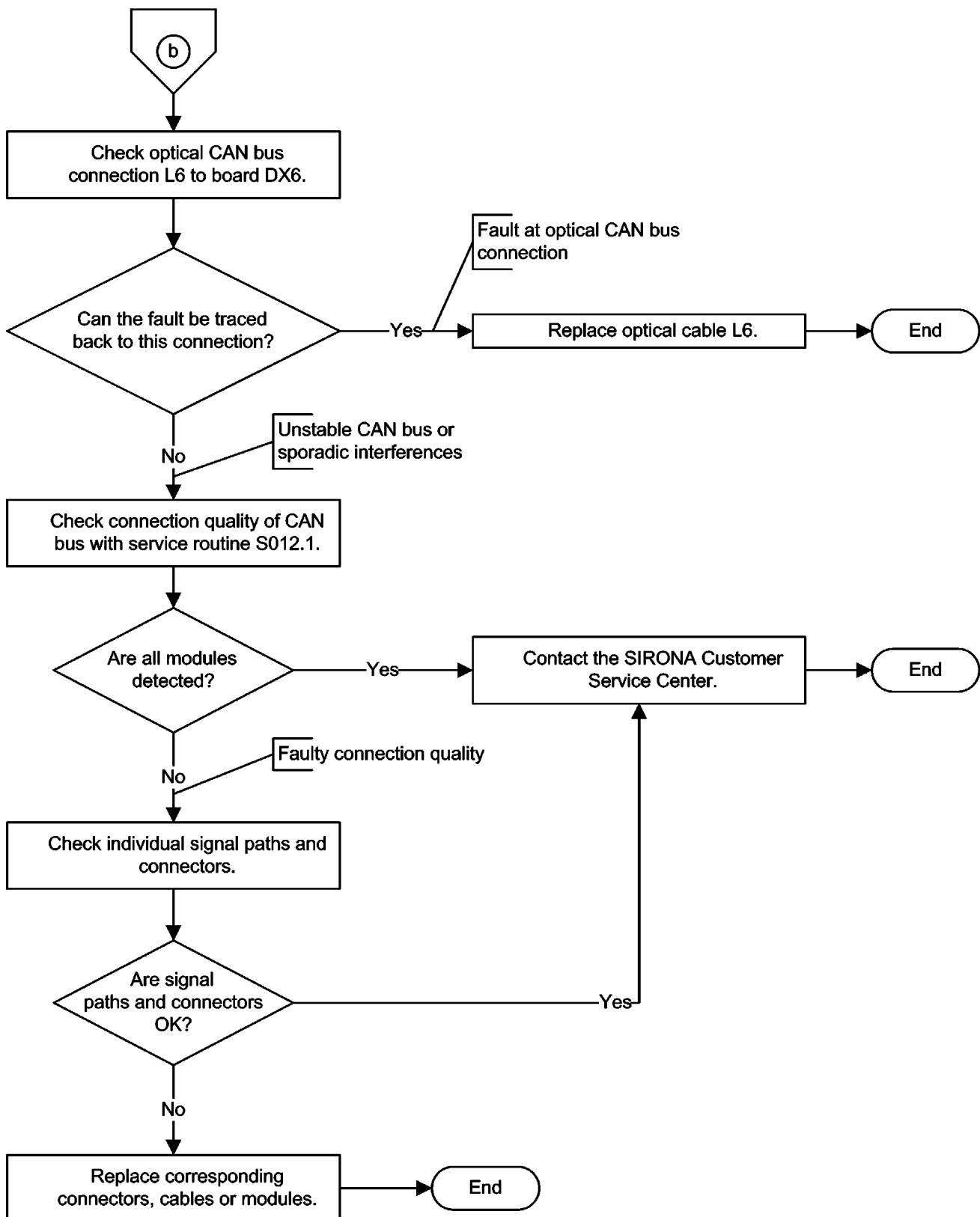














### 6.2.1 Checking the CAN bus with the diagnostic function of board DX1

Board DX1 features a diagnostic function for diagnosing malfunctions of the CAN bus via LEDs V700 and V701 (see wiring diagrams). The following table indicates the operating status of the CAN bus and the recommended error correction measures:

V700	V701	CAN bus operation	Error correction
Slow flashing	Slow flashing	CAN bus OK	Not required
Fast flashing	Off	CAN error, no communication with board DX7, i.e. no display of error messages	<ul style="list-style-type: none"> <li>Check cabling.</li> <li>Check CAN jumper (jumper positions in CAN bus) [ → 145]</li> </ul>
Fast flashing	Fast flashing	CAN error, no physical communication with CAN bus possible; there is probably a short circuit in the CAN cable or on the board of a module.	<ul style="list-style-type: none"> <li>Disconnect CAN cables one after the other (set jumpers to inner position!) until the CAN bus functions again (V700 and V701 flash slowly). Replace faulty module.</li> </ul>
Off	Fast flashing	CAN error, CAN bus TTP (time trigger protocol) disturbed by defective, constantly transmitting board (bus-heavy).	<ul style="list-style-type: none"> <li>Disconnect CAN cables one after the other (set jumpers to inner position!) until the CAN bus functions again (V700 and V701 flash slowly). Replace faulty module.</li> </ul>
Off	Off	System did not power up (DX11)	Switch unit off and on again and wait until end of power-on time.

### 6.2.2 Jumper positions in the CAN bus

The jumpers are on board DX1 of the following sockets (see also wiring diagrams (REF 64 95 233):

- X302 (DX7, control panel)
- X306 (DX61, diaphragm)
- X309 (DX91, cephalometer)
- X500 (DCS sensor)
- X503 (CEPH sensor)

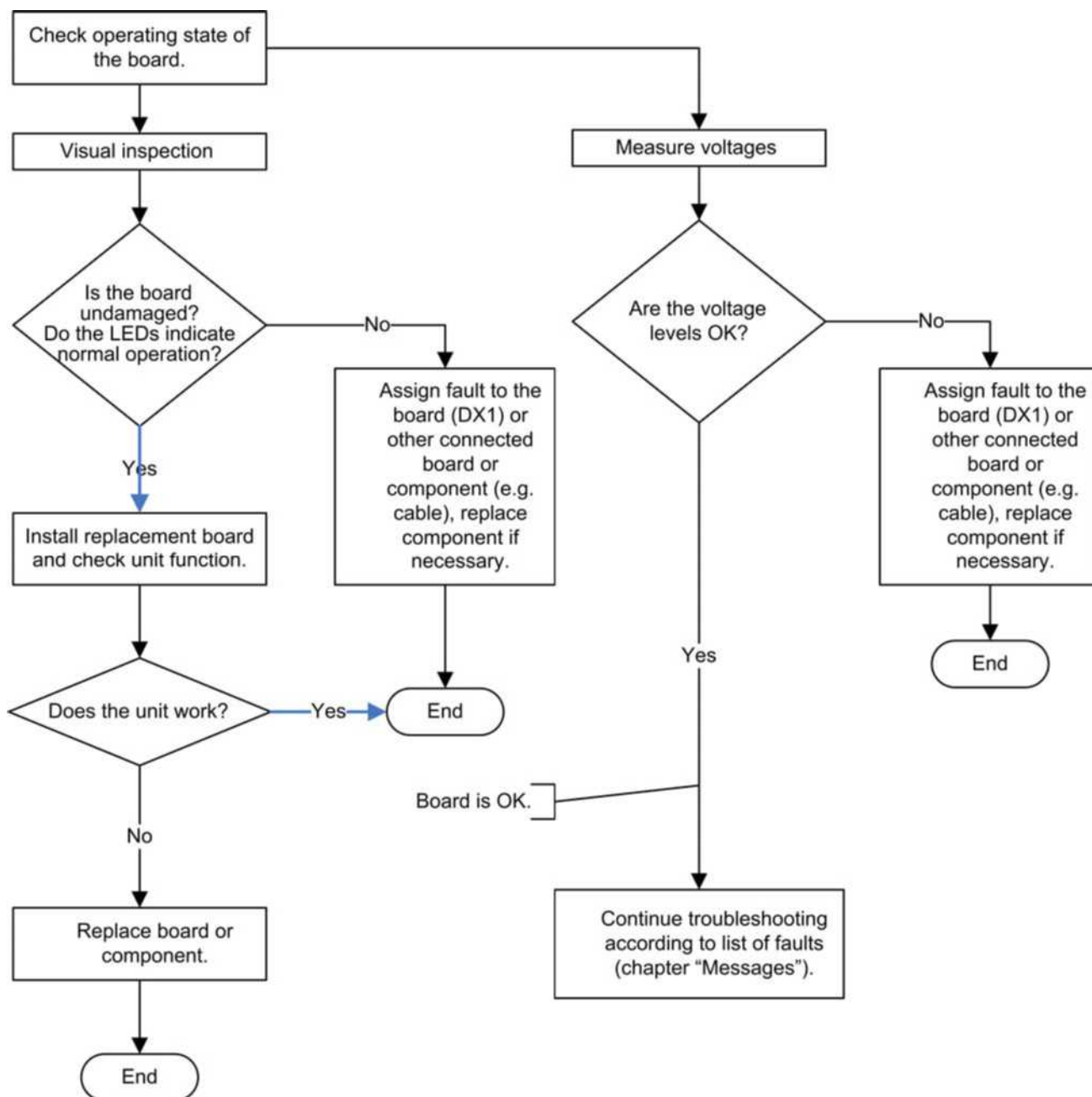
**If a cable is plugged into the socket, the corresponding jumpers must be set to the outer position.**

**If no cable is plugged in, the the jumpers must be set to the inner position.**

If a jumper is set to the inner position without a cable plugged in, the CAN bus is interrupted at this location. Modules located behind this location can no longer be connected to the CAN bus and, therefore, do not function.



## 6.3 Checking the boards





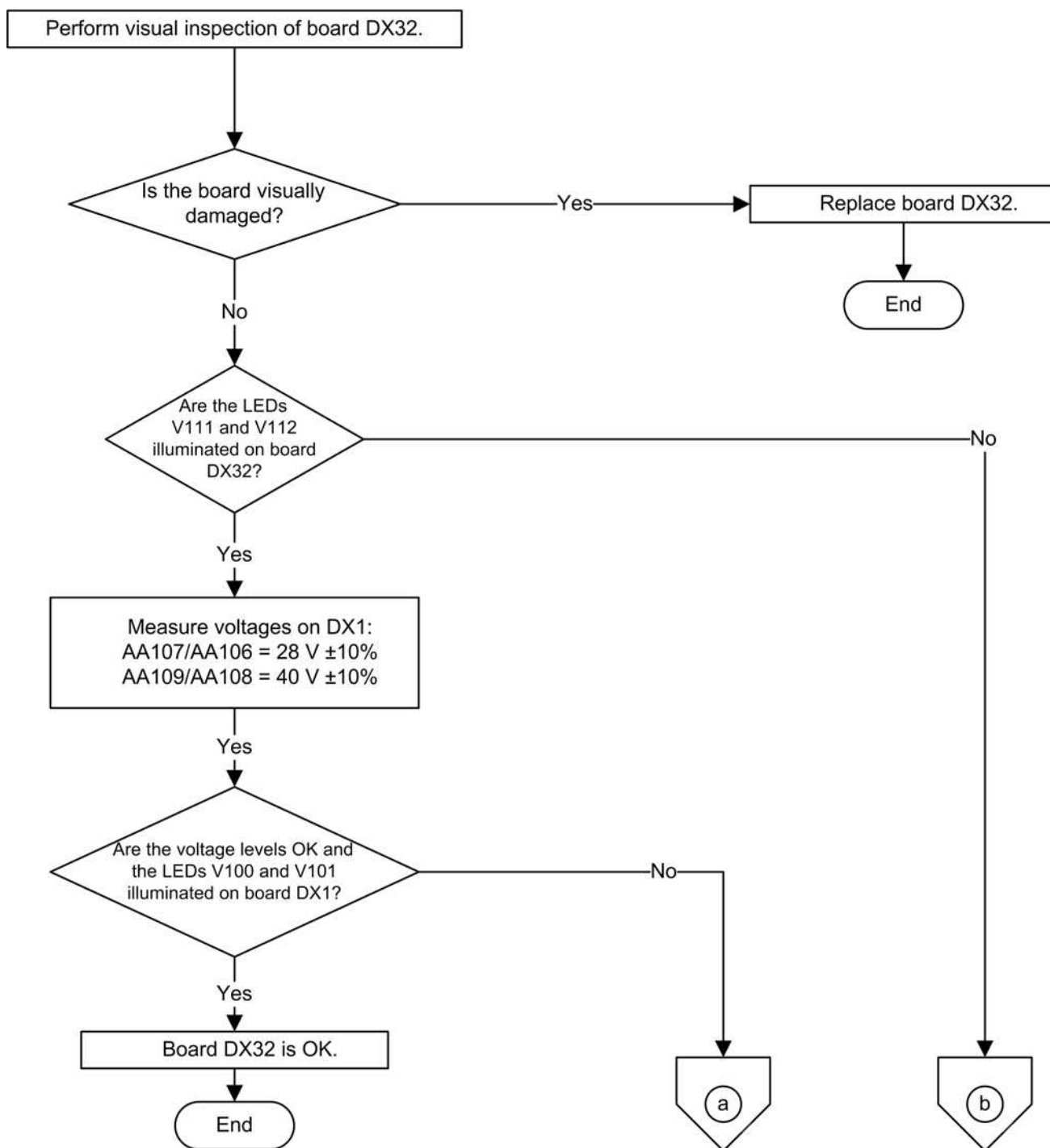
## Important LEDs on the boards

(see also wiring diagrams)

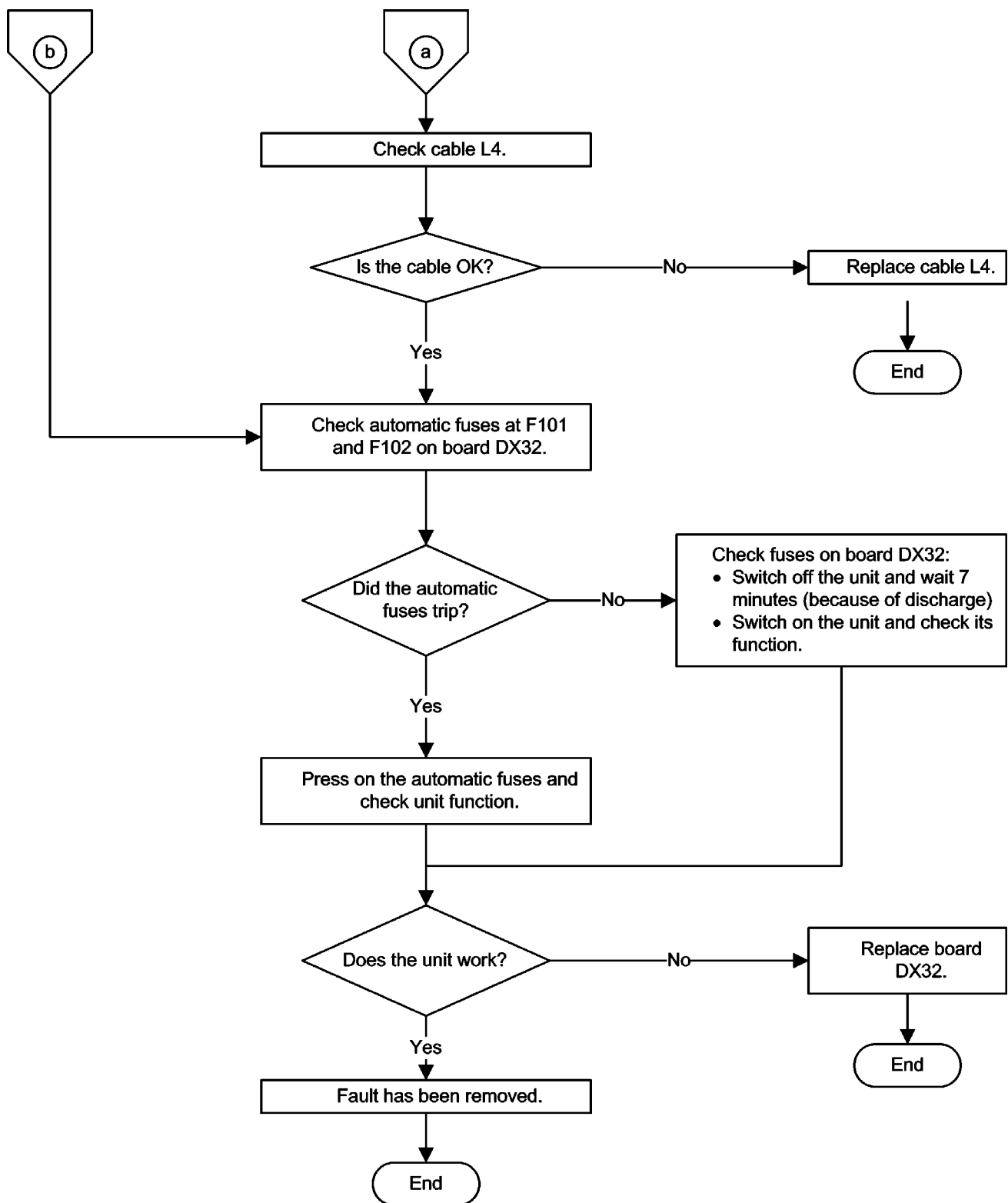
Board	LEDs	Normal mode	Malfunction	Bootloader
DX1 64 90 960	V200	flashing at 1 Hz	lit / not lit	flashing quickly
	V610	lit	not lit	
	V700	flashing at 1 Hz	lit / not lit / flashing quickly	
	V701	flashing at 1 Hz	lit / not lit / flashing quickly	
	V1301	lit	not lit	
	V1303	lit	not lit	
	V1316	lit	not lit	
	V1317	lit	not lit	
	V1323	lit	not lit	
	V1324	lit	not lit	
DX6 (X-ray tube assembly 2.0)	V200	flashing at 1 Hz	not lit	flashing at 2 Hz
	V500	lit	not lit	
DX61	V101	flashing at 1 Hz	not lit	flashing at 2 Hz
	V501	lit	not lit	
DX7	V100	lit	not lit	
	V101	lit	not lit	
	V102	lit	not lit	
DX32	V111	lit	not lit	
	V112	lit	not lit	
DX42	V101	lit	not lit	
	V103	lit	not lit	
DX91	V102	flashing at 1 Hz	not lit	flashing at 2 Hz
	V501	lit	not lit	



### 6.3.1 Checking board DX32

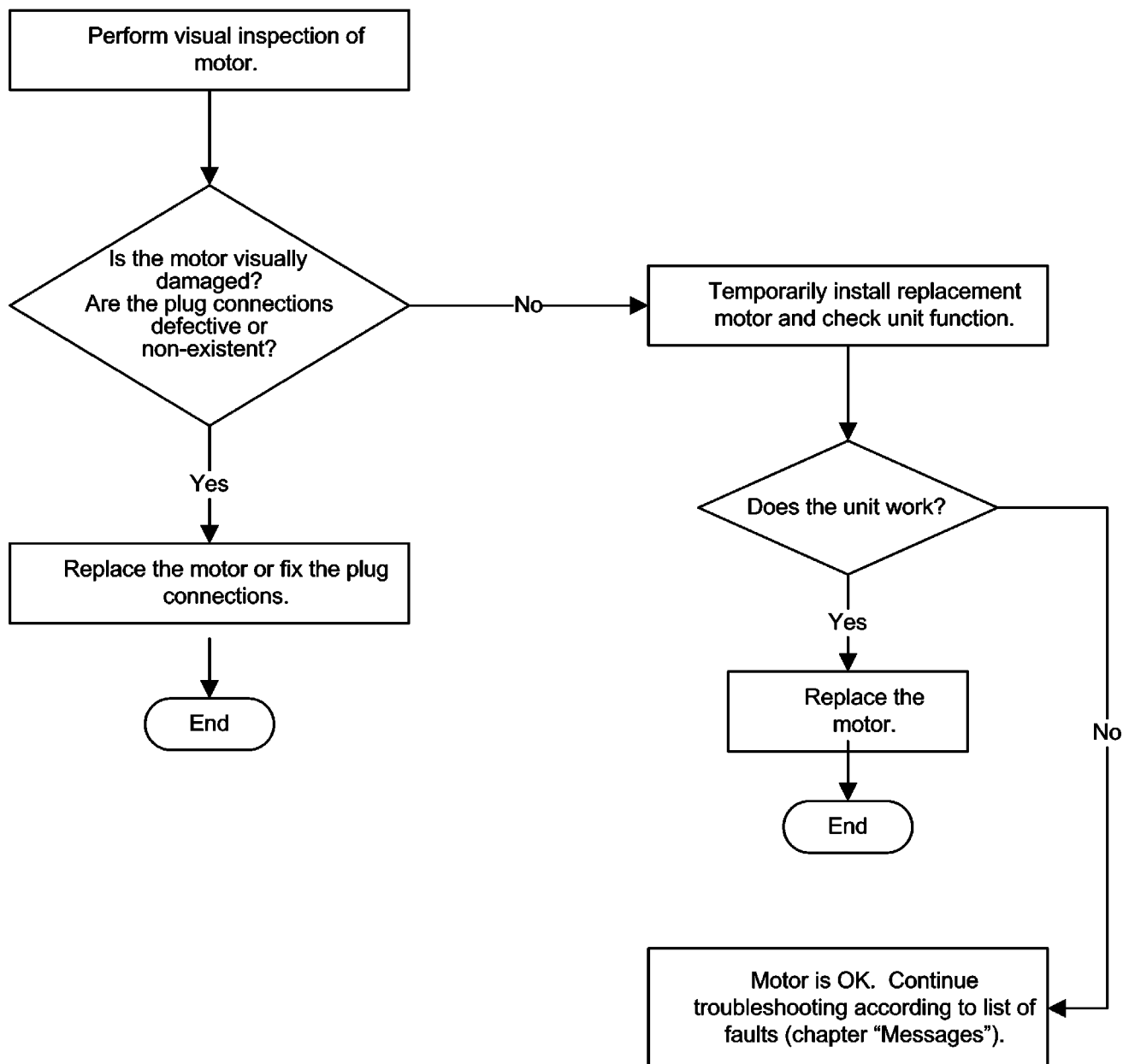






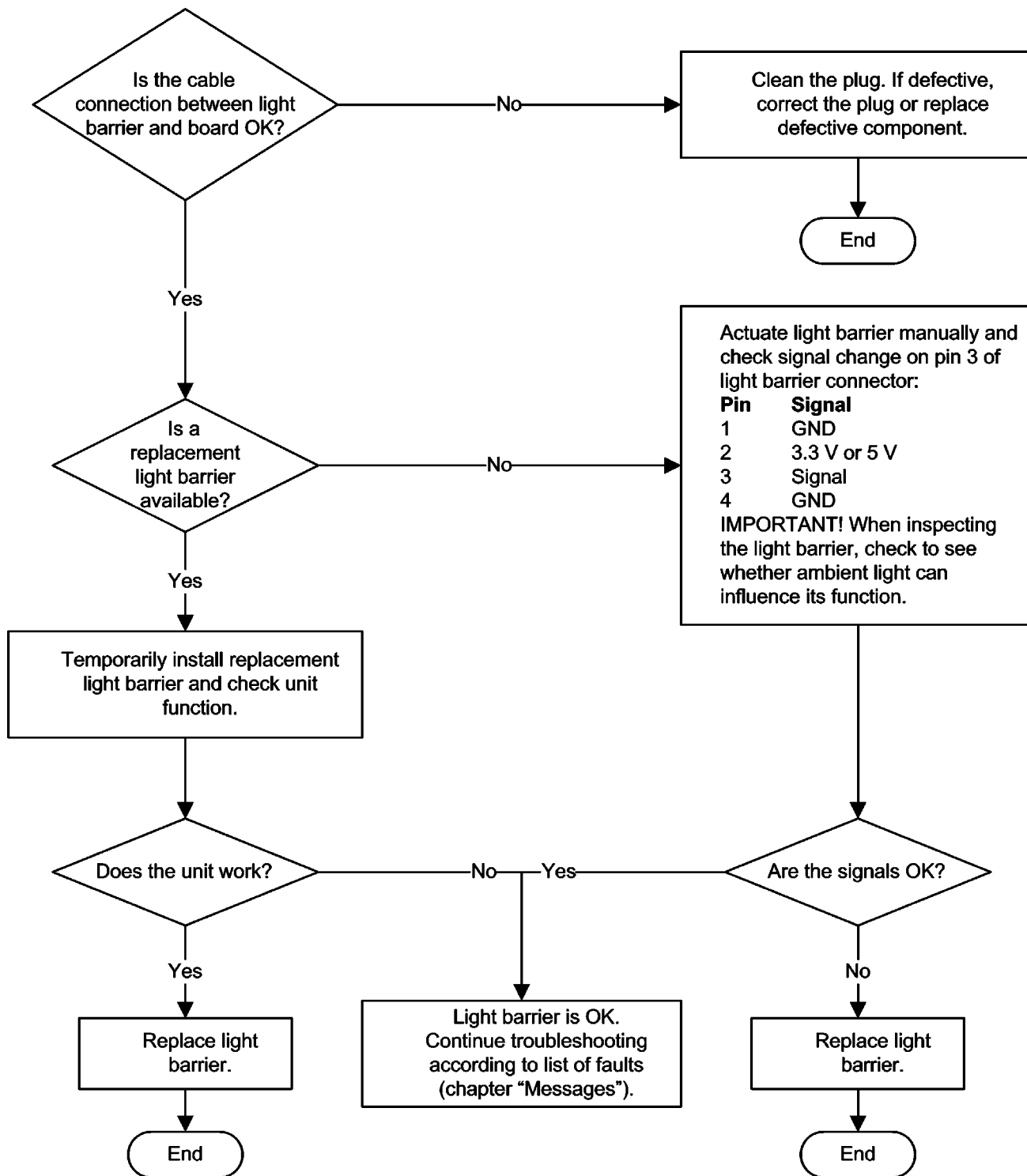


## 6.4 Checking the motors



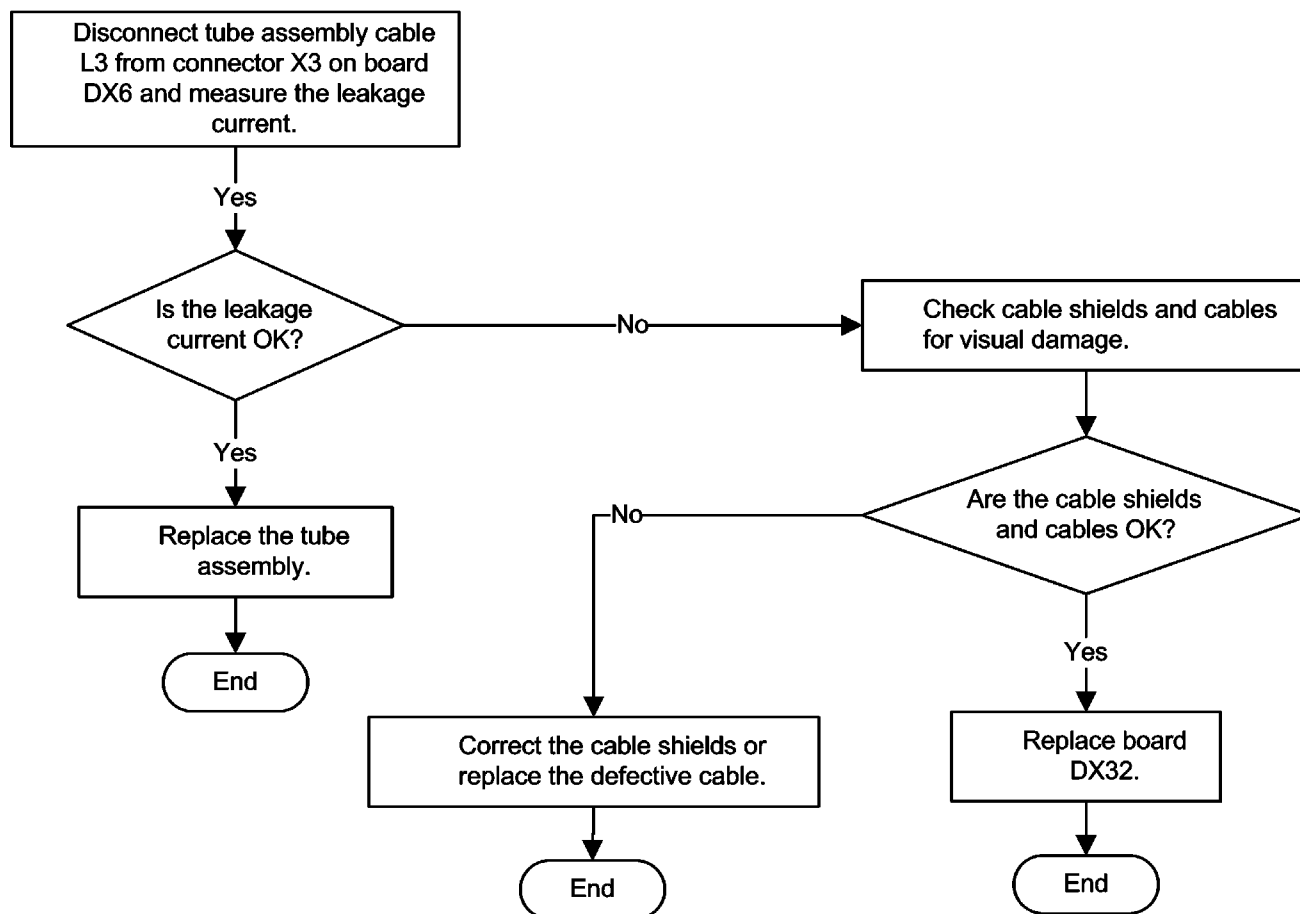


## 6.5 Checking the light barriers





## 6.6 Device leakage current too high



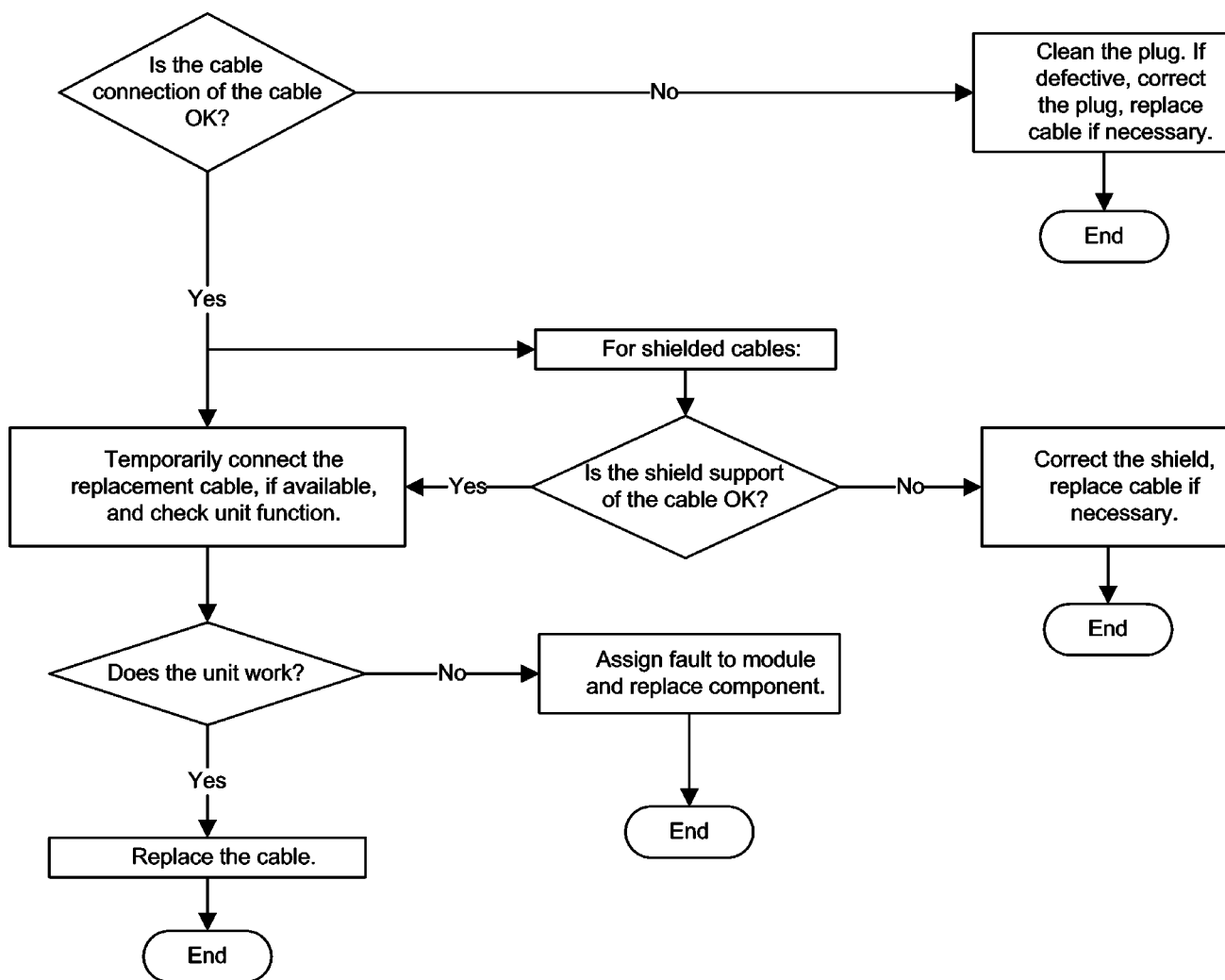


## 6.7 Checking the cables

### NOTICE

You can use a standard Cat5 cable as a test cable for L10, L12, L40 and L37. This cable must not be permanently installed.

**IMPORTANT:** Most cables have the same plug at both ends and are connected 1:1.

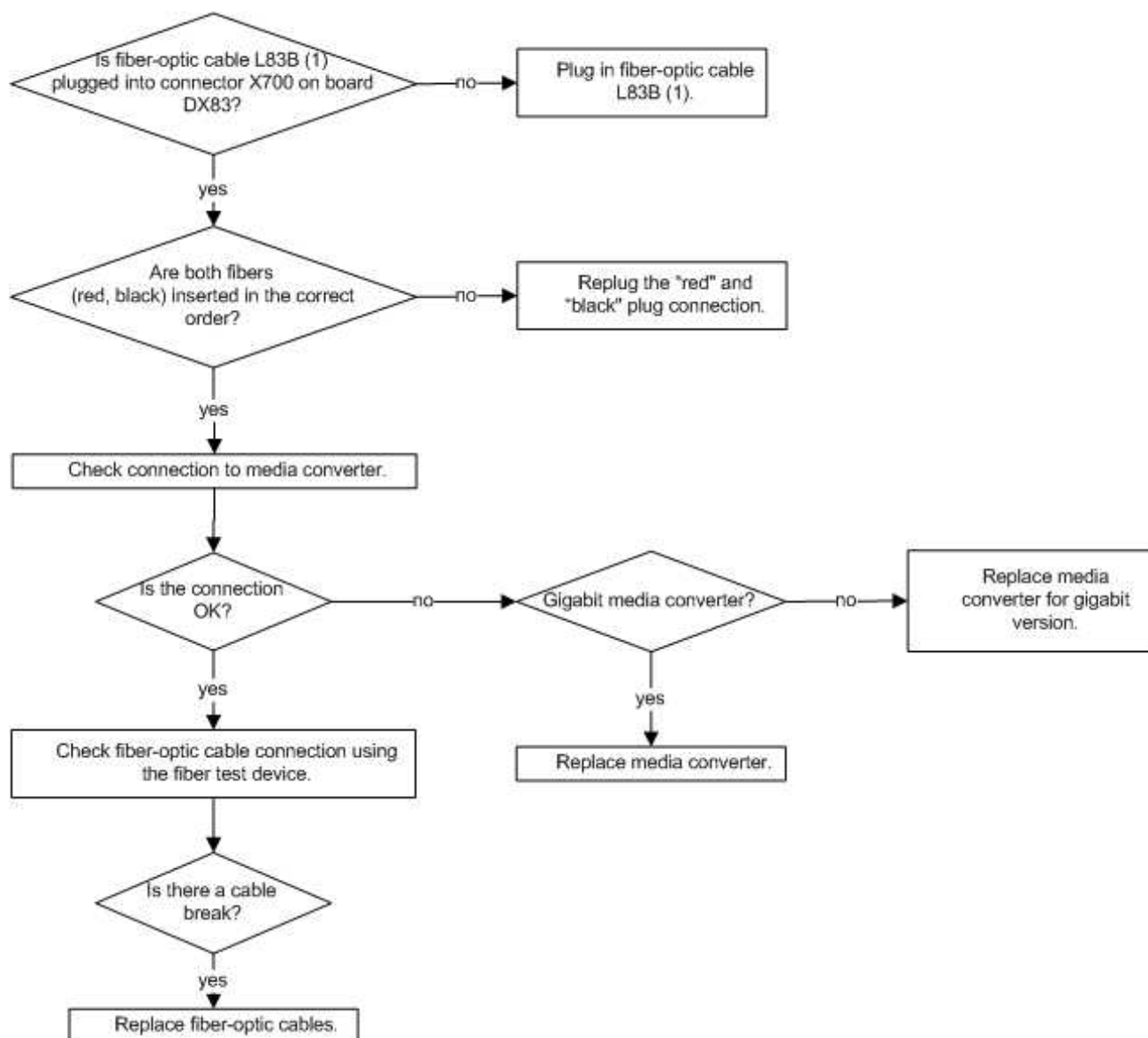




## 6.8 Checking fiber-optic cables

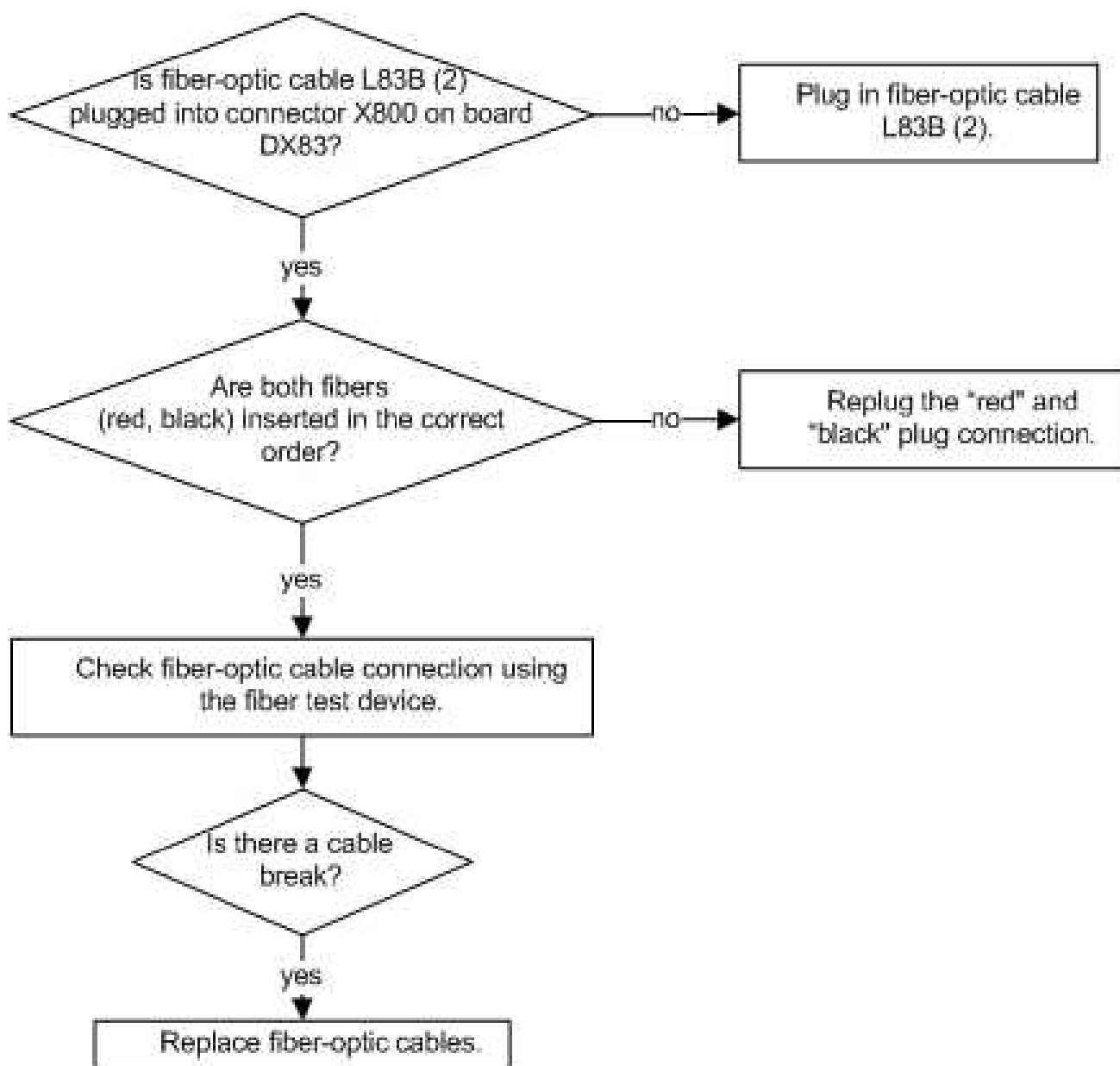
A fiber test device, e.g. Fiberpoint®250MD is required [ → 13] to test the fiber-optic cables.

**Checking fiber-optic cables L83B (1) between board DX83 (X700) and media converters**





Checking fiber-optic cables L83B (2) between board DX83 (X800)  
and board DX1 (J901)

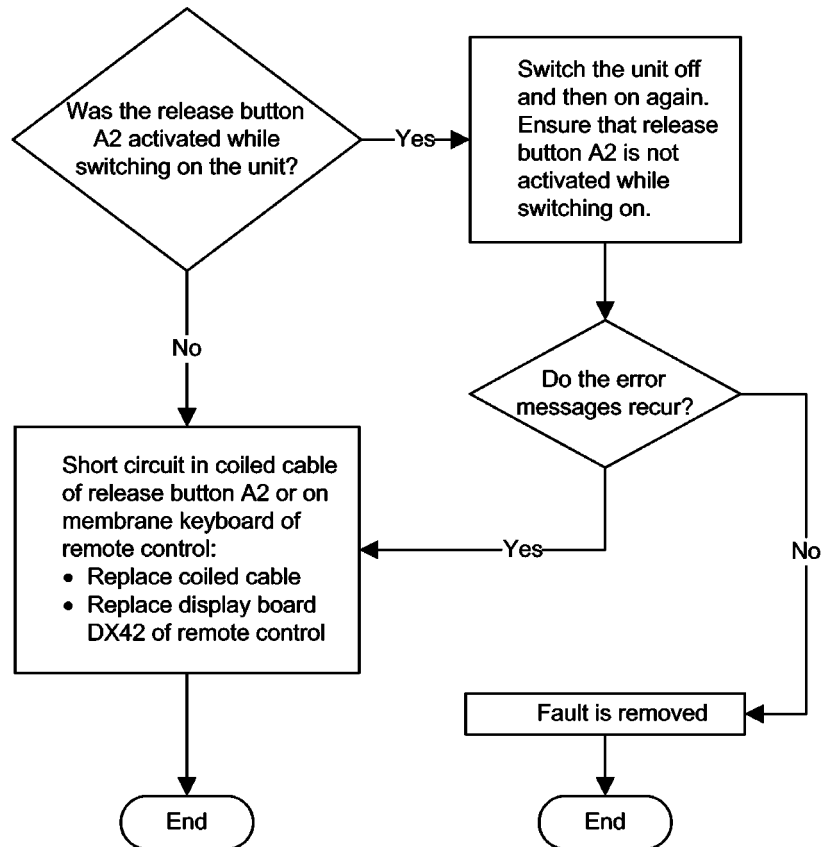




## 6.9 Error analysis of X-RAY control signal path

Error and help messages *with remote control installed*

E3 42 31 + E3 13 40 occur in combination after the unit is switched on with the door contact closed:



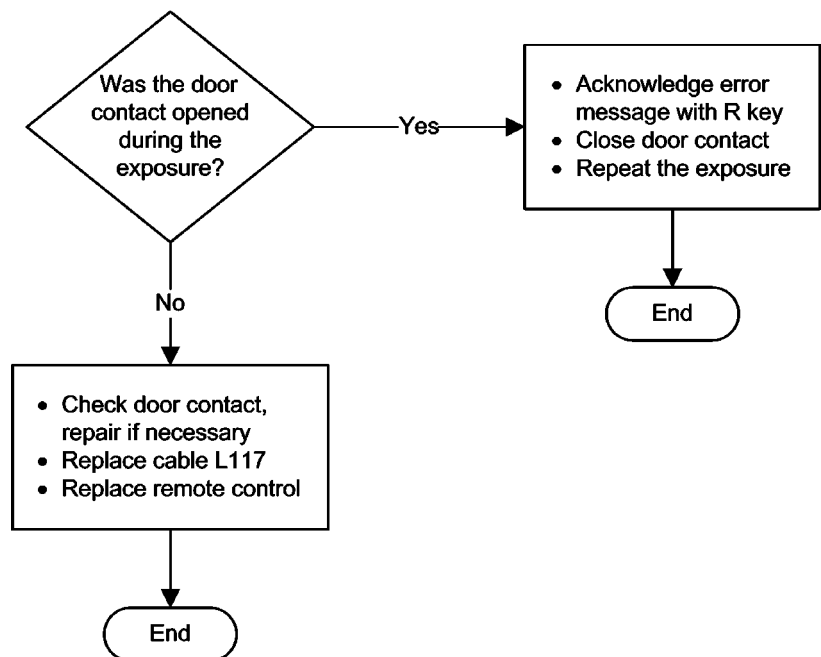
E3 42 31 occurs once after the unit is switched on:

Hardware fault on display board DX42 or short circuit in coiled cable of release button A2 or on membrane keyboard of remote control:

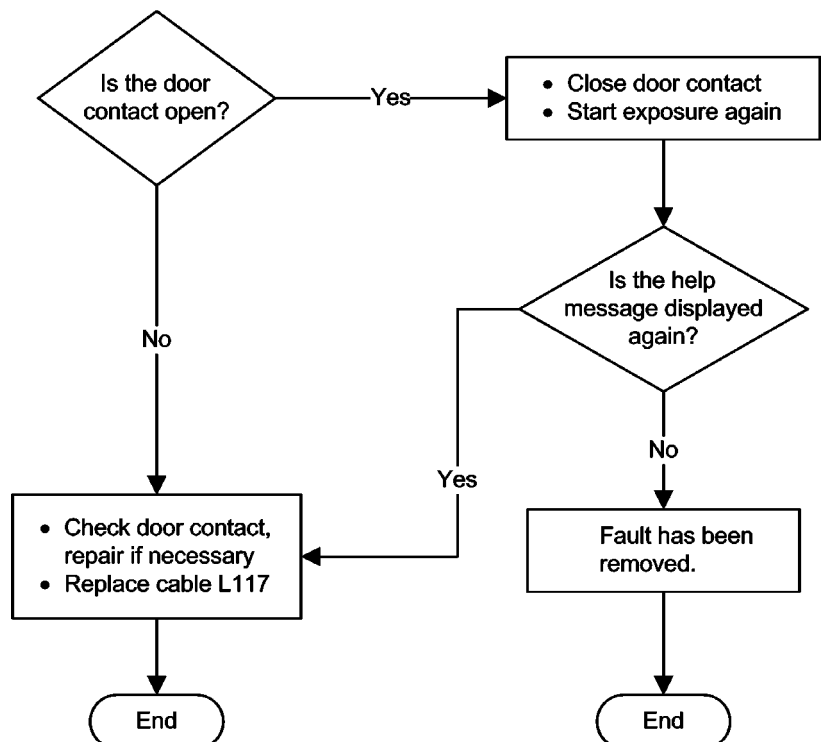
- Replace release button A2
- Replace remote control



E6 13 43 occurs once during operation of the unit:



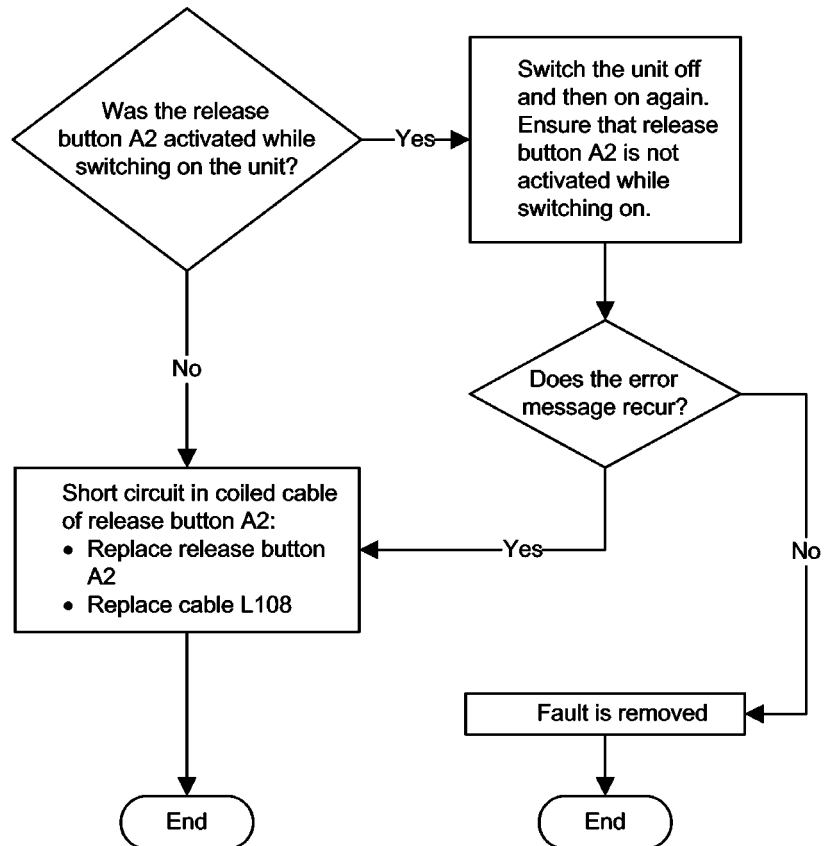
H321 is triggered at start of exposure:





**Error messages *without installed remote control***

E3 13 40 occurs after the unit is switched on:



**Error messages *with and without installed remote control***

Error code	Description	Actions required	see
E3 13 40	Short circuit in signal path between board DX11 and release button A2 during power-on.	<ul style="list-style-type: none"> <li>• Replace cable L117 or L108.</li> <li>• Replace board DX1.</li> <li>• Replace board DX11.</li> </ul>	S. [ → 404], S. [ → 396]
E6 13 41	Release signal missing on board DX11 at start of exposure.	<ul style="list-style-type: none"> <li>• Replace cable L117 or L108.</li> <li>• Replace board DX1.</li> <li>• Replace board DX11.</li> </ul>	S. [ → 404], S. [ → 396]
E3 13 42	Short circuit in signal path between board DX11 and release button A2 during operation of the unit.	<ul style="list-style-type: none"> <li>• Replace cable L117 or L108.</li> <li>• Replace board DX1.</li> <li>• Replace board DX11.</li> </ul>	S. [ → 404], S. [ → 396]



## 6.10 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) (see chapter “S032: Sensor test [→ 304]”).



## 7 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.

### NOTICE

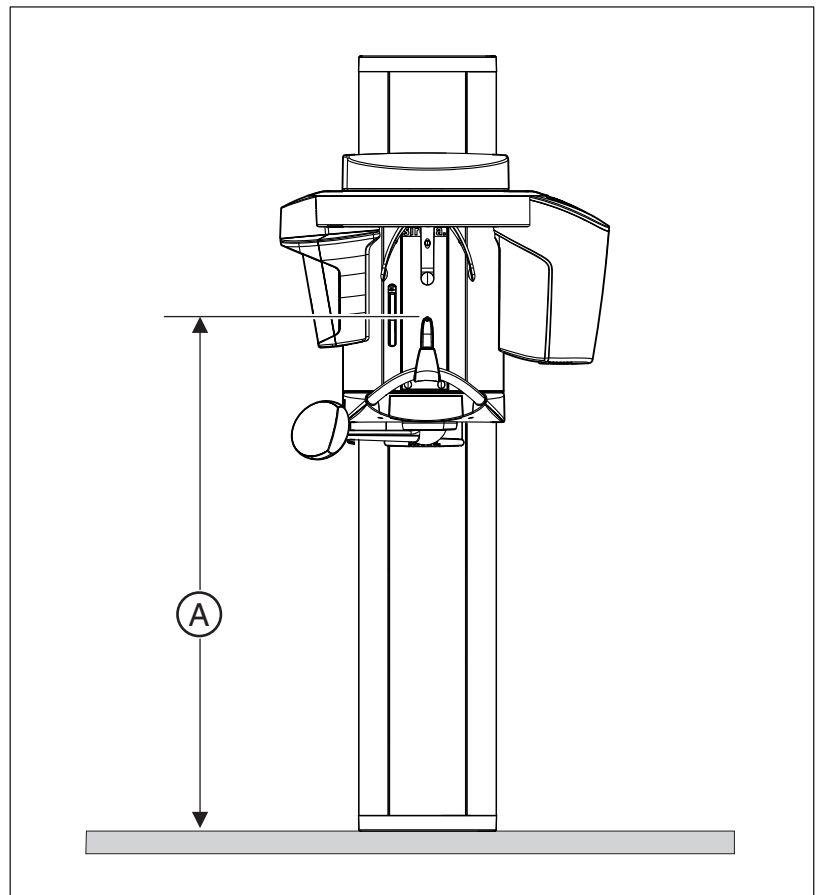
#### unnoticed image quality fault

Incorrect diagnosis / treatment

- 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.







## 7.1 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.



### 7.1.1 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".

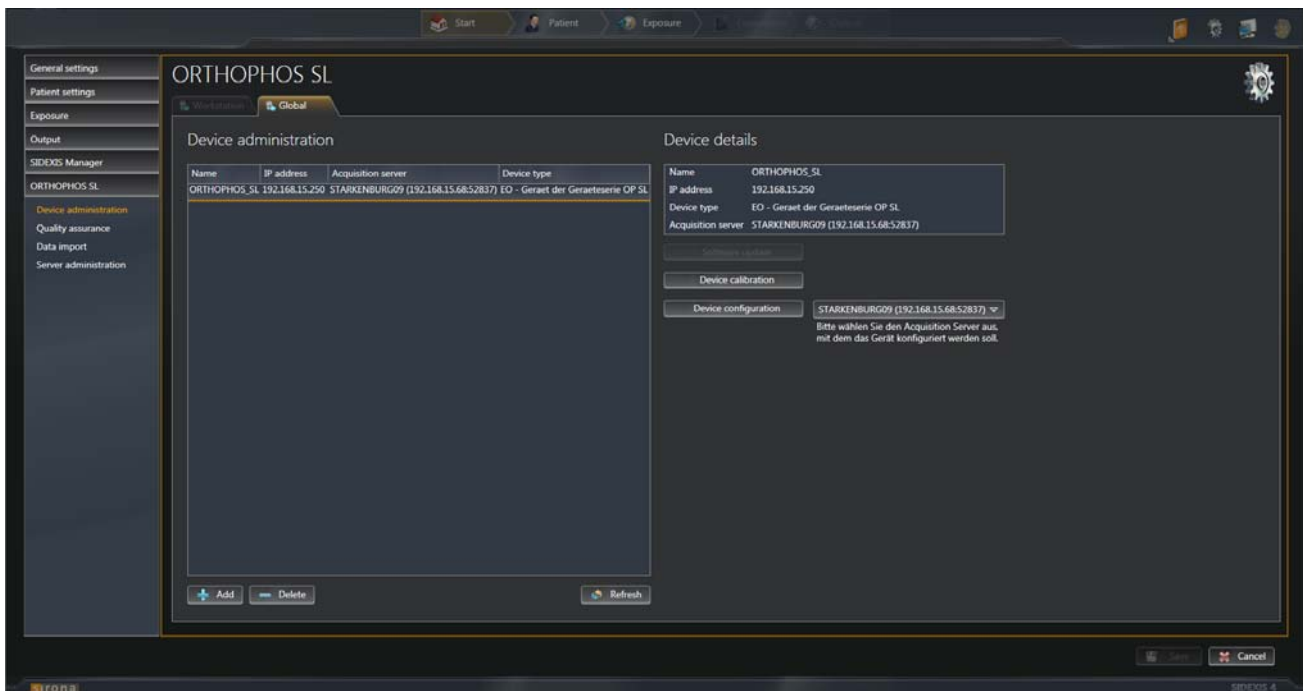


## 7.1.2 Calibration menu

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

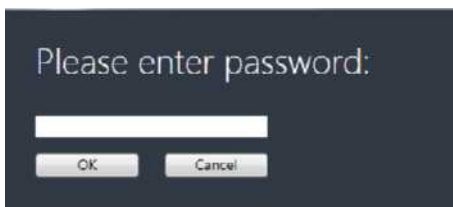
### 7.1.2.1 Opening the calibration menu

- ✓ 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.

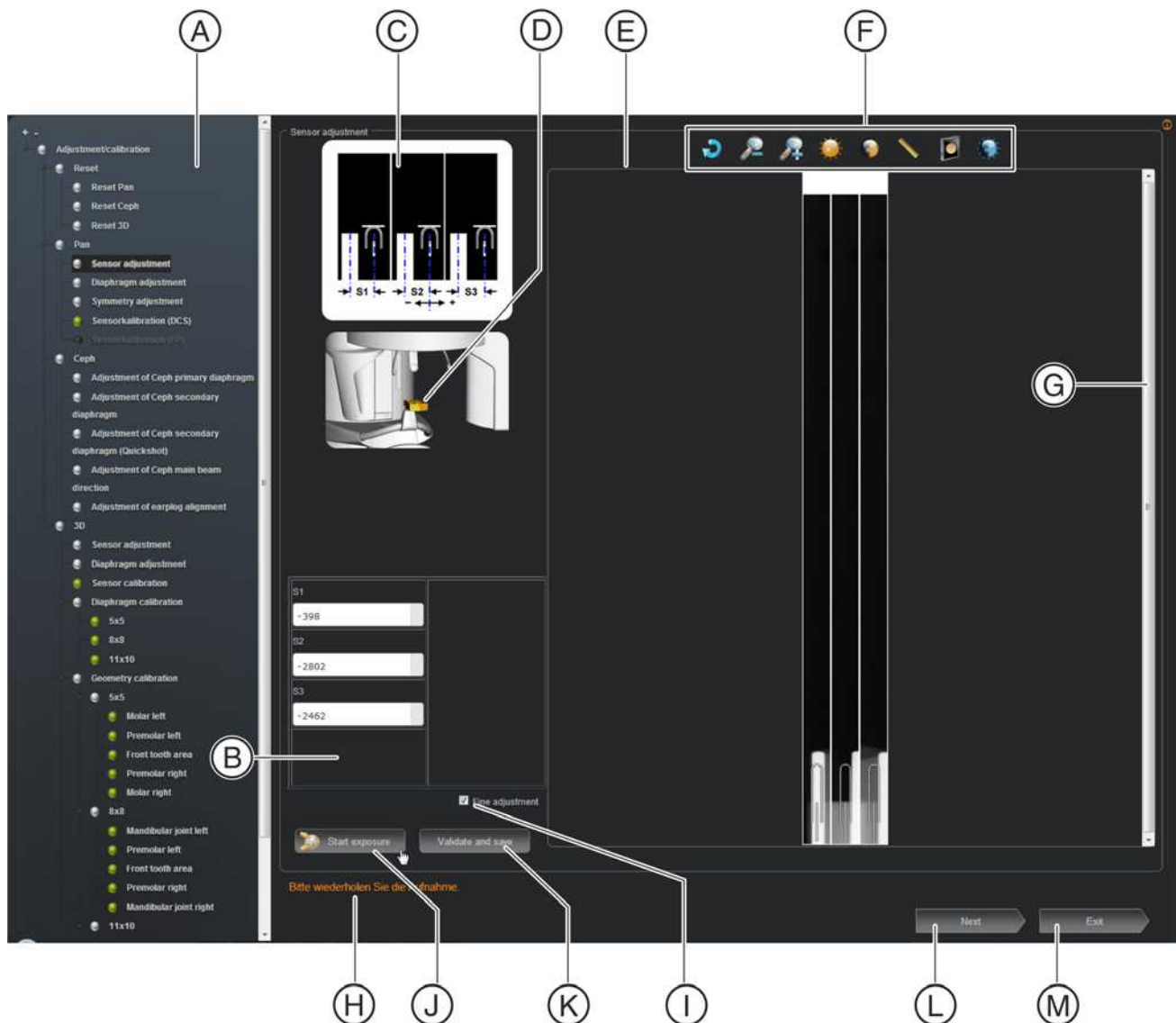
Service mode is displayed on the Easypad via the PC service image.





## 7.1.2.2 Menu structure

The menu is divided into different functional areas.



A	Navigation area	Structure tree for adjustment and calibration [ → 169]
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









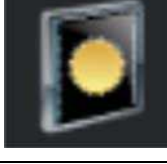
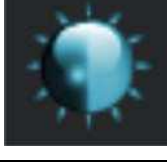
G	Scroll bar	Scrolls within the exposure window
H	Message window	Shows messages and information about this stage of the adjustment/calibration procedure

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

I	<i>"Fine adjustment"</i>	Before the fine adjustment, and with the check box unchecked, a coarse adjustment is performed [ → 170].
J	<i>"Start acquisition"</i>	Creates exposure readiness [ → 175].
G	<i>"Validate and save"</i>	Saves the current adjustment/calibration values.
H	<i>"Next"</i>	Switches to the next stage of the adjustment/calibration procedure.
I	<i>"Exit"</i>	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)



#### 7.1.2.2.1 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 [ → 162]".

##### 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

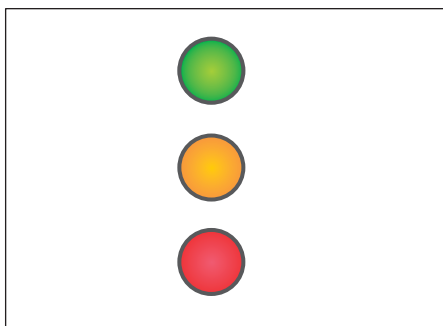
The elements of the structure tree used for adjusting (calibrating) the unit are prefixed by status indicators indicating the current status of the corresponding adjustment or calibration operation.

#### 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

#### 7.1.2.2.2 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.

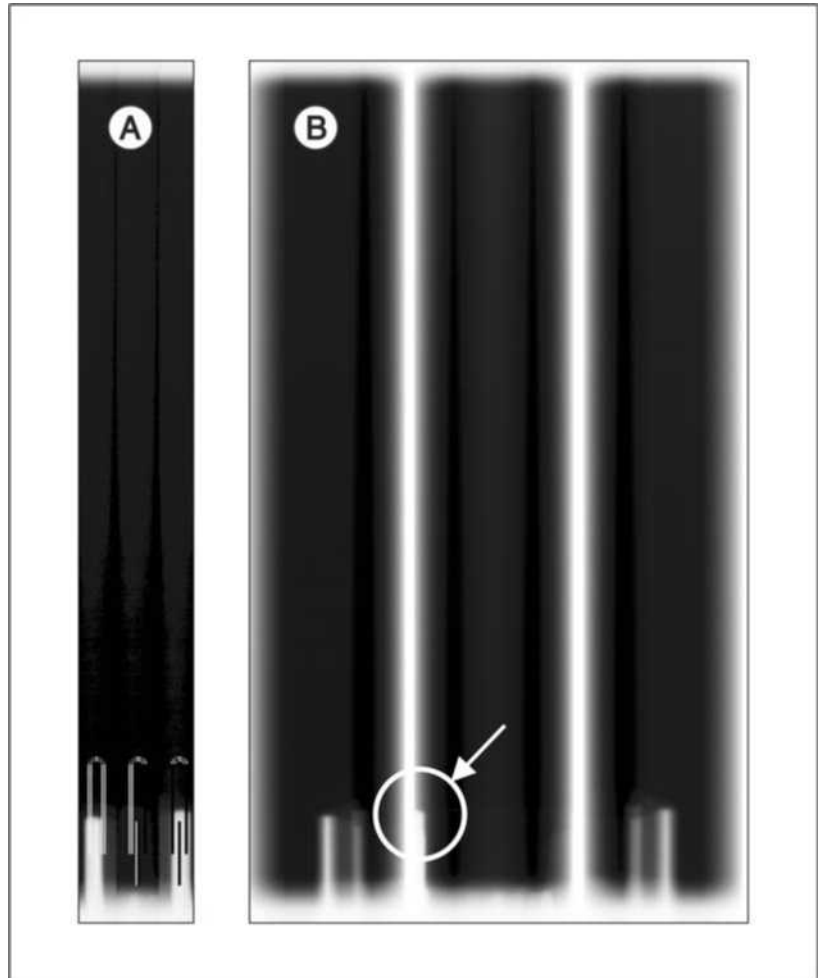
The correction procedure required for coarse adjustment is identical to that for precision adjustment. The only difference between the two modes is the size of the image field considered. Furthermore, there are fewer auxiliary lines in the coarse adjustment mode.



### 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).

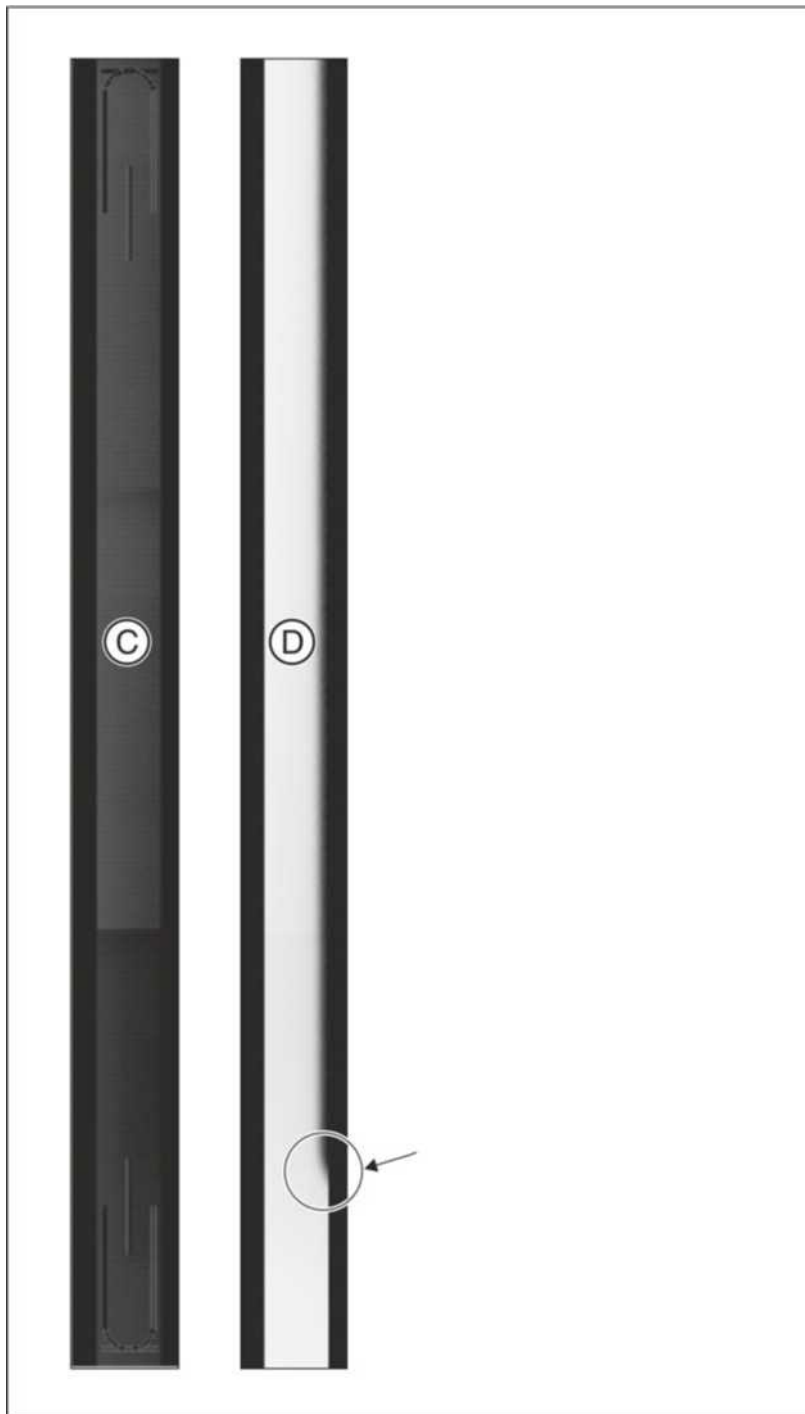


On the exposure with coarse adjustment (B), the center pin is just barely visible on the left margin of the image section in the middle. Even in this extreme case, an adjustment would still be possible.



***"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).

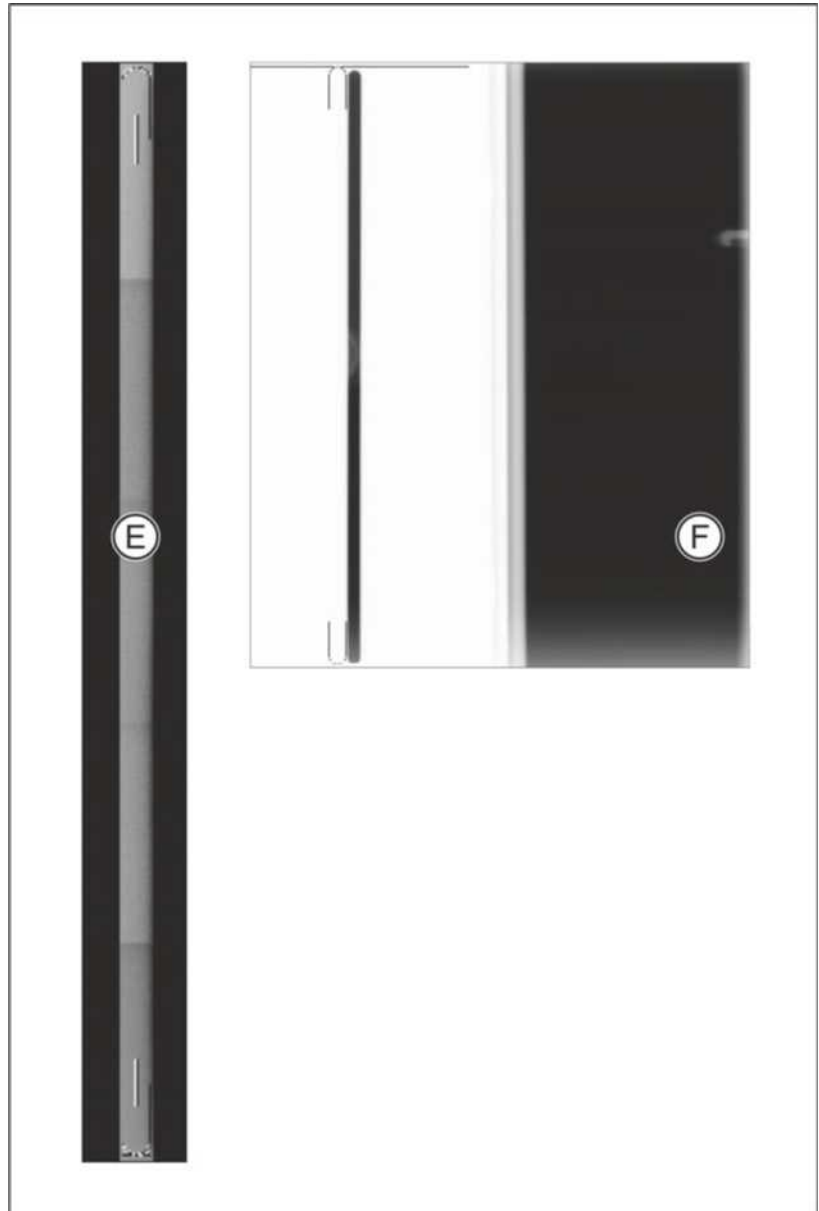


On the exposure with coarse adjustment (D), the exposed area is just barely visible at the right margin of the image field. Even in this extreme case, an adjustment would still be possible.



***"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).



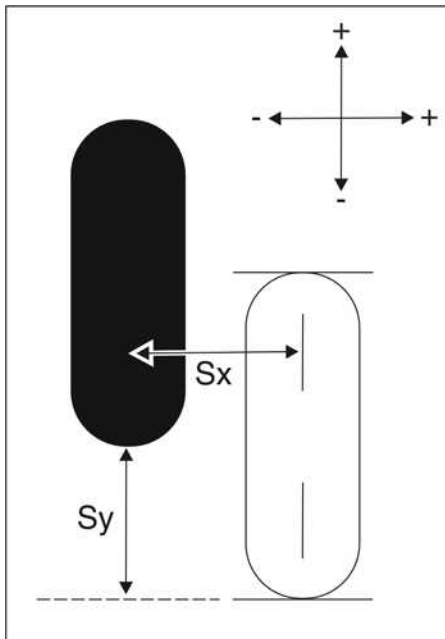
On the exposure with coarse adjustment (F), the exposed area is still visible in the image field. Even in this extreme case, an adjustment would still be possible.



#### 7.1.2.2.3 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**.

#### 7.1.2.2.4 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

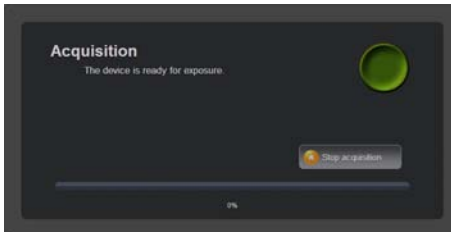
During the automatic 3D adjustment via the calibration menu, whether the adjustment was successful or must be repeated again is displayed in the message window in plain text.



### 7.1.3 Enabling exposure readiness

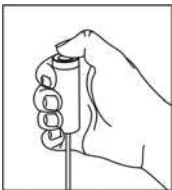
To take an exposure, the system must first be made ready for exposure.

- ✓ The calibration menu must be opened [ → 164].
- ✓ 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.



### 7.1.4 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 [ → 175].
- 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 [ → 287]).



### 7.1.5 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).



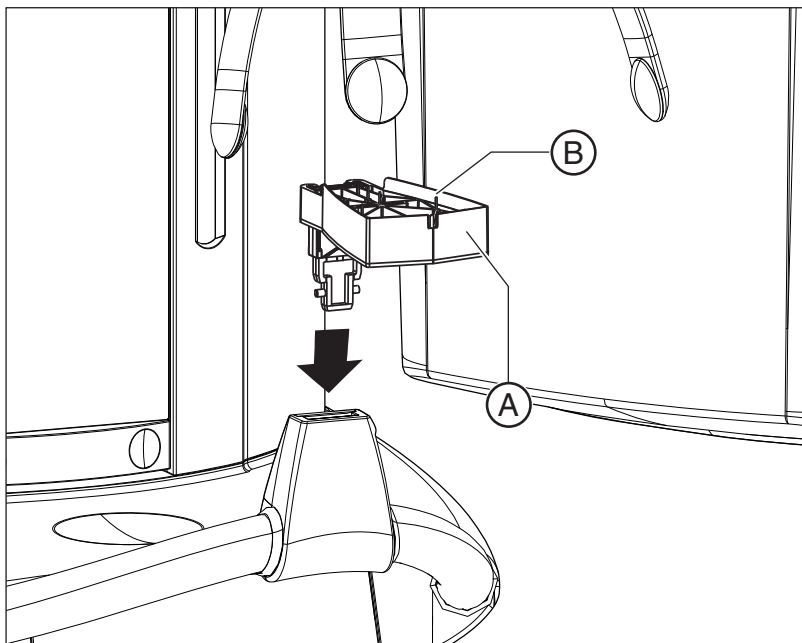
## 7.1.6 Test phantom for adjustment and calibration

### 7.1.6.1 Needle phantom for panoramic adjustment

#### NOTICE

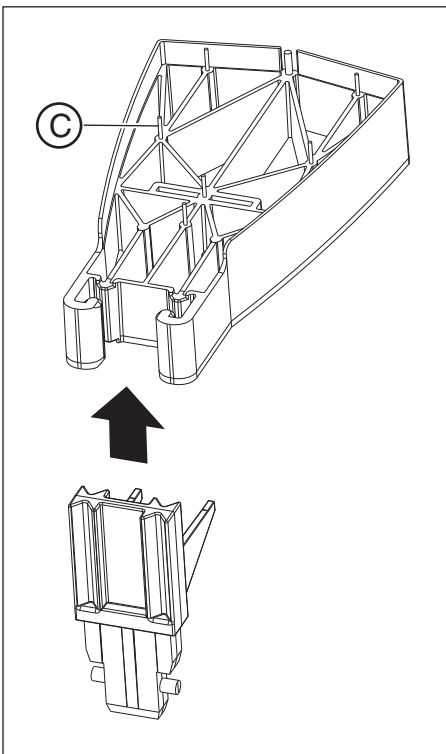
##### Risk of damage to unit

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.

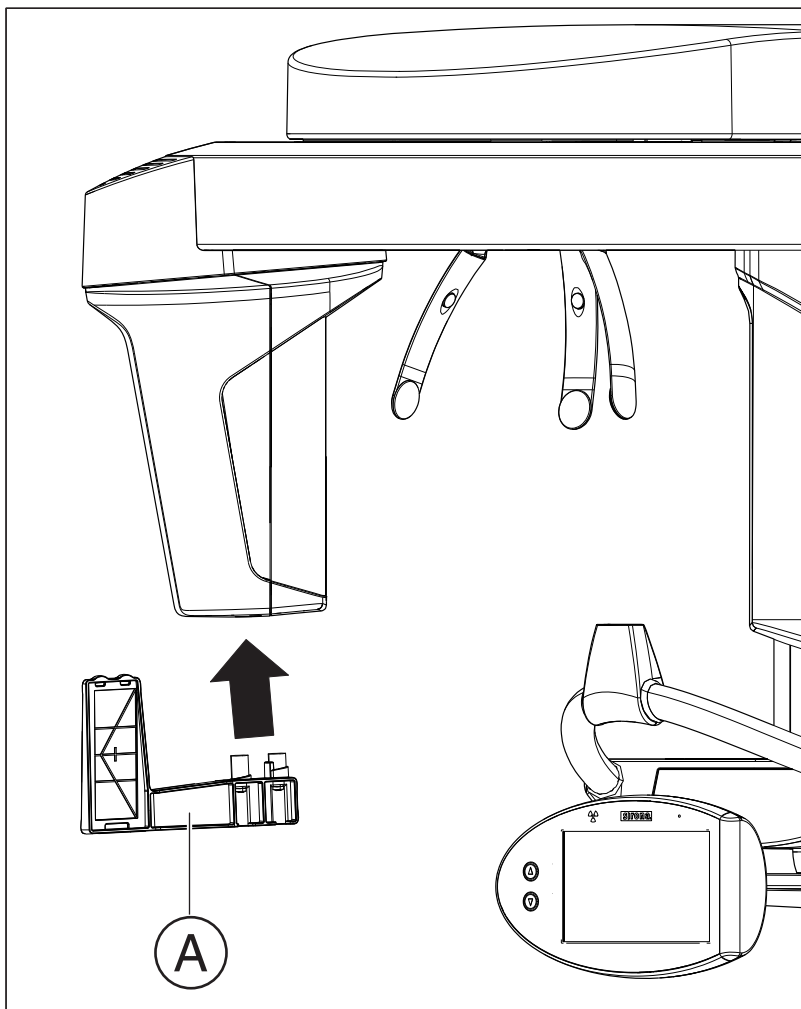




When fitting the needle phantom, make sure that it is correctly oriented. For the panorama adjustment of the unit, the phantom must be fitted so that the needles (C) point upward.



### 7.1.6.2 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.

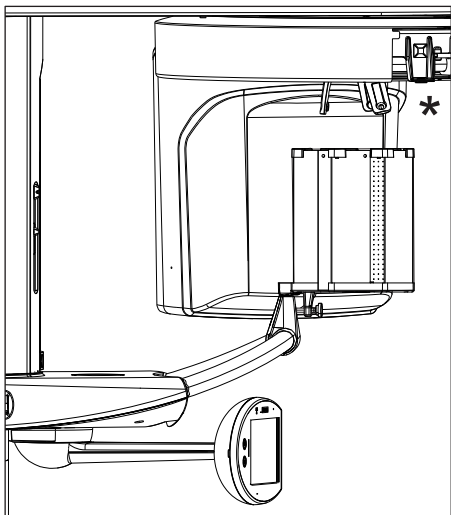


### 7.1.6.3 Geometry phantom for volume calibration

#### NOTICE

##### Risk of damage to unit

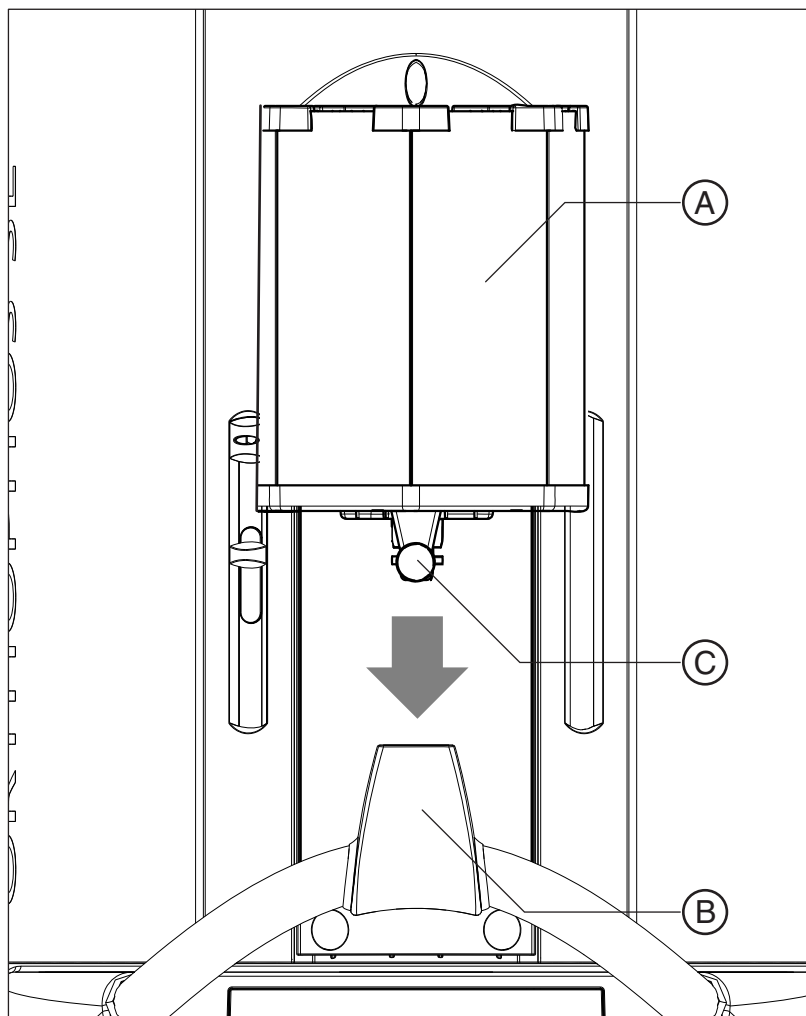
Make absolutely sure that the geometry phantom is inserted in the bite block holder of the unit in such a way that the body of the phantom and the screw (C) point *away from the unit in the direction of the patient* (see figure). Otherwise, this can result in a collision between the sensor unit and the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

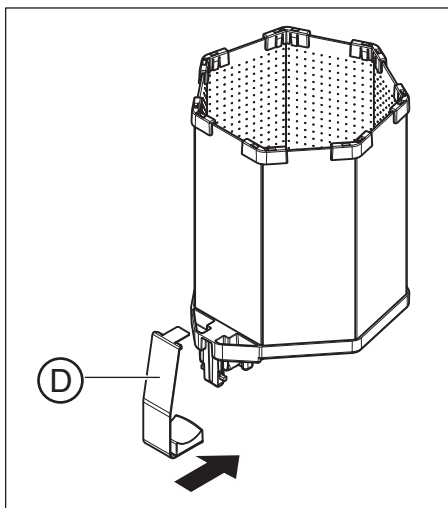




**NOTICE**

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.





## 7.2 Adjustment and calibration via the calibration menu

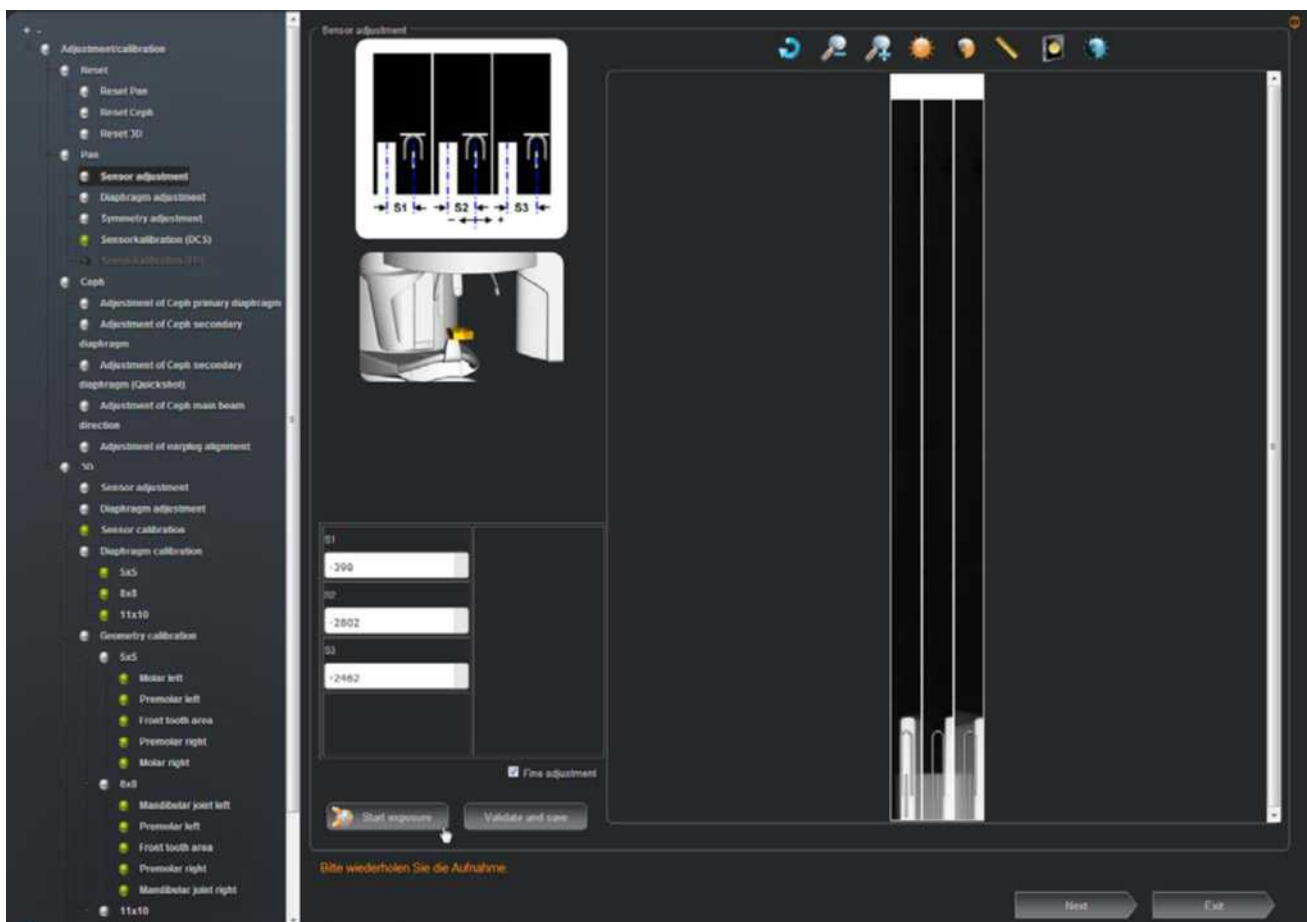
Only for Germany

### 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).

### 7.2.1 2D adjustment/calibration

#### 7.2.1.1 Pan sensor adjustment



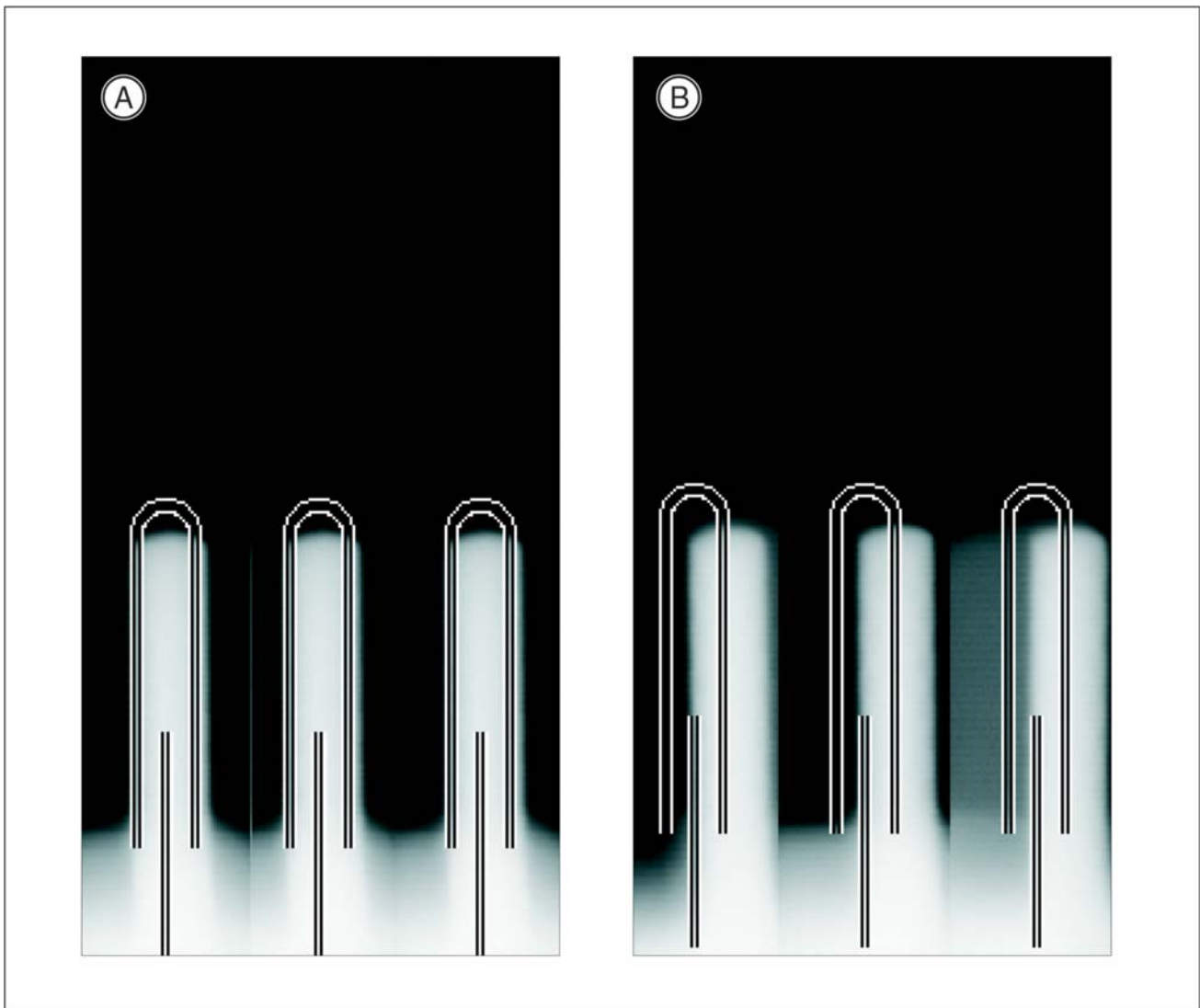


**7.2.1.1.1 Automatic adjustment: Panoramic sensor (standard)**

- ✓ The needle phantom is in the bite block holder on the unit [ → 176].
- 1. Open the calibration menu [ → 164].
- 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. [ → 170]
- 3. Establish receptivity [ → 175].
- 4. Create an exposure (60 kV / 3 mA; 0.7 s). [ → 175]
  - ✎ 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.

S1	-1226
S2	-1784
S3	465





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

- 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 [ → 185].



The image shows a vertical stack of three sensor adjustment fields. Each field consists of a label (S1, S2, S3) on the left and a text input box on the right. The input boxes are white with a light gray border and a small gray arrow on the right side. The value '0' is entered in each box. Below the third field is a solid black rectangular area.

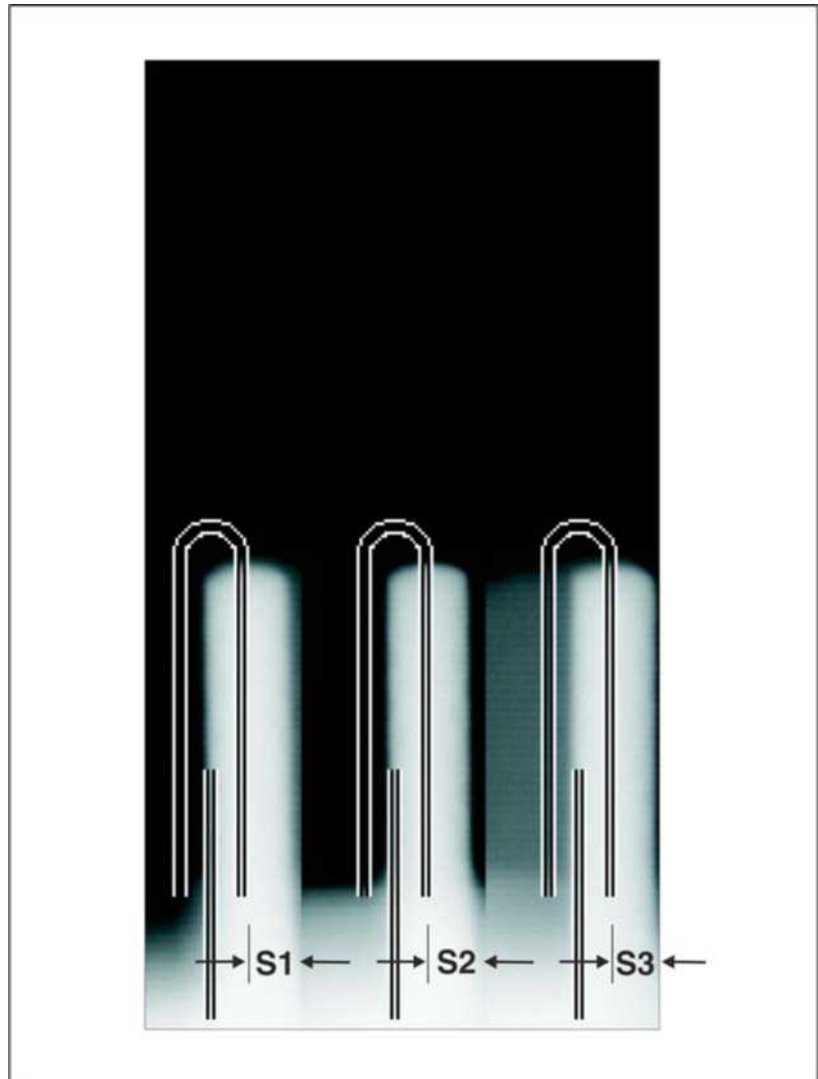
Sensor	Value
S1	0
S2	0
S3	0

6. If adjustment is OK (the adjustment values in the text boxes are equal to zero), save the values. [ → 175]
  - ✎ 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. [ → 187]



#### 7.2.1.1.2 Manual adjustment: Panoramic sensor

1. Start the adjustment procedure as described in the chapter entitled "Automatic adjustment: Panoramic sensor (standard) [ → 182]".



2. After taking the exposure, measure the distances **S1**, **S2** and **S3** with the toolbar measuring ruler [ → 166].  
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 [ → 166] the exposure using the toolbar functions.





The screenshot shows a vertical menu with three input fields. The first field is labeled 'S1' and contains the value '-1226'. The second field is labeled 'S2' and contains the value '-1784'. The third field is labeled 'S3' and contains the value '465'. Below these fields is a large empty rectangular area.

Label	Value
S1	-1226
S2	-1784
S3	465

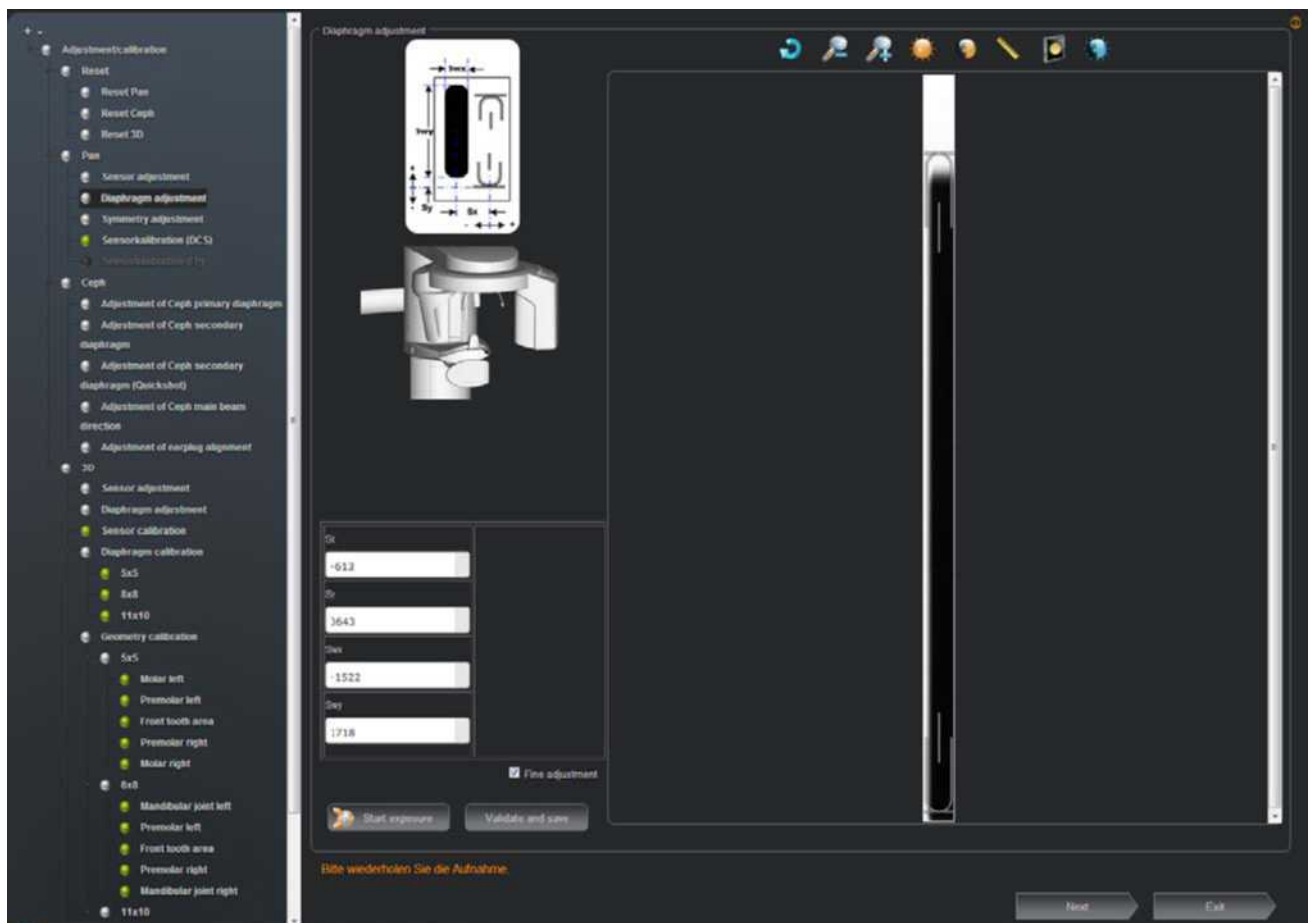
3. Overwrite the adjustment values for **S1**, **S2** and **S3** in the text boxes of the *"Sensor adjustment"* menu with the measured values. For information about the shifting direction (input of +/- sign in the menu), see the chapter entitled "Shifting direction of the exposed image area [→ 174]".

**NOTICE! Use points as decimal separators!**

4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Panoramic sensor (standard) [→ 182]".



### 7.2.1.2 Pan aperture adjustment





## 7.2.1.2.1 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 [→ 203] and repeat after the exposure.

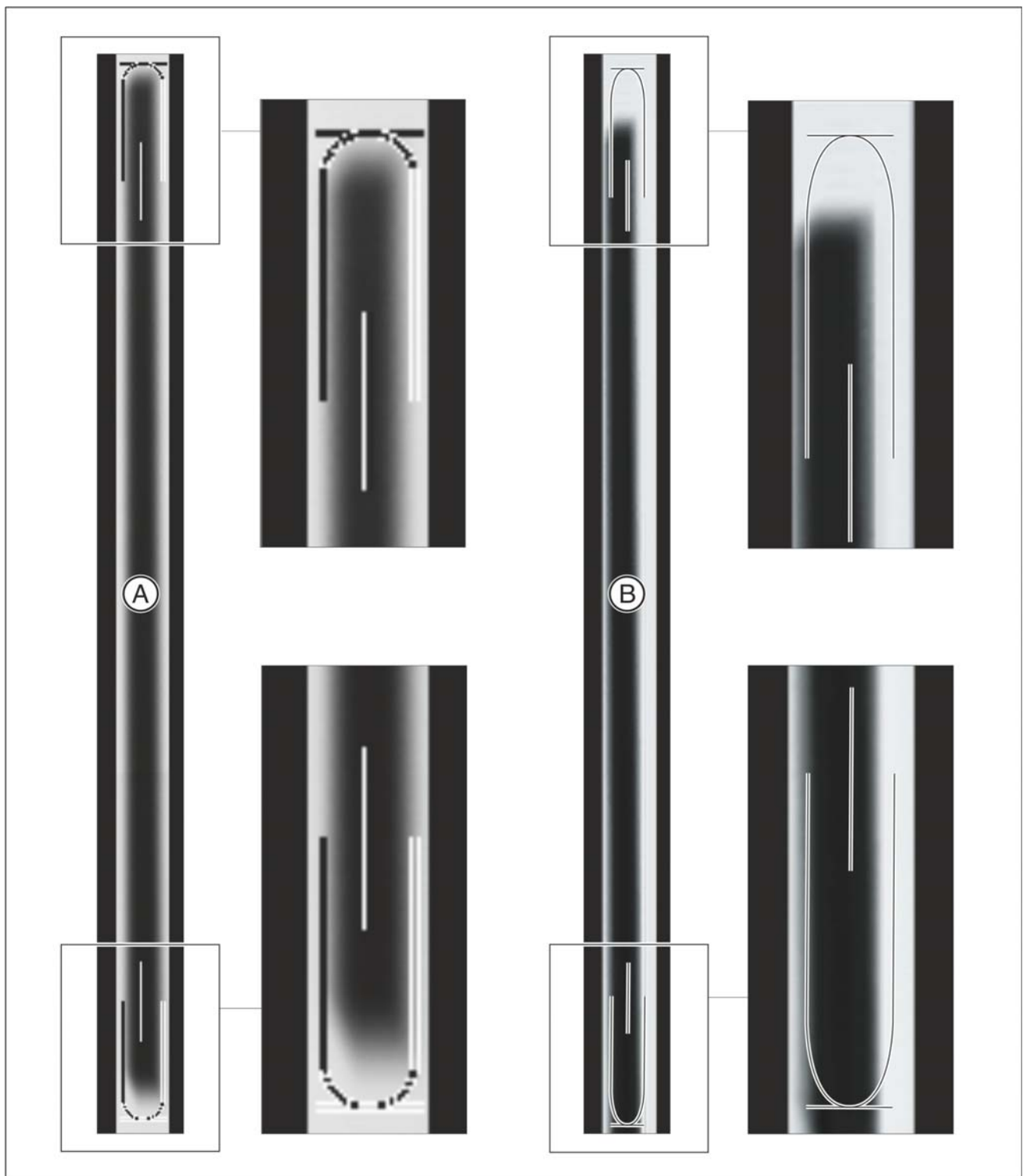
**IMPORTANT**

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. [→ 170]
- 2. Establish receptivity [→ 175].
- 3. Create an exposure (60 kV / 3 mA; 0.3 s) [→ 175].
  - ✎ 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.

Sx	-359
Sy	5298







A	Adjustment OK	<ul style="list-style-type: none"> <li>• The exposed diaphragm area must lie horizontally centered in the image section as well as inside the auxiliary lines.</li> <li>• A surrounding white border must be present.</li> <li>• The maximum density must lie in the center of the diaphragm area.</li> </ul>
B	Adjustment not OK	

The image shows a screenshot of a software interface with two input fields. The top field is labeled 'Sx' and the bottom field is labeled 'Sy'. Both fields contain the number '0' and have a small square button to their right.

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 [ → 191].

5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [ → 175]

☞ The status indicator that prefixes the *"Diaphragm adjustment"* element is checked.

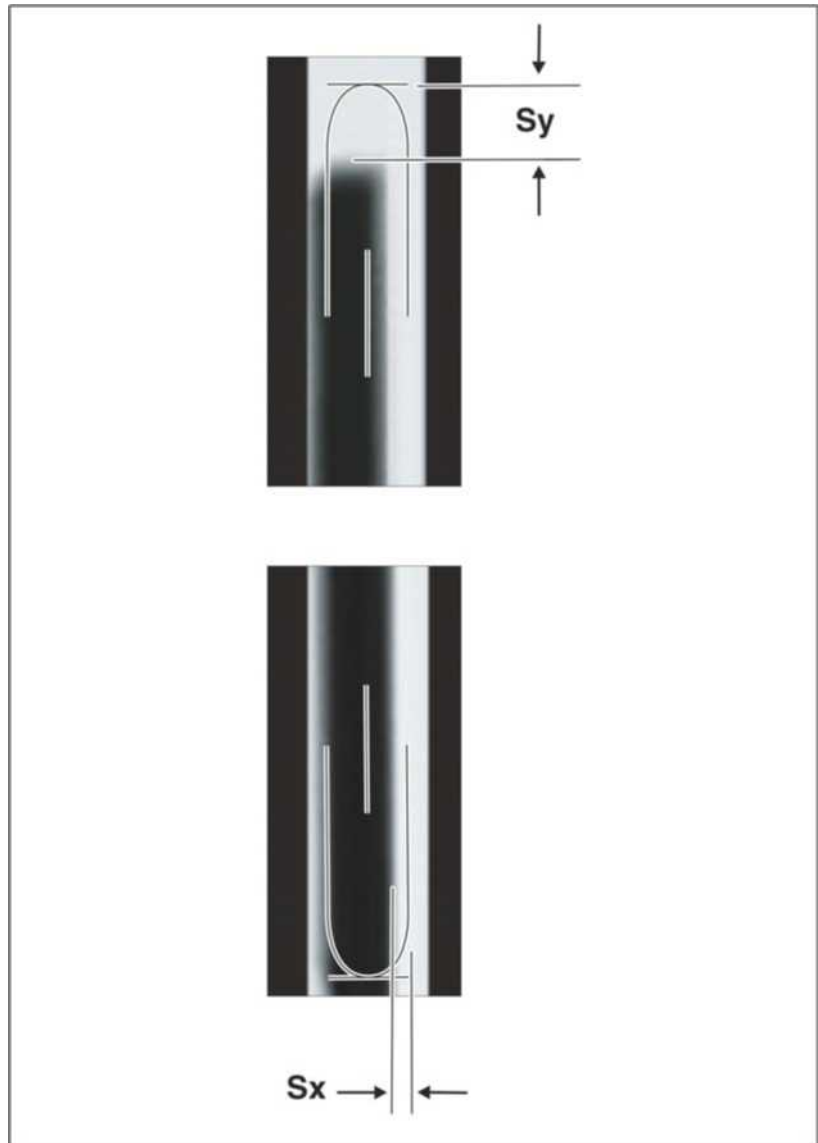
6. Continue with the next stage of the adjustment procedure [ → 193].



#### 7.2.1.2.2 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) [→ 188]".





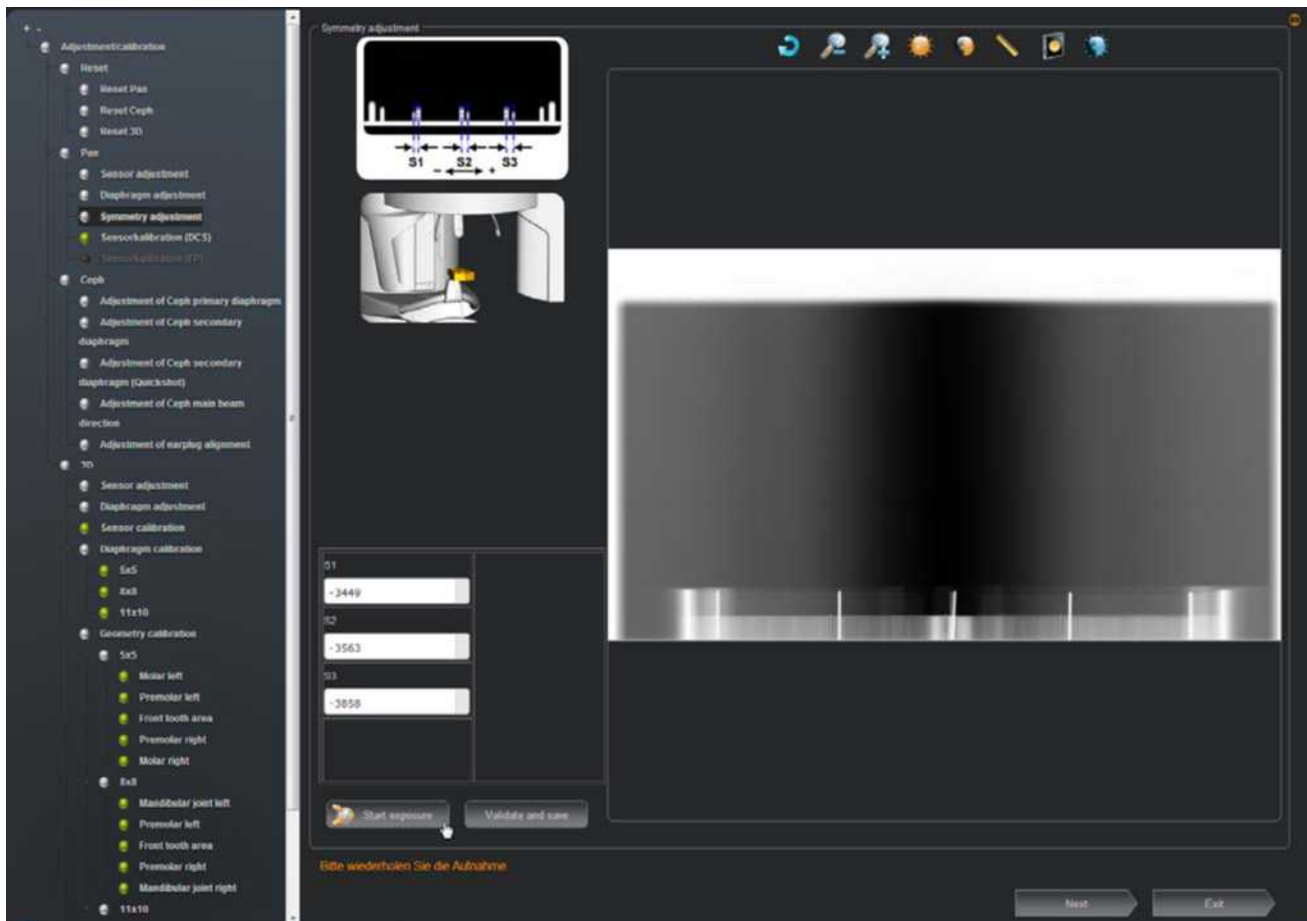


The image shows a software interface with two input fields. The top field is labeled 'Sx' and contains the value '-359'. The bottom field is labeled 'Sy' and contains the value '5298'. Both fields have a small grey button to their right.

2. Once you have taken the exposure, measure distances **Sx** and **Sy** with the toolbar measuring ruler [ → 166].  
**Tip:** For better measurement, you can also edit [ → 166] 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 [ → 174]".  
**NOTICE! Use points as decimal separators!**
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan diaphragm (standard) [ → 188]".



### 7.2.1.3 Pan symmetry adjustment

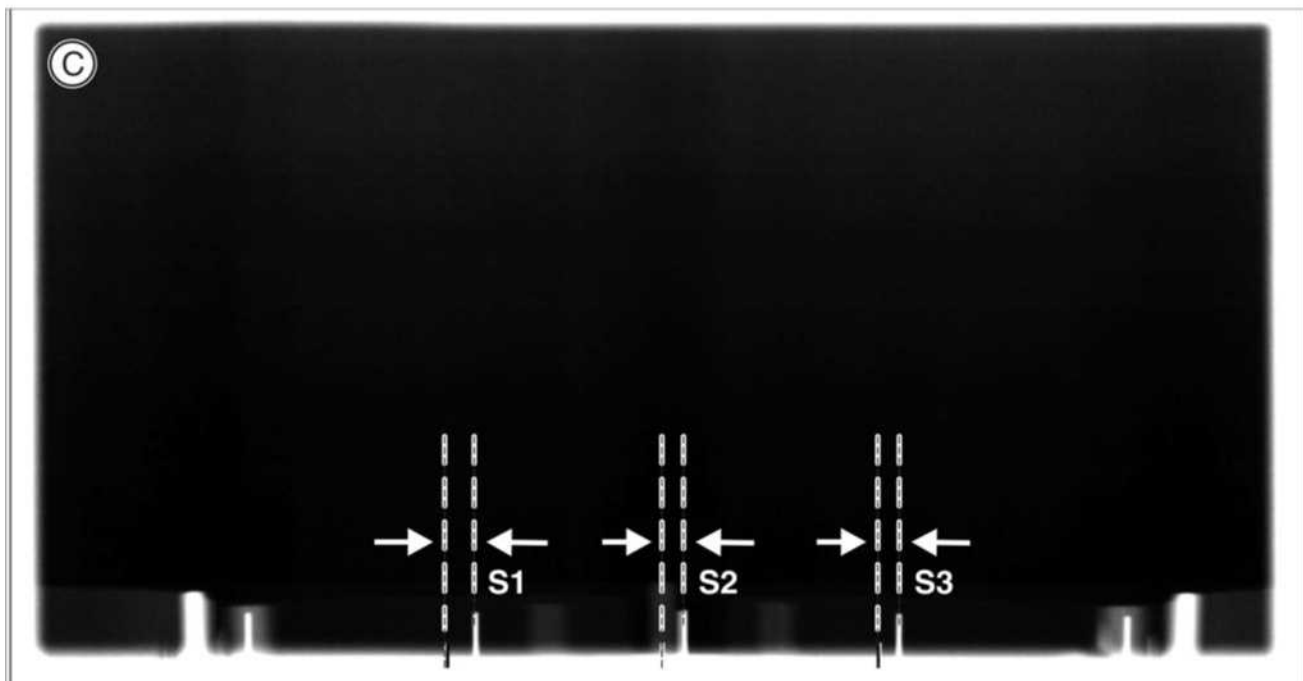
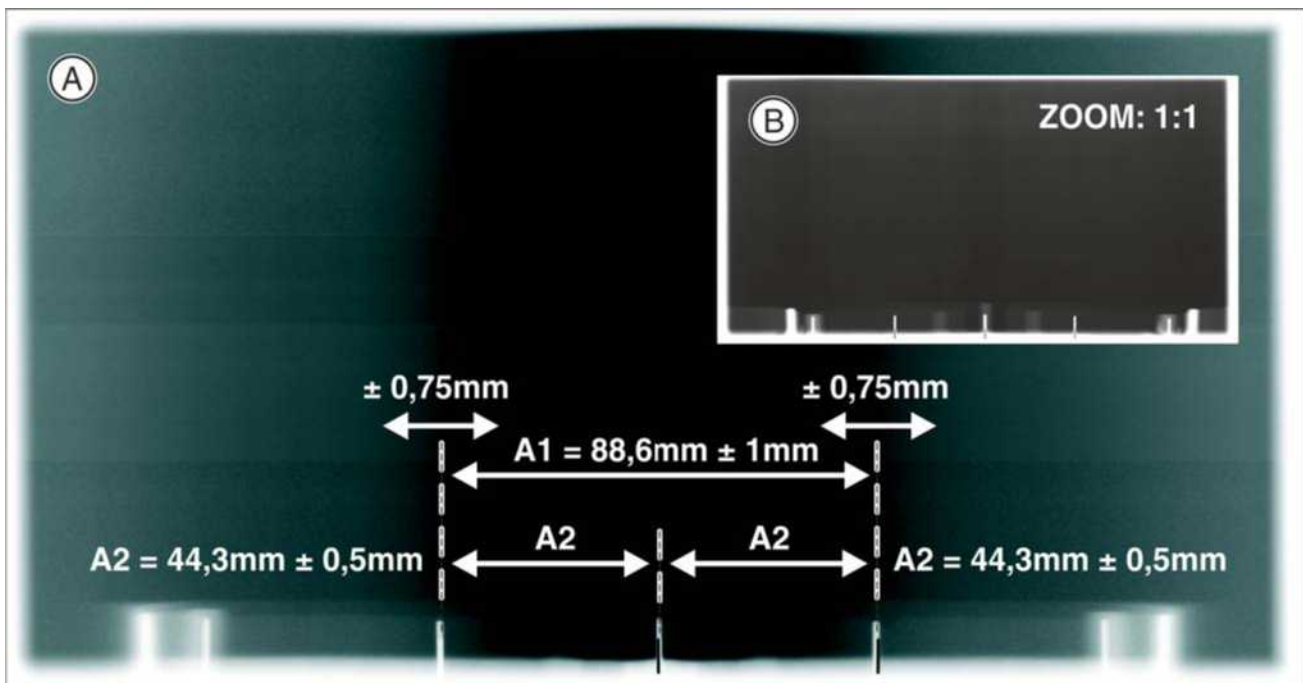


#### 7.2.1.3.1 Automatic adjustment: Pan - Symmetry

- ✓ The needle phantom is in the bite block holder on the unit [ → 176].
- 1. In the structure tree, under *"Pan"*, click on the *"Symmetry adjustment"* element (S010.2).
  - ✎ The *"Pan - Symmetry"* menu is displayed in the action area.
- 2. Establish [ → 175] receptivity.
- 3. Create an exposure (60 kV / 3 mA; 14.1 s) [ → 175].
  - ✎ The adjustment values **S1**, **S2** and **S3** are automatically determined from the exposure and entered in the text boxes of the *"Symmetry adjustment"* menu.
  - ✎ The exposure is displayed in the exposure window.

S1	-2563
S2	-1108
S3	-1203







A	Adjustment OK	<ul style="list-style-type: none"> <li>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 <math>\pm 0.75</math> mm is admissible.</li> <li>Distance A1 must be <math>88.6 \pm 1</math> mm.</li> <li>Distances A2 must be identical, each being <math>44.3 \pm 0.5</math> mm.</li> </ul>
B		<ul style="list-style-type: none"> <li>A surrounding white border must be present.</li> </ul>
C	Adjustment not OK	

The image shows a vertical stack of three input fields. Each field has a label on the left (S1, S2, S3) and a text box on the right. The text boxes contain the number '0'.

- 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 [ → 196].
- If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [ → 175]  
  - The status indicator that prefixes the *"Symmetrie adjustment"* element is checked.
- Remove the needle phantom from the bite block holder of the unit.
- Continue with the next calibration point. [ → 197]



### 7.2.1.3.2 Manual adjustment: Pan - Symmetry

The manual adjustment procedure is similar to the one for automatic adjustment [ → 182]. 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 [ → 193]".



2. After taking the exposure, measure the distances **S1**, **S2** and **S3** with the toolbar measuring ruler [ → 166].  
 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 [ → 166] the exposure using the toolbar functions.

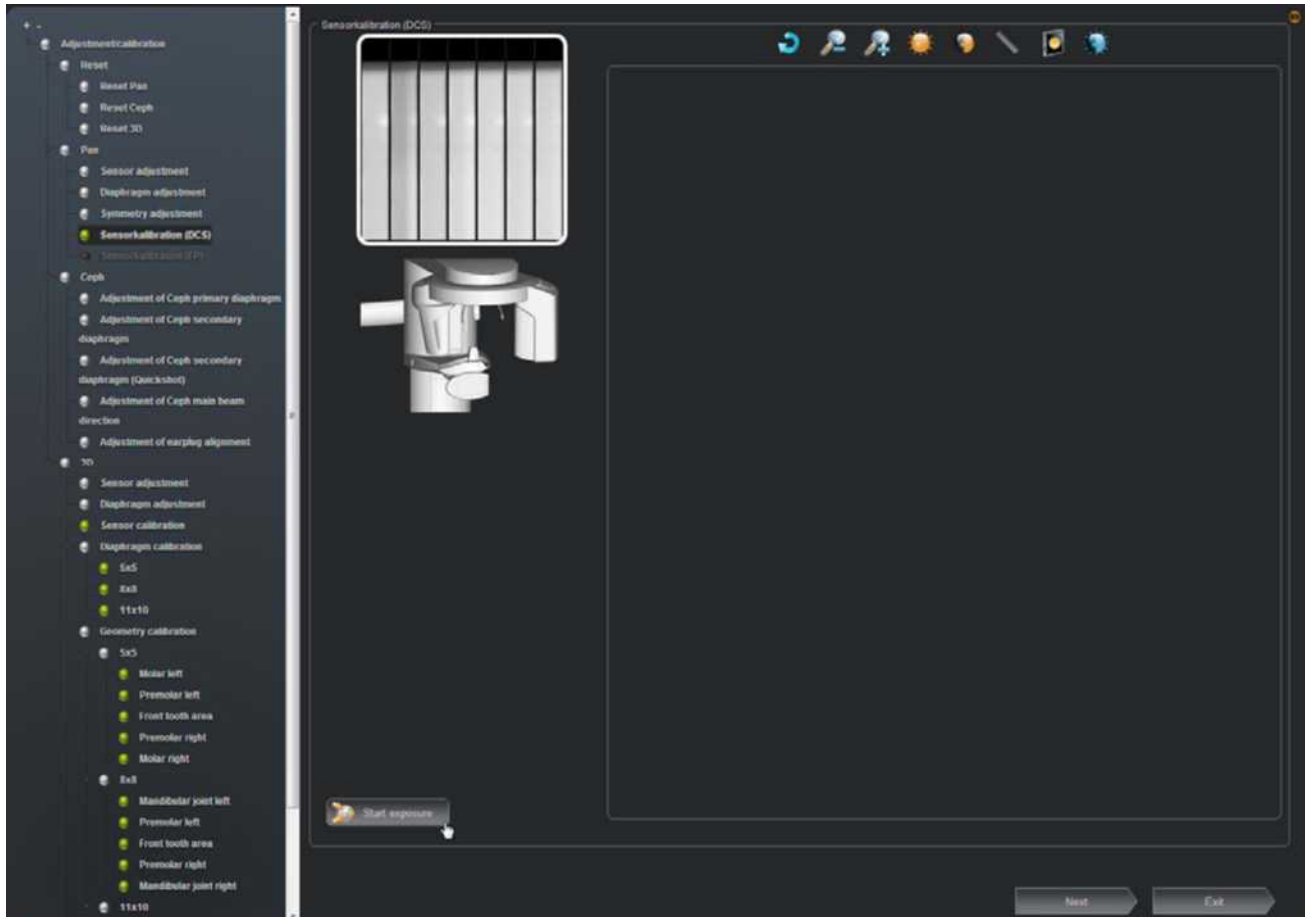
S1	-2563
S2	-1108
S3	-1203

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 [ → 174]".  
**NOTICE! Use points as decimal separators!**
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan - Symmetry [ → 193]".



#### 7.2.1.4 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 [ → 164].
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.

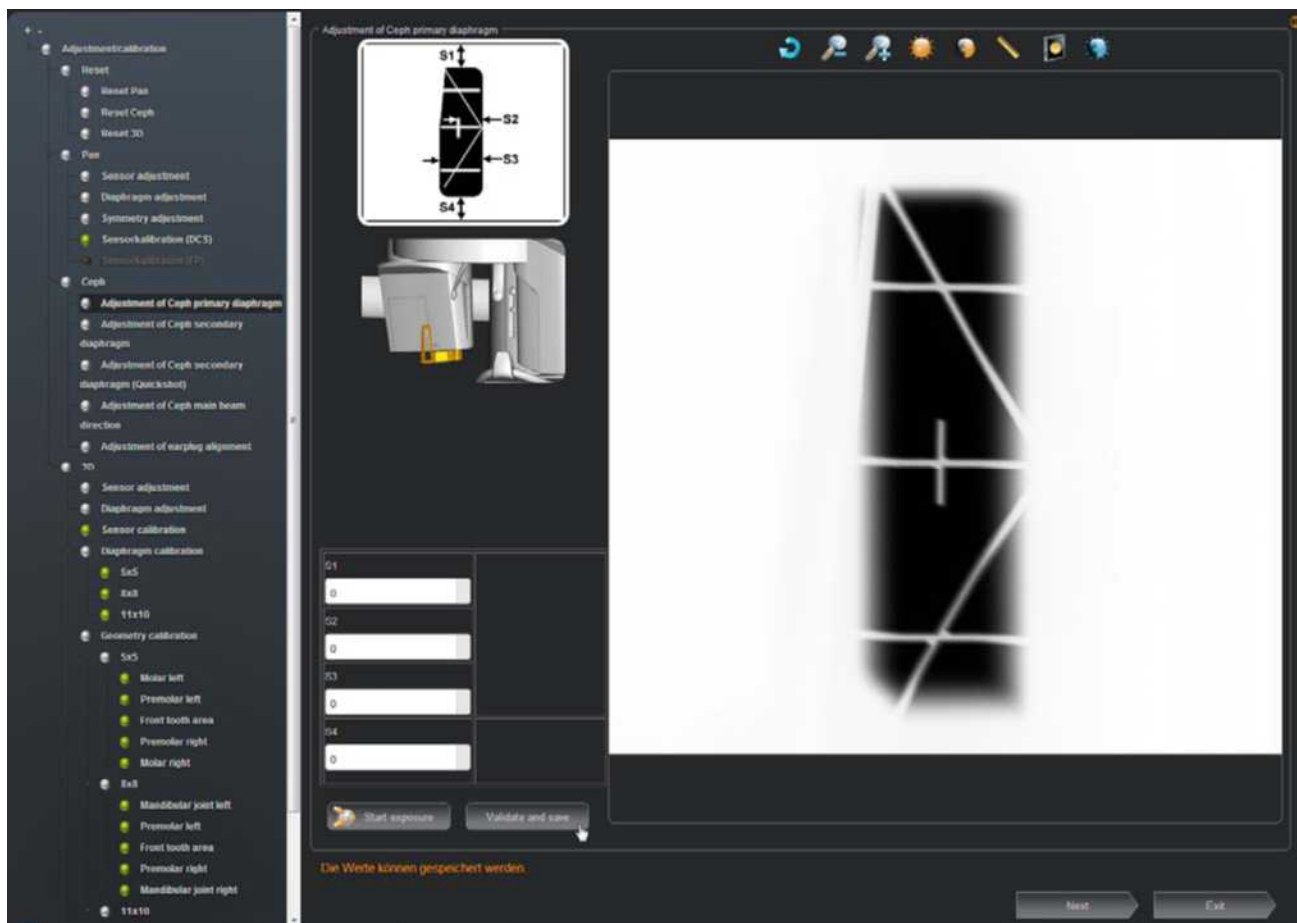
3. Establish [ → 175] receptivity.
4. Take the exposure for the first kV/mA combination (60 kV / 5 mA; 15.1s) [ → 175].
  - ↳ After taking the exposure, the unit automatically re-establishes receptivity.
5. Take the exposure for the second Kv/mA combination [ → 175].
  - ↳ After taking the exposure, 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 [ → 199].



### 7.2.1.5 Adjustment of the ceph primary diaphragm





## 7.2.1.5.1 Automatic adjustment: Ceph - Primary diaphragm (standard)

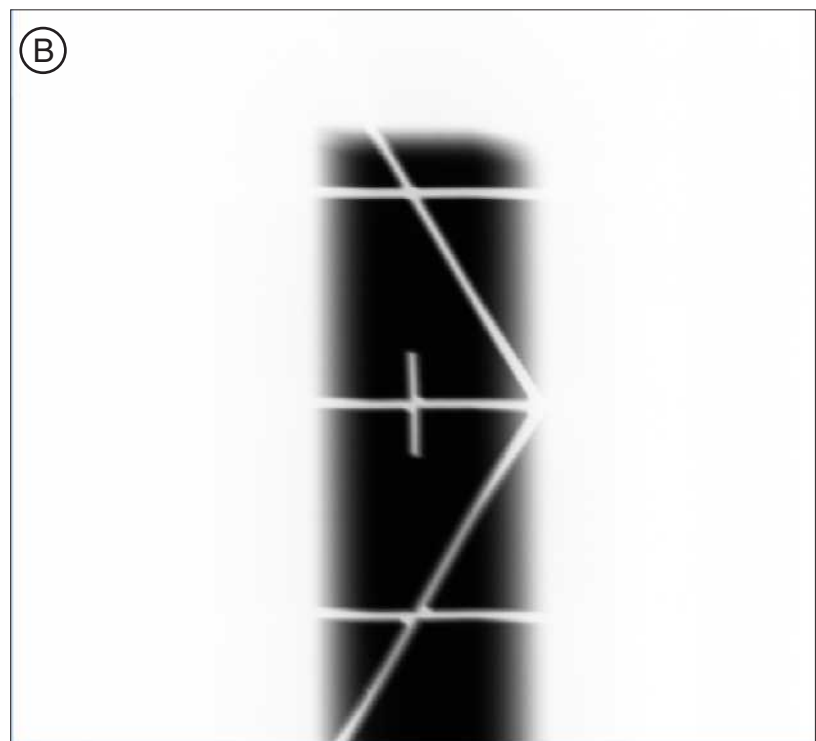
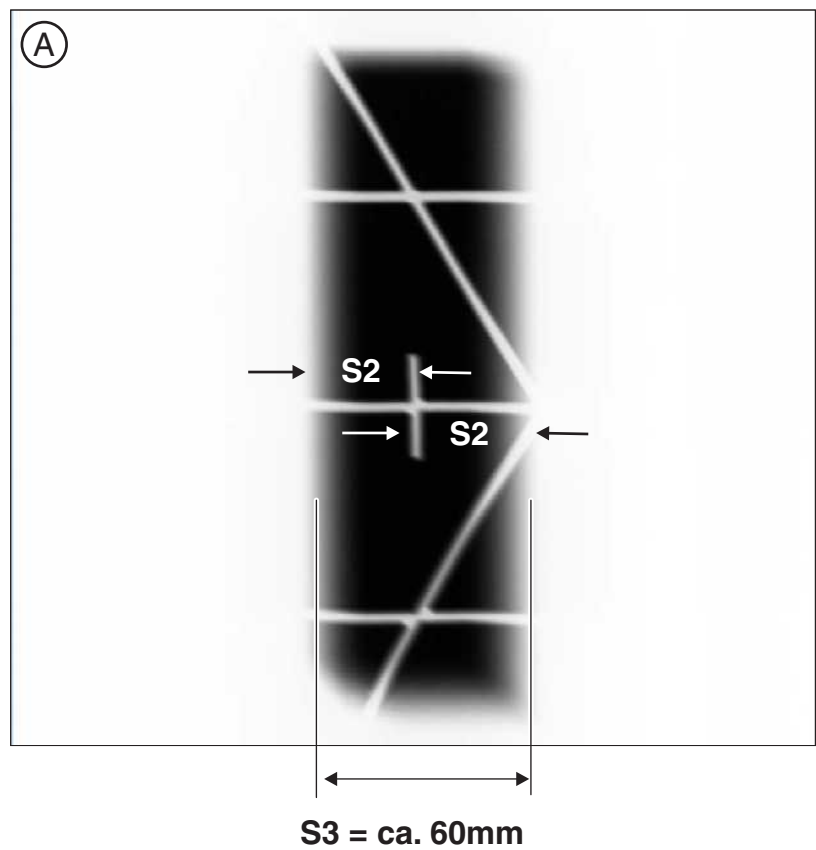
**NOTICE****Risk of damage to unit**

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 [→ 178].
  - ✓ 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 [→ 175] receptivity.
  3. Create an exposure (64 kV / 16 mA; 6.1 s) [→ 175].
    - ✎ 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.

S1	35998
S2	19751
S3	50494
S4	11118







A	Adjustment OK	<ul style="list-style-type: none"> <li>The vertical pin must be horizontally centered in the exposed image section. A slight vertical offset of the grid is permissible.</li> <li>A uniform white border surrounding the image on all sides must be visible.</li> <li>Distance S3 must be approx. 60 mm.</li> </ul>
B	Adjustment not OK	<b>IMPORTANT:</b> If S3 is >70mm, 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 [→ 203].

5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [→ 175]

↳ 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. [→ 204]

The image shows a vertical stack of four adjustment settings. Each setting consists of a label (S1, S2, S3, S4) on the left and a corresponding text input field on the right. All four input fields contain the number '0'.



#### 7.2.1.5.2 Manual adjustment: Ceph - Primary diaphragm

The manual adjustment procedure is similar to the one for automatic adjustment [ → 200]. 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) [ → 200]".
2. Once you have taken the exposure, measure distances **S1**, **S2**, **S3**, and **S4** with the toolbar measuring ruler [ → 166].  
**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 [ → 166] 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) [ → 200]".

S1	35998
S2	19751
S3	50494
S4	11118

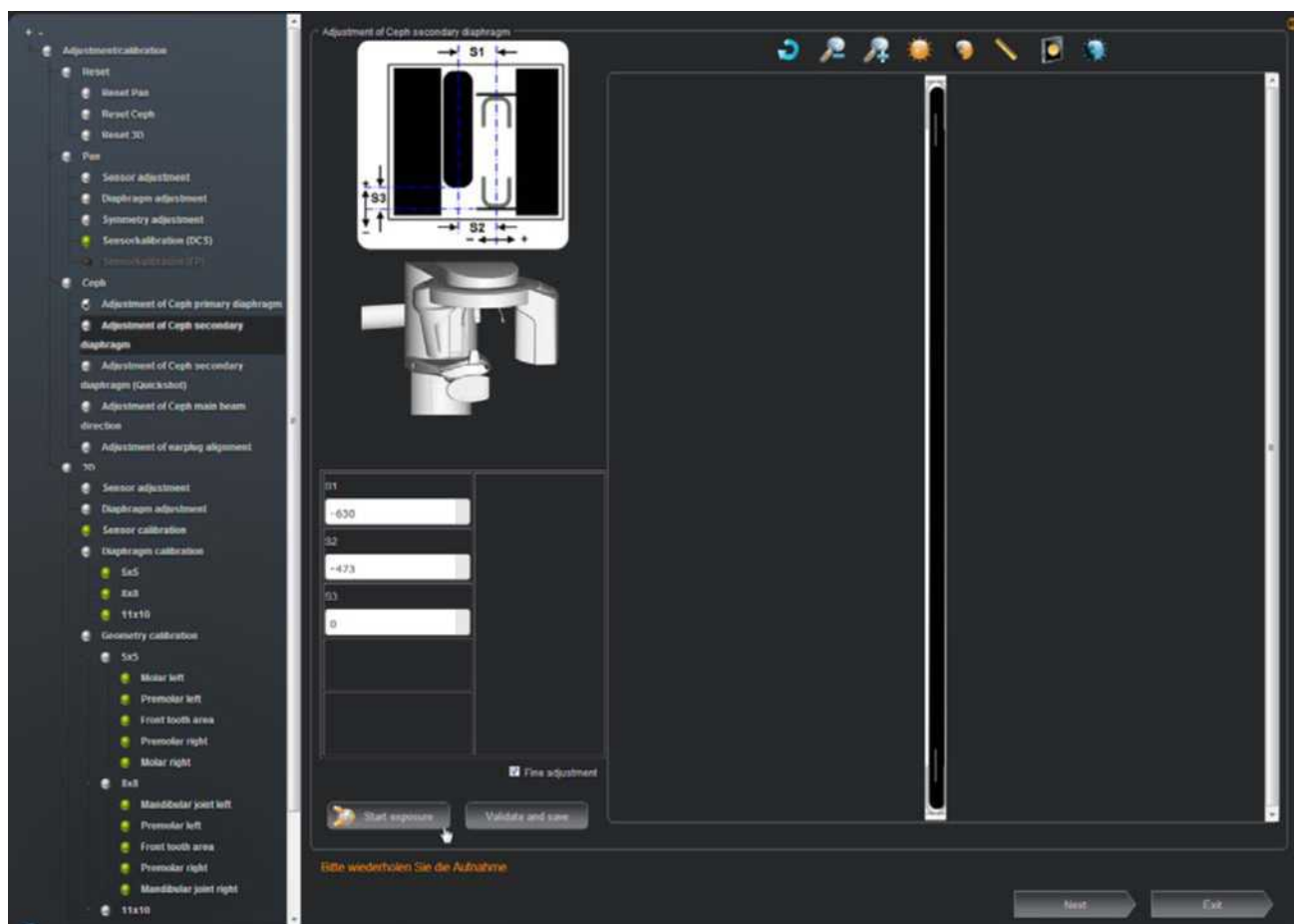


### 7.2.1.6 Adjustment of the ceph secondary diaphragm

#### IMPORTANT

If you cannot correctly adjust the ceph secondary diaphragm via the calibration menu, the Ceph secondary diagram must first be readjusted mechanically [ → 210].

After mechanical readjustment has been completed, repeat adjustment via the calibration menu.





#### 7.2.1.6.1 Automatic adjustment: Ceph secondary diaphragm (standard)

##### NOTICE

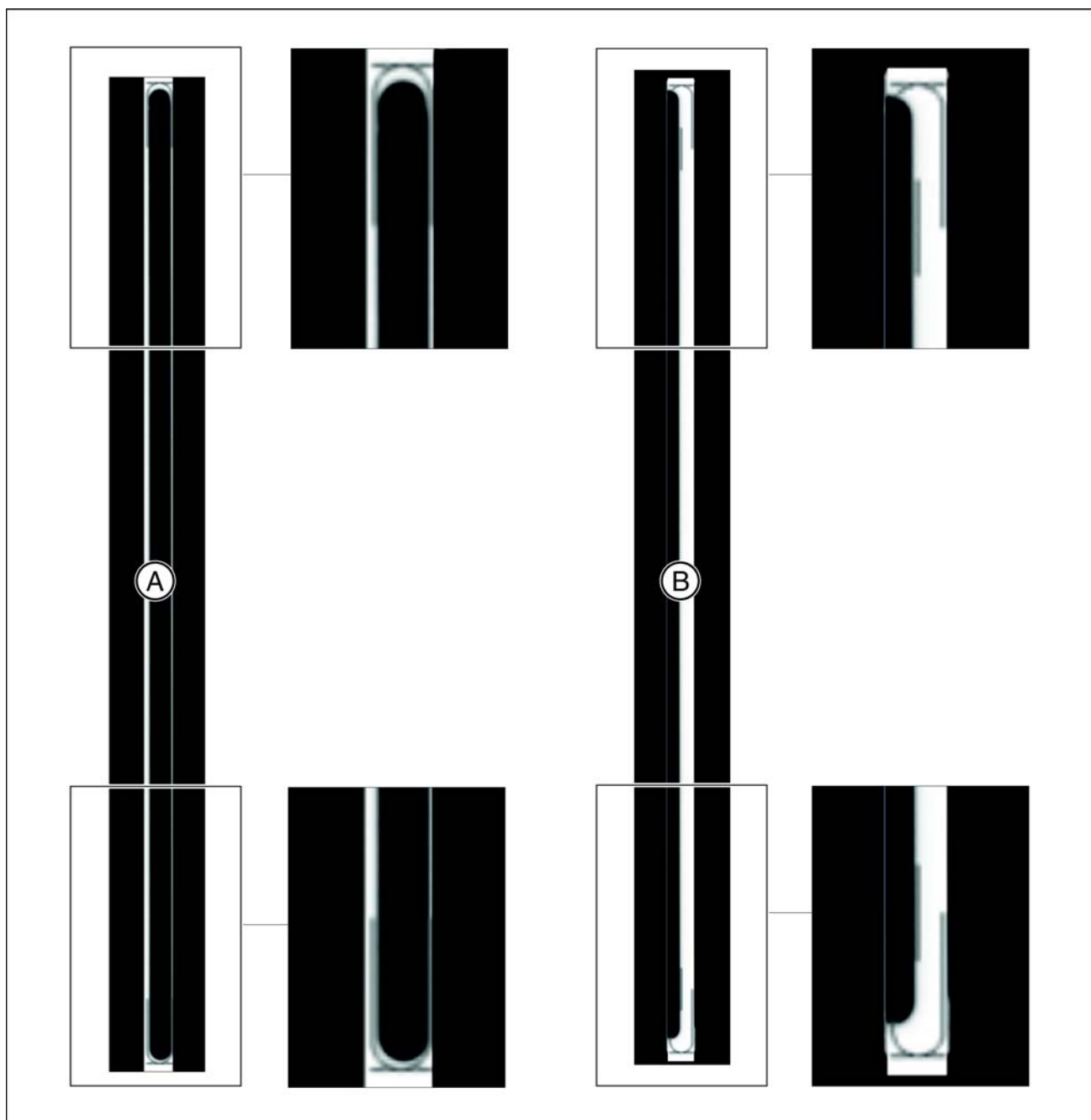
##### Risk of damage to unit

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. [ → 170]
- 2. Establish readiness for exposure [ → 175].
- 3. Create an exposure (80kV / 14 mA; 0.6 s) [ → 175].
  - ✎ 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.

S1	-1107
S2	-1196
S3	508





A	Adjustment OK	<ul style="list-style-type: none"> <li>• The exposed diaphragm area must lie centered and straight in the image section as well as inside the superimposed auxiliary lines.</li> <li>• A surrounding white border must be present.</li> <li>• The maximum density must lie in the center of the diaphragm area.</li> </ul>
B	Adjustment not OK	



The image shows a vertical stack of three adjustment steps, labeled S1, S2, and S3. Each step consists of a dark rectangular header with the label (S1, S2, or S3) in white text, followed by a white text box containing the number '0'. To the right of the text box is a vertical slider bar with a grey track and a white knob. Below the S3 step is a larger, empty dark rectangular area.

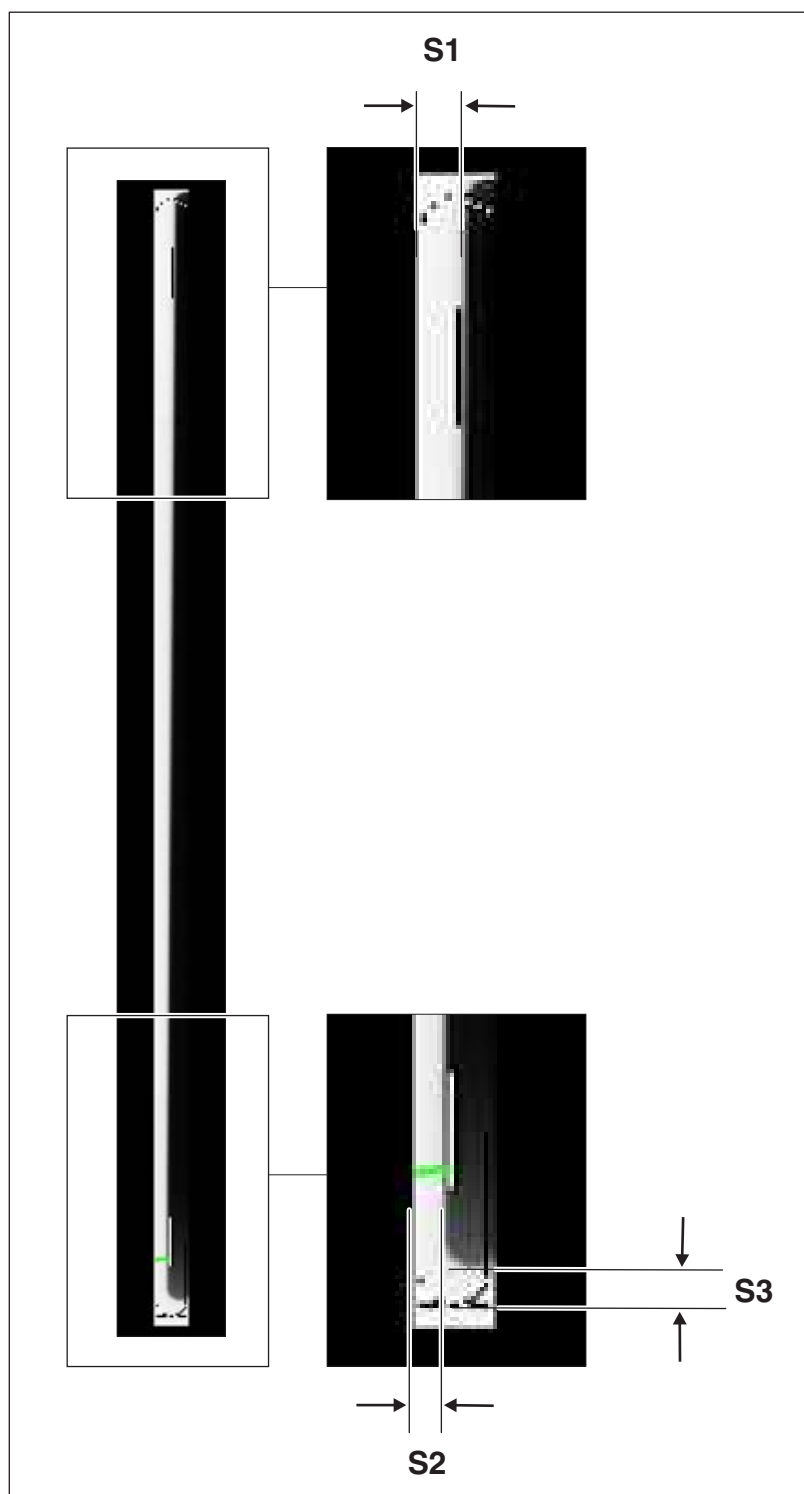
4. Repeat the procedure starting at Step 2 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.  
**IMPORTANT:** If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [ → 208].
5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [ → 175]  
    ↪ The status indicator that prefixes the element *"Adjustment of Ceph secondary diaphragm"* is checked.
6. Continue with the next stage of the adjustment procedure [ → 217].



### 7.2.1.6.2 Manual adjustment: Ceph secondary diaphragm

The manual adjustment procedure is similar to the one for automatic adjustment [ → 205]. 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) [ → 205]"



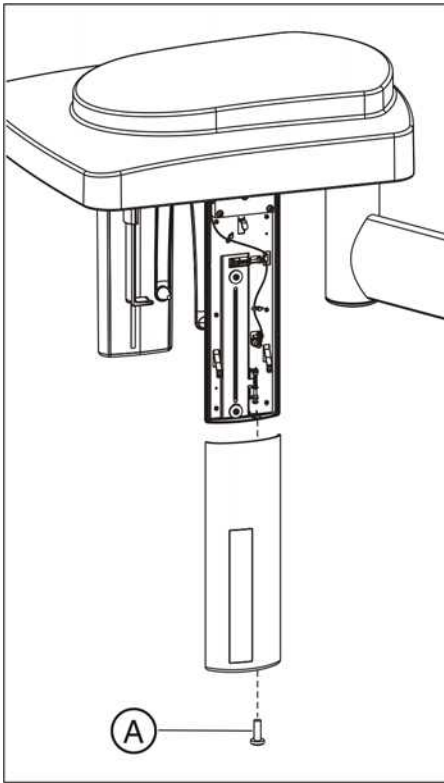


S1
-1107
S2
-1196
S3
508

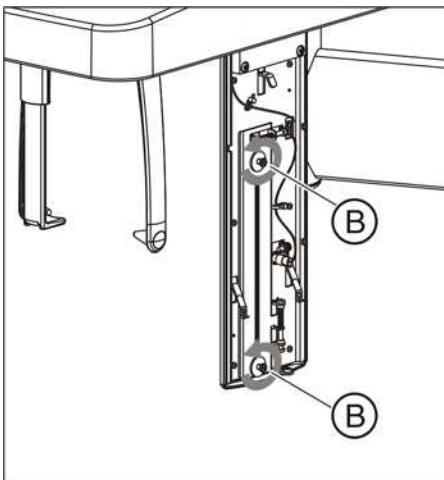
2. Once you have taken the exposure, measure distances **S1**, **S2** and **S3** with the toolbar measuring ruler [ → 166].
3. Overwrite the adjustment values for **S1**, **S2** and **S3** in the text boxes of the "*Adjustment of Ceph secondary diaphragm*" menu with the measured values. For information about the shifting direction (input of +/- sign in the menu), see the section entitled "Shifting direction of the exposed image area [ → 174]".  
**NOTICE! Use points as decimal separators!**
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph secondary diaphragm (standard) [ → 205]"



#### 7.2.1.6.3 Mechanical adjustment: Ceph secondary diaphragm

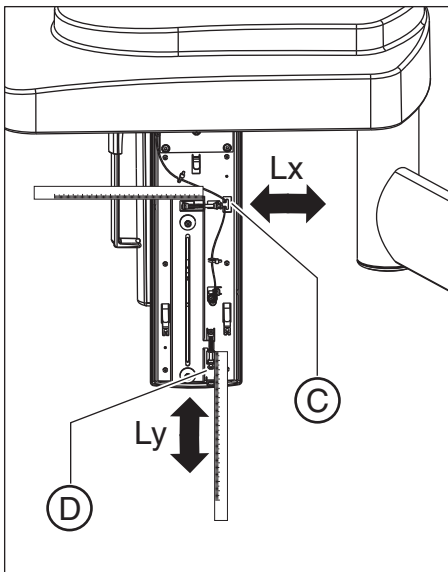


1. Loosen screw (A) and remove the cover of the secondary diaphragm by pulling it downward.



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

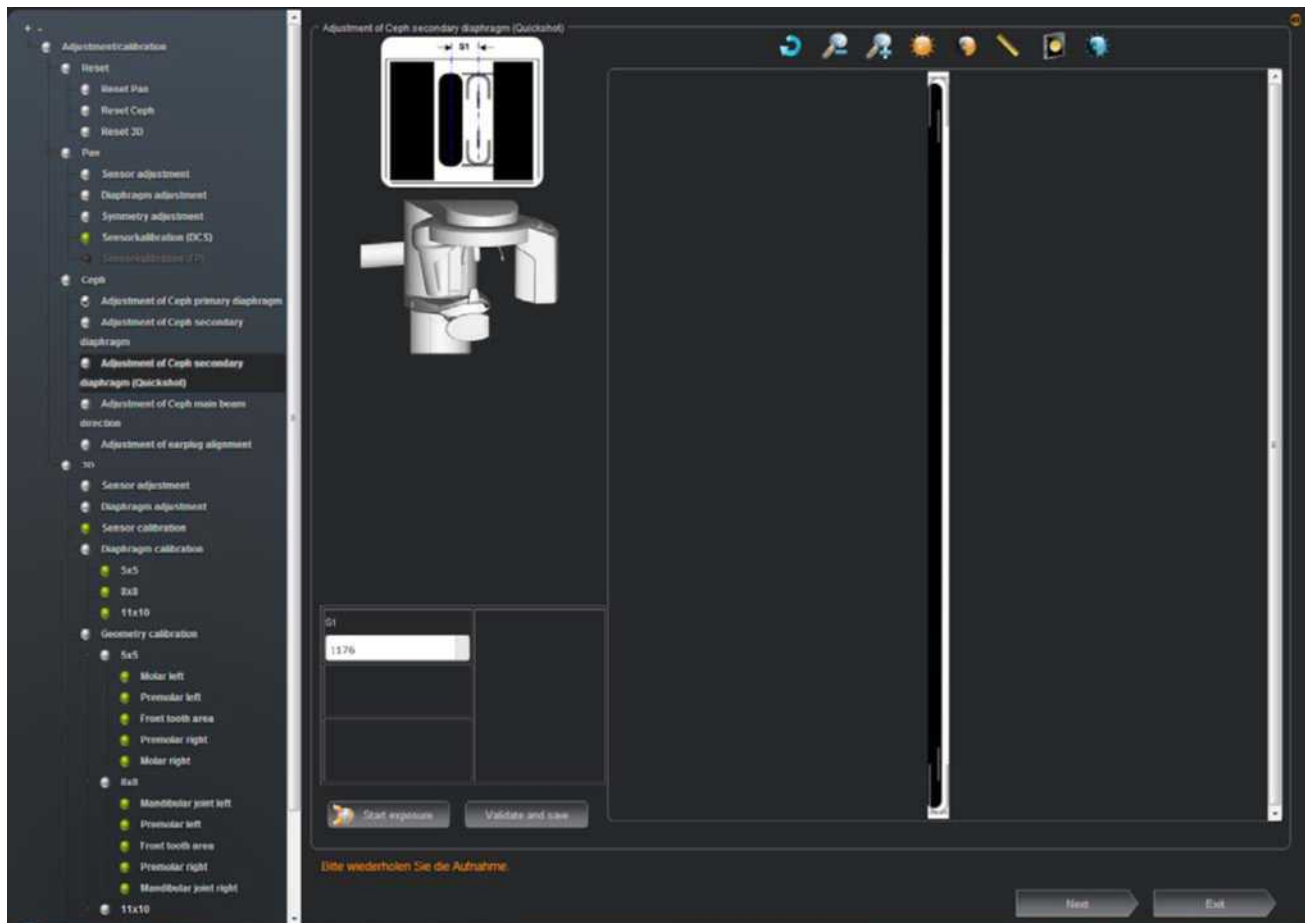
To measure the adjustment, use a gauge.

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).



### 7.2.1.7 Adjustment of the ceph secondary diaphragm (QuickShot)



#### 7.2.1.7.1 Automatic adjustment: Ceph secondary diaphragm (QuickShot) (standard)

##### NOTICE

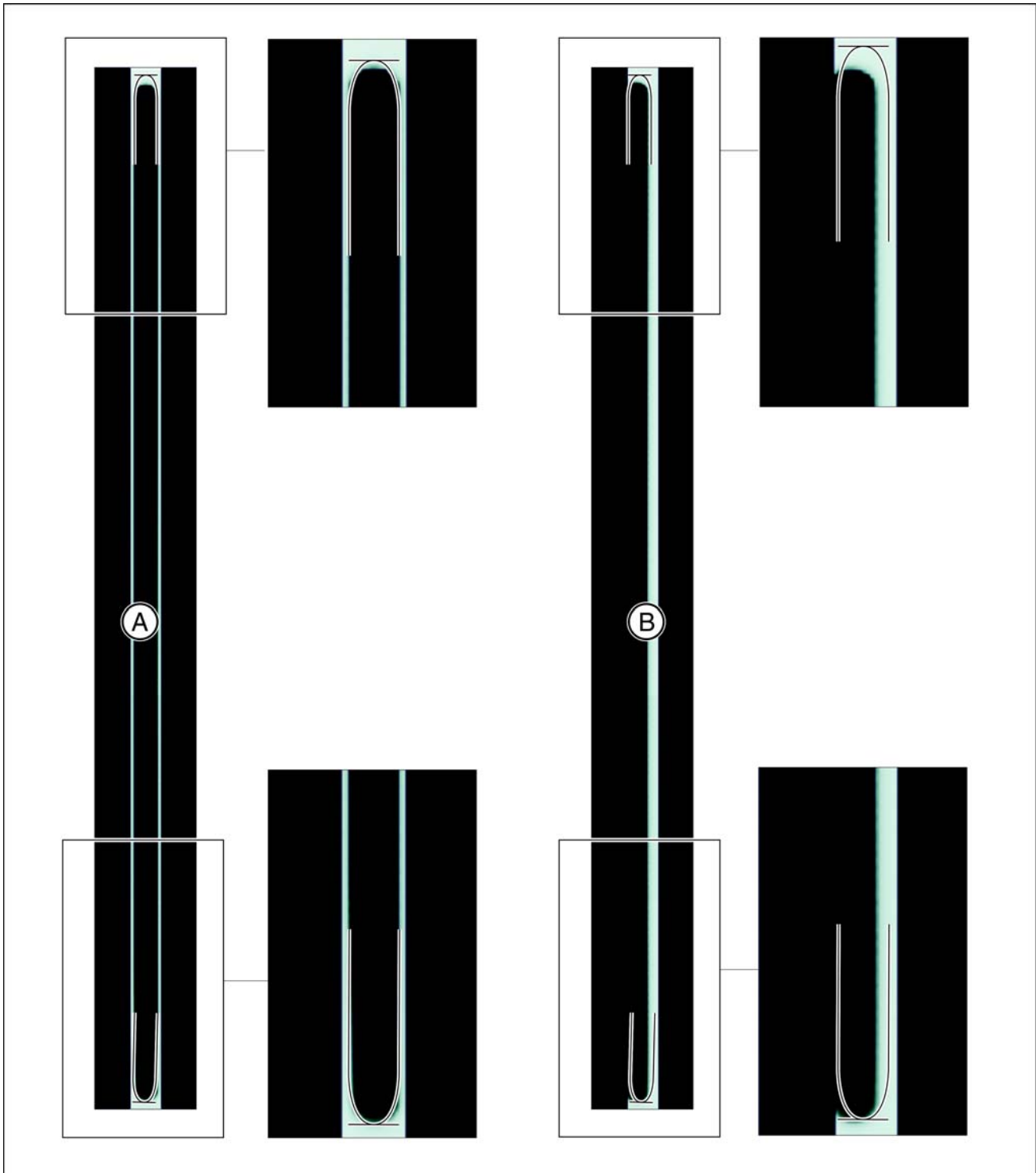
##### Risk of damage to unit

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 [ → 175] receptivity.

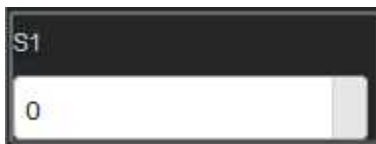


3. Create an exposure (80kV / 14 mA; 0.3 s) [ → 175].
  - ↪ Adjustment value **S1** is calculated automatically from the exposure and entered in the text box of the *"Adjustment of Ceph secondary diaphragm (Quickshot)"* menu.
  - ↪ The exposure is displayed in the exposure window.





A	Adjustment OK	<ul style="list-style-type: none"> <li>• The exposed image section must lie centered and straight in the image section as well as inside the superimposed auxiliary lines.</li> <li>• A surrounding white border must be present.</li> <li>• The maximum density must lie in the center of the diaphragm area.</li> </ul>
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 [ → 208].

5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [ → 175]

✎ The status indicator that prefixes the "*Adjustment of Ceph secondary diaphragm (Quickshot)*" element is checked.

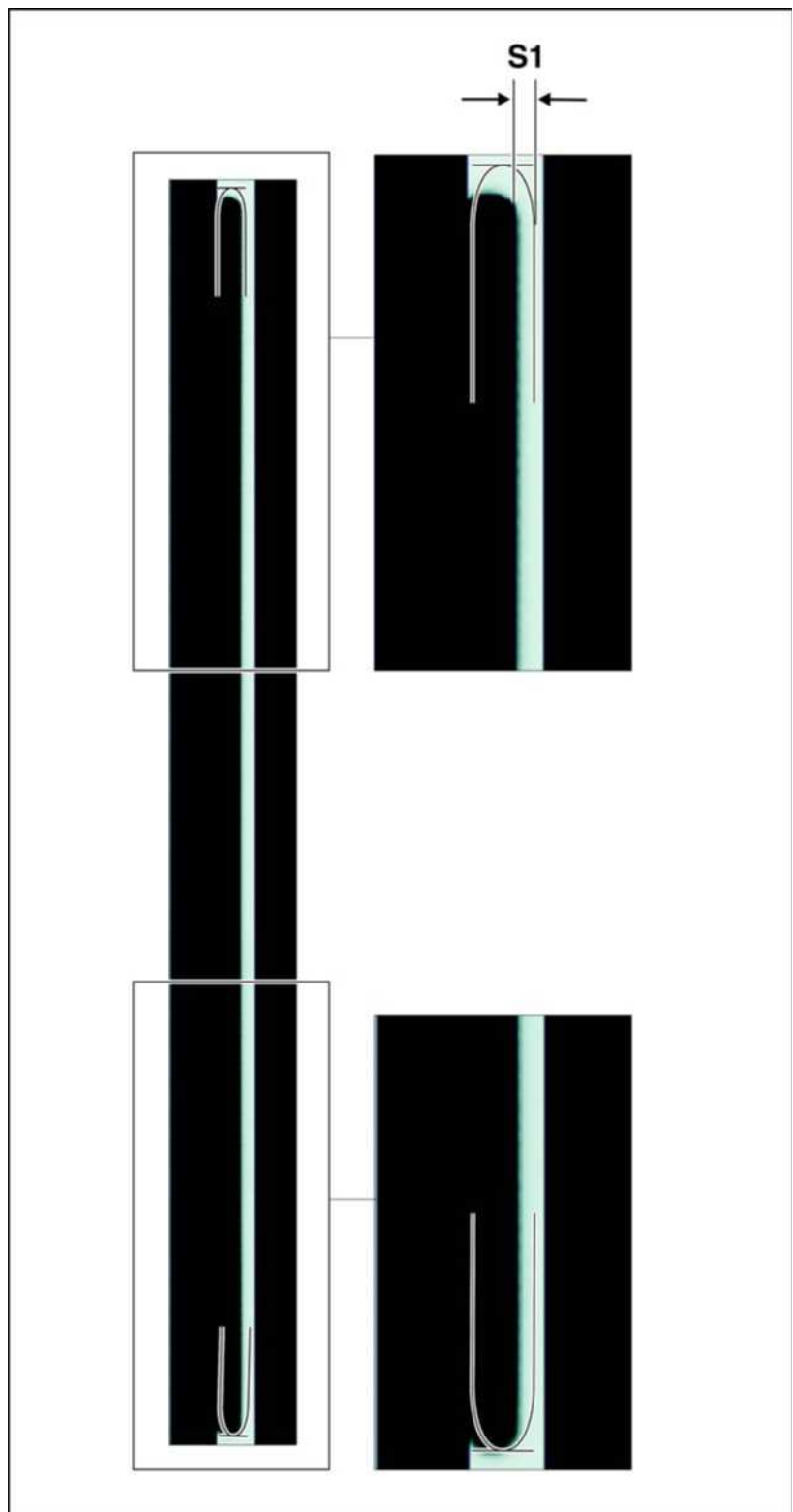
6. Continue with the next stage of the adjustment procedure. [ → 217]

#### 7.2.1.7.2 Manual adjustment: Ceph secondary diaphragm (QuickShot)

The manual adjustment procedure is similar to the one for automatic adjustment [ → 212]. 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) [ → 212]".



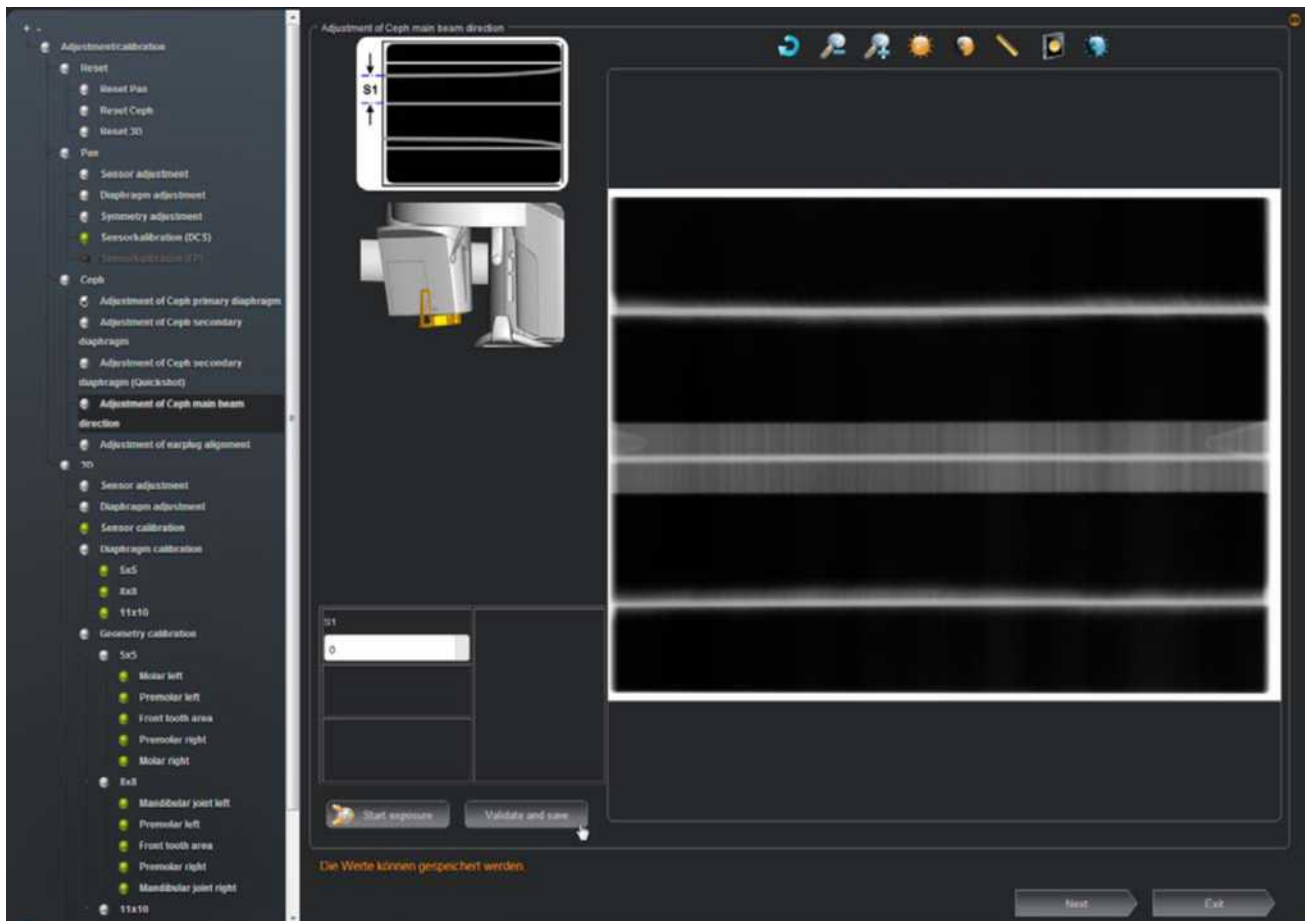




2. Once you have taken the exposure, measure distance **S1** with the toolbar measuring ruler [ → 166].
3. Overwrite the adjustment value for **S1** in the text box of the *"Adjustment of Ceph secondary diaphragm (Quickshot)"* menu with the measured value.  
For information about the shifting direction (input of +/- sign in the menu), see the chapter entitled "Shifting direction of the exposed image area [ → 174]".  
**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) [ → 212]"



### 7.2.1.8 Adjustment of the ceph main X-ray beam



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

##### NOTICE

##### Risk of damage to unit

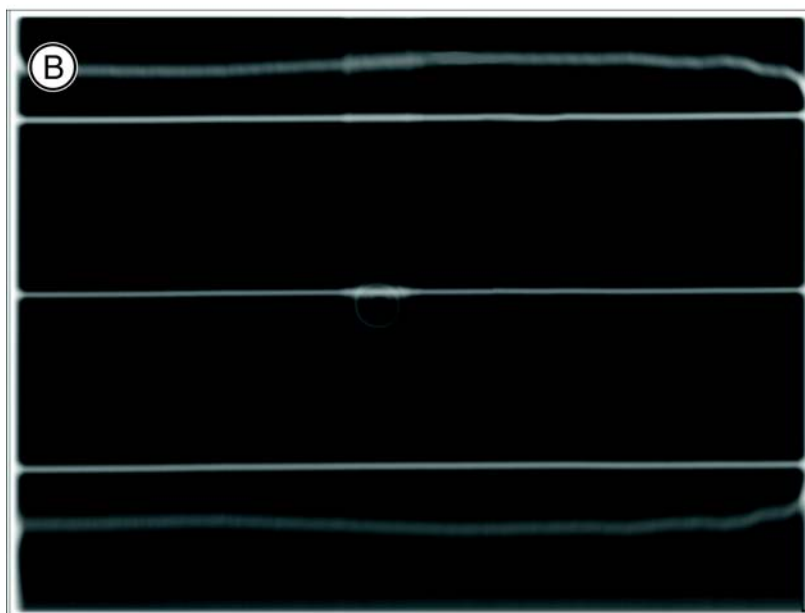
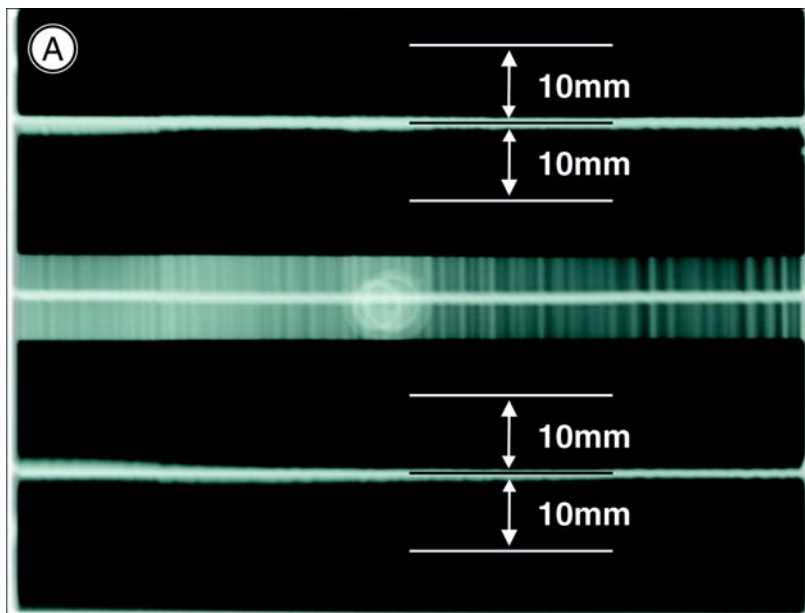
It is essential that the needle phantom is removed from the pan bite block holder on the unit **before** a ceph exposure is taken; otherwise, the sensor unit could collide with the phantom.

- ✓ The ceph test phantom connects to the unit's sensor unit [ → 178].
- ✓ 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 [ → 175] receptivity.
- 3. Create an exposure (80 kV / 14 mA; 14.9 s) [ → 175].





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	<ul style="list-style-type: none"> <li>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 <math>\pm 10</math> mm.</li> </ul>
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 [ → 220].

5. If adjustment is OK (the adjustment values in the text boxes are equal to "zero"), save the values. [ → 175]

↩ 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. [ → 221]

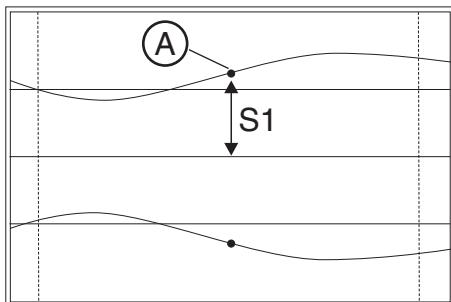
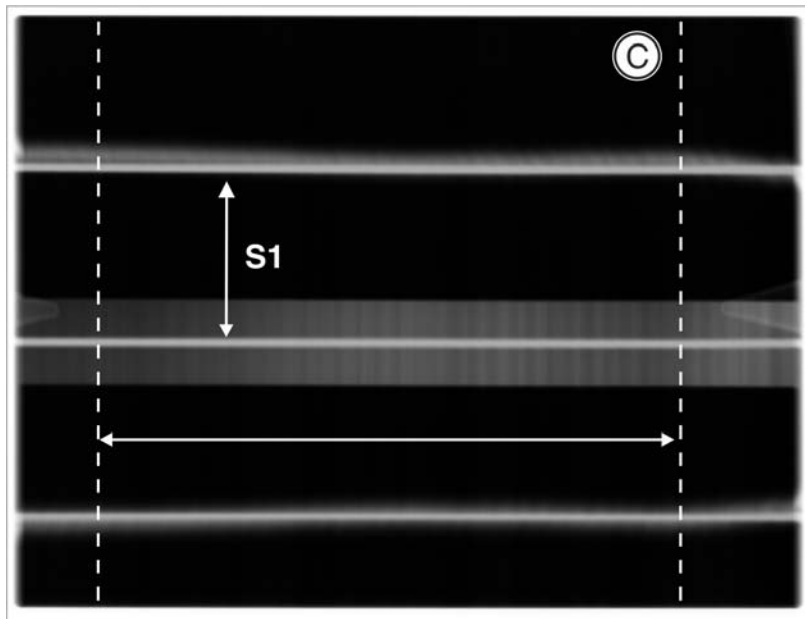




**7.2.1.8.2 Manual adjustment: Ceph - Main X-ray beam direction**

The manual adjustment procedure is similar to the one for automatic adjustment [ → 217]. 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.

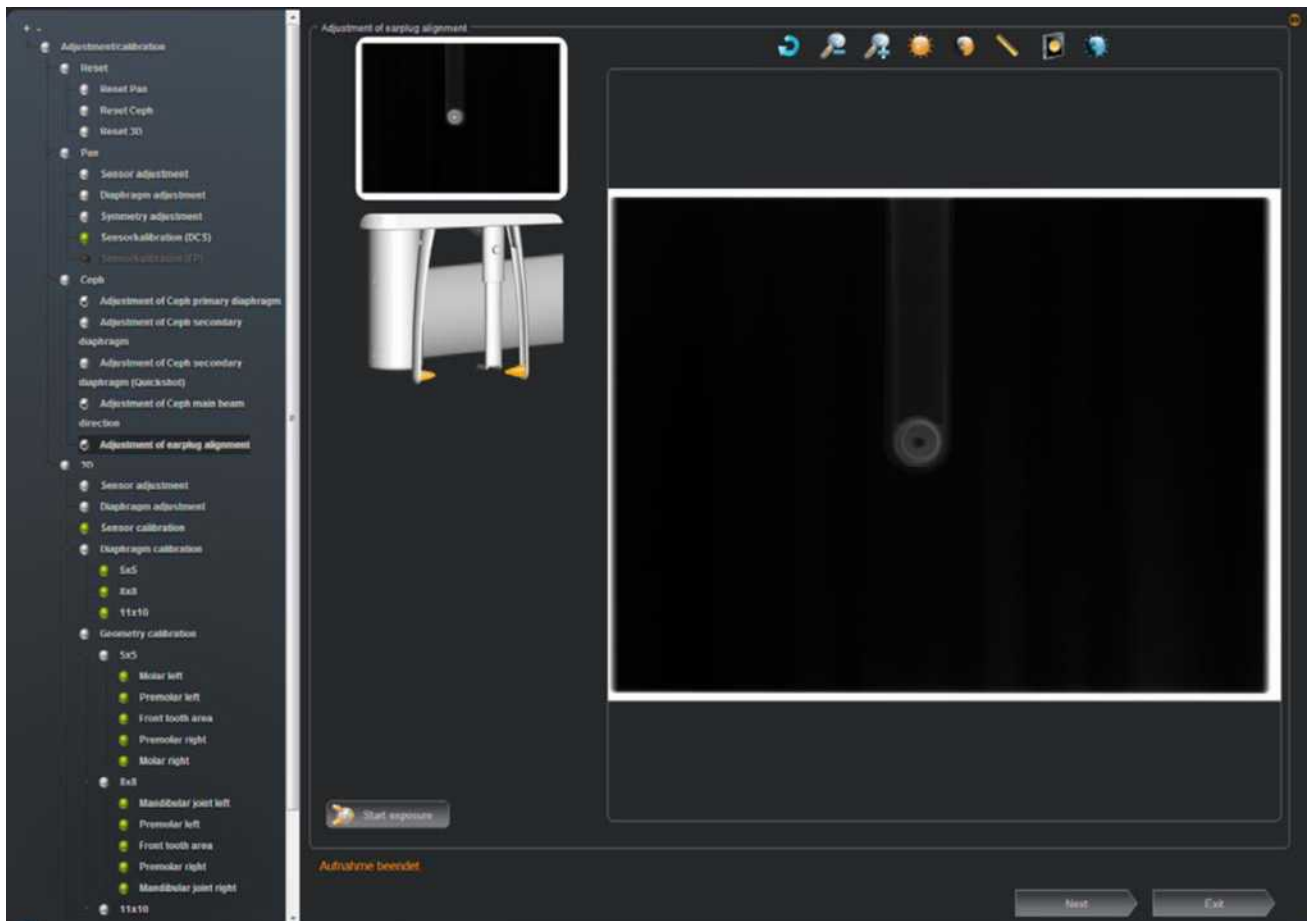
1. Start the *"Adjustment of Ceph main beam direction"* adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Main X-ray beam direction (standard) [ → 217]".



2. Once you have taken the exposure, measure the distance **S1** with the toolbar measuring ruler [ → 166]. 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 [ → 174]".  
**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) [ → 217]".

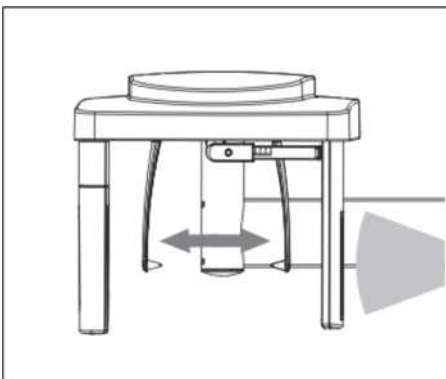


### 7.2.1.9 Adjusting the earplug alignment

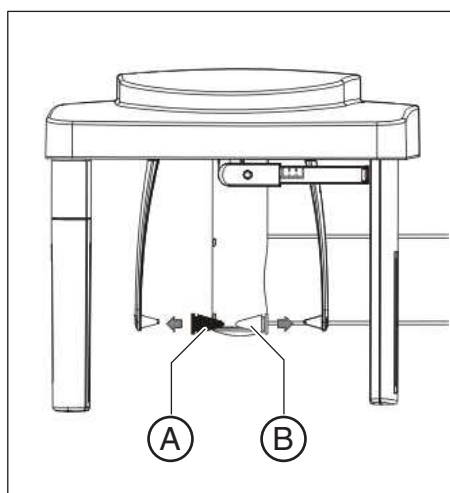


#### 7.2.1.9.1 Checking the ear plug alignment

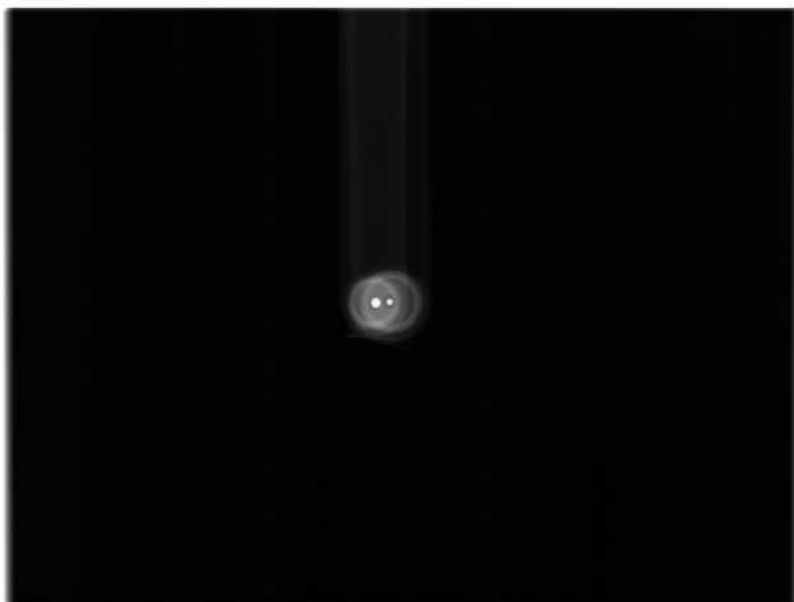
- ✓ The ceph sensor is plugged into the ceph slot on the unit.
- 1. In the structure tree, under "*Ceph*", click on the "*Adjustment of earplug alignment*" element (S010.17).
  - ↳ The "*Adjustment of earplug alignment*" menu is displayed in the action area.
  - ↳ The unit is moved into the ceph exposure 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 [ → 175] receptivity.
5. Create an exposure (80 kV / 14 mA; 14.9 s) [ → 175].
  - ↪ 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.

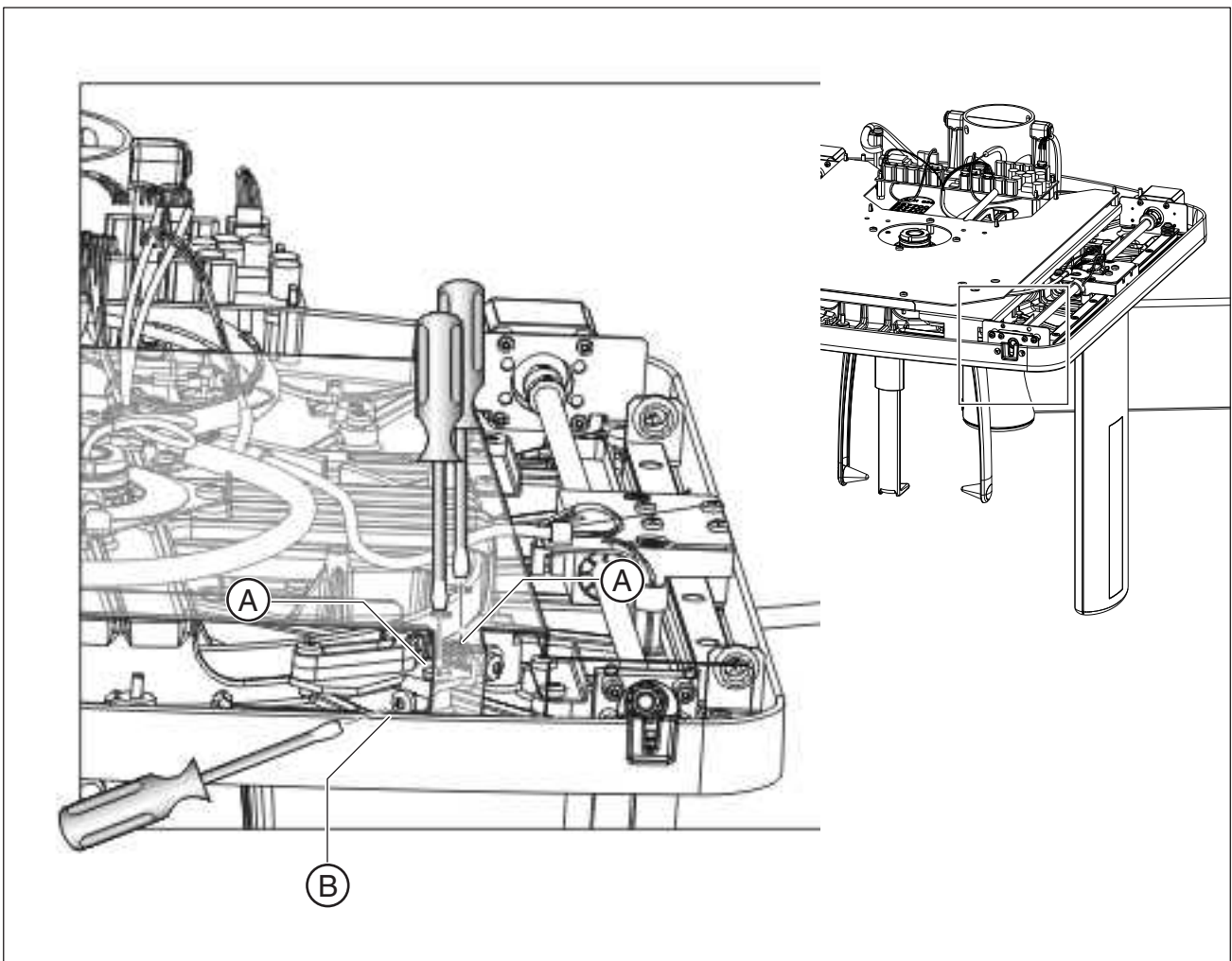
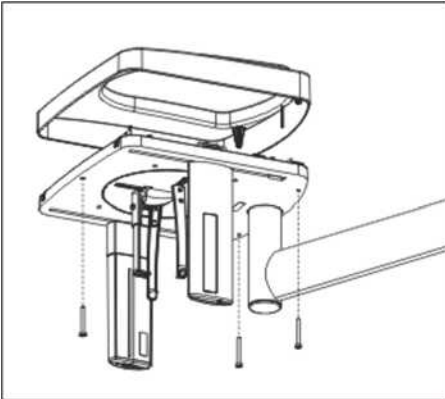


6. *If the two dots are not coincident*, adjust the earplug alignment as described in the section "Adjusting the ear plug alignment [ → 223]" and repeat the scan.
7. Continue with the next stage of the adjustment procedure [ → 226].



#### 7.2.1.9.2 Adjusting the ear plug alignment

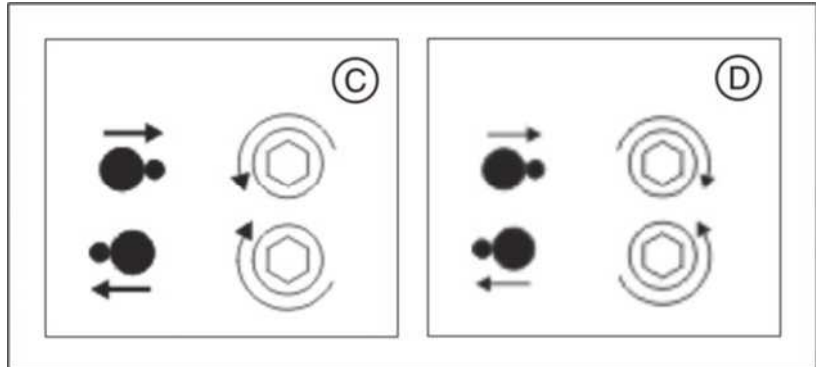
- Unscrew and remove the cover from the cephalometer.





### Horizontal correction

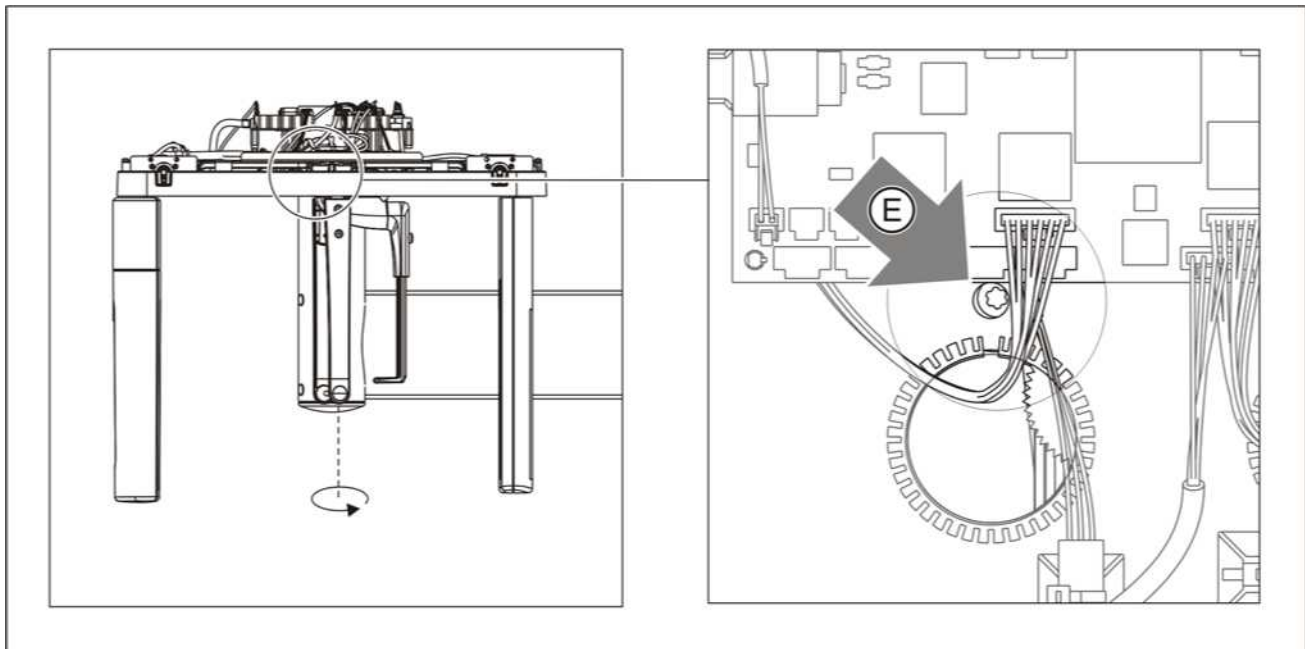
1. Loosen the screws (A) slightly (approx. 2 - 3 turns).  
**Tip:** Do not unscrew them fully!
2. Adjust the ear plugs in the horizontal direction by turning the screw (B) counterclockwise or clockwise. The direction of rotation for left-arm (C) and right-arm (D) versions is shown in the drawing below.



3. Tighten the screw (A).

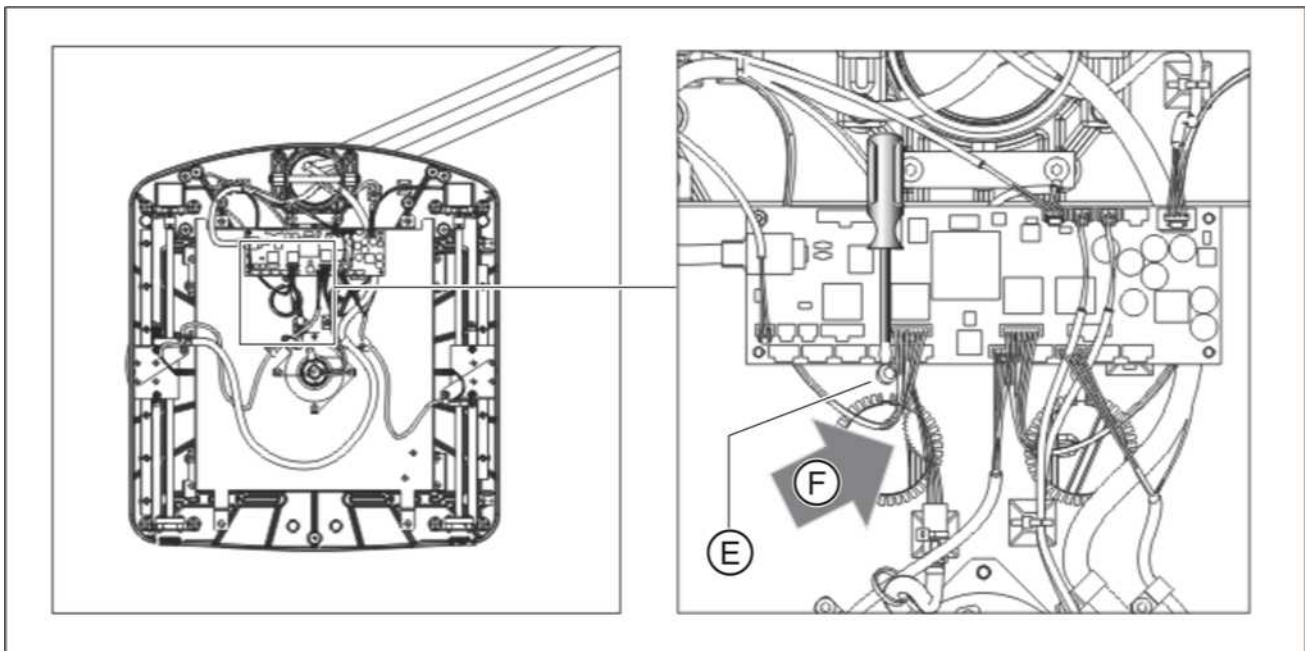
### Vertical correction

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

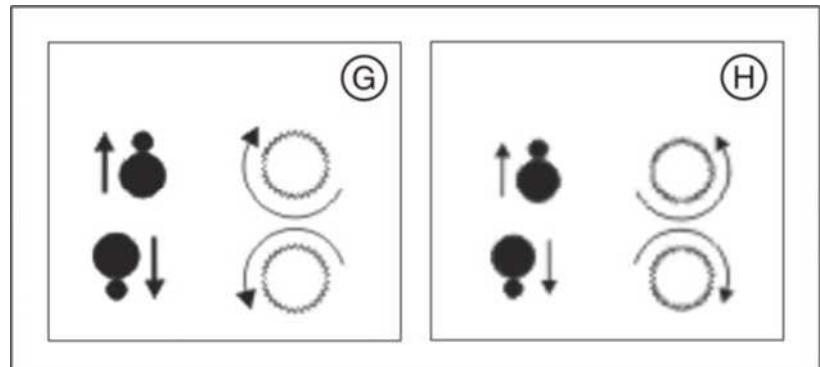


2. Loosen the screws (E) slightly (approx. 2 - 3 turns).  
**Tip:** Do not unscrew them fully!





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.
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 [ → 221].

#### Following adjustment



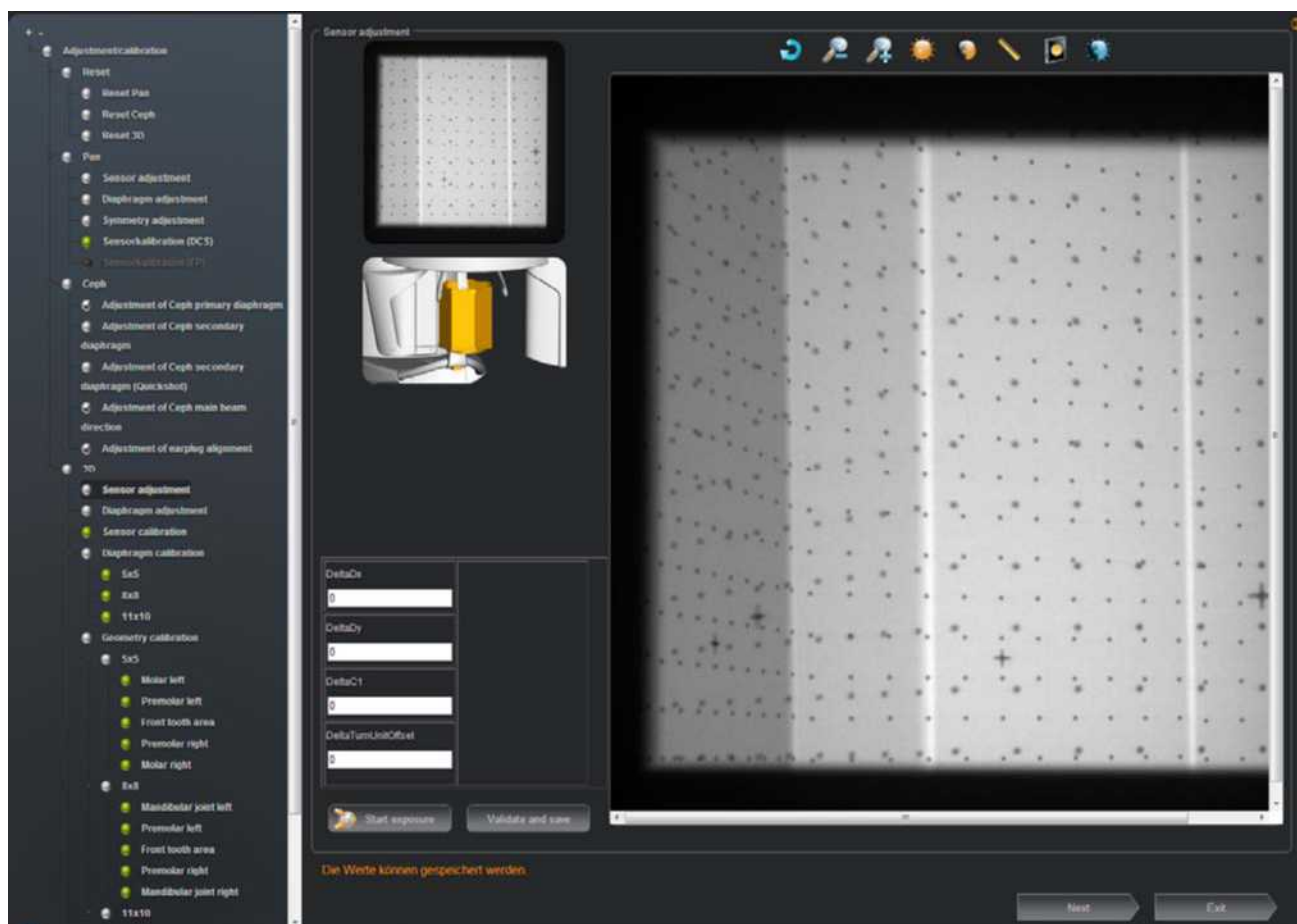
## 7.2.2 3D adjustment/calibration

### IMPORTANT

For the 3D adjustment and calibration, the values in the input fields do not have to be equal to zero.

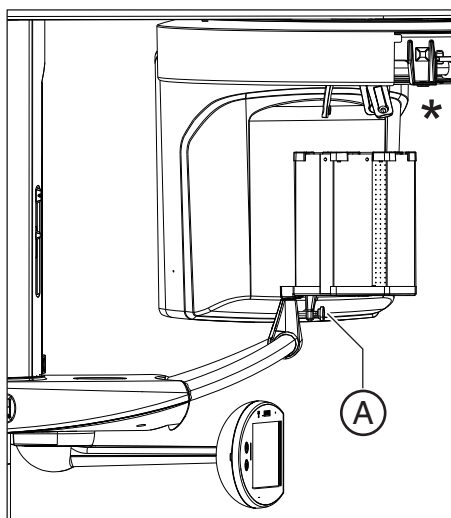
Confirmation of a successful adjustment and calibration is the message in the calibration menu action window; e.g. "Adjustment successful", "Values can be adopted", etc.

### 7.2.2.1 Sensor adjustment



1. Insert the 3D calibration block into the bite block holder on the unit.  
 [ → 179]



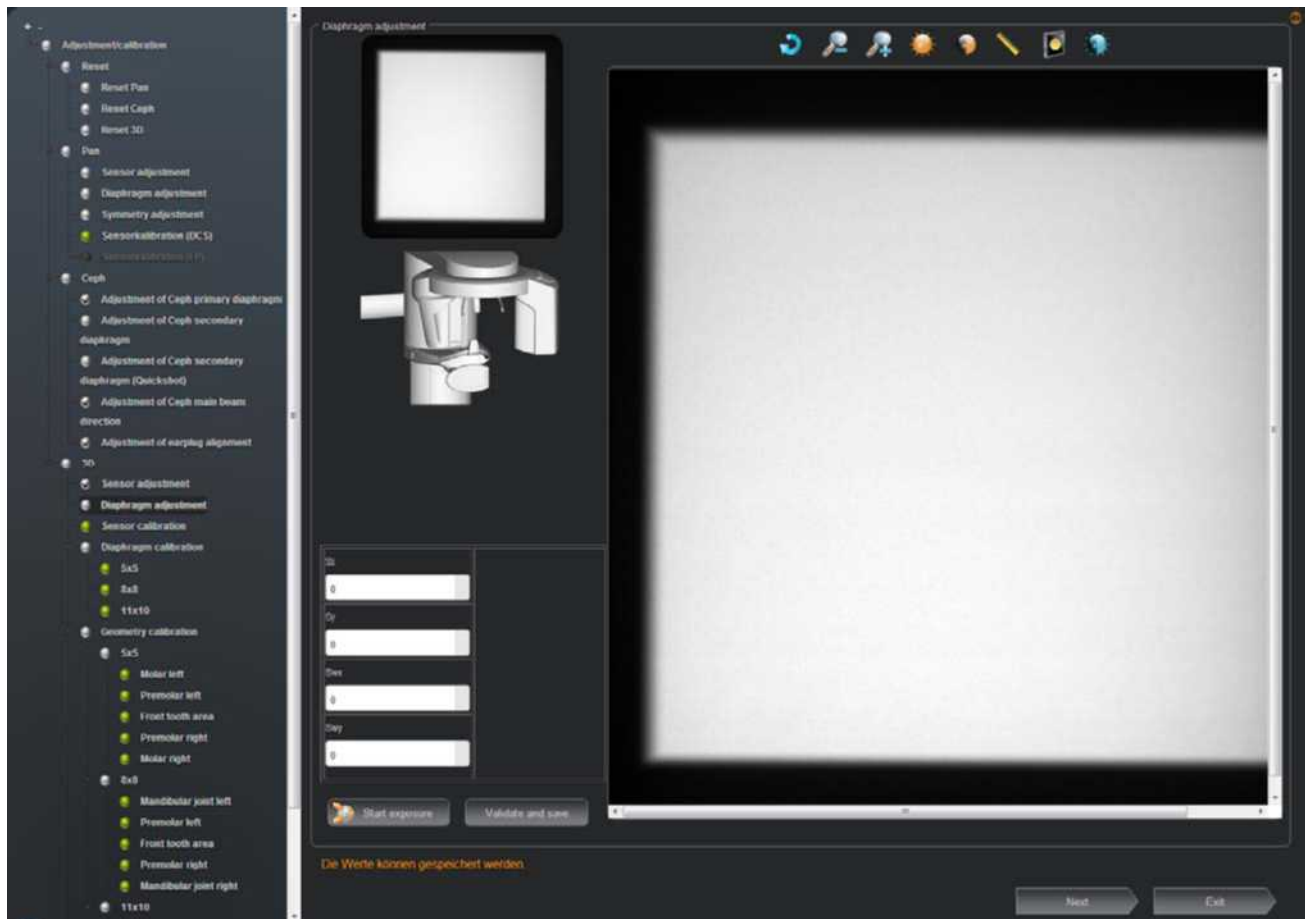


DeltaDx	0
DeltaDy	0
DeltaC1	0
DeltaTurnUnitOffset	0

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 [ → 164].
4. In the structure tree, under "3D", click on the "Sensor adjustment" element (S010.20).
5. Establish readiness for exposure [ → 175].
6. Create an exposure (85 kV / 22 mAs) [ → 175].  
↳ 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 [ → 175].  
↳ 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 [ → 228].



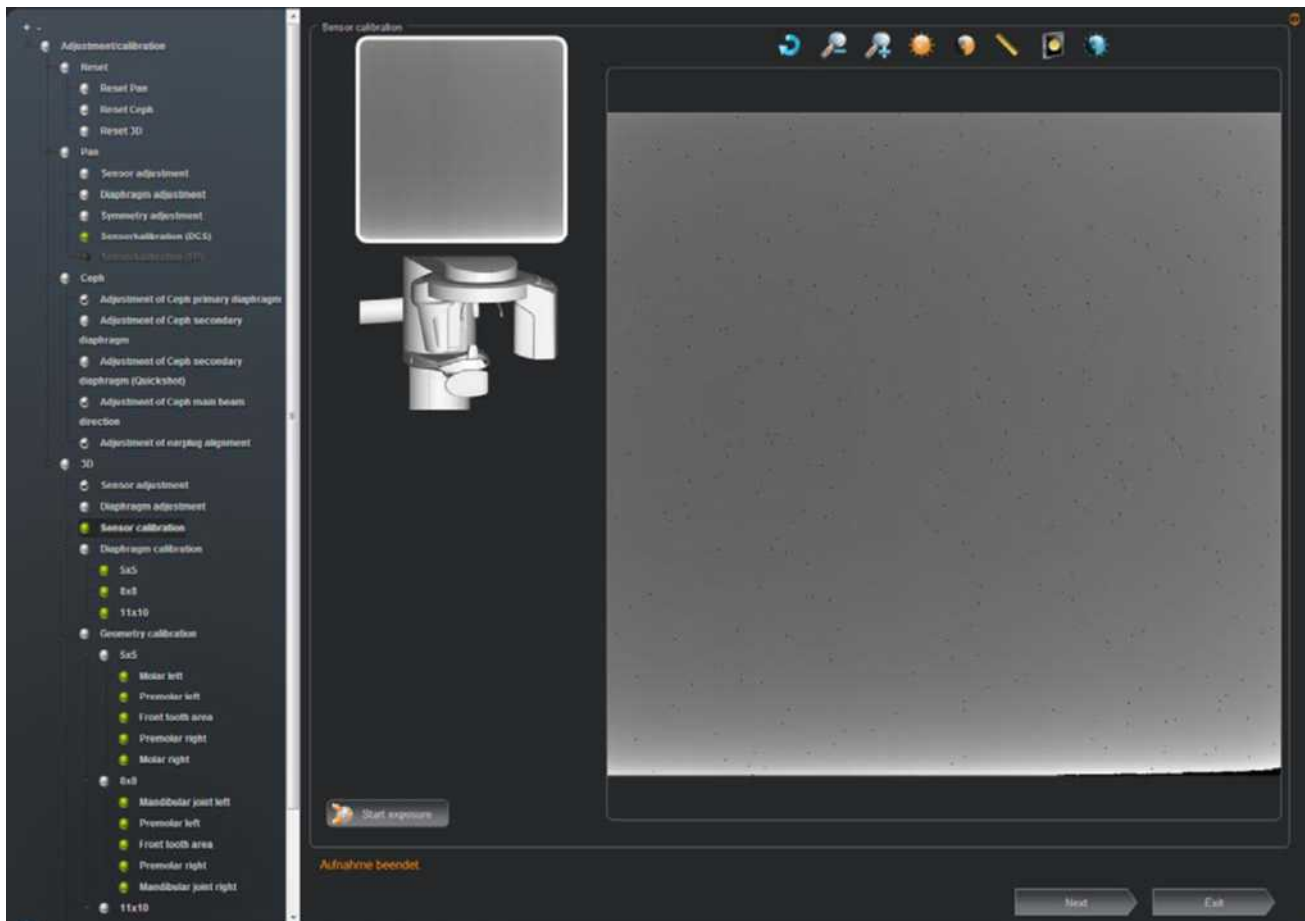
### 7.2.2.2 Diaphragm adjustment



- ✓ 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 [ → 175].
3. Create an exposure (85 kV / 0.34 mAs) [ → 175].
  - ✎ 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. [ → 175]
  - ✎ 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. [ → 229]



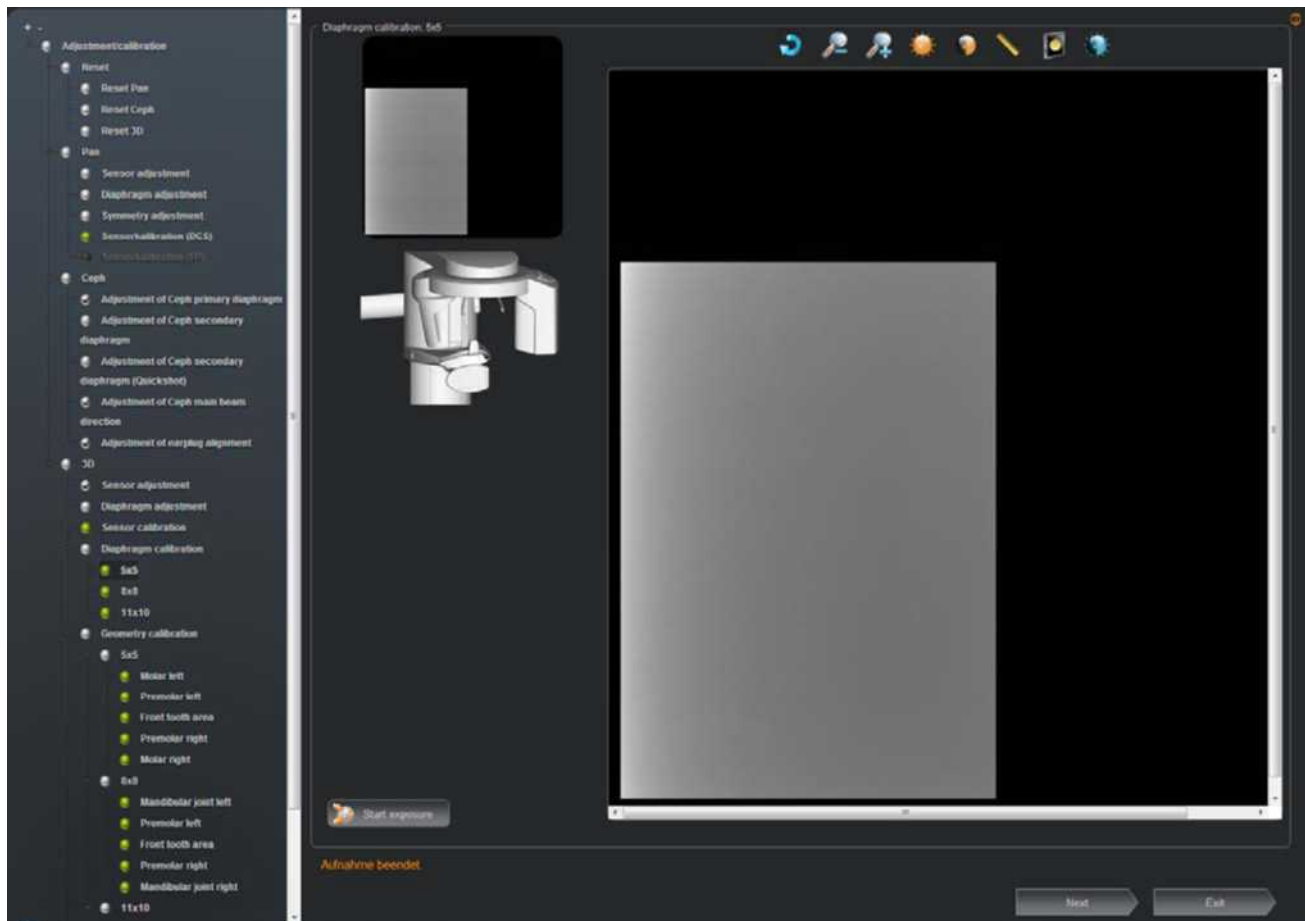
### 7.2.2.3 Sensor calibration



1. In the structure tree, under "3D", click on the "Sensor calibration" element (S010.64).
2. Establish [ → 175] receptivity.
3. Create an exposure (85 kV / 22 mAs) [ → 175].
  - ↳ 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 [ → 230].



## 7.2.2.4 Diaphragm configuration



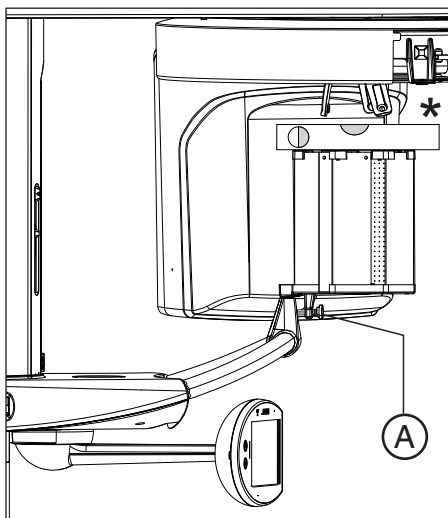
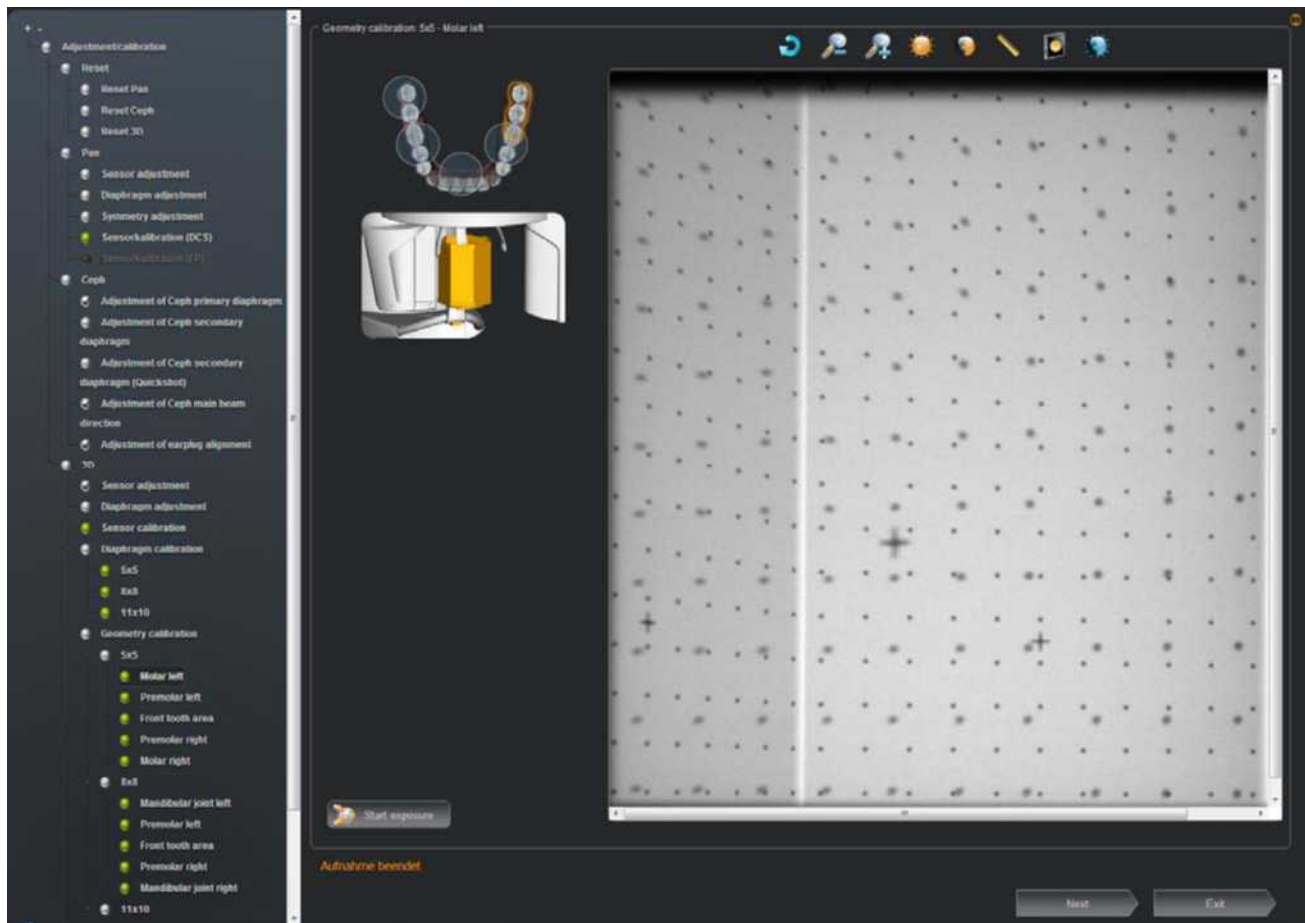
- ✓ The 3D calibration block *is not* in the bite block holder on the unit.
- 1. In the structure tree, under "3D" / "Diaphragm calibration", click on the "5x5" element (S030.11).
  - ↳ The "5x5" volume is selected.
- 2. Establish [ → 175] receptivity.
- 3. Create an exposure (85 kV / 0.34 mAs) [ → 175].
  - ↳ 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 [ → 175] receptivity.



6. Take an exposure (85kV / 0.34 mAs) [ → 175].
  - ✎ 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 [ → 175] receptivity.
9. Take an exposure (85kV / 0.34 mAs) [ → 175].
  - ✎ 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. [ → 232]



### 7.2.2.5 Geometry calibration



1. Insert the 3D calibration block into the bite block holder on the unit.  
[ → 179]
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 [ → 175] receptivity.
5. Create an exposure (85kV / 22 mAs) [ → 175].  
↳ 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".

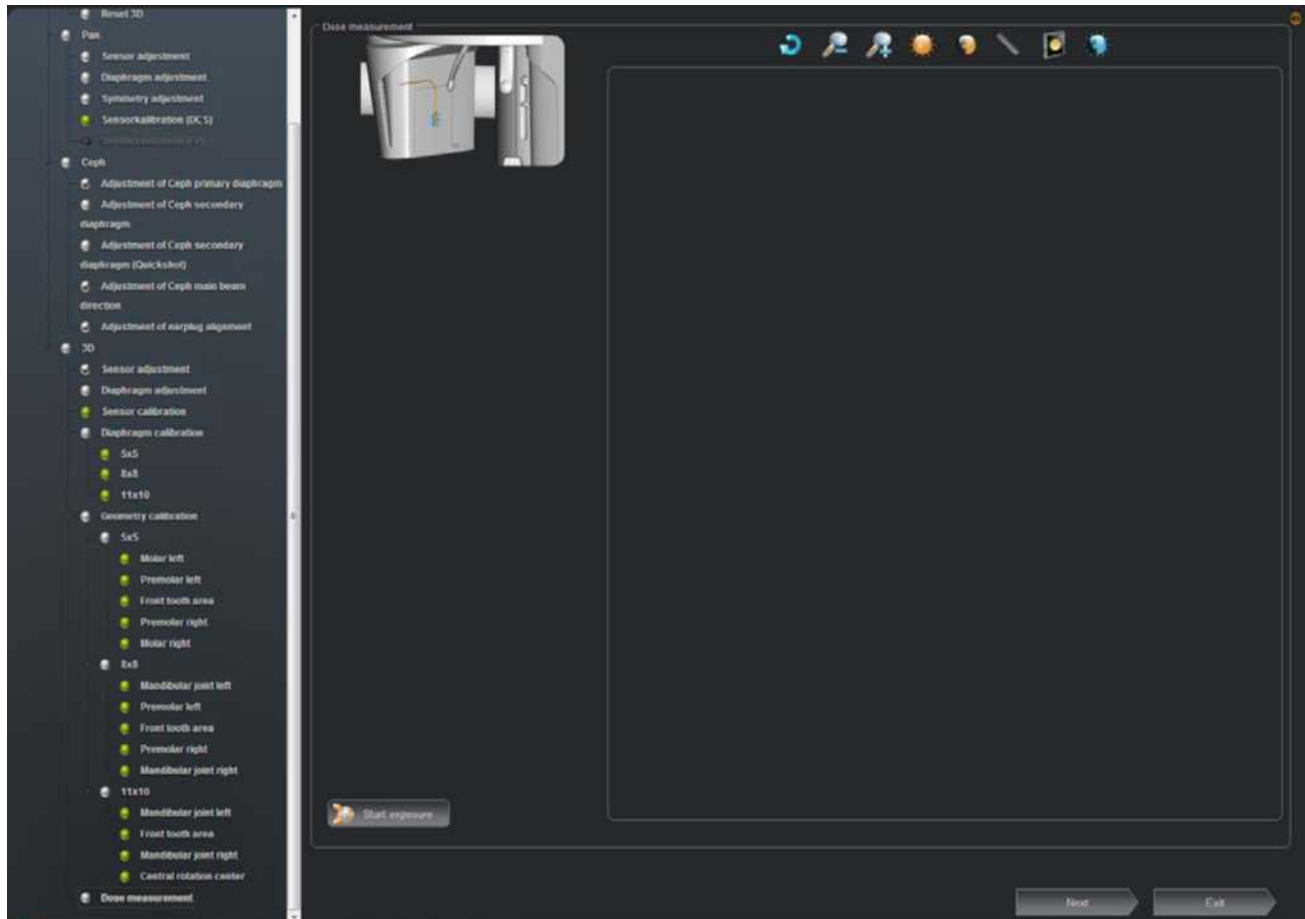


8. Establish [ → 175] receptivity.
9. Take an exposure (85kV/22 mAs) [ → 175].
  - ↳ A message is displayed in the action window to indicate whether adjustment has been successful and the status indicator in front of the "5x5" / "Premolar left" element in the structure tree responds accordingly:
    - 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.



### 7.2.2.6 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 [ → 175] receptivity.
5. Create an exposure (85kV / 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.

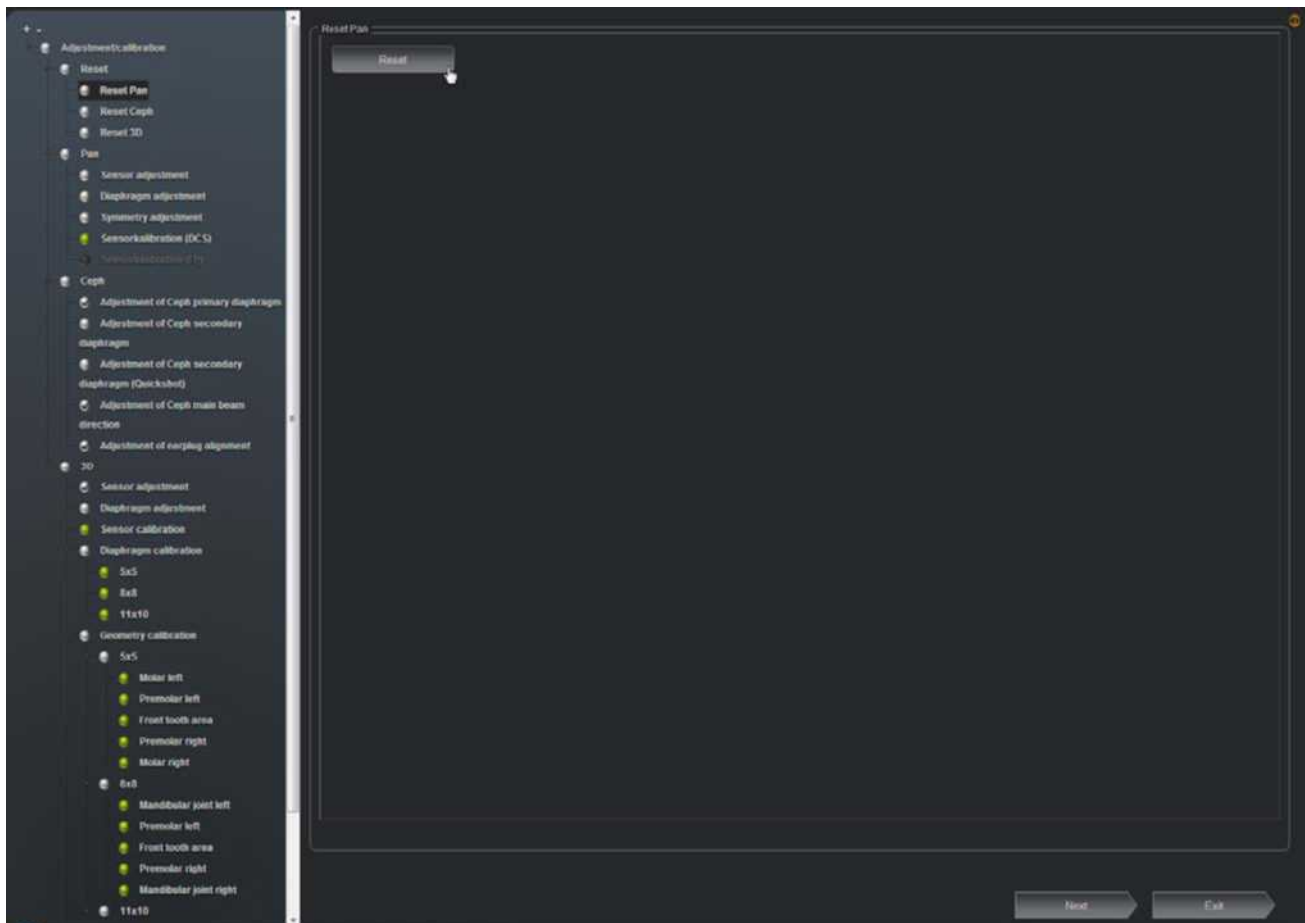


### 7.2.3 Resetting adjustment/calibration

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.



## 7.3 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

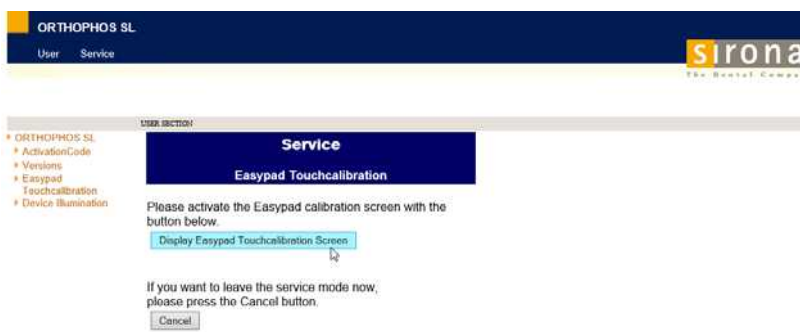
**Tip:** The IP address of your unit can be found on the info screen.

- 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.

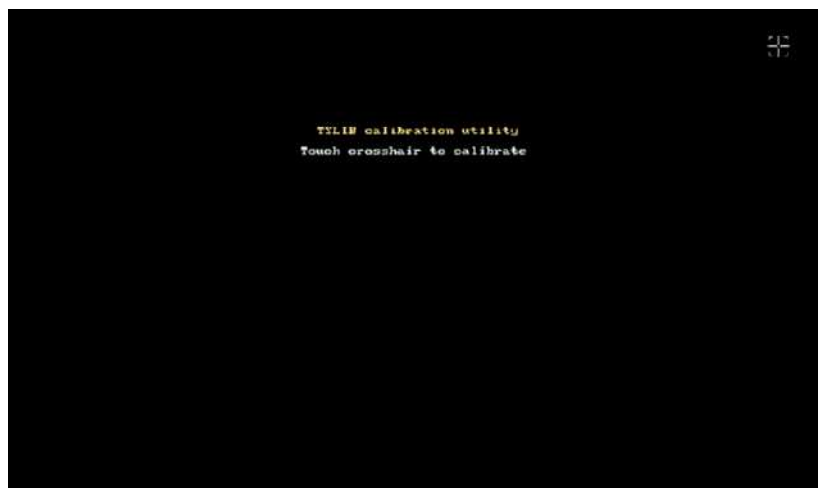




- A message is displayed in the web browser to indicate that the adjustment screen has been opened on the display.
- The **first adjustment screen** appears on the control panel.

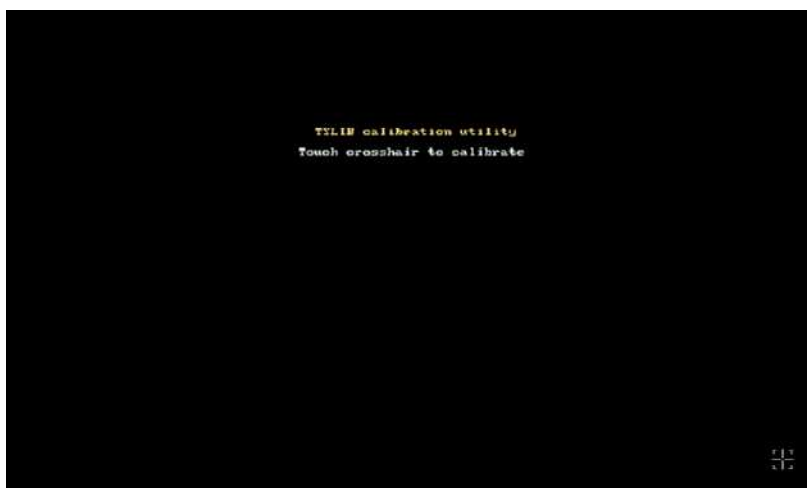


6. Touch the center of the square in the **top left** corner of the screen.

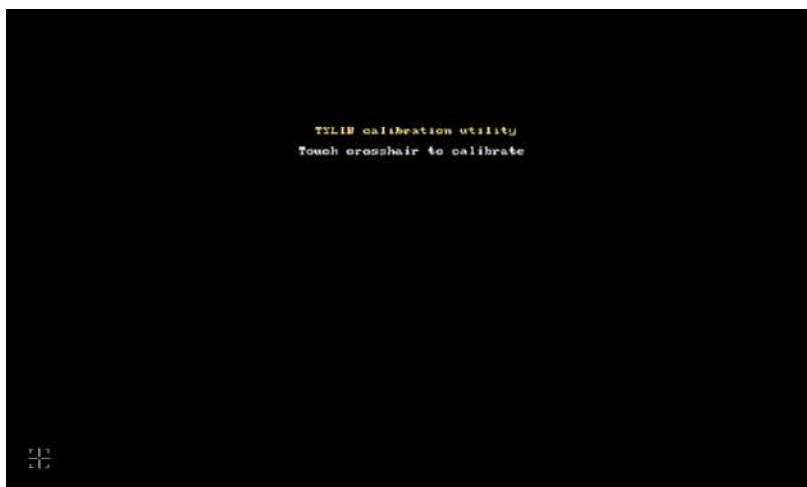


7. Touch the center of the square in the **top right** corner of the screen.





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.



## 8 Service routines

### 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.

### 8.1 Perform service routines via the control panel

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 [→ 327]).

#### 8.1.1 Overview of service routines

##### 8.1.1.1 List of all service routines available for selection

Service routine	Function	see
S001	Radiation without rotary movement, fixed maximum radiation time	S. [→ 253]
S002	Radiation without rotary movement, selectable kV/mA level and maximum radiation time	S. [→ 255]
S002.1	Radiation without rotary movement; selectable kV/mA level and maximum radiation time; primary diaphragm in last position selected	S. [→ 255]
S002.3	Radiation without rotary movement; selectable kV/mA level and maximum radiation time (max. 14s); primary diaphragm fully opened with respect to PAN position	S. [→ 256]
S002.4	Radiation without rotation; maximum radiation time selectable; the primary diaphragm is set to a widened opening symmetrical to the PAN setting so that the step filter still remains covered	S. [→ 258]
S005	General X-ray tube assembly service	S. [→ 260]
S005.2	Automatic adjustment of preheating	S. [→ 260]
S005.4	Tube assembly fan test	S. [→ 261]
S005.5	Temperature sensor test, single tank	S. [→ 262]
S005.6	Switch off cool-down interval of the single tank	S. [→ 262]
S005.7	Configuring continuous operation of the tube assembly fan	S. [→ 264]
S007	Fault buffer	S. [→ 265]
S007.1	View error memory	S. [→ 265]
S007.2	Clear error memory	S. [→ 266]
S008	Update service	S. [→ 267]
S008.2*	Overview of module software versions	S. [→ 267]
S008.3*	Confirming the unit serial number	S. [→ 267]



Service routine	Function	see
<b>S009</b>	<b>Flash file system</b>	S. [ → 268]
S009.4	Formatting flash file system	S. [ → 268]
<b>S011</b>	<b>Dosimetry (without ring movement)</b>	S. [ → 269]
S011.14	Dosimetry with continuous radiation	S. [ → 269]
S011.24	Dosimetry with pulsed radiation	S. [ → 271]
<b>S012</b>	<b>CAN bus service</b>	S. [ → 272]
S012.1	Presence display of modules	S. [ → 272]
S012.2	Inquiry of the CAN status register of the modules	S. [ → 273]
S012.3	Resetting the CAN status register of the modules	S. [ → 274]
S012.4	Display of CAN bus cycle on the LEDs of the modules	S. [ → 274]
<b>S014</b>	<b>Rotation motor service</b>	S. [ → 275]
S014.3	Free travel of rotational drive	S. [ → 275]
S014.4	Display of light barrier signals of rotational drive	S. [ → 275]
<b>S015</b>	<b>Actuator service</b>	S. [ → 276]
S015.5	Functional test of actuators 1 + 2	S. [ → 276]
<b>S017</b>	<b>Configuration service</b>	S. [ → 277]
S017.2*	Configuring the hardware version	S. [ → 278]
S017.3*	Enter the country group code	S. [ → 281]
S017.4*	Select a language	S. [ → 282]
S017.6*	Activating / deactivating the remote control	S. [ → 283]
S017.8*	Selecting the kV/mA level series	S. [ → 284]
S017.13*	Enable/disable the welcome screen	S. [ → 285]
S017.14*	Enable/disable certain lines of the welcome screen	S. [ → 286]
S017.15*	Activate/deactivate the acoustic signal for end of exposure	S. [ → 287]
S017.18*	Activation/deactivation of occlusal bite block function	S. [ → 288]
<b>S018</b>	<b>Service for height adjustment</b>	S. [ → 289]
S018.2	Set the maximum travel height	S. [ → 289]
S018.3	Undo the maximum travel height setting	S. [ → 290]
S018.4	Check the height adjustment sensor system	S. [ → 291]
S018.5	Setting the minimum travel height	S. [ → 292]
S018.6	Undoing the minimum travel height setting	S. [ → 292]
S018.7	Set the nominal angle for the occlusal bite block as required by the customer.	S. [ → 293]
S018.8	Functional check of the occlusal bite block	S. [ → 295]
S018.9	Calibrating the occlusal bite block	S. [ → 297]
S018.10	Setting the PWM values for the height adjustment creep speed	S. [ → 299]
<b>S020</b>	<b>Service for temple support</b>	S. [ → 300]
S020.1	Programming the switching thresholds of the temple support	S. [ → 300]



Service routine	Function	see
<b>S021</b>	<b>Service for the packing position</b>	S. [ → 304]
S021.3	Initiate the packing position for the diaphragm	S. [ → 302]
S021.4	Initiate the packing position for the sensor unit	S. [ → 303]
<b>S032</b>	<b>Sensor test</b>	S. [ → 304]
S032.10	Self-test of the DCS image data path	S. [ → 304]
S032.50	Self-test of the FP image data path	S. [ → 305]
<b>S033</b> (Ceph units only)	<b>Test of the ceph image path</b>	S. [ → 307]
S033.10	Test of the ceph image path	S. [ → 307]
<b>S034</b>	<b>Service for the digital cephalometer</b>	S. [ → 309]
S034.4	Calibrating / displaying the center position of ceph scan sensor axis	S. [ → 309]
S034.5	Display/calibrate center position of Ceph scan secondary diaphragm axis	S. [ → 313]
S034.6	Moving to the Ceph packing position	S. [ → 316]
S034.8	User-specific determination of the shadowing limit for C1 and C2	S. [ → 317]
S034.9	User-specific determination of the shadowing limit for C3 and C3 30x23	S. [ → 318]
<b>S037</b>	<b>Network service</b>	S. [ → 320]
S037.1	Displaying the network data	S. [ → 320]
S037.2	Setting the default IP address, default gateway address and default subnet mask	S. [ → 322]
S037.3*	Configuring boot mode: DYNAMIC (DHCP/AutoIP) / STATIC (fixed address)	S. [ → 323]
S037.4*	Manual input of static network settings (IP address, default gateway address, and subnet mask)	S. [ → 324]

\*) operable also via WEB service



### 8.1.1.2 Alphabetical list of service routine functions

Function	Service routine	see
Inquiry of the CAN status register of the modules	S012.2	S. [ → 273]
Switch off cool-down interval of the single tank	S005.6	S. [ → 262]
Activation/deactivation of occlusal bite block function	S017.18*	S. [ → 288]
Actuator service	S015	S. [ → 276]
Activate/deactivate the acoustic signal for end of exposure	S017.15*	S. [ → 287]
General X-ray tube assembly service	S005	S. [ → 260]
User-specific determination of the shadowing limit for C1 and C2	S034.8	S. [ → 317]
User-specific determination of the shadowing limit for C3 and C3 30x23	S034.9	S. [ → 318]
Presence display of modules	S012.1	S. [ → 272]
Display of CAN bus cycle on the LEDs of the modules	S012.4	S. [ → 274]
Display of light barrier signals of rotational drive	S014.4	S. [ → 275]
Automatic adjustment of preheating	S005.2	S. [ → 260]
Undo the maximum travel height setting	S018.3	S. [ → 290]
Undoing the minimum travel height setting	S018.6	S. [ → 292]
Enable/disable the welcome screen	S017.13*	S. [ → 285]
Confirming the unit serial number	S008.3*	S. [ → 267]
Configuring boot mode: DYNAMIC (DHCP/AutoIP) / STATIC (fixed address)	S037.3*	S. [ → 323]
CAN bus service	S012	S. [ → 272]
Moving to the Ceph packing position	S034.6	S. [ → 316]
Configuring continuous operation of the tube assembly fan	S005.7	S. [ → 264]
Dosimetry (without ring movement)	S011	S. [ → 269]
Dosimetry with pulsed radiation	S011.24	S. [ → 271]
Dosimetry with continuous radiation	S011.14	S. [ → 269]
Set the nominal angle for the occlusal bite block as required by the customer.	S018.7	S. [ → 293]
Fault buffer	S007	S. [ → 265]
View error memory	S007.1	S. [ → 265]
Clear error memory	S007.2	S. [ → 266]
Activating / deactivating the remote control	S017.6*	S. [ → 283]
Flash file system	S009	S. [ → 268]
Formatting flash file system	S009.4	S. [ → 268]
Free travel of rotational drive	S014.3	S. [ → 275]
Functional check of the occlusal bite block	S018.8	S. [ → 295]
Functional test of actuators 1 + 2	S015.5	S. [ → 276]
Configuring the hardware version	S017.2*	S. [ → 278]
Enter the country group code	S017.3*	S. [ → 281]



Function	Service routine	see
Setting the default IP address, default gateway address and default subnet mask	S037.2	S. [ → 322]
Calibrating the occlusal bite block	S018.9	S. [ → 297]
Configuration service	S017	S. [ → 277]
Selecting the kV/mA level series	S017.8*	S. [ → 284]
Tube assembly fan test	S005.4	S. [ → 261]
Manual input of static network settings (IP address, default gateway address, and subnet mask)	S037.4*	S. [ → 324]
Set the maximum travel height	S018.2	S. [ → 289]
Setting the minimum travel height	S018.5	S. [ → 292]
Display/calibrate center position of Ceph scan secondary diaphragm axis	S034.5	S. [ → 313]
Calibrating / displaying the center position of cephal scan sensor axis	S034.4	S. [ → 309]
Network service	S037	S. [ → 320]
Displaying the network data	S037.1	S. [ → 320]
Programming the switching thresholds of the temple support	S020.1	S. [ → 300]
Setting the PWM values for the height adjustment creep speed	S018.10	S. [ → 299]
Resetting the CAN status register of the modules	S012.3	S. [ → 274]
Self-test of the DCS image data path	S032.10	S. [ → 304]
Self-test of the FP image data path	S032.50	S. [ → 305]
Check the height adjustment sensor system	S018.4	S. [ → 291]
Sensor test	S032	S. [ → 304]
Service for height adjustment	S018	S. [ → 289]
Service for motor-driven diaphragm	S021	S. [ → 304]
Service for temple support	S020	S. [ → 300]
Service for the digital cephalometer	S034	S. [ → 309]
Select a language	S017.4*	S. [ → 282]
Radiation without rotary movement; selectable kV/mA level and maximum radiation time (max. 14s); primary diaphragm fully opened with respect to PAN position	S002.3	S. [ → 256]
Radiation without rotary movement, fixed maximum radiation time	S001	S. [ → 253]
Radiation without rotary movement, selectable kV/mA level and maximum radiation time	S002	S. [ → 255]
Radiation without rotary movement; selectable kV/mA level and maximum radiation time; primary diaphragm in last position selected	S002.1	S. [ → 255]
Radiation without rotation; maximum radiation time selectable; the primary diaphragm is set to a widened opening symmetrical to the PAN setting so that the step filter still remains covered	S002.4	S. [ → 258]
Temperature sensor test, single tank	S005.5	S. [ → 262]
Test of the cephal image path	S033 (Ceph units only)	S. [ → 307]



Function	Service routine	see
Test of the ceph image path	S033.10	S. [ → 307]
Overview of module software versions	S008.2*	S. [ → 267]
Rotation motor service	S014	S. [ → 275]
Update service	S008	S. [ → 267]
Initiate the packing position for the diaphragm	S021.3	S. [ → 302]
Initiate the packing position for the sensor unit	S021.4	S. [ → 303]
Enable/disable certain lines of the welcome screen	S017.14*	S. [ → 286]

\*) operable also via WEB service

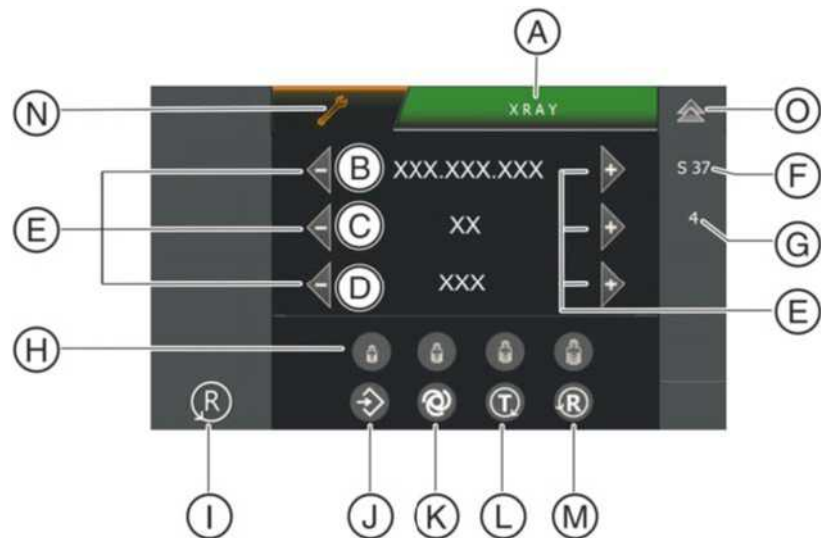


## 8.1.2 Service menu and service routines

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

### 8.1.2.1 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.



### 8.1.3 Basic operating procedures in the service menu of the control panel

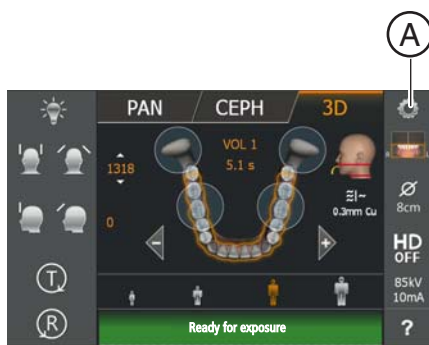
#### 8.1.3.1 Calling the service menu

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.

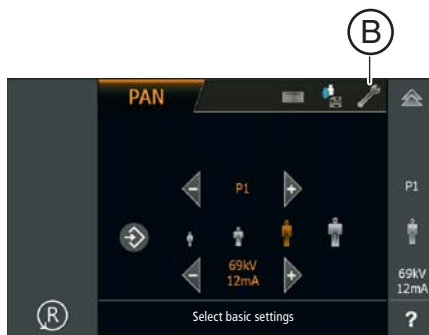
1. Touch the toothed wheel (A) in the upper right corner of the touchscreen.

↳ Level 2 is displayed.



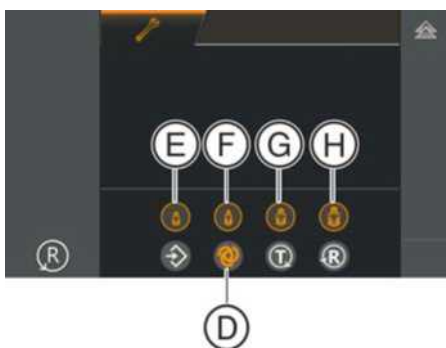
2. Touch the wrench symbol (B).

↳ 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.



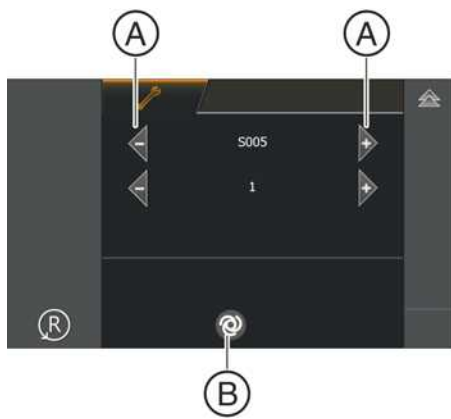
↳ The service menu is opened.





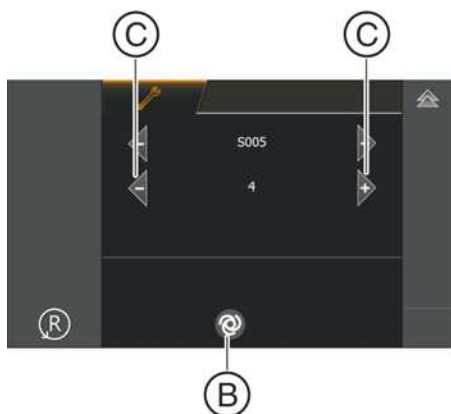
### 8.1.3.2 Selecting service routines and test steps

#### 8.1.3.2.1 Selecting a service routine

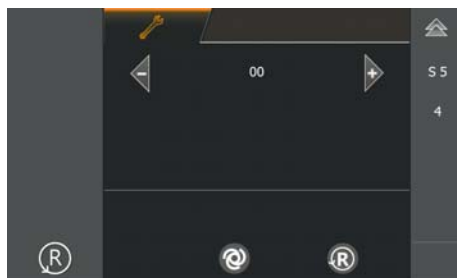


- ✓ The service menu must be selected.
- Select the desired service routine via the arrow keys in the selection field 1 (A) and confirm the selection via the service key (B).  
If the selected service routine has several test steps, the first selectable test step is displayed in selection field 2 (test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

#### 8.1.3.2.2 Selecting a test step



- ✓ The required service routine must be selected [ → 249].
- 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).



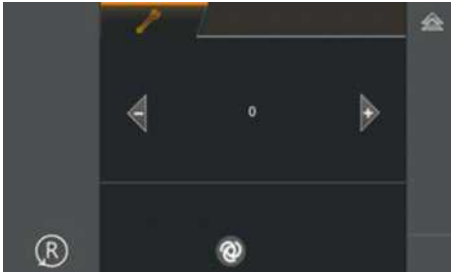
### 8.1.3.2.3 Service routines with security access

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.

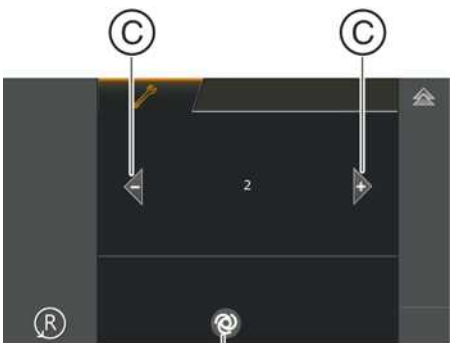
To select a service routine or test step with security access, proceed as follows:

1. Select the service routine or the test step, and confirm your selection with the Service key [→ 249].

➤ 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.

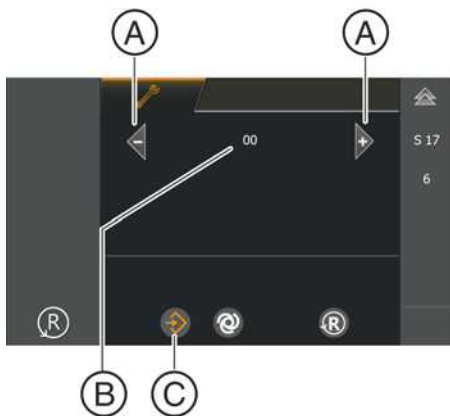
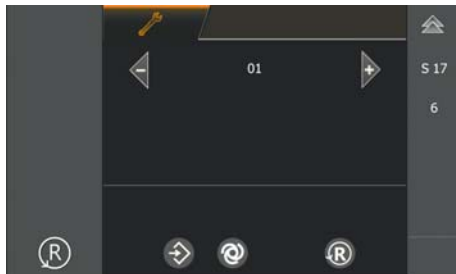




### 8.1.3.3 Select parameters

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.

### 8.1.3.4 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

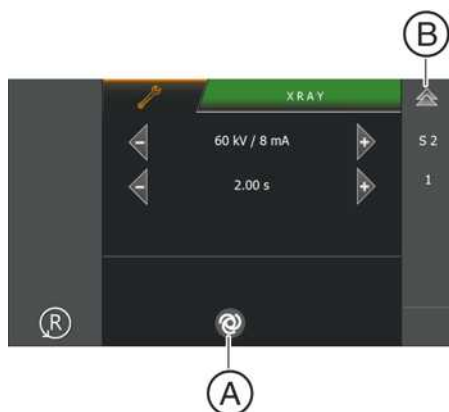


You want to run service routine S017.6 to save the selected option "Remote control disabled".

- ✓ 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.



#### 8.1.3.5 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.



### 8.1.4 S001: Radiation without rotary movement, fixed maximum radiation time

SR*	SA**	Function
S001	yes	X-ray beam test kV/ma levels test Explanation: <ul style="list-style-type: none"> <li>• Radiation with selected kV/mA level</li> <li>• Radiation time cannot be selected, max. 14.0 s</li> <li>• Primary diaphragm remains in last position selected</li> </ul>

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

#### WARNING

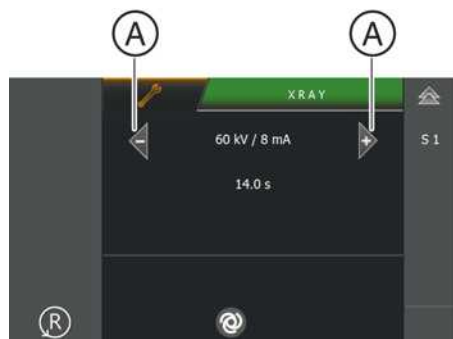
##### Unit is radiating X-rays

Excess exposure to X-rays is detrimental to health.

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

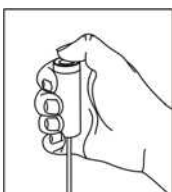
Selection field	Parameter/Display	Range of values
1	kV/mA level	60 kV/3mA – 90kV/12mA –
2	Radiation time	14s

Factory settings: 60kV/8mA –



1. Call service routine S001 [ → 249].  
The maximum radiation time is displayed in selection field 2. The maximum radiation time cannot be changed in this service routine. It is set to 14.0 seconds. Radiation is emitted as long as the release button remains pressed, but for no longer than 14.0 seconds.
2. Use the arrow keys (A) in selection field 1 to select the required kV/ mA level (see table).



**3. Initiate the radiation.**

- ✎ Radiation is released from any tube assembly position.
- ✎ There is no rotational movement.
- ✎ The primary diaphragm is in the last position set.
- ✎ The radiation time is 14.0 seconds.

**IMPORTANT:** If you let go of the release button before this radiation time expires, radiation will be terminated prematurely. The actual radiation time is *not* displayed.

When you release radiation during the cool-down interval, a countdown of the remaining waiting time is displayed in the title bar of the control panel (automatic exposure blocking).

Radiation is emitted as long as the release button remains pressed, but for no longer than 14.0 seconds.

**4. Exit the service routine [ → 252].**



### 8.1.5 S002: Radiation without rotary movement, selectable kV/ mA level and maximum radiation time

S002	SA**	Function
S002		X-ray beam test Explanation: <ul style="list-style-type: none"> <li>• Radiation with selected kV/mA level</li> <li>• Maximum radiation time selectable</li> <li>• Radiation from any position</li> </ul>
S002.1	yes	The primary diaphragm remains in the last position selected.
S002.3	yes	The primary diaphragm is opened fully.
S002.4	yes	The primary diaphragm is set to a widened opening symmetrical to the PAN setting so that the step filter still remains covered.

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

#### 8.1.5.1 S002: Test step 1

**Radiation without rotary movement; selectable kV/mA level and maximum radiation time; primary diaphragm in last position selected**

#### WARNING

##### Unit is radiating X-rays

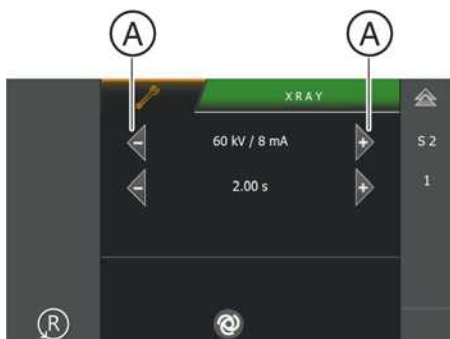
Excess exposure to X-rays is detrimental to health.

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

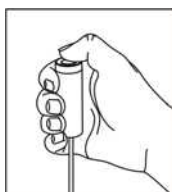
Selection field	Parameters	Range of values
1	kV/mA level	60 kV/3mA – 90kV/12mA –
2	Radiation time	0.1s – 4s

Factory settings: 60kV/8mA, 2s

1. Call service routine S002.1 [ → 249].
2. Use the arrow keys (A) to select the required kV/mA level and the required radiation time (see table).







3. Initiate the radiation.

- ✎ Radiation is released from any tube assembly position.
- ✎ There is no rotational movement.
- ✎ The primary diaphragm is in the last position set.
- ✎ The radiation time corresponds to the selected radiation time.  
**Important:** If you let go of the release button before this radiation time expires, radiation will be terminated prematurely. The actual radiation time is not displayed.  
When you release radiation during the cool-down interval, a countdown of the remaining waiting time is displayed in the title bar of the control panel (automatic exposure blocking).

4. Exit the service routine [ → 252].

8.1.5.2 S002: Test step 3

**Radiation without rotary movement; selectable kV/mA level and maximum radiation time; primary diaphragm fully opened with respect to PAN position.**

**! WARNING**

**Unit is radiating X-rays**

Excess exposure to X-rays is detrimental to health.

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

Selection field	Parameters	Range of values
1	kV/mA level	60 kV/3mA – 90kV/12mA –
2	Radiation time	0.1s – 4s

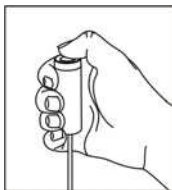
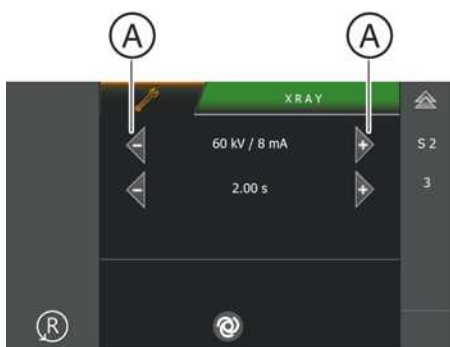
Factory settings: 60kV/8mA, 2s

1. Call service routine S002.3 [ → 249].

- ✎ Calling this service routine moves the primary diaphragm to the new position (fully opened with respect to PAN position). During this time, a progress indicator is displayed in selection field 1.







2. Use the arrow keys (A) to select the required kV/mA level and the required radiation time (see table).

3. Initiate the radiation.

- ↗ Radiation is released from any tube assembly position.
- ↗ There is no rotational movement.
- ↗ The primary diaphragm is opened fully.
- ↗ The radiation time corresponds to the selected radiation time.  
**Important:** If you let go of the release button before this radiation time expires, radiation will be terminated prematurely. The actual radiation time is not displayed.  
When you release radiation during the cool-down interval, a countdown of the remaining waiting time is displayed in the title bar of the control panel (automatic exposure blocking).

4. Exit the service routine [ → 252].



### 8.1.5.3 S002: Test step 4

Radiation without rotation; maximum radiation time selectable; the primary diaphragm is set to a widened opening symmetrical to the PAN setting so that the step filter still remains covered.

#### WARNING

**Unit is radiating X-rays.**

Excess exposure to X-rays is detrimental to health.

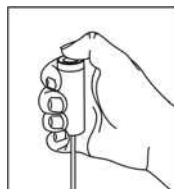
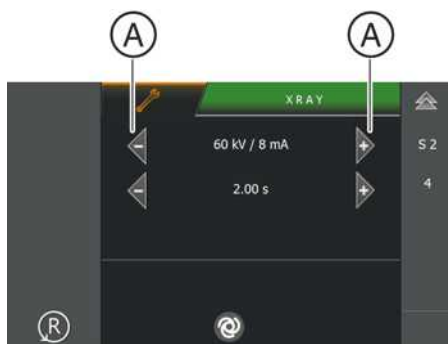
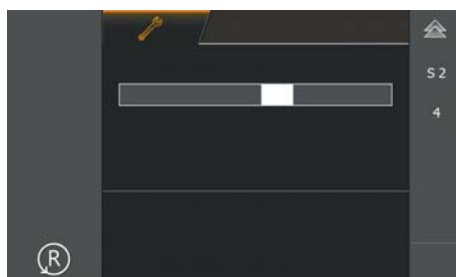
- Use the prescribed accessories for radiation protection.
- Do not stay in the X-ray room during exposure. Move as far away from the unit as the coiled cable for the release button allows you to.

Selection field	Parameters	Range of values
1	kV/mA level	60kV/3mA – 90kV/12mA –
2	Radiation time	0.1s – 4s

Factory settings: 60kV/8mA, 2s

1. Call service routine S002.4 [ → 249].

- ✎ Selecting test step 4 moves the primary diaphragm to the new position (opened fully and symmetrical to PAN) and puts the step filter into the beam path. During this time, a progress indicator is displayed in selection field 1.



2. Use the arrow keys (A) to select the required kV/mA level and the required radiation time (see table).
3. Initiate the radiation.

- ✎ Radiation is released from any tube assembly position.
- ✎ There is no rotational movement.
- ✎ The primary diaphragm is opened symmetrical to the PAN setting.
- ✎ The step filter is in the beam path.



- ↩ The radiation time corresponds to the selected radiation time.  
**Important:** If you let go of the release button before this radiation time expires, radiation will be terminated prematurely. The actual radiation time is not displayed.  
When you release radiation during the cool-down interval, a countdown of the remaining waiting time is displayed in the title bar of the control panel (automatic exposure blocking).

4. Exit the service routine [ → 252].



### 8.1.6 S005: General X-ray tube assembly service

SR*	SA**	Function
S005		General X-ray tube assembly service
S005.2	yes	Automatic adjustment of preheating
S005.4	no	Fan test
S005.5	no	Temperature sensor test, single tank
S005.6	yes	Switch off cool-down interval of the single tank
S005.7	no	Configuring continuous operation of the tube assembly fan

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

#### 8.1.6.1 S005: Test step 2

##### Automatic adjustment of preheating

#### WARNING

##### Unit is radiating X-rays.

Excess exposure to X-rays is detrimental to health.

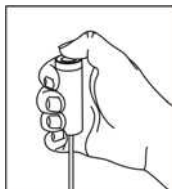
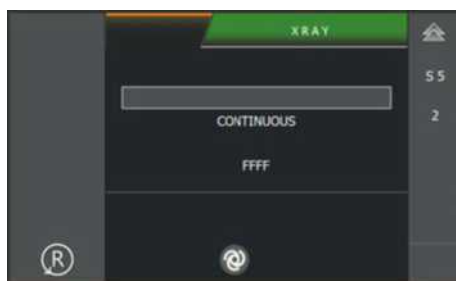
- Use the prescribed accessories for radiation protection.
- Do not stay in the X-ray room during exposure. Move as far away from the unit as the coiled cable for the release button allows you to.

#### IMPORTANT

The tube assembly must be at operating temperature before the compensation. To this end, run service routine S001 to release radiation once for 14.0 s at kV/mA level 60/8 [ → 253].

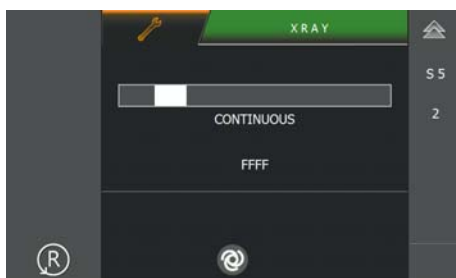
1. Call service routine S005.2 [ → 249].

- ↳ An inactive progress indicator in selection field 1 and the message "FFFF" in selection field 3 signal that the system is ready for compensation.



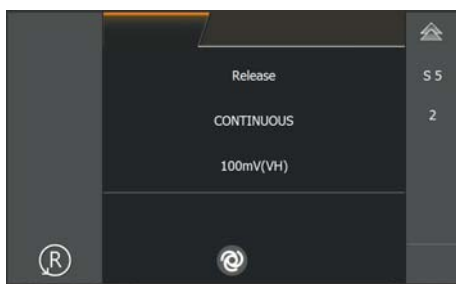
2. Start automatic adjustment by releasing radiation.  
**Important:** Keep pressing the release button until adjustment is completed and the new offset value for preheating is displayed. If you interrupt the adjustment procedure prematurely by letting go of the release button, the message "EEEE" appears in selection field 3. This message may have to be acknowledged by pressing the R key.





During the adjustment procedure, a progress indicator is displayed in selection field 1.

"CONTINUOUS" is displayed in selection field 2.



After a successful adjustment, the offset value is displayed in selection field 3. The "Release" note in selection field 1 requests that you let go of the release button.

3. Exit the service routine [ → 252].

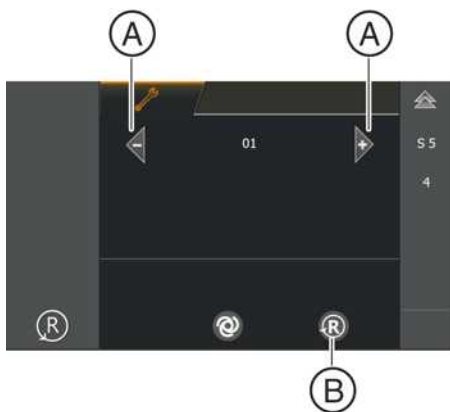
#### 8.1.6.2 S005: Test step 4

##### Fan test

Selection field	Code	Function
1	00	Fan off*
	01	Fan on

\* factory settings

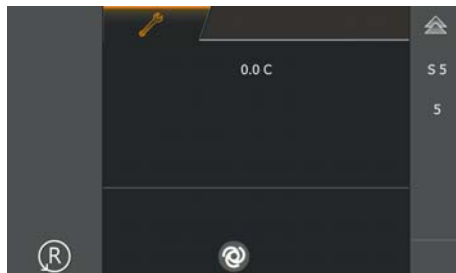
1. Call service routine S005.4 [ → 249].
2. Use the arrow keys (A) in selection field 1 to select the code "01" (see table).
3. Confirm your selection by pressing the R key (B).
  - ↳ The fan starts up.
4. Check the fan for running noise.
5. Exit the service routine [ → 252].  
Upon exiting the service routine, the fan is automatically switched off again.





### 8.1.6.3 S005: Test step 5

#### Temperature sensor test, single tank



1. Call service routine S005.5 [ → 249].  
↳ After the service routine has been selected, selection field 1 displays the single tank temperature in °C. The display is updated once per second.
2. Exit the service routine [ → 252].

### 8.1.6.4 S005: Test step 6

#### Switch off cool-down interval of the single tank

#### NOTICE

##### Risk of X-ray tube assembly failure

##### Running this service routine is irreversible!

The device is operated beyond its specifications afterwards. This may result in an X-ray tube assembly failure. As a result, the system warranty expires. SIRONA is able to prove this system setting after a system failure.

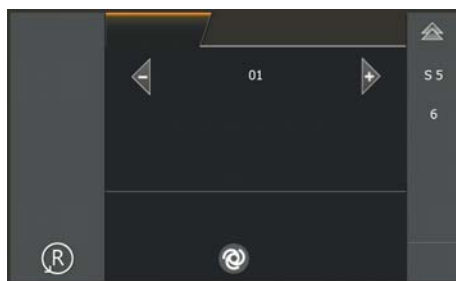
#### IMPORTANT

Upon explicit customer request, the monitored pulse/pause ratio can be disabled in exceptional cases. This can only be done once by running this service routine. Re-enabling the pulse/pause monitoring function is not possible, though. Such a one-time disablement can be displayed on the info screen and in the detail query by entering "PulsePause-Disable".

Selection field	Code	Function
1	00	Pulse/pause monitoring inactive
	01	Pulse/pause monitoring active*

\* factory settings

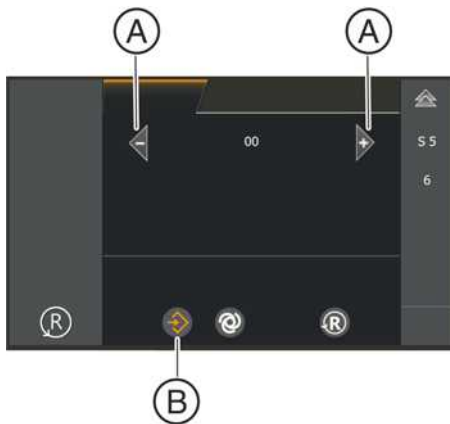
1. Call service routine S005.6 [ → 249].  
↳ The status of the pulse/pause treatment is displayed in selection field 1 (see table).







↳ If pulse/pause monitoring has already been disabled prematurely, this service routine simply displays the status and the arrow keys are not shown. The status cannot be changed.



2. To disable pulse/pause monitoring, use the arrow keys (A) to select the code "00".  
↳ The Memory key (B) lights up.
3. Save the setting [ → 251].  
↳ **PulsePause monitoring is irreversibly disabled.**
4. Exit the service routine [ → 252].



#### 8.1.6.5 S005: Test step 7

##### Configuring continuous operation of the tube assembly fan

###### NOTICE

###### Contamination of the fan and the single tank housing

Because of the expected greater contamination of the fan and of the single tank housing, the configuration of continuous operation is documented irreversibly on the tube assembly in order to obtain additional information in the case of returned goods.

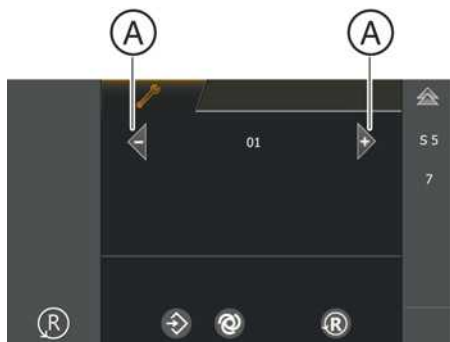
###### IMPORTANT

The tube assembly fan can be configured for continuous operation at the express wish of the customer. This can be done by running this service routine. The customer should be informed in advance about the increased noise generation to be expected. A demonstration of the fan noise can be made with service routine .

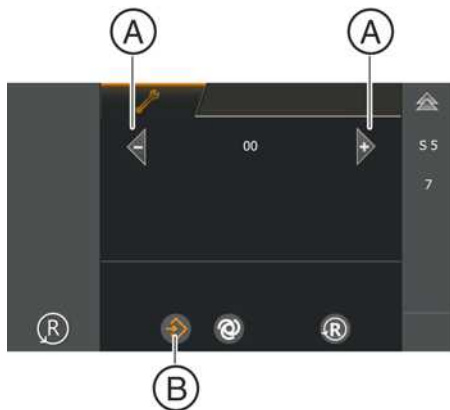
Selection field	Code	Function
1	00	Fan switches off (controlled operation)*
	01	Fan switches to continuous operation

\* factory settings

1. Call service routine S005.7 [ → 249].  
↳ The operating mode of the fan is displayed in selection field 1.



2. To set the fan to continuous operation, use the arrow keys (A) to select the code "00" (see table).  
↳ The Memory key (B) lights up.
3. Save the setting [ → 251].
4. Exit the service routine [ → 252].





### 8.1.7 S007: Fault buffer

SR*	SA**	Function
S007		Fault buffer
S007.1	No	View error memory
S007.2	Yes	Clear error memory

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

#### 8.1.7.1 S007: Test step 1

##### View error memory

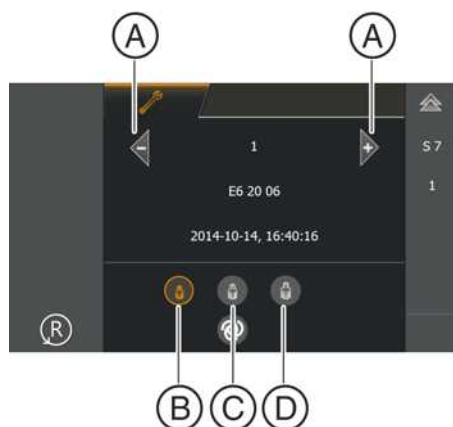
Besides the service routine S007.1, you may also query [ → 59] the error memory using the "Unit information".

Symbol on the control panel	Status	Function
Patient symbol key 1 (B)	is selected	Step width for scrolling between error events = 1*
Patient symbol key 2 (C)	is selected	Step width for scrolling between error events = 10
Patient symbol key 3 (D)	is selected	Step width for scrolling between error events = 100

Selection field	Selection/display
1	Error event
2	Error code for the selected event
3	Date and time of the selected error event

\* factory settings

1. Call service routine S007.1 [ → 249].
2. Use the patient symbol keys (B, C, D) to select the step width for scrolling between the error events (see table).  
↳ The selected patient symbol key lights up.
3. Use the arrow keys (A) in selection field 1 to select the required error event (in the example 1).  
↳ The corresponding error message is displayed [ → 84] in selection field 2.  
↳ Selection field 3 displays the date and time of the error event.
4. Exit the service routine [ → 252].





### 8.1.7.2 S007: Test step 2

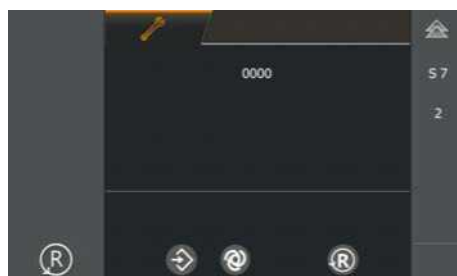
#### Clear error memory

1. Call service routine S007.2 [ → 249].

✎ The system's readiness to clear the memory is indicated by the display message "FFFF" in selection field 1. If the error memory does not contain any data, "0000" is displayed.



2. To clear the memory, press the Memory key (A) (R key (B) lights up) followed by the R key (B).



✎ Once the memory has been cleared, the message "0000" is displayed in selection field 1.

3. Exit the service routine [ → 252].







### 8.1.9 S009: Flash file system

#### IMPORTANT

When the flash file system is formatted, the content of the error logging memory is lost.

#### IMPORTANT

After running service routine SR 009.4 a software update to the currently installed software version must be performed to install the DX11 FGBA file again.

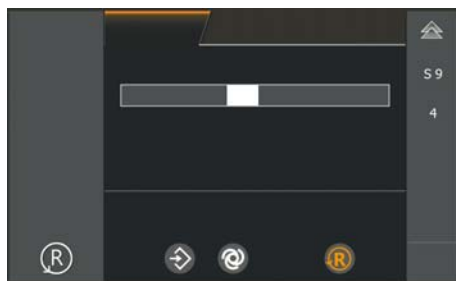
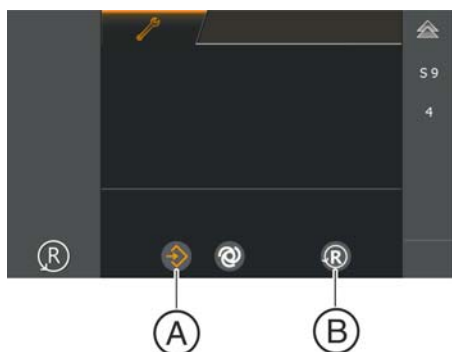
SR*	SA**	Function
S009		Flash file system
S009.4	yes	Initializing the flash file system
S009.5	No	Test flash file system

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

#### 8.1.9.1 S009: Test step 4

##### Formatting flash file system

1. Call service routine S009.4 [ → 249].
2. To initialize the flash file system, press the Memory key (A) (R key lights up), followed by the R key (B).



Flash file system formatting in progress. This process takes approx. 5-6 mins and is visualized by a progress indicator. The end of this process is indicated by the message "0000" in selection field 2.

3. Exit the service routine [ → 252].

#### 8.1.9.2 S009: Test step 5

##### Test flash file system



### 8.1.10 S011: Dosimetry (without ring movement)

#### WARNING

##### Unit is radiating X-rays.

Excess exposure to X-rays is detrimental to health.

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

SR*	SA**	Function
S011		Dosimetry (without ring movement)
S011.14	yes	Dosimetry with continuous radiation
S011.24	yes	Dosimetry with pulsed radiation

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

#### 8.1.10.1 S011: Test step 14

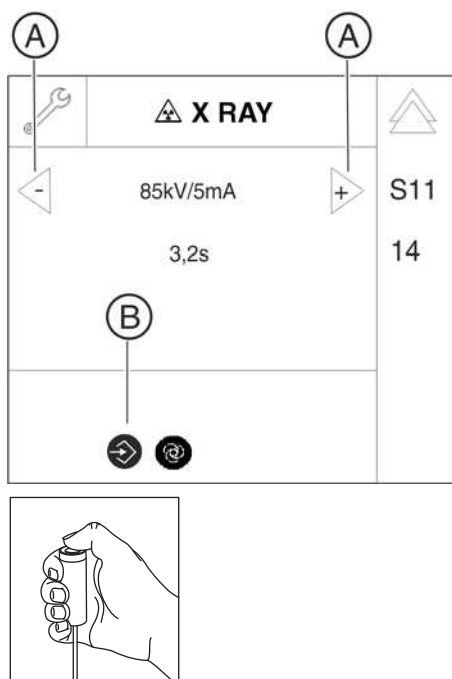
##### Dosimetry with continuous radiation

A standard dosimeter is required for dosimetry.

Selection field	Parameters	Range of values
1	kV/mA levels	85kV/5mA (3.2s) 85kV/7mA (5s) 85kV/10mA (5s) 85kV/13mA (5s)
2	Radiation time (not selectable)	3.2 s 5 s

1. Attach the Mult-O-Meter sensor in the middle of the sensor unit (flat panel detector side).
2. Call service routine S011.14 [ → 249].





- ↩ The kV/mA level is displayed in selection field 1.
  - ↩ The corresponding radiation time is displayed in selection field 2.
3. Use the arrow keys (A) to select the required kV/mA level, e.g. "85kV/5mA".
    - ↩ The corresponding radiation time "3.2 s" is displayed in selection field 2.
    - NOTE: The radiation time cannot be selected separately.
    - ↩ Once the required setting has been selected, the Memory key (B) lights up.
  4. Save the setting.
  5. Initiate the radiation.
    - ↩ Continuous radiation of 85kV/5mA is applied for 3.2 s.
    - IMPORTANT:** If you let go of the release button before the maximum radiation time has elapsed, radiation is terminated prematurely and the exposure is interrupted.
    - When you release radiation during the cool-down interval, a countdown of the remaining waiting time is displayed in the Easypad title bar (automatic exposure blocking).
  6. Read the dose shown on the Mult-O-Meter.
  7. Exit the service routine.
  8. Remove the Mult-O-Meter from the sensor unit again.



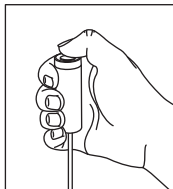
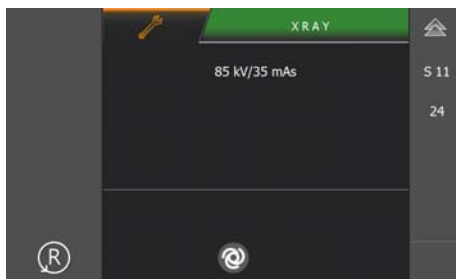
### 8.1.10.2 S011: Test step 24

#### Dosimetry with pulsed radiation

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

1. Attach the Mult-O-Meter sensor in the middle of the sensor unit (flat panel detector side).
2. Call service routine S011.24 [ → 249].

↳ Selection field 1 displays "85kV/35mAs".



3. Initiate the radiation.

↳ Radiation uses 200 pulses and 85kV/35mAs.

**Important:** If you let go of the release button before the maximum radiation time has elapsed, radiation is terminated prematurely and the exposure is interrupted. The actual radiation time is *not* displayed.

When you release radiation during the cool-down interval, a countdown of the remaining waiting time is displayed in the EasyPad title bar (automatic exposure blocking).

4. Read the dose shown on the Mult-O-Meter.
5. Exit the service routine [ → 252].
6. Remove the Mult-O-Meter from the sensor unit again.



### 8.1.11 S012: CAN bus service

SR*	SA**	Function
S012		CAN bus service
S012.1	No	Presence display of modules
S012.2	No	Inquiry of the CAN status register of the modules
S012.3	No	Resetting the CAN status register of the modules
S012.4	No	Display of CAN bus cycle on the LEDs of the modules

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

#### IMPORTANT

The CAN bus service is not yet implemented for the module DX11!

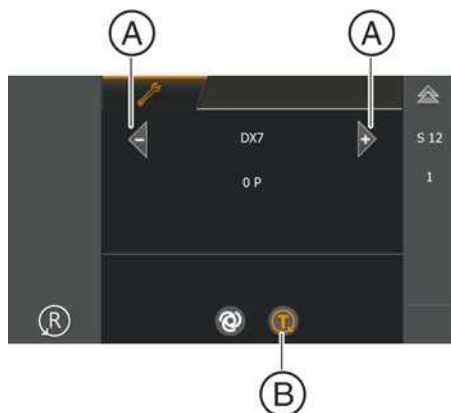
#### 8.1.11.1 S012: Test step 1

##### Presence display of modules

Selection field	Parameter/Display	Range of values
1	Subunit	DX6 - DX91
2	<ul style="list-style-type: none"> <li>Counter value of CAN bus events</li> <li>Presence code behind the counter value: P = module present L = module lost</li> </ul>	

➤ Call service routine S012.1 [ → 249].

##### Checking the module



➤ Use the arrow keys (A) in selection field 1 to select the required module.

↳ The counter value of the CAN bus events (change from "P" to "L" since the last switch-on of the unit) of the selected module processed so far is displayed in selection field 2 with the presence code of the module ("L" or "P") (see table).

↳ Once the module has been selected, the T key (B) lights up.

##### Clearing the counter for the module

- To delete the counter, press the T key (B).  
↳ The counter is then reset to "0".
- Exit the service routine [ → 252].

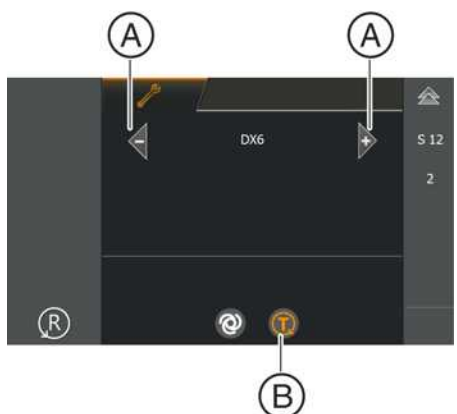
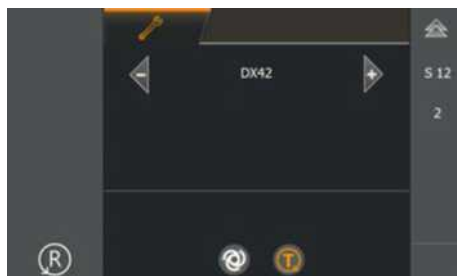


### 8.1.11.2 S012: Test step 2

#### Inquiry of the CAN status register of the modules

##### IMPORTANT

Before querying the CAN status register for the modules, you should first run service routine S012.3 to reset the registers [→ 274].



1. Call service routine S012.2 [→ 249].  
 ↳ The currently selected module is displayed in selection field 1 (DX42 in the example).
2. Use the arrow keys (A) in selection field 1 to select the required module.  
 ↳ Once the module has been selected, the T key (B) lights up.
3. Touch the T key (B).  
 ↳ The CAN status registers for the module called, e.g. *CAN-State DX6*, are displayed.  
 If values deviate from "zero", it points to a problematic CAN bus connection.
4. Exit the service routine. [→ 252]



### 8.1.11.3 S012: Test step 3

#### Resetting the CAN status register of the modules

##### IMPORTANT

Run this service routine as required before service routine S012.2.



1. Call service routine S012.3 [ → 249].  
Once the service routine has been selected, the Memory key (A) lights up.
2. To delete the CAN bus registers, press the Memory key (A) (R key lights up) followed by the R key (B).
3. Exit the service routine [ → 252].

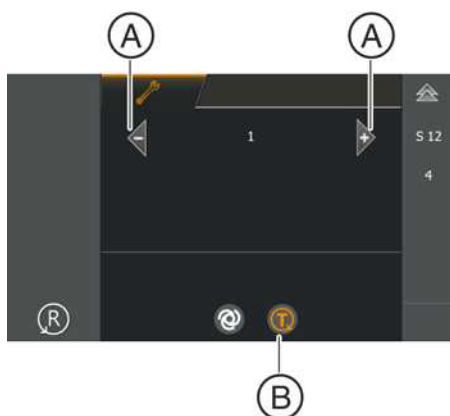
### 8.1.11.4 S012: Test step 4

#### Display of CAN bus cycle on the LEDs of the modules

Selection field	Code	Function
1	0	LED display on the modules is switched off*
	1	LED display on the modules is switched on

\* factory settings

1. Call service routine S012.4 [ → 249].  
After selecting the service routine, selection field 1 displays the code for the current setting of the display (see table).
2. Use the arrow keys (A) in selection field 1 to select the required code and confirm your selection by pressing the T key (B).
3. Exit the service routine [ → 252].



The LEDs on the modules normally flash slowly (1 Hz) (for code "0"). When code "1" has been selected and confirmed, the CAN bus clock pulse of the TTP protocol, which is output by the master module as a broadcast with a frequency of 20 Hz, is output on the LEDs (the green life LED flashes on DX7). Thus by "rocking through" the connectors, you can detect directly the contact loss of the module on the CAN bus. The activation or deactivation of this function simultaneously acts on all modules.



### 8.1.12 S014: Rotation motor service

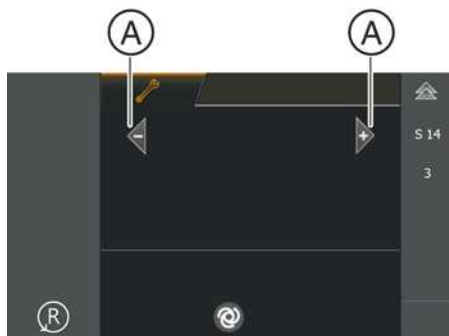
SR*	SA**	Function
S014		Rotation motor service
S014.3	No	Free travel of rotational drive
S014.4	No	Display of light barrier signals of rotational drive

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

#### 8.1.12.1 S014: Test step 3

##### Free travel of rotational drive

This service routine implements the free travel of the rotational drive in both directions.

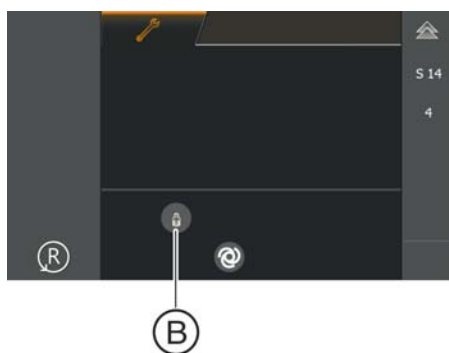


1. Call service routine S014.3 [ → 249].  
Once the service routine has been selected, the arrow keys (A) are displayed in selection field 1.
2. Touch the arrow keys (A) to move the ring to the right (+) or to the left (-). The ring keeps moving as long as you touch the key or until it reaches the respective end position.
3. Exit the service routine [ → 252].

#### 8.1.12.2 S014: Test step 4

##### Display of light barrier signals of rotational drive

This service routine implements display of the switching state of rotation motor light barrier V1\_3.



1. Call service routine S014.4 [ → 249].  
Once the service routine has been selected, both the Service key and patient symbol key 1 (B) are displayed on the control panel.
2. Turn the ring manually. Patient symbol key 1 (B) lights up to indicate that the light barrier has been released.
3. Exit the service routine [ → 252].



### 8.1.13 S015: Actuator service

SR*	SA**	Function
S015		Actuator service
S015.5	No	Functional test of actuators 1 + 2

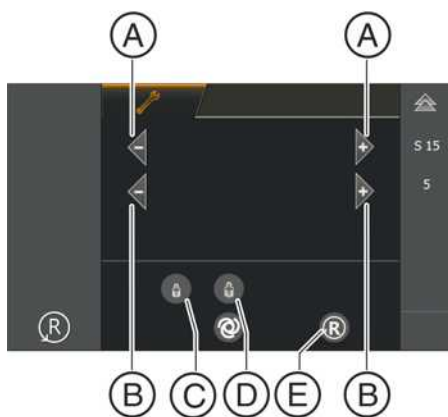
\* SR=service routine, \*\* SA=security access

#### 8.1.13.1 S015: Test step 5

##### Testing of actuators 1 and 2

The use of this service routine is suitable for troubleshooting motor and cable defects. Furthermore, the possibility of performing isolated travel with an individual drive makes it possible to release the clamping of the actuator/rotation system and check the stiffness of the individual adjusting axes.

Symbol on the control panel	Status	Meaning
Patient symbol key 1 (C)	lit	Light barrier of actuator 1 is located in the switching flag
	not lit	Light barrier of actuator 1 is not located in the switching flag
Patient symbol key 2 (D)	lit	Light barrier of actuator 2 is located in the switching flag
	not lit	Light barrier of actuator 2 is not located in the switching flag
Patient symbol key 1+2 (C+D)	lit	Unit is in the pan home position



- Call service routine S015.5 [ → 249].
  - Once the service routine has been selected, the arrow keys (A+B) are displayed in selection field 1 and 2.
  - The patient symbol key 1 (C) shows the switching state of the light barrier of actuator 1, the patient symbol key 2 (D) shows the switching state of the light barrier of actuator 2 (see table).
- Touch the arrow keys (A) in selection field 1 to move actuator 1 to the right (+) or to the left (-). The actuator movement continues as long as the key is pressed.
 

The R key (E) can be used to move the system (actuator 1 and 2) back to the pan home position. Patient symbol keys 1 and 2 light up in this position.
- Touch the arrow keys (B) in selection field 2 to move actuator 2 to the right (+) or to the left (-). The actuator movement continues as long as the key is pressed.
 

The R key (E) can be used to move the system (actuator 1 and 2) back to the pan home position. Patient symbol keys 1 and 2 light up in this position.
- Exit the service routine [ → 252].



### 8.1.14 S017: Configuration service

NOTE: The unit can also be configured via the web service via service routine [→ 327] S017.

#### IMPORTANT

After making changes to the unit configuration, error message E7 1130 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



#### 8.1.14.1 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.

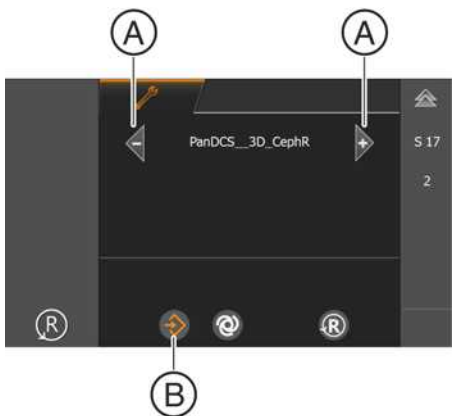


##### 2. Use arrow keys (A) to select the required unit variants in selection field 1 (see table).

- Once the unit variant has been selected, the Memory key (B) lights up.

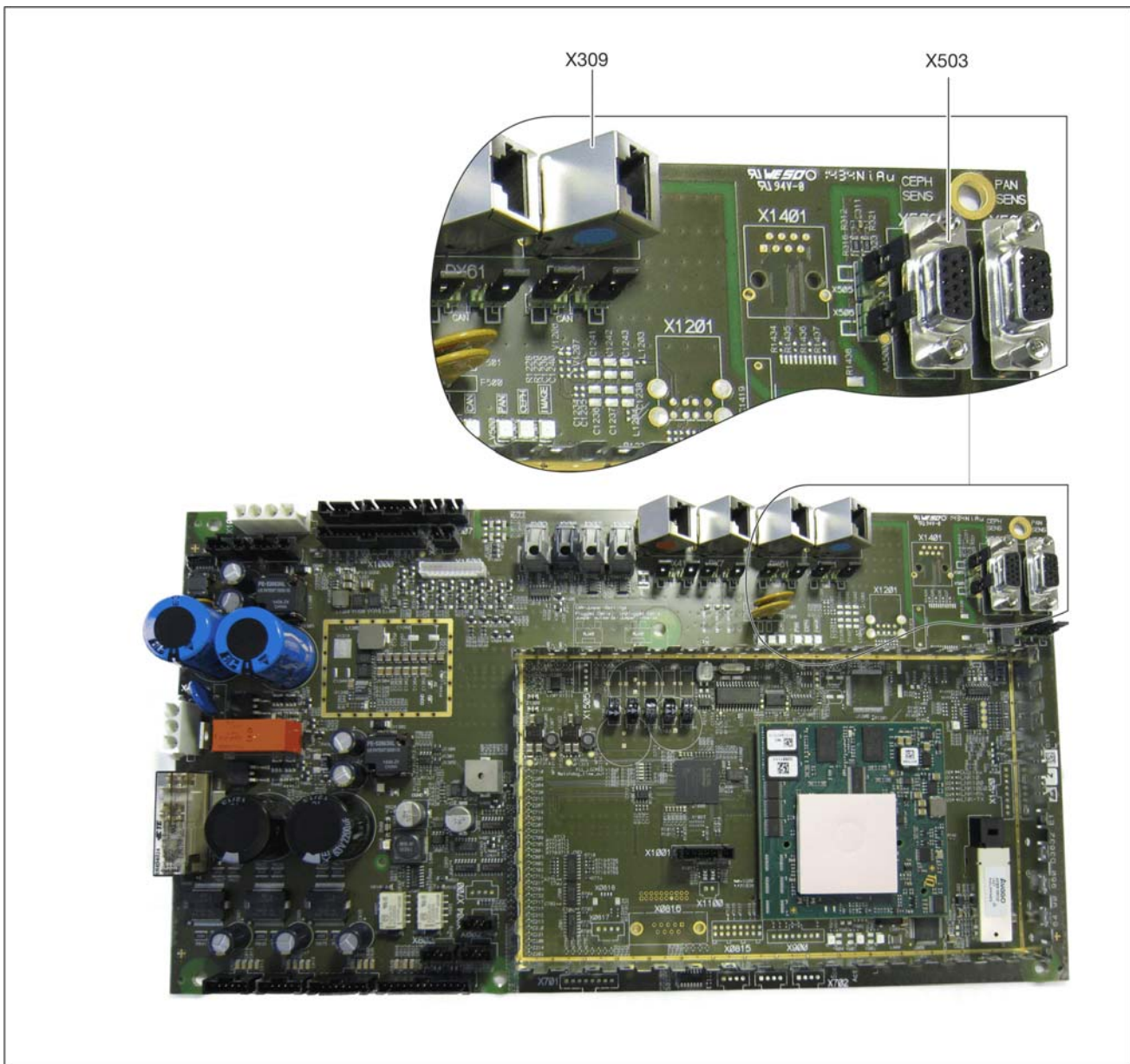
##### 3. Save the setting.

##### 4. Exit the service routine.



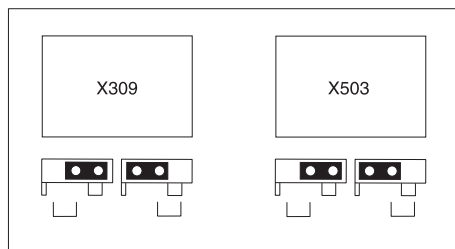


### Checking the jumper position on board DX1

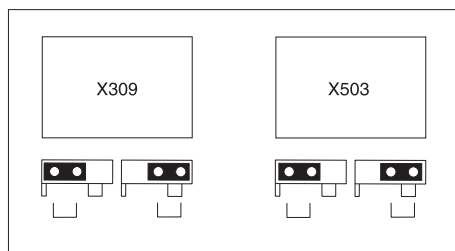


- Check the jumper positions of the sockets on board DX1:  
X309 (DX91, ceph sensor) and  
X503 (DX81, ceph sensor)



**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.



### 8.1.14.2 S017: Test step 3

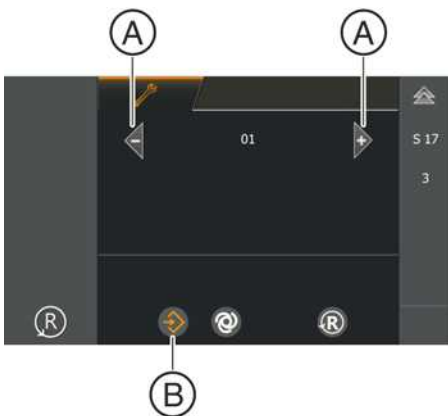
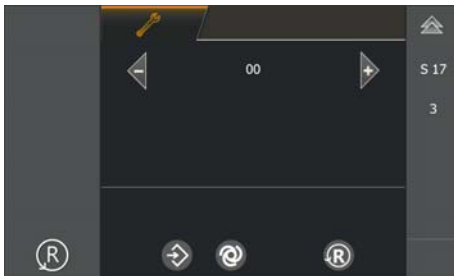
#### Enter the country group code

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.



### 8.1.14.3 S017: Test step 4

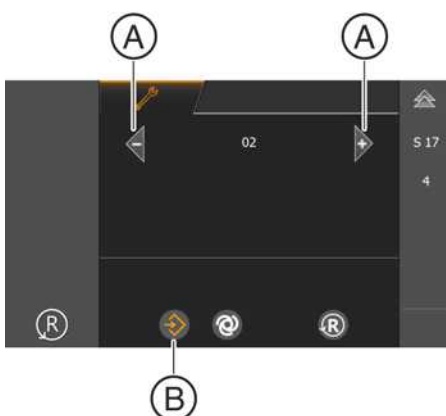
#### Select a language

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.



#### 8.1.14.4 S017: Test step 6

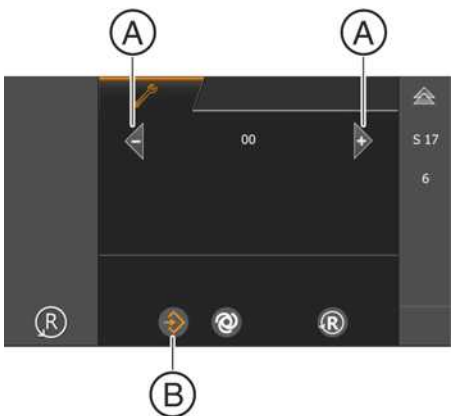
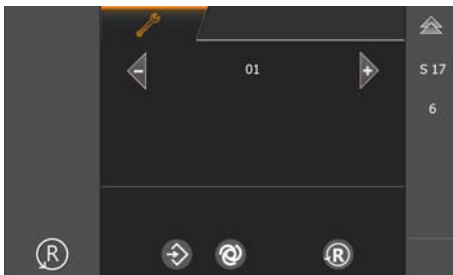
##### Activate / deactivate the remote control display

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.



#### 8.1.14.5 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

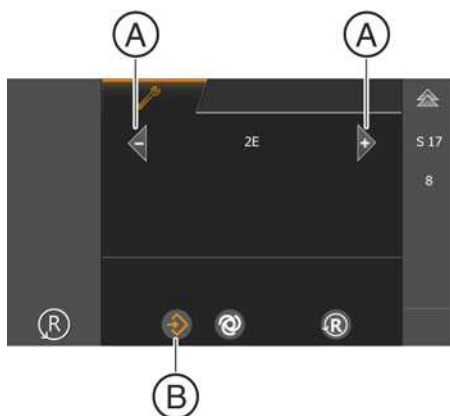
1. Call service routine S017.8.

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.



#### 8.1.14.6 S017: Test step 13

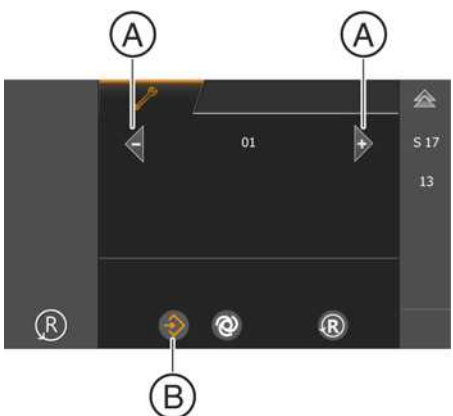
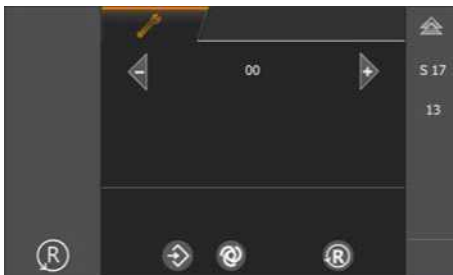
##### Enable/disable the welcome screen

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.



#### 8.1.14.7 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

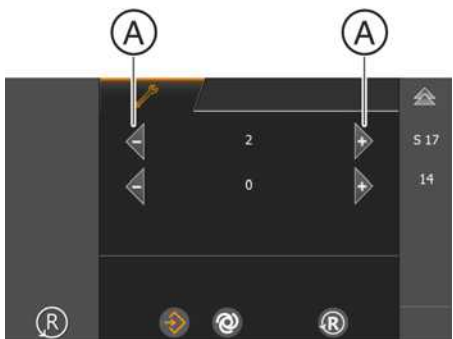
1. Call service routine S017.14.

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



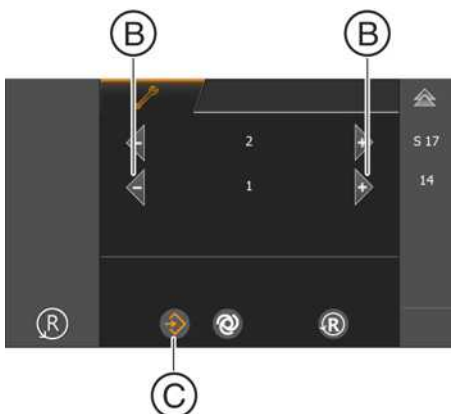
2. Use arrow keys (A) to select the required line in selection field 1 (see table).

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.



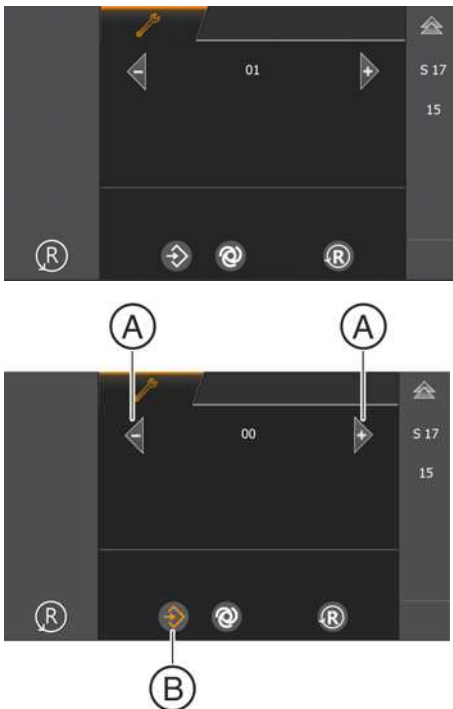
### 8.1.14.8 S017: Test step 15

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

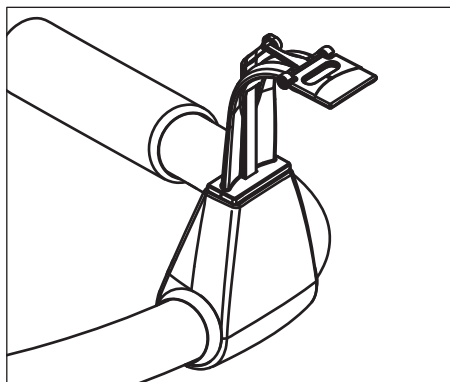
1. Call service routine S017.15.  
 ↳ Once the service routine has been selected, the code for the current setting is displayed in selection field 1.
2. Use arrow keys (A) to select the required setting in selection field 1 (see table).  
 ↳ Once the required setting has been selected, the Memory key (B) lights up.
3. Save the setting.
4. Exit the service routine.





#### 8.1.14.9 S017: Test step 18

##### Occlusal bite block function



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

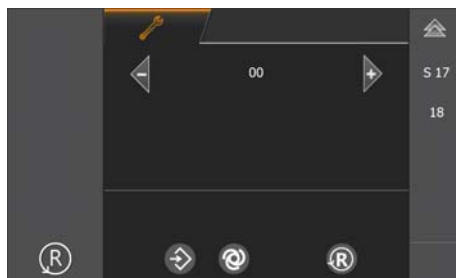
Should the customer wish to set a nominal angle deviating from the factory setting (7°), make the corresponding configuration settings via service routine S018.7).

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

\* factory settings

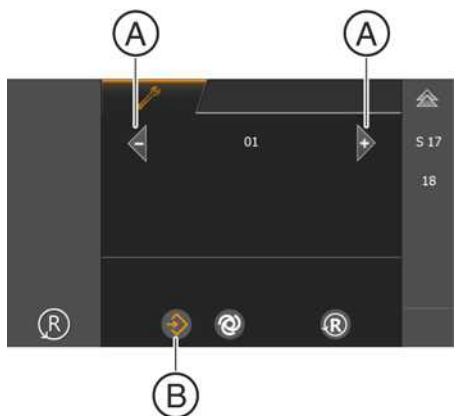
1. Call service routine S017.18 [→ 288].

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.



### 8.1.15 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

#### 8.1.15.1 S018: Test step 2

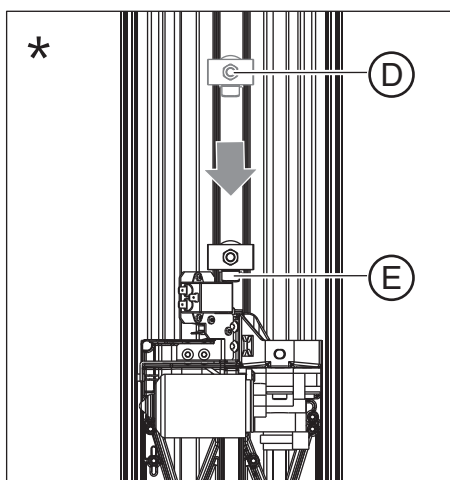
NOTE: Limiting the max. travel height is only possible from a position value of >1500.

##### 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.

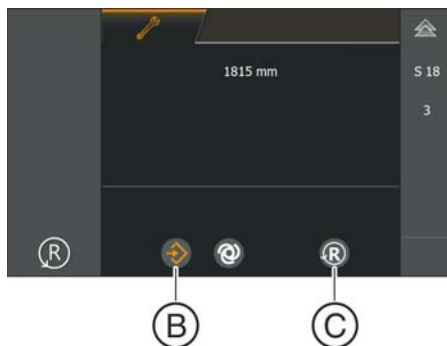
The next time the UP key is pressed, the unit stops 10 mm below the limit switch.

5. Exit the service routine.

#### 8.1.15.2 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.





### 8.1.15.3 S018: Test step 4

#### Check the height adjustment sensor system

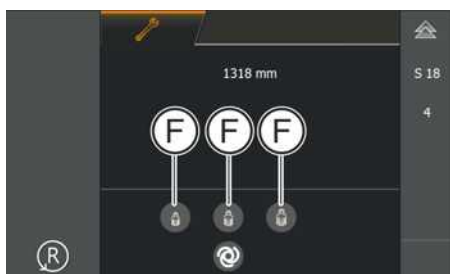
This service routine is used to move the unit up or down as far as the limit switches using the Up/Down keys on the control panel. The "soft limit positions" set by the software are ignored in this case.

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.

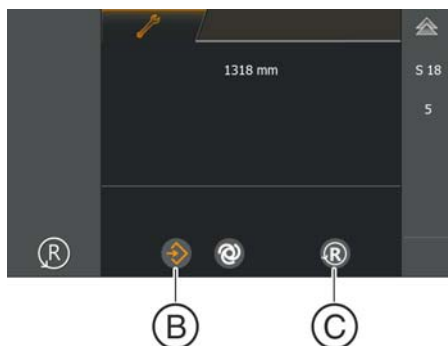


#### 8.1.15.4 S018: Test step 5

##### 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.

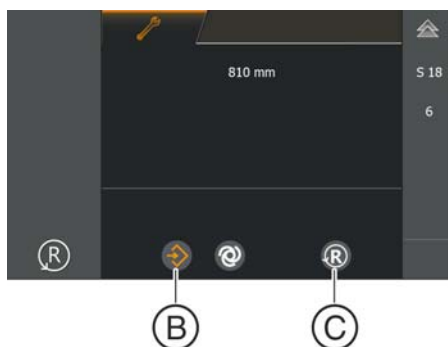


The limitation of the minimum travel height is purely software based. The lower limit switch is not mechanically adapted to the new minimum travel height!

#### 8.1.15.5 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.





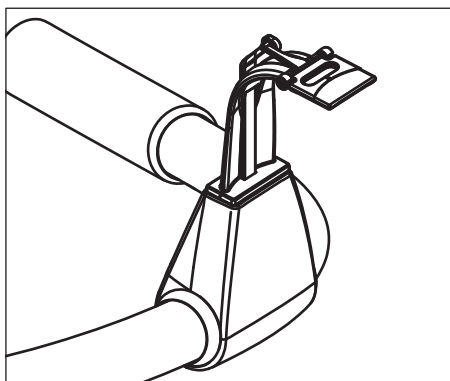
### 8.1.15.6 S018: Test step 7

NOTE: In order to execute this service routine, the occlusal bite block function must be activated via service routine S017.18[ → 288].

**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

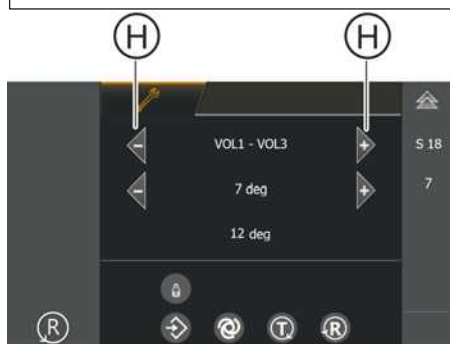
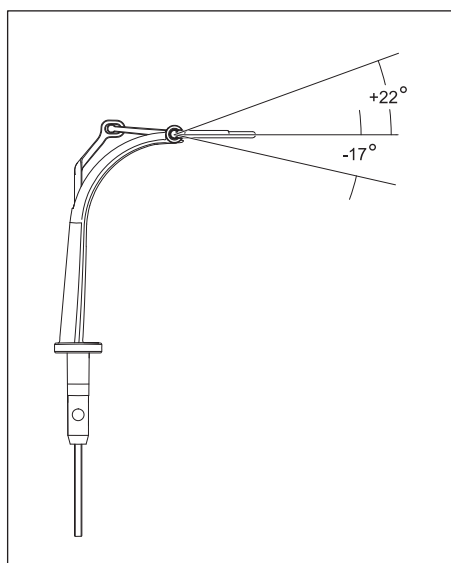
Selection field	Parameter/Display	Range of values
1	Program groups	P1 - P12 BW1 - BW2 VOL1 - VOL3
2	Nominal angle of the bite block plate	-13° to +18°
3	Measured deflection of the bite block plate	-17° to +18°



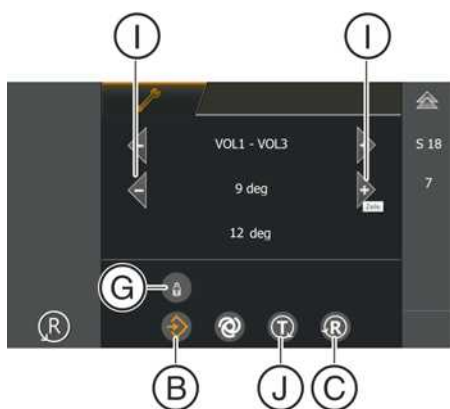
#### 1. Call service routine S018.7.

- ↪ 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.



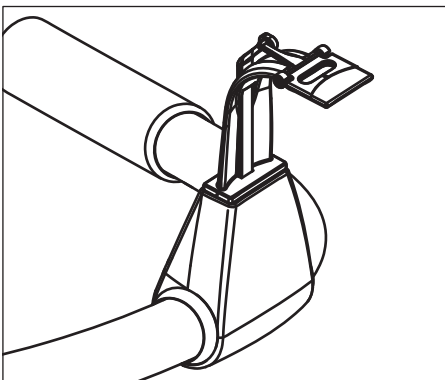
### 8.1.15.7 S018: Test step 8

NOTE: In order to execute this service routine, the occlusal bite block function must be activated via service routine S017.18[ → 288].

#### 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 [ → 296]



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 [ → 296]").
- ↗ The display of patient symbol key 1 (G) indicates whether or not the bite block is connected (see table).

2. Exit the service routine.



#### 8.1.15.7.1 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.



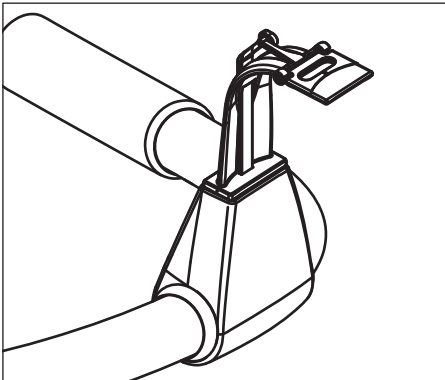
### 8.1.15.8 S018: Test step 9

NOTE: In order to execute this service routine, the occlusal bite block function must be activated via service routine S017.18[ → 288].

#### 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.

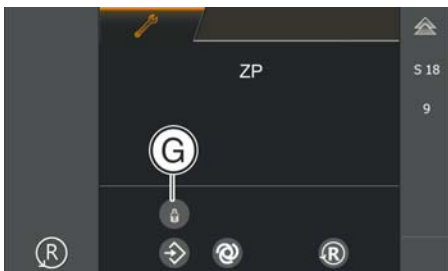


Symbol on the control panel	Status	Meaning
Patient symbol key 1 (G)	visible	Occlusal bite block connected
	not visible	Occlusal bite block not connected

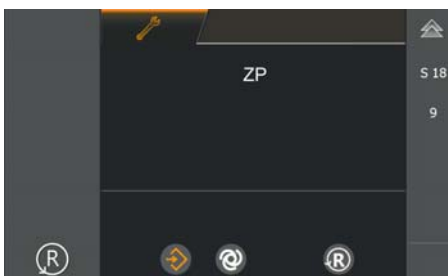
Selection field	Display	Meaning
1	ZP	Zero point
	U	Upper value
	S	Lower value

➤ 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).



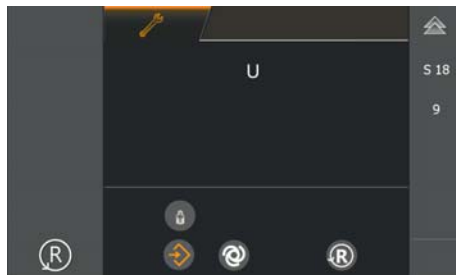
#### ZP: Adjusting and saving the zero point



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.

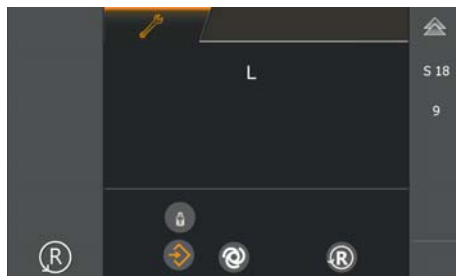


### U: Adjusting and saving the upper value



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

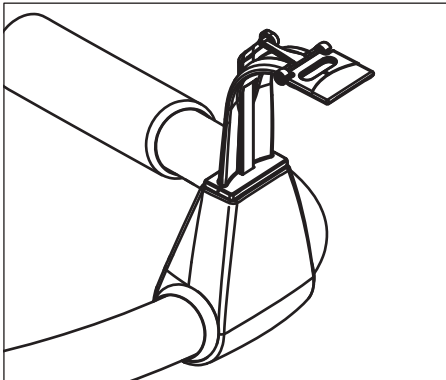
1. Check the adjustment via service routine S018.7 [ → 293]. To do this, move the bite block plate and check whether the adjustment range is between  $-17^{\circ}$  and  $+22^{\circ}$ .
2. Exit the service routine.



### 8.1.15.9 S018: Test step 10

NOTE: In order to execute this service routine, the occlusal bite block function must be activated via service routine S017.18[ → 288].

#### 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.



### 8.1.16 S020: Service for temple support

SR*	SA**	Function
S020		Service for temple support
S020.1	Yes	Programming the switching thresholds of the temple support

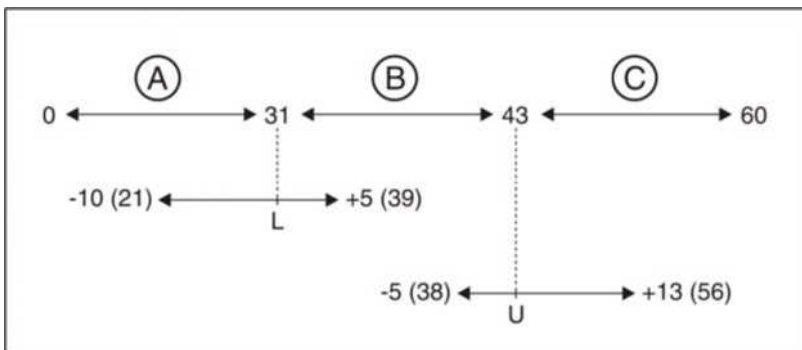
\* SR=service routine, \*\* SA=security access

#### 8.1.16.1 S020: Test step 1

##### Programming the switching thresholds of the temple support

This service routine can be used to change the factory-set switching points of the temple width measurement used for setting the jaw width ("small", "normal" or "large") within certain limits.

The following drawing shows the motor position values (initial and individual offset ranges) as well as the mechanical end stops of the temple support.



The switch-over point between large ↔ normal is referred to as the lower switch-over point (marked L = Lower) and the switch-over point between normal ↔ small as the upper switch-over point (marked U = Upper).

These switch-over points can be adjusted with service routine S020.1.

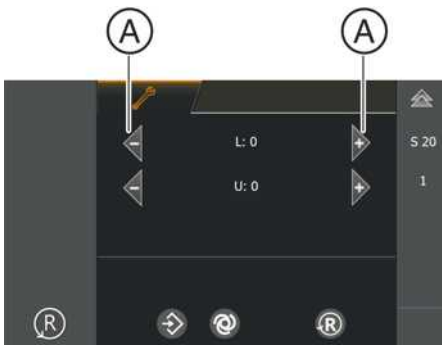
Selection field	Parameters	Range of values
1	L	-10...0*...+5
2	U	-5...0*...+13

\* Factory setting

1. Call service routine S020.1 [→ 249].

- After selecting the service routine, the lower switching point in selection field 1 is displayed in the form "L: 0". The upper switching point is displayed in selection field 2 in the form "U: 0".





2. Use the arrow keys (**A**) in the corresponding selection field to select the required offset for the switching point (see table).

#### IMPORTANT

A negative offset shifts the respective switching point toward larger skulls; a positive offset has the opposite effect.

3. Save the setting [ → 251].
4. Exit the service routine [ → 252].



### 8.1.17 S021: Service for the packing position

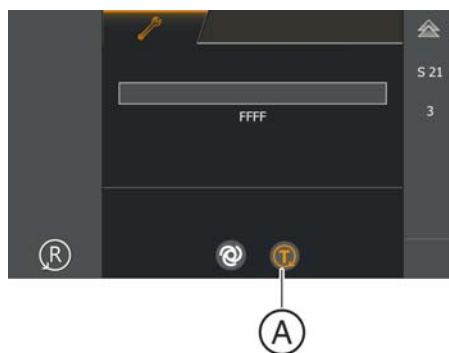
SR*	SA**	Function
S021		Service for packing position
S021.3	No	Initiate the packing position for the diaphragm
S021.4	No	Initiate the packing position for the sensor unit

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

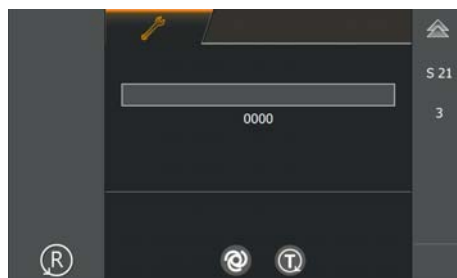
#### 8.1.17.1 S021: Test step 3

##### Initiate the packing position for the diaphragm

1. Call service routine S021.3 [ → 249].  
 ↳ 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).



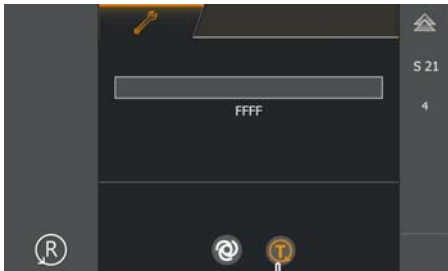
- ↳ The diaphragm is moved to the packing position. During this time, a progress indicator is displayed.
  - ↳ When the packing position is reached, "0000" is displayed in selection field 2.
3. Exit the service routine [ → 252].



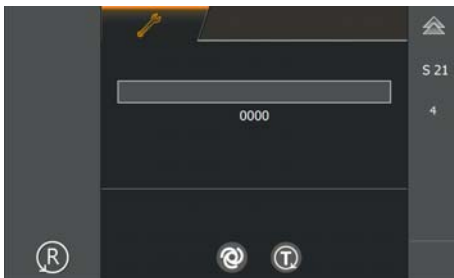
### 8.1.17.2 S021: Test step 4

#### Initiate the packing position for the sensor unit

1. Call service routine S021.4 [→ 249].
  - ↳ 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).



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 [→ 252].

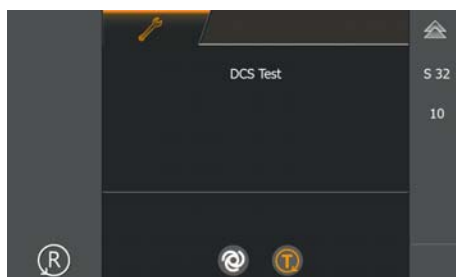


### 8.1.18 S032: Sensor test

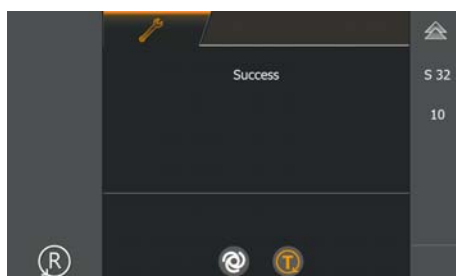
SR*	SA**	Function
S032		Sensor test
S032.10	No	Self-test of the DCS image data path
S032.50	No	Self-test of the FP image data path

#### 8.1.18.1 S032: Test step 10

##### Self-test of the DCS image data path



1. Call service routine S032.10 [ → 249].  
↳ 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.

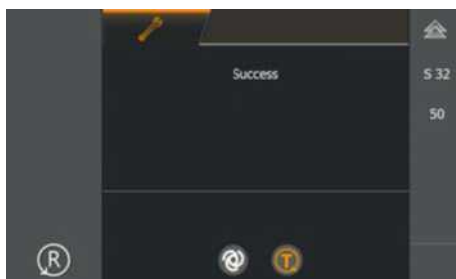
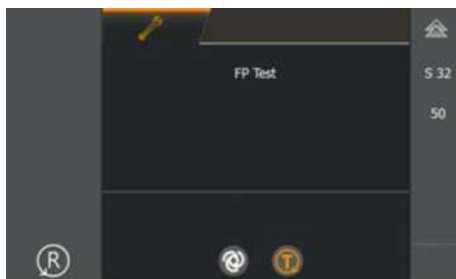


- ↳ If the image data path is OK, "Success" is displayed in the selection field 1.
3. Exit the service routine [ → 252].



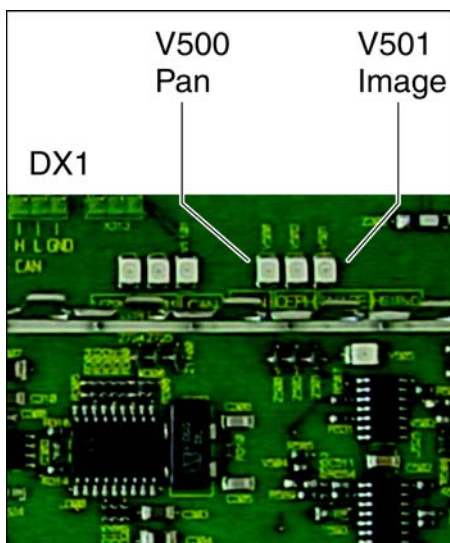
### 8.1.18.2 S032: Test step 50

#### Self-test of the FP image data path



1. Call service routine S032.50 [ → 249].  
 ↳ 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 [ → 252].

### 8.1.18.3 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.



#### 8.1.18.4 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 [ → 395] board **DX11**
- Replace [ → 378] 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 [ → 395] board **DX11**
- Replace [ → 378] 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 [ → 395] board **DX11**
- Replace [ → 378] sensor unit

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



### 8.1.19 S033: Test of ceph image path (for ceph units only)

SR*	SA**	Function
S033		Test of the ceph image path
S033.10	No	Test of the ceph image path

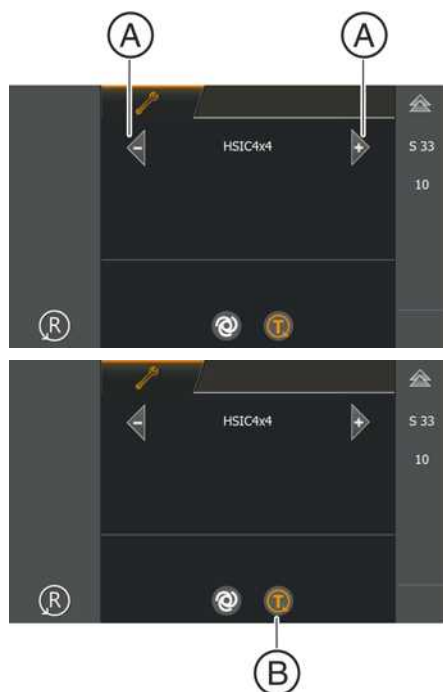
\* SR=service routine, \*\* SA=security access

#### 8.1.19.1 S033: Test step 10

##### Signal tests for sensor in ceph slot

Selection field	Parameters	Function
1	HSIC4x4	Sensor in ceph mode with synchronized readout sequence 4x4 clocked out without ceph scan
	HSIC4x4M	Sensor in ceph mode with synchronized readout sequence 4x4 clocked out with ceph scan

1. Call service routine S033.10 [ → 249].  
 ↳ After test step 10 is selected, selection field 1 displays the current selection for synchronized readout sequence.
2. Use the arrow keys (A) in selection field 1 to select the mode of the required synchronized readout sequence (see table).



- ↳ Once the mode for the synchronized readout sequence has been selected, the T key (B) lights up.

#### IMPORTANT

##### If parameter "HSIC4x4M" is selected:

If the R key should light up first, the sensor holder must first be moved to the corresponding position. To do so, press the R key.

3. Touch the T key (B).  
 ↳ The synchronized readout sequence is activated.





↩ The result of the synchronized readout sequence is displayed (see S032: Test step 10: Result of synchronized readout sequence).

4. Exit the service routine [ → 252].



### 8.1.20 S034: Service for the digital cephalometer

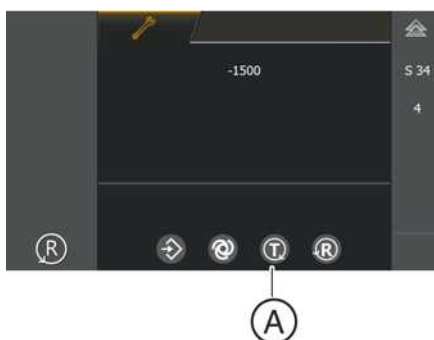
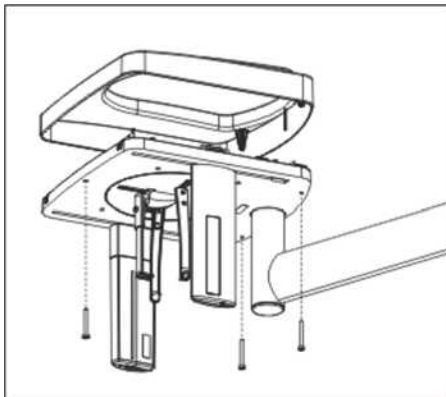
SR*	SA**	Function
S034		Service for the digital cephalometer
S034.4	No	Display/calibrate center position of Ceph scan sensor axis
S034.5	No	Display/calibrate center position of Ceph scan secondary diaphragm axis
S034.6	No	Moving to the Ceph packing position
S034.8	No	User-specific determination of the shadowing limit for C1 and C2
S034.9	No	User-specific determination of the shadowing limit for C3 and C3 30x23

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

#### 8.1.20.1 S034: Test step 4

##### Calibrating / displaying the center position of ceph scan sensor axis

**Tip:** Move the unit to a comfortable working height with the Up/Down keys on the control panel *before* commencing calibration of the sensor axis. When the service routine is called, it is not possible to adjust the height of the unit.

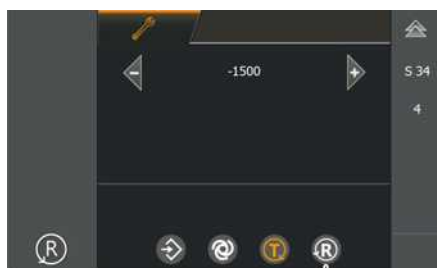


1. Use UP/DOWN keys (A) on the control panel to move the unit up and down and use patient symbol keys (F) to check the switching states.
2. Detach the cover to the cephalometer [ → 37].
3. Call service routine S034.4 [ → 249].

➤ After selecting the service routine, the current offset value for the center position of the ceph scan *sensor axis* is displayed in selection field 1.

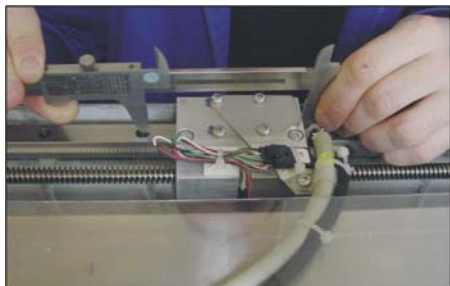
4. Touch the T key (A).  
➤ The test mode is activated.



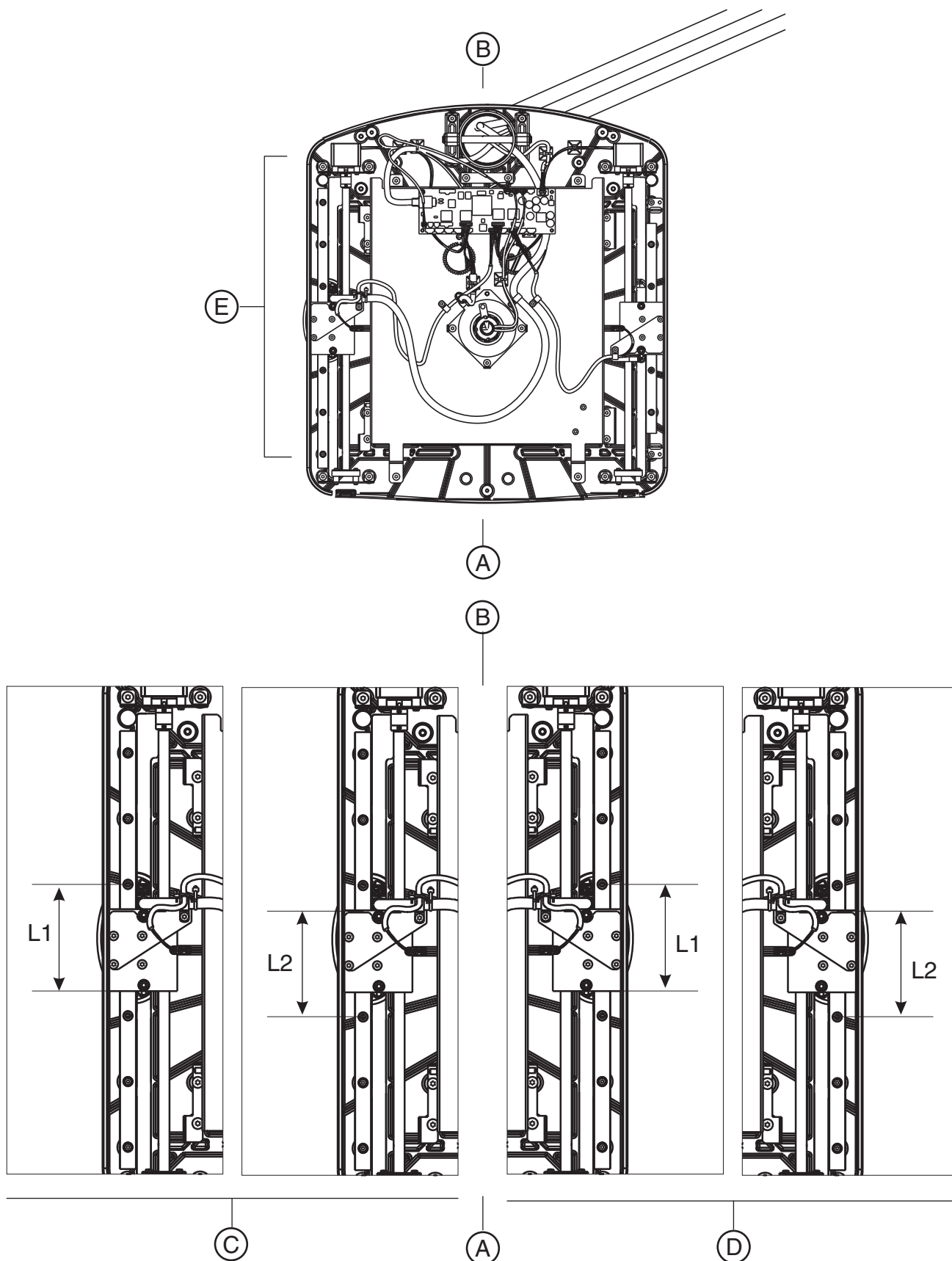


✎ In the test mode, travel to the center position of the cephalometric scan sensor axis is initially performed without offsets. The T key lights up and indicates the test mode.

5. Move the sensor to its front position by touching the R key (B). The sensor can always be moved back and forth between its front and center positions with the R key.
6. Move the sensor to its center position by touching the R key.
7. Measure distances **L2** and **L1** with a slide gage.

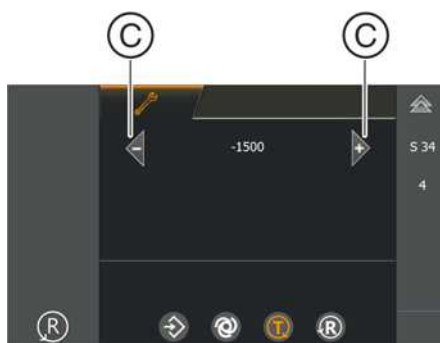








A	Room side
B	Wall side
C	Ceph arm mounted on left-hand side
D	Ceph arm mounted on right-hand side
E	Sensor side

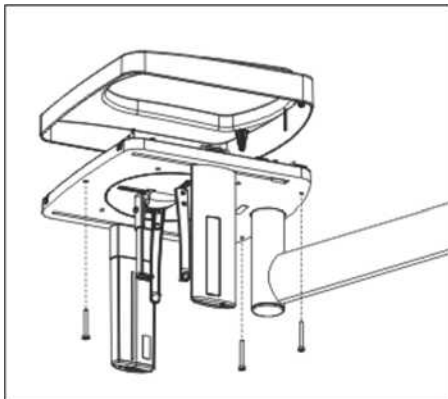


8. Calculate the offset value according to the following formula:  
*For left-side arm:*  $(L2 - L1) \div 2 = \text{offset value}$   
*For right-side arm:*  $(L1 - L2) \div 2 = \text{offset value}$
9. Use the arrow keys (C) in selection field 1 to select an offset value.  
 The offset value may have a positive or negative sign.  
*For left-side arm:*  
 A positive offset value shifts the sensor in room direction.  
 A negative offset value shifts the sensor in wall direction.  
*For right-side arm:*  
 A positive offset value shifts the sensor in wall direction.  
 A negative offset value shifts the sensor in room direction.  
 Since the offset value can be set only in steps of 500 (500 = 0.5 mm), set a value that is as close as possible to your calculated value.
10. Save the setting [ → 251].
11. Touch the T key (A).
  - ✎ The test mode is deactivated again.
  - ✎ The offset settings are taken into account in normal operation.
12. Move the sensor to its reference position by touching the R key (B).  
 The sensor can always be moved back and forth between its front and center positions with the R key.
13. Measure distances **L1** and **L2** with a slide gage and calculate the remaining offset as described.
  - ✎ If the offset is still  $> \pm 0.5 \text{ mm}$ , the offset value must be corrected again. To do so, repeat this service routine.
  - ✎ If the offset is  $< \pm 0.5 \text{ mm}$ , the calibration is OK.
14. Exit the service routine [ → 252].
15. Reattach the cover to the cephalometer [ → 37].

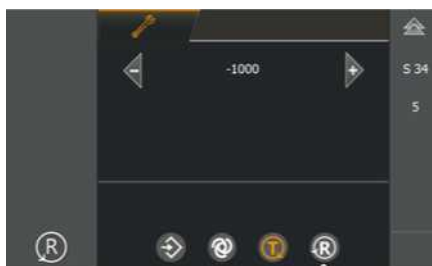


### 8.1.20.2 S034: Test step 5

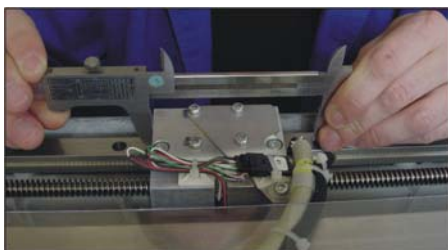
#### Center position of ceph scan secondary diaphragm axis, display/calibrate



A



B



1. If not already done, detach the cover to the cephalometer [ → 37].
2. Call service routine S034.5 [ → 249].

↳ After selecting the service routine, the current offset value for the center position of the ceph scan *secondary diaphragm axis* is displayed in selection field 1.

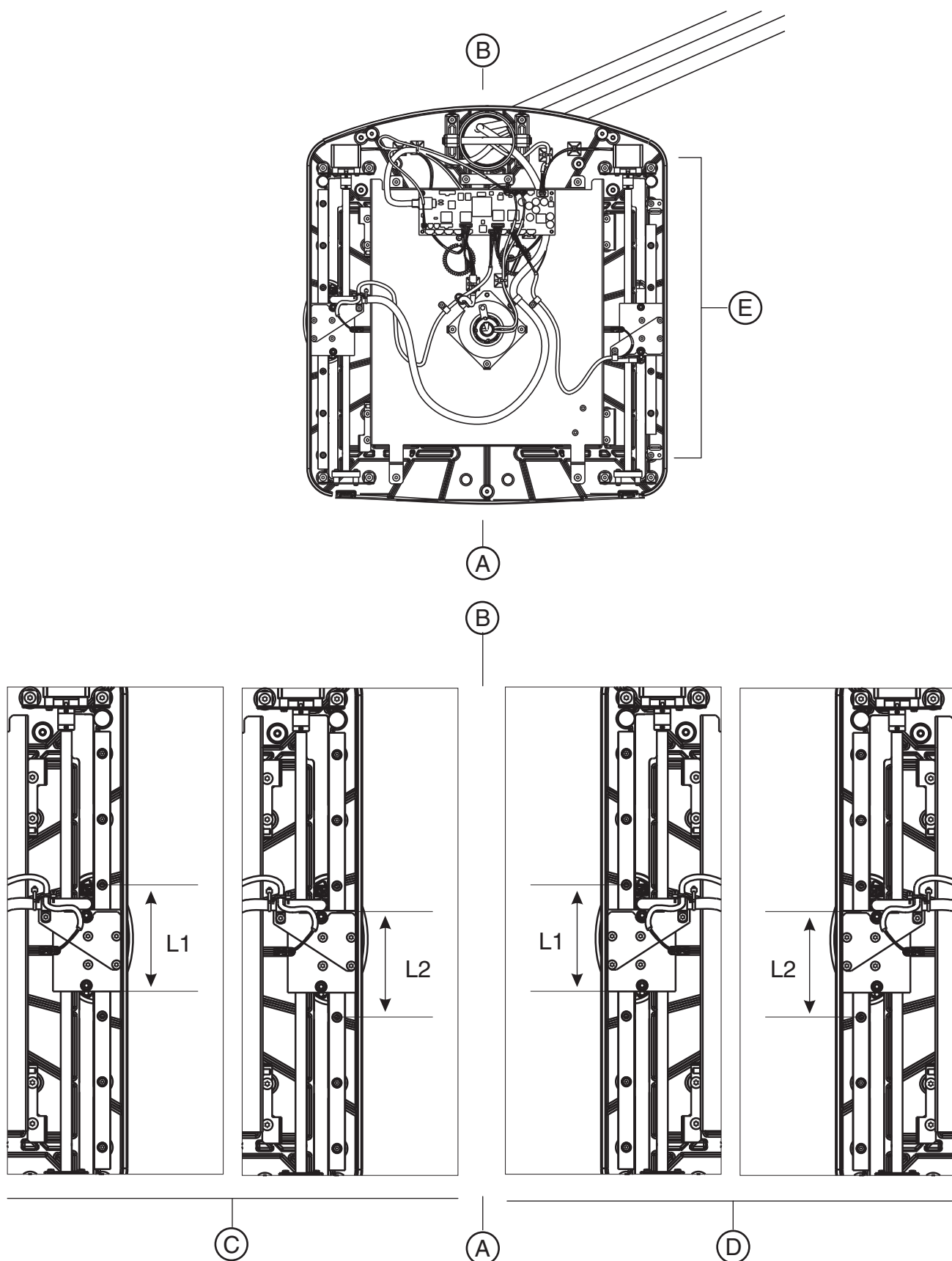
3. Touch the T key (A).

↳ The test mode is activated.

↳ In the test mode, travel to the center position of the ceph scan secondary diaphragm axis is initially performed without offsets. The T key lights up and indicates the test mode.

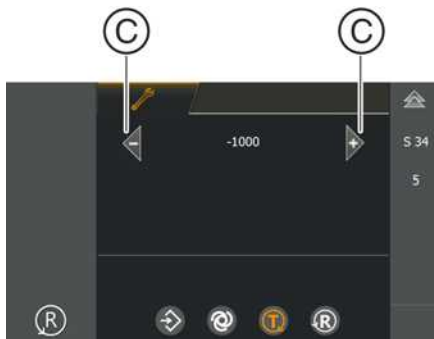
4. Move the secondary diaphragm to its front position by touching the R key (B). The secondary diaphragm can always be moved back and forth between its front and center positions with the R key.
5. Move the secondary diaphragm to its center position by touching the R key.
6. Measure distances **L2** and **L1** with a slide gage.







A	Room side
B	Wall side
C	Ceph arm mounted on left-hand side
D	Ceph arm mounted on right-hand side
E	Secondary diaphragm side



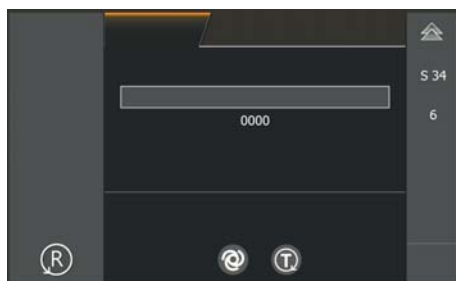
7. Calculate the offset value according to the following formula:  
*For left-side arm:*  $(L2 - L1) \div 2 = \text{offset value}$   
*For right-side arm:*  $(L1 - L2) \div 2 = \text{offset value}$
8. Use the arrow keys (C) in selection field 1 to select an offset value.  
 The offset value may have a positive or negative sign.  
*For left-side arm:*  
 A positive offset value shifts the sensor in room direction.  
 A negative offset value shifts the sensor in wall direction.  
*For right-side arm:*  
 A positive offset value shifts the sensor in wall direction.  
 A negative offset value shifts the sensor in room direction.  
 Since the offset value can be set only in steps of 500 (500 = 0.5 mm), set a value that is as close as possible to your calculated value.
9. Save the setting [ → 251].
10. Touch the T key (A).
  - ↳ The test mode is deactivated again.
  - ↳ The offset settings are taken into account in normal operation.
11. Move the secondary diaphragm to its reference position by touching the R key (B). The secondary diaphragm can always be moved back and forth between its front and center positions with the R key.
12. Measure distances L1 and L2 with a slide gage and calculate the remaining offset as described.
  - ↳ If the offset is still  $> \pm 0.5$  mm, the offset value must be corrected again. To do so, repeat this service routine.
  - ↳ If the offset is  $< \pm 0.5$  mm, the calibration is OK.
13. Exit the service routine [ → 252].
14. Reattach the cover to the cephalometer [ → 37].



### 8.1.20.3 S034: Test step 6

#### Moving to the Ceph packing position

1. Call service routine S034.6 [ → 249].
  - ↳ 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 [ → 252].

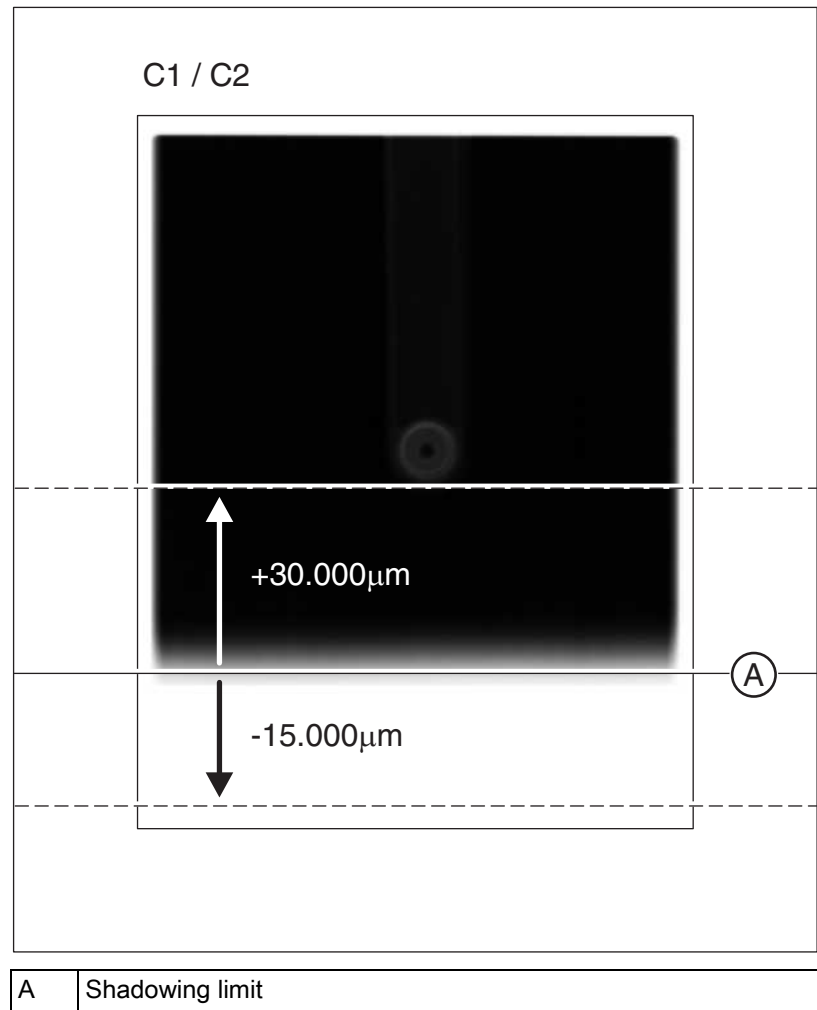




#### 8.1.20.4 S034: Test step 8

##### User-specific determination of the shadowing limit for C1 and C2

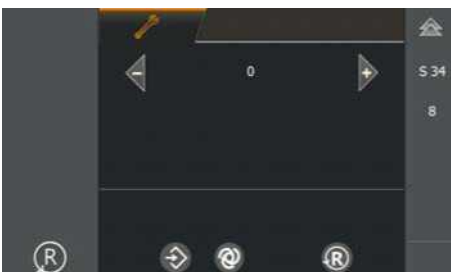
For ceph programs C1 and C2, the default setting of the shadowing limit can be assigned an individual offset. In this way the shadowing can be shifted within certain limits.



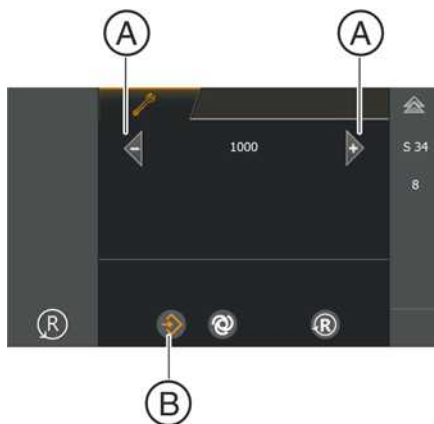
The offset must be determined by reference to an existing exposure. Based on the default setting, an offset in the range of +30,000 µm to -15,000 µm can be selected and saved.

1. Call service routine S034.8 [→ 249].

✎ The current offset value is displayed in selection field 1.





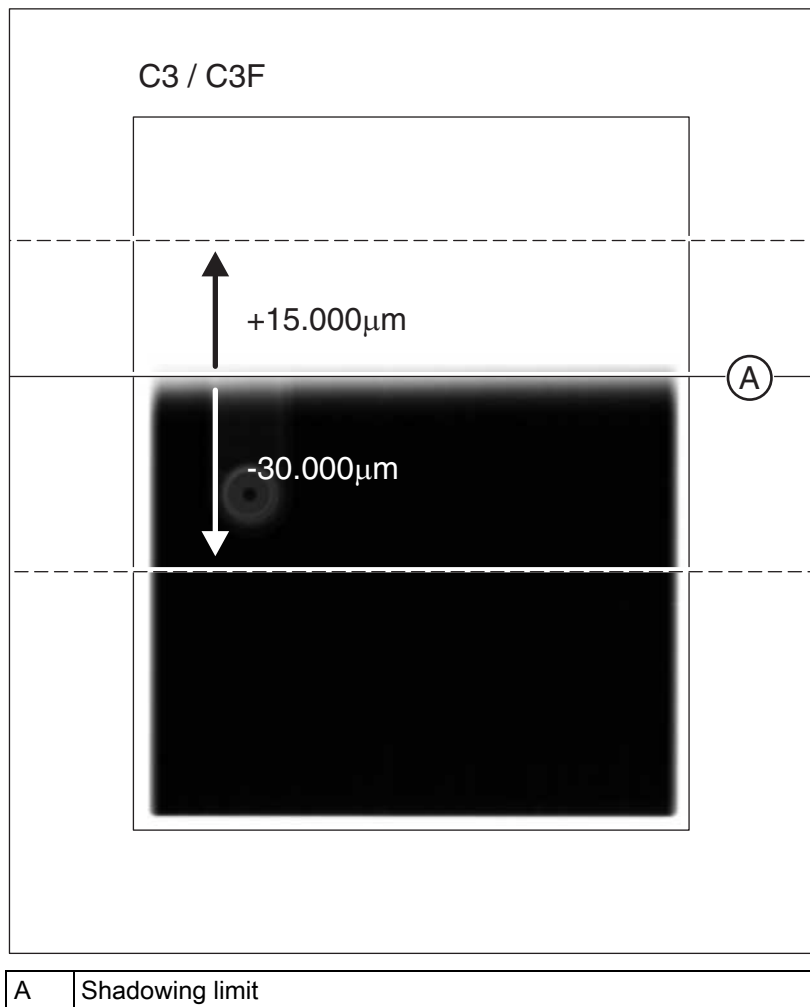


2. Select the desired offset value using the arrow keys (A) in selection field 1 (step width = 500, offset value = 1000 corresponds to a 1 mm shift of the shadowing limit).  
 ⚡ Once the required setting has been selected, the Memory key (B) lights up.
3. Save the setting [ → 251].
4. Exit the service routine [ → 252].

#### 8.1.20.5 S034: Test step 9

##### User-specific determination of the shadowing limit for C3 and C3 F

For ceph programs C3 and C3F, the default setting of the shadowing limit can be assigned an individual offset. In this way the shadowing can be shifted within certain limits.

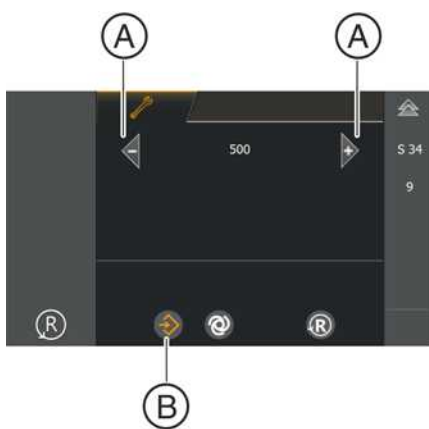
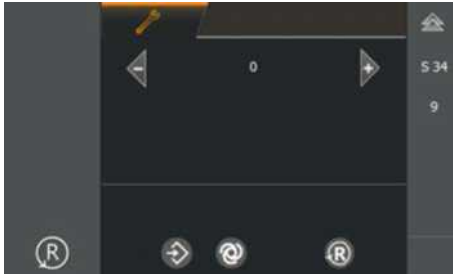




The offset must be determined by reference to an existing exposure. Based on the default setting, an offset in the range of +15,000  $\mu\text{m}$  to -30,000  $\mu\text{m}$  can be selected and saved.

1. Call service routine S034.9 [ → 249].

↳ The current offset value is displayed in selection field 1.



2. Select the desired offset value using the arrow keys (A) in selection field 1 (step width = 500, offset value = 1000 corresponds to a 1 mm shift of the shadowing limit).  
↳ Once the required setting has been selected, the Memory key (B) lights up.
3. Save the setting [ → 251].
4. Exit the service routine [ → 252].



## 8.1.21 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

### 8.1.21.1 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

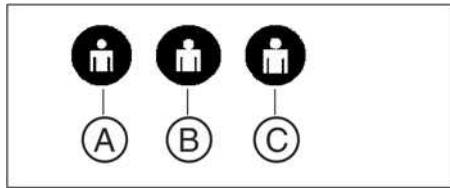
Selection field	Parameter/Display	Meaning
1	IP address, default gateway, or subnet mask of the unit	
2	default	Fixed address*
	static	Fixed address, modified setting
	dynamic	Automatic address assignment

\* factory settings





A



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.



### 8.1.21.2 S037: Test step 2

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

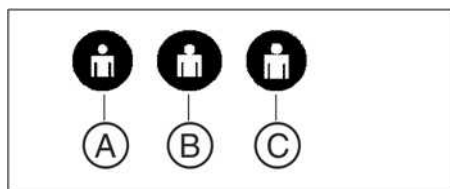
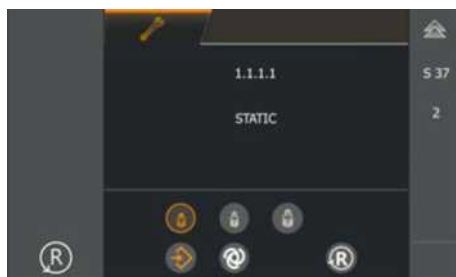
#### IMPORTANT

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 [ → 320].
- ↳ The Memory key and the R key also become visible.
- ↳ The Memory key lights up.

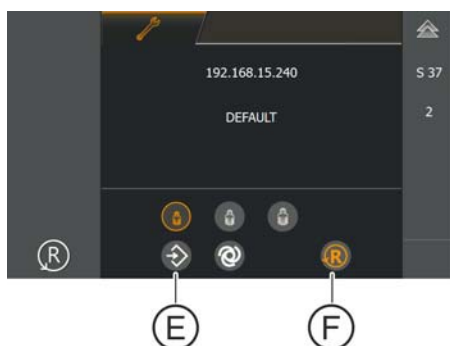


#### 2. Use the patient symbol keys (A, B, or C) to check the network data existing in the system prior to the restore operation (see table).

- ↳ 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 [ → 320].



#### 4. Exit the service routine.

#### 5. Perform a restart of the unit.



### 8.1.21.3 S037: Test step 3

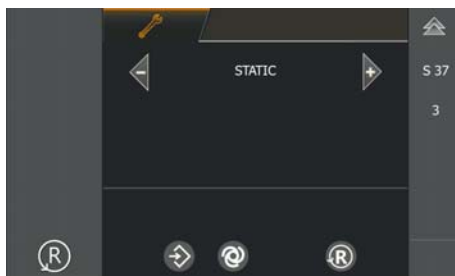
#### Configuring boot mode

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

\* Factory setting

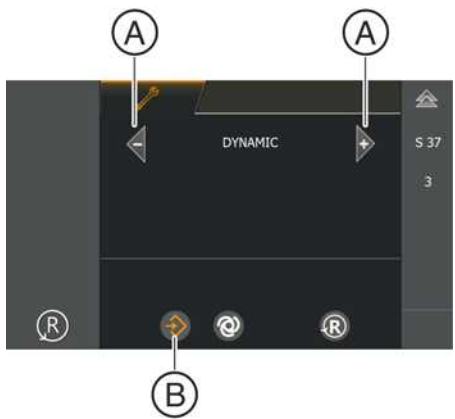
1. Call service routine S037.3.

↳ 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.



#### 8.1.21.4 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).

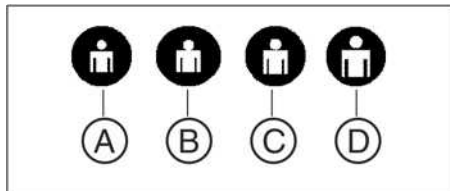
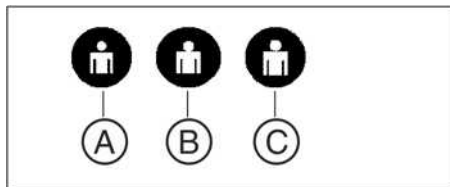
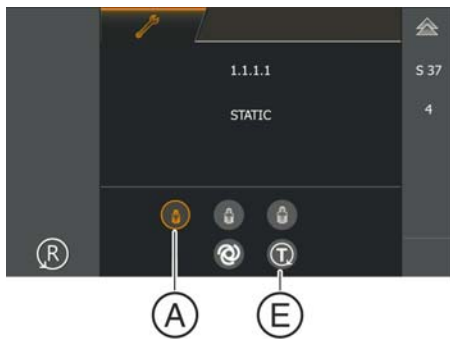
Symbol on the control panel	Status	Function
Patient symbol key 1 (A)	lit	The IP address is displayed in selection field 1*
		or - after pressing the T key - number pad B1 is selected
Patient symbol key 2 (B)	lit	The default gateway is displayed in selection field 1
		or - after pressing the T key - number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

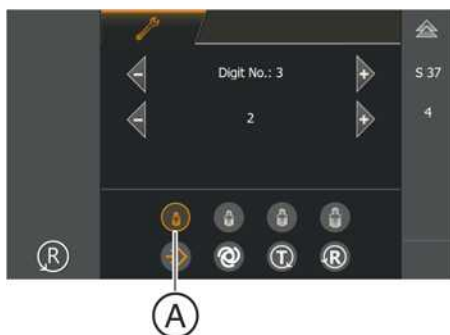
Selection field	Parameter/Display	Meaning
1	IP address, default gateway, or subnet mask of the unit	
	or - after pressing the T key - selected digit	
2	default	Fixed address*
	static	Fixed address, modified setting
	dynamic	Automatic address assignment

\* factory settings





Digit No. 1 2 3  
192.168.015.178  
B1 B2 B3 B4



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.

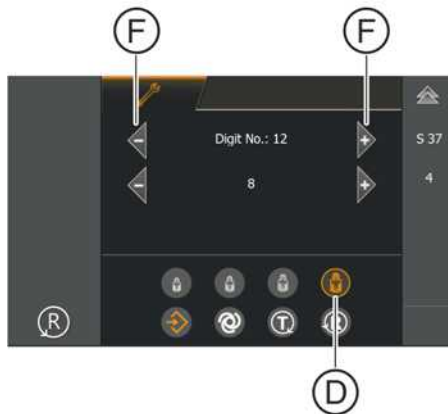
- ✎ The digit currently selected for changing is displayed in selection field 1 ("Digit No. 3" in the example).

**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).

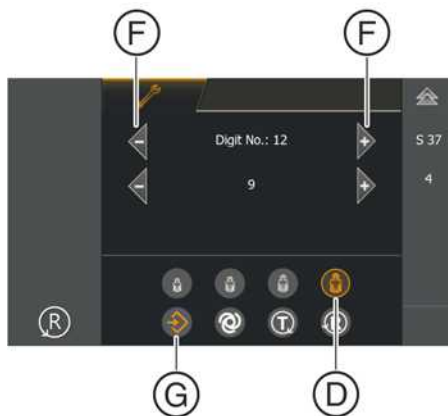


Digit No. 12  
**192.168.015.178**  
 B4



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.

Digit No. 12  
**192.168.015.179**  
 B4



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.



## 8.2 Running service routines via the web service

NOTE: The web service is only available in English

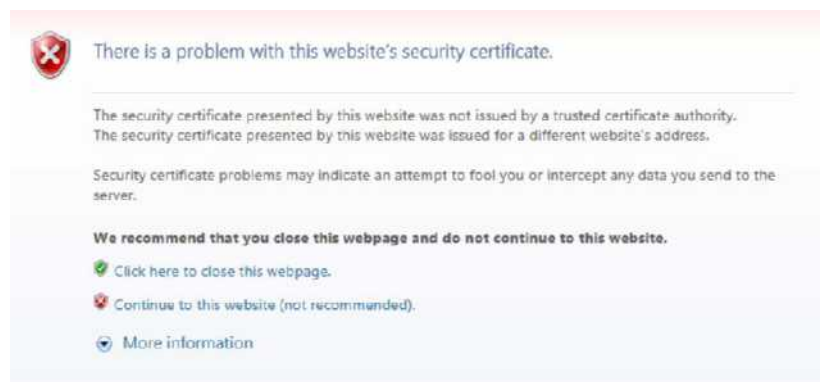
NOTE: The following service routines can be run using the Sirona Web service:

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.



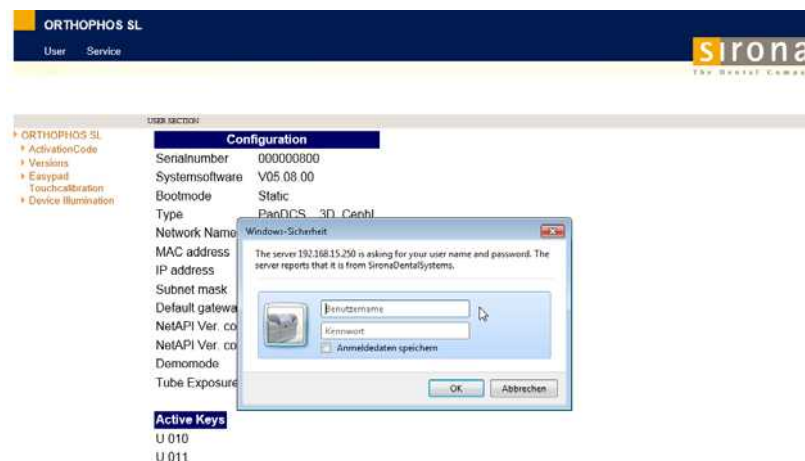
4. Click on the link *"Continue to this Website"*.

↳ 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.



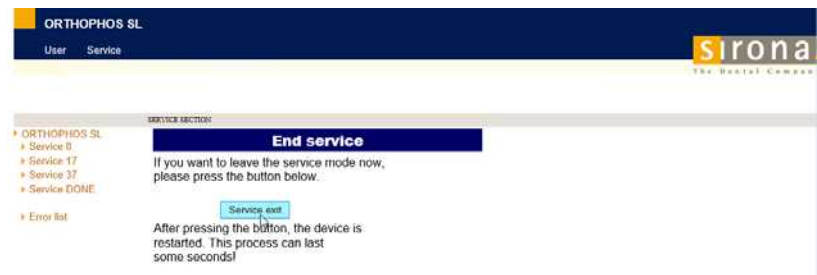
↳ The service routine, e.g. S008.3 is displayed.

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 [ → 240]").

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.



## 9 Repair

### DANGER

#### Perilous shock hazard!

It is essential to switch the unit off and to wait at least 1 minute, or 4 minutes if disconnecting the tube assembly (cable L3), before starting the repair or taking off a cover panel!

When replacing parts in the vicinity of the power connection, power switch, board DX32 or X-ray tube assembly, the unit must be disconnected from the junction box of the main building!

### CAUTION

Make sure to reattach all ground cables to ensure correct grounding of all modules.

### CAUTION

#### Product safety

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 should be operated only with original accessories from Sirona or Sirona-approved accessories from third parties. The user is responsible for any damage resulting from the use of non-approved accessories.

### NOTICE

#### Do not damage the cables

Be careful not to kink the cables when removing or installing them. Take particular care with fiber-optic cables L5, L6, L7, and L15. Tighten cable ties only as far as the contact and do not apply force.

### 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

Create a data backup of the adjustment/calibration data in all cases before you replace the boards.



#### IMPORTANT

After replacing boards or modules containing boards, check to make sure that the software version of the module corresponds to the current software status of the system. The software versions of the modules can be queried by running service routine S008.2 [→ 267] or using the "Unit information" [→ 59]. You can also check the info screen in advance to determine whether the current software constellation is permissible. If this is not the case, the version number of the entire software is labeled with an asterisk (e.g. V05.08.02\*).

#### IMPORTANT

When replacing modules, be sure to note which ones contain boards and follow the instructions in the section titled Measures following replacement of boards. Also check whether the current software CD or the SIRONA dealer page contains any additional more up-to-date information about module replacement.

Be sure to follow the instructions about how to proceed following module replacement. You will find this information at the end of each set of repair instructions.

#### IMPORTANT

Clean the device after it has been serviced. To do this, use only mild commercially available cleaning agents (see "*ORTHOPHOS SL Operating Instructions*" (REF 64 94 947)).

## 9.1 Safety checks

Once repairs are completed, the circuit breaker test and unit leakage current test must be carried out (see chapter "Checking the circuit breaker" and "Checking the unit leakage current").



## 9.2 Height adjustment motor (M1\_4)/spindle

### 9.2.1 Preparing for motor replacement

1. Switch the unit on.
2. Use the Up/Down keys on the control panel to move the slide up.
3. Switch the unit off again.
4. Remove the covers [ → 37]:
  - Intermediate piece
  - profile cover (top and bottom)

**Tip:** While loosening the screws, press the top profile cover down towards the unit and allow it to slide down once the screws are loose.

  - Arm cover
  - Slide cover rear, center
  - Slide cover rear, top
  - Slide cover rear, bottom and
  - Slide cover front.

**Tip:** If the height adjustment motor is inoperative, you can also move the slide manually [ → 332].

#### 9.2.1.1 Moving the slide manually

##### CAUTION

##### **uncontrolled movement of the slide**

Service engineer may be injured

- Secure the position of the slide with the height adjustment service kit.
- Make sure that no one is located underneath the ring arm during the repair.

If the slide can no longer be moved electrically, it must be moved mechanically.

#### **Height adjustment service kit**

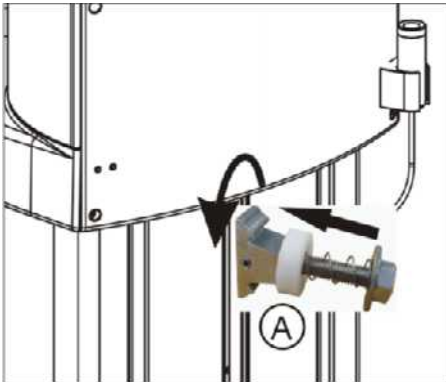
You must lock the slide in position to prevent the risk of the carriage plummeting downward during service work if the self-locking function does not fully engage. Sirona recommends using the height adjustment service kit, REF. 62 57 518. This service kit is used to prevent automatic downward movement of the slide during service by fixing the slide and the spindle holder.

Fix the clamp (A) securely underneath the slide. The locking pin (B) is used to secure the spindle holder against twisting.

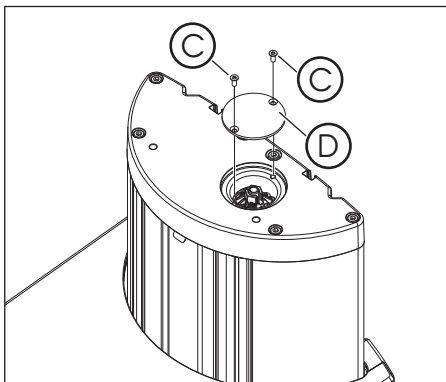


### 9.2.1.1.1 Moving the slide with the "height adjustment" service kit, REF. 62 57 518

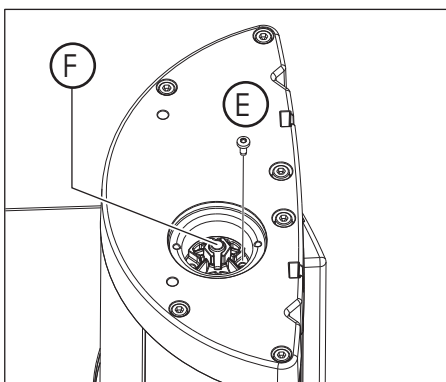
move the slide



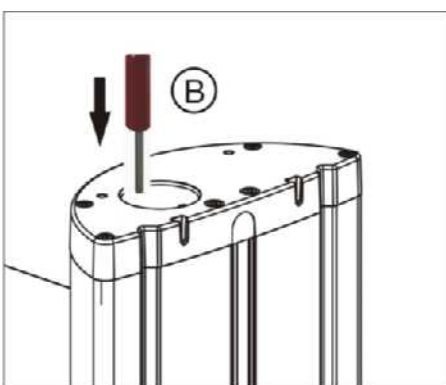
1. Insert the clamp through the opening (A) in the stand and rotate it 90°. Tighten the nut securely.



2. Loosen the two screws (C) and remove the cover (D).



3. Remove the 1st screw (E) on the spindle holder (F).



4. Insert the locking pin (B) into this opening.
5. Now remove the 2nd screw (E) on the spindle holder (F).
6. Attach the socket wrench (SW19) to the spindle. Remove the locking pin and then turn the slide up to the desired height using the socket wrench.  
Clockwise rotation of spindle = slide moves up  
Counterclockwise rotation of spindle = slide moves down
7. Reinsert the locking pin.

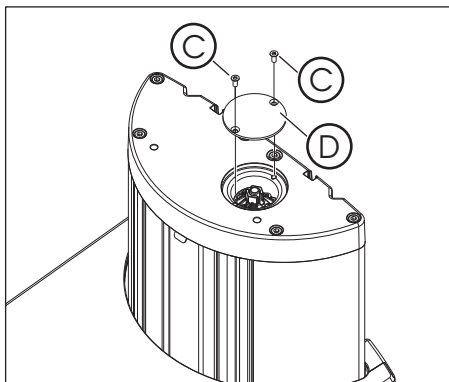
Locking the slide

- Now move the clamp (A) directly underneath the slide.  
⚡ The slide is now locked in this position for further repair work.

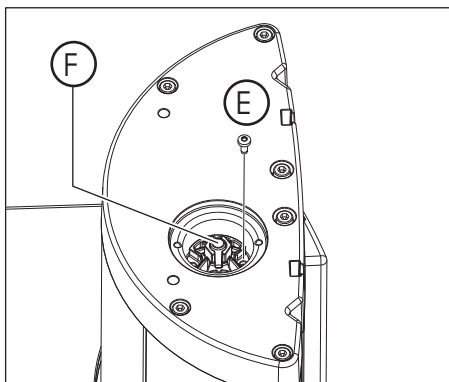


#### 9.2.1.1.2 Moving the slide without the "height adjustment" service kit, REF. 62 57 518

move the slide



1. Loosen the two screws (C) and remove the cover (D).



2. Loosen the 1st of the two screws (E) on the spindle holder (F).



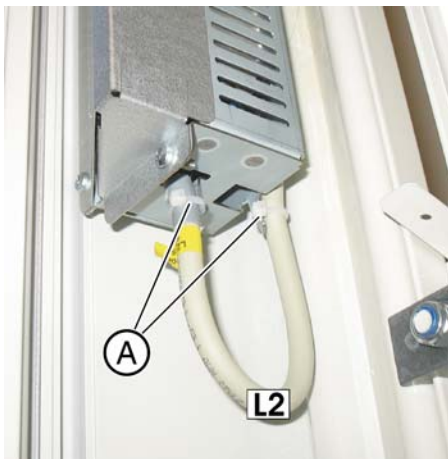
3. Attach the socket wrench (SW19) to the spindle. Hold it firmly in place while you unscrew the 2nd of the two screws (E).  
**CAUTION! If the socket wrench has to be reset, secure the spindle holder against turning, e.g. by using a screw.**
4. Rotate the spindle holder using a socket wrench (SW19) to move the slide to the required height.  
Clockwise rotation of spindle = slide moves up  
Counterclockwise rotation of spindle = slide moves down
5. After reaching the desired target position, secure the position again using the two screws (E).  
**CAUTION! Before replacing the height adjustment motor, the slide must be secured in this position.**



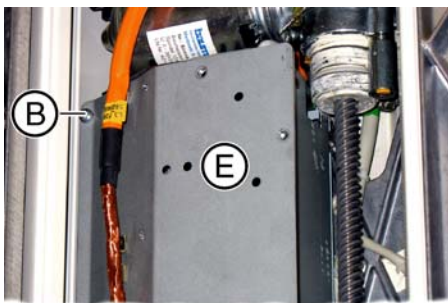
### 9.2.2 Removing board DX32



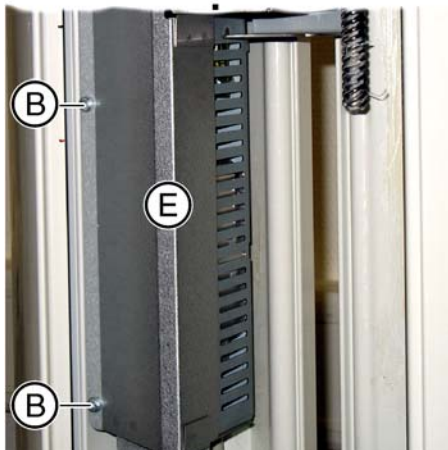
1. Unscrew the bracket (C). The bracket (C) is located in front of board DX32.
2. Move the stand to a height of 1260 (control panel display)
3. **DANGER!** Potentially lethal shock hazard! Disconnect the unit from the junction box of the building installation.



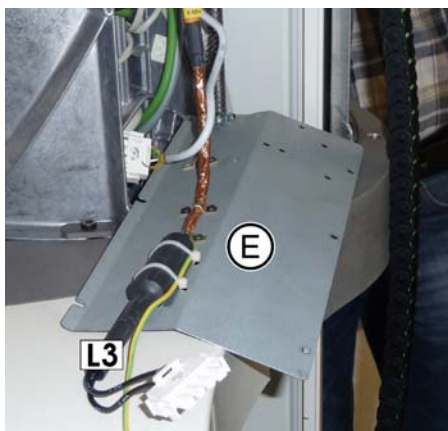
4. Remove the cable ties (A) from cable L2.



5. Loosen all the left-hand screws (B) of the protective plates (E).
6. Unscrew the remaining screws from the protective plates (E).
7. Remove the covering plates (E) (top and bottom) from the connection box (F) of board DX32.





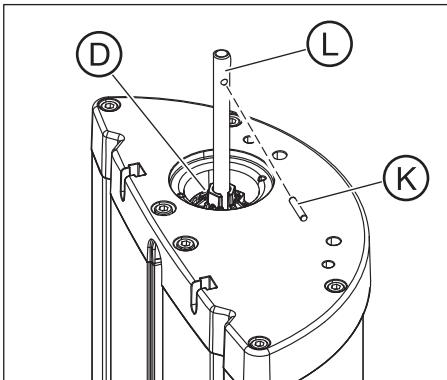


8. The cable **L3** can stay on the top covering plate (E).
9. Remove connector **X2** from board **DX32** and remove the protective conductor.
10. Remove cable **L2** from terminal **X100** and pull it downwards from out of the connection box (F).
11. Remove connector **X1** from board **DX32**.
12. Loosen the two left-hand screws (G).
13. Loosen the two screws on the right (I) and remove the connection box including board **DX32**.



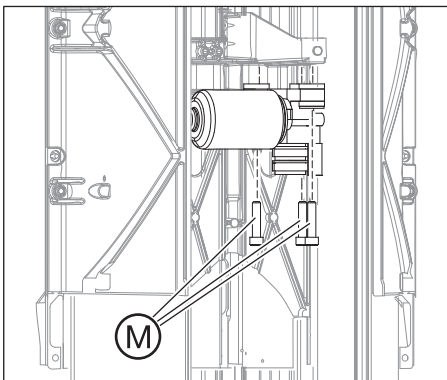
### 9.2.3 Replacing the height adjustment motor/spindle

#### Removing the spindle



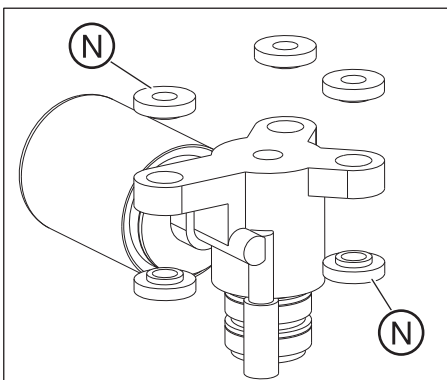
1. Loosen the two screws (E) on the spindle holder (F) (if you have not already done so) [ → 332].
2. Turn spindle holder (D) (with an 18 mm A/F socket wrench) counterclockwise until the motor comes to rest on the limit stop and spindle (L) has been turned all the way out of the motor.
3. Remove the straight pin (K).
4. Remove the spindle (L).  
**Tip:** First, pull spindle (L) downward along the motor, and then diagonally upward and out of the unit.

#### Removing the defective motor



1. Pull the pulse generator cable connector **X402** off board **DX1**.
2. Detach the motor cable from the cable harness and carefully pull it out of the stand.
3. Pull the motor connecting cable off of the filter.
4. Loosen the three screws (M).
5. Remove the motor while carefully pulling the motor cable out of the stand.

#### Inserting the dampers



- Attach the new rubber pads (N) to the new motor.  
They are included in the scope of supply of a new HA motor.



## Installing the new motor

Install the height adjustment motor in the reverse order of removal.

Please observe the following:

**Nuts:** When fastening the motor, make sure that all three screws are tightened uniformly and protrude approx. 3 mm out of the nut.

**Acorn nuts:** If acorn nuts have been installed in the unit, turn the acorn nuts to the end stop.

**CAUTION!** Do not forget to reattach all connectors or cables, route them in their original position and reattach all cable ties and cable clamps. Make sure that none of the cables are crushed by the cover plates of the DX32 connection box.

## Final work

*With the "height adjustment" service kit*

1. After reinstalling the spindle, screw the first of the two screws (E) back into the spindle holder.
2. Then remove the locking pin and screw in the second of the two screws (E).
3. Attach the cover (D).
4. Remove the clamp (A).
5. Only then should you check the travel function of the slide.

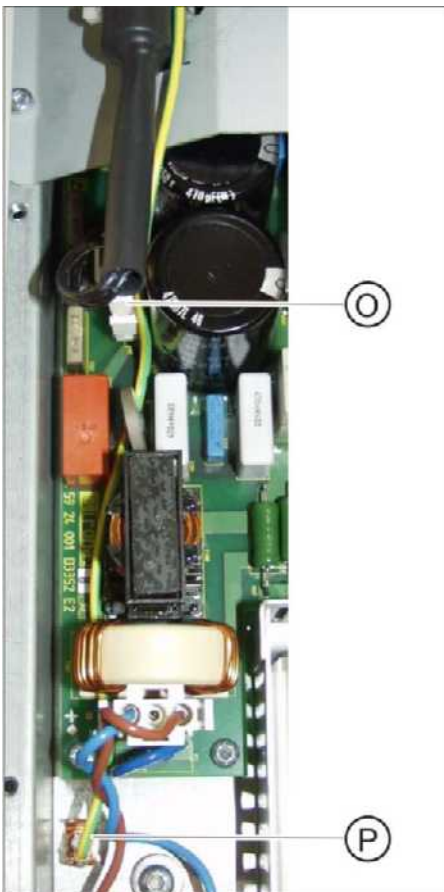
*Without the "height adjustment" service kit*

1. Attach the spindle holder (F) with the two screws (E).
2. Attach the cover (D).
3. Reattach the upper limit stop to the previously marked position.
4. Only then should you check the travel function of the slide.



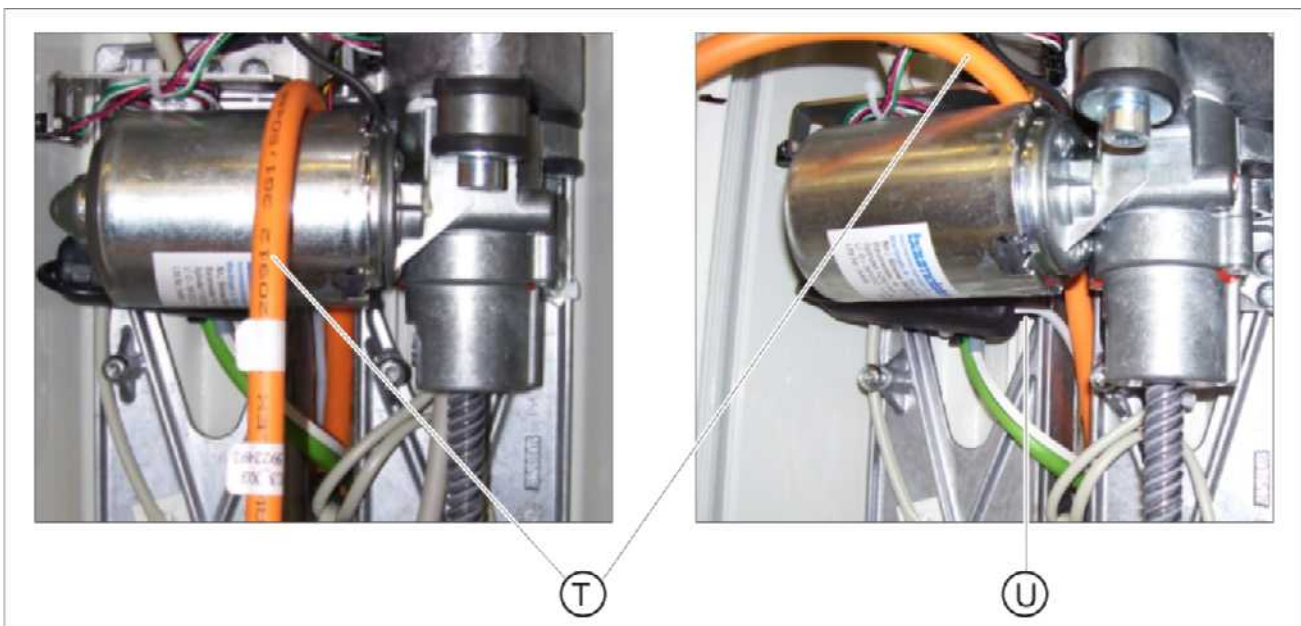
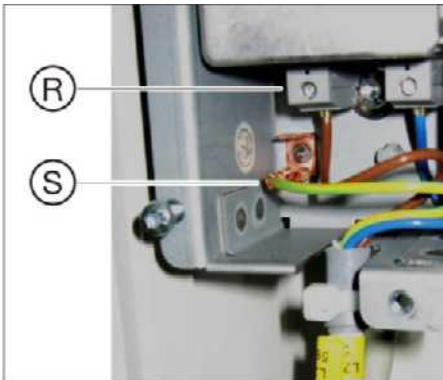
### 9.2.4 Laying of cables when replacing the height adjustment motor

1. Plug connector **X2 (O)** into board **DX32**.
2. Connect the protective ground wire (**P**) and lay it as shown in the photo.



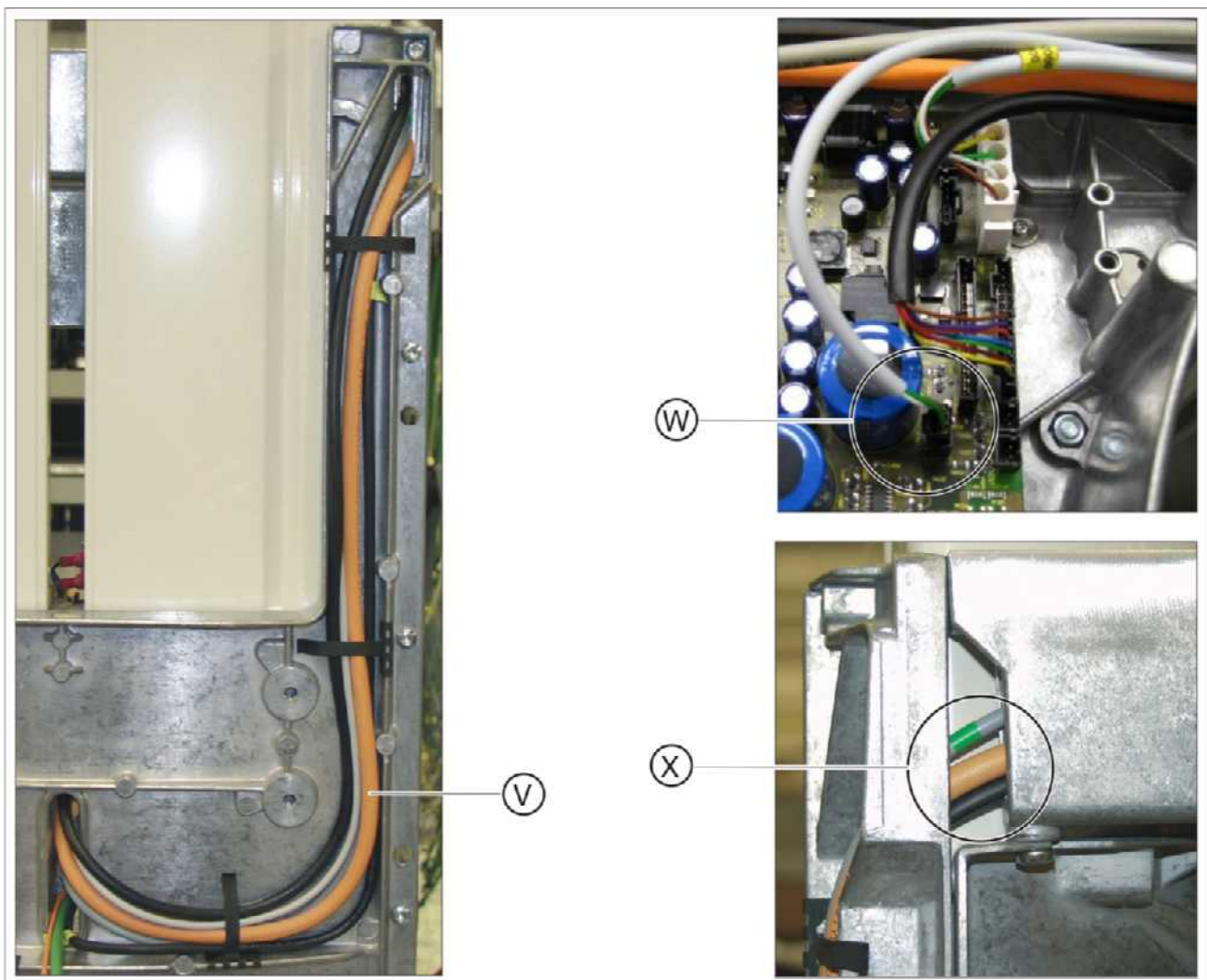


3. Attach cable **L2** first to the lower strain relief (photo on the left) and then to the upper strain relief (photo on the right) (Q) of board **DX32**.
4. Connect cable **L2** to board **DX32** (R) and attach the protective ground wire (S).



5. Run cable **L3** (T) and the motor cable (U) around the height adjustment motor.





6. Lay the motor cable in the cable harness (V) on the rear of the unit and secure in position with the cable clamps.
7. Route the cable into the arm.  
**IMPORTANT:** The green mark must lie in the recess (X).
8. Plug connector X402 (W) into board DX1.

#### 9.2.5 What has to be done after replacing the height adjustment motor (M1\_4) or the spindle?

1. After inserting the new spindle above and below the height adjustment motor, grease it thoroughly with Chesterton 622.
2. Use the Up/Down keys on the control panel to check the function of the height adjustment motor.
3. Reset the travel height.



## 9.3 Ring motor (M1\_3)

### 9.3.1 Replacing the ring motor

#### Removing the covers

#### Removing the defective motor

- Remove the "arm cover" [ → 37].

1. Detach the motor cable from the cable harness and pull it off of connector **X813** on board **DX1**.
2. Loosen the four screws (A) on the ring motor and remove the motor including the screws and the serrated washers (B).

#### Installing the new motor

1. Insert the new motor including coupling and absorber in the ring.  
**Tip:** While inserting the motor, turn it back and forth slightly until the pinion engages in the ring gear.
2. Use the screws (A) and serrated washers (B) to screw the new motor onto the motor support ring.
3. Run the ring motor cable along its original path and plug it back into connector **X813** on board **DX1**.  
**IMPORTANT:** Don't forget to reattach all cable ties and clamps.

#### Attaching the covers

- Reattach the covers.

### 9.3.2 Replacing the pinion at the ring motor

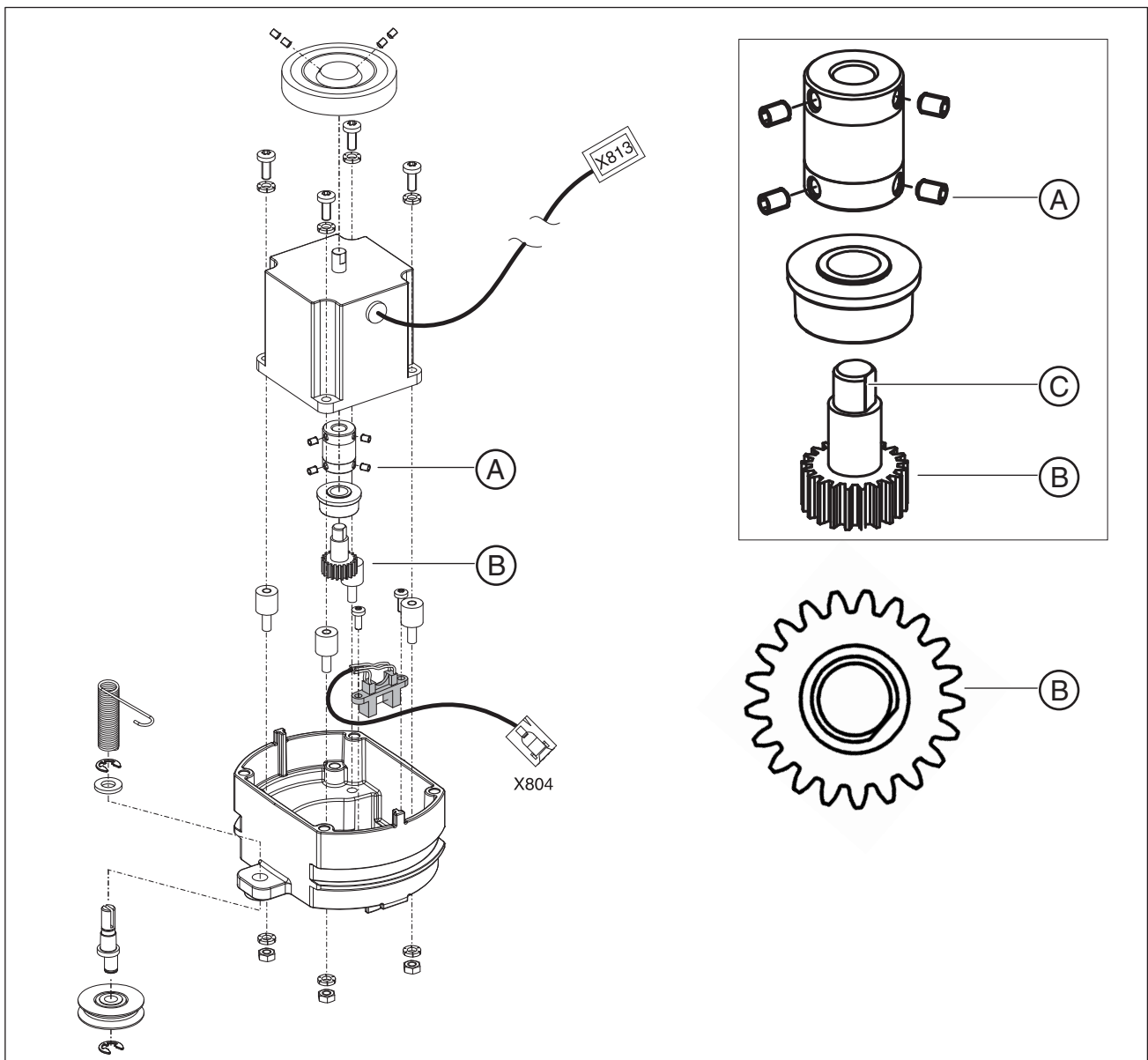
#### Removing the covers

#### Removing the motor

- Remove the "arm cover" [ → 37].

- Remove the ring motor as described in the chapter Replacing the ring motor [ → 342].





### Replacing the pinion

1. Loosen the set screws (A) and pull off the defective pinion (B).
2. **IMPORTANT:** Ensure that the pinion is seated in the coupling so that the set screws (A) are sitting on the flattened surface (C) of the pinion during subsequent tightening to prevent the pinion from turning. Insert the new pinion.
3. **IMPORTANT:** Apply Loctite 242 to the set screws (B) before tightening. Retighten the set screws (A).

### Installing the motor

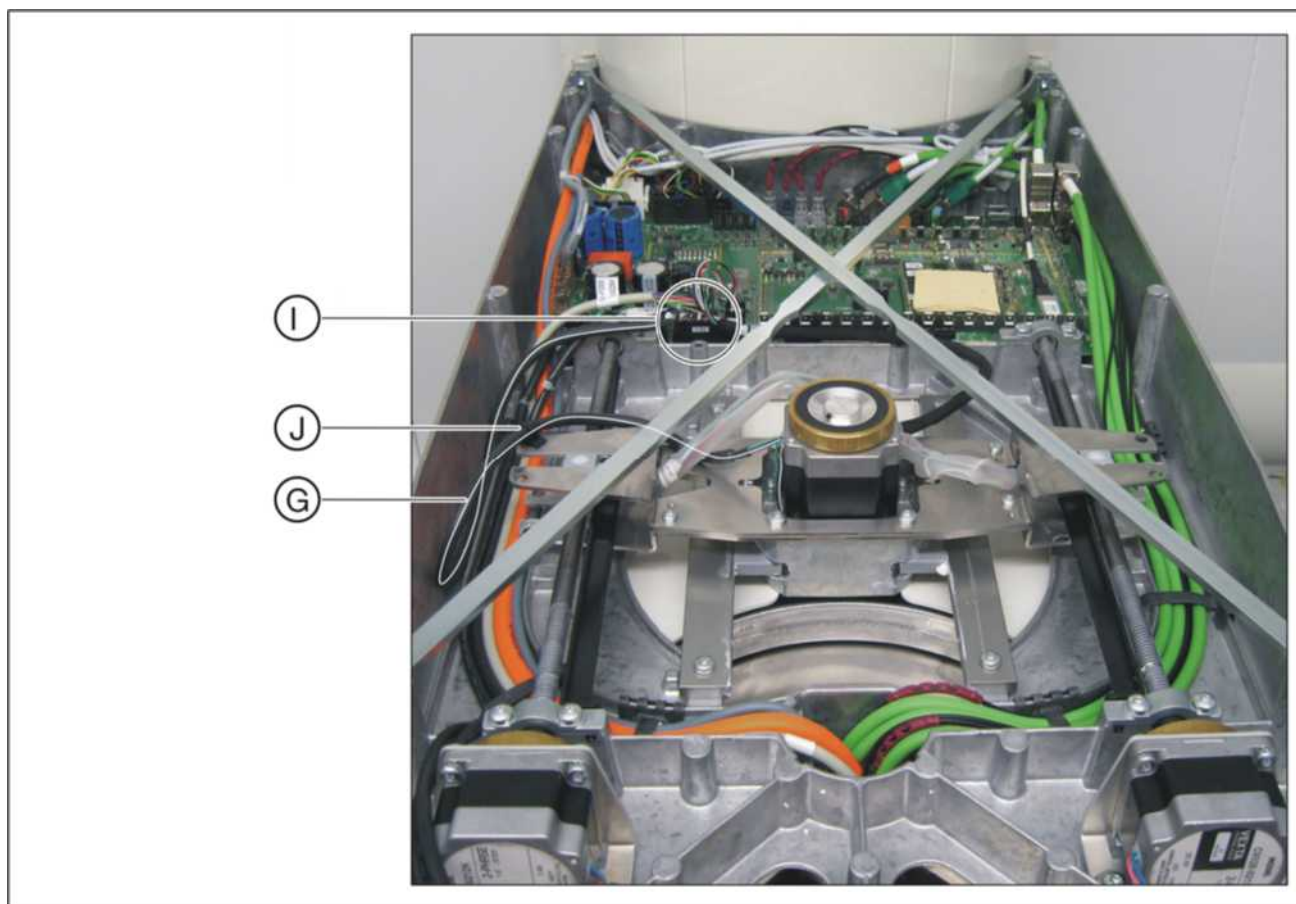
- Reinsert the motor in the ring, route the cable and connect the motor as described in the chapter Replacing the ring motor [ → 342].

### Attaching the covers

- Reattach the covers.



### 9.3.3 Laying of cables when replacing the ring motor



1. Lay the cable (G) in a loop from top to bottom and fix it in the cable clamp (J).
2. Plug connector X813 (H) into board DX1.

### 9.3.4 What has to be done after replacing the ring motor (M1\_3)/pinion?

1. Check the function of the ring motor.
2. Perform complete unit adjustment or calibration [ → 160].



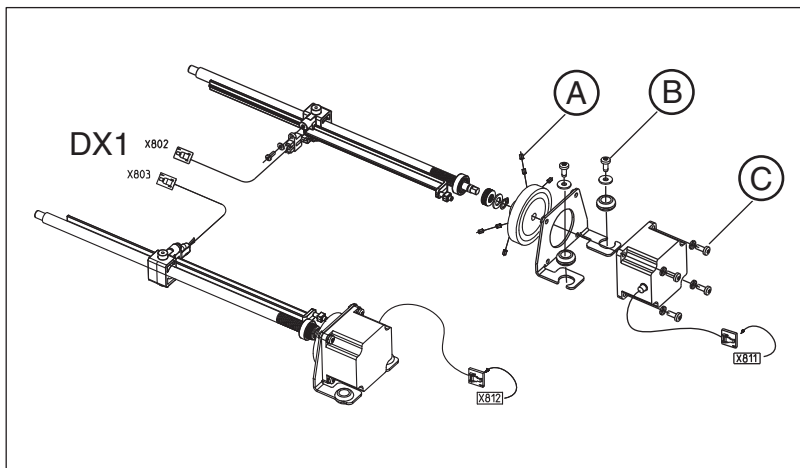
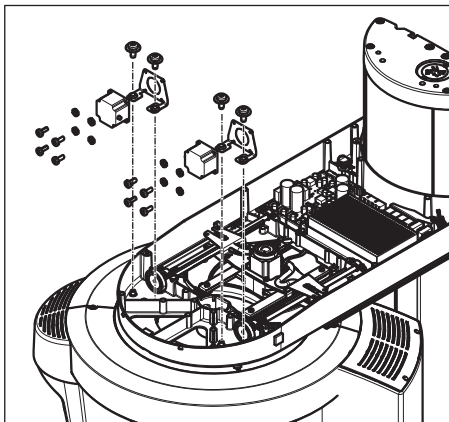
## 9.4 Pan actuators (M1\_1/2)

### 9.4.1 Replacing actuators

#### Removing the covers

- Remove the "arm cover, top" [ → 37].

#### Removing the defective actuator



1. Detach the actuator cable from the cable holders and pull it off connector **X812** (AK2; M1\_2, left) or **X811** (AK1; M1\_1, right) on board **DX1**.
2. Loosen set screws (A) on the coupling and the two screws (B) on the actuator holder and pull the actuator including the holder out toward the rear.
1. Loosen the four screws (C) and remove the actuator holder from the defective motor.
2. Place the new actuator in the holder and fasten it with the four screws (C).

#### Reusing the motor holder (if required)

#### Installing the new actuator

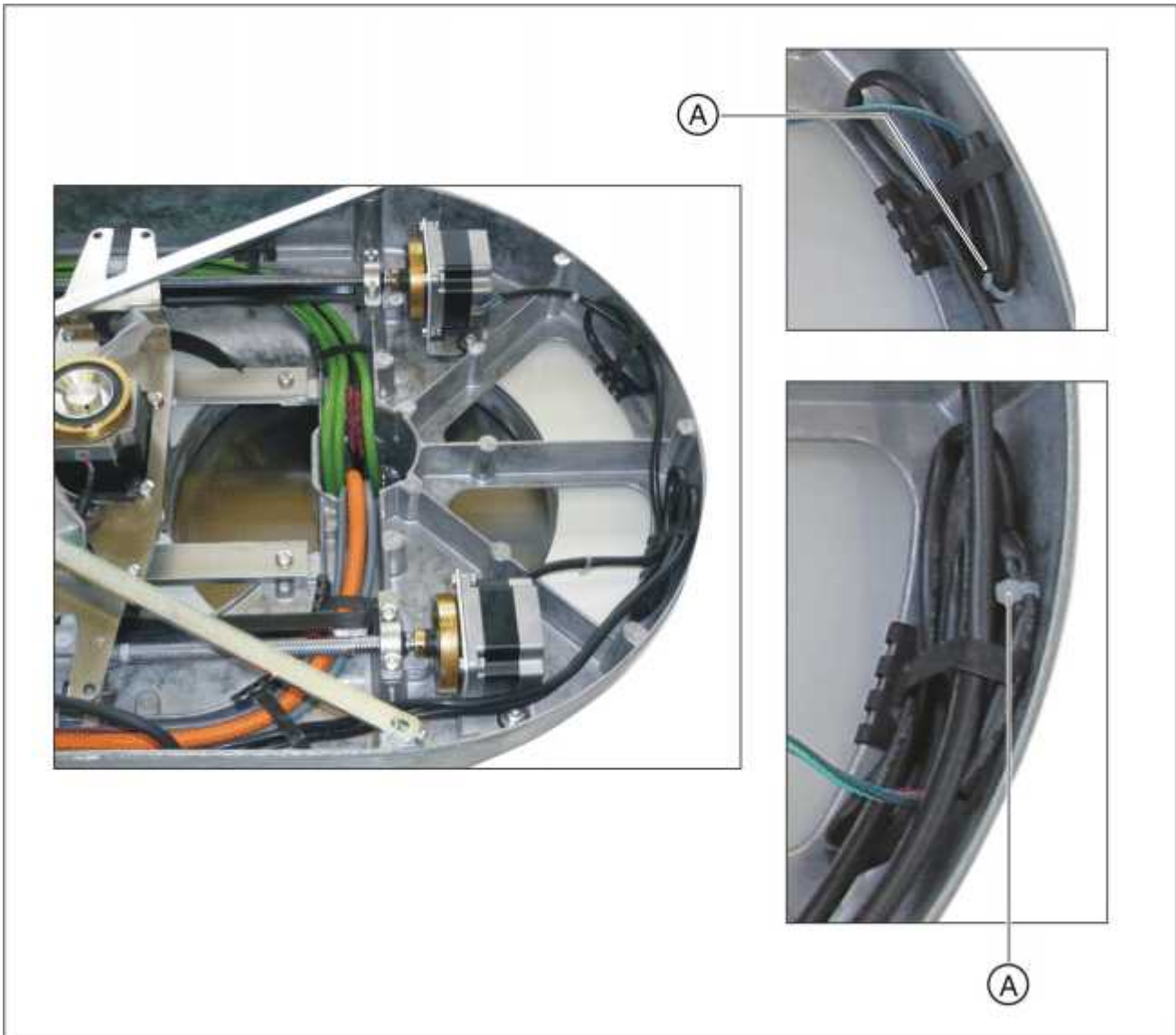
#### IMPORTANT

Remember to plug connectors **X811** and **X812** back in, lay the cables in their original positions, and reattach all cable ties and clamps [ → 346].

- **IMPORTANT:** Secure set screws (A) with Loctite 242 before tightening.  
Install the actuator in reverse order of removal.



### 9.4.2 Laying of cables when replacing the actuator



- Lay the cables in a loop and secure the loop with the cable ties (A).

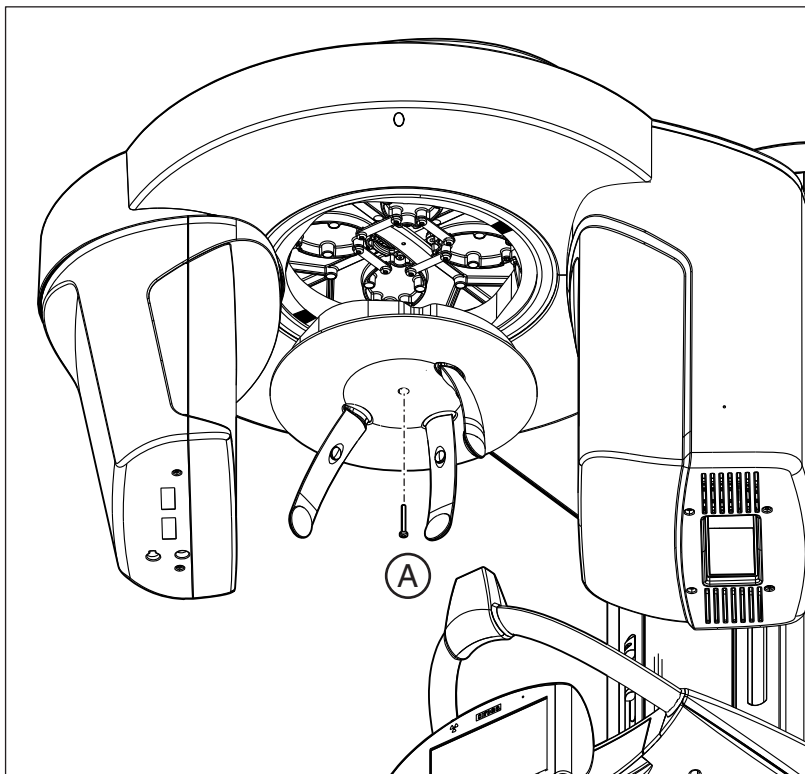
### 9.4.3 What has to be done after replacing the actuators?

1. Check the function of the actuators.
2. Perform a complete unit adjustment and calibration.



## 9.5 Head support

### 9.5.1 Replacing the headrest



#### Removing the defective headrest

1. Hold the headrest firmly from below, loosen screw (A), and remove the defective headrest.

**Tip:** To remove the headrest, this must be tilted slightly.

2. Pull cable **L18** off connector **X1** on board **DX5** [ → 30].

#### Installing the new headrest

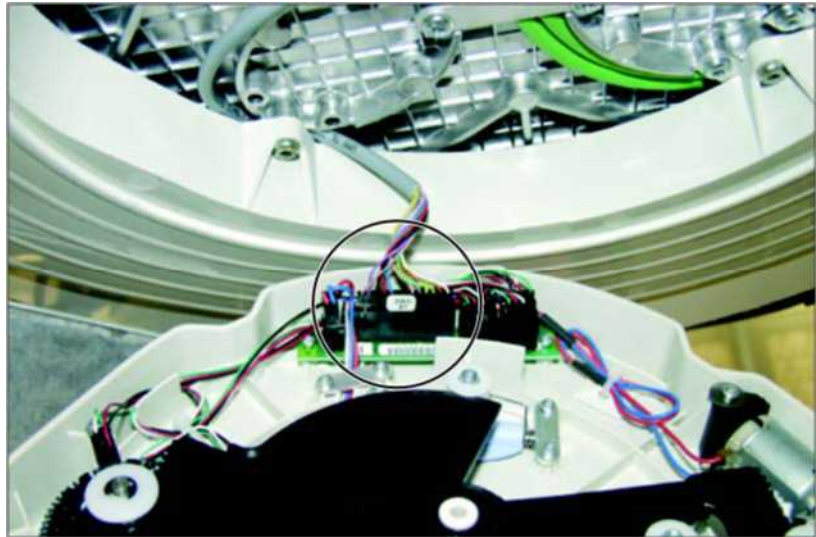
1. Plug cable **L18** into connector **X1** on board **DX5** of the new headrest [ → 348].
2. Position the new headrest in the unit and screw it on loosely with the screw (A) until a slight stop is perceptible.

#### Aligning the new headrest

1. Switch the unit on.
2. Switch the light localizers on and align the headrest so that the MS light beam strikes the center of the forehead support.
3. **IMPORTANT:** Make sure that the headrest does not turn when you tighten the screw. Tighten the screw (A).



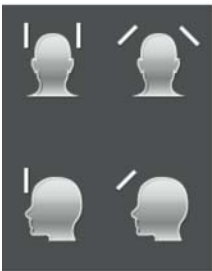
### 9.5.2 Laying of cables when replacing the headrest



- Plug cable **L13** into connector **X1** on board **DX5**.

### 9.5.3 What has to be done after replacing the headrest?

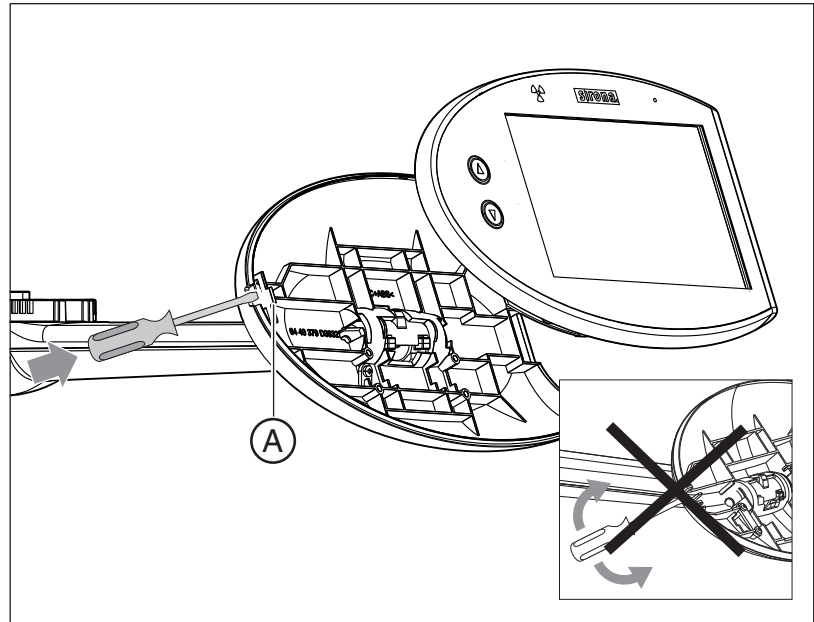
- Use the forehead and temple support keys on the touchscreen to check the function of the headrest.



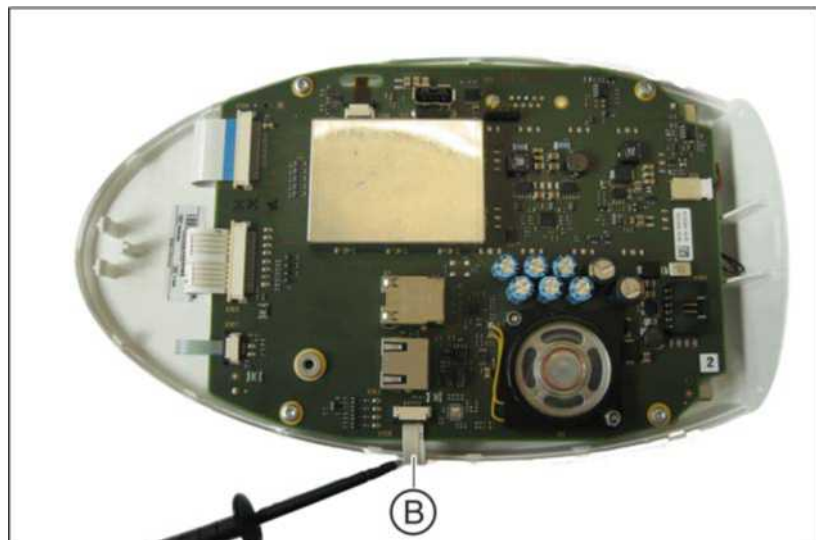


## 9.6 Control panel

### 9.6.1 Replacing the user interface

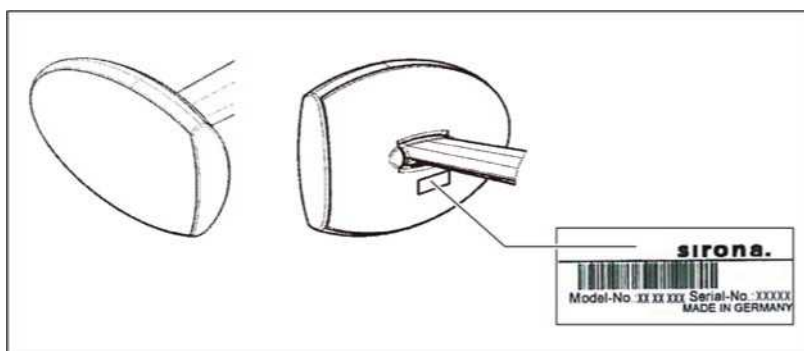


1. Press into slit (A) of the housing cover with a screwdriver (do not pry!) and remove the defective user interface from the control panel.
2. Pull cables **L9 (gray)** and **L10 (green)** off connectors **X102 (L9)** and **X103 (L10)** on board **DX7** of the defective user interface.
3. Plug the cables into connectors **X102 (L9)** and **X103 (L10)** of board **DX7** on the new user interface.



4. **CAUTION!** Ensure that the flat-ribbon cable (B) is not crushed, Clip the new user interface onto the control panel.





5. Update the nameplate at the control panel cover.  
To do so, affix the supplied label as shown in the figure.

#### 9.6.1.1 What has to be done after replacing the user interface?

##### **IMPORTANT**

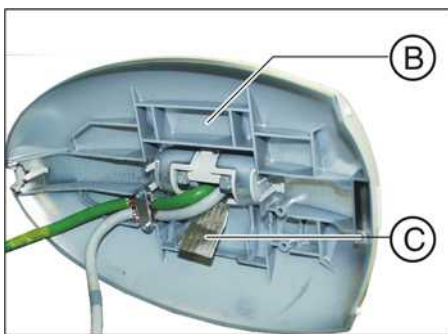
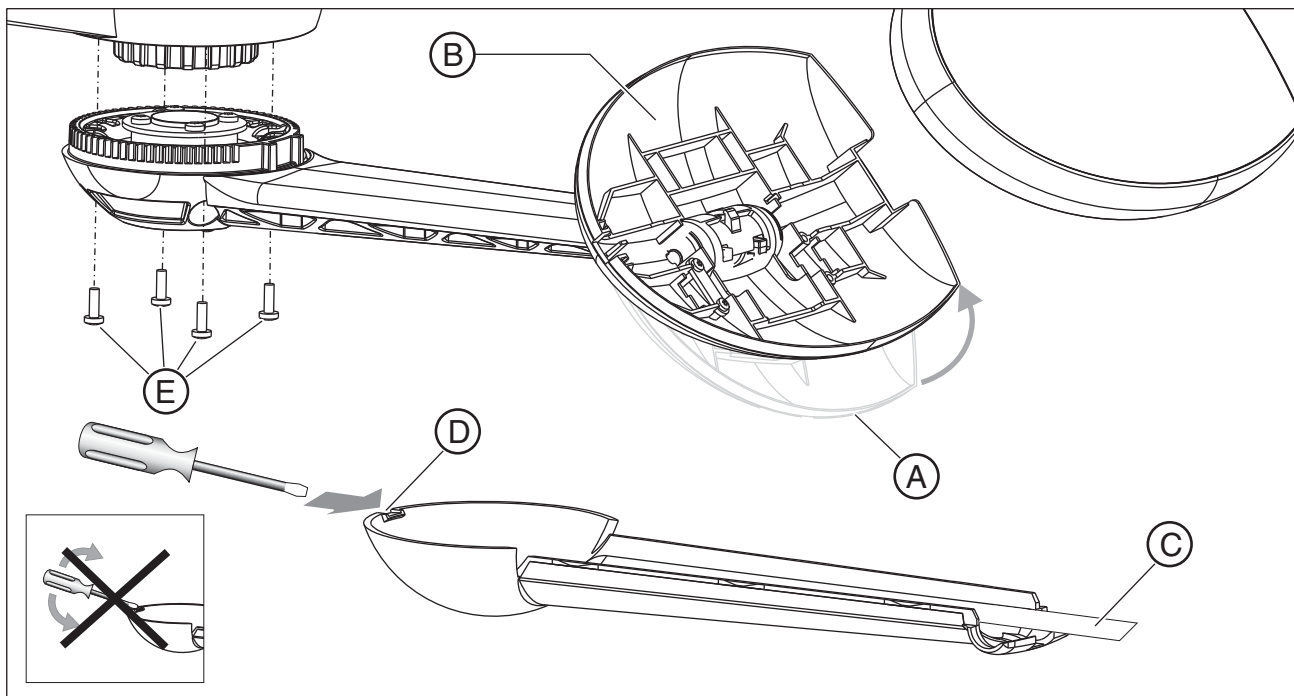
So that the board is also replaced with the user interface, you **MUST** also follow the instructions in the section titled "Measures following replacement of boards [ → 398]".

1. Check that the user interface and the display elements are functioning correctly: When the unit is switched on, all of the display elements must light up briefly.
2. Perform a software update to the latest version.



## 9.6.2 Replacing the control panel

1. Remove the user interface [ → 349].



2. Swing the folding mechanism for the Easypad (A) all the way up. This makes it easier to remove the cover.
3. Carefully remove the adhesive strip from the shield plate (B) and grounding strap (C).
4. Press into slit (D) of the housing cover with a screwdriver (do not pry!) and remove the cover.
5. Detach cables **L9** and **L10** from the strain reliefs.
6. Rotate the control panel to the center position and loosen the four screws (E).
7. Pull the cables out of the control panel and remove the panel.
8. Pull the cables **L9** and **L10** into the new control panel and install it with the four screws (E).
9. Lay the cables and reattach the strain reliefs (see the chapter Laying cables when replacing the control panel [ → 352]).
10. Guide the grounding strap (C) of the cover into the new control panel.
11. Clean the adhesive surface and affix the grounding strap (C) with an adhesive strip to the shield plate (B).
12. Reattach the covers.
13. Install the user interface [ → 349].



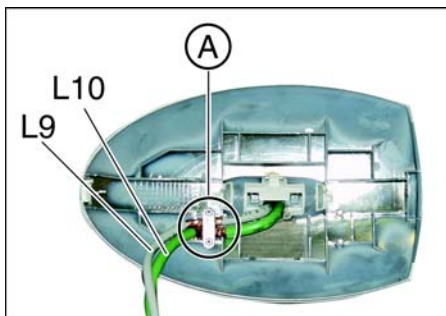
### 9.6.2.1 What has to be done after replacing the control panel?

#### IMPORTANT

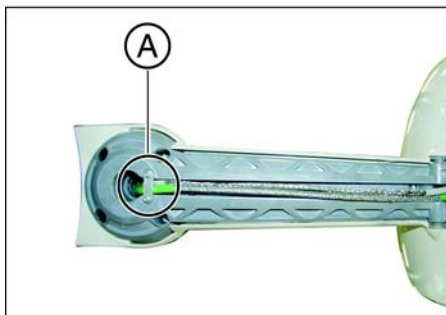
Use the most current software version available on the *"ORTHOPHOS SL Firmware DVD"*.

1. Switch the unit on.
2. Perform a software update to the current unit software version.
3. Switch the unit off.  
Wait approx. 1 minute. Then switch the unit on again.
4. Check the control panel and the display elements for correct functioning: When the unit is switched on, all of the display elements must light up briefly.

### 9.6.3 Laying cables for control panel replacement



A	Strain relief
---	---------------





## 9.7 Laser light localizers

### CAUTION

**Risk of injury to eyes.**

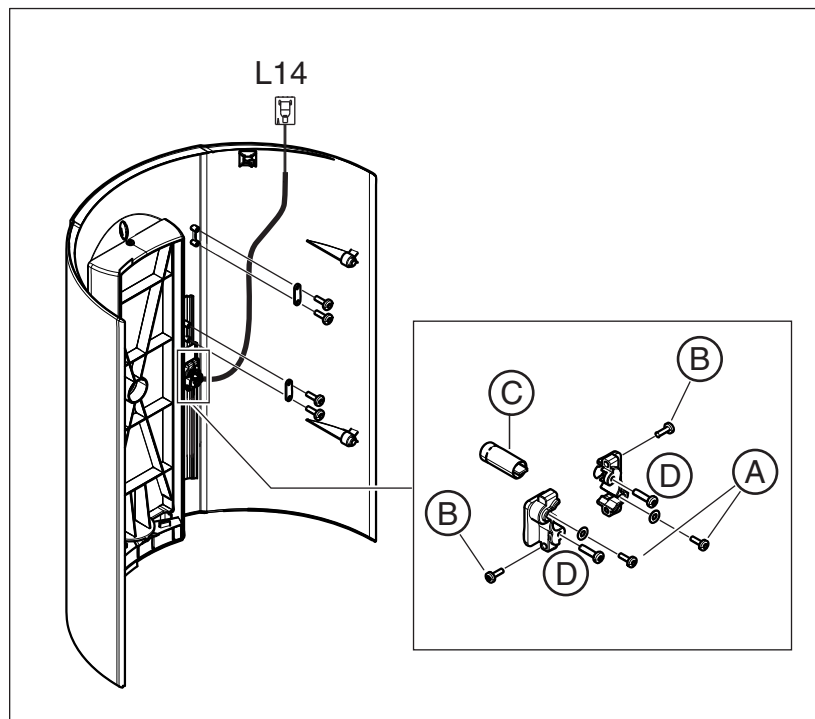
The unit contains lasers of Class 1.

Keep a distance of at least 4" (10 cm) between eye and laser. Do not look into the laser beam.



### 9.7.1 FH laser light localizer (Pan)

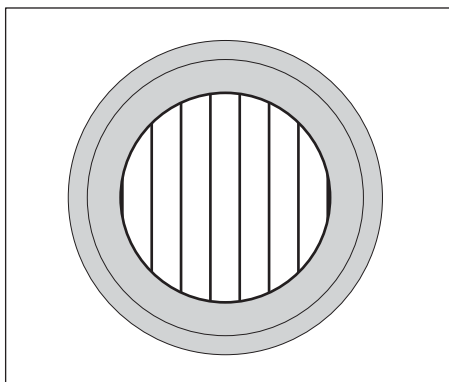
#### 9.7.1.1 Replacing the laser module in the FH (Pan) laser light localizer



1. Loosen the "front slide" [ → 37] cover, and carefully pull it off toward the front together with the FH light localizer.
2. Pull the cable of the FH laser module from **L14**.
3. Detach the cable of the laser module from the strain reliefs.
4. Loosen the screws (A) and (B).
5. Remove the holder incl. laser module (FH).



6. Loosen the screws (B) and carefully pull the laser module (C) out of the holder toward the front.
7. Insert the new laser module (FH) in the holder and retighten screws (B).

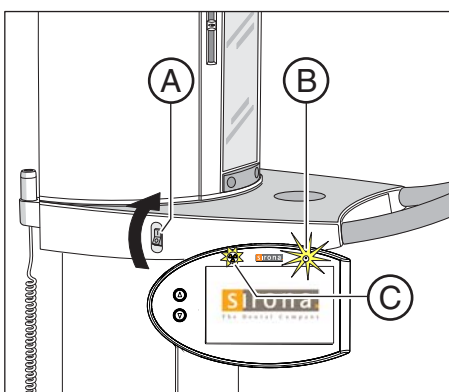
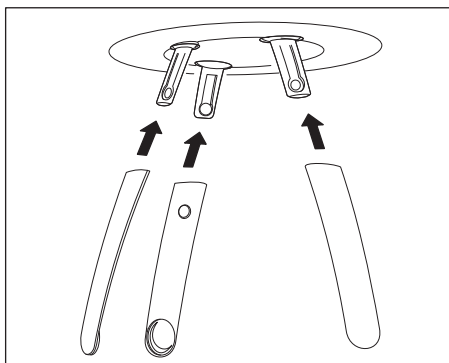


#### IMPORTANT

Make sure that the lines in the laser module run vertically.

8. Screw the holder securely back onto the cover with screws (A) and reattach the strain reliefs.
9. Set the "Front slide" cover down on the "Top support" cover.
10. Plug the cable of the FH laser module into the sockets of cable **L14**.
11. Now adjust the FH (PAN) laser localizer [ → 354].
12. Reattach the "Front slide" cover [ → 37].

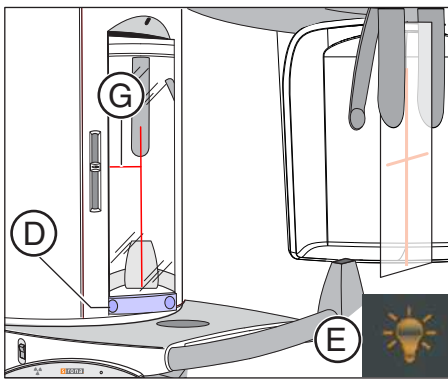
#### 9.7.1.2 Adjusting the laser light localizer FH (PAN)



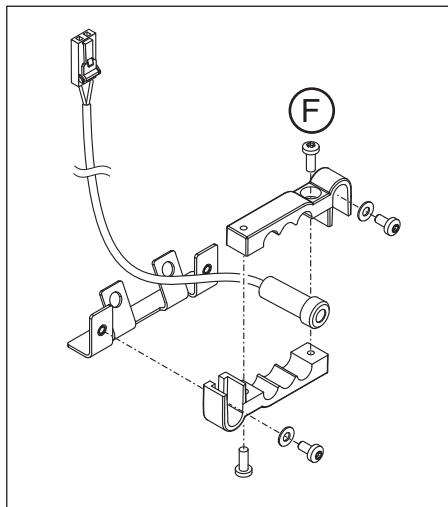
1. Insert the forehead and temple supports.
2. Switch the unit on via the switch (A) (see also Operating Instructions).
  - ✎ The X-Ray radiation indicator (B) lights up briefly.
  - ✎ After approx. 2 seconds, the green LED (C) in the upper part of the control panel lights up. This LED remains lit as long as the unit is on.
  - ✎ The start screen appears on the touchscreen of the Easypad and the system's self-adjustment routine starts running (for approx. 1 minute). The diaphragm moves into position. Forehead and temple supports on the panoramic unit are moved to the home position.
  - ✎ On completion of the self-adjustment routine, the main menu appears on the touchscreen. Help message H301 prompts you to move the unit into the starting position.
3. Touch the PAN symbol at the top of the touchscreen.
  - ✎ The program group PAN is selected.
4. Touch the R key on the touchscreen.
  - ✎ The unit moves to its starting position for PAN exposures.
5. Affix a piece of white cardboard between the temple supports.







6. Rotate the mirror by pressing into the left depression (D) of the toolbar.
7. Touch the light localizer key (E) on the touchscreen.
  - ↪ Then light localizers are switched on.
  - ↪ The laser beam is displayed on the cardboard by a red line.
  - ↪ The horizontal laser beam (G) must be displayed horizontally. If this is not the case, adjust the laser light localizer.



8. Slightly loosen the screws (F) of the laser module and align the laser module FH (PAN) so that the horizontal laser beam is displayed horizontally.
9. Firmly tighten the screws (F) of the laser module.
10. Switch the laser light localizers off again.



## 9.7.2 FH laser light localizer (Ceph)

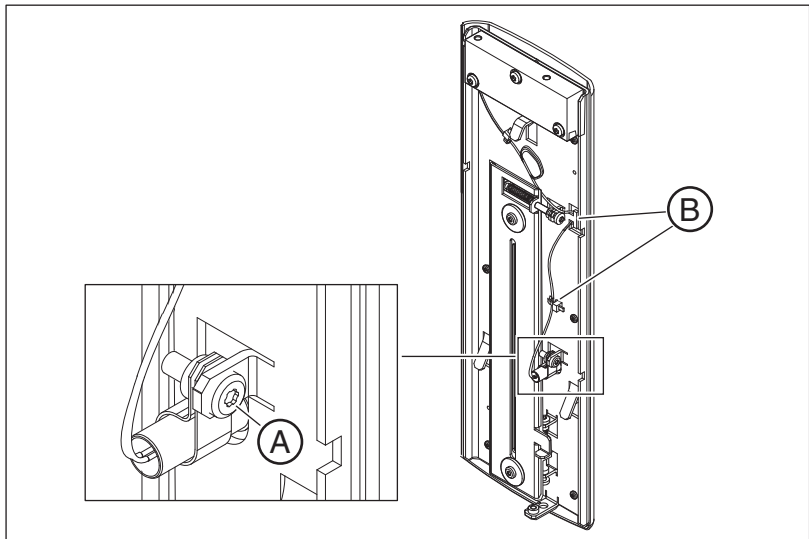
### 9.7.2.1 Replacing the ceph laser module in the FH laser light localizer (ceph)

1. Remove the covers "Cephalometer cover" and "Outside secondary diaphragm" [→ 37].

#### IMPORTANT

Do not under any circumstances remove or move the secondary diaphragm!  
Otherwise the system will require readjustment and recalibration.

2. Pull the cable of the Ceph laser module off connector **X407** on board **DX91** and detach the cable from the cable ties and holder.

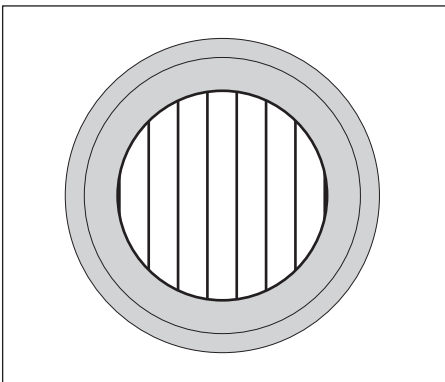


3. Loosen the screw (A) and remove the FH laser module (Ceph).
4. Insert the new laser module (FH) and retighten screw (A).

#### IMPORTANT

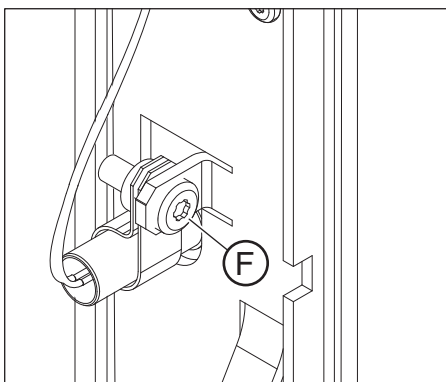
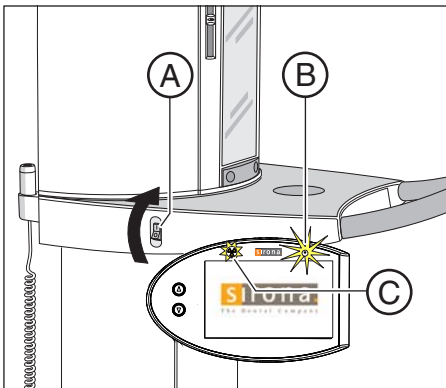
Make sure that the lines in the laser module run vertically.

5. Plug the cable of the FH laser module back into connector **X407** on board **DX91**.
6. Lay the cable in its original position and secure it there with cable ties.
7. Reattach the cover "Cephalometer cover" [→ 37].
8. Next, adjust the FH laser light localizer (Ceph) [→ 357].
9. Reattach the "Outside secondary diaphragm" cover [→ 37].

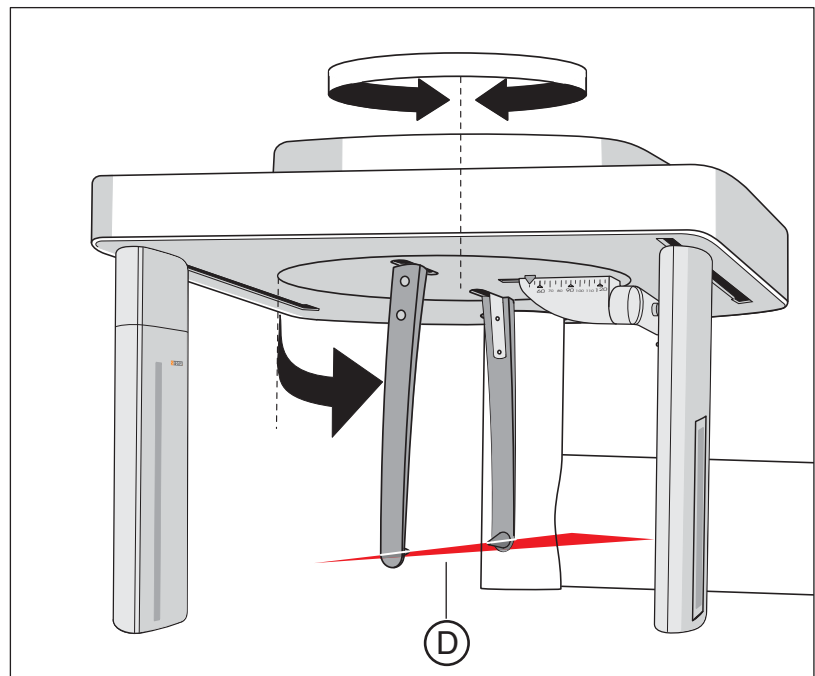




### 9.7.2.2 Adjusting the FH laser light localizer (Ceph)



- ✓ Reattach the "Outside secondary diaphragm" cover [→ 37].
1. Switch the unit on via the switch (A) (see also Operating Instructions).
  - ↪ The X-Ray radiation indicator (B) lights up briefly.
  - ↪ After approx. 2 seconds, the green LED (C) in the upper part of the control panel lights up. This LED remains lit as long as the unit is on.
  - ↪ The start screen appears on the touchscreen of the Easypad and the system's self-adjustment routine starts running (for approx. 1 minute). The diaphragm moves into position. Forehead and temple supports on the panoramic unit are moved to the home position.
  - ↪ On completion of the self-adjustment routine, the main menu appears on the touchscreen. Help message H301 prompts you to move the unit into the starting position.
2. Touch the CEPH symbol at the top of the touchscreen.
  - ↪ The CEPH program group is selected.
3. Touch the R key on the touchscreen.
  - ↪ The diaphragm and the sensor move into the starting position for Ceph exposures.
4. Touch the light localizer key on the touchscreen.
  - ↪ Then light localizers are switched on.
  - ↪ The FH laser beam (D) must run horizontally between the ear plugs (tolerance:  $\pm 1.5$  mm).
5. Firmly tighten the screws (F) of the laser module.





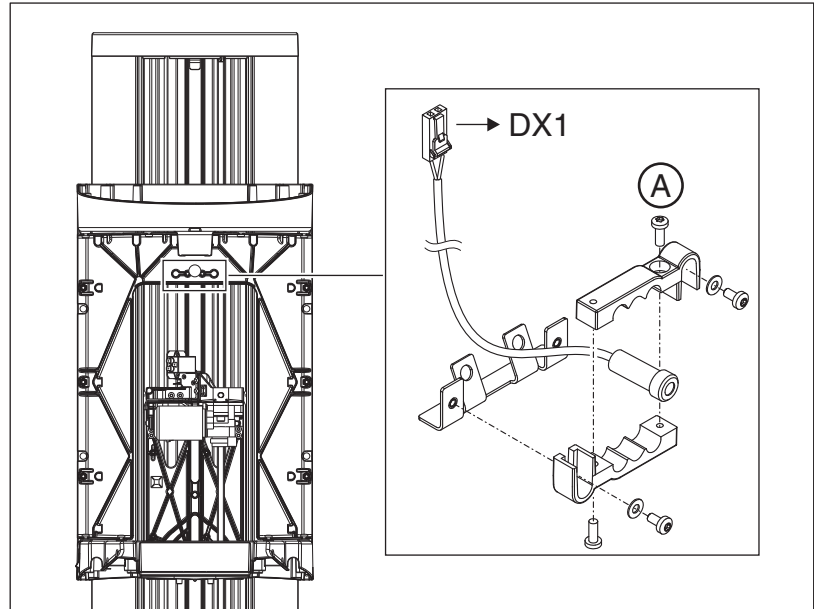
6. Align the Ceph (FH) laser module so that FH light beam (D) runs horizontally between the ear plugs (tolerance:  $\pm 1.5$  mm).
7. **NOTICE! Ensure that you do not turn the laser module while tightening the screws.**  
Firmly tighten the screws (F) of the laser module.
8. Switch the laser light localizers off again.
9. Check the light localizer again and perform a correction if necessary.



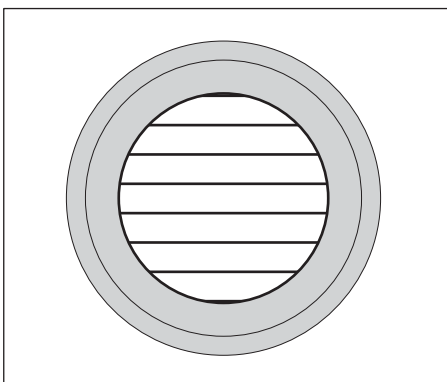
### 9.7.3 MS laser light localizer (pan)

#### 9.7.3.1 Replacing the laser module in the MS laser light localizer (pan)

1. Remove the "Top arm" cover [ → 37].



2. Pull the cable of the MS laser module off connector **X811** on board **DX1**.
3. Loosen the "Front slide" [ → 37] cover, and carefully pull it off toward the front together with the FH double laser light localizer.
4. Pull the cable of the FH laser module from **L14**.
5. Loosen the cables of the MS laser module from the cable holder.
6. Loosen the screws (A) and carefully remove the laser module (MS) toward the front.
7. Insert the new laser module (MS) in the holder and screw in the screws (A) (do not tighten yet!).



#### IMPORTANT

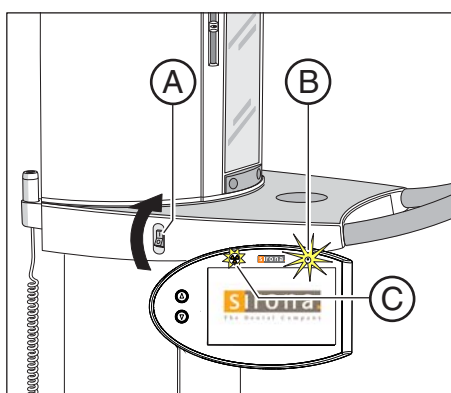
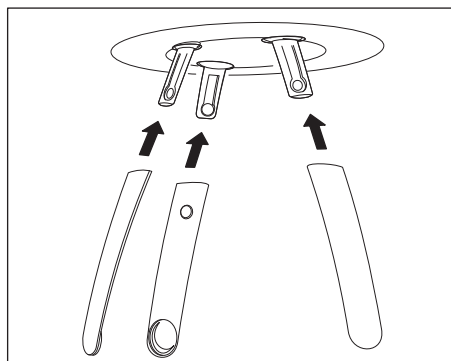
Make sure that the lines in the laser module run horizontally.

8. Tighten the screw (A).
9. Plug the cable of the new MS laser module into connector **X811** on board **DX1** and run the cable in the cable holder.
10. Next, adjust the MS laser localizer [ → 360].
11. Set the "Front slide" cover down on the "Top support" cover.
12. Plug the cable of the FH laser module into the sockets of cable **L14**.
13. Reattach the "Front slide" and "Top arm" covers [ → 37].



### 9.7.3.2 Adjusting the MS laser light localizer (PAN)

✓ The "Front slide" cover must have been removed [ → 37].



1. Insert the forehead and temple supports (see also Operating Instructions).

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

- ✦ The X-ray radiation indicator (B) lights up briefly.
- ✦ After approx. 2 seconds, the green LED (C) in the upper part of the control panel lights up. This LED remains lit as long as the unit is on.
- ✦ The start screen appears on the touchscreen of the Easypad and the system's self-adjustment routine starts running (for approx. 1 minute). The diaphragm moves into position. Forehead and temple supports on the panoramic unit are moved to the home position.
- ✦ On completion of the self-adjustment routine, the main menu appears on the touchscreen. Help message H301 prompts you to move the unit into the starting position.

3. Touch the PAN symbol at the top of the touchscreen.

- ✦ The program group PAN is selected.

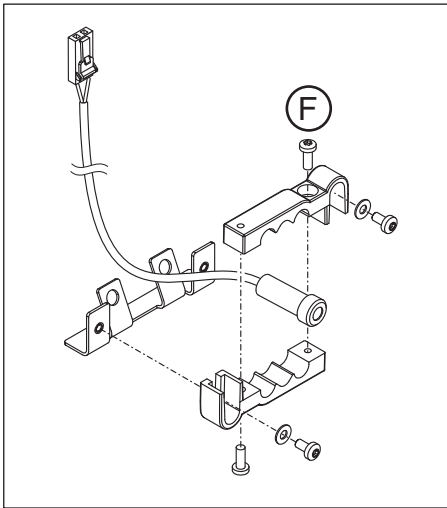
4. Touch the R key on the touchscreen.

- ✦ The unit moves to its starting position for PAN exposures.

5. Press the light localizer key on the control panel.

- ✦ The light localizers are switched on.
- ✦ The vertical laser beam must be displayed in the center of the forehead support and the bite block holder.





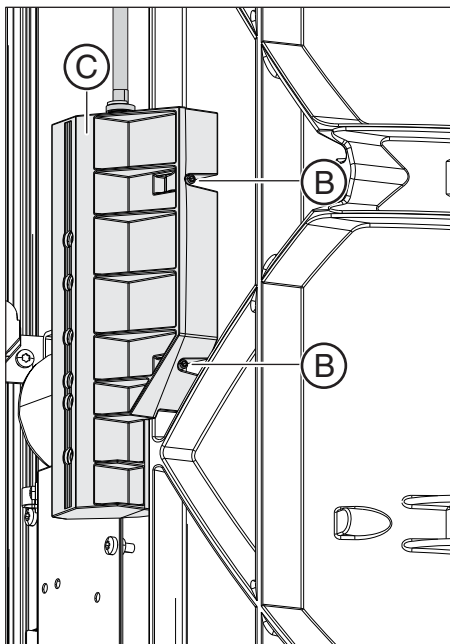
6. Slightly loosen the screws (F) of the laser module and align the laser module (MS) so that the MS light beam is displayed at the center of the bite block or bite block holder.
7. Firmly tighten the screws (F) of the laser module.
8. Switch the laser light localizers off again.



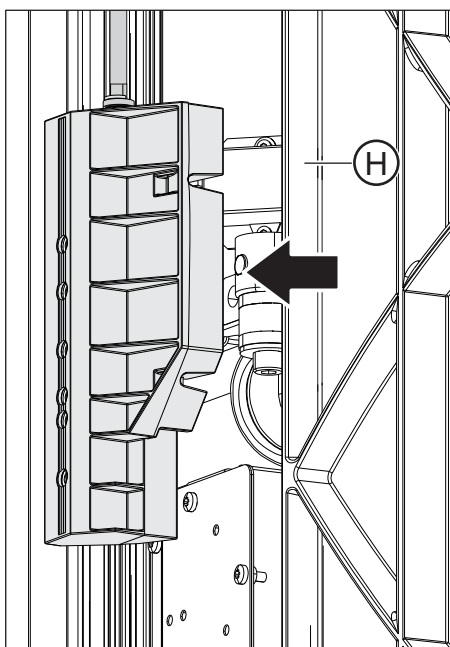
## 9.7.4 Laser area display (VOL)

### 9.7.4.1 Replacing the laser area display (VOL)

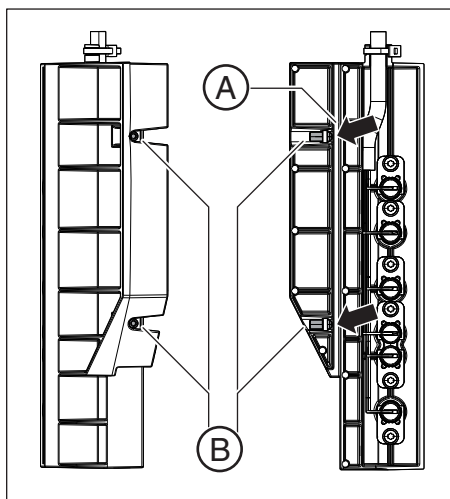
1. Remove the "Top arm" and "Front slide" covers [ → 37].
2. Remove the cable of the defective laser area display (C) from connector **X1500** on board **DX1** and loosen the cable from the cable holders.
3. Loosen the thread (B) slightly (approx. 3 - 4 turns).



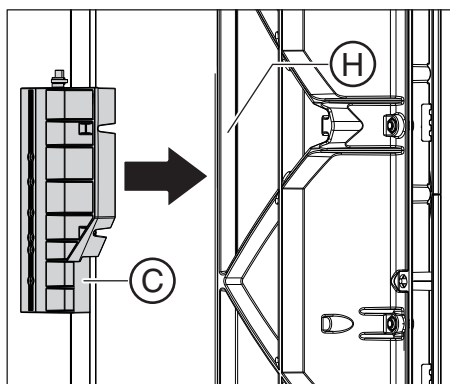
4. Remove the defective laser area display from the struts of the cast part (H).



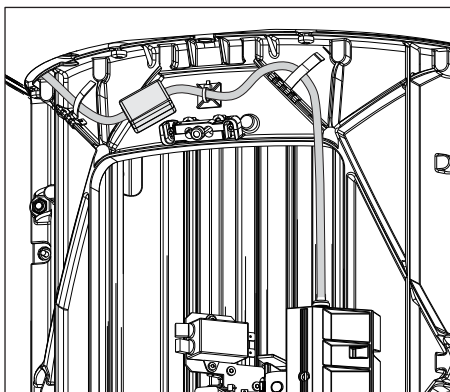




5. Ensure that the threads (B) on the new laser area display are unscrewed so far that the notch is released (A).



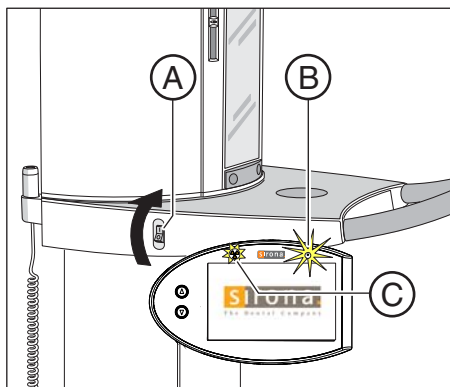
6. **NOTICE!** Ensure that the laser area display is attached to the cast part and that there is no gap between the laser area display and the cast part.  
Insert the new laser area display (C) into the struts of the cast part (H). Do not tighten the thread (B) fully yet.
7. Now adjust the height of the laser area display [ → 364].
8. After the adjustment, fully tighten the thread (B).



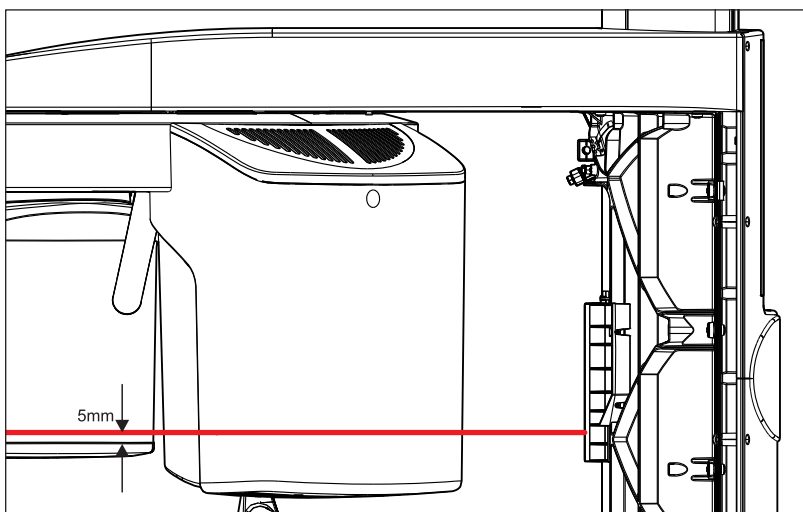
9. Lay the cable of the new laser area display in the cable clamps and re-insert the cable onto connector X1500 on board DX1.
10. Reattach the "Top arm" and "Front slide" covers [ → 37].



### 9.7.4.2 Adjusting the laser area display (VOL)

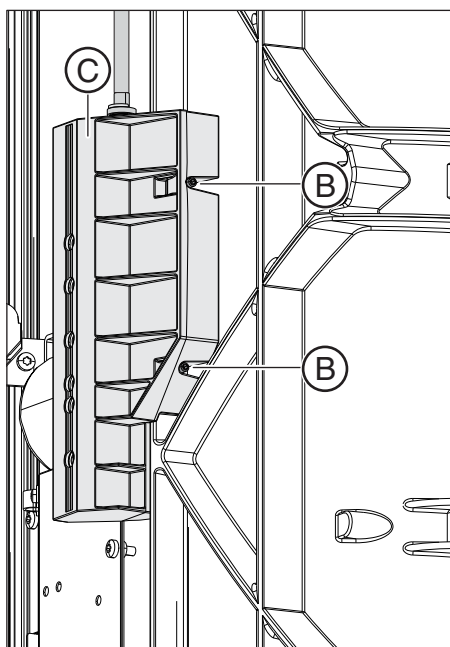


1. Switch the unit on via the switch (A) (see also Operating Instructions).
  - ✎ The X-ray radiation indicator (B) lights up briefly.
  - ✎ After approx. 2 seconds, the green LED (C) in the upper part of the control panel lights up. This LED remains lit as long as the unit is on.
  - ✎ The start screen appears on the touchscreen of the Easypad and the system's self-adjustment routine starts running (for approx. 1 minute). The diaphragm moves into position. Forehead and temple supports on the panoramic unit are moved to the home position.
  - ✎ On completion of the self-adjustment routine, the main menu appears on the touchscreen. Help message H301 prompts you to move the unit into the starting position.
2. Press the R key.
  - ✎ The unit moves to its starting position.
3. Touch the 3D symbol at the top of the touchscreen.
  - ✎ The 3D program group is selected.
4. Press the R key.
  - ✎ The diaphragm and the sensor move into the starting position for 3D exposures.
5. Touch the light localizer key on the control panel.



- ✎ The laser line of the first laser module (count direction from bottom) depicts the sensor unit on the cover (flat panel detector side). A distance of 5 mm should be measured between the laser line and joint of the sensor cover.





6. *If threads B should tightened:*  
Slightly loosen the screws (B) of the laser area display.
7. Adjust the laser area display (A) vertically in such a way that the distance between the displayed laser line and cover joint is 5 mm.
  - ↳ Following the adjustment, two horizontal laser lines from the laser area display and a vertical laser line from the MS laser light localizer should be displayed on the sensor unit cover.

#### IMPORTANT

A third line from the horizontal laser line of the FH laser module must not be displayed. If a third horizontal laser line (FH) is displayed on the sensor cover instead of the vertical laser line (MS), then the plug-in positions on board DX1 have been swapped. In this case, swap the plug-in positions **X607** and **X611** on board **DX1**.

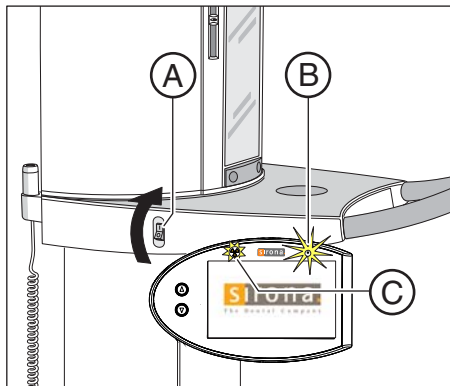
8. Re-tighten the screws (B) of the laser area display.
9. Switch the laser light localizers off again.
10. Switch the X-ray unit off again.



### 9.7.5 Checking the connection of the MS and FH (pan) laser light localizers

NOTE: The cables/plugs of the laser light localizers are not labeled ex works. Should the sockets for plugs **X607** (MS) and **X611** (FH) get mixed up on board DX1, there will be a control error in the 3D design of the ORTHOPHOS SL X-ray unit.

In order to check whether the plugs of the MS and FH laser light localizers are plugged into the correct sockets on the DX1 board, complete the following steps:



1. Switch the unit on via the switch (A) (see also Operating Instructions).
  - ↳ The X-ray radiation indicator (B) lights up briefly.
  - ↳ After approx. 2 seconds, the green LED (C) in the upper part of the control panel lights up. This LED remains lit as long as the unit is on.
  - ↳ The start screen appears on the touchscreen of the Easypad and the system's self-adjustment routine starts running (for approx. 1 minute). The diaphragm moves into position. Forehead and temple supports on the panoramic unit are moved to the home position.
  - ↳ On completion of the self-adjustment routine, the main menu appears on the touchscreen. Help message H301 prompts you to move the unit into the starting position.
2. Touch the 3D symbol at the top of the touchscreen.
  - ↳ The 3D program group is selected.
3. Press the R key.
  - ↳ The diaphragm and the sensor move into the starting position for 3D exposures.
4. Press the light localizer key on the control panel.
  - ↳ Two horizontal laser lines from the laser area display and a vertical laser line from the MS laser light localizer should be displayed on the sensor unit cover (side of the flat panel detector).  
**There must not be a third horizontal laser line from the FH laser module shown in the 3D programs.**
  - ↳ If a third vertical laser line is shown on the sensor unit cover (instead of the horizontal laser line), swap the connections of plugs **X607** and **X611** and repeat the test in the 3D program group once more.



## 9.8 Occlusal bite block

### 9.8.1 Replacing the occlusal bite block

- Replace the defective occlusal bite block with the new one.

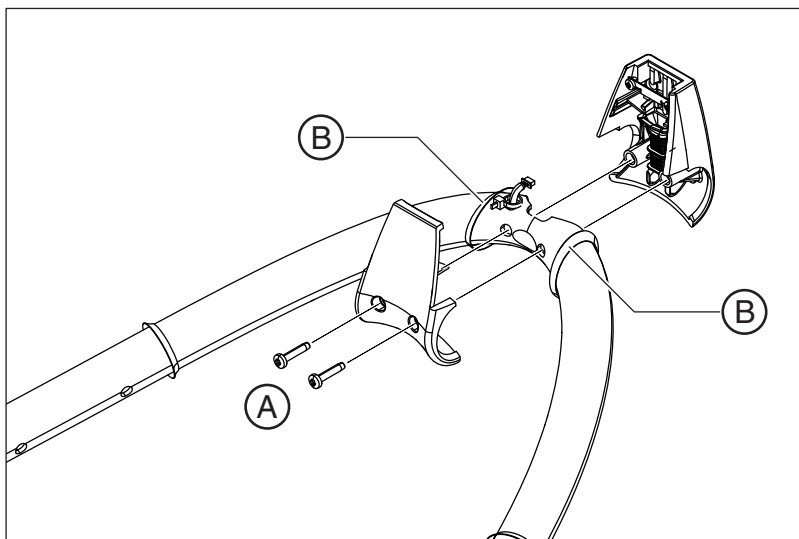
### 9.8.2 What has to be done after replacing the occlusal bite block?

1. Switch the unit on.
2. Perform adjustment of the AD acceptance angle values using service routine S018.9 [ → 297].
3. Check the function of the occlusal bite block.



## 9.9 Bite block holder

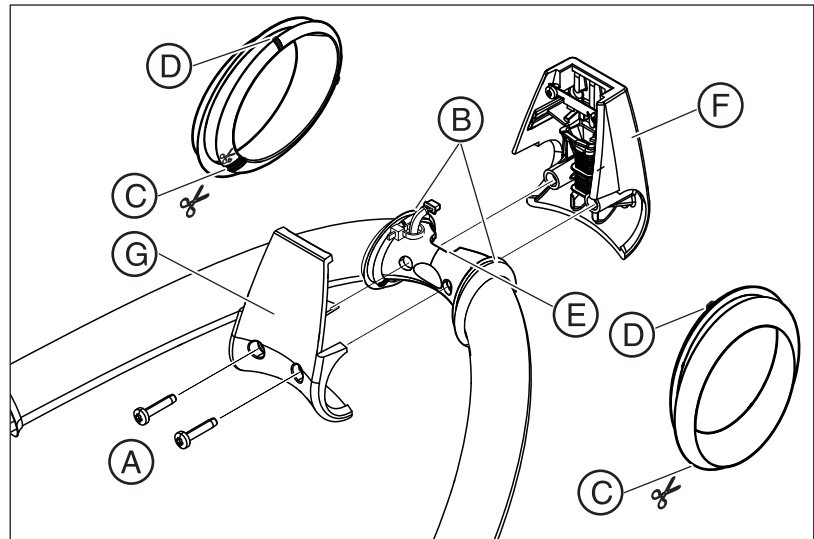
### 9.9.1 Replacing the bite block holder



1. Loosen the two screws (A) and remove the bite block holder.
2. Unplug the connector of cable **L41** from board **DX51**.
3. Unscrew board **DX51** from the front half of the defective bite block holder and screw board **DX51** into the new bite block holder.
4. Replace the silicone rings (B) (see chapter "Replacing the silicone rings [ → 369]").
5. Plug the connector of cable **L41** into the board of the new bite block holder.
6. Place the bite block holder into the groove of the silicone rings on the tube bend and fasten it with the two screws (A).



### 9.9.2 Replacing the silicone rings



See also the chapter "Replacing the bite block holder [ → 368]".

1. Loosen the two screws (A) and remove the bite block holder.
2. Unplug the connector of cable **L41** from board **DX51**.
3. For silicone rings that have not yet been cut:  
To prevent paint damage on the bracket, pull the old silicone rings (B) slightly clear and cut through the silicone rings using scissors.  
Remove the silicone rings (B).
4. Cut open the new silicone rings at the marking (C) using scissors.
5. Replace the old silicone rings with the new silicone rings with the markings (D) facing inwards and the cut edge (C) at the back.
6. Align the silicone rings with the recess (E) of the bracket using the markings (D) on the silicone rings.
7. Place the front half (F) of the bite block holder into the groove in the silicone rings.
8. For units with an occlusal bite block:  
Plug the connector of cable **L41** into the board of the bite block holder.
9. Place the back half (G) of the bite block holder into the groove in the silicone rings and check whether the outer edges are exactly flush with the bite block holder.
10. Screw the bite block holder securely with the two screws (A).

### 9.9.3 What has to be done after replacing the bite block holder / silicone ring?

1. Check the unit adjustment using the "*Pan - symmetrie control exposure*" test exposure (Pan - Symmetrical test exposure (2D) [ → 430]").
2. Perform a 2D unit adjustment, if necessary [ → 181].



## 9.10 Diaphragm unit

### 9.10.1 Replacing the diaphragm unit

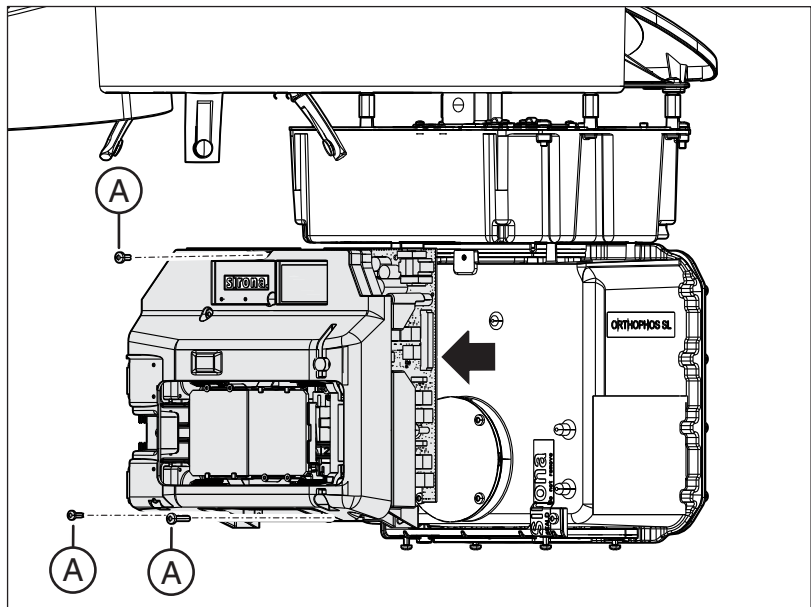
#### IMPORTANT

Only the diaphragm unit of ORTHOPHOS SL may be installed! Note the dependency of the diaphragm unit on device serial numbers in the spare parts list.

#### IMPORTANT

The diaphragm unit may be replaced only as a complete module.

1. Remove the "Rear tube assembly" cover [ → 37].
2. Pull cables **L11** and **L12** off connectors **X501** (L11) and **X101** (L12) on board **DX61**.
3. Pull off the cables **L21** (2x) and **L20** from the connectors **X303**, **X304** (L21) and **X203** (L20) on board **DX61**.



4. **NOTICE! Hold on to the diaphragm while you remove it.**  
Loosen the screws (A) on the old diaphragm unit and remove it from the X-ray tube assembly.
5. **NOTICE! Hold on to the diaphragm while you attach it.**  
Mount the new diaphragm unit with the screws (A) on the X-ray tube assembly.
6. Plug cables **L20** and **L21** back into connectors **X203** (L20), **X302** (L21) and **X303** (L21) on board **DX61**.
7. Plug cables **L11** and **L12** back into connectors **X501** (L11) and **X101** (L12) on board **DX61**.
8. Reattach the "Rear tube assembly" cover [ → 37].



### 9.10.2 What has to be done after replacing the diaphragm unit?

<b>IMPORTANT</b>
------------------

Use the most current software version available on the <i>"ORTHOPHOS SL Firmware DVD"</i> .
---

1. Switch the unit on.
2. Perform a software update to the current unit software version.
3. Switch the unit off.  
Wait approx. 1 minute. Then switch the unit on again.  
↳ All modules are updated in accordance with the configuration.

<b>IMPORTANT</b>
------------------

<b>If error message E7 61 17 is displayed:</b>
--

Perform service routine S017.17.
----------------------------------

4. Perform a complete unit adjustment or calibration [ → 160].
5. Delete the X-ray component in the SIDEXIS 4 configuration menu *"ORTHOPHOS SL" / "Device Administration"* and add a new one (refer to chapter "Setting up the X-ray component [ → 49]").
6. *Only for Germany, Austria, Switzerland and France:*  
Perform an acceptance check without consulting an expert.



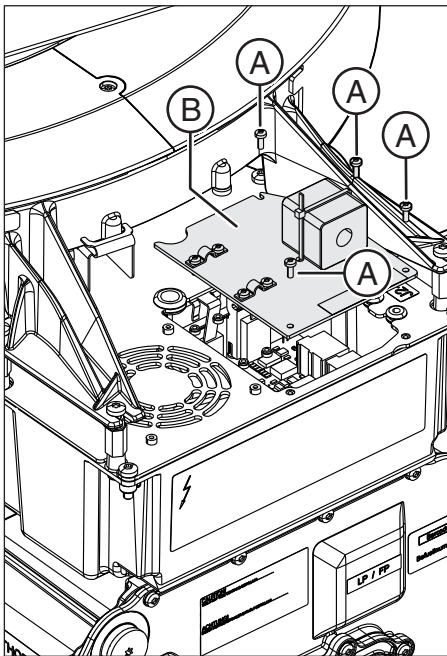
## 9.11 X-ray tube unit

### DANGER

#### Perilous shock hazard!

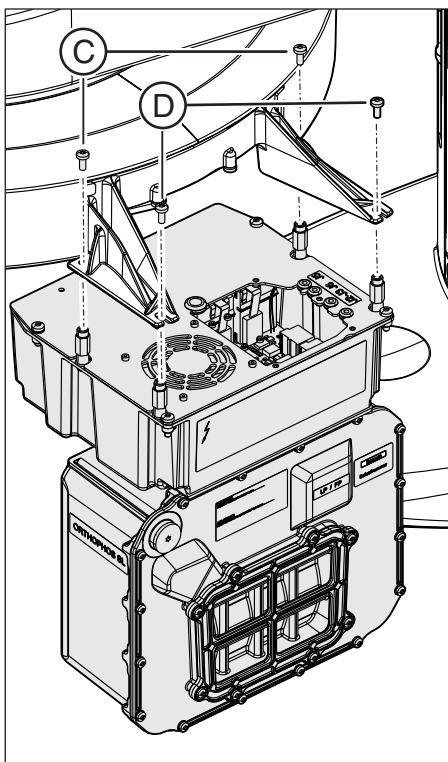
It is essential to switch the unit off and to wait at least another 4 minutes before starting the repair or taking off a cover panel!

### 9.11.1 Replacing the X-ray tube assembly



1. Remove the "Front tube assembly" and "Rear tube assembly" covers [ → 37].
2. Remove the diaphragm unit as described in the chapter entitled Replacing the diaphragm unit [ → 370].
3. **NOTICE! At the same time, remove cable L3 from connector X3 and the ground cable from connector X103 on board DX6.**  
Unscrew the four screws (A) and remove the cover plate (B) including the cable shielding (L3).  
**Tip:** The ferrite core and cable shielding can remain on the cover plate.
4. Detach cables **L5** and **L6** from the rubber grommets and pull the cables out of sockets **J6** (L5) and **J2-J3** (L6) on board **DX6**.





5. Loosen the two rear screws (C) on the tube assembly.
6. **CAUTION! The tube assembly is heavy!**  
Hold the tube assembly firmly in place, loosen the two front screws D (3-4 turns) and remove the tube assembly toward the front.  
**Tip:** If you leave the two front screws on the rotating element, you can immediately hang the tube assembly on them when reinstalling it.
7. Hang the new tube assembly on the two front screws of the rotating element and tighten them securely.
8. Insert the two rear screws and tighten them firmly.
9. Plug cables **L3**, **L5** and **L6** as well as the ground cable back onto board **DX6** and reattach the cables to the rubber grommets.
10. Reattach the cover plate.
11. Reassemble the diaphragm unit [ → 370].
12. Reattach the covers "Front tube assembly" and "Rear tube assembly" [ → 37].



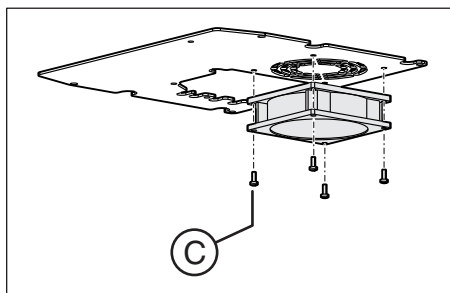
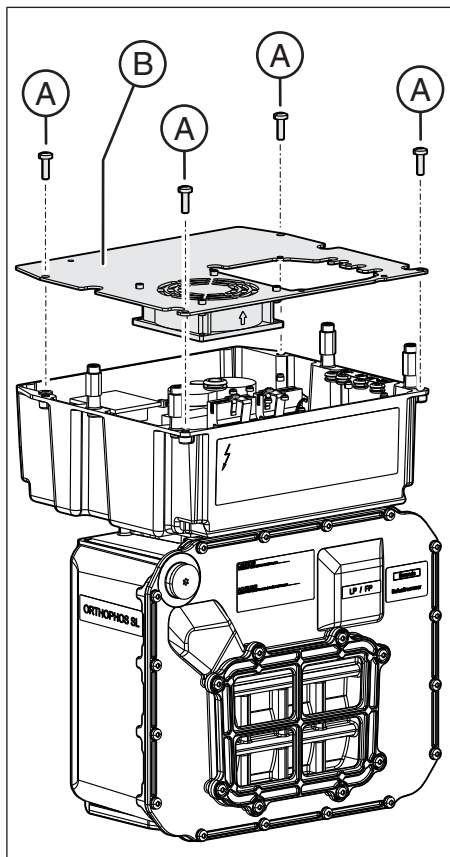
## 9.11.2 Replacing the fan in the X-ray tube assembly

### 9.11.2.1 Replacing the fan

#### IMPORTANT

As the X-ray tube assembly has to be disassembled when replacing the fan, the unit must be fully readjusted (recalibrated) [→ 160] after replacing the fan.

1. Disassemble the tube assembly [→ 372].
2. **NOTICE! Cable!** Loosen the four screws (A) and carefully remove the cover plate (B) including the fan.
3. Pull the fan cable off connector **X2** from board **DX6** [→ 30].



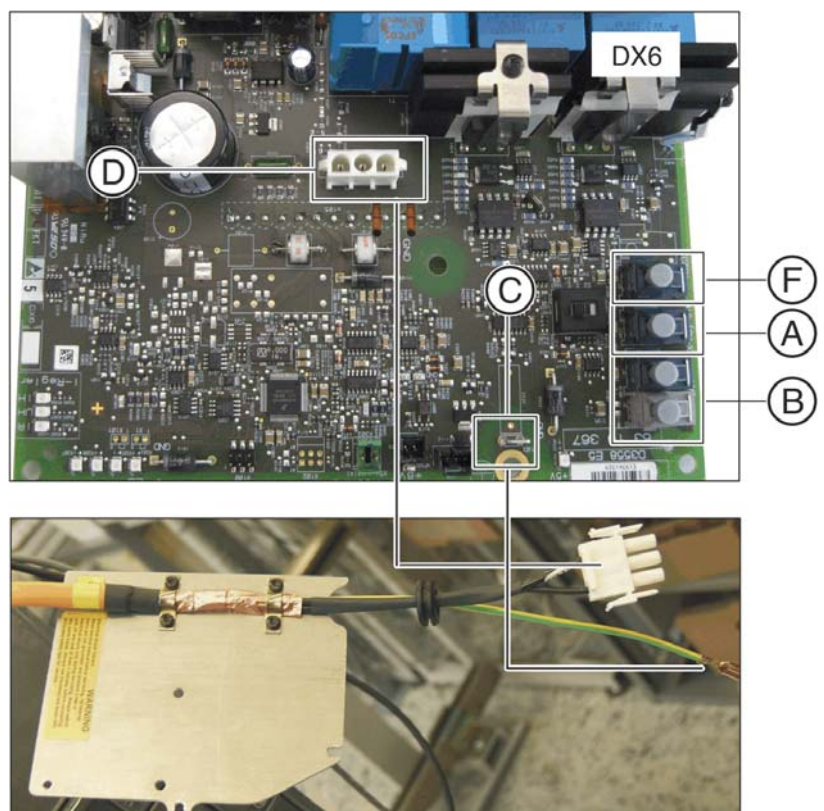
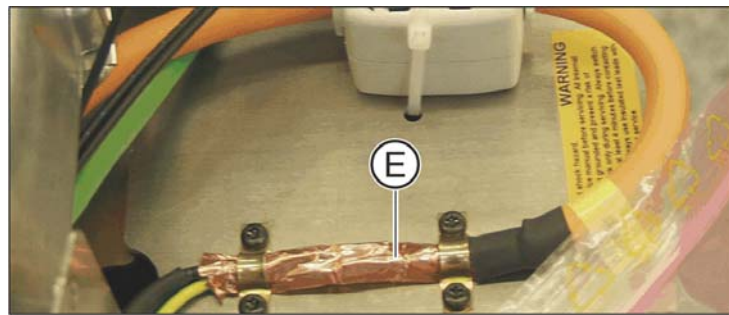
4. Loosen the four screws (C) and carefully remove the defective fan from the cover plate.
5. Install the new fan, the cover plate, and the tube assembly in the reverse order of removal.

### 9.11.2.2 What has to be done after replacing the fan?

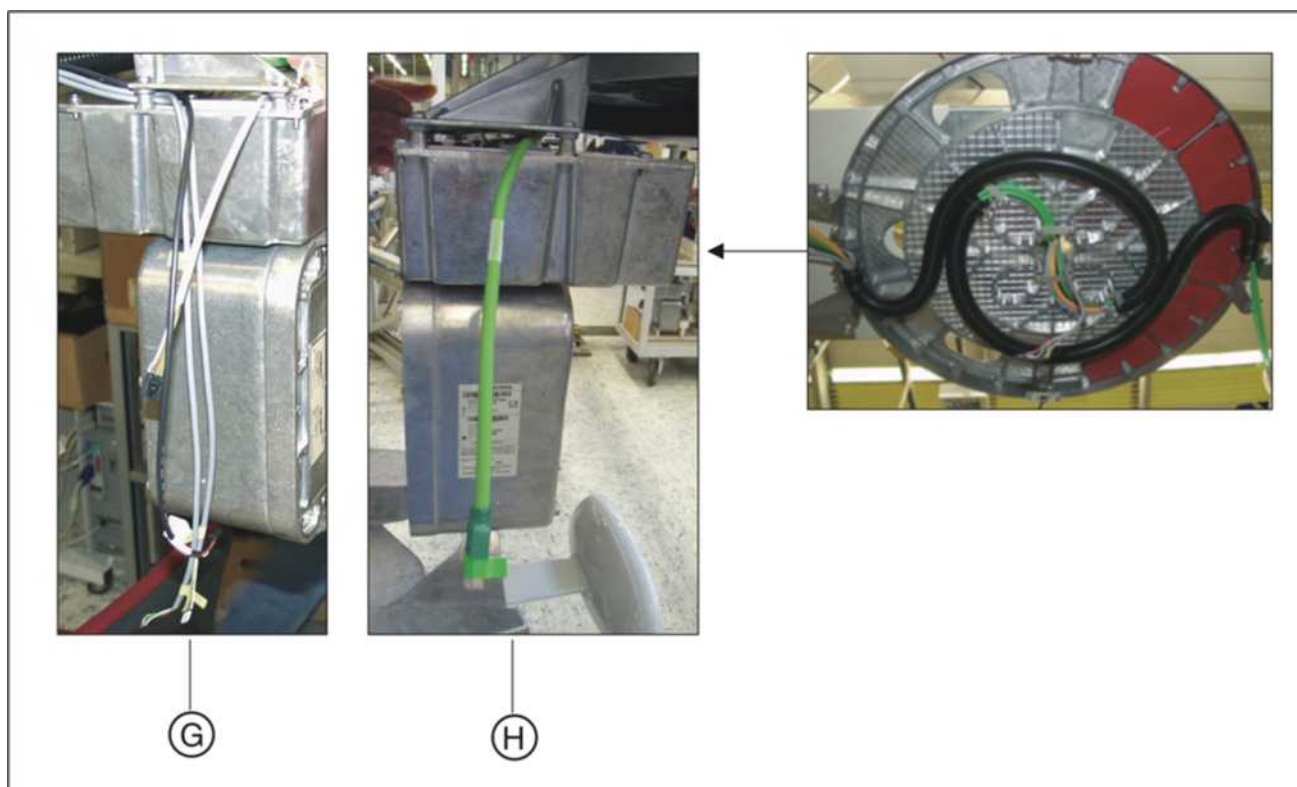
1. Check the function of the fan using service routine S005.4 [→ 261].
2. Perform a complete unit adjustment and calibration [→ 160].



### 9.11.3 Cables and connectors for replacement of the X-ray tube assembly







A	Cable L5 → socket J6 on board DX6
B	Cable L6 → socket J2/J3 on board DX6
C	Ground cable → Connector X304 (tube assembly 1.0) or X103 (tube assembly 2.0) on board DX6
D	Cable L3 → socket X3 on board DX6
E	Laying cables correctly on the cover plate
F	Cable L15 → socket J5 on board DX6
G	Cable routed on left side of tube assembly: 2x L21, L20 and L11.
H	Cable L12 routed on right side of tube assembly.



#### 9.11.4 What has to be done after replacing the X-ray tube assembly?

<b>IMPORTANT</b>
------------------

The tube assembly may be replaced only as a complete module.
--

<b>IMPORTANT</b>
------------------

Note the dependency of the tube assembly on device serial numbers in the spare parts list.
--

<b>IMPORTANT</b>
------------------

Use the most current software version available on the ORTHOPHOS SL Firmware DVD.
---

1. Switch the unit on.
  - ↳ Error message **E6 15 04** is occasionally displayed at this point. This error message can be ignored at this point. Acknowledge the error message with the R key, if necessary.
  - ↳ Error message **E61505** (undefined unit serial number) is displayed.
2. Acknowledge the error message using the R key on the control panel.
3. Call the service menu.
4. Call up service routine S008.3.
5. Check the serial number

**IMPORTANT:** The unit serial number is located on the nameplate of the unit.  
**NOTICE! If the serial number is incorrect, cancel the update and contact the Sirona Customer Service Center!**
6. Confirm the serial number using service routine S008.3.
7. Perform a software update to the current software version.
  - ↳ All modules are updated in accordance with the configuration.
8. Switch the unit off.  
Wait approx. 1 minute. Then switch the unit on again.
9. Perform a complete unit adjustment and calibration.
10. Delete the X-ray component in the SIDEXIS 4 configuration menu "ORTHOPHOS SL" / "Device Administration" and add a new one (refer to chapter "Setting up the X-ray component [ → 49]").
11. *Only for Germany, Austria, Switzerland and France:*  
Perform an acceptance check without consulting an expert.
  - ↳ The process is completed.



## 9.12 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.

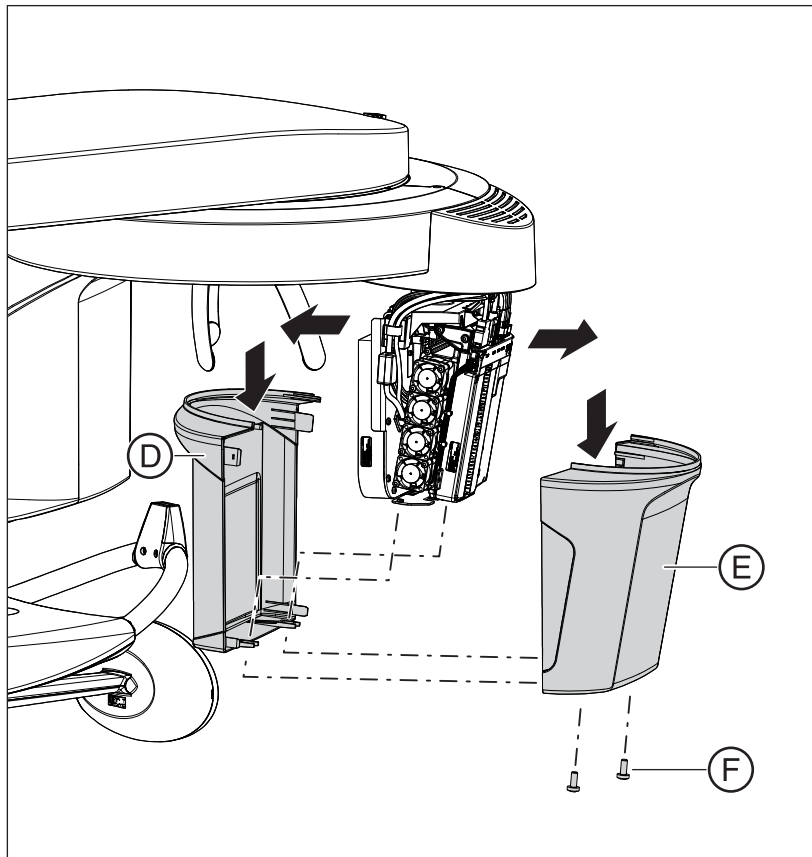
### NOTICE

#### 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.

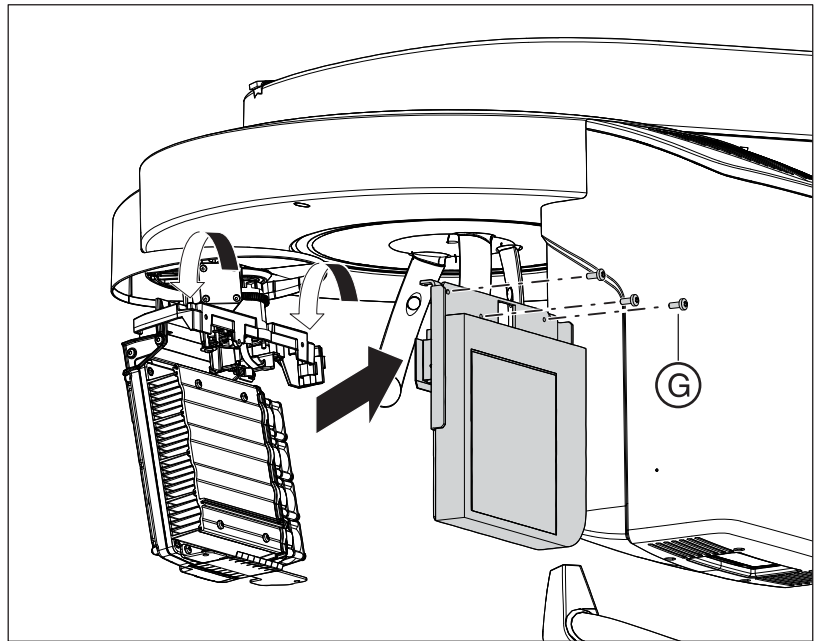
### 9.12.1 Flat Panel Detector

#### 9.12.1.1 Replacing the flat panel detector



1. Loosen the screws (F).
2. Release the 4 latches on the sensor cover (D) and carefully remove the covers (D and E) from the sensor unit.
3. Pull the cable **L84** off from board **DX83**.

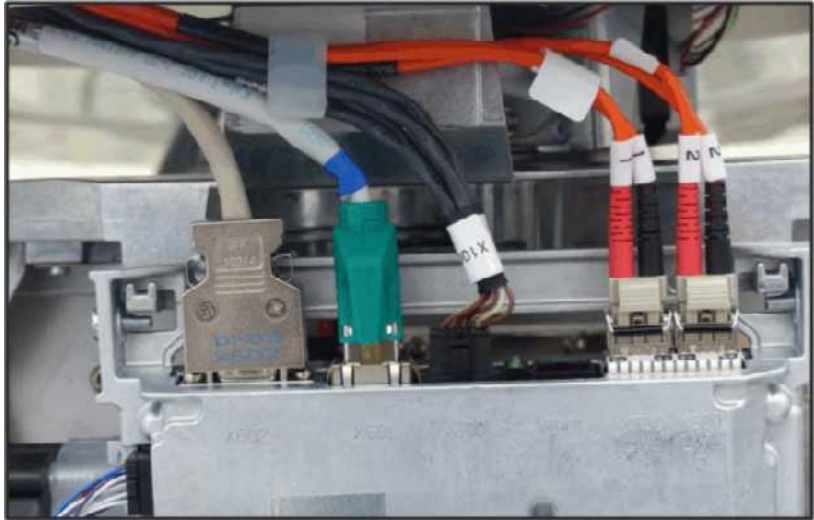




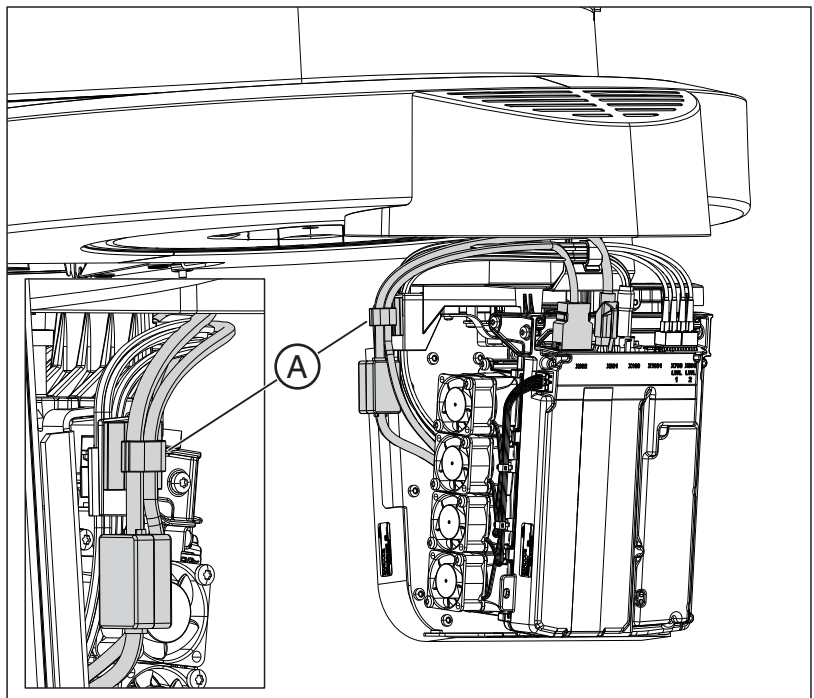
4. Loosen the 3 screws (G) and unhinge the flat panel detector from the guide of the rotation unit.
5. Install the new flat panel detector in the reverse order of removal.



#### 9.12.1.2 Connecting a sensor unit



1. Insert lead **L84** from the flat panel detector, as shown in the illustration, into plugs **X601** and **X602** on board **DX83**.



2. Lay the leads as shown in the illustration.



### 9.12.1.3 What has to be done after replacing the flat panel detector?

#### IMPORTANT

Use the most current software version available on the *"ORTHOPHOS SL Firmware DVD"*.

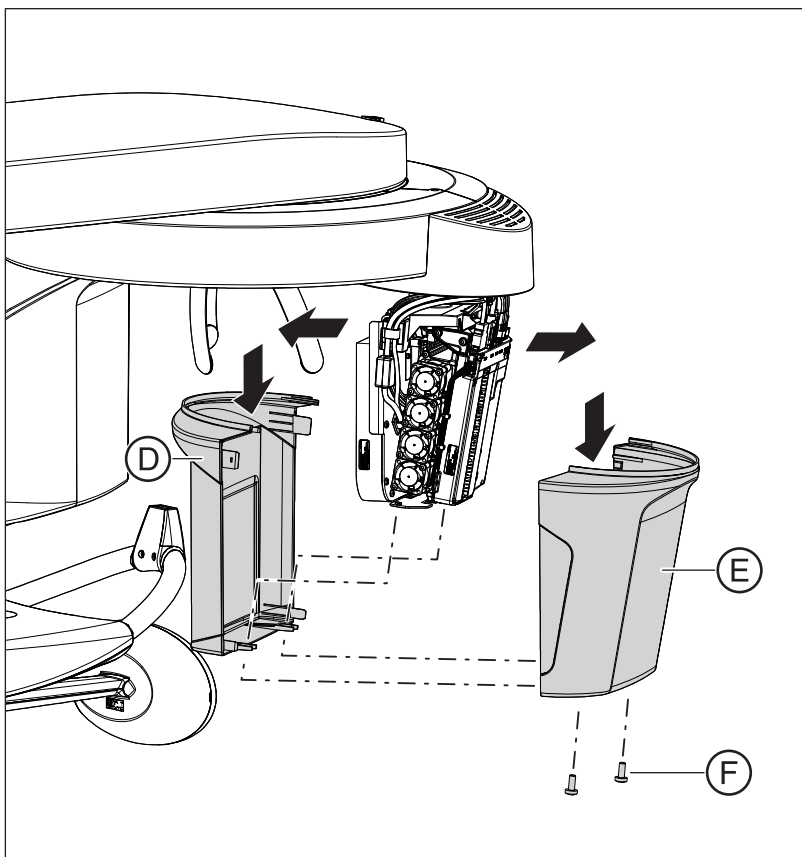
1. Reattach the covers of the sensor unit in reverse order of removal.
2. Switch the unit on.
3. Check the rotation unit for a smooth rotation by switching between the operating modes *Pan* and *3D* via the control panel.
4. Install the sensor data of the new flat panel detector using the menu *"Backup / Restore sensor data" ⇒ "Install new sensor data"* on board **DX83** of the unit (refer to chapter "Installing sensor data [ → 75]").  
**Note:** The zip file with the sensor data is included in the scope of supply of the flat panel detector.
5. Perform a firmware update to the current unit software version.
6. Perform a complete unit calibration (see the chapter titled "Adjustment and calibration via the calibration menu [ → 181]").
7. Delete the X-ray component in the SIDEXIS 4 configuration menu *"ORTHOPHOS SL" / "Device Administration"* and add a new one (refer to chapter "Setting up the X-ray component [ → 49]").
8. Create a backup copy of the sensor data (see chapter "Backing up / restoring / installing sensor data [ → 71]").
9. *Only for Germany, Austria, Switzerland and France:*  
Perform an acceptance check without consulting an expert.



## 9.12.2 DCS sensor

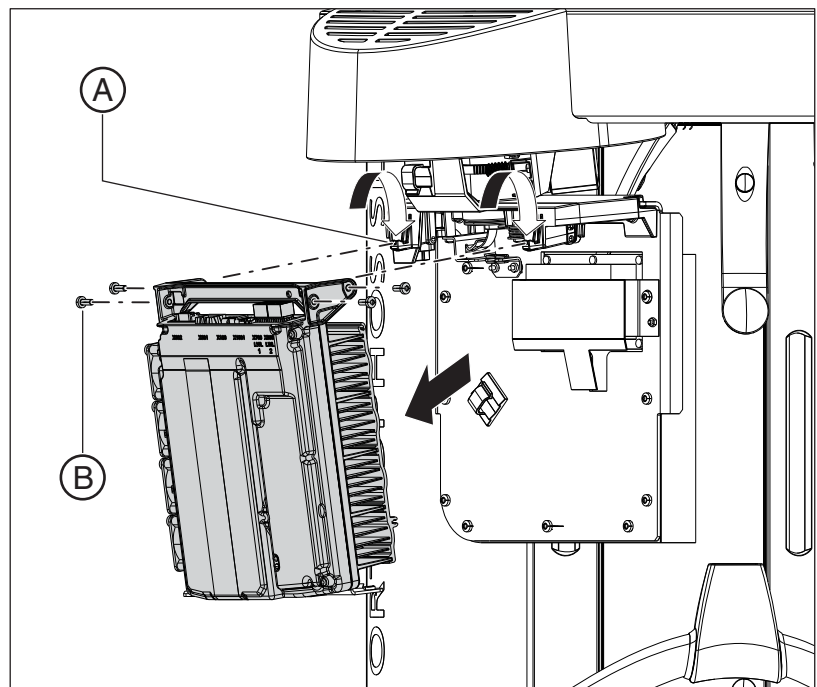
### 9.12.2.1 Replacing the DCS sensor

- ✓ There is a backup file of the sensor data.  
NOTE: If there is no backup file for the sensor data, the sensor data must be downloaded from board DX83 and saved **before replacing the DCS sensor** (see the chapter titled "Backing up sensor data [→ 73]").



1. Loosen the screws (F).
2. Carefully draw the sensor covers (D and E) off the sensor unit.
3. Pull all cables off the sensor unit.

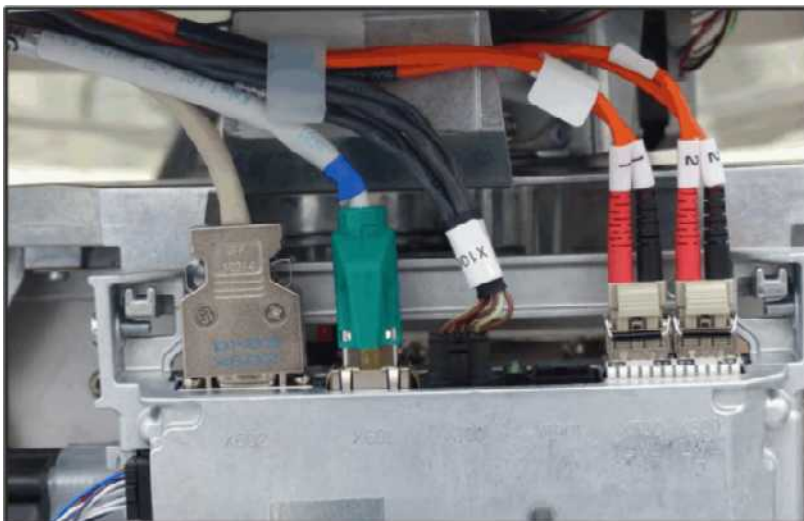




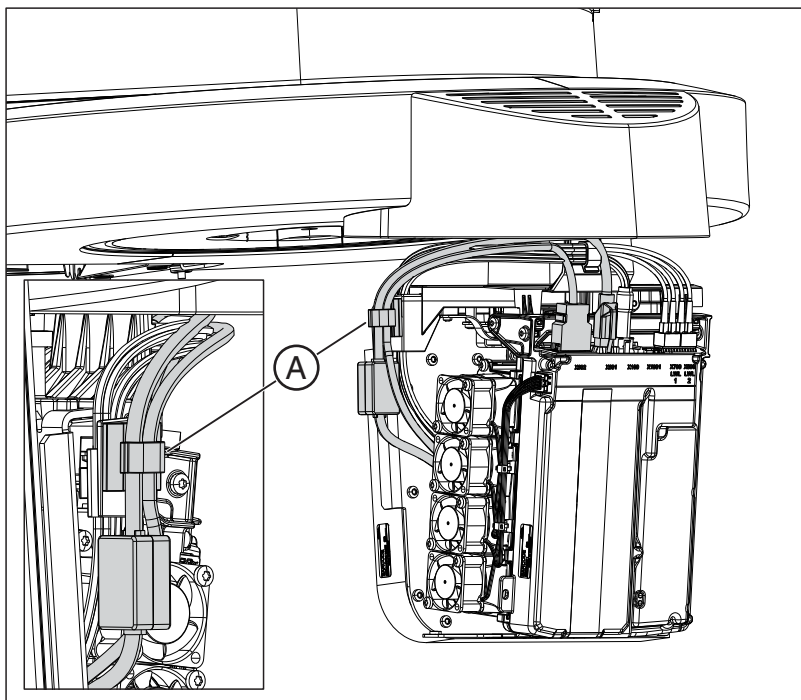
4. Loosen the 4 screws (B) and unhinge the DCS sensor from the lugs (A) of the rotation unit.
5. Install the new sensors in the reverse order of removal. For the instructions on connecting the sensor unit, see chapter "Connecting a sensor unit [ → 384]".
6. Reattach the covers of the sensor unit (D and E) with the 2 screws (F) in reverse order of removal.
7. *Only if there is a flat panel detector:*  
Restore the previously installed sensor data using the menu "*Backup / Restore sensor data*" ⇒ "*Restore sensor data*" on board **DX83** of the unit (refer to chapter "Restoring sensor data [ → 74]").
8. Perform a complete unit adjustment or calibration.



### 9.12.2.2 Connecting a sensor unit



1. Insert leads **L83A** and **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.



### 9.12.2.3 What has to be done after replacing the DCS sensor?

<b>IMPORTANT</b>
------------------

Use the most current software version available on the <i>"ORTHOPHOS SL Firmware DVD"</i> .
---

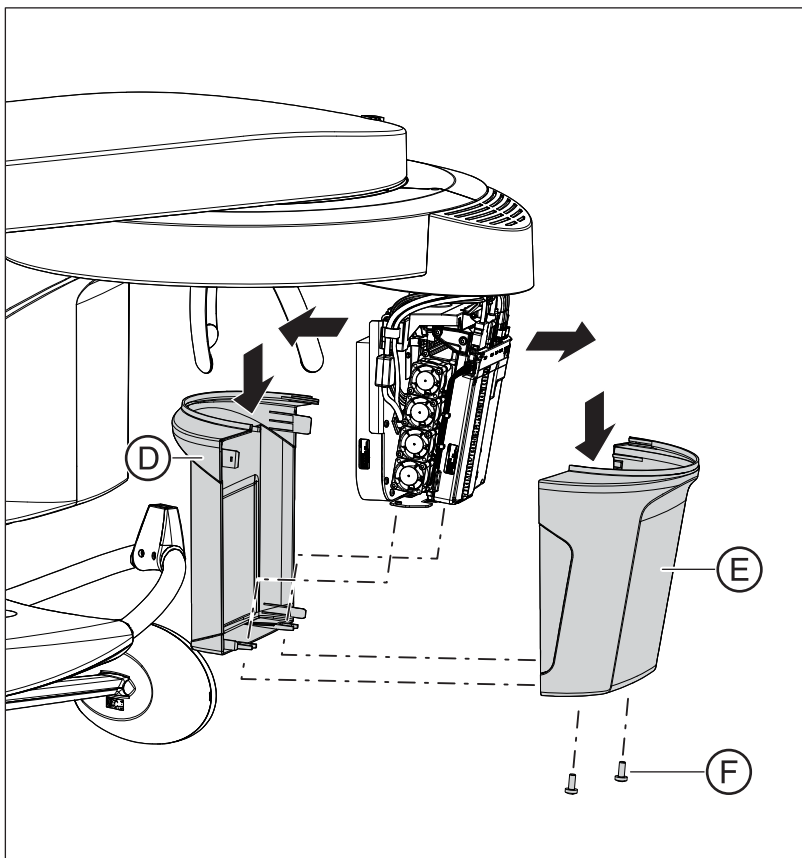
1. Reattach the covers of the sensor unit in reverse order of removal.
2. Switch the unit on.
3. Check the rotation unit for a smooth rotation by switching between the operating modes *Pan* and *3D* via the control panel.
4. *Only if there is a flat panel detector:*  
Restore the previously installed sensor data using the menu *"Backup / Restore sensor data"* ⇒ *"Restore sensor data"* on board **DX83** of the unit (refer to chapter "Restoring sensor data [→ 74]").
5. Perform a firmware update to the current unit software version.
6. Perform a complete unit calibration (see the chapter titled "Adjustment and calibration via the calibration menu [→ 181]").
7. Delete the X-ray component in the SIDEXIS 4 configuration menu *"ORTHOPHOS SL" / "Device Administration"* and add a new one (refer to chapter "Setting up the X-ray component [→ 49]").
8. Create a backup copy of the sensor data (see chapter "Backing up / restoring / installing sensor data [→ 71]").
9. *Only for Germany, Austria, Switzerland and France:*  
Perform an acceptance check without consulting an expert.



### 9.12.3 Replace board DX83

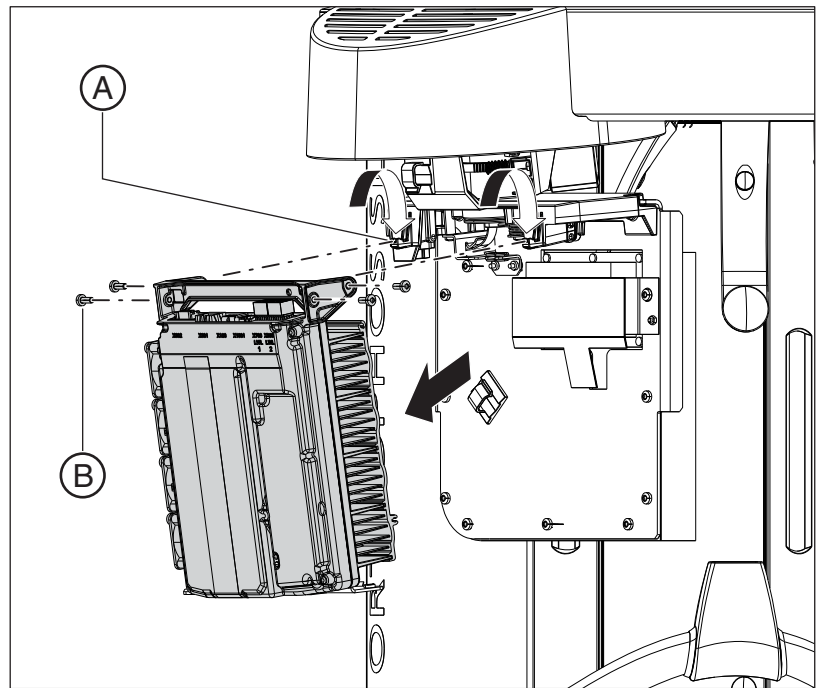
- ✓ There is a backup file of the sensor data.

NOTE: If there is no backup file for the sensor data, the sensor data must be downloaded and saved from the board **before replacing the DX83 board** (see section “Backing up sensor data [→ 73]”).

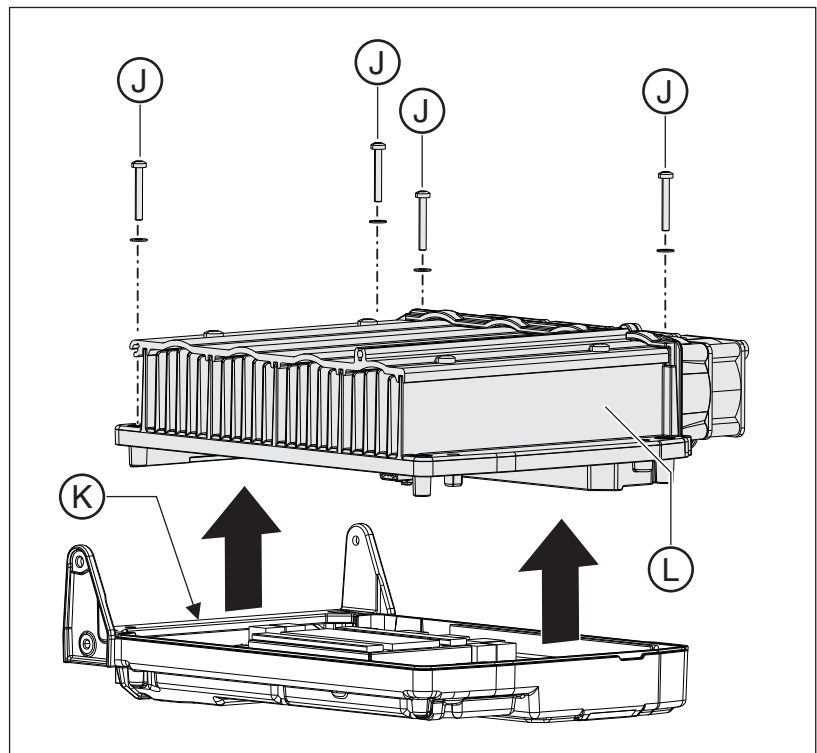
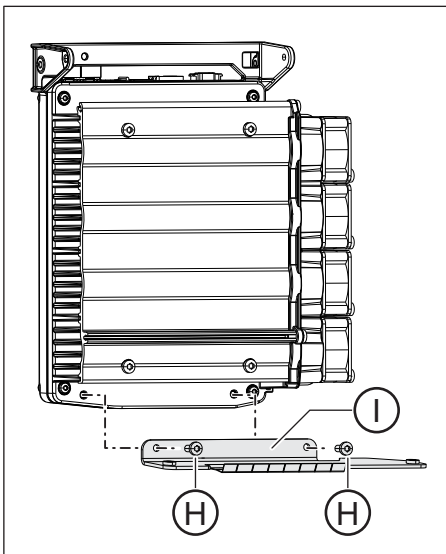


1. Loosen the screws (F).
2. Carefully draw the sensor covers (D and E) off the sensor unit.
3. Pull all cables off the sensor unit.





4. Loosen the 4 screws (B) and unhinge the DCS sensor from the lugs (A) of the rotation unit.
5. Pull the fan package line off connector X1000 from board DX83 .
6. Loosen the two screws (H) and disconnect the cover plate (I).
7. Place the DCS sensor on a flat surface with the heatsink (L) facing upwards.
8. Loosen the 4 screws (J).

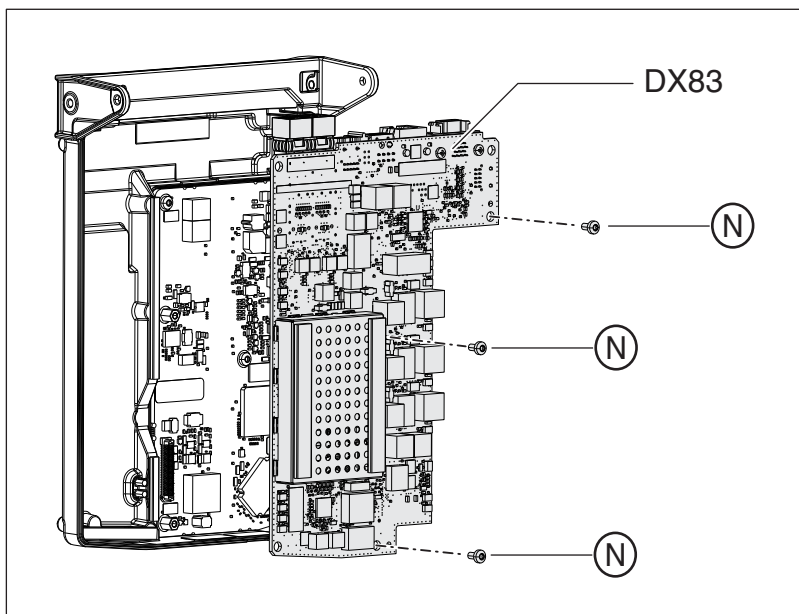
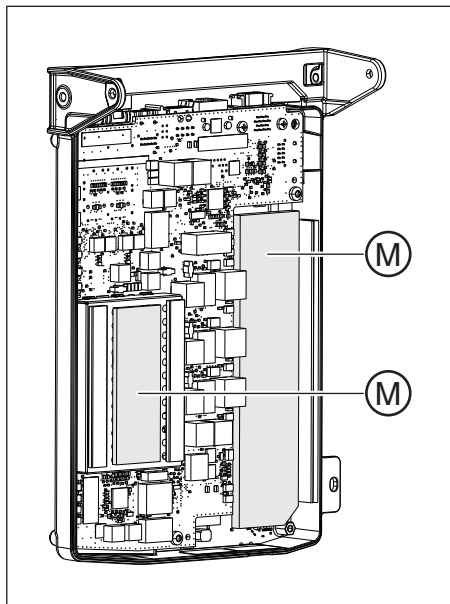




9. Hold the DCS sensor in place on the frame (K) and carefully remove the heatsink (L).

NOTE: This can stick slightly to the **DX83** board due to the two thermal conducting foils.

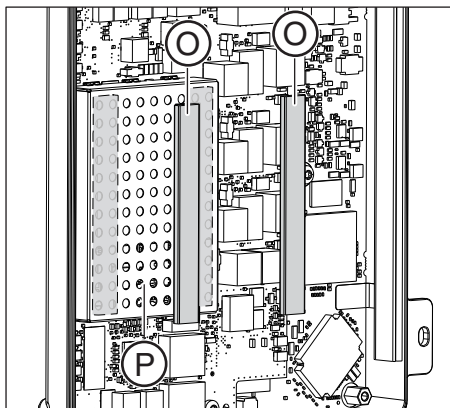
10. Remove the two thermal conducting foils (M).  
These are not reused.



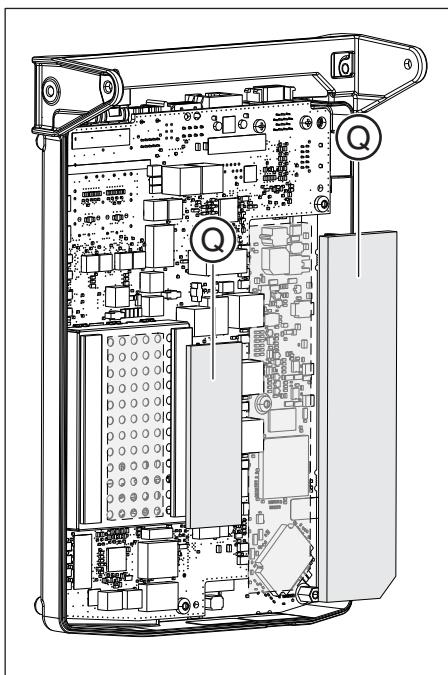
11. Loosen the three screws (N) and remove the **DX83** board.

12. Install the new board **DX83** with the three screws (N) on the DCS sensor.

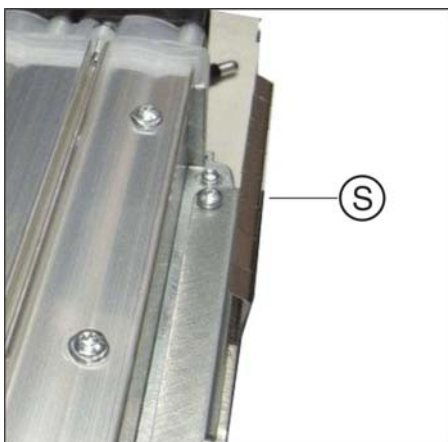
13. Attach the two new HF shields (O) (included in the scope of supply for board DX83) on the cover plate (P) of board **DX83**.







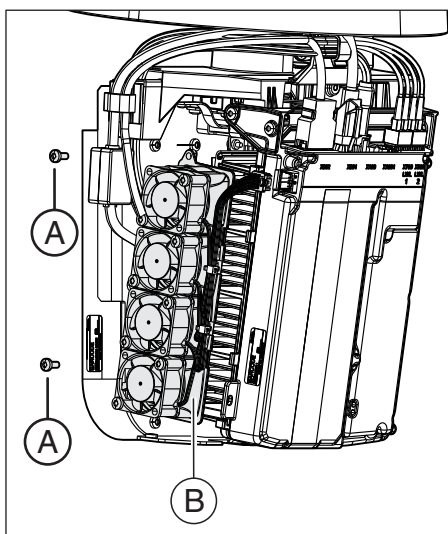
14. Place the two new heat conducting foils (Q) (included in the scope of supply for board DX83) on board **DX83**.



15. Reattach the heatsink with the four screws (J) and plain washers on the DCS sensor.  
NOTE: Make sure that the HF shield on the side is positioned correctly. The combed parts of the shield (S) must not become trapped.
16. Refit the panel (I) with the two screws (H) on the DCS sensor (see removal).
17. Plug the cable of the fan package back into connector **X1000** on board **DX83**.
18. Fit the DCS sensor into the holes (A) of the rotation unit and secure the sensor back on the rotation unit with the 4 screws (B) (see removal).
19. Fit the flat panel detector (or counterbalance) into the guide of the rotation unit and secure the it back on the rotation unit with the 3 screws (G) (see removal).
20. Reconnect the cables of the sensor unit. Follow the instructions on connecting the sensor unit in chapter "Connecting a sensor unit [ → 380]".
21. Reattach the covers of the sensor unit (D and E) with the 2 screws (F) (see removal).
22. Restore the previously installed sensor data using the menu "*Backup / Restore sensor data*" ⇒ "*Restore sensor data*" on board **DX83** of the unit (refer to chapter "Restoring sensor data [ → 74]").
23. Perform a complete unit adjustment and calibration.



### 9.12.4 Replacing fan package

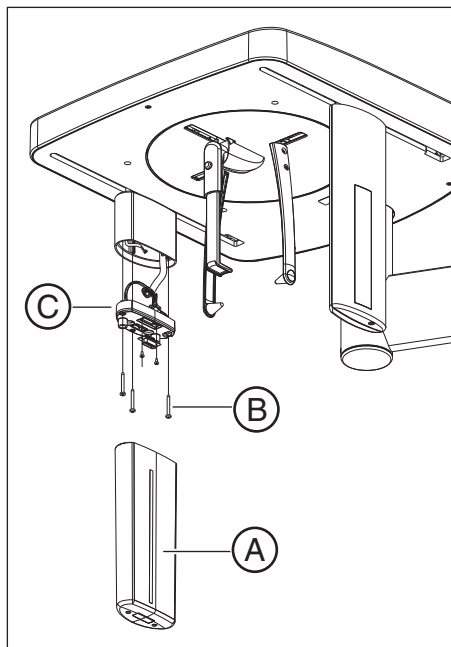


1. Remove the cover of the sensor unit.
2. Loosen the cable of the defective fan package (B) from the cable holders on the sensor unit and pull it out from connector **X1000** on board **DX83**.
3. Loosen the two screws (A) and remove the defective fan package.
4. Attach the new fan package in the reverse order to disassembly.
5. Re-attach the cover of the sensor unit.

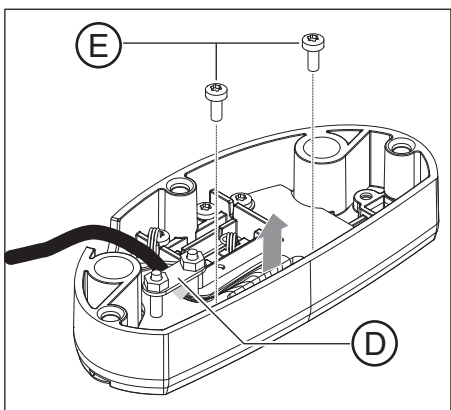


## 9.13 Cephalometer

### 9.13.1 Replacing the ceph sensor holder



1. Remove the sensor (A).
2. **NOTICE! Do not tear off cable L35.**  
Loosen the 3 screws (B) and remove the connection socket (C).



3. Detach the cable shield from terminal (D) and the connector screw connection (loosen the two screws (E) from the rear) and thread the connector to the rear through the connection socket.
4. **NOTICE! Do not forget to reattach the cable shield.**  
Install the new sensor holder in reverse order of the disassembly.

#### 9.13.1.1 What has to be done after replacing the ceph sensor holder?

- Perform the ceph unit adjustment (see section ("Unit adjustment and calibration [→ 160]")).



## 9.13.2 Replacing the ceph sensor

Removal and insertion of the ceph sensor is described in the Operating Instructions of the unit.

### 9.13.2.1 What has to be done after replacing the ceph sensor?

IMPORTANT
-----------

Use the most current software version available on the "ORTHOPHOS SL Firmware DVD".
---

1. Switch the unit on.
2. Perform a firmware update to the current unit software version.
  - ↳ All modules are updated in accordance with the configuration.
3. Switch the unit off.  
Wait approx. 1 minute. Then switch the unit on again.
4. Check the ceph adjustment using the test exposure Ceph - Fixed point of rotation test exposure (2D). If necessary, perform a ceph unit adjustment [ → 160].
5. *Only for Germany, Austria, Switzerland and France:*  
Perform an acceptance check without consulting an expert.

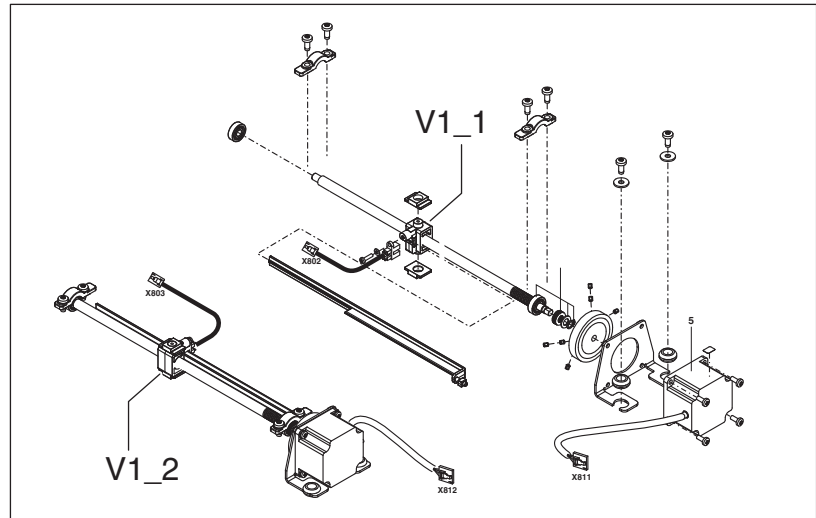


## 9.14 Light barriers

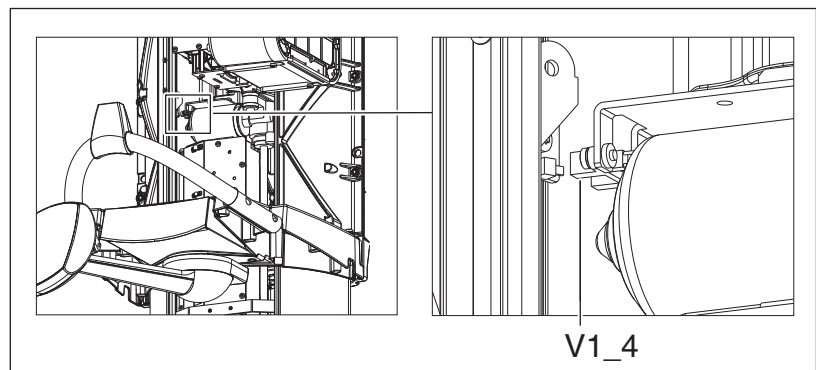
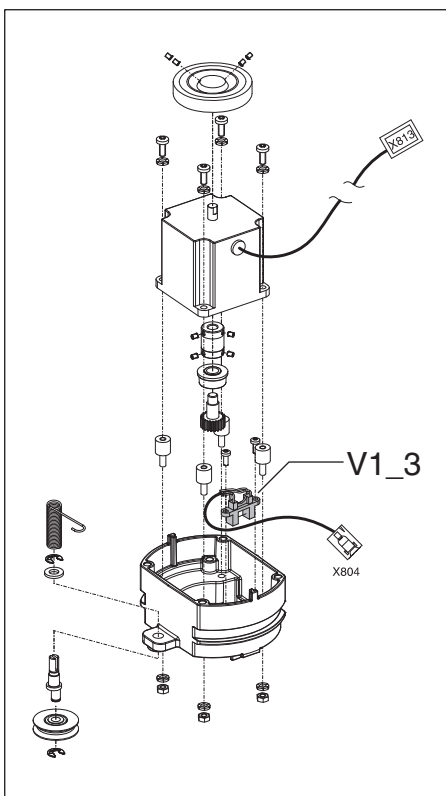
### 9.14.1 Replacing the light barriers

The following light barriers can be replaced (see also Spare parts list):

#### X-ray unit



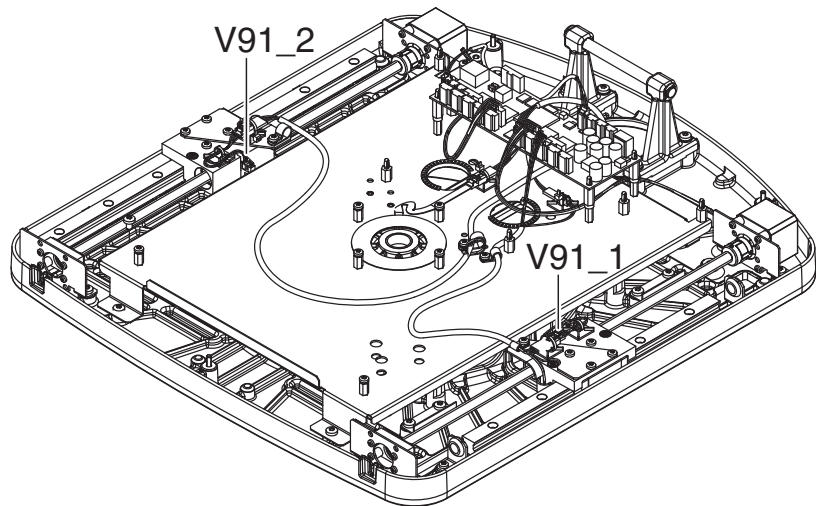
- Light barrier at actuator 1, ON position: **V1\_1**
- Light barrier at actuator 2, ON position: **V1\_2**
- Light barrier at ring motor, starting position of rotation: **V1\_3**



- Light barrier at HA motor, height adjustment: **V1\_4**



### Cephalometer



- Light barrier for patient diaphragm position detection, ceph: **V91\_1**
- Light barrier for sensor position detection, ceph: **V91\_2**

#### 9.14.2 What has to be done after replacing the light barriers?

After replacing V1\_1, V1\_2 or V1\_3

After replacing V1\_4

After replacing V61\_4 or V61\_5

After replacing V91\_1 or V91\_2

- Perform a complete unit adjustment or calibration [ → 160].
  - Perform a function check.
  - Perform a complete unit adjustment or calibration [ → 160].
1. Perform service routines S034.4 [ → 309] and S034.5 [ → 313].
  2. Check the ceph adjustment using the test exposure Ceph - Fixed point of rotation test exposure [ → 437].
  3. Perform a ceph unit adjustment, if necessary [ → 160].



## 9.15 Boards

### 9.15.1 Important notes about replacing boards

#### NOTICE

**Touching the boards can damage them.**

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

#### Connector designations on the boards

The connectors on the boards are labeled on delivery of the system.

**Tip:** When pulling off cables, check the connector designations and label the cables accordingly if necessary.

#### Prior to replacing boards

Perform a back-up of the adjustment/calibration data, **before** starting to replace the boards.

Be sure to observe the information in chapter "Action required following board replacement [ → 398]. In this section, all measures required following module and board replacement are described, provided they were established when this manual was written. You will find more up-to-date information and supplements concerning this subject on the latest *"ORTHOPHOS SL Firmware DVD"* and on the Sirona dealer page on the Internet. For this reason, you should always check for the latest information on the replacement of modules and performing updates before you start replacing any modules or boards.

#### When replacing the boards DX6 (X-ray tube assembly) and DX11 or DX83 and DX11

Never replace these boards at the same time. After replacing one of these boards, first proceed as specified in section "Action required following board replacement [ → 398]" and then restart the unit. Only then may you begin replacement of the other module.

#### When replacing the board DX11

Following replacement of board DX11, the user preferences (patient symbols, Quickshot preselection, etc.) are lost. Instruct the user accordingly or set these values after replacing the board, provided that they were properly noted down before the board was replaced.



## 9.15.2 Replacing boards

### CAUTION

#### 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

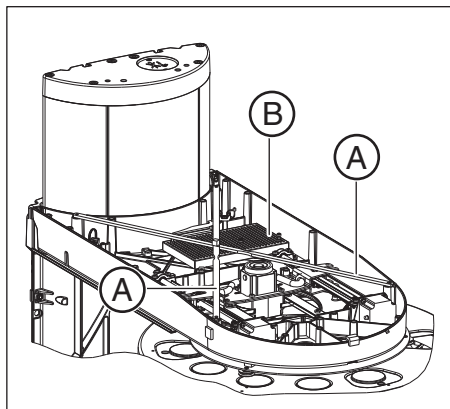
The connectors on the boards are labeled on delivery of the system.

**Tip:** Check the designations on the connectors when pulling off the cables and label them correctly if necessary.

### 9.15.2.1 Replacing PC board DX1

### IMPORTANT

The software version of the "DX1/DX11 board" must be compatible with the main software version of the unit.



1. Remove the "arm cover".
2. Disassemble both cross braces (A).
3. **CAUTION!** Touch a ground point to discharge static electricity before touching any boards.  
Remove the cover plate (B) from board DX11.
4. Pull all cables off board DX1.
5. Disassemble and remove the defective board DX1.
6. **NOTICE!** Be sure to observe the information given in the chapter titled "Replacing board DX11 [→ 397]".  
Attach board DX11 from the defective DX1 onto the new DX1.
7. Reinstall the DX1 board in the unit and reattach the connectors.
8. Reinstall both cross braces (A).
9. Check that the laser light localizers MS and FH are functioning correctly.  
**NOTE:** The cables/plugs of the laser light localizers are not labeled ex works. Should the sockets for plugs X607 (MS) and X611 (FH) get mixed up on board DX1, there will (only) be a control error of the laser light localizers in the 3D design of the ORTHOPHOS SL X-ray unit. The method to check whether the plugs of the MS and FH laser modules are plugged into the correct sockets on the DX1 board is described in the chapter titled "Checking the connection of the MS and FH (pan) laser light localizers [→ 366]".
10. Reattach the covers.

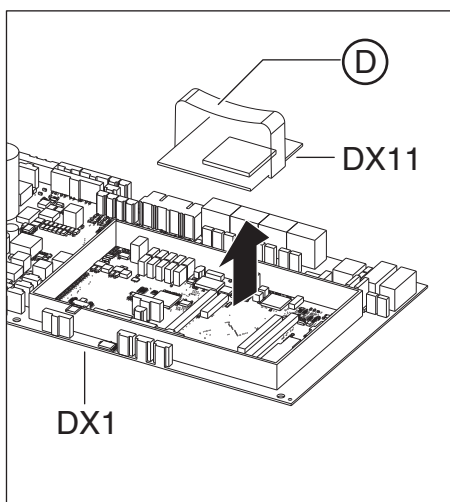
**NOTICE!** Once you have removed the cross braces A, the unit must be completely readjusted and recalibrated.

After replacing board DX1, be sure to observe the instructions in the chapter titled "Measures following replacement of boards [→ 398]".



### 9.15.2.2 Replacing board DX11

- ✓ The cover plate of board **DX11** must be removed [ → 396].
- 1. **CAUTION! Touch a ground point to discharge static electricity before touching any boards.**  
Pull the defective **DX11** board using the removal tool (**D**) to remove it from the **DX1** board.  
**IMPORTANT:** The removal tool (**D**) is included in the delivery scope of the **DX11** board.
- 2. **NOTICE! Ensure that the connector strips of boards DX1 and DX11 are aligned precisely above one another and are not offset, before pressing the boards together firmly.**  
Attach the new **DX11** board on to the **DX1**.
- 3. Check that the **DX11** board is correctly attached to the **DX1** board. There must be no visible gap between the connector strips.
- 4. Reattach the cover plate.



After replacing board **DX11**, be sure to observe the instructions in the section “Measures following replacement of boards [ → 398]”.

### 9.15.2.3 Replacing board DX32

The removal of the board **DX32** is described in the chapter “Removing board DX32 [ → 335]”. Install the board by following the same procedure in reverse order.

After replacing board **DX32**, be sure to observe the instructions in the section “Measures following replacement of boards [ → 398]”.



### 9.15.3 Measures following replacement of boards

#### IMPORTANT

After replacing boards or modules containing boards, check to make sure that the software version of the module corresponds to the current software version of the unit.

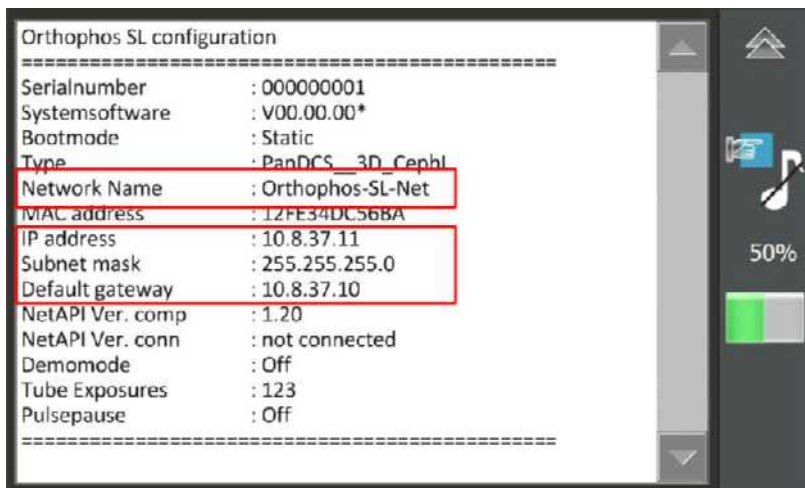
The software versions of the modules can be queried by running service routine S008.2 or using the *"Device details"* in SIDEXIS 4[ → 59]. You can also check the info screen in advance to determine whether the current software constellation is permissible. If this is not the case, the version number of the entire software is marked by an asterisk (e.g. V04.03.01\*).

In case of software incompatibilities, carry out a software update or downgrade.

Always carry out the measures described below exactly in the order specified and do not perform any other actions in between.

#### 9.15.3.1 After changing the DX11 board

1. Switch the unit on.  
**NOTICE! Do not acknowledge any error messages at this time.**
2. Call [ → 76] the info screen.



↳ A "Factory Default" DX11 must be displayed on the info screen.

3. Call the service menu [ → 248].
4. Call service routine S017 [ → 249] and perform [ → 278] service routine S017.2:
5. Switch the unit off.  
Wait approx. 1 minute. Then switch the unit on again.  
↳ **NO key** and the error message **E1 11 20** are displayed.
6. Use the *"Automatic"* update mode to perform an automatic software update to the current unit software version.  
The current update file is located on the *"ORTHOPHOS SL Firmware DVD"* on the Sirona dealer page on the Internet.



### IMPORTANT

When installing a new DX11 which already has the same software status as the overall system, you must nevertheless perform a software update to this status, so that an administrative entry can be written to the memory of the DX11.

7. Switch the unit off.  
Wait approx. 1 minute. Then switch the unit on again.
  - ↳ Error message **E61505** (undefined unit serial number) is displayed.
8. Call the service menu [ → 248].
9. Call up service routine S008.3 [ → 249].
10. Check the serial number  
**IMPORTANT:** The unit serial number is located on the nameplate of the unit.  
**NOTICE! If the serial number is incorrect, cancel the update and contact the Sirona Customer Service Center!**
11. Confirm the serial number using service routine S008.3 [ → 267].
12. Switch the unit off.  
Wait approx. 1 minute. Then switch the unit on again.
13. Call the service menu [ → 248].
14. Call service routine S017 [ → 249] and perform the unit configuration using service routines S017.2 - S017.18 [ → 277].
15. Switch the unit off.  
Wait approx. 1 minute. Then switch the unit on again.
16. If the travel height of the unit has to be limited:  
Set the travel height with service routine S018.2 [ → 289].
17. Perform a software update to the current software version.
  - ↳ All modules are updated in accordance with the configuration.
- ↳ The process is completed.



## 9.16 Cable

### 9.16.1 Replacing energy chain 1 completely

#### Removing the defective energy chain

##### IMPORTANT

##### Remove cable ties

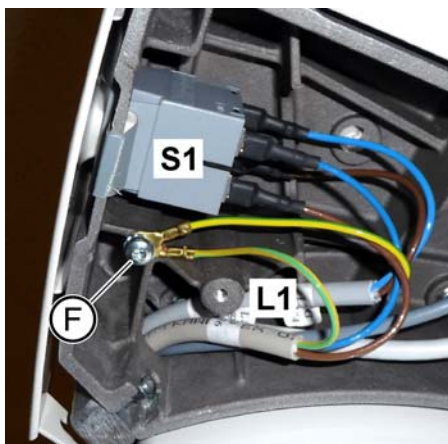
For the following steps, all necessary cable ties should be removed with wire cutters.

##### DANGER

##### Danger of fatal electrocution!

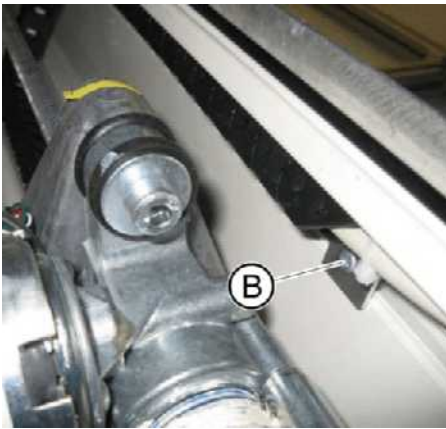
➤ Before you remove the energy chain, switch off the power supply.

1. Disconnect cable **L1** from switch **S1**.
2. Disconnect cable **L1** from the ground point (**F**).

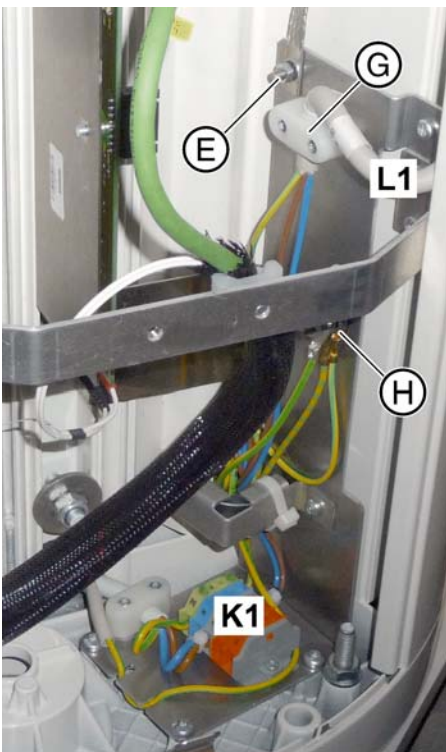


3. Loosen the two screws (**A**).



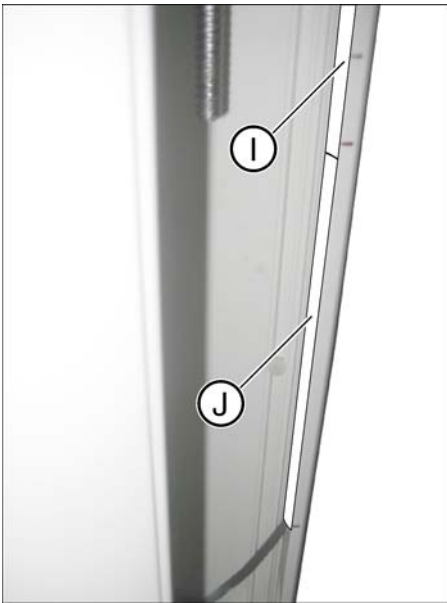


4. **If not present:** Mark the position of the screw (B) on the stand.
5. Make a note of the position of the screw (B) for when you later install the new energy chain.
6. Remove the screw (B) from the energy chain 1.



7. Remove the power cable from terminal K1.
8. Unscrew the mains filter plate.





9. Remove the cable covers (I) and (J) of the right-hand cable duct.
10. Remove the energy chain along with the mains filter plate from the stand.

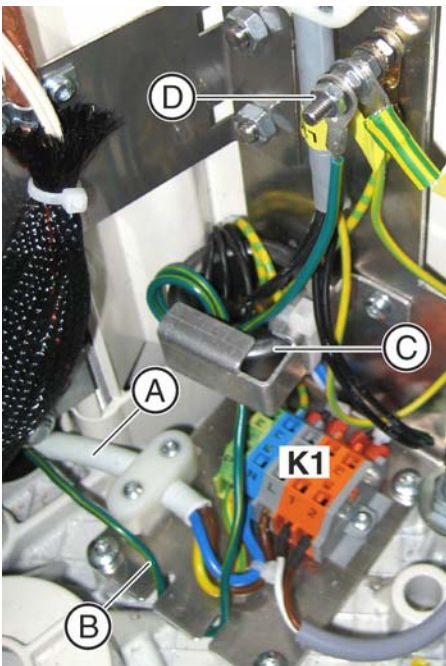
#### Installing the new energy chain



1. Route the energy chain up through the stand from its base.
2. Insert new energy chain 1 in the stand.

<b>IMPORTANT</b>
<b>Assembly instructions</b>
➤ Pay attention to the energy chain's rolling direction.





## IMPORTANT

### Possible assembly errors

The one end piece has been removed to make the new energy chain easier to lay .

The missing end piece is enclosed.

- Attach this end piece to the energy chain only when the energy chain has been laid in the stand.

3. Screw down the mains filter plate.
4. Screw the new energy chain down in the position (marking) of the old energy chain.
5. Screw the power cable (A) to the terminal **K1** and the strain relief.
6. Route the external PE cable (B) over the mains filter plate through the ferrite core twice (C) (two hoses).
7. Screw the external PE cable (B) down on the ground bolts (D).



### 9.16.2 Replacing cables

#### CAUTION

Switch the unit off before you start replacing cables or removing connectors.

#### NOTICE

Be careful not to twist the cables or kink the fiber-optic light guides when installing them.

Always check the cables before replacing them [ → 153].

The cables are labeled with small flags. They specify the designation and part number of the cable. The plugs and sockets on the cables are designated both on the boards and cables. Check the designation when you pull off the cables.

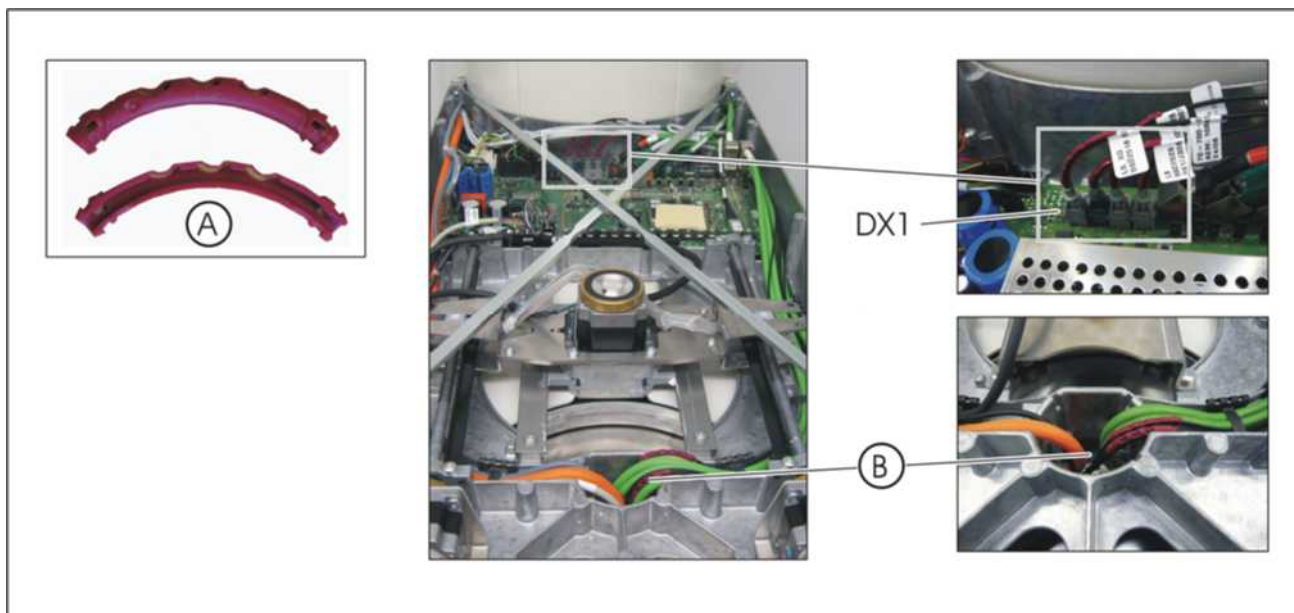
Some cables feature markings of green adhesive tape. Mark the corresponding positions on the unit before removing an old cable. Lay the new cable so that the cable markings again come to rest at the corresponding positions marked on the unit while removing the old cable.

An overview of all cables can be found in the chapter “Overview of cabling [ → 26]”.



### 9.16.2.1 Replacing fiber-optic cable L5, L6 or L15

1. Remove the defective fiber-optic cable.



2. **NOTICE! Do not kink or twist fiber-optic cables, the bending radius may not be less than 20mm, otherwise it is at risk of breaking!**  
Clip the two parts of the first radius limiter (A) close to the connector, which is plugged onto board **DX1** onto the cable.
3. Plug the connector of the new fiber-optic cable to the same color assignment on the board **DX1**.
4. Lay the fiber-optic cables up to point (B), and clip the two parts of the second radius limiter (A) at point (B) (approx. 900 mm from the connectors on DX1) onto the cable.
5. Guide the fiber-optic cable to board **DX6** and plug the connector of the new fiber-optic cable to the same color assignment on board **DX6**.



### 9.16.2.2 Cable exchange (L3, L5, L6, L11, L12, and L15)/Laying the cable/corrugated tube at the rotation unit

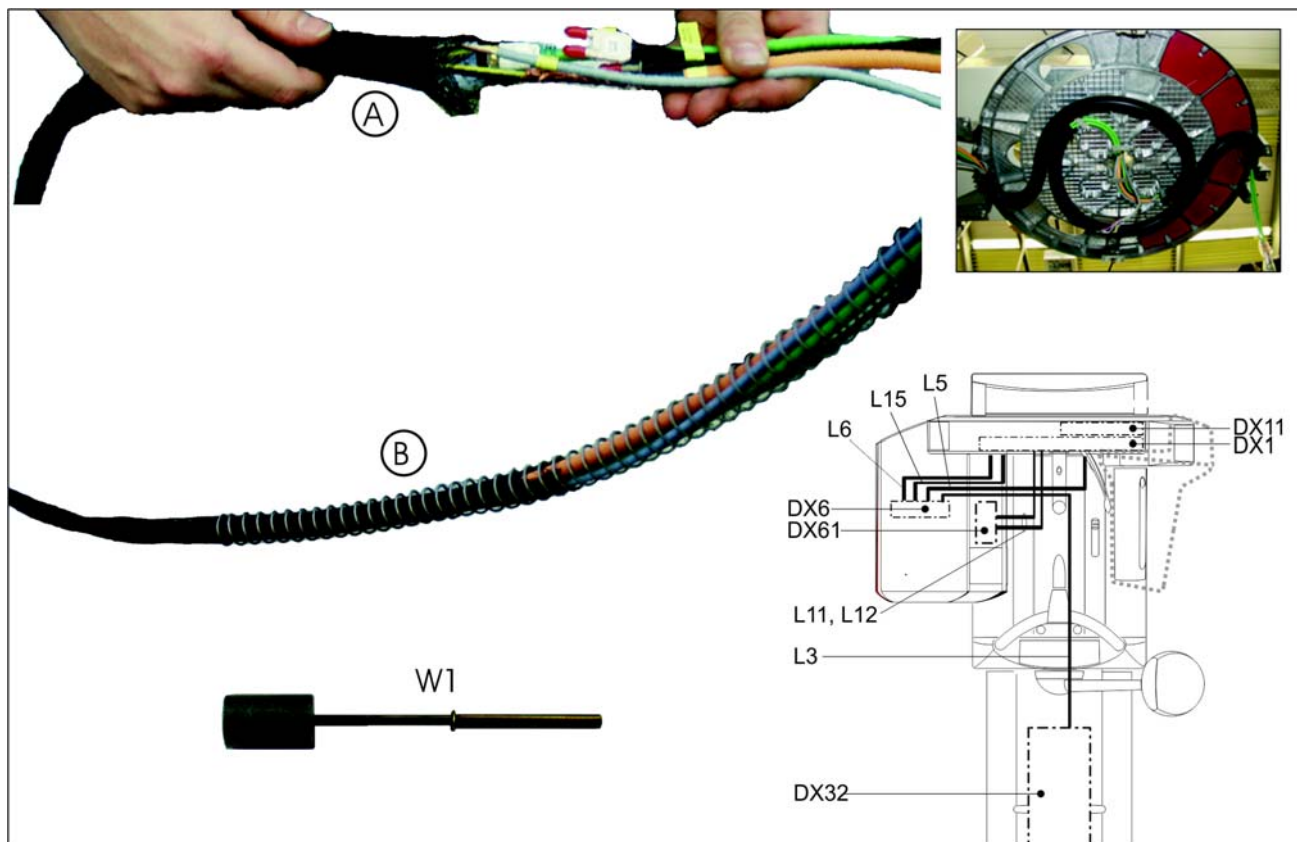
#### NOTICE

The connectors and cables must be protected by inserting them in the fabric tube (A) supplied with the cables.

#### Prepare the cable exchange

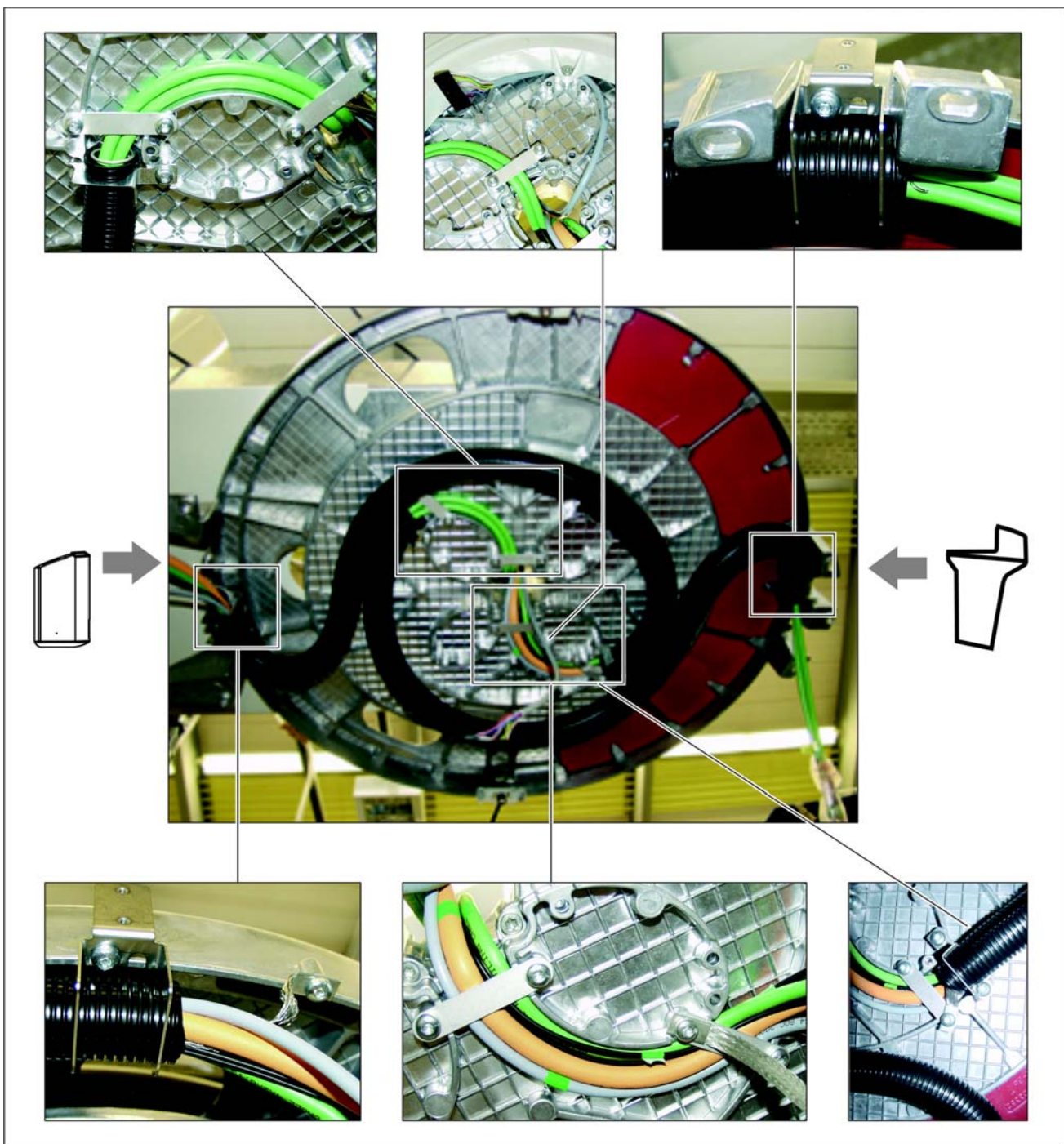
1. Remove the covers.
2. Pull the connectors off board DX6.

#### Replacing cables



1. For L12: Wrap the flap of connector RJ45 with insulating tape to protect it.  
**NOTICE! Ensure that the contacts are free of adhesive!**
2. For L3: Remove the connector of the cable with tool W1.
3. Remove the corrugated tube and the spiral spring (B) from the cable loom.
4. Remove the defective cable and run the new cable up to the rotary ring in the original position.
5. Bunch the cables together again to form a loom.
6. Fasten the defective cable to the loom and use it as a pull wire to pull the loom through the fabric tube (A).
7. Pull the fabric tube over the connector and as far over the cable loom as possible.
8. Use the pull wire to pull the fabric tube into the spiral spring (B).





**Laying the corrugated tube or cable at the rotation unit**

9. Slide the corrugated tube over the spiral spring.
10. Remove the fabric tube and the pull wire.
1. Lay the corrugated tubes and cables back in their original position.
2. Plug the connectors back in again.
3. Reattach the covers.



### 9.16.2.3 Replacing cable L117 or L108 in cable track 2

1. Switch the unit on.
2. Move the slide downward to a pleasant working position using the Up/Down keys on the control panel.
3. Switch the unit off again.
4. Remove the "arm cover" [ → 37].
5. Remove the two cross braces and the cover plate of board **DX1**.
6. **NOTICE! Wrap the connector X303 (cable L108) with adhesive tape immediately after pulling it off to protect the detent at the connector against breaking off.**  
Disconnect the fiber-optic cable **L117** and cable **L108** from board **DX1**.
7. Switch the unit on.
8. Use the Up/Down keys on the control panel to move the slide up.  
**Tip:** If the height adjustment motor is inoperative, you can also move the slide manually. [ → 332]
9. Switch the unit off again.
10. Remove the covers "Intermediate piece" and "Profile (top and bottom)" [ → 37].  
**Tip:** While loosening the screws, press the top profile cover down towards the unit and allow it to slide down once the screws are loose.
11. Remove board **DX32** (Removing board DX32 [ → 397]).
12. Detach fiber optic cable **L117** and cable **L108** from the cable clamps at the rear of the unit and pull the cables through the slit in the slide toward the front into the stand.



13. Unscrew the angle brackets on both sides of the cable track.





14. Remove the motor-side end piece from the cable track.



15. With defective cable **L117**: Unscrew cable **L117** from the interface board and remove the shield.  
If cable **L117** should be intact and used again, this step is not necessary. Unless it is not possible to lay down the cable track flat near the stand (see next step).

16. Remove the cable ties from the cable track and lay the cable track down on a flat surface stretched out.



17. **CAUTION! You must observe the position of connector X303 of cable L108 (see image).**

Carefully pull both cables (together) out of the cable track and the fabric tube.

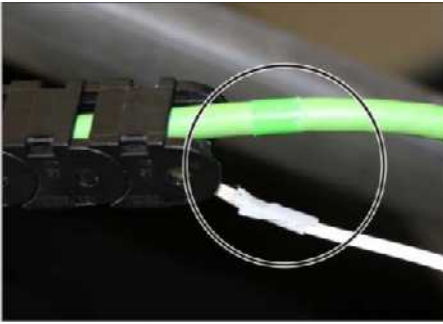
18. With defective cable **L108**: Wrap the connector **X303** of the new cable **L108** with adhesive tape to protect the detent against breaking off.

19. Lay the cable track down on a flat surface stretched out.



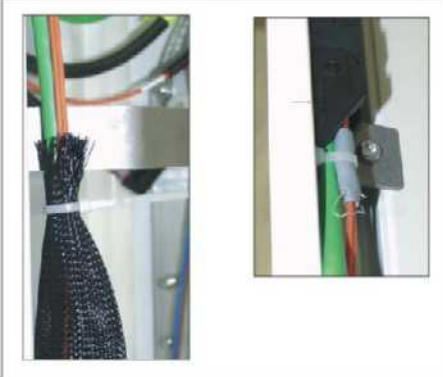
20. Fasten the two (new) cables together with adhesive tape above the flag labels.





- 21. CAUTION! Push the green cable. The white cable is carried along. In this way, you can prevent the sensitive fiber optic cable from being damaged.** Push both cables (together) into the cable track up to the cable markings.

New cables do not have cable markings. Orientate yourself according to the marking on the second (old) cable and make sure that both cables protrude equally far out of the cable track once they have been drawn in. Then make a mark on the new cable.



- 22. NOTICE! The cable ties should only fix the position of the cables. They must not be tightened too much, otherwise fiber-optic cable L7 could be damaged.**

Before installing the cable track in the stand, fix the cables at both ends of the cable track with a cable tie.

- 23. Reinstall the cable track in the stand.**  
Installation of the cable track is performed in reverse order of the removal.

#### 9.16.2.4 Replacing cable L1 or grounding strap in cable track 1

The procedure for replacing cable L1 and the grounding strap is basically the same as the procedure described in chapter Replacing cable L117 or L108 in the cable track 2 [→ 408].



## 10 Maintenance



### DANGER

#### Potentially lethal shock hazard!

It is essential to switch the unit off and to wait at least 1 minute, or 4 minutes if disconnecting the tube assembly (cable L3), before starting the maintenance or taking off a cover panel!



### CAUTION

#### Risk of electric shock!

Always switch the unit off before ...  
...connecting a measuring instrument or  
...carrying out continuity checks.

### 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.

### NOTICE

#### Risk of damage to tube assembly

Keep to the prescribed cool-off periods if several exposures have to be taken to check a measured value.

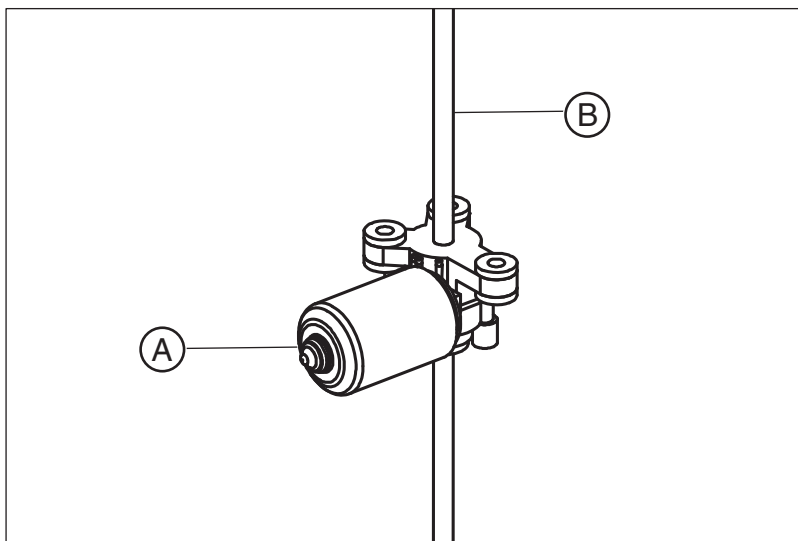
**IMPORTANT:** Select the correct current/voltage type and adjust the measuring range to match the expected readings.

### 10.1 Calibrating the unit

The unit calibration is described in the chapter "Unit adjustment and calibration [ → 160]".



## 10.2 Checking the height adjustment



**Check the threaded rod and motor for abrasion**

- Perform a visual inspection of height adjustment motor (A) and spindle (B) for abrasion.

If significant abrasion is present:

- ✚ Replace the height adjustment motor including spindle [ → 337].

**Check whether the height adjustment produces atypical running noises**

- Use the Up/Down keys on the touchscreen to move the unit up and down through its entire adjustment range.

If the mechanics of the height adjustment is defective, a speed-dependent hammering noise may occur which points to bearing damage at the height adjustment motor.

If a hammering noise occurs:

- ✚ Replace the height adjustment motor including spindle [ → 337].

**Check whether precise, jolt-free height adjustment is possible**

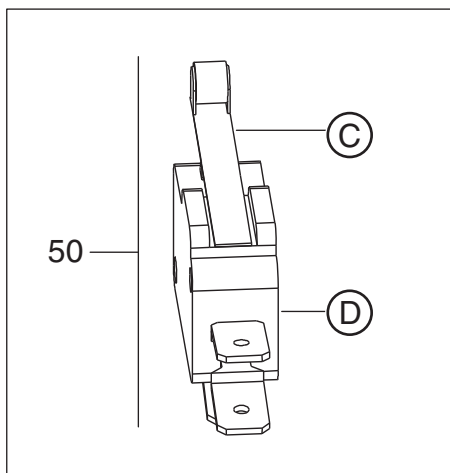
If the unit is not used for a longer period of time, a slight jolt may occur the first time it starts moving. However, the next time it starts moving, it must execute a jolt-free soft start.

- Use the Up/Down keys on the control panel to move the unit and observe the movement of the slide. The slide must start in gentle starting and then change over to a faster movement. If the height adjustment cannot be correctly positioned in detail using the gentle start:

- ✚ Lubricate the spindle with a light coat of **Chesterton 622**.



### Check whether the height adjustment limit switches are functioning properly



### Check whether an audible signal can be heard during height adjustment

- Manually press the actuators (C) of both limit switches (D) one after the other while the height adjustment motor is running. The motor must stop.

If the motor does not stop:

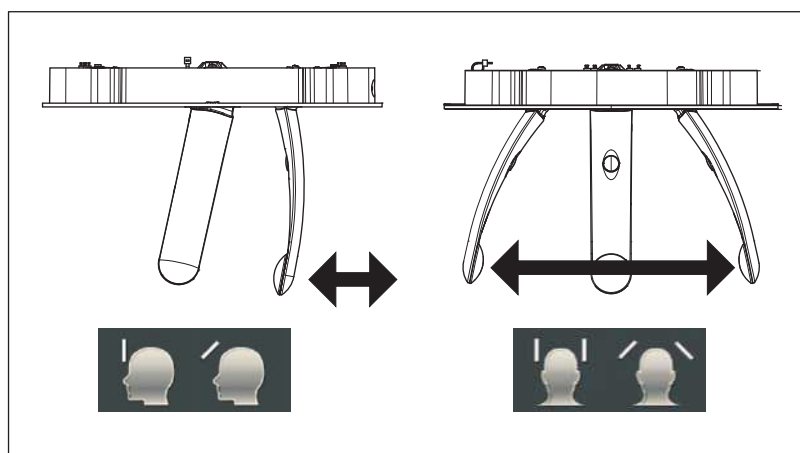
- ✚ Check the corresponding microswitch and replace if necessary
- ✚ Check cable L19, replace if necessary.

- Use the Up/Down keys on the control panel to move the unit up and down. An acoustic signal must be audible.

If no acoustic signal sounds:

- ✚ Replace board DX1 [ → 396].

## 10.3 Checking the forehead and temple supports



### Check whether the forehead support moves easily and without jolting throughout its travel range

### Check whether the temple supports move easily and symmetrically

- Move the forehead support and observe the position. If the forehead support cannot be adjusted easily and jerk-free:
  - ✚ Replace the headrest [ → 347].

- Move the temple supports and observe the position. If the temple supports cannot be adjusted jerk-free and symmetrically:
  - ✚ Replace the headrest [ → 347].



## 10.4 Check rotation unit on the sensor unit for ease of access



✓ The unit must be switched on.

1. To switch from the PAN or CEPH program group to the 3D program group (or the other way around), touch the icons at the top edge of the touchscreen.
2. Confirm your selection by pressing the R key on the touchscreen.
  - ↳ The rotation unit moves from the 2D to the 3D position or vice versa.
3. Pay attention to unusual running noises.  
If unusual running noises should occur during the test cycle or the rotation unit stops due to increased resistance:
  - ↳ Check mounting of the sensor unit.
  - ↳ Replace sensor unit.

## 10.5 Testing the rotating unit for smooth running

The mechanical function of the rotating unit (ring movement) is checked via a 3D 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 smooth cycle of the rotation unit is possible. The unit stops automatically if the resistance increases.

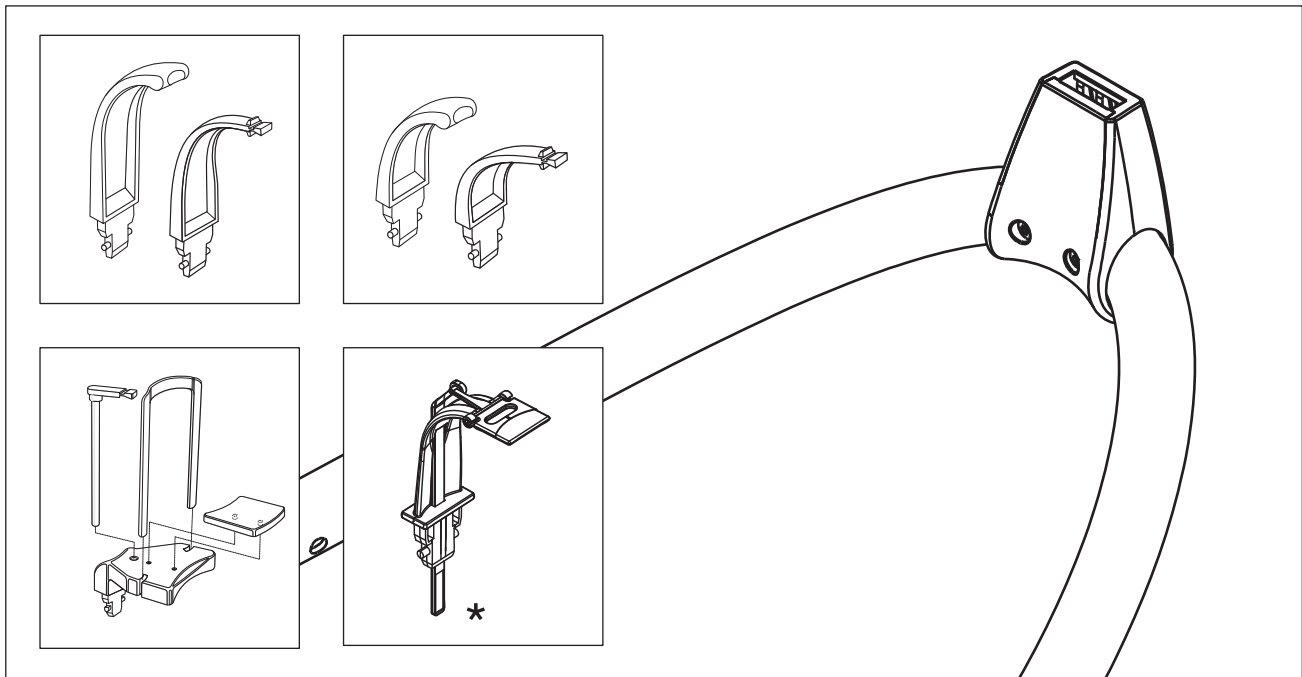


✓ The unit must be switched on.

1. Press the T key on the touchscreen.
  - ↳ 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. Pay attention to unusual running noises.  
If unusual running noises should occur during the test cycle or the rotating unit stops due to increased resistance:
  - ↳ Establish the mechanical fault.
  - ↳ Correct the mechanical fault.
4. Press the T key on the touchscreen.
  - ↳ The program exits test cycle mode.



## 10.6 Inspecting the bite block holder



\* only for units with an occlusal bite block

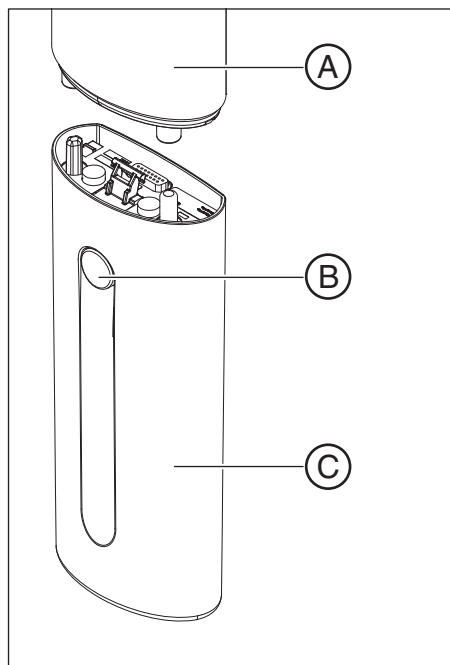
**Check whether the bite block, contact segment and chin rest can be fitted securely in the bite block holder**

- Insert the bite block, contact segment and chin rest one after the other in the bite block holder and check them to make sure they are firmly seated.  
For loose seating:
  - ↪ Check the bite block, contact segment and/or chin rest for damage; replace with new parts if necessary.
  - ↪ Replace the support piece.



## 10.7 Checking the ceph sensor holder

**Check whether the sensor locks and unlocks easily and is firmly seated in the holder**



1. Carefully insert the sensor upward into the holder:  
The sensor must snap in place audibly.
2. Check the sensor for firm seating.
3. Press the locking button and carefully pull the sensor downward out of the holder: The sensor must easily be removed.  
If the sensor cannot easily be inserted in or removed from the holder, or is seated too loosely in the holder:
  - ✎ Check the magnets on the sensor for dirt or foreign particles and clean them or remove any foreign particles if necessary.
  - ✎ Replace the sensor holder [ → 391].
  - ✎ Replace the sensor (see Operating Instructions).



## 10.8 Checking the laser light localizers

### CAUTION

#### Risk of injury to eyes.

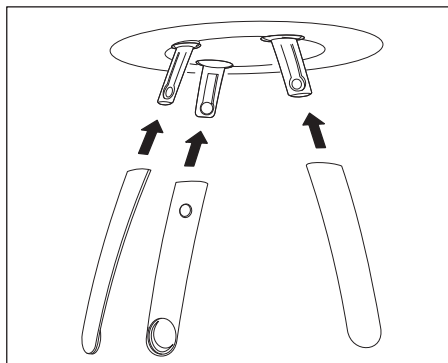
The unit contains lasers of Class 1.


Keep a distance of at least 4" (10 cm) between eye and laser. Do not look into the laser beam.



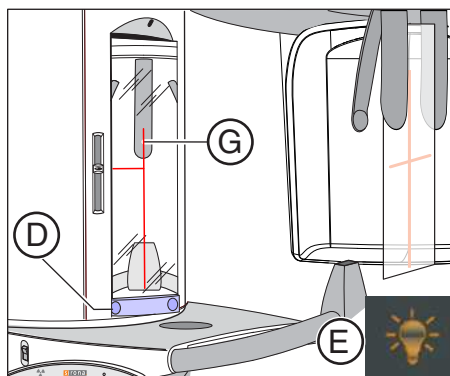
### Checking the laser light localizers

#### 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.

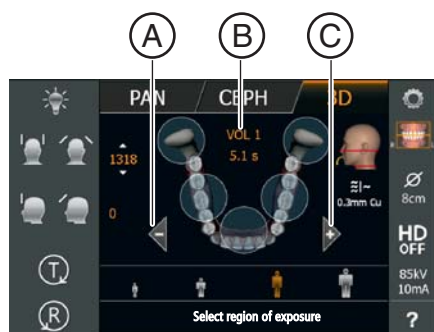




### Checking the PAN laser beam

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.

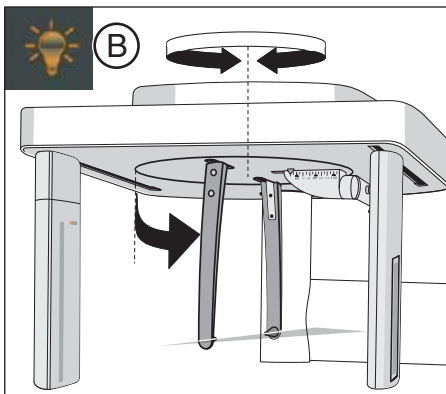
VOL1 VOL1 HD	Volume exposure with a diameter of approx. 8 cm and a height of approx. 8 cm or 5.5 cm collimated.
VOL2 VOL2 HD	Volume exposure with a diameter of about 5 cm and a height of about 5.5 cm for upper <b>or</b> lower mandible
VOL3 VOL3 HD	Volume exposure with a diameter of about 11 cm and a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



1. 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.
2. 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.



## 10.9 Checking the X-ray images

The check must be performed for pan, ceph and 3D X-ray images.



**Check whether the X-ray images taken by the dentist are OK**

1. *For 2D X-ray images only:*  
Check to see whether the X-ray images taken by the dentist exhibit an unexposed border on all 4 sides.
2. Check whether the X-ray images show normal definition.
3. Check whether the density of the X-ray image is OK.

If the quality of the X-ray image is not OK in any way:

- ✎ Check adjustment or calibration, if required, readjust and recalibrate.

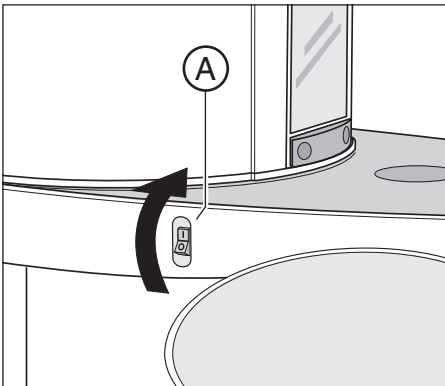


## 10.10 Checking the tube data

### 10.10.1 Checking the tube voltage

#### Preparing the measurement

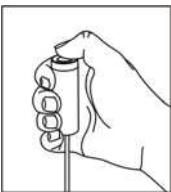
1. Attach the Mult-O-Meter sensor in the middle of the sensor (on 2D sensor side).
2. Set the main switch (A) to **I** (see also Operating Instructions).
3. Wait for approx. 1 minute.



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

#### Performing measurements

1. Select the **P1** program (see Operating Instructions).
2. Set the kV/mA level **63kV/8 mA** (see Operating Instructions).
3. Establish receptivity (see SIDEXIS 4 Operator's Manual).
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 63kV. The permissible tolerance is  $\pm 10\%$ .

- ↳ If the measured values *are not within the permissible tolerance range*, replace the *tube assembly*.
- ↳ 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).



### 10.10.2 Checking the tube current

#### NOTICE

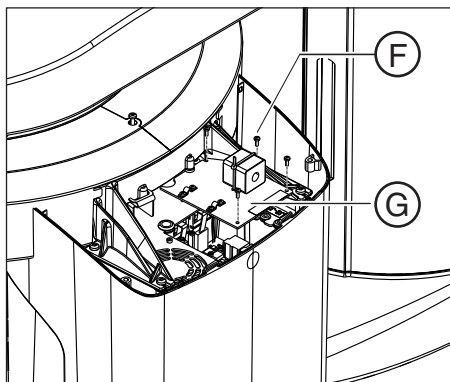
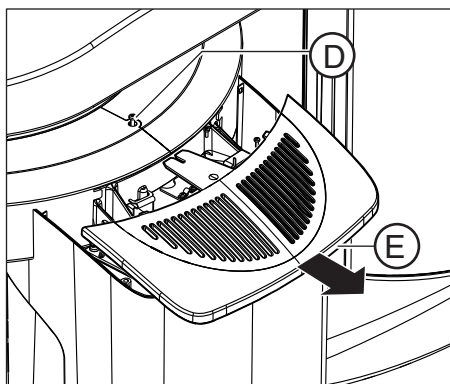
##### Damage to the measuring unit

The ring assembly and the tube assembly move during the measurement.

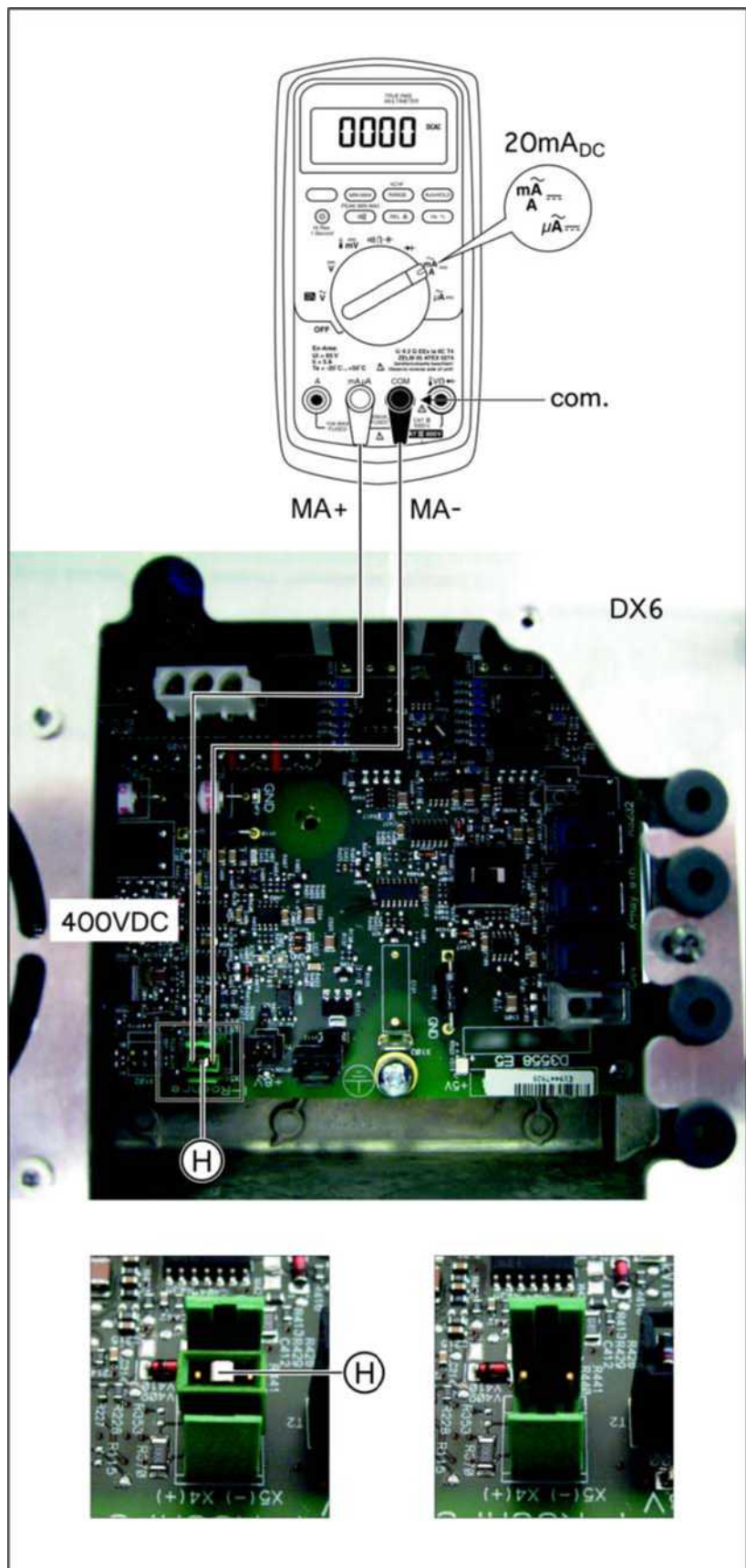
Make sure that the measuring wires are sufficiently long to allow for the ring movement and that the measuring unit is in a secure position so that it will not fall down.

#### Preparing the measurement

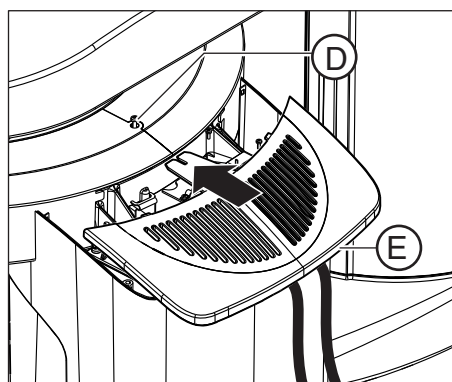
1. Switch off the unit (see Operating Instructions).  
**DANGER! After switching off the unit, wait at least 4 minutes (LED V500 on the DX6 must no longer be on) before removing the cover on the tube assembly.**
2. Loosen the screw (D) and remove the lid of the tube assembly cover (E).
3. Loosen the 4 screws (F) and remove the cover plate (G).





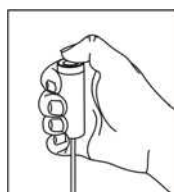






4. **DANGER! After switching off the unit, wait at least 4 minutes (LED V500 on the DX6 must no longer be on) before removing jumper H from the DX6 board.**  
Remove the jumper (H) from connector **X302** on the **DX6** board.
5. **DANGER! Only use fully insulated measuring wires.**  
Connect the digital 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 20mA 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 (E) on the unit using the screw (D).
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. Touch the **R** key on the touchscreen.  
↳ The unit moves to its starting position.

### Performing measurements



1. Select the **P1** program (see Operating Instructions).
2. Set the highest kV/mA level, **66kV/8mA** (see Operating Instructions).
3. Establish receptivity (see SIDEXIS 4 Operator's Manual).
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

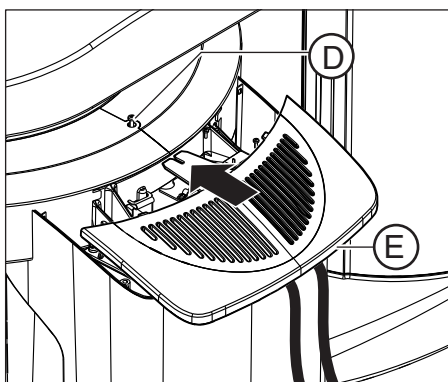
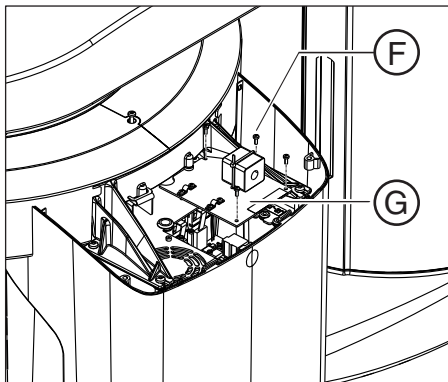
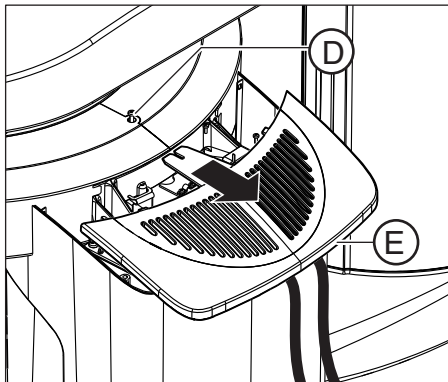
1 mA corresponds to a tube current of 1 mA. The permissible tolerance is  $\pm 20\%$ .

### Analyzing measurements

- Read the voltage value on the display of the multimeter.
  - ↳ The tube current must be **8mA  $\pm$  1.6mA**.
  - ↳ If the measured value is *not* within the permissible tolerance, replace the *tube assembly*.
  - ↳ 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 (D) and remove the lid of the tube assembly cover (E).
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 (E) to the unit and secure it with the screw (D).

#### 10.10.3

### Checking the fan and temperature sensor in the tube assembly housing

#### Check whether the fan is functioning

- Check the function of the fan using service routine S005.4 [→ 261].  
    ↳ If the fan is defective: Replace the fan [→ 374].

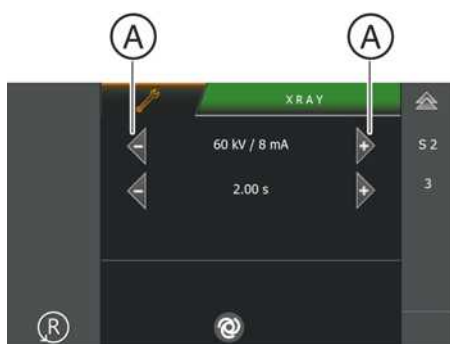
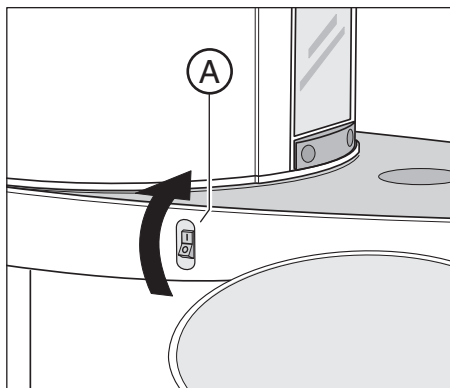
#### Check whether the temperature sensor is supplying plausible values

- Read the temperature in the single tank with service routine S005.5 [→ 262].  
    ↳ If the displayed temperature reading is not plausible: Replace the tube assembly. [→ 372]



### 10.10.4 Checking the radiation time

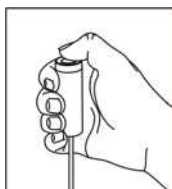
#### Preparing the measurement



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  $\pm 10\%$ .
  - ↳ 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.

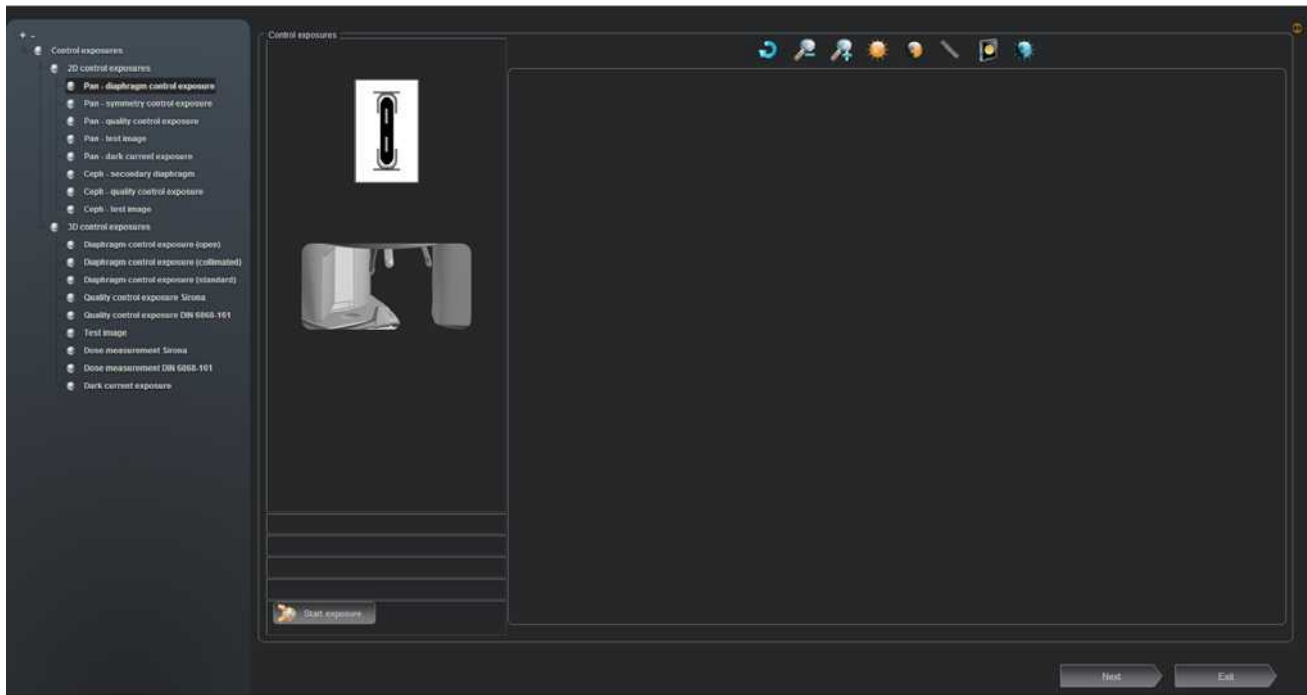
#### Concluding the measurement

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



## 10.11 Test exposures/Test images

The 2D/3D test exposures and test images are used for fast checking of the unit adjustment and calibration.



"Control exposures" menu

The following test exposures are available:

### 2D test exposures

- "Pan - diaphragm control exposure"
- "Pan - symmetry control exposure"
- "Pan - quality control exposure"
- "Pan - test image"
- "Pan - dark current exposure"

Additionally for units with cephalometer:

- "Ceph - secondary diaphragm"
- "Ceph - quality control exposure"
- "Ceph - test image"

### 3D test exposures

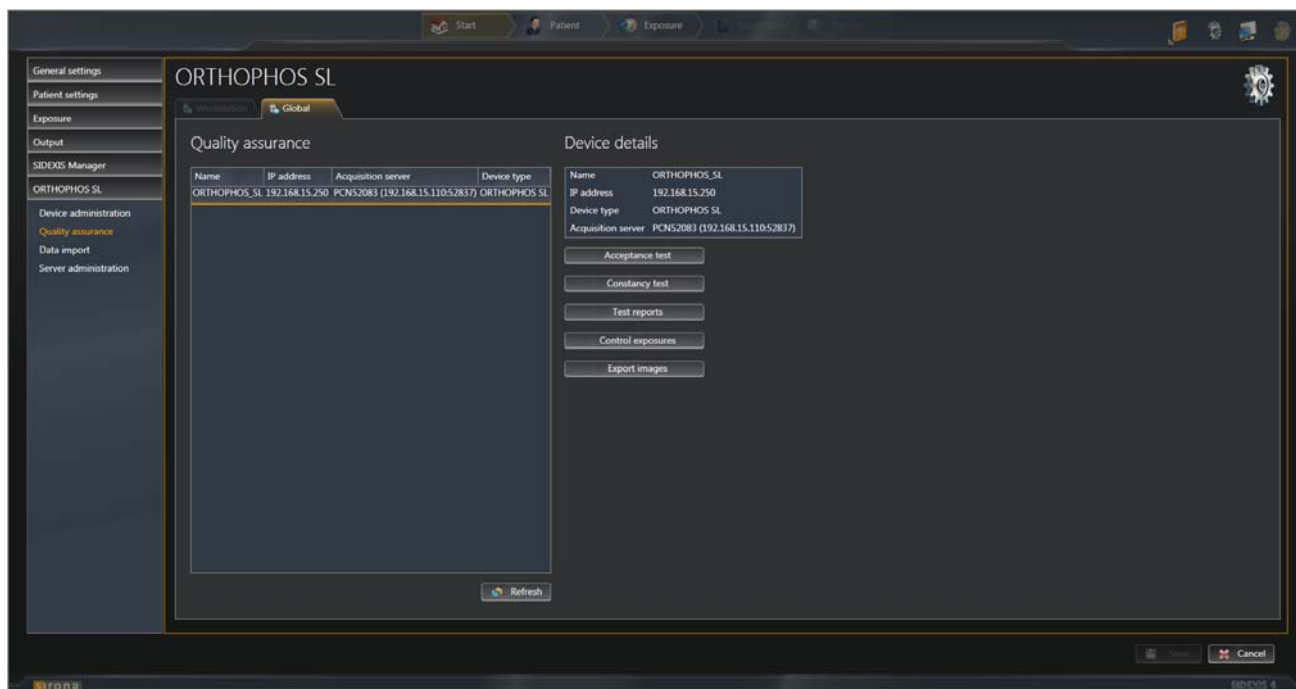
- "Diaphragm control exposure (open)"
- "Diaphragm control exposure (standard)"
- "Quality control exposure Sirona"
- "Quality control exposure DIN 6868-161"
- "Test image"
- "Dose measurement Sirona"
- "Dose measurement DIN 6868-161"
- "Dark current exposure"

The menu can be called up without a service password, so test exposures can thus be performed by the user as well.



### 10.11.1 Calling "Test exposures" menu

- ✓ SIDEXIS 4 is installed.
- 1. Start SIDEXIS 4.
- 2. In SIDEXIS 4, call the *"ORTHOPHOS SL" / "Quality assurance"* configuration menu.



Configuration menu *"ORTHOPHOS SL" / "Quality assurance"*

- 3. Select the desired X-ray component from the unit list.
- 4. Click on the *"Control exposures"* button.
  - ↳ The *"Control exposures"* menu is started.



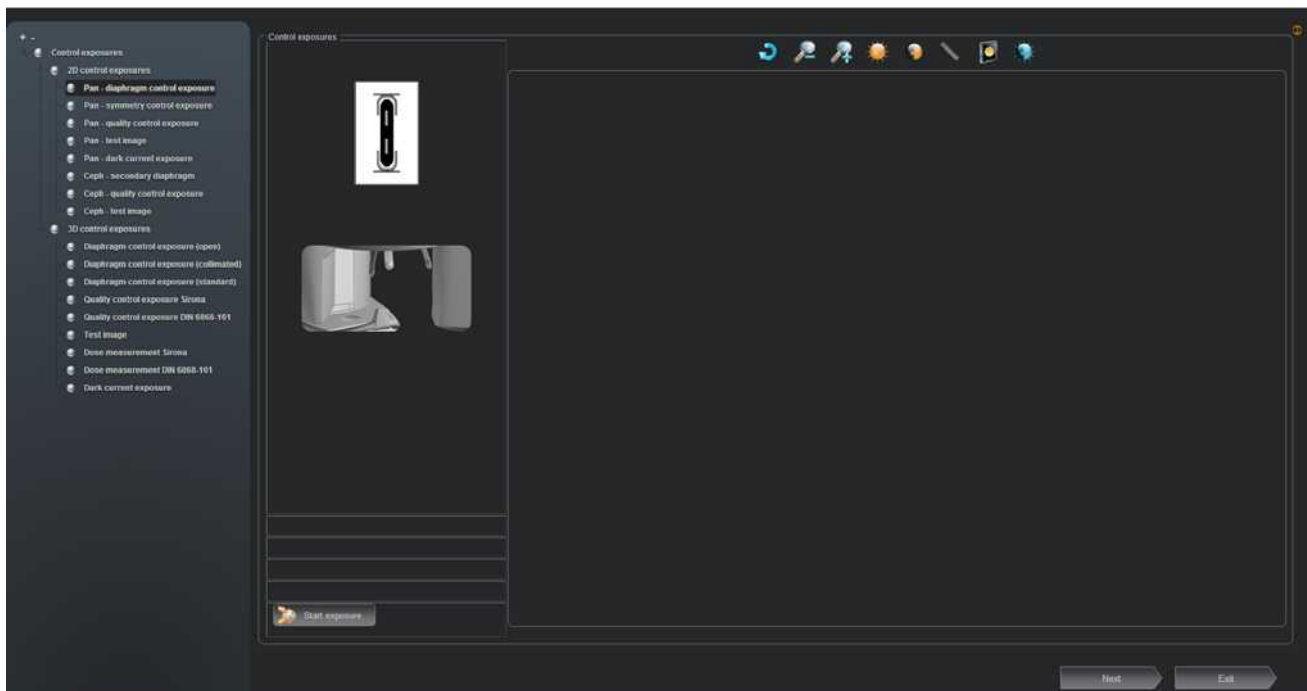
## 10.11.2 2D test exposures

### 10.11.2.1 Pan - diaphragm test exposure (2D)

You can use the *"Pan - diaphragm control exposure"* to check the adjustment of the Pan - diaphragm adjustment [ → 187].

1. Call up the *"Control exposures"* menu [ → 428].
2. Select the *"Pan - diaphragm control exposure"* element in the structure tree under *"2D control exposures"*.

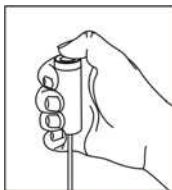
✎ In the action area, the menu appears to create the *"Pan - diaphragm control exposure"*.



3. Click on the *"Start acquisition"* button.

✎ Exposure readiness is 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.



4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).

✎ The exposure is displayed in the exposure window.

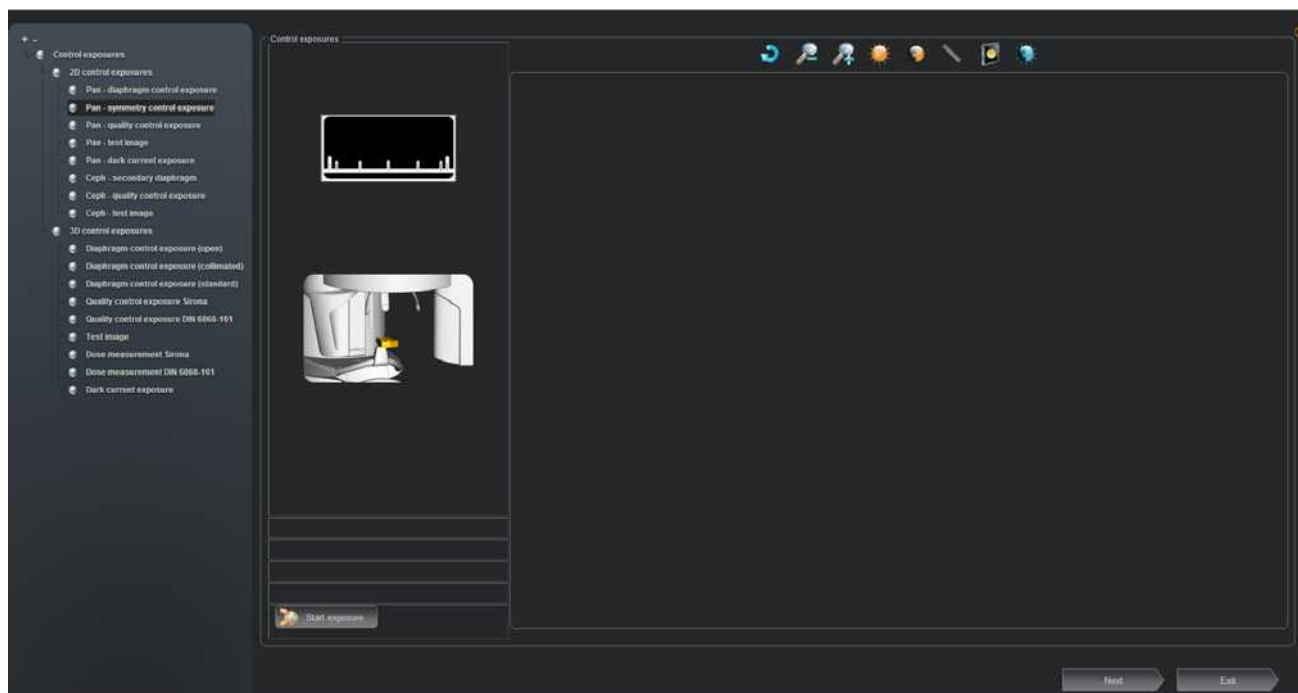
For notes on evaluating the exposure, refer to the section *"Unit adjustment and calibration [ → 160]"/"Pan aperture adjustment [ → 187]"*.



### 10.11.2.2 Pan - Symmetrical test exposure (2D)

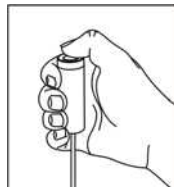
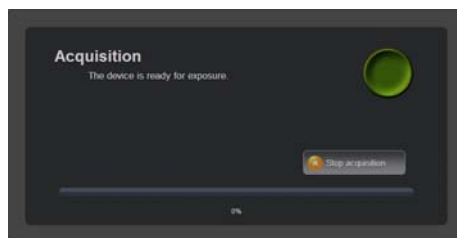
You can use the *"Pan - symmetrie control exposure"* to check the adjustment of the Pan - symmetry adjustment [ → 193].

1. Insert the needle phantom into the bite block holder of the unit [ → 176].
2. Call up the *"Control exposures"* menu [ → 428].
3. Select the *"Pan - symmetrie control exposure"* element in the structure tree under *"2D control exposures"*.  
 ↳ In the action area, the menu appears to create the *"Pan - symmetrie control exposure"*.



4. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.



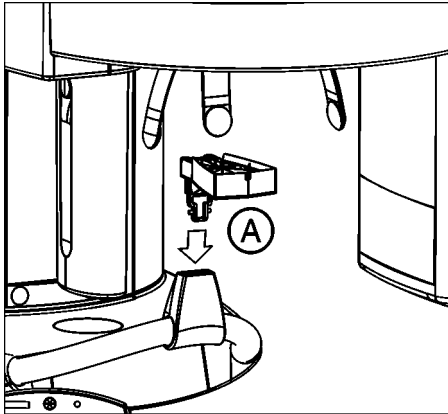
5. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).  
 ↳ The exposure is displayed in the exposure window.  
 For notes on evaluating the exposure, refer to the section "Unit adjustment and calibration [ → 160]" / "Pan symmetry adjustment [ → 193]".
6. Remove the needle phantom again.



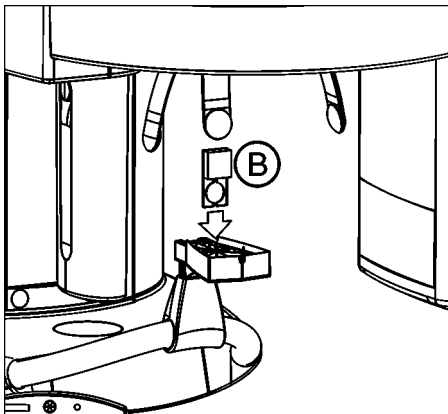
### 10.11.2.3 Pan - quality test exposure (2D)

You can use the "*Pan - quality control exposure*" to create a panoramic exposure with full rotation. This function enables you to simulate a quality test, for example, in a similar way to an acceptance/constancy test.

1. Insert the needle phantom (A) into the bite block holder.



2. Plug the contrast element (B) into the slot on the needle phantom provided for that purpose.



#### NOTICE

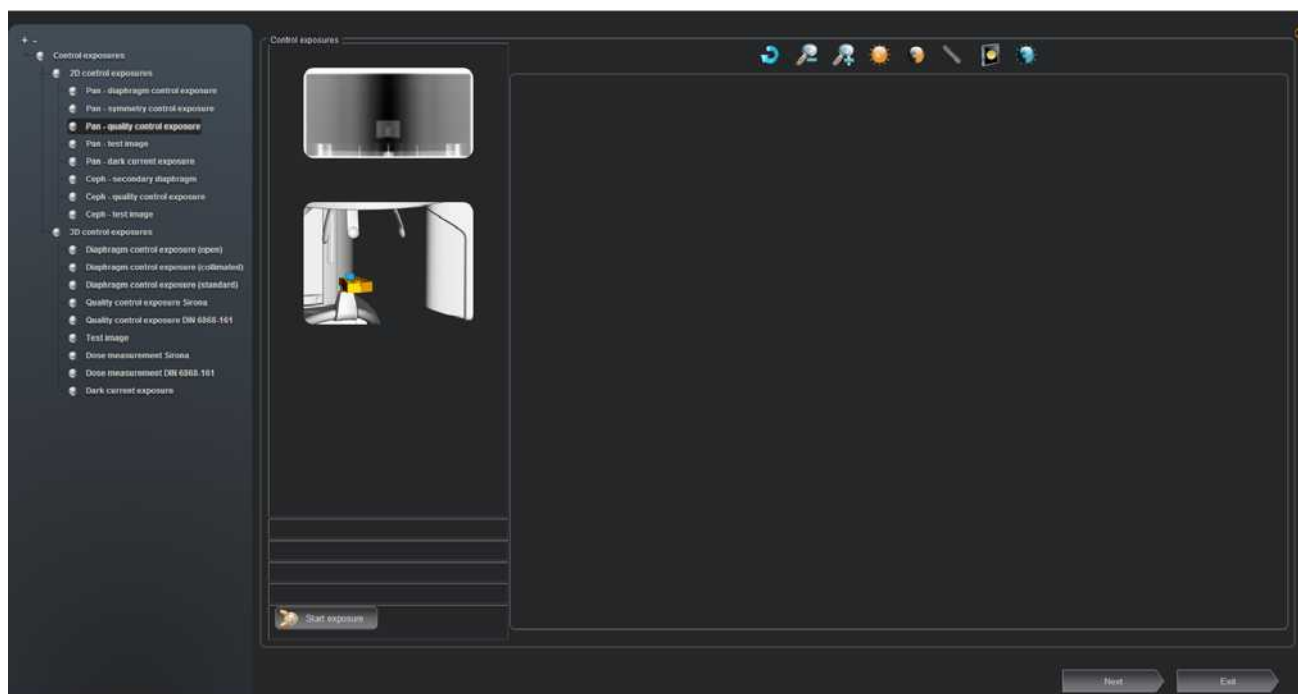
The aluminum plate of the contrast element must be facing away from the column of the unit.

Do not attach any additional aluminum plate to the unit.



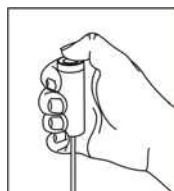
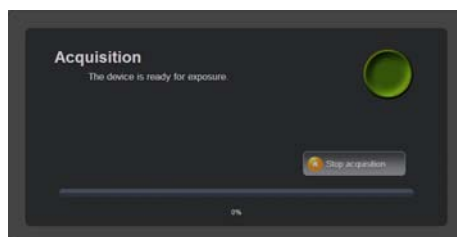
3. Press the R key.
  - ↳ The unit moves to its starting position.
4. Call the "*Control exposures*" menu [→ 428].
5. In the structure tree, under "*2D control exposures*", select the "*Pan - quality control exposure*" element.
  - ↳ The menu for creating the "*Pan - quality control exposure*" appears in the action window.





6. Click on the *"Start acquisition"* button.

- Exposure readiness is 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.



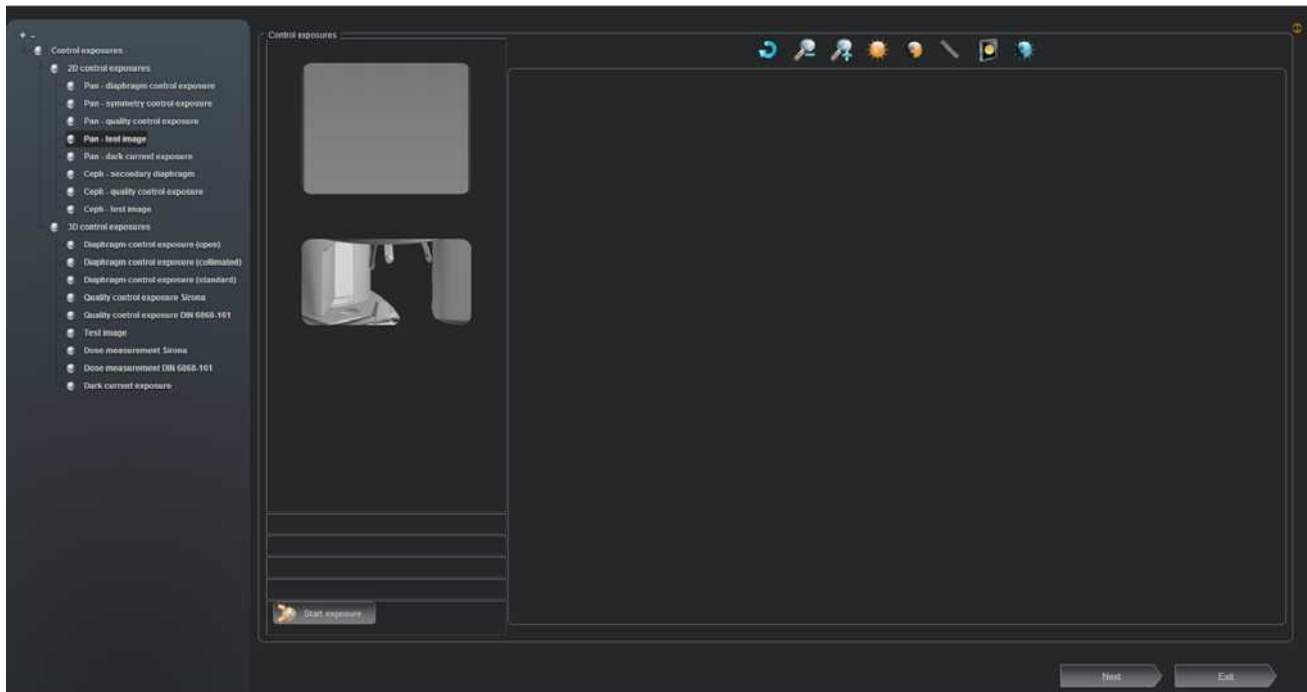
7. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if it has been configured).
- The exposure is displayed in the exposure window.  
For notes on evaluating the exposure, refer to the technical documentation for acceptance/constancy testing.
8. Remove the needle phantom again with the constancy test phantom.



#### 10.11.2.4 Pan - test image (2D)

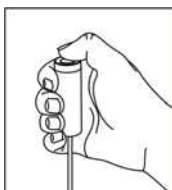
You can use the *"Pan - test image"* menu to check the 2D data path of the unit and the operability of the DCS sensor.

1. Call up the menu *"Control exposures"* [ → 428].
2. Select the *"Pan - test image"* element in the structure tree under *"2D control exposures"*.
  - ↳ The menu for creating the test image appears in the action window.



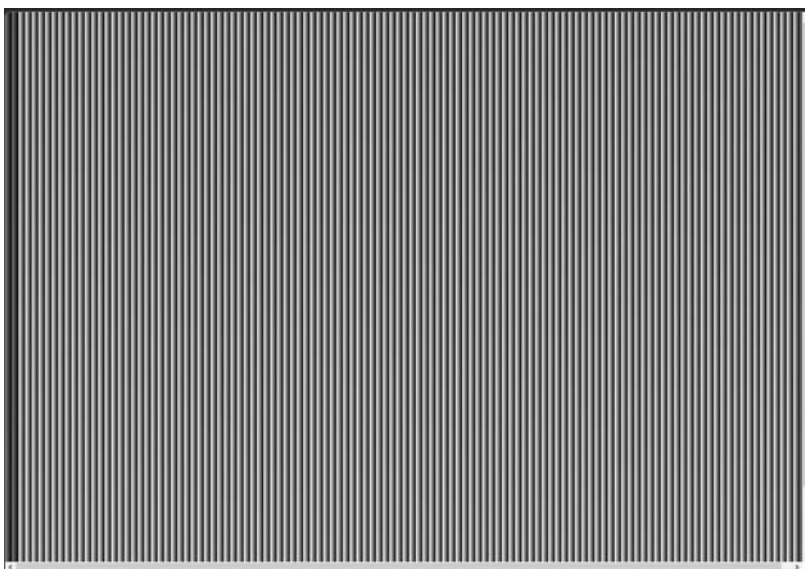
3. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.



4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).
  - ↳ The exposure is displayed in the exposure window.  
See below for reference image.



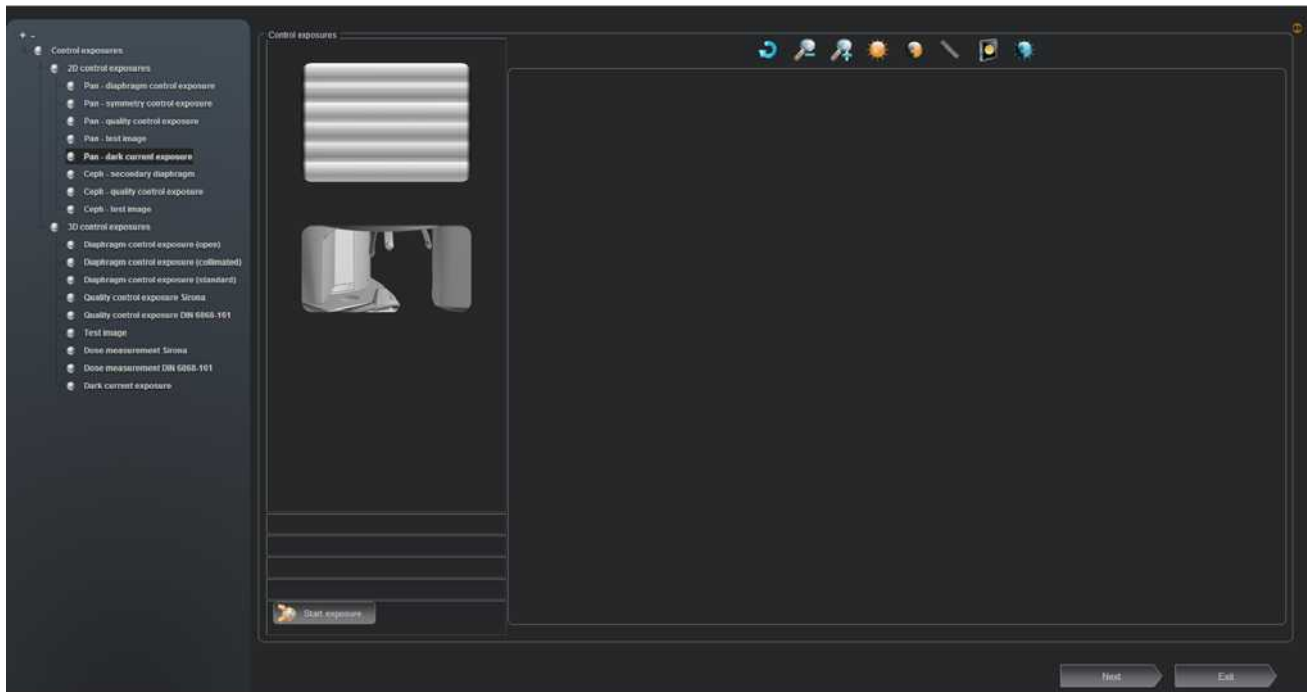




### 10.11.2.5 Pan - dark current exposure (2D)

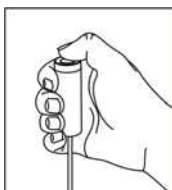
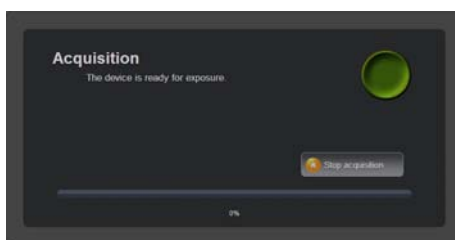
You can use the *"Pan - dark current exposure"* menu to check the DCS sensor and the data path.

1. Call up the menu *"Control exposures"* [ → 428].
2. Select the *"Pan - dark current exposure"* element in the structure tree under *"2D control exposures"*.
  - ↳ The menu for creating the *"Pan - dark current exposure"* appears in the action window.



3. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.



4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).
  - ↳ The exposure is displayed in the exposure window.  
See below for reference image.



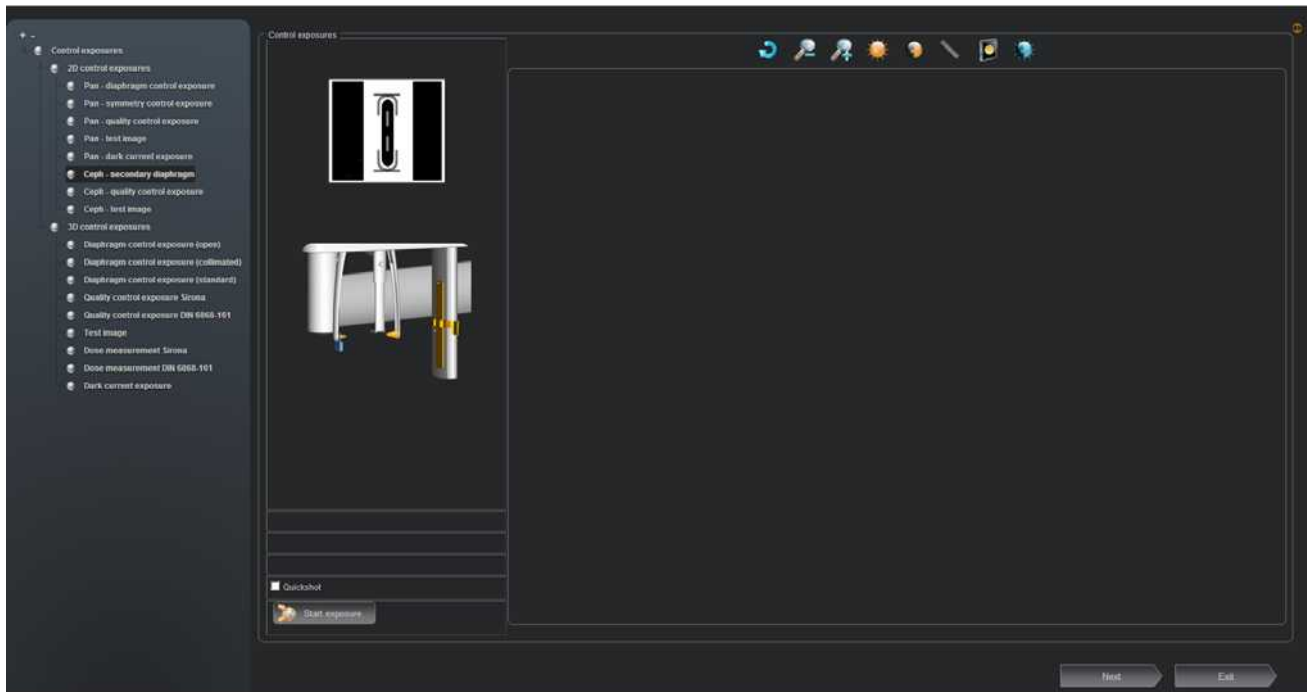




### 10.11.2.6 Ceph - secondary diaphragm (2D)

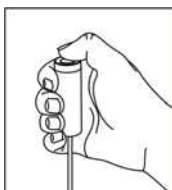
You can use the *"Ceph - secondary diaphragm"* menu to check the adjustment of the Ceph secondary diaphragm.

1. Call up the menu *"Control exposures"* [ → 428].
2. Select the *"Ceph - secondary diaphragm"* element in the structure tree under *"2D control exposures"*.  
 ↳ In the action area, the menu appears to create the exposure for the *"Ceph - secondary diaphragm"*.



3. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.



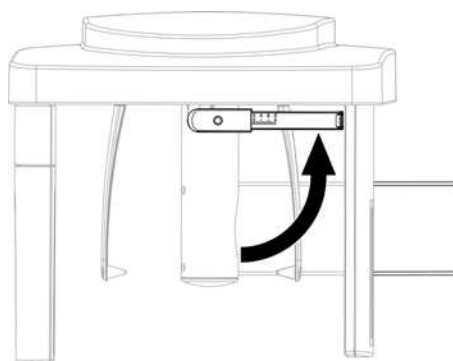
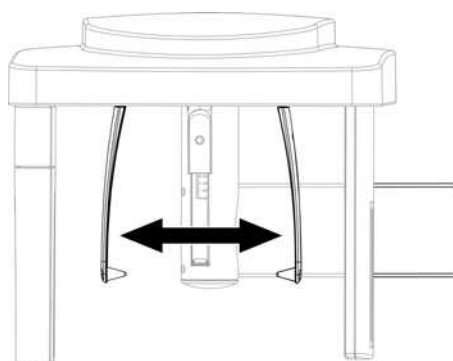
4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).  
 ↳ The exposure is displayed in the exposure window.  
 For notes on evaluating the exposure, refer to the section *"Unit adjustment and calibration [ → 160]"/"Adjustment of the ceph secondary diaphragm [ → 204]"*.



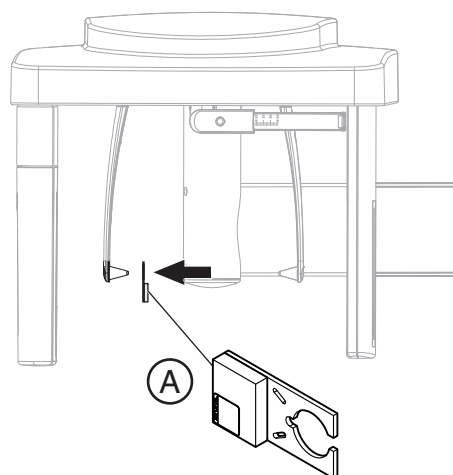
### 10.11.2.7 Ceph - quality test exposure (2D)

You can use the "*Ceph - quality control exposure*" to create a Ceph exposure with full rotation. This function enables you to simulate a quality test, for example, in a similar way to an acceptance/constancy test.

- ✓ No needle phantom is inserted into the bite block of the unit.
  - ✓ The Ceph sensor is inserted in the sensor holder of the cephalometer.
1. Open the ear plug holders completely.
  2. Turn the ear plug holders so that one ear plug is directly in front of the image receptor.



3. Fold up the nose support.

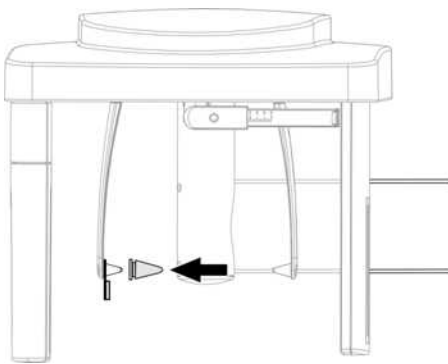


4. Fit the contrast element (A) with its hole onto the ear plug.

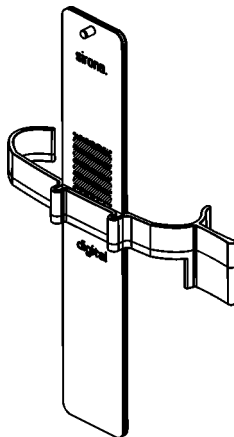
#### NOTICE

The aluminum plate of the contrast element must face the X-ray tube assembly.

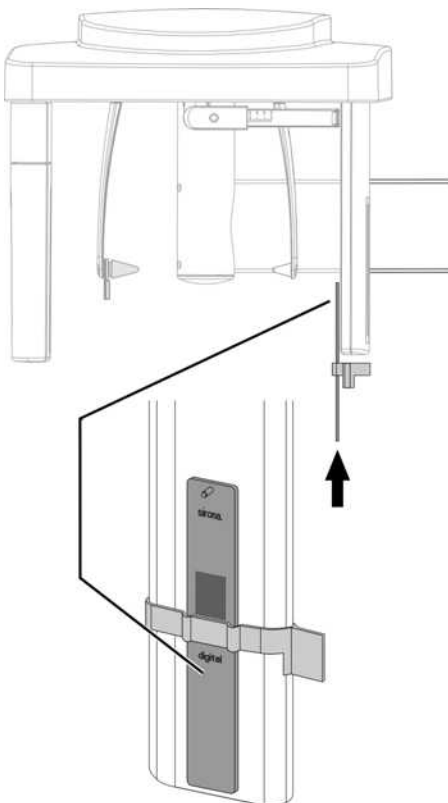




5. Secure the contrast element using a hygienic cap.



6. Attach the ceph test phantom to the clip provided for that purpose.



7. Push the ceph test phantom with the clip from **below** on to the secondary diaphragm of the ceph arm.

#### IMPORTANT

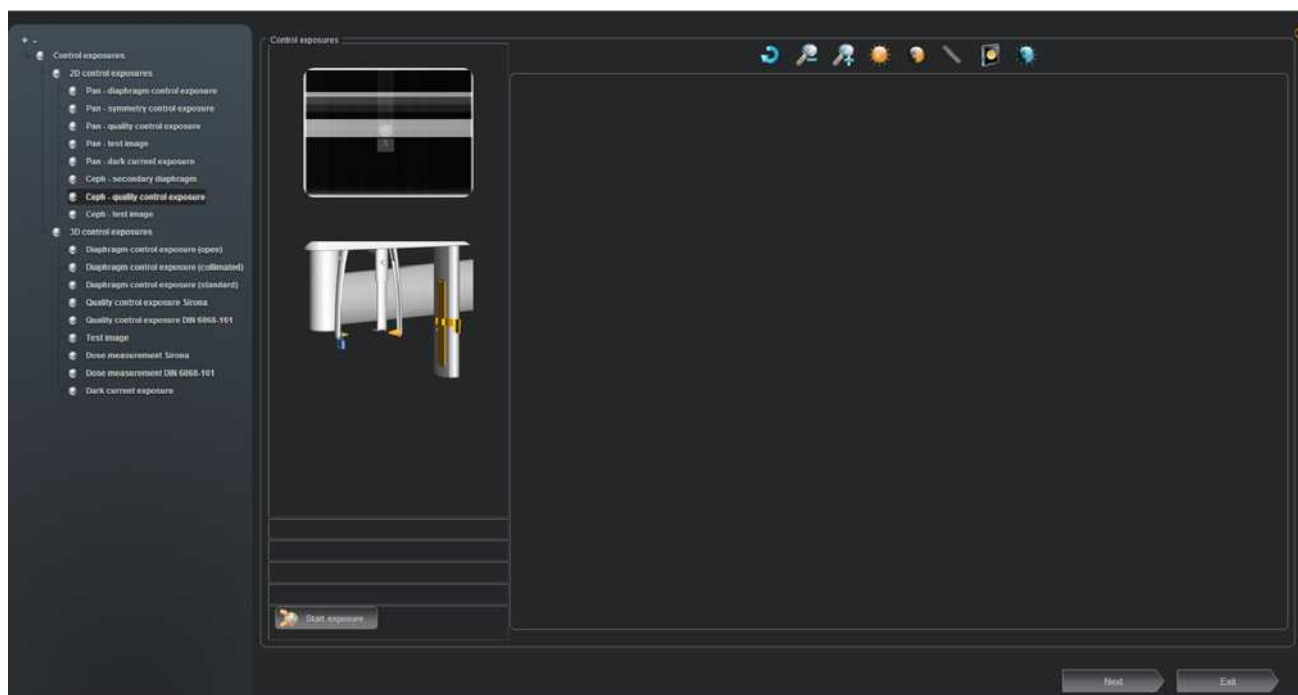
The clip must engage into the opening on the secondary diaphragm provided for that purpose.



8. Press the R key.  
↩ The unit moves to its starting position.

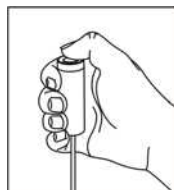


9. Call the *"Control exposures"* menu [ → 428].
10. In the structure tree, under *"2D control exposures"*, select the *"Ceph - quality control exposure"* element.
  - ↳ In the action area, the menu appears to create the *"Ceph - quality control exposure"*.



11. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.



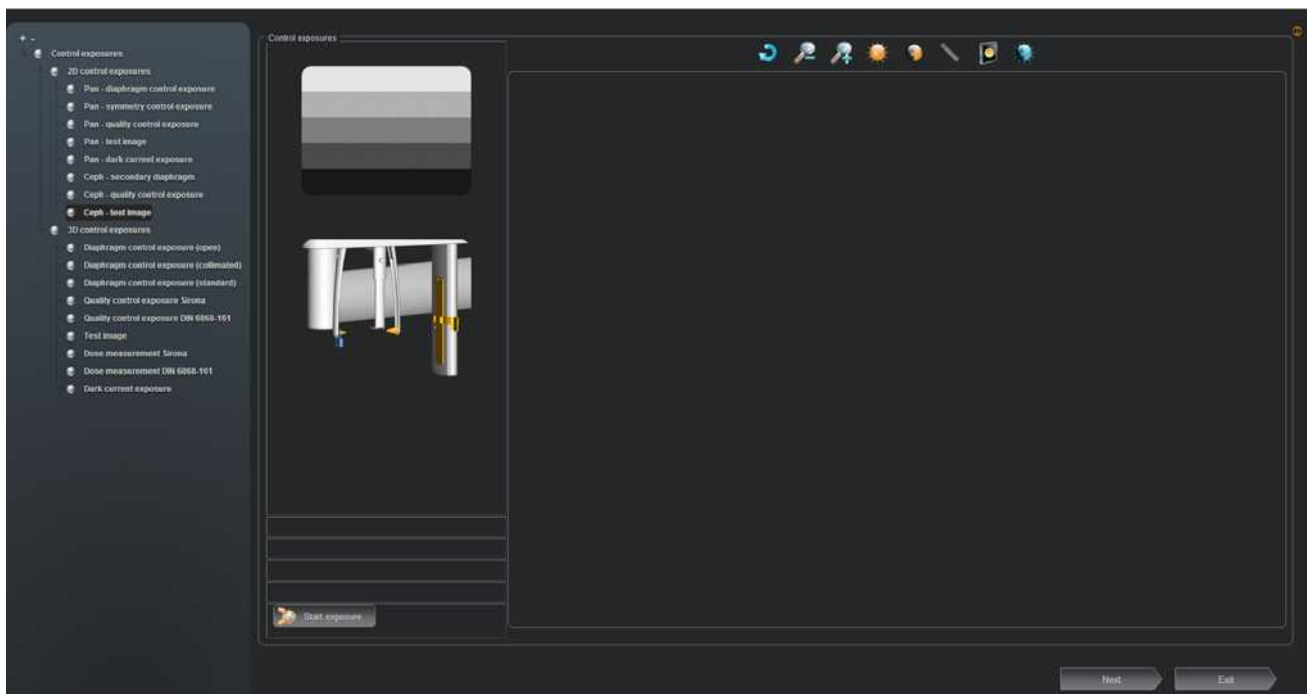
12. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if it has been configured).
  - ↳ The exposure is displayed in the exposure window.  
For notes on evaluating the exposure, refer to the technical documentation for acceptance/constancy testing.



### 10.11.2.8 Ceph - test image (2D)

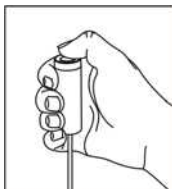
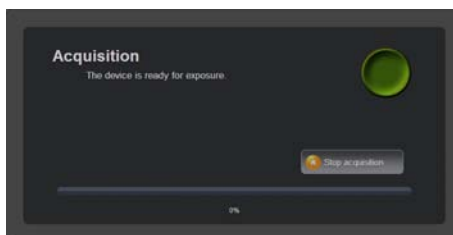
You can use the "*Ceph - test image*" menu to check the 2D data path of the unit and the operability of the Ceph sensor.

1. Call up the menu "*Control exposures*" [ → 428].
  2. Select the "*Ceph - test image*" element in the structure tree under "*2D control exposures*".
- The menu for creating the test image appears in the action area.



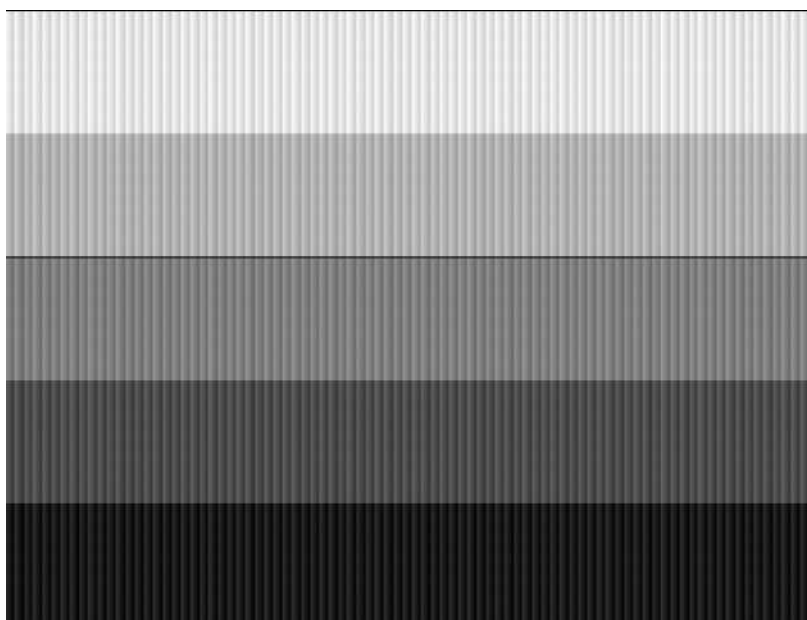
3. Click on the "*Start acquisition*" button.

- Exposure readiness is 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.



4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).
- The exposure is displayed in the exposure window.  
See below for reference image.





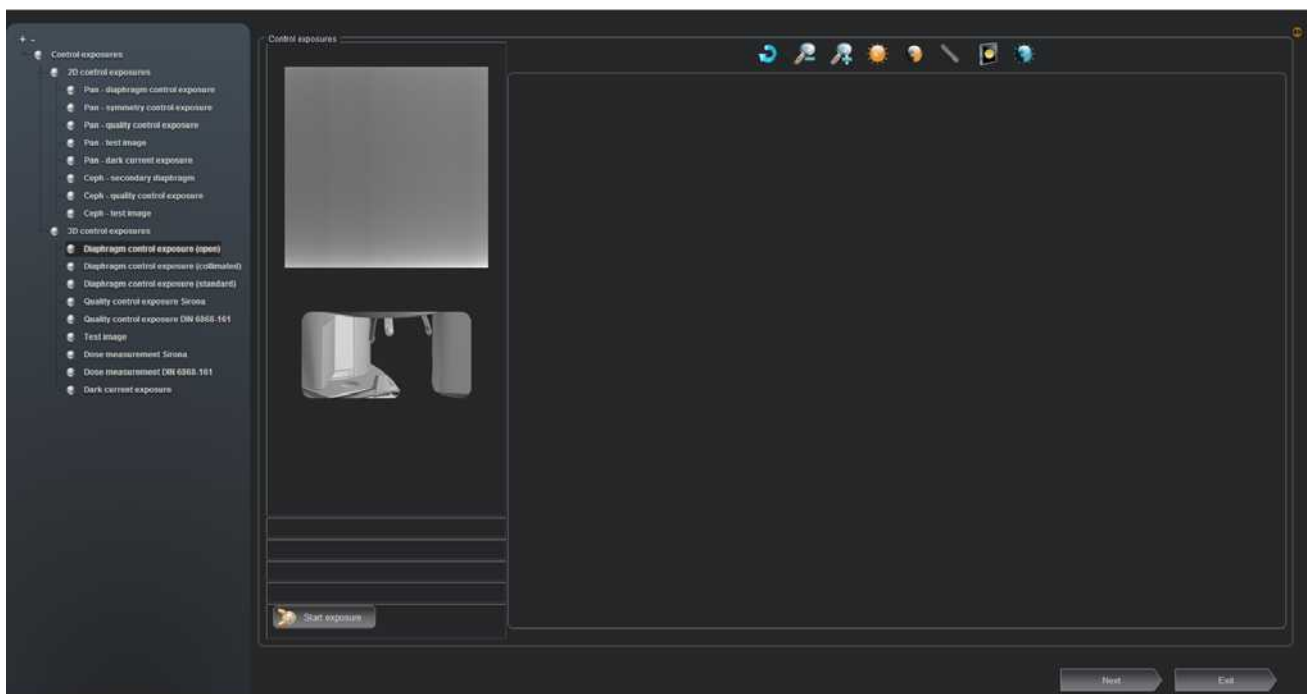


### 10.11.3 3D test exposures

#### 10.11.3.1 Diaphragm test exposure (open) (3D)

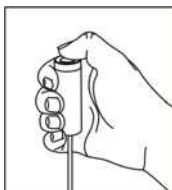
You can use the *"Diaphragm control exposure (open)"* to check the adjustment of the 3D diaphragm for overexposure when the diaphragm is open.

1. Call up the menu *"Control exposures"* [ → 428].
2. Select the *"Diaphragm control exposure (open)"* element in the structure tree under *"3D control exposures"*.  
 ↳ In the action area, the menu appears to create the *"Diaphragm control exposure (open)"*.



3. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.



4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).  
 ↳ The exposure is displayed in the exposure window.  
 See below for reference image.  
 No foreign bodies may appear on the image.



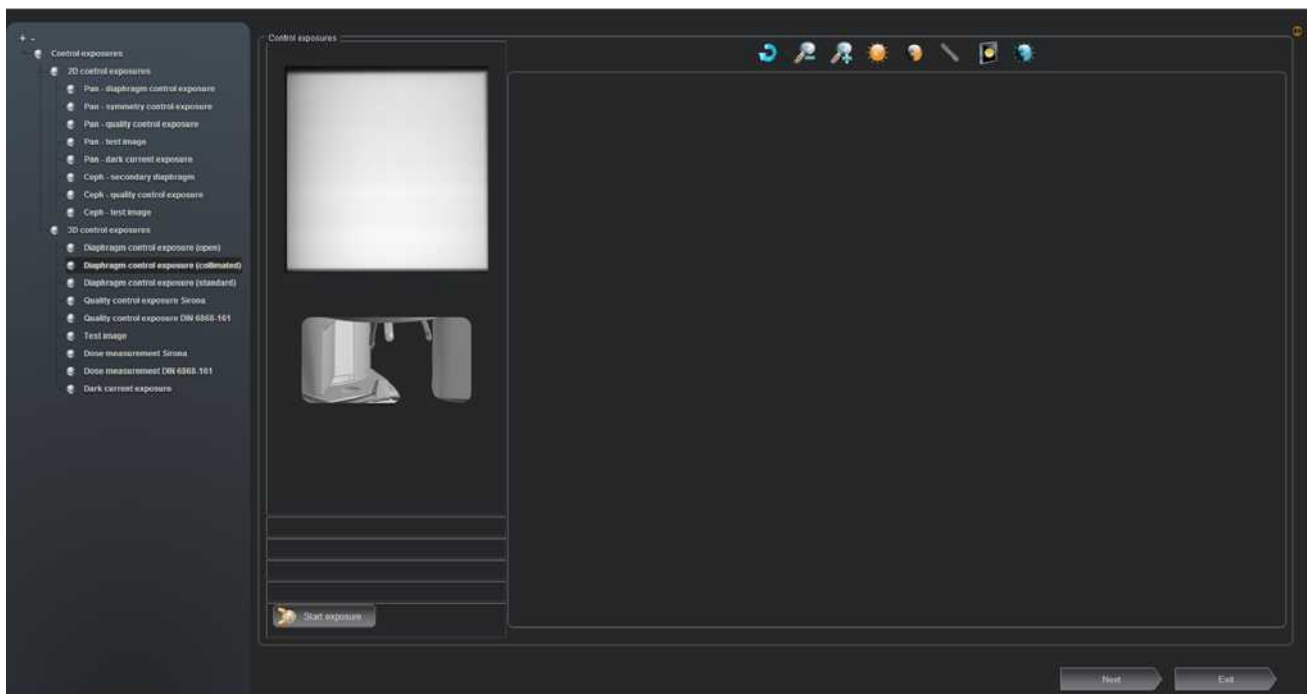




### 10.11.3.2 Diaphragm test exposure (collimated) (3D)

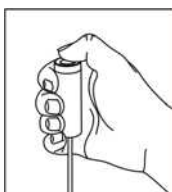
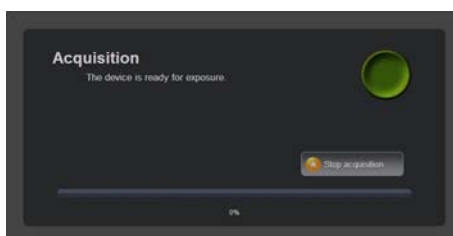
You can use the *"Diaphragm control exposure (collimated)"* to adjust the **Pan diaphragm with reduced diaphragm opening (to check dose waste on all sides)**.

1. Call up the menu *"Control exposures"* [ → 428].
2. Select the *"Diaphragm control exposure (collimated)"* element in the structure tree under *"3D control exposures"*.  
 ↳ In the action area, the menu appears to create the *"Diaphragm control exposure (collimated)"*.



3. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.



4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).  
 ↳ The exposure is displayed in the exposure window.  
 See below for reference image.



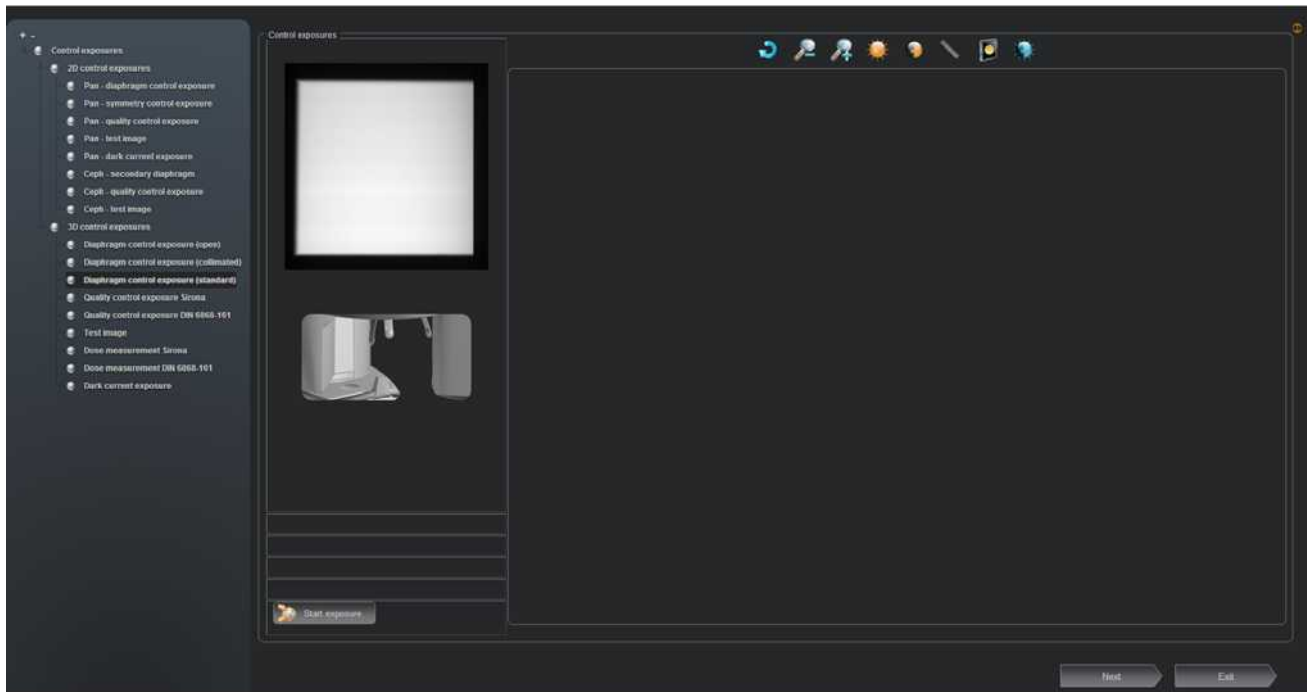




### 10.11.3.3 Diaphragm test exposure (standard) (3D)

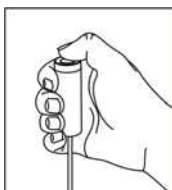
You can use the *"Diaphragm control exposure (standard)"* to check the adjustment of the **original 3D diaphragm to check the circulating edge**.

1. Call up the menu *"Control exposures"* [ → 428].
2. Select the *"Diaphragm control exposure (standard)"* element in the structure tree under *"3D control exposures"*.  
 ↳ In the action area, the menu appears to create the *"Diaphragm control exposure (standard)"*.



3. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.



4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).  
 ↳ The exposure is displayed in the exposure window.  
 See below for reference image.



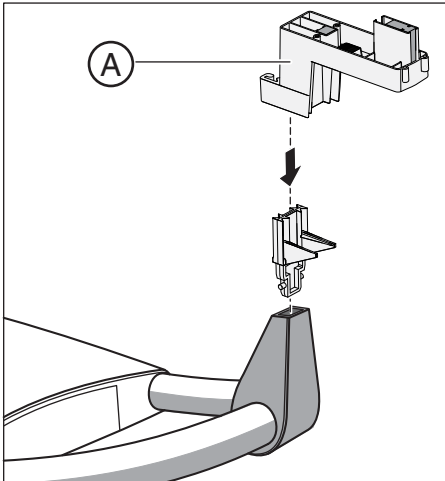


The diaphragm is correctly adjusted if a black surrounding edge can be detected.

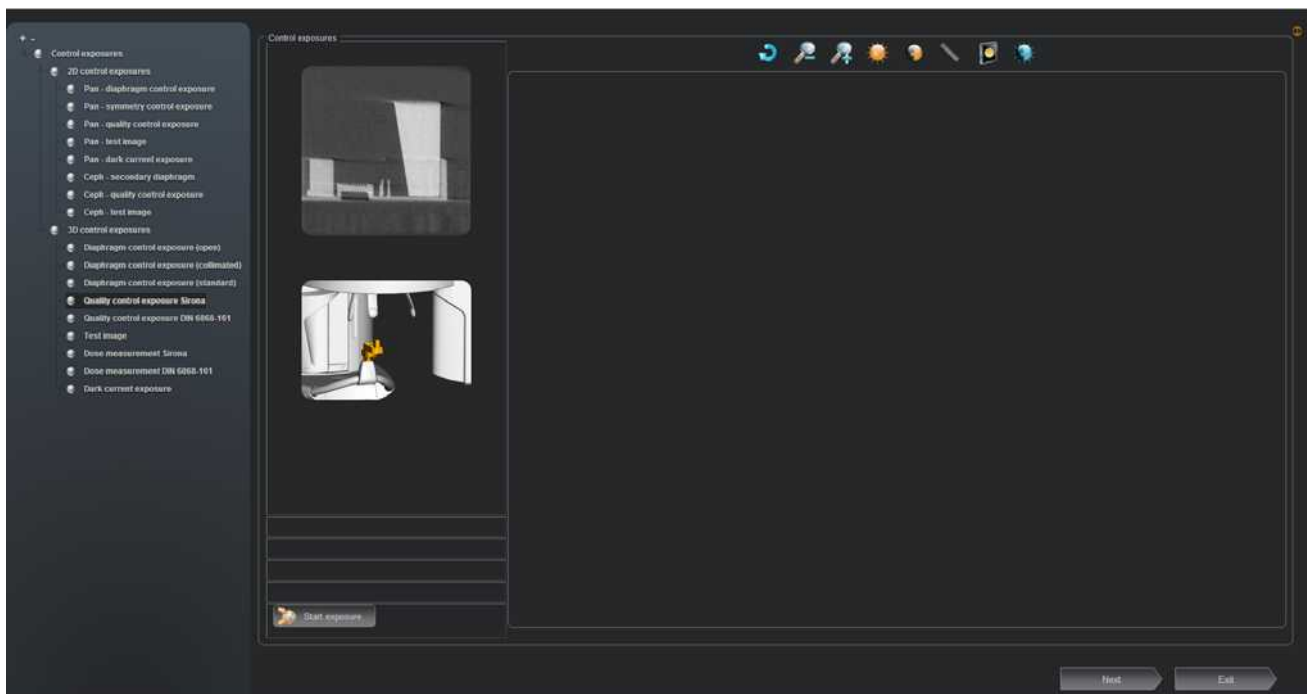


#### 10.11.3.4 Quality test exposure (3D)

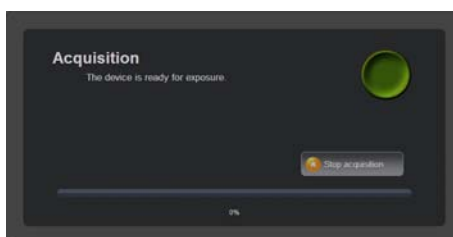
You can use the *"Quality control exposure Sirona"* to create a **volume exposure with a full rotation**. This function enables you to simulate a quality test, for example, in a similar way to an acceptance/constancy test.



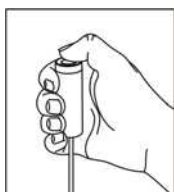
1. Insert the constancy test phantom (A) into the bite block of the unit.
2. Call menu *"Control exposures"* [ → 428].
3. In the structure tree, under *"3D control exposures"*, select the *"Quality control exposure Sirona"* element.
  - ↳ In the action area, the menu appears for creating the *"Quality control exposure Sirona"*.



4. Click on the *"Start acquisition"* button.
  - ↳ Exposure readiness is 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.





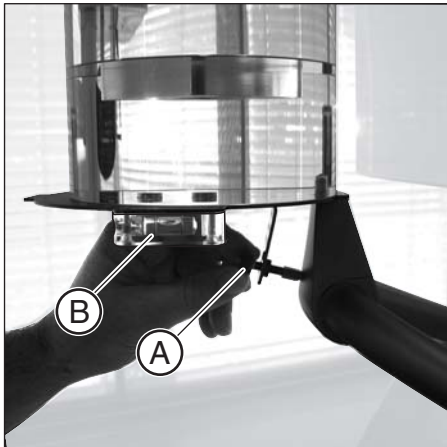


5. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if it has been configured).
  - ↳ The exposure is displayed in the exposure window.  
For notes on the evaluation of the exposure, refer to technical documentation for acceptance/constancy testing.
6. Remove the test phantom again.

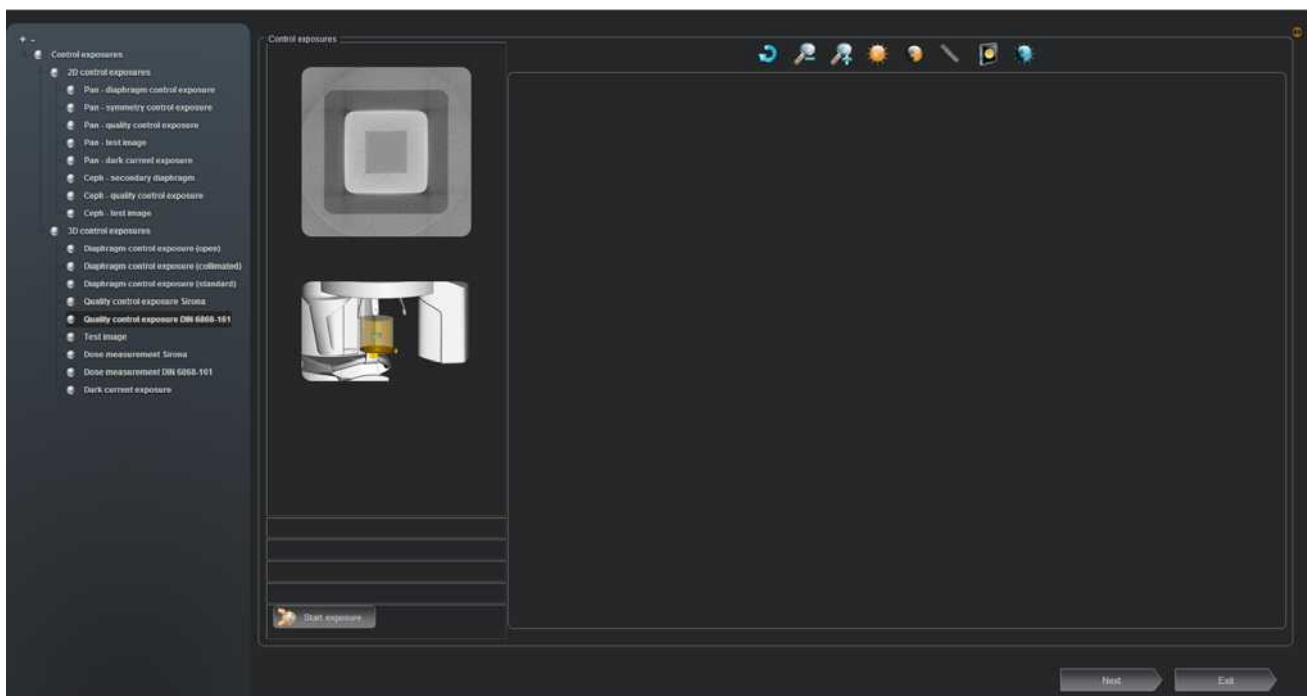


### 10.11.3.5 Quality test exposure DIN 6868-161 (3D)

You can use the *"Quality control exposure DIN 6868-161"* to create a **volume exposure with a full rotation according to DIN 6868-161**. This function enables you to simulate a quality test, for example, in a similar way to an acceptance/constancy test.



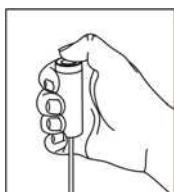
1. Insert the 3D test phantom into the bite block holder of the unit.  
**NOTICE! The 3D test phantoms from ORTHOPHOS and GALILEOS have a similar appearance. Ensure that you use the 3D test phantom with the "ORTHOPHOS" product designation.**
2. Align the 3D test phantom with the aid of the in-built spirit level (B) by twisting the setting screw (A) horizontally.
3. Press the R key.  
↳ The unit moves to its starting position.
4. Call menu *"Control exposures"* [ → 428].
5. In the structure tree, under *"3D control exposures"*, select the *"Quality control exposure DIN 6868-161"* element.  
↳ In the action area, the menu appears for creating the *"Quality control exposure DIN 6868-161"*.



6. Click on the *"Start acquisition"* button.  
↳ Exposure readiness is 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.





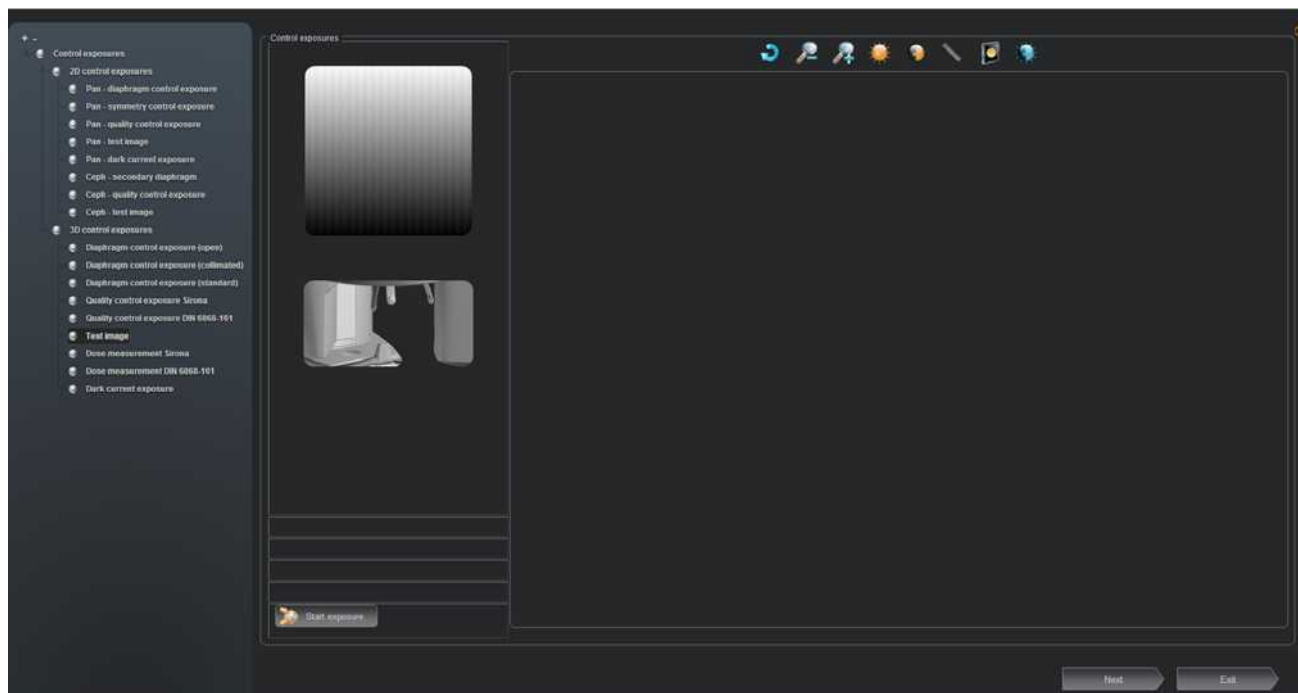


7. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if it has been configured).
  - ↳ The exposure is displayed in the exposure window.
  - For notes on the evaluation of the exposure, refer to technical documentation for acceptance/constancy testing.
8. Remove the 3D test phantom again.

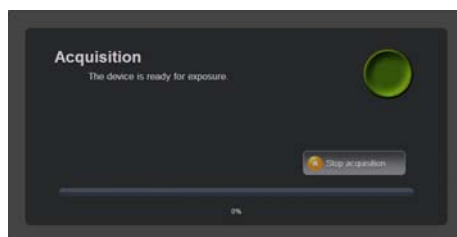
### 10.11.3.6 Test image (3D)

You can use the *"Test image"* menu to check the 3D data path of the unit and the operability of the flat panel detector.

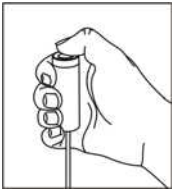
1. Call up the menu *"Control exposures"* [ → 428].
2. Select the *"Test image"* element in the structure tree under *"3D control exposures"*.
  - ↳ In the action area, the menu appears to create the *"Test image"*.



3. Click on the *"Start acquisition"* button.
  - ↳ Exposure readiness is 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.

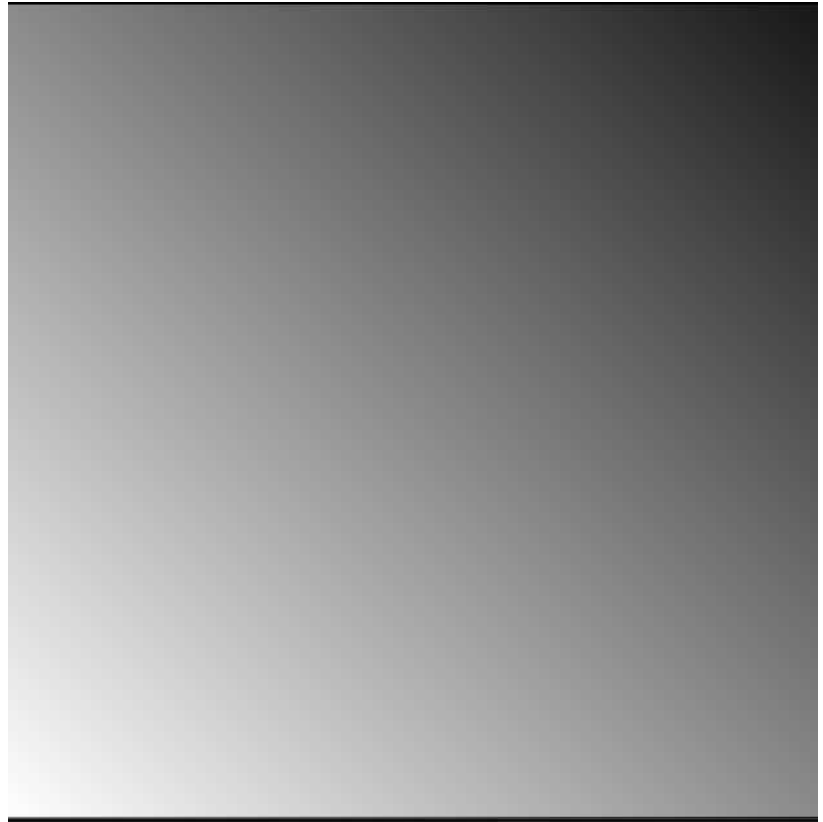






4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).

↗ The exposure is displayed in the exposure window.  
See below for reference image.



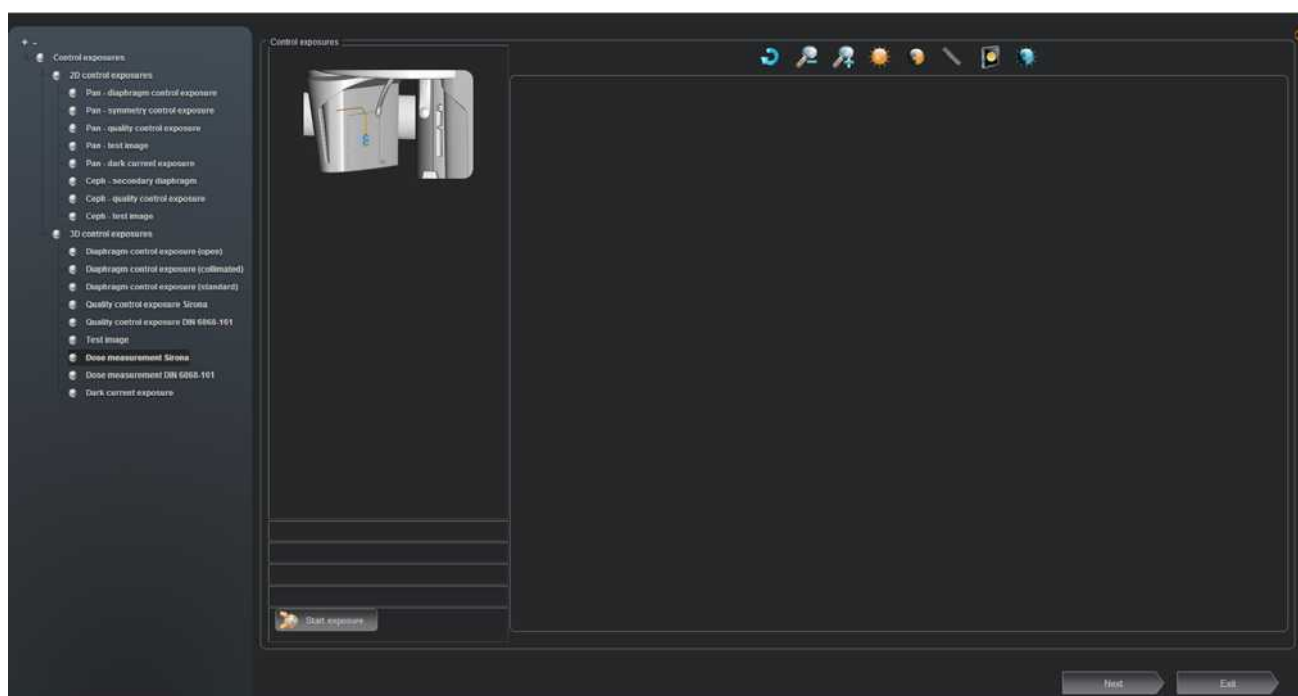


### 10.11.3.7 Dosimetry (3D)

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

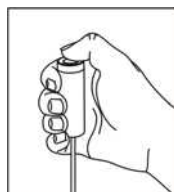
You can use the *"Dose measurement Sirona"* menu to perform dosimetry independently of the unit adjustment and calibration.

1. Attach the Mult-O-Meter sensor in the middle of the sensor unit.
2. Select a program from the 3D program group on the control panel.  
↳ The unit moves to the 3D exposure position.
3. Call up the *"Control exposures"* menu [ → 428].
4. Select the *"Dose measurement Sirona"* element in the structure tree under *"3D control exposures"*.  
↳ In the action area, the menu appears to create the *"Dose measurement Sirona"*.



5. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.



6. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).
7. Read off the dose from the Mult-O-Meter. The dose value must be between 1.2 and 2.3 mGy.
8. Remove the Mult-O-Meter from the sensor unit again.

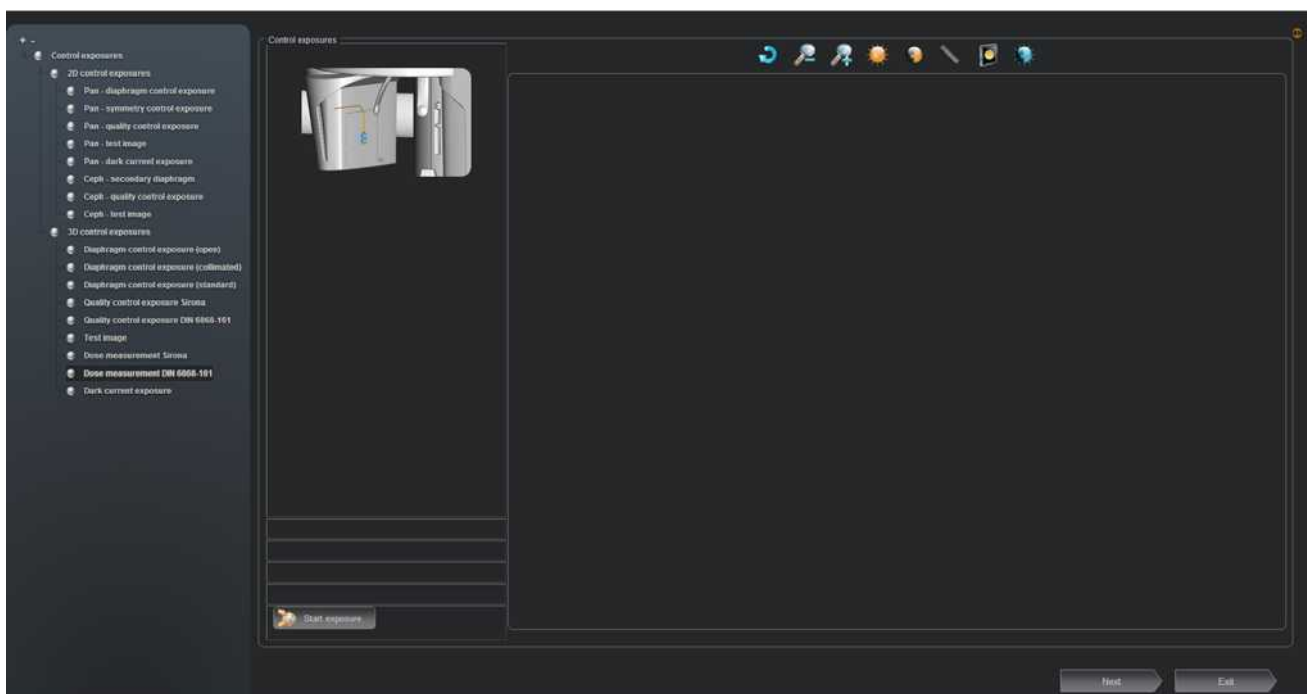


### 10.11.3.8 Dosimetry DIN 6868-161 (3D)

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

You can use the *"Dose measurement DIN 6868-161"* menu to perform **dosimetry according to DIN 6868-161** independently of the unit adjustment or calibration.

1. Attach the Mult-O-Meter sensor in the middle of the sensor unit.
2. Select a program from the 3D program group on the control panel.  
↳ The unit moves to the 3D exposure position.
3. Call up the *"Control exposures"* menu [ → 428].
4. Select the *"Dose measurement DIN 6868-161"* element in the structure tree under *"3D control exposures"*.  
↳ In the action area, the menu appears to create the *"Dose measurement DIN 6868-161"*.

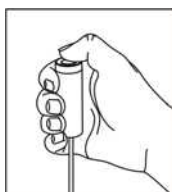


5. Click on the *"Start acquisition"* button.

- ↳ Exposure readiness is 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.





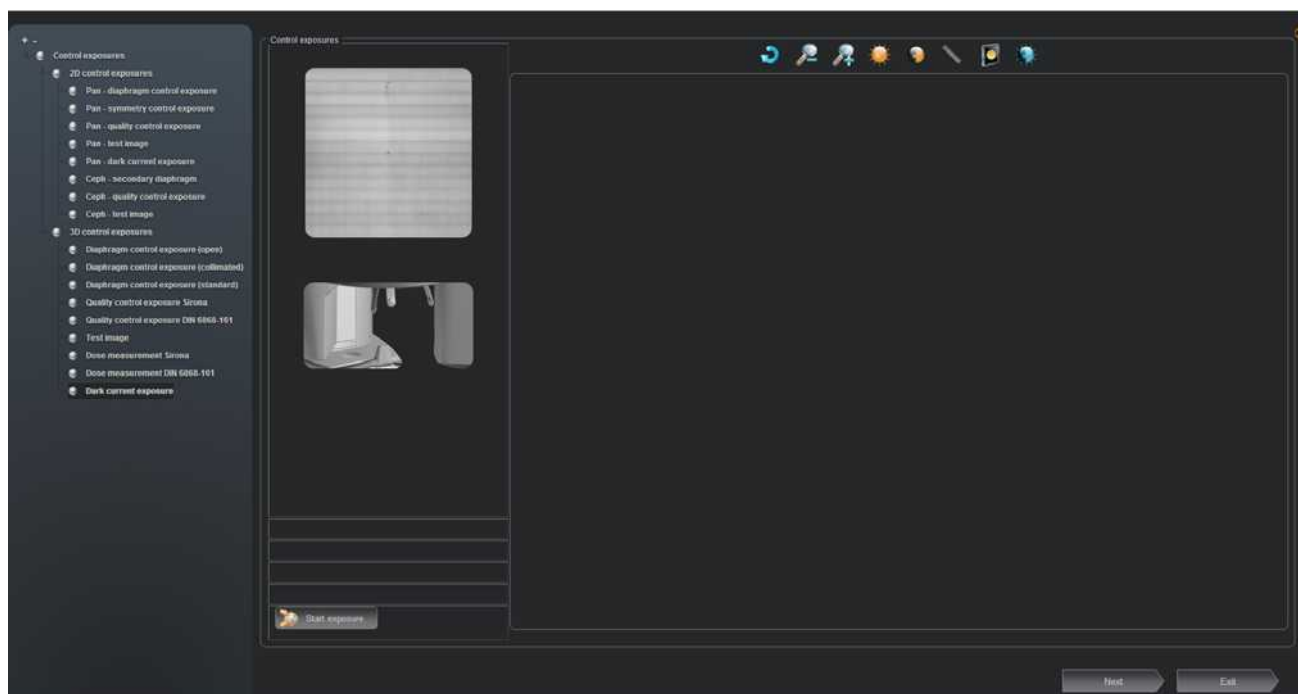


6. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if configured).
7. Read the dose shown on the Mult-O-Meter.
8. Remove the Mult-O-Meter from the sensor unit again.

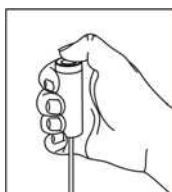
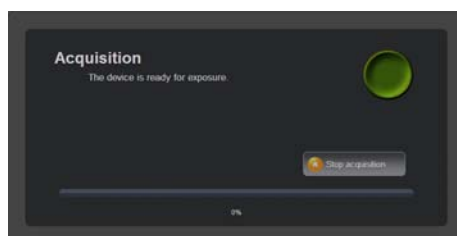
### 10.11.3.9 Dark current exposure (3D)

You can use the *"Dark current exposure"* to check the flat panel detector.

1. Call menu *"Control exposures"* [ → 428].
2. In the structure tree, under *"2D control exposures"*, select the *"Dark current exposure"* element.
  - ↳ In the action area, the menu appears for creating the *"Dark current exposure"*.

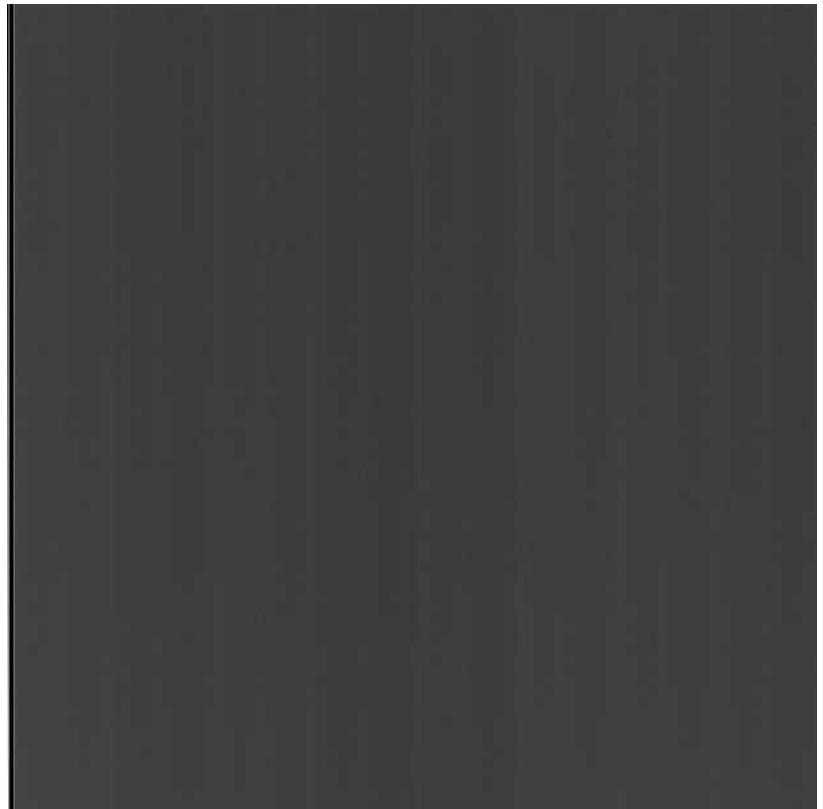


3. Click on the *"Start acquisition"* button.
  - ↳ Exposure readiness is established. A dialog window displays the status of readiness to exposure.
  - ↳ The service routine used for the corresponding exposure is displayed on the control panel, along with the specific exposure parameters.



4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if it has been configured).
  - ↳ The exposure is displayed in the exposure window.







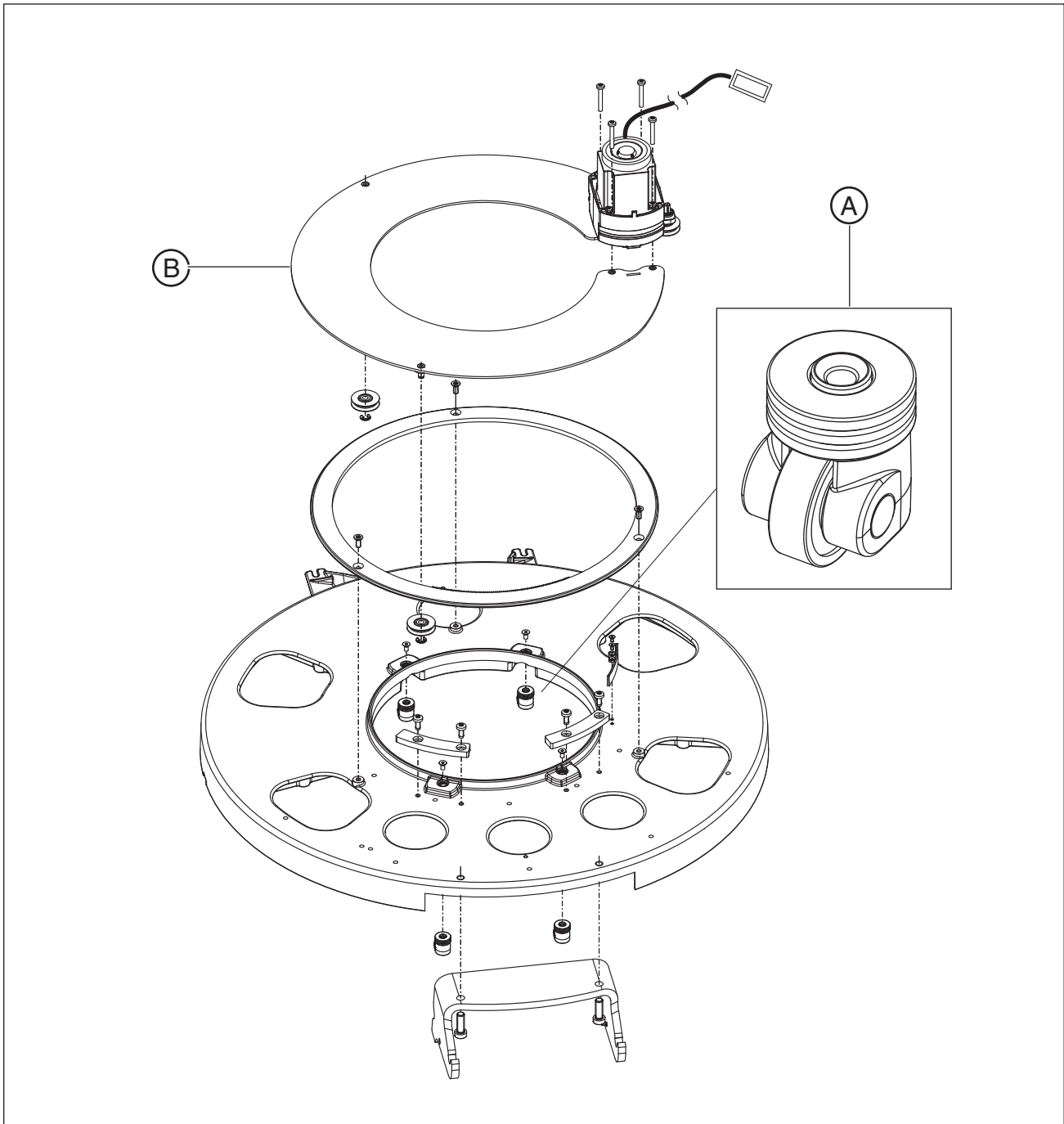
## 10.12 Checking the cables for damage

**Check whether the cables feeding the unit are OK**

- Perform a visual inspection of the power cable, protective ground wire, control cables and data cables.  
If cables exhibit external damage:
  - ↪ Replace the respective cable [ → 400].



## 10.13 Checking the idling rollers



**Check whether the idling rollers (A) are OK**

➤ Manually turn the ring (B) and check it for smooth and easy movement.

If the ring does not move smoothly and easily:

✚ Remove the housing covers and check the idle rollers (A) for dirt and foreign particles. Clean and remove foreign particles if necessary.



## 10.14 Checking the grounding straps

### Grounding strap in the stand



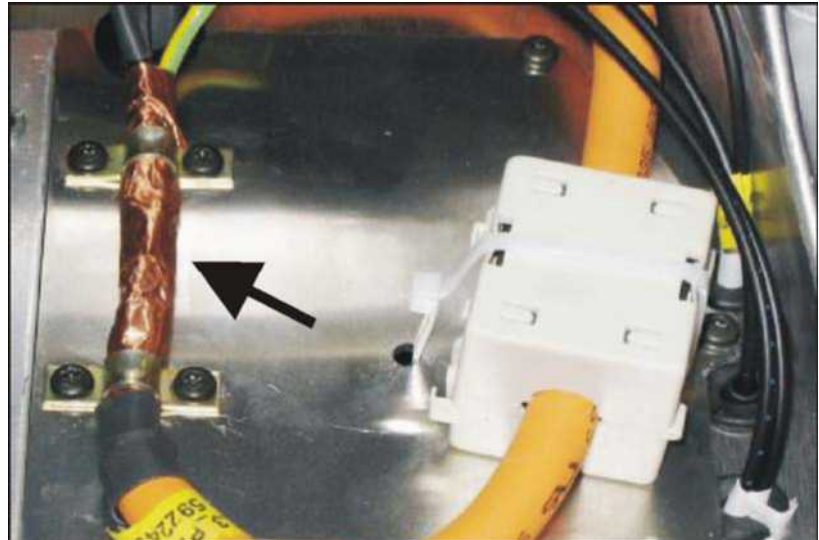
**Check whether the grounding straps have complete and firm contact**

1. Perform a visual and "hands-on" inspection of the grounding straps to ensure that they have complete and firm contact at the positions marked.  
If the grounding straps do not have correct contact:  
✚ Fasten the grounding straps correctly.
2. Perform a visual inspection of the grounding straps for damage.  
If the grounding straps are damaged:  
✚ Replace the grounding straps.



## 10.15 Checking the cable shields

### Shield on the tube assembly



### Shield on the housing

Check whether the cable shielding is OK



- Perform a visual and “hands-on” inspection of the cable shields to ensure that they have complete and firm contact at the positions marked.  
If the cable shields do not have correct contact:
  - ↪ Fasten the cable shields correctly.



## 10.16 Checking the protective ground wires

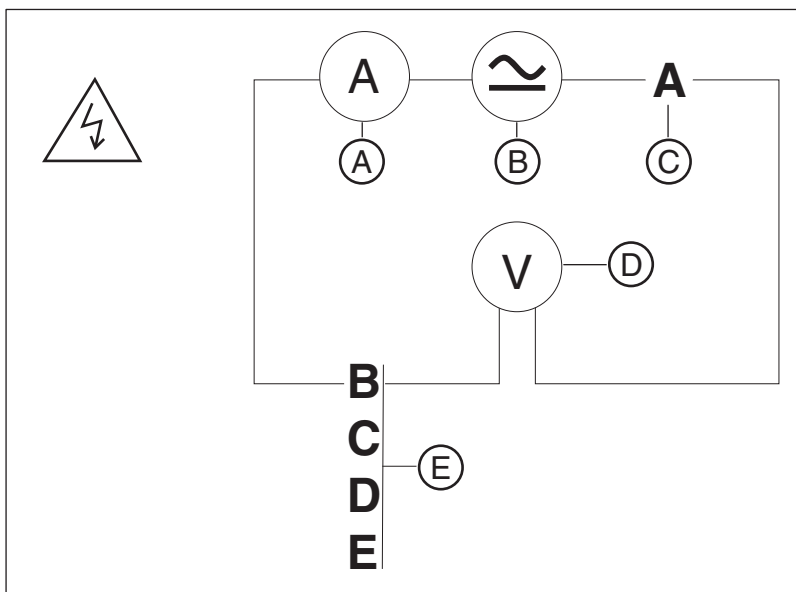
### **DANGER**

#### **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 [ → 37].

#### **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 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.

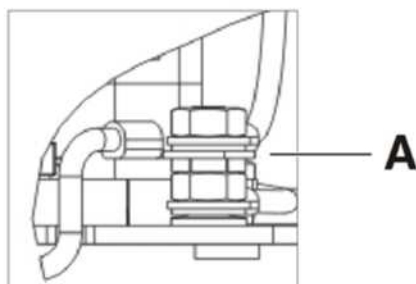
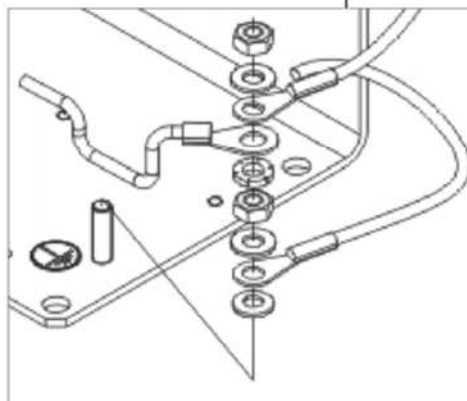
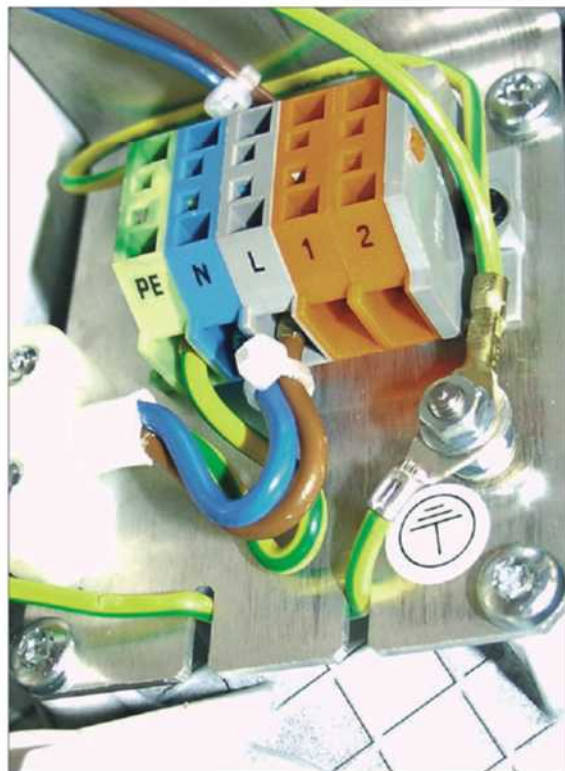
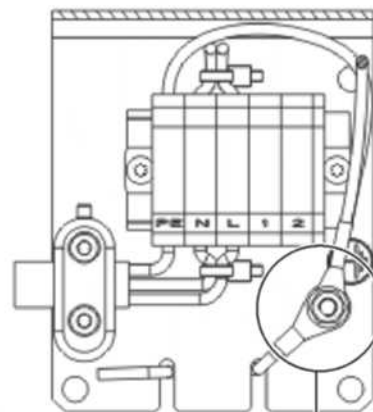
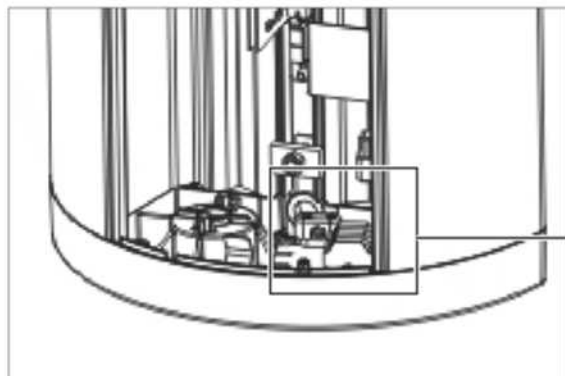
Check whether plain washer, tooth lock washer and cable lug are installed on the protective ground wire in the correct order and whether the nuts of the protective ground wire connections are firmly tightened.

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 device leakage current first.

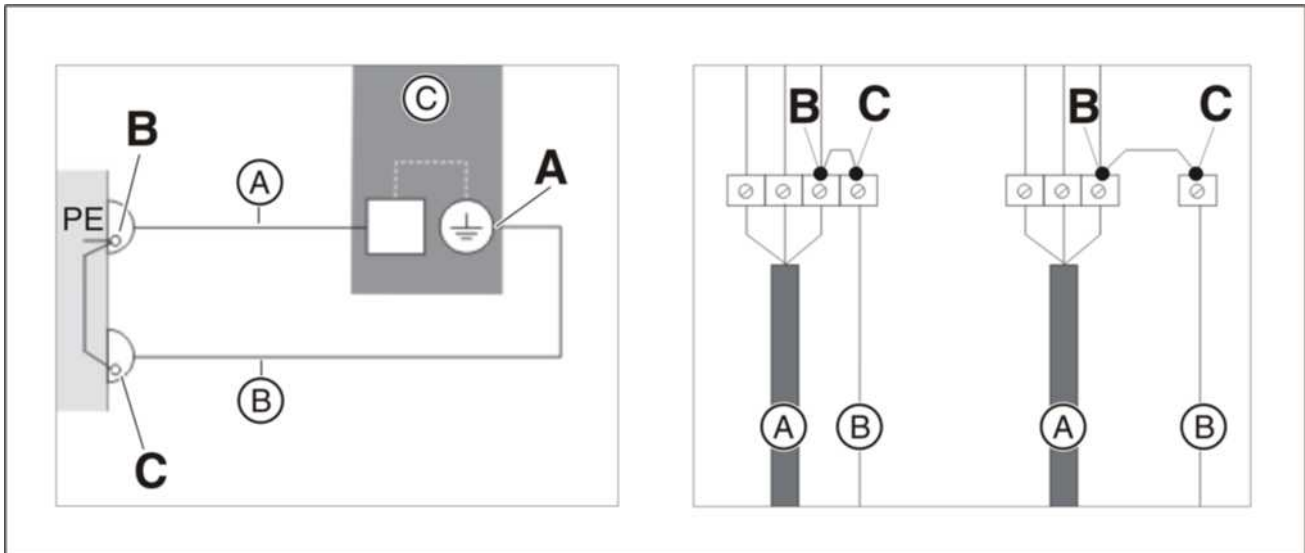


### Measuring point A: Central protective ground wire



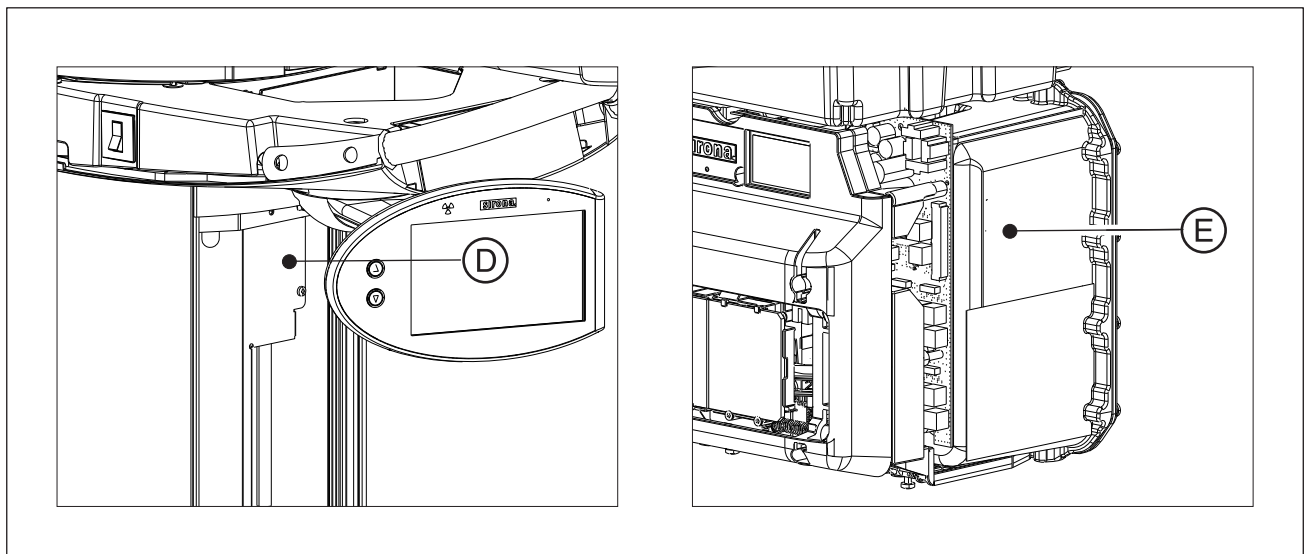


**Measuring points B and C: GNYE power connection and 2nd ground wire**



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

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



D	Board cage DX32
E	Tube assembly housing



## 10.17 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 in Table 3 of standard IEC 62353:2014, the maximum device leakage current permitted by the manufacturer is 5 mA for permanently connected units.

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  $\pm 20\%$  from the original value is permitted for the measured leakage current.
8. *If a deviation from the original value is  $>\pm 20\%$ :*  
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).



# 11 Dismantling and disposal

## 11.1 Dismantling and reinstallation

When dismantling and reinstalling the system, proceed according to the installation instructions for new installation in order to guarantee its proper functioning and stability.

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

## 11.2 Disposal



In accordance with Directive 2012/19/EU and national disposal regulations regarding old electrical and electronic devices, please be advised that such items must be disposed of in a special way within the European Union (EU). These regulations require environmental friendly usage/disposal of old electrical and electronic devices. Such items must not be disposed of as domestic refuse. This has been expressed using the icon of the “crossed out trash can” since March 24, 2006, amongst other methods.

### Disposal procedure

We feel responsible for our products from the first idea to their disposal. For this reason, we give you an option to return our old electronic and electrical devices.

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

#### In Germany

To initiate return of the electrical device, please send a disposal request to enretec GmbH. You have the following options here:

- Use the “Returning an electrical device” button under the “eom” menu item on the enretec GmbH homepage ([www.enretec.de](http://www.enretec.de)).
- Alternatively, you can also contact enretec GmbH directly.

enretec GmbH  
Kanalstraße 17  
16727 Velten

Tel.: +49 3304 3919-500  
E-Mail: [eom@enretec.de](mailto:eom@enretec.de)

In accordance with the national disposal regulations regarding old electrical and electronic devices (ElektroG), as the manufacturer, we assume the costs for disposing of the electrical and electronic devices in question. Disassembly, transport and packaging costs shall be borne by the owner / operator.

Prior to disassembly / disposal of the product, it must be fully prepared (cleaned / disinfected / sterilized).

If your unit is not permanently installed, it will be collected from the practice. If it is permanently installed, it will be picked up curbside at your address by appointment.



**Abroad:**

For country-specific information on disposal, contact your local dental dealers.

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

The unit contains counterbalancing weights made of lead.



## 12 Service Manual History

<b>Version 1:</b>	New creation
<b>Version 2:</b>	PC software and device firmware updated, chapter "Updating the unit firmware [ → 68]" added, chapter "Sensor unit [ → 378]" updated, general corrections
<b>Version 3:</b>	Chapter : "Replacing the silicone rings" ; Checking the device leakage current; General corrections











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

© Sirona Dental Systems GmbH 2016  
D3632.076.01.03.02 09.2016

Sprache: englisch  
Ä.-Nr.: 122 807

Printed in Germany

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