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ORTHOPHOS XG 3D / Ceph

Service Manual

English

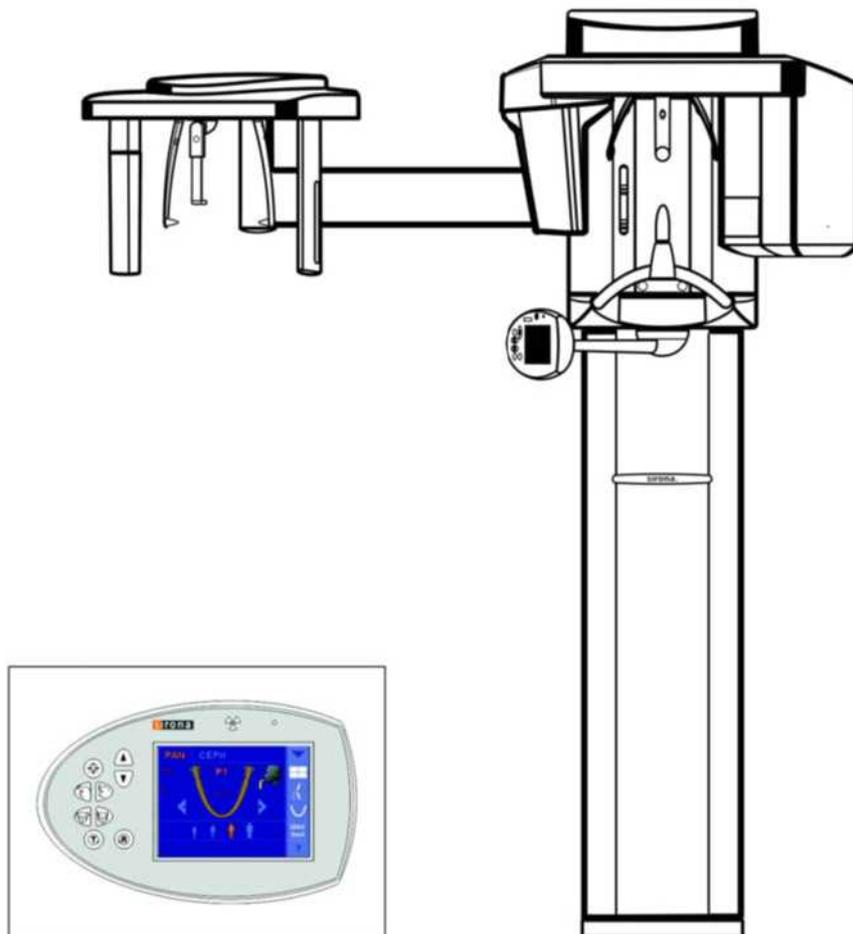


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1 About this Service Manual

1.1 Scope

This Service Manual describes the servicing of the ORTHOPHOS XG 3D/ Ceph digital volume tomograph. It is intended for use exclusively by trained and authorized distributors and service technicians.

1.2 Other documentation required

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

Spare parts list

- GALILEOS List of Spare Parts: Order No. 61 25 699

Wiring diagrams

- GALILEOS Wiring References: Order No. 61 25 640

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

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, 13 mm A/F
- Socket wrench, 13 mm A/F
- Side cutting pliers
- Spirit level
- Digital Multimeter, Accuracy Class 1
- Mult-O-Meter 512L
- 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:

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

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

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

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

IMPORTANT
Application instructions and other important information.

Tip: Information on making work easier.

1.4.2 Formats and symbols used

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

<ul style="list-style-type: none"> ✓ Prerequisite 1. First action step 2. Second action step or <li style="padding-left: 20px;">➤ Alternative action ↔ Result ➤ Individual action step 	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 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.

2.2 Fixed connection

DANGER

Potentially lethal shock hazard!

Fixed connection!

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

2.3 Electromagnetic compatibility

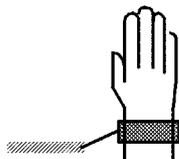
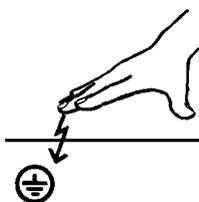
The unit complies with the requirements of standard IEC 60601-1-2.

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.

2.4 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.

2.5 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.

2.6 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"

2.7 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.



2.8 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.

2.9 Qualifications of service personnel

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

2.10 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.

2.11 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").

2.12 Functional check

CAUTION

Be sure to observe the descriptions and safety information given in the chapter titled "Switching the unit on [→ 60]" and "Test exposures/Test images [→ 469]".

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:

Accompanying documents



This symbol is affixed next to the unit rating plate.

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



This symbol is affixed on the unit rating plate.

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

Electrostatic discharge (ESD)



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

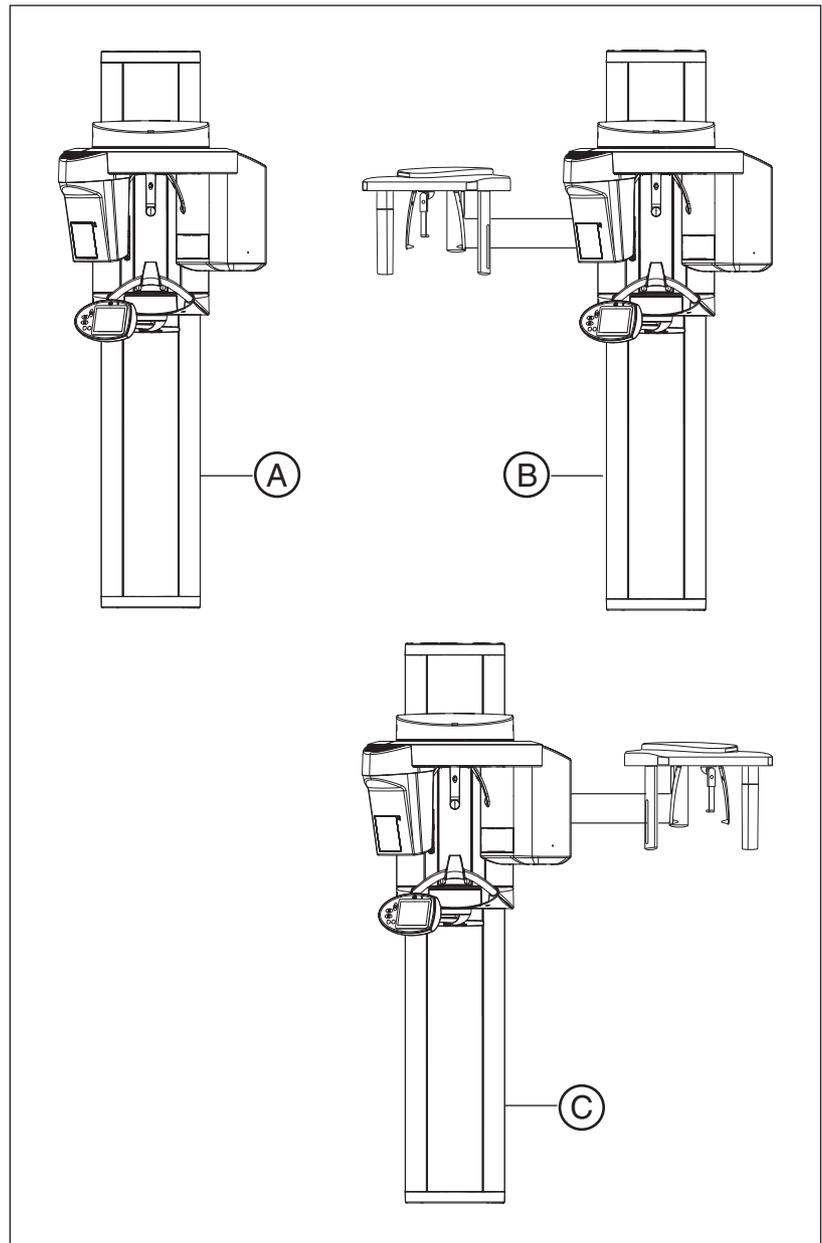
Identification of single use devices



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

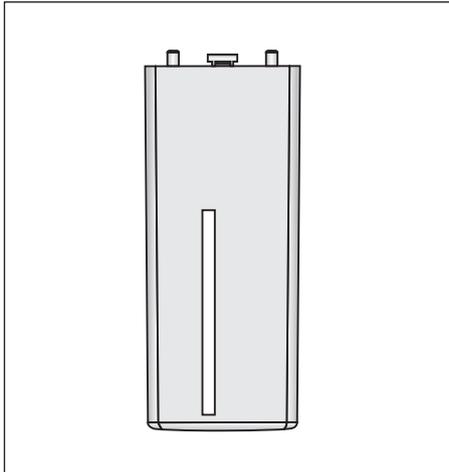
Single use devices are identified with the symbol shown on the left. They must be disposed of immediately after use. Do not use single use devices more than once.

3.1.2 System versions

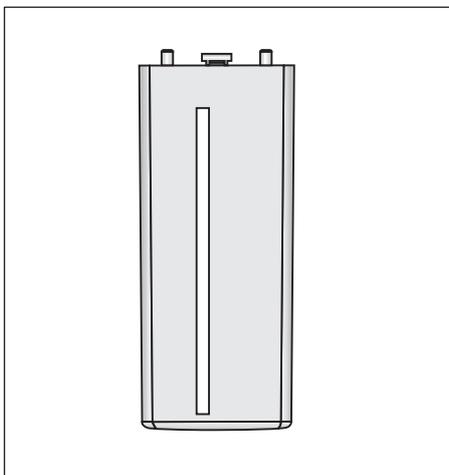


A	ORTHOPHOS XG 3D, digital volume tomograph
B	ORTHOPHOS XG 3D/Ceph, digital volume tomograph with cephalometer, left-arm version
C	ORTHOPHOS XG 3D/Ceph, digital volume tomograph with cephalometer, right-arm version

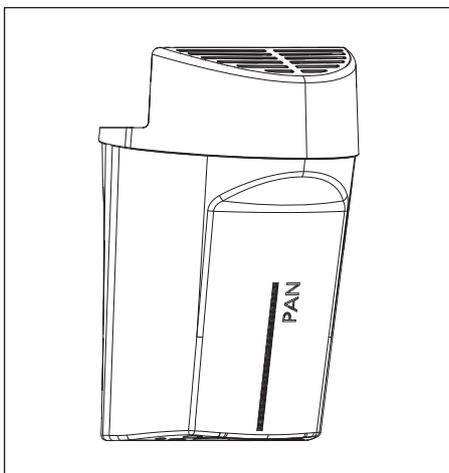
3.1.3 Sensor versions



Sensor XG PAN: Sensor for panoramic X-ray (PAN)

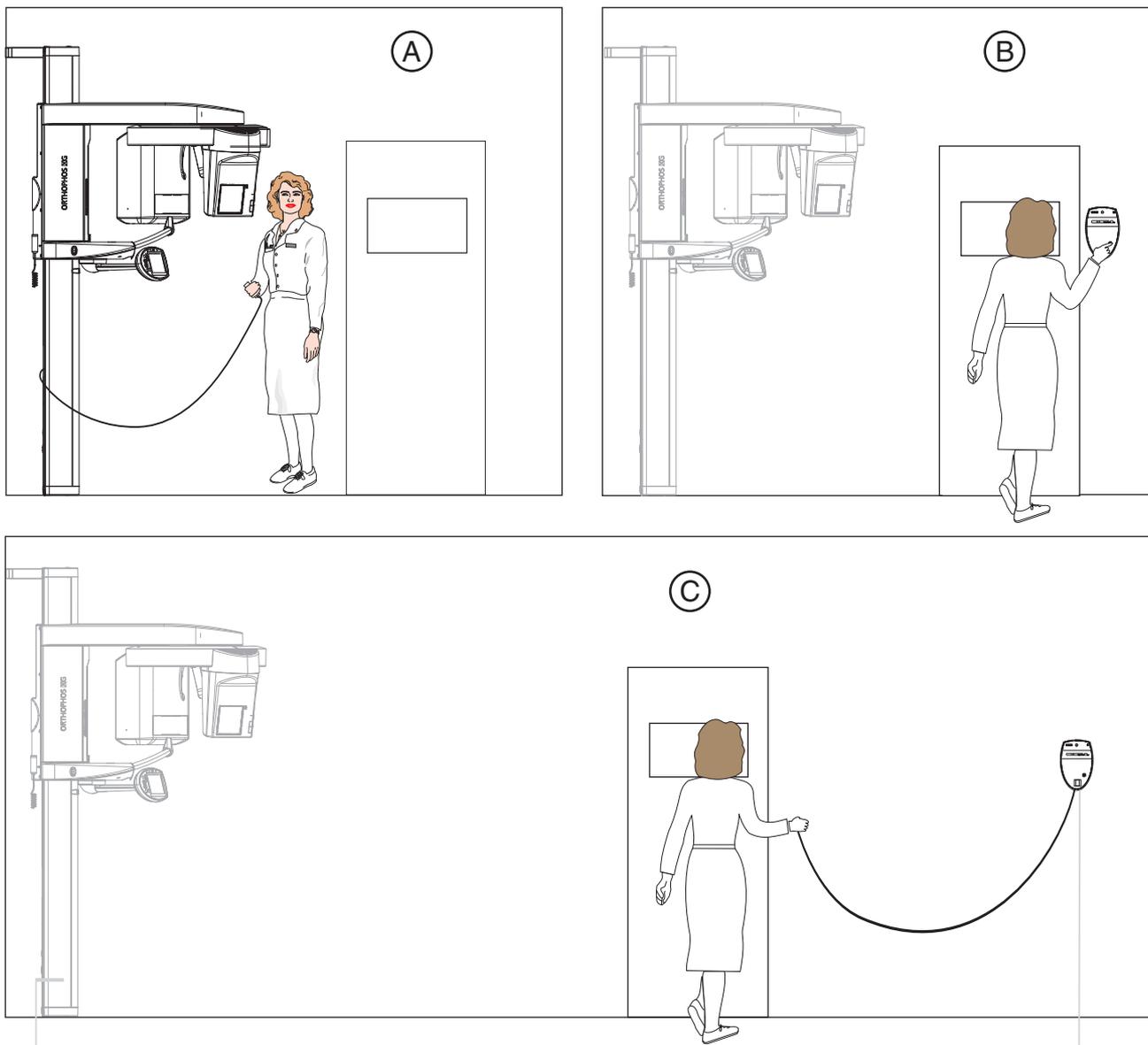


Sensor XG CEPH: Sensor for panoramic and cephalometric (CEPH) X-ray



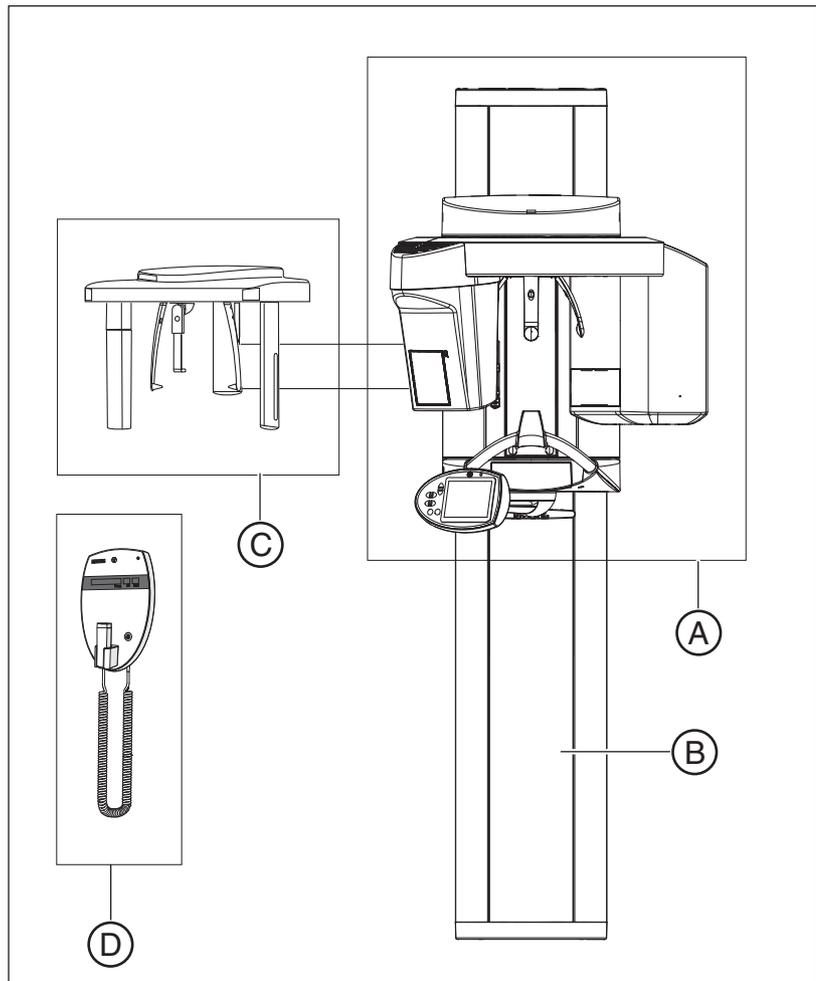
PAN/3D combisensor:
Sensor for panoramic X-ray (PAN) and volume exposures (3D)

3.1.4 Installation versions



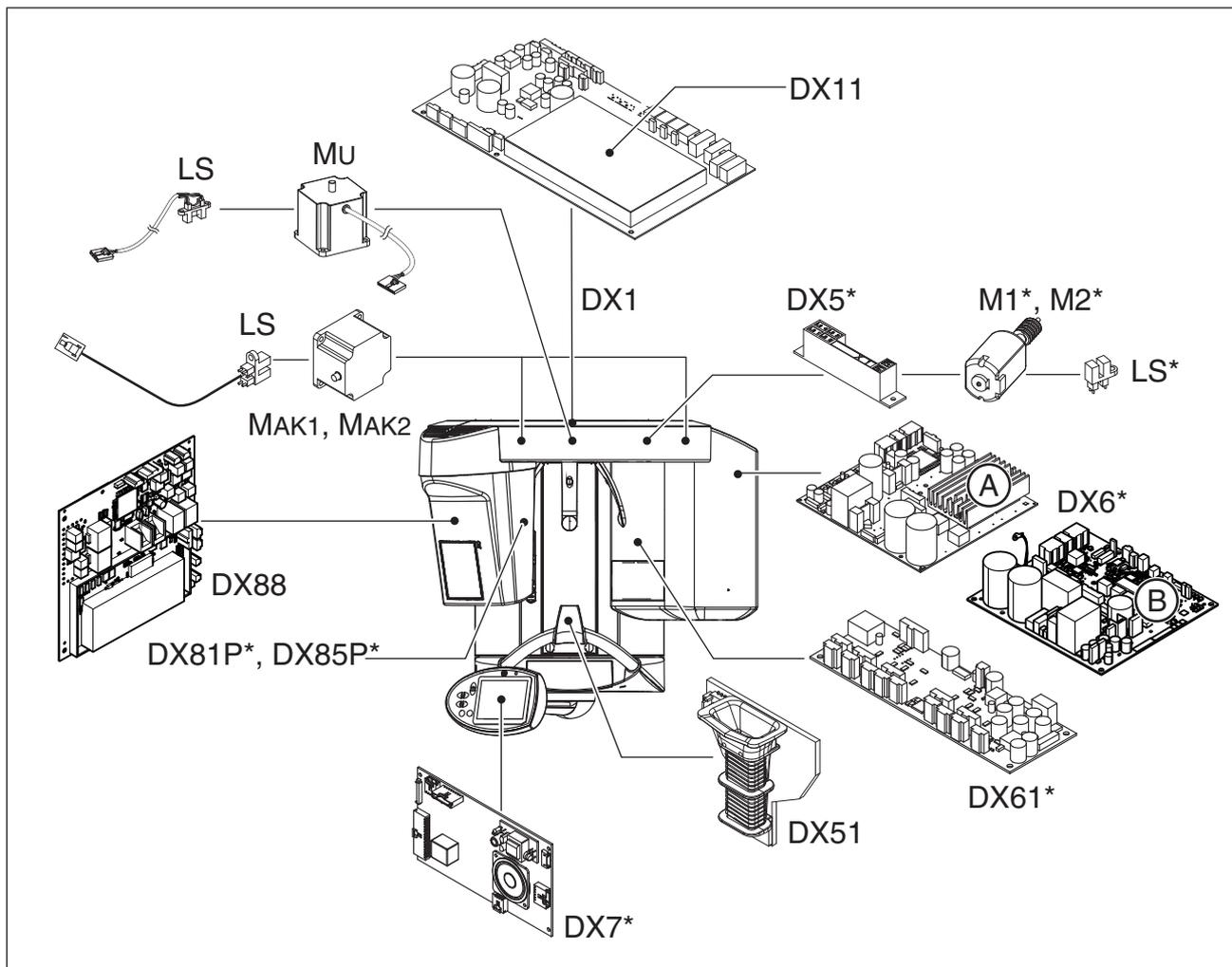
A	<p>Standard installation</p> <p>Unit <i>without</i> remote control with release button on the coiled cable in the treatment room.</p>
B	<p>Installation version 1</p> <p>Unit <i>with</i> remote control outside the X-ray room <i>without</i> release button on the coiled cable. (see section Installation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

3.1.5 Modules and components



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

3.1.5.1 Slide

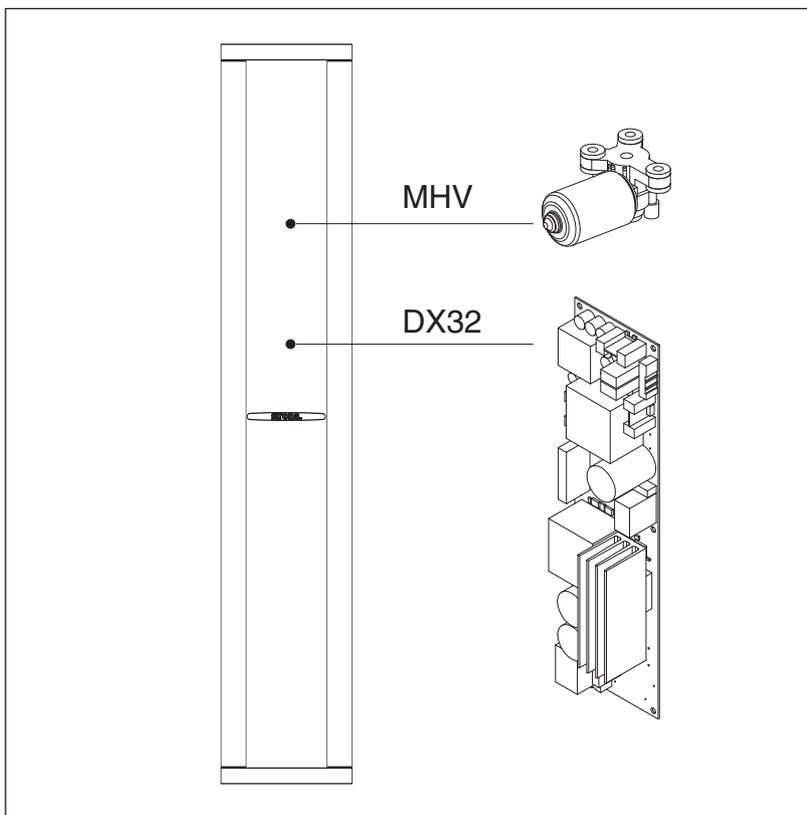


Component	Designation	Function
Boards	DX1	Open loop/closed loop control in general
	DX11	Controller board
	DX5*	Headrest adapter
	DX51*	Occlusal bite block
	DX6*	(A) Open-loop/closed-loop control (tube assembly 1.0)
	DX6*	(B) Open-loop/closed-loop control (tube assembly 2.0)
	DX7*	Easypad touchscreen
	DX61*	Diaphragm control
	DX81P	Digital sensor
	DX85P*	Digital sensor power supply
	DX88	Image memory

Component	Designation	Function
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

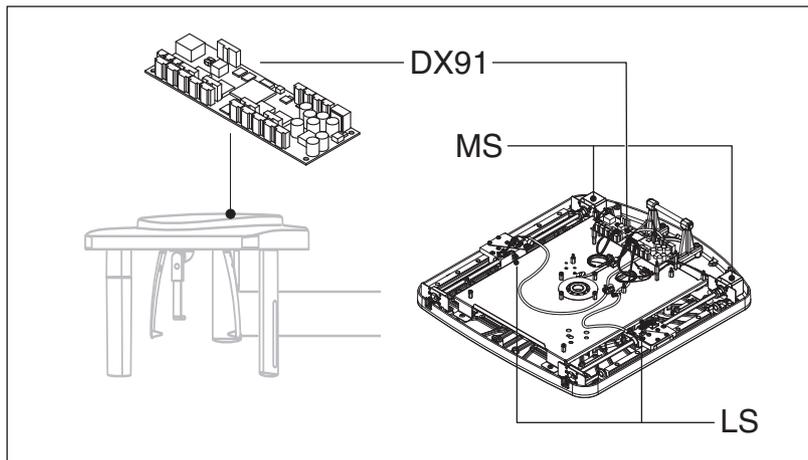
*) not available as individual repair part (see spare parts list).

3.1.5.2 Stand



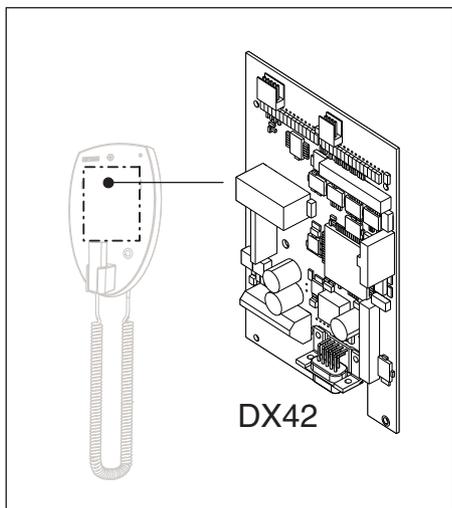
Component	Designation	Function
Boards	DX32	Power supply board
Motor	MHV	Linear movement of height adjustment

3.1.5.3 Cephalometer



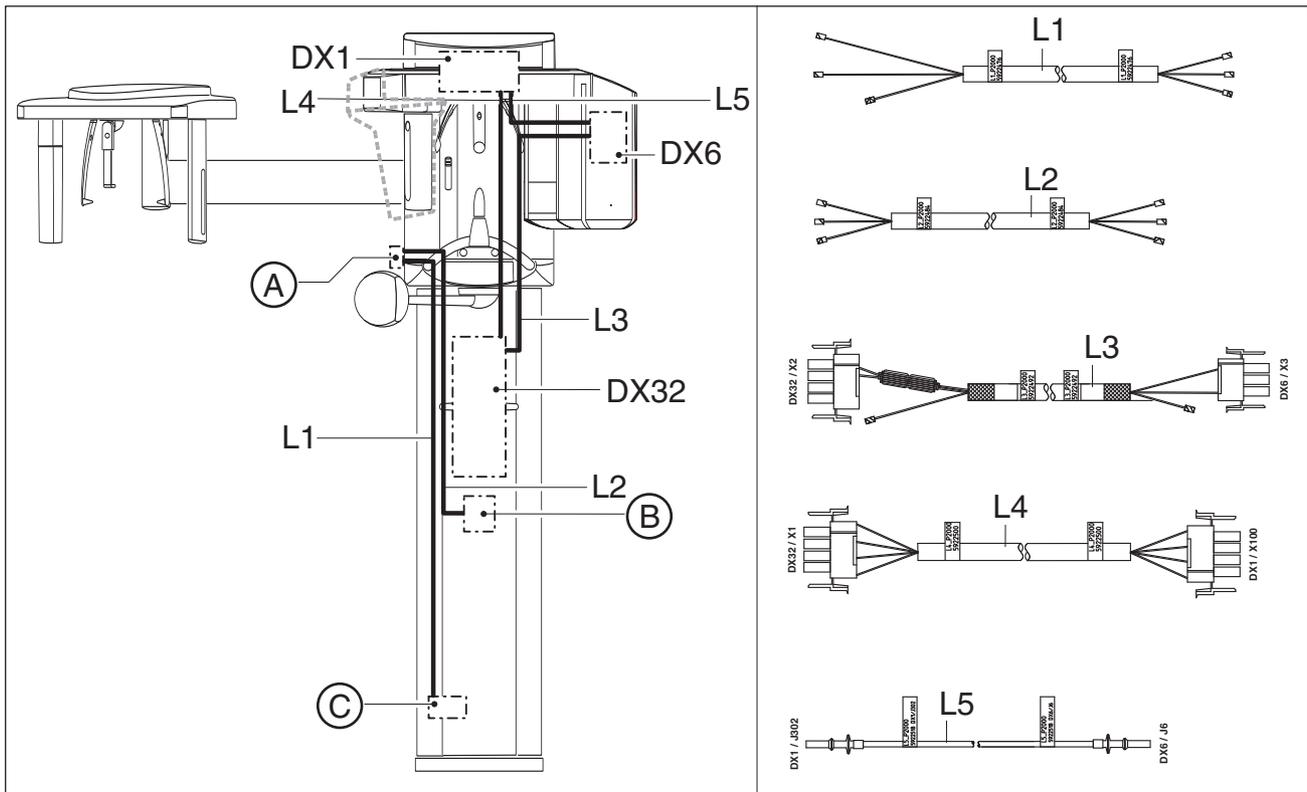
Component	Designation	Function
Boards	DX91	Cephalometer control
Motors	MS	Stepping motors: linear movement of secondary diaphragm and sensor
Light barriers	LS	Position check

3.1.5.4 Remote control

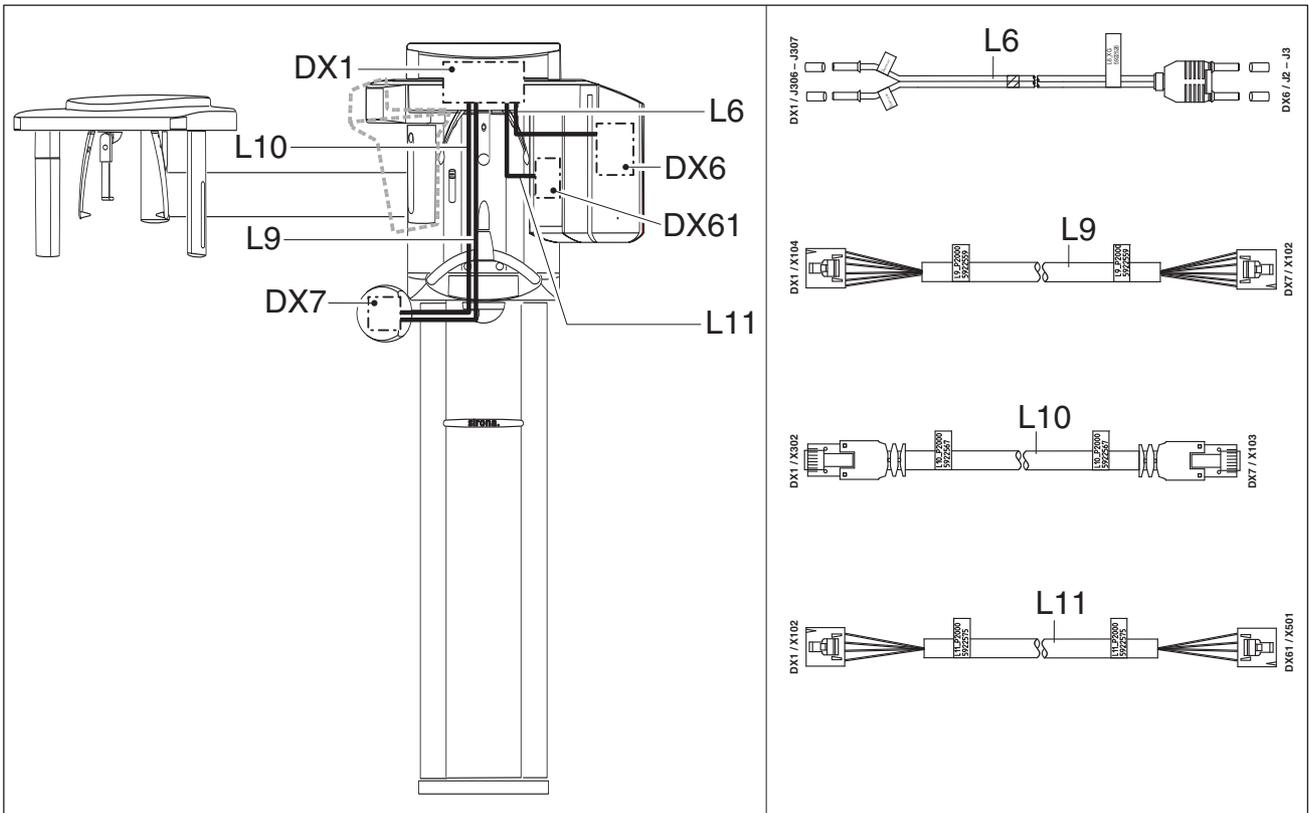


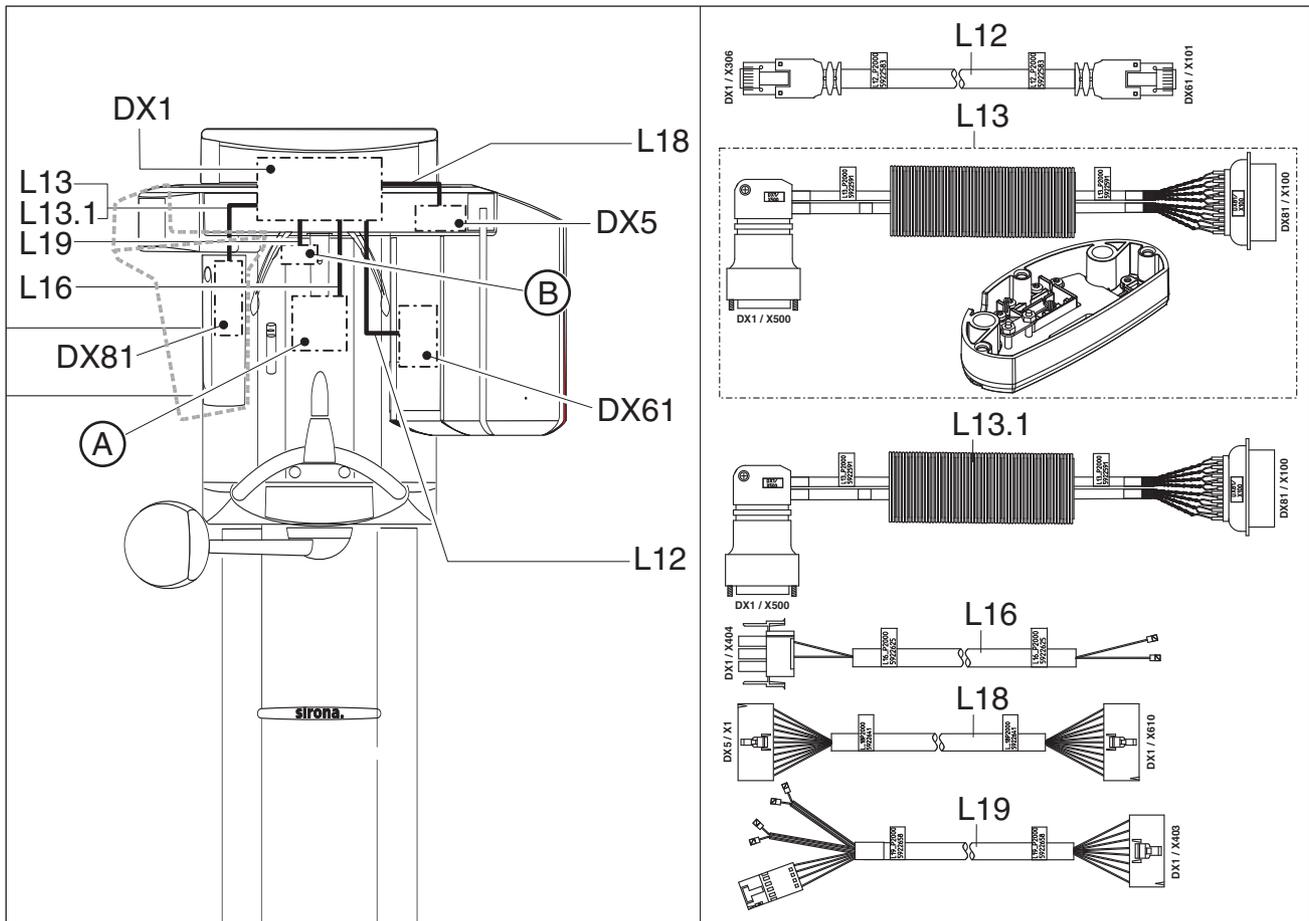
Component	Designation	Function
Board	DX42	Display board for remote control

3.1.6 Cabling overview

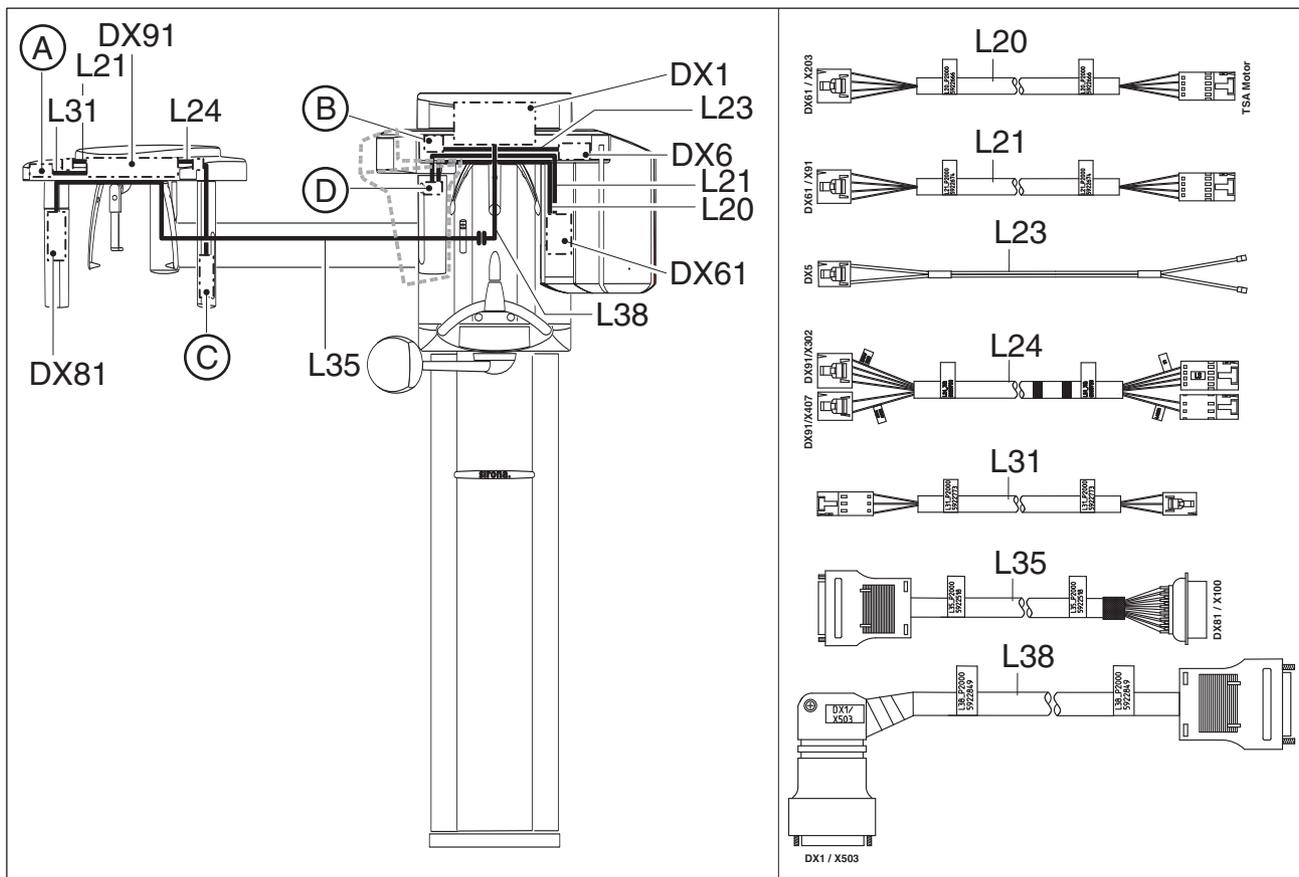


A	Power switch/S1
B	Line filter
C	Wago terminal

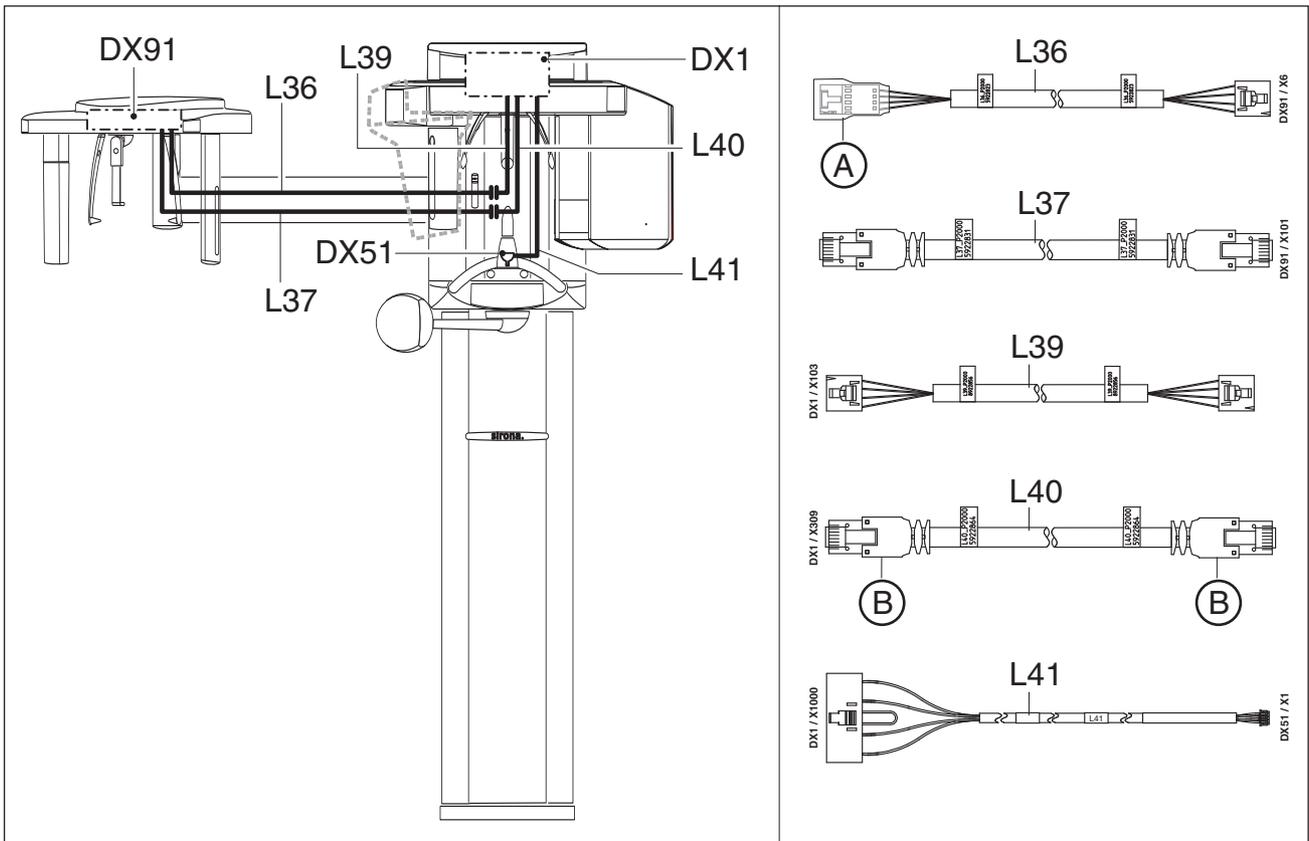




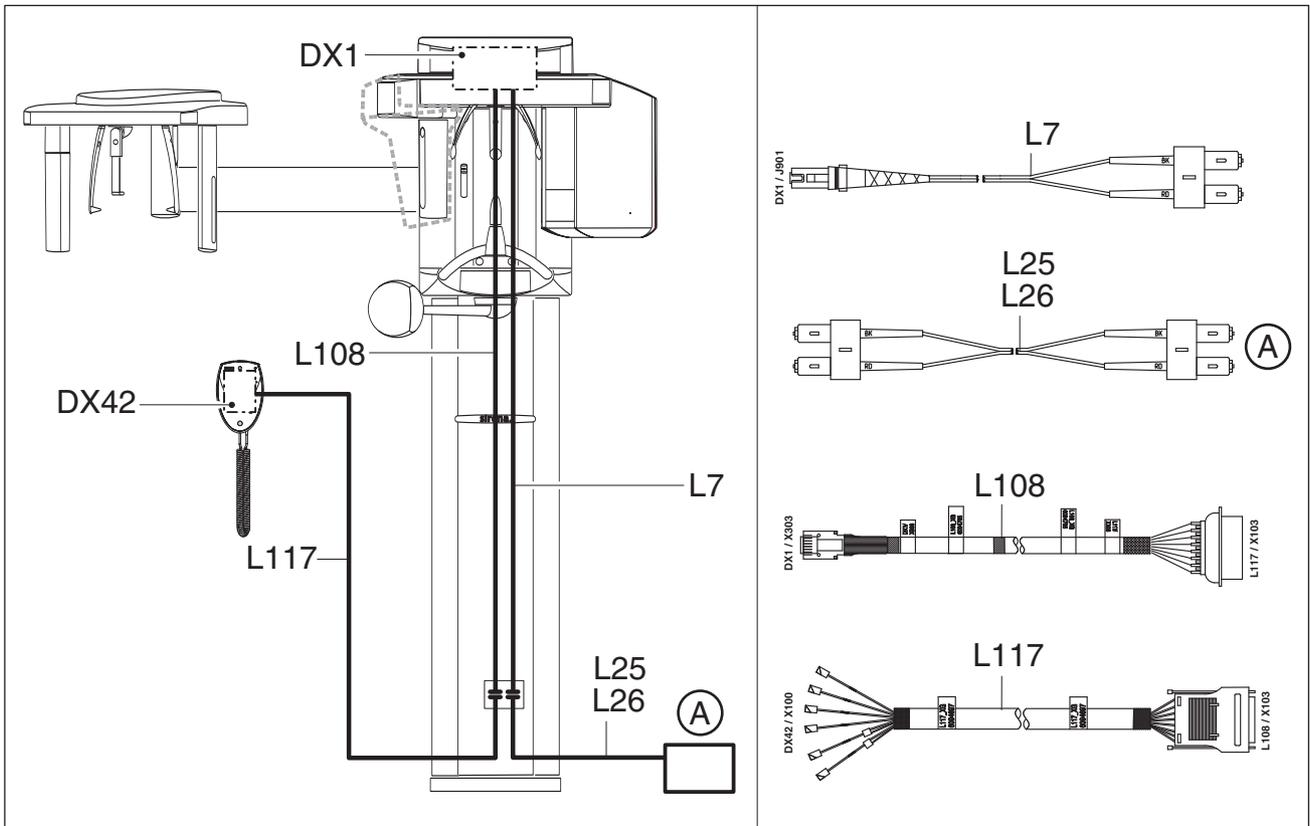
A	HA motor
B	LS sensor



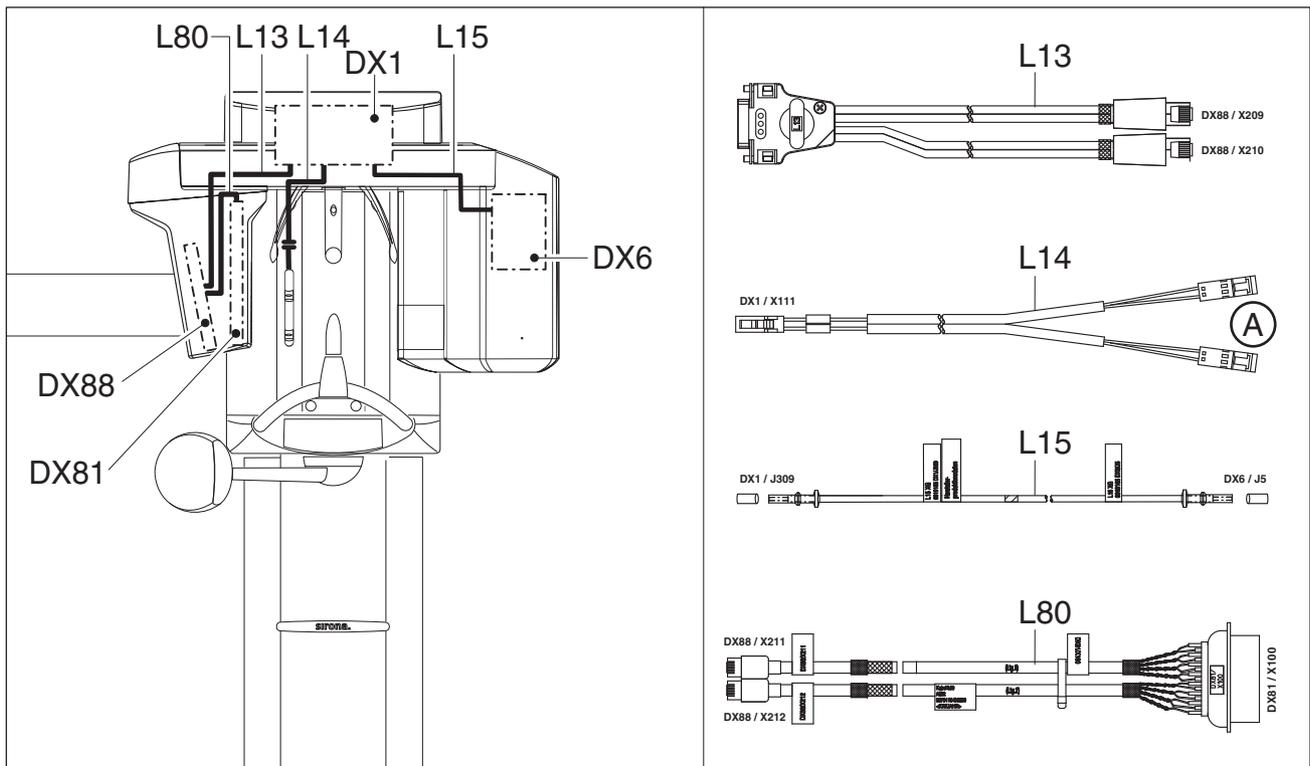
A	Potentiometer
B	Motor
C	Laser module
D	LS sensor



A	Heat shrink tube
B	Cover, blue



A Media converter

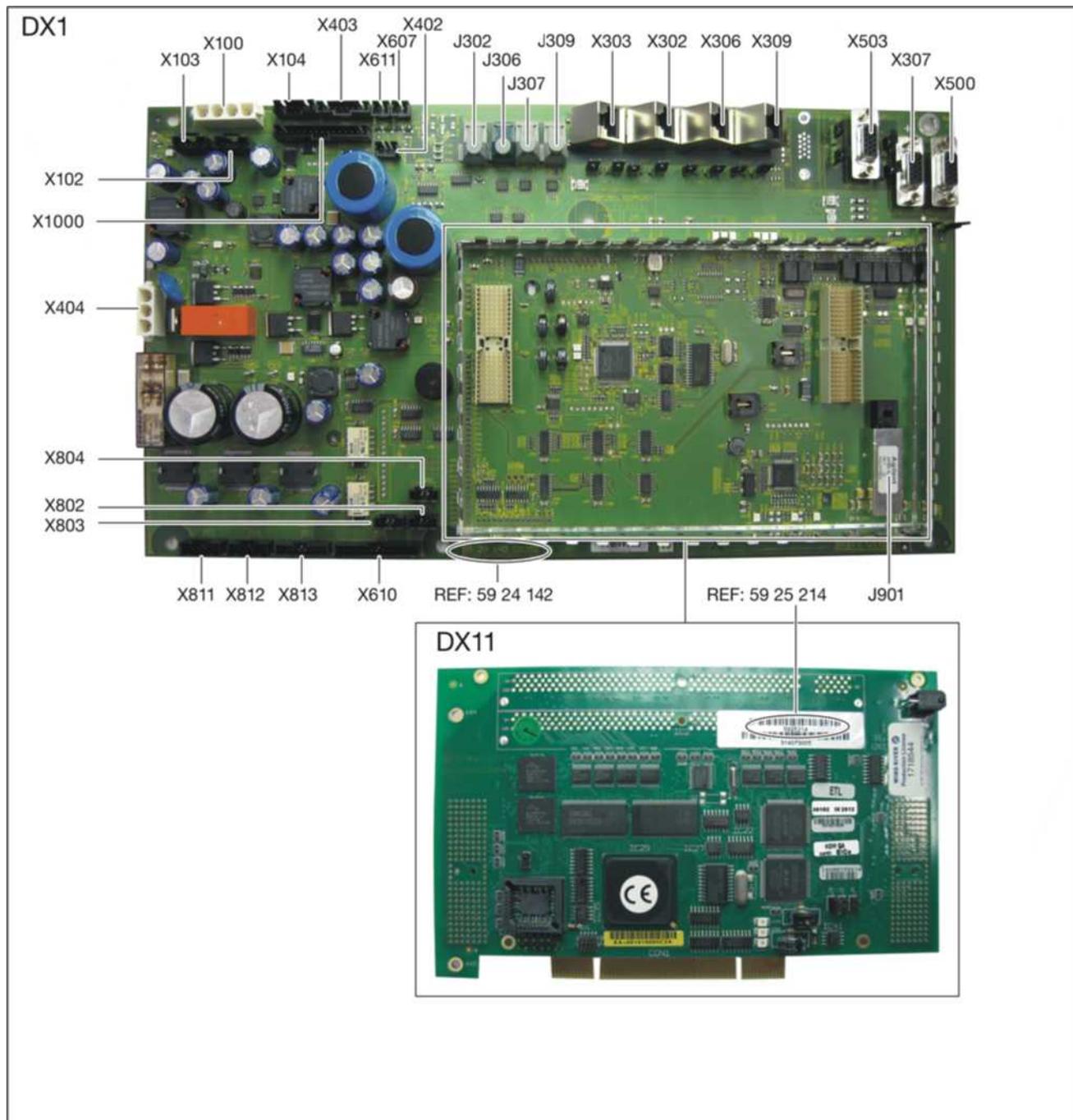


3.1.7 Board photos

3.1.7.1 Boards in the slide

Boards DX1/DX11

Installed up to unit serial number 628999 for "ORTHPHOS XG3D" and 648999 for "ORTHPHOS XG3D/Ceph"

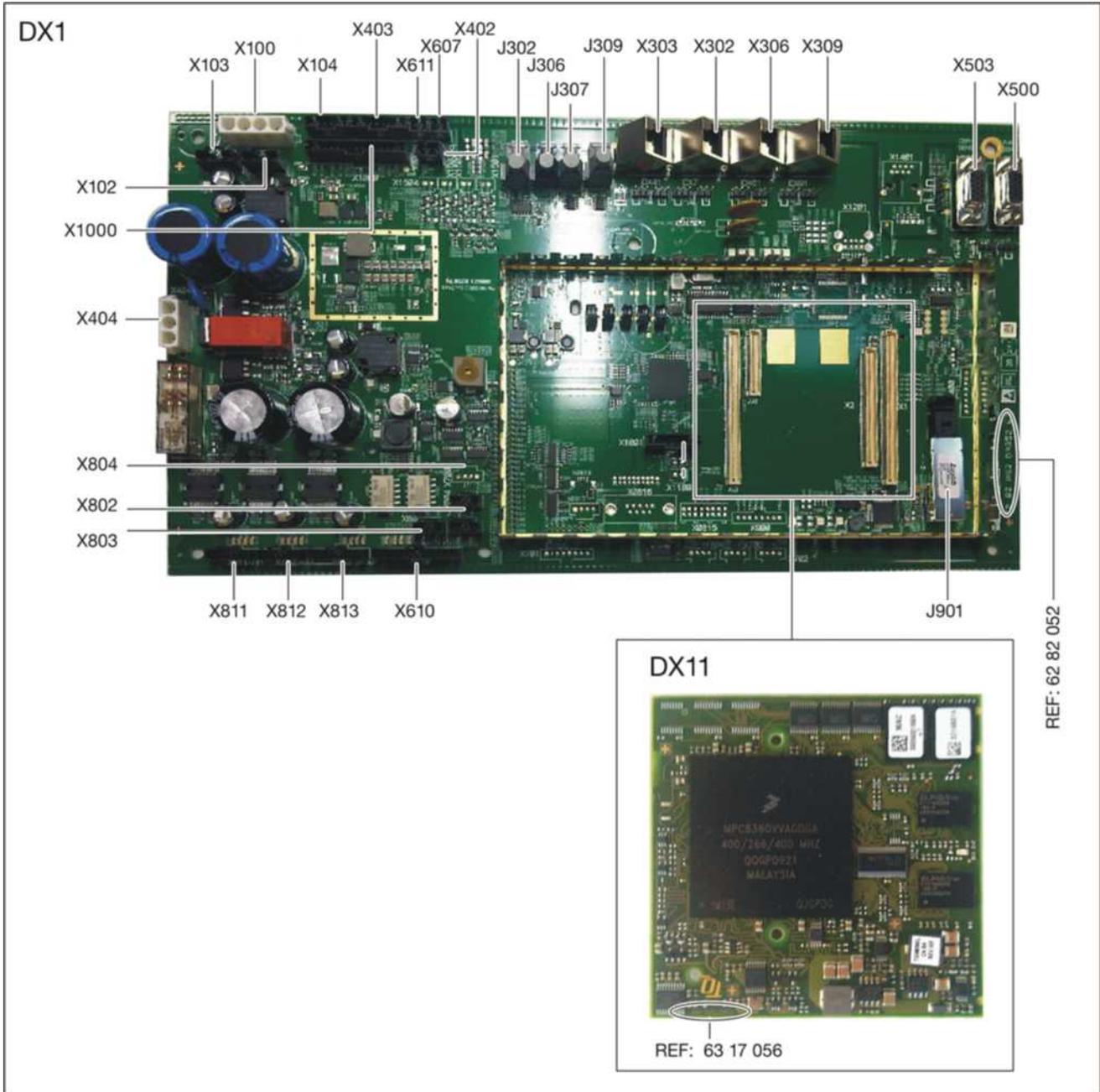


Boards DX1/DX11

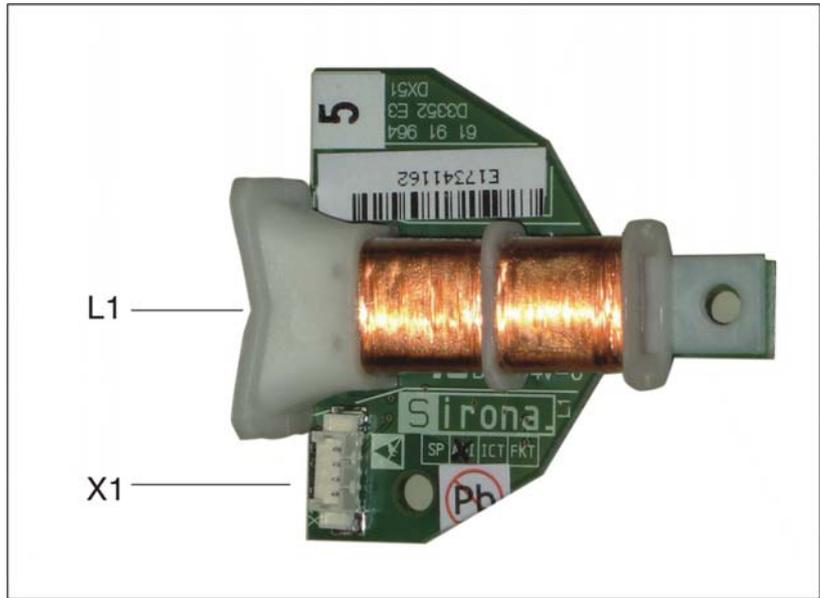
Installed as of unit serial number 629000 for "ORTHOPHOS XG3D" and 649000 for "ORTHOPHOS XG3D/Ceph"

IMPORTANT

The DX1/DX11V2 board can only be operated with unit software version V04.04.00 or higher.



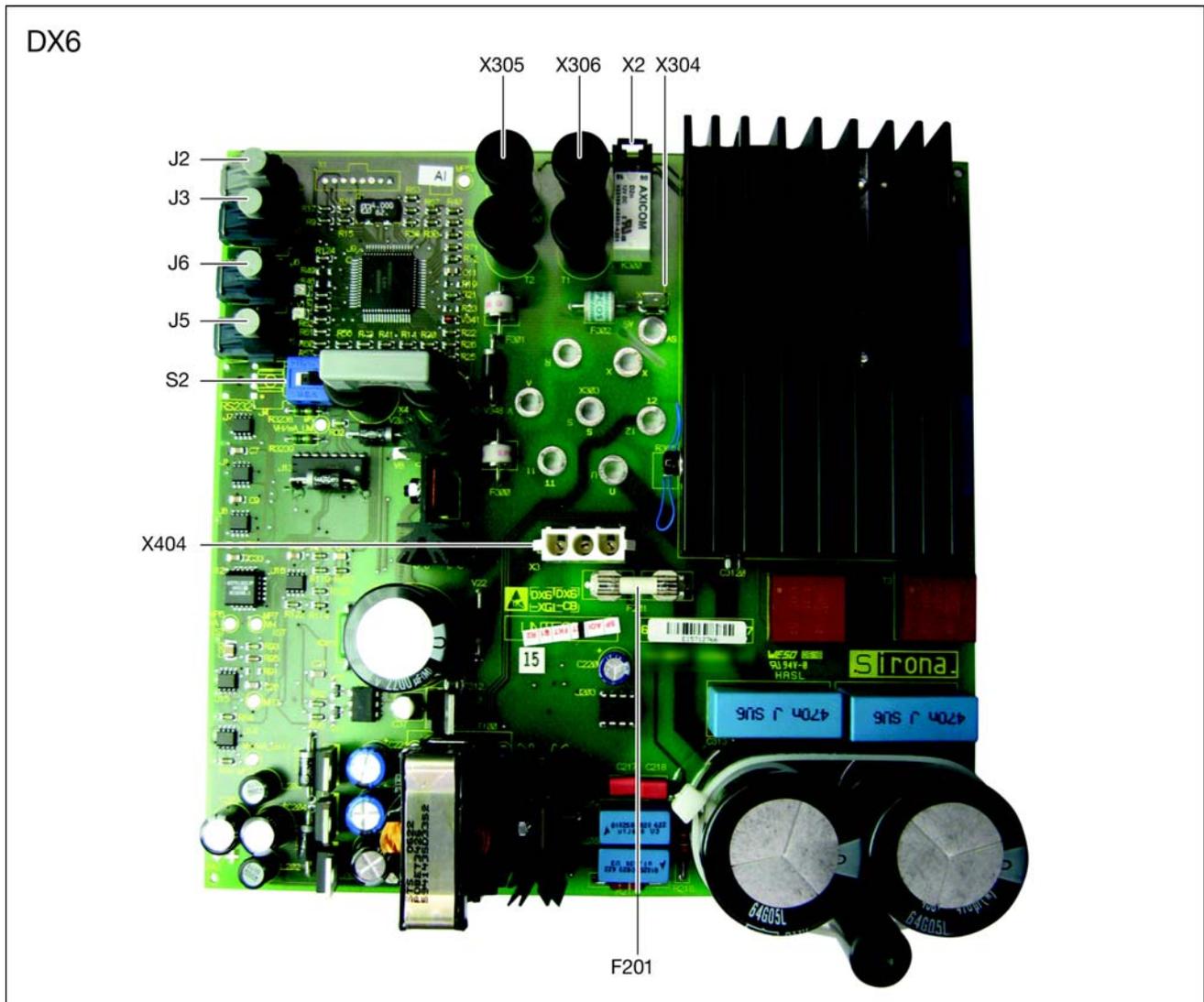
Board DX51



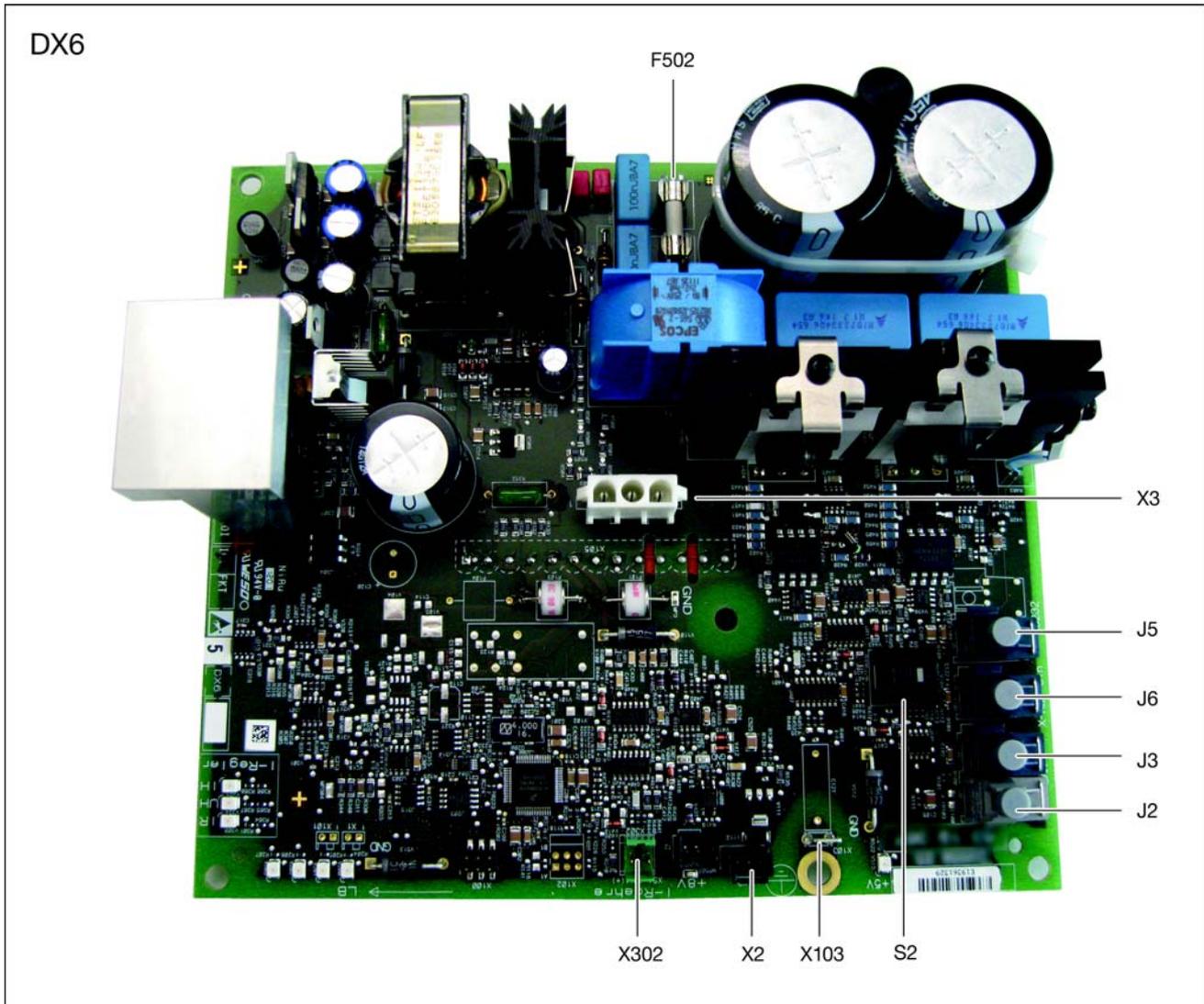
Board DX6

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

DX6 in X-ray tube assembly 1.0:

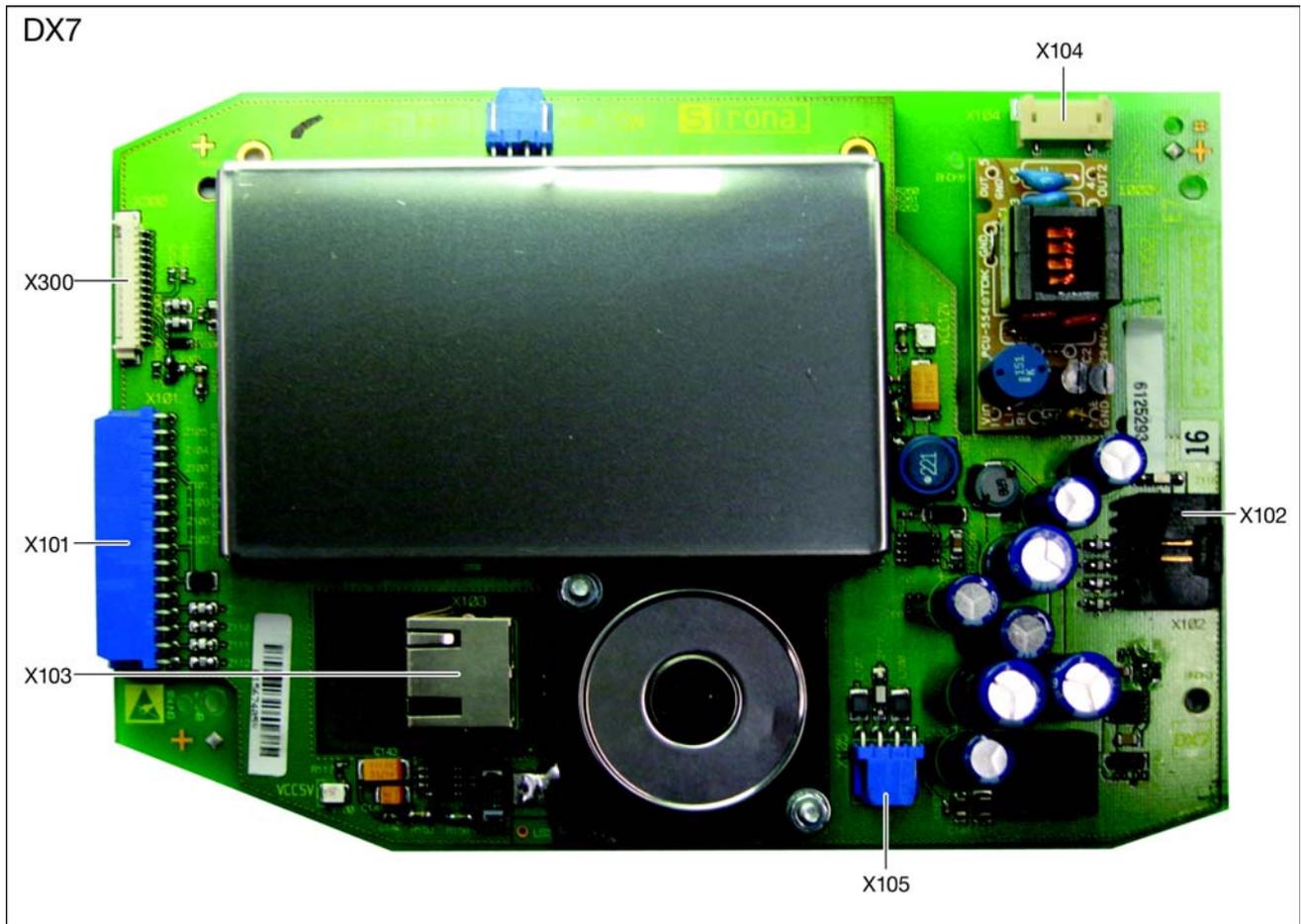


DX6 in X-ray tube assembly 2.0:



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.



Boards DX81P / DX85P

NOTICE

You are not permitted to open the sensor! The sensor may be replaced only as a complete unit!

Board is not available as a spare part or a repair part. Sensor can only be ordered as a complete unit.



DX81

DX85

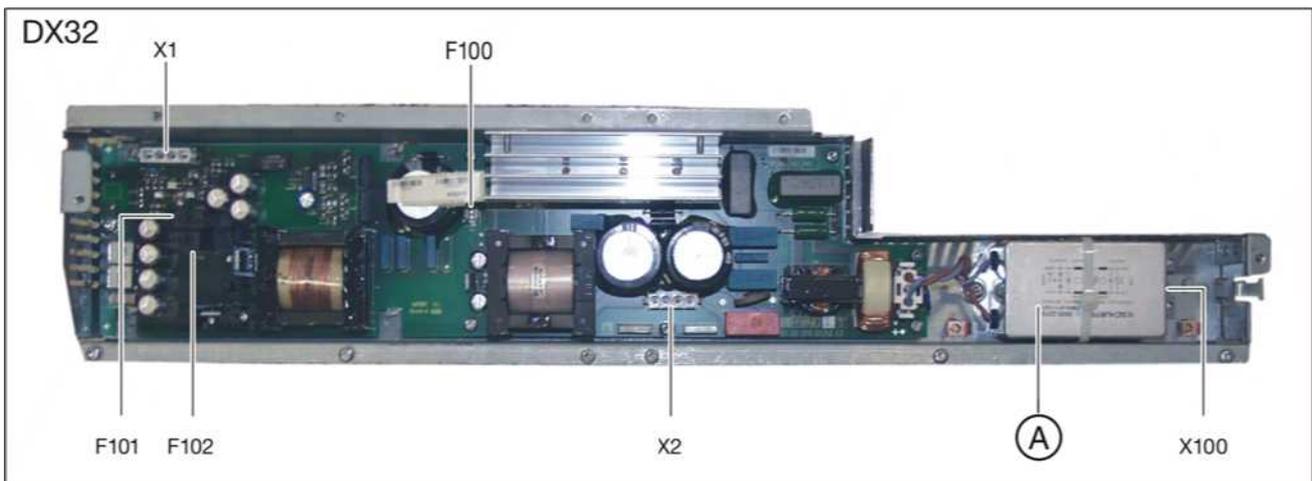


Board DX88



3.1.7.2 Boards in the stand

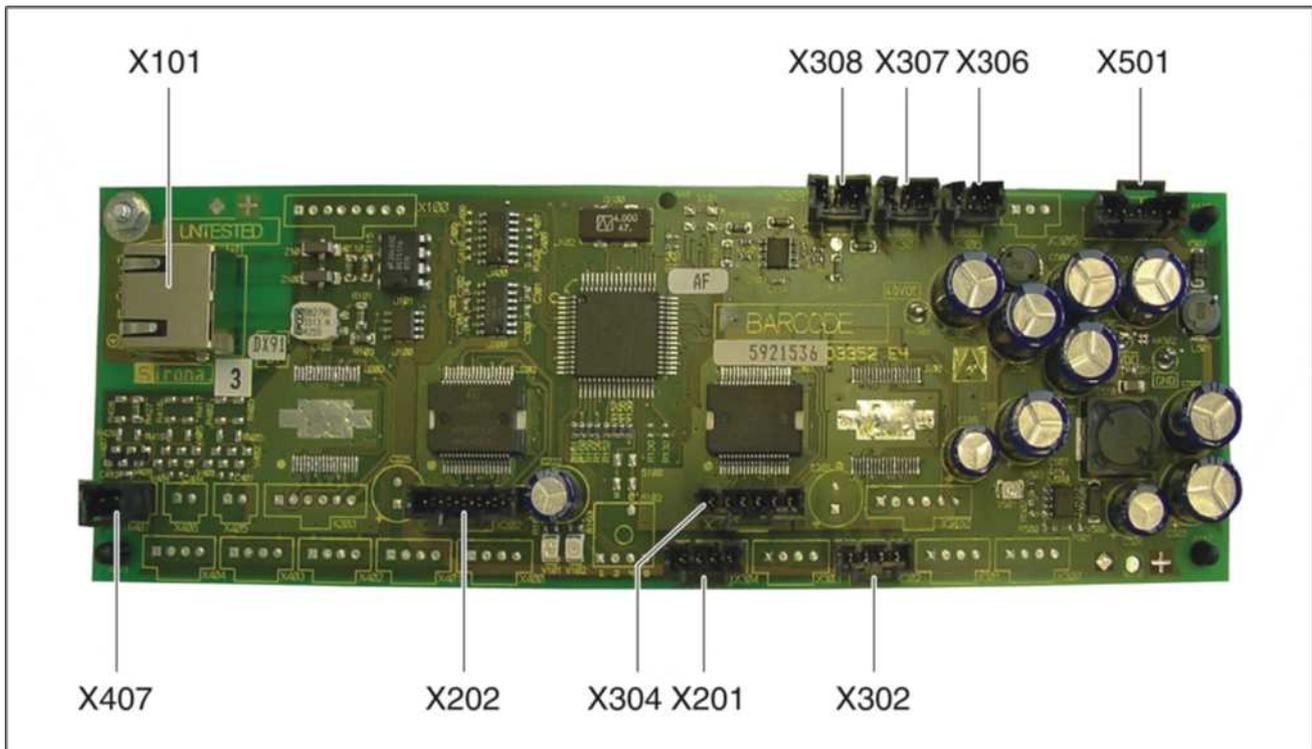
Board DX32



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

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

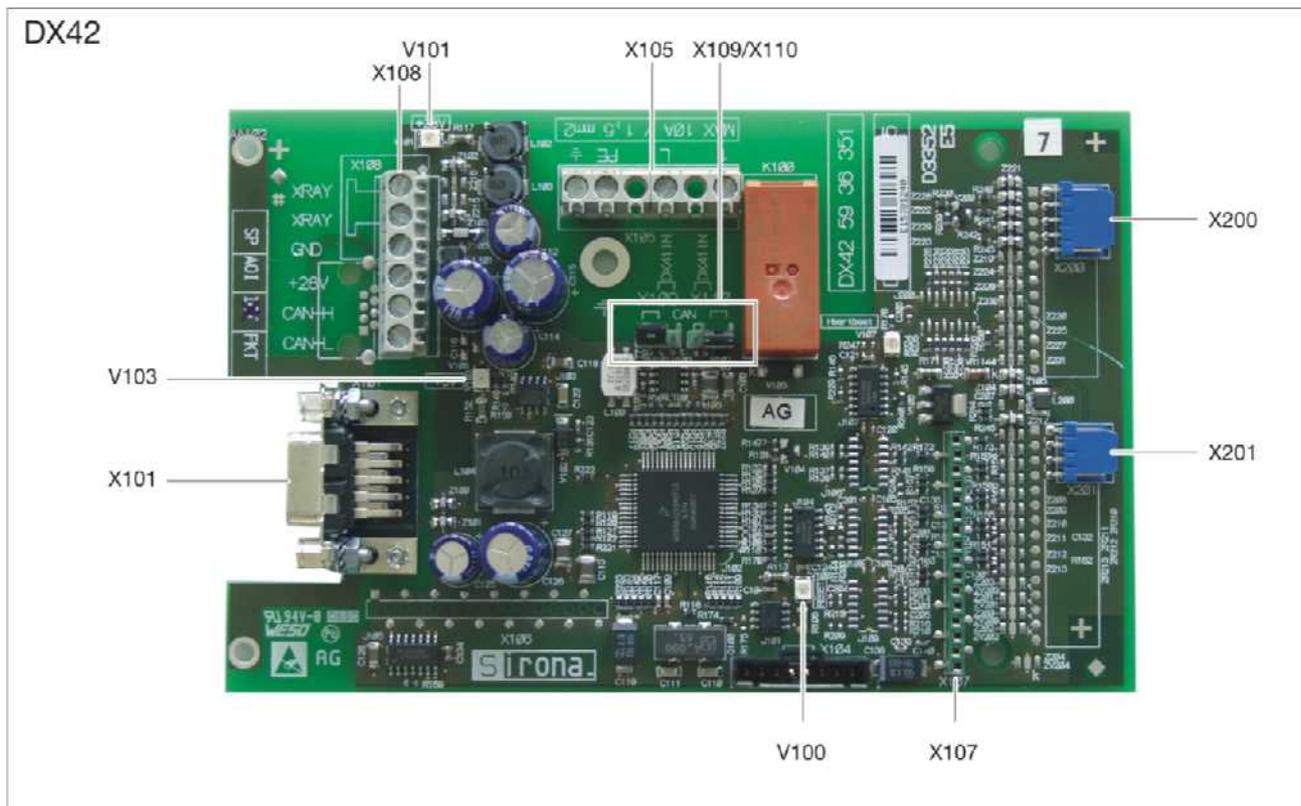
Board DX91



3.1.7.4 Board in the remote control

Board DX42

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

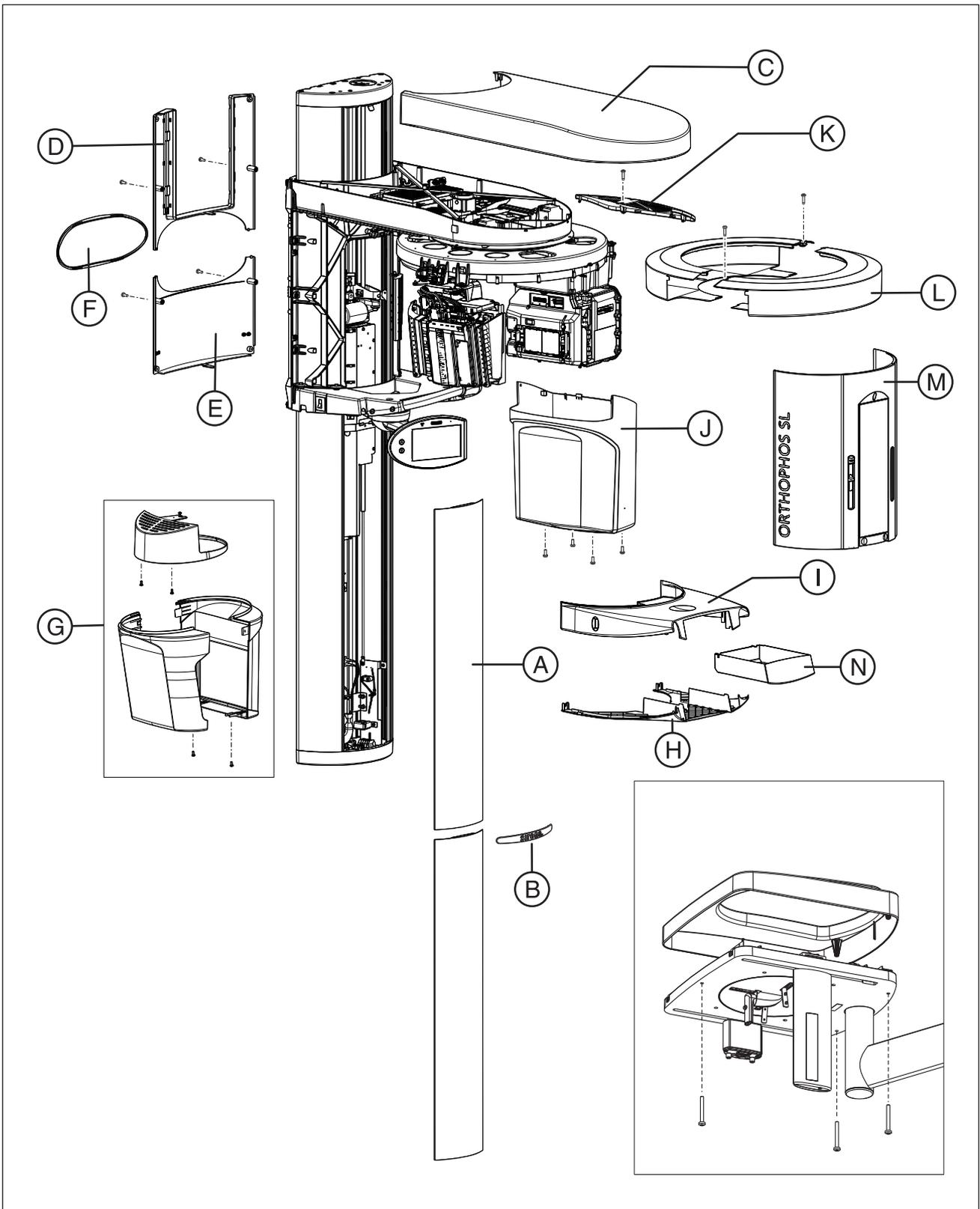


3.1.8 Covers

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

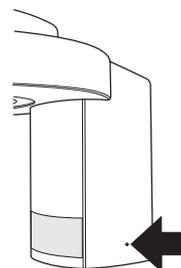
C	Arm cover, top
D	Slide cover, top rear
E	Slide cover, bottom rear
F	Slide cover, center rear
G	Sensor cover, complete
H	Support cover, bottom
I	Support cover, top
J	Tube assembly cover
K	Tube assembly, cover
L	Ring cover
M	Slide cover, complete
N	Drawer
O	Cover, Ceph

3.1.9 Technical Data

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
Rated power:	2 kW at 90 kV/12 mA with any radiation time
Nominal frequency:	50/60 Hz
Mains resistance:	max. 0.8 ohms
Main building fuse:	25 A slow-blow (16 A for single line)
Power consumption:	2 kVA
Power output of tube assembly:	90 kV/12 mA = 1080 W with any radiation time
Tube voltage:	60 – 90 kV (for 90 kV max. 12 mA)
Tube current:	3 – 16 mA (for 16 mA max. 66 kV)
Maximum setting range:	60 kV / 3 mA to 90 kV / 12 mA
High-voltage waveform:	High-frequency multipulse Residual ripple ≤ 4 kV
Program duration:	see Operating Instructions, section on "Program values"
Exposure time:	see Operating Instructions, section on "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 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

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. A countdown of the waiting time is displayed on the control panel.

Class I device

Degree of protection against electric shock:

Type B device 

Degree of protection against ingress of water:

Ordinary equipment (without protection against ingress of water)

Year of manufacture:

 20XX (on the rating plate)

Operating mode:

Continuous operation

Long-term power output:

200 W

Anode material:

Tungsten

Exposure parameters for determining leakage radiation:

2 mA / 90 kV

Transport and storage temperature:

-10°C – +70°C (14°F – 158°F)

Air humidity:

10% – 95%

Admissible operating temperature:

Acc. to IEC 60601-1 between +10 °C and +40 °C (50 °F – 104 °F)

X-ray tube

SR 90 / 15 from Siemens or OCX 100 CEI

PAN Sensor

Digital CCD line sensor, repluggable for panoramic exposure technique

Active sensor area, Pan type: 138 mm x 6.48 mm

Detail resolution: 0.027 mm pixel size

Focus-sensor distance: 497 mm

Flat Panel Detector

Digital Flat Panel Detector with CMOS technology, integrated for 3D exposure technique

Active sensor area type 3D: 125 mm x 125 mm

Detail resolution: 0.1 mm pixel size

Focus-sensor distance: 530 mm

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

Ceph sensor

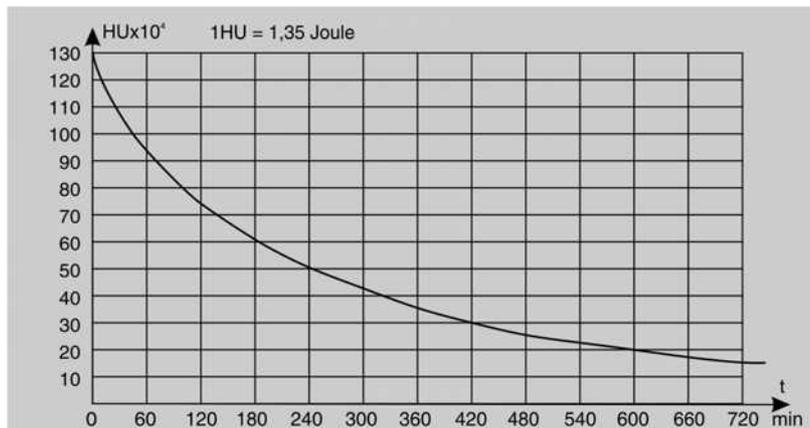
Digital CCD line sensor, repluggable for panoramic or ceph exposure technique

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

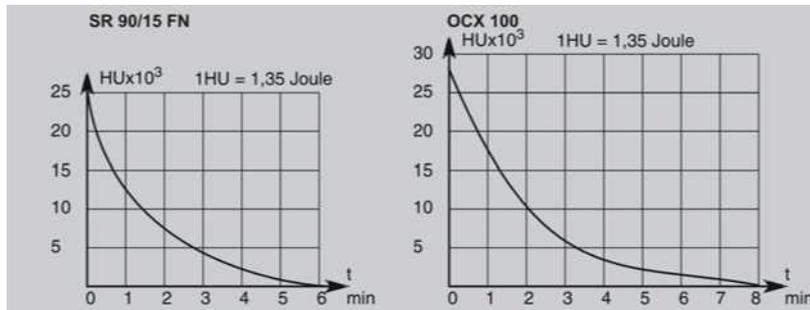
Detail resolution: 0.027 mm pixel size

Focus-sensor distance: 1,714 mm

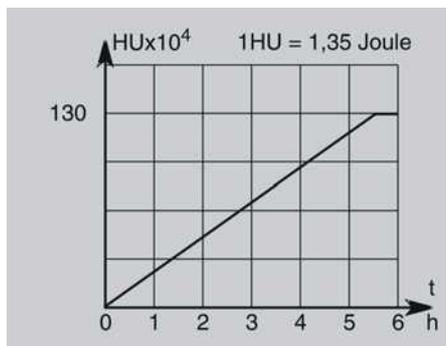
Cooling curve of tube housing



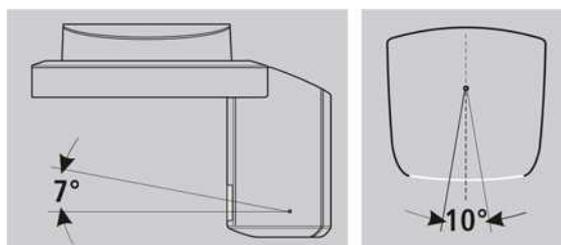
Cooling curve of X-ray tube



Heating curve of tube housing



Central X-ray beam and anode angle



Minimum PC system requirements for SIDEXIS

Processor:	DualCore 1.6 GHz
RAM	2 GB
Free hard disk storage:	5 GB for SIDEXIS installation and database
Removable medium:	CD/DVD writer
Operating system:	Windows XP Professional, 32-bit, SP3 Windows 7 Professional, 32-bit or 64-bit (64-bit version not tested) Windows 7 Ultimate, 32-bit or 64-bit
Graphics card:	> 512 MB, minimum resolution 1280 x 1024 pixels, 16.7 million colors (TrueColor)
Screen:	Suitable for diagnosis applications
Network card:	Network RJ45, 100 MBit/s
USB port:	For Version 1.1 and higher, required for USB components only
Software:	Internet Explorer 6.0, SP1 Acrobat Reader 8.0, contained on CD, required for the PDF test report function

Requirements for GALAXIS PC system

	Minimum requirements	Recommended configuration
Processor:	DualCore from 2 GHz	QuadCore from 2 GHz
RAM	4 GB	8 GB
Hard disk storage:	500 GB	1 TB
Removable medium:	DVD writer	
Operating system:	Windows XP Professional, 32-bit, SP3 Windows 7 Professional, 32-bit or 64-bit	Windows 7 Ultimate, 64-bit
Graphics card:	external (no chipset graphics), > 512 MB, minimum resolution 1280x1024 pixels, 16.7 mil. colors (TrueColor), Shader Model 3 for advanced rendering in GALILEOS Implant	
Screen:	Suitable for diagnostic applications	
Network card:	Network RJ45, 100 MBit/s	Network RJ45, 1 GBit/s

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. 04.03.01*).

Main software V04.03.00

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.03.00	DX42	V02.52.04
DX11-FPGA	V01.03.00		
DX6	V03.03.07		
DX61	V03.05.00		
DX7	V02.74.07		
DX7-L0	V02.29.00		
DX7-L1	V02.29.00		
DX7-L2	V02.27.00		
DX7-L3	V02.27.00		
DX7-L4	V02.04.00		
DX7-L5	V02.02.00		
DX71	V02.52.01		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.00.03		
DX88-FPGA	V01.23.00		
DX91	V02.44.00		

SIDEXIS XG	XG3D Workstation software	RCU Server software	GALILEOS Software Compatibility Update	GALILEOS Implant
V2.5.1	V1.0	V1.8	V1.7.4	V1.7.2
V2.5.2	V1.1	V2.0		

Main software V 04.03.01

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.03.00	DX42	V02.52.04
DX11-FPGA	V01.03.00		
DX6	V03.04.00		
DX61	V03.05.00		
DX7	V02.74.07		
DX7-L0	V02.29.00		
DX7-L1	V02.29.00		
DX7-L2	V02.27.00		
DX7-L3	V02.27.00		
DX7-L4	V02.04.00		
DX7-L5	V02.02.00		
DX71	V02.52.01		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.00.03		
DX88-FPGA	V01.23.00		
DX91	V02.44.00		

SIDEXIS XG	XG3D Workstation software	RCU Server software	GALILEOS Software Compatibility Update	GALILEOS Implant
V2.5.1	V1.0	V1.8	V1.7.4	V1.7.2
V2.5.2	V1.1	V2.0		

Main software V04.04.00

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.04.01	DX42	V02.54.00
DX11-FPGA	V01.03.00		
DX6	V03.05.00		
DX61	V04.01.00		
DX7	V02.77.01		
DX7-L0	V02.29.00		
DX7-L1	V02.29.00		
DX7-L2	V02.27.00		
DX7-L3	V02.27.00		
DX7-L4	V02.04.00		
DX7-L5	V02.02.00		
DX71	V02.54.00		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.02.00		
DX88-FPGA	V01.30.00		
DX91	V02.44.00		

SIDEXIS XG	XG3D Workstation software	RCU Server software	GALILEOS Implant
V2.5.2	V1.1	V2.0	V1.8
V2.5.3			

Main software V04.07.00

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.07.00	DX42	V02.55.00
DX11-FPGA	V01.03.00		
DX6	V03.05.00		
DX61	V04.02.00		
DX7	V02.79.00		
DX7-L0	V02.29.00		
DX7-L1	V02.29.00		
DX7-L2	V02.27.00		
DX7-L3	V02.27.00		
DX7-L4	V02.04.00		
DX7-L5	V02.02.00		
DX71	V02.54.01		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.03.00		
DX88-FPGA	V01.31.00		
DX91	V02.44.00		

SIDEXIS XG	XG3D Workstation software	RCU Server software	GALILEOS Implant
V2.5.2	V1.2	V2.1	V1.9
V2.5.3			

Main software V04.07.01

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.07.01	DX42	V02.55.00
DX11-FPGA	V01.03.00		
DX6	V03.05.00		
DX61	V04.02.00		
DX7	V02.79.00		
DX7-L0	V02.29.00		
DX7-L1	V02.29.00		
DX7-L2	V02.27.00		
DX7-L3	V02.27.00		
DX7-L4	V02.04.00		
DX7-L5	V02.02.00		
DX71	V02.54.01		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.02.05		
DX88-FPGA	V01.31.00		
DX91	V02.44.00		

SIDEXIS XG	XG3D Workstation software	RCU Server software	GALILEOS Implant
V2.5.2	V1.2	V2.1	V1.9
V2.5.3			

Main software V04.09.02

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.09.02	DX42	V02.56.02
DX11-FPGA	V01.03.00		
DX6 tube assembly 1.0	V03.06.03		
DX6 tube assembly 2.0	V04.07.01		
DX61	V04.02.00		
DX7	V02.80.05		
DX7-L0	V02.29.00		
DX7-L1	V02.29.00		
DX7-L2	V02.27.00		
DX7-L3	V02.27.00		
DX7-L4	V02.04.00		
DX7-L5	V02.02.00		
DX71	V02.54.03		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.02.05		
DX88-FPGA	V01.31.00		
DX91	V02.44.00		

SIDEXIS XG	XG3D Workstation software	RCU Server software	GALILEOS Implant
V2.5.2 V2.5.3 V2.5.6	V1.2	V2.2	V1.9 SP1

Main software V04.12.00

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.12.00	DX42	V02.56.04
DX11-FPGA	V01.04.00		
DX6 tube assembly 1.0	V03.07.03		
DX6 tube assembly 2.0	V04.09.00		
DX61	V04.03.00		
DX7	V02.80.07		
DX7-L0	V02.29.00		
DX7-L1	V02.29.00		
DX7-L2	V02.27.00		
DX7-L3	V02.27.00		
DX7-L4	V02.04.00		
DX7-L5	V02.02.00		
DX71	V02.54.03		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.02.07		
DX88-FPGA	V01.31.00		
DX91	V02.44.00		

SIDEXIS XG	XG3D Workstation software	RCU Server software	GALILEOS Implant
V2.5.6	V1.3	V2.3	V1.9 SP1

Main software V04.14.00

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.14.00	DX42	V02.58.02
DX11-FPGA	V01.04.00		
DX6 tube assembly 1.0	V03.08.00		
DX6 tube assembly 2.0	V04.09.07		
DX61	V04.04.00		
DX7	V02.82.01		
DX7-L0	V02.31.00		
DX7-L1	V02.31.00		
DX7-L2	V02.29.00		
DX7-L3	V02.29.00		
DX7-L4	V02.06.00		
DX7-L5	V02.02.00		
DX71	V02.55.02		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.03.07		
DX88-FPGA	V01.31.00		
DX91	V02.45.00		

SIDEXIS XG	XG3D Workstation software	RCU Server software	GALILEOS Implant
V2.5.6	V1.4	V2.4	V1.9 SP1

Main software V04.14.01

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.14.00	DX42	V02.58.02
DX11-FPGA	V01.04.00		
DX6 tube assembly 1.0	V03.08.00		
DX6 tube assembly 2.0	V04.09.07		
DX61	V04.04.00		
DX7	V02.82.01		
DX7-L0	V02.31.00		
DX7-L1	V02.31.00		
DX7-L2	V02.29.00		
DX7-L3	V02.29.00		
DX7-L4	V02.06.00		
DX7-L5	V02.04.00		
DX71	V02.55.02		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.03.07		
DX88-FPGA	V01.31.00		
DX91	V02.45.00		

SIDEXIS XG	XG3D Workstation software	RCU Server software	GALILEOS Implant
V2.5.6	V1.4	V2.4	V1.9 SP1

Main software V04.14.02

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.14.00	DX42	V02.58.02
DX11-FPGA	V01.04.00		
DX6 tube assembly 1.0	V03.08.00		
DX6 tube assembly 2.0	V04.09.07		
DX61	V04.04.00		
DX7	V02.82.01		
DX7-L0	V02.31.00		
DX7-L1	V02.31.00		
DX7-L2	V02.29.00		
DX7-L3	V02.29.00		
DX7-L4	V02.06.00		
DX7-L5	V02.04.00		
DX71	V02.55.02		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.03.07		
DX88-FPGA	V01.31.00		
DX91	V02.45.00		

SIDEXIS XG	SIDEXIS 4	XG3D Workstation software	RCU Server software	GALILEOS Implant
V2.6.2	V4.1.2	V1.5	V2.5	V1.9 SP1

Main software V04.14.03

ORTHOPHOS XG 3D		Remote control	
Board	Module software	Board	Module software
DX11	V04.16.06	DX42	V02.58.02
DX11-FPGA	V02.03.00		
DX6 tube assembly 1.0	V03.08.00		
DX6 tube assembly 2.0	V04.10.06		
DX61	V04.04.00		
DX7	V02.82.02		
DX7-L0	V02.32.00		
DX7-L1	V02.31.00		
DX7-L2	V02.29.00		
DX7-L3	V02.29.00		
DX7-L4	V02.06.00		
DX7-L5	V02.04.00		
DX71	V02.55.02		
DX81	V02.33.00		
DX81-FPGA	V03.08.00		
DX88	V03.03.07		
DX88-FPGA	V01.31.00		
DX91	V02.45.00		

SIDEXIS XG	SIDEXIS 4	XG3D Workstation software	RCU Server software	GALILEOS Implant
V2.6.2	V4.1.2	V1.5	V2.5	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 [→ 325].

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.

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.

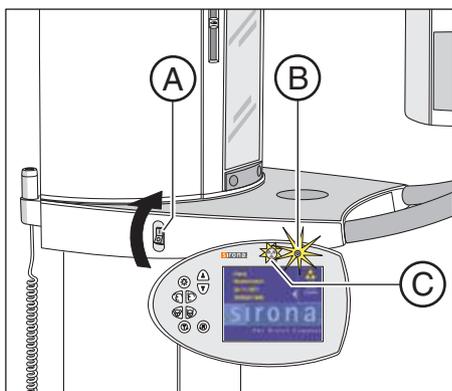
IMPORTANT

After the unit is switched on, the touchscreen has only limited readability for several minutes until the background lighting has completed its warm-up phase.

After the unit is switched off with the main switch, the touchscreen remains lit for approx. another 3 to 5 seconds.

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.
 - ↪ 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 [→ 244].
4. Press the R key.
 - ↪ The unit moves to its starting position.
5. Switch on the PC.
6. Start SIDEXIS.
 - ↪ As long as no connection has been made to SIDEXIS, the message *"Switch SIDEXIS to ready for exposure state"* is displayed in the comment line of the control panel.

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.
- The unit language is preconfigured as ordered.
- 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.

If the customer requires a different configuration, this can be implemented via service routine S017.

4.2 Updating the unit firmware

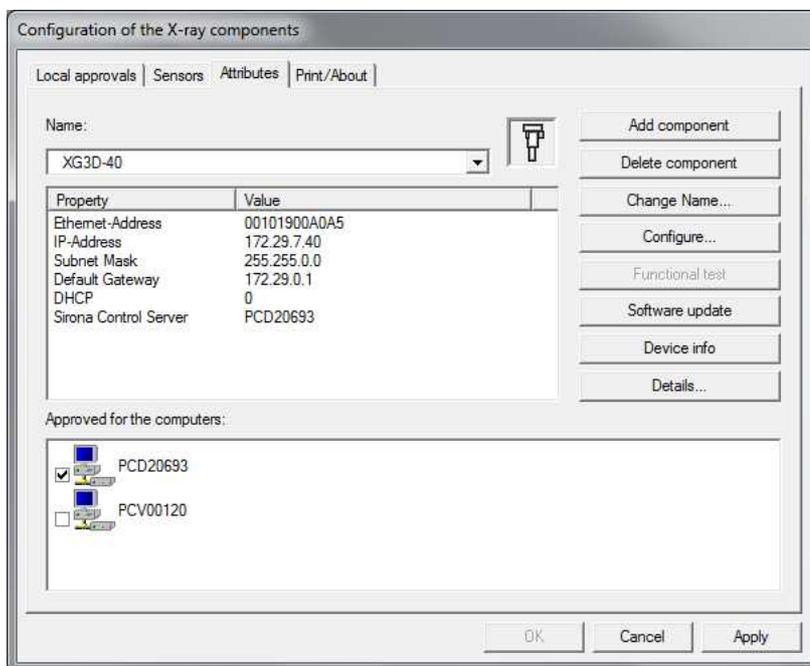
IMPORTANT

Downgrading to older versions

Downgrading the unit software version V04.14.00 or higher to an older version is not a simple process. However, if this is essential, please get in contact with the SIRONA Customer Service Center (CSC) in advance.

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.

1. Start the "SIDEXIS Manager" under "Start"/"Programs"/"SIDEXIS"/"SIDEXIS XG".
2. Click "Configuration of the X-ray components".
 - ↳ The "Configuration of the X-ray components" menu opens.



3. Select the "Attributes" tab.
4. Click on the "Software update" button.
 - ↳ The dialog box for entering the service password opens.



5. Enter the service password.

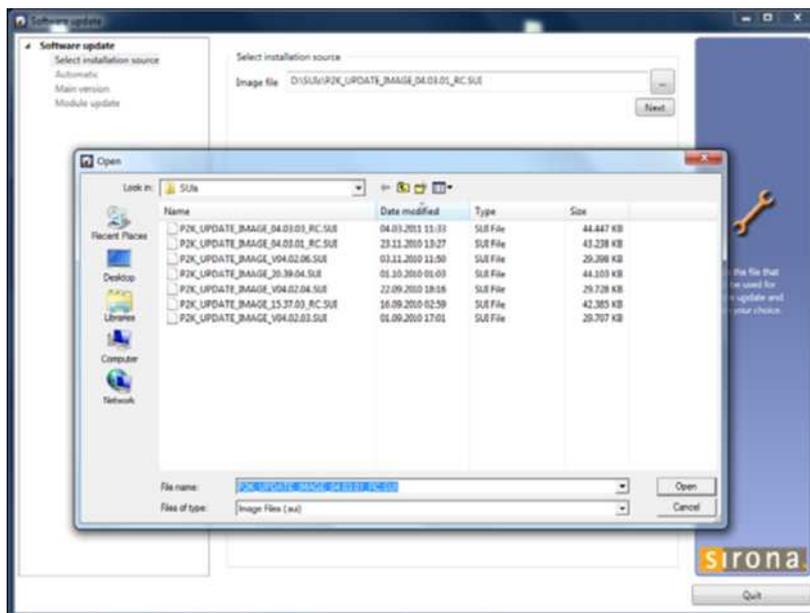
Enter the first 4 digits of the current system date in reverse order as the service password (e.g. on 05/24/1995, 5042 must be entered as the service password).

If an incorrect service password or no password at all is entered, the limited update menu for users will be started. This includes only the possibility for an automatic update [→ 67].

 - ↳ The dialog box for selecting the installation source opens.



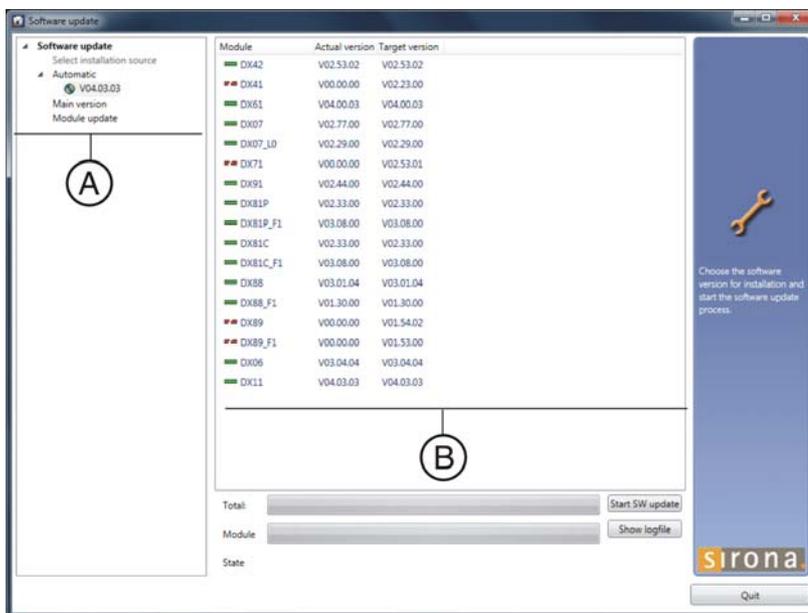
6. Click on the button with the 3 dots.
↳ The dialog box for selecting the update file opens.



7. Select the desired update file from the list and confirm the selection with the "Open" button.
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



8. Click on the "Next" button.
↳ The software manager opens.
↳ The modules and their current software versions are displayed in the action window (A) of the software manager.
↳ In the structure tree on the left (B) of the software manager, the update modes "Automatic", "Main version" and "Module update" can now be selected.



IMPORTANT

In main software V04.09.02 and higher, two versions of the DX6 assembly (tube assembly 1.0 and tube assembly 2.0) appear in the action window (A) of the software manager. Depending upon which tube assembly has been installed, one of the versions is displayed with a red bar and the other with a green bar.

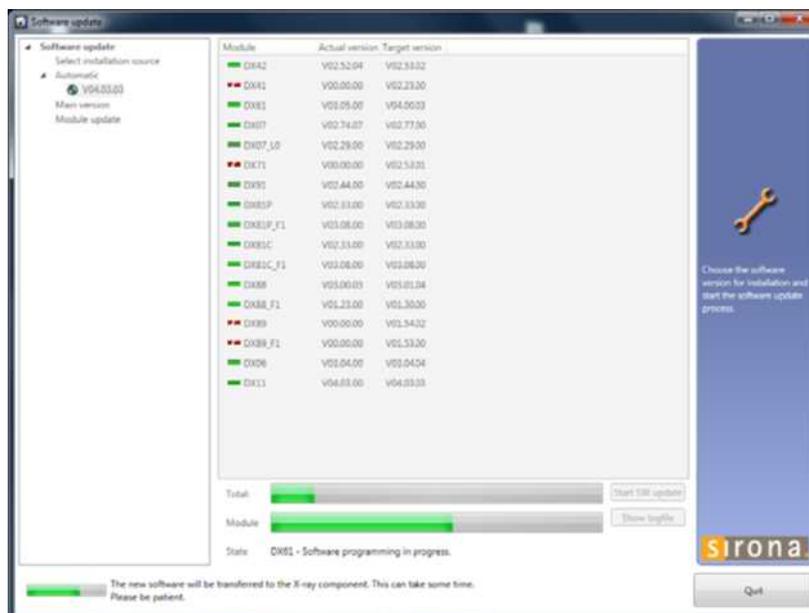
9. Select the desired mode for the software update (see chapter entitled "Update mode [→ 67]").

NOTICE

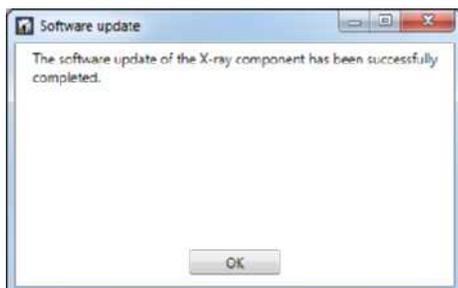
Unit inoperability!

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

10. Click on the "Start SW update" button.



↪ The update is started. A message box informs you when the update process is completed.



11. Confirm the update by clicking on the "OK" button.

↪ A message in the software manager notifies you that a unit restart is required to activate the software update you performed.

NOTICE

Effectiveness of the software update

The unit must be restarted after every software update. The new DX11 version will run only after the unit has been rebooted (see also chapter "Measures following replacement of boards [→ 432]"). Any errors with the consecutive numbers 01, 03, 04, 06, or 07 displayed immediately following the software update may be ignored. If these messages appear again after the system is rebooted, please carry out troubleshooting as described in the "Error messages [→ 91]" section. If any conspicuous problems occur in connection with system handling after the software update and unit reboot has been completed, please repeat the software update immediately.

12. Click on the "Show logfile" button and use the log files to check whether the update was successfully performed.
 If it features entries such as "Update of DXxx failed!", please perform the update again. Repeat this procedure as often as necessary until the "failed messages" no longer appear.

```

p2ksw_20110111_1024.log - Editor
Datei bearbeiten  Format  Ansicht
-----
friendly name      : XGD-40
ip address         : 172.28.7.40
ethernet address  : 00101900ab41
-----
01-11-2011 10:15:55-START
01-11-2011 10:15:55-Reading image-data from SIXELIS
01-11-2011 10:15:55-Maximum available memory for softwareupdate: 20971520
01-11-2011 10:16:18-Automatic version update to version V01.02.06
01-11-2011 10:16:18-nothing to do for DX42 !
01-11-2011 10:16:18-device dx41 is not connected or not required!
01-11-2011 10:16:18-nothing to do for DX61 !
01-11-2011 10:16:18-nothing to do for DX07 !
01-11-2011 10:16:18-nothing to do for DX07_10 !
01-11-2011 10:16:18-device dx71 is not connected or not required!
01-11-2011 10:16:18-nothing to do for DX08 !
01-11-2011 10:16:19-update of DX81P V00.00 (v00.00.00) to V02.33 (v02.33.00), Image: compImg_V02.33_DX81P_PROC_MC908A260A_V00.00_V39.99
01-11-2011 10:16:52-update of DX81P done !
01-11-2011 10:17:15-update of DX81P_F1 V00.00 (v00.00.00) to V03.08 (v03.08.00), Image: compImg_V03.08_DX81P_FPGA_FPGA1_V00.00_V39.99
01-11-2011 10:21:15-update of DX81P_F1 done !
01-11-2011 10:21:39-nothing to do for DX81C_F1 !
01-11-2011 10:22:10-update of DX88 V00.00 (v00.00.00) to v67.00 (v03.00.02), Image: compImg_v67.00_dx88_PROC_MC908A260A_V00.00_V99.99
01-11-2011 10:22:12-update of DX88 done !
01-11-2011 10:22:37-nothing to do for DX88_F1 !
01-11-2011 10:22:37-device dx88 is not connected or not required!
01-11-2011 10:22:37-device dx89_f1 is not connected or not required!
01-11-2011 10:22:37-nothing to do for DX08 !
01-11-2011 10:22:37-nothing to do for DX11 !
01-11-2011 10:22:38-version descriptor successfully written.

```

13. Restart the unit now.

14. Use the software manager or service routine S008.2 (see section "Firmware [→ 49]") to test whether all modules have the current program version (see section "Check program releases [→ 69]").

15. Call up "Further Details" [→ 71].

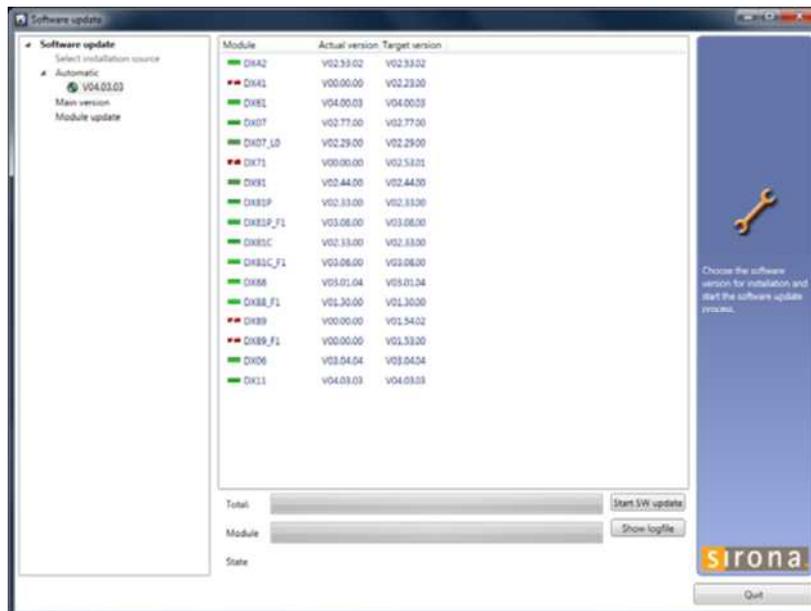
This generates an XML file (with the system parameters) which is saved in the PDATA/.../P2K_Config directory [→ 71] under the network name of the unit.

4.2.1 Update mode

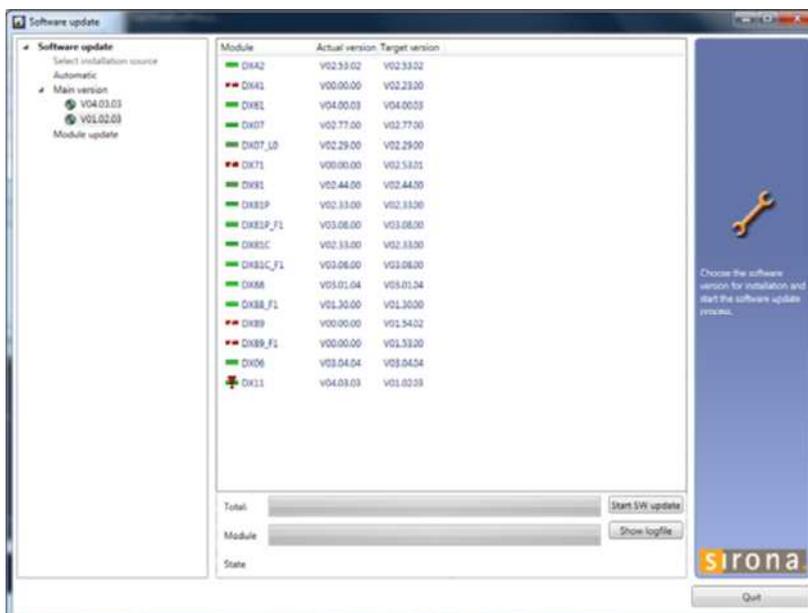
IMPORTANT

Update mode Module update is only intended for internal Sirona purposes and is not activated for User or Service mode.

In *Service mode* (accessible only by entering the Service Password [→ 188]), the update manager supports two modes for updating the software; these can be selected via the elements "*Automatic*" and "*Main version*" in the structure tree:



- **Automatic**
The software of all components is automatically *updated to the latest software version*.
The right window displays a list of the modules, their installed software version and the latest software version offered by the update.



- **Main version**

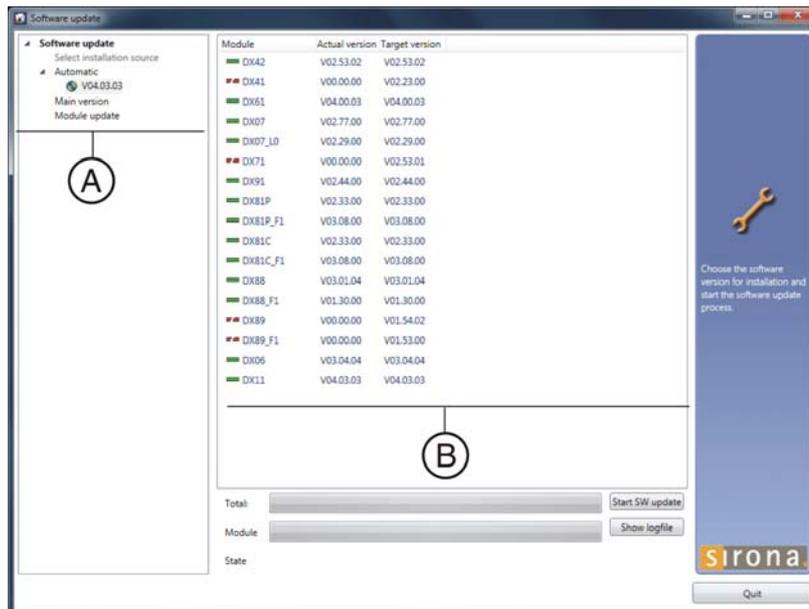
The software can be updated or downgraded using this menu.

This update mode is required, among other things, if a replacement module arrives from the warehouse and features a newer release than the existing main release of the unit. In this case, a main version update to the overall unit status (displayed on the info screen) must be performed for the corresponding component with the appropriate update file (*.SUI). The module is then reprogrammed.

In *User mode* (which can be accessed without a service password), the update manager only supports "Automatic" update mode.

The colored bars in front of the software releases indicate their validity (see chapter entitled "Check program releases [→ 69]").

4.2.2 Check program releases



Module	Actual version	Target version
DX42	V02.53.02	V02.53.02
DX41	V00.00.00	V02.23.00
DX61	V04.00.03	V04.00.03
DX07	V02.77.00	V02.77.00
DX07_L0	V02.29.00	V02.29.00
DX71	V00.00.00	V02.53.01
DX91	V02.44.00	V02.44.00
DX81P	V02.33.00	V02.33.00
DX81P_F1	V03.08.00	V03.08.00
DX81C	V02.33.00	V02.33.00
DX81C_F1	V03.08.00	V03.08.00
DX88	V03.01.04	V03.01.04
DX88_F1	V01.30.00	V01.30.00
DX89	V00.00.00	V01.54.02
DX89_F1	V00.00.00	V01.53.00
DX06	V03.04.04	V03.04.04
DX11	V04.03.03	V04.03.03

You can use the action window (A) of the software manager to check which modules are connected to the unit and what their latest program release is.



Modules which are connected and whose program release corresponds to the latest main software version (see chapter entitled "Firmware [→ 49]" are identified by a continuous green bar.



Modules which the system does not recognize are identified by a broken red bar.

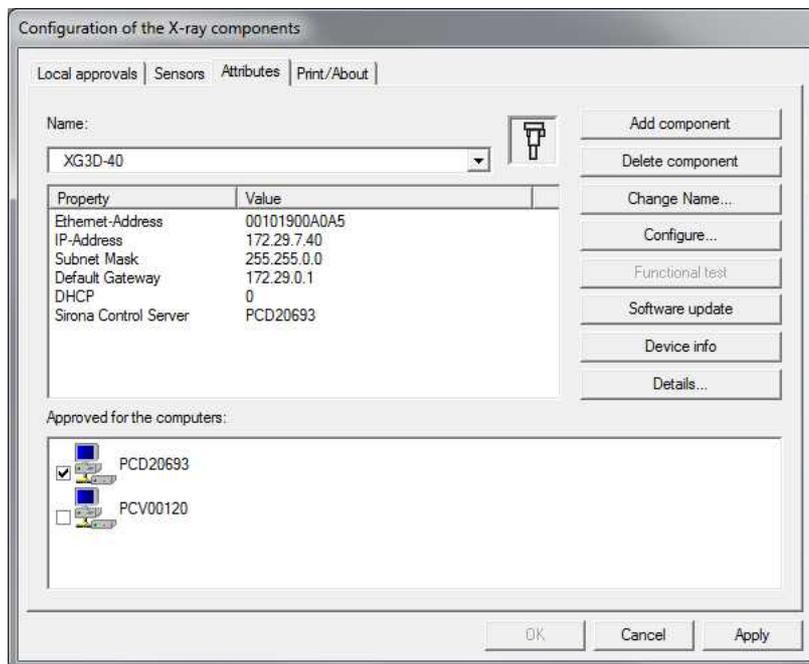
If the actual status of the module cannot be polled for the update, the actual SW version will be displayed as = V00:00.

If a module has a hardware incompatibility to the program status to be programmed or the software version on the module is newer than the one in the update file, this will be indicated by a red triangle with an exclamation mark.

If the version of the selected update file is lower than the current software version of the unit, then there will be no display in the right window. The downgrade required in this case is possible only via "*Main version*" mode.

4.3 Opening "Details"

1. Start the "SIDEKIS Manager" under "Start"/"Programs"/"SIDEKIS"/"SIDEKIS XG".
2. Click "Configuration of the X-ray components".
 - ↳ The "Configuration of the X-ray components" menu opens.



3. Select the "Attributes" tab.
4. Click on the "Details..." button.
 - ↳ The current parameters are read from the unit and filed in an XML file under the network name of the unit in the PDATA/.../ P2K_Config folder. The process can take up to 30 seconds. After the parameters are read, an editor displaying the data is opened automatically.

```

Details.txt x
-----
32
33
34 ----- Standard Configuration DX 11 -----
35
36 Name of flat module:      'DX11 '
37 Code Number:             ' 5025214'
38 Serial Number:           '      329039368'
39 Hardware Index:          0
40 Hardware Revision:       2
41 Test Date:               2010-Feb-15
42 Test Counter:            1
43 Processor Derivate:      '      MPC856T2P80D4'
44 Previous Software Version: 132
45 Previous Software Revision: 2
46 Date Last Software Update: 2010-Oct-01
47 Current Software Version: 148
48 Current Software Revision: 39
49 GBPS defined area:       0x0f 0x0f 0x0f 0x0f 0x0f 0x0f 0x0f 0x0f
50
51 -----
52 ----- Extended Configuration DX 11 -----
53
54 DX11 SerialNo:           18757644
55 DX11FpgaVersion:         3
56 DX11FpgaRevision:        4
57 DX11HWVersion:           8
58 DX11MemorySize:          134217728
59 DX11CpuClock:             80020000
60 BspVersion:               1.4/2-IX0204
61
62 -----
63 ----- Error Logging Data DX 11 -----
64
65
66 Timestamp                Category      Message
67 2010-10-12, 10:13:33 [Message ]: Logbook started
68 2010-10-12, 10:13:55 [Error   ]: E1 11 20 (ERR_DX11_INVALID_CB_CALIBDATA)
69 2010-10-12, 10:17:22 [RTC Date/Time change]: Tried to change to: 2010-Oct-12, 10:17:22
70 2010-10-12, 10:19:57 [Message ]: Logbook started
71 2010-10-12, 10:20:19 [Error   ]: E1 11 20 (ERR_DX11_INVALID_CB_CALIBDATA)
72 2010-10-12, 10:21:37 [RTC Date/Time change]: Tried to change to: 2010-Oct-12, 10:18:56
73 2010-10-12, 10:40:27 [Message ]: Logbook started
74 2010-10-12, 10:40:49 [Error   ]: E1 11 20 (ERR_DX11_INVALID_CB_CALIBDATA)
75 2010-10-12, 10:41:36 [RTC Date/Time change]: Tried to change to: 2010-Oct-12, 10:44:17
76 2010-10-12, 10:59:54 [Message ]: Logbook started
77 2010-10-12, 11:00:15 [Error   ]: E1 11 20 (ERR_DX11_INVALID_CB_CALIBDATA)
78 2010-10-12, 11:00:41 [RTC Date/Time change]: Tried to change to: 2010-Oct-12, 11:00:41
79 2010-10-12, 11:03:10 [Message ]: Logbook started
80 2010-10-12, 11:06:34 [Message ]: Logbook started
  
```

4.4 Setup of an 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.

The program SiXABCon is used to manage networkable X-ray components. It can be executed on any PC in the network on which SIDEXIS XG has been installed.

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 needs to be assigned a unique IP address.

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

192.168.15.240 (subnet mask: 255.255.255.0)

Checking existing IP addresses

To find out whether an IP address already exists in the network, enter the "PING" function in the input prompt (DOS window).

1. Switch on *all* network devices (computers, printers, X-ray components) which are being operated in the network.
 2. Invoke the input prompt (DOS window) from a network computer.
 3. At the input 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:

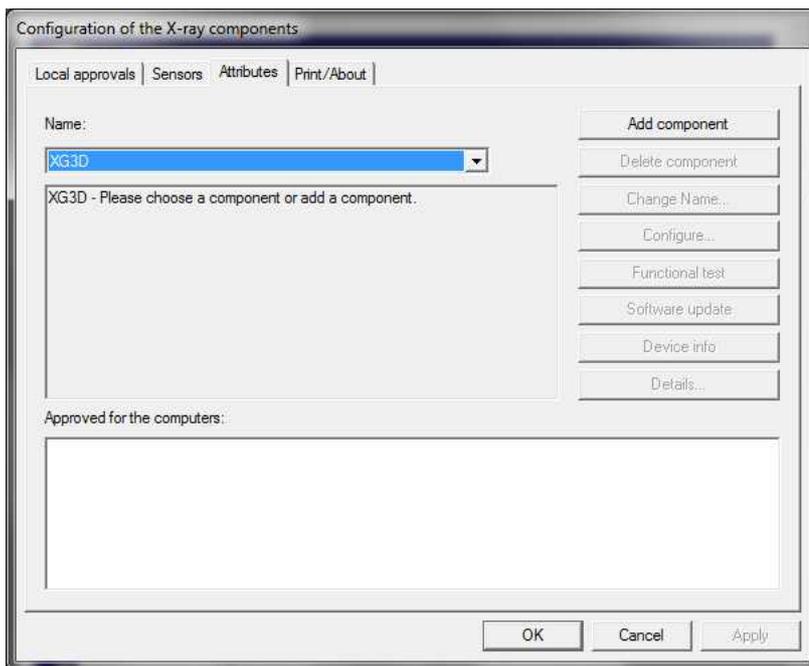
Antwort von 192.168.15.13: Bytes=32 Zeit<1ms TTL=63

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

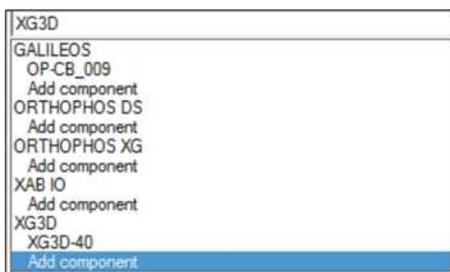
C:\>
```

4.4.1 Selecting an X-ray component

1. Switch all networkable X-ray components off.
2. Start the "SIDEXIS Manager" by selecting "start" / "Program Files" / "SIDEXIS".
3. Click "Configuration of the X-ray components".
 - ↳ The "Configuration of the X-ray components" menu opens.
4. Select the "Attributes" tab.

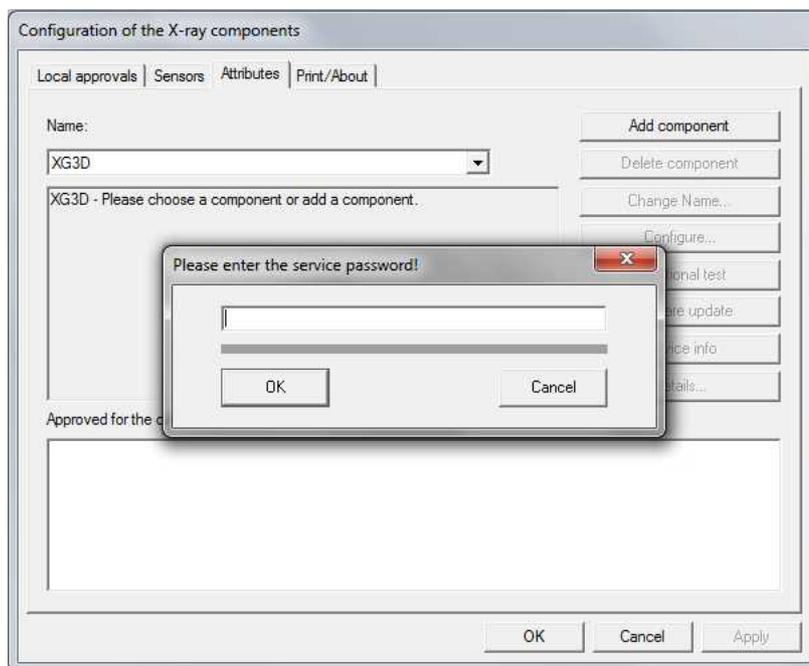


5. Select the name of the desired X-ray component in the "Name" pull-down menu ("XG3D" in the example); then click the "Add component" button.

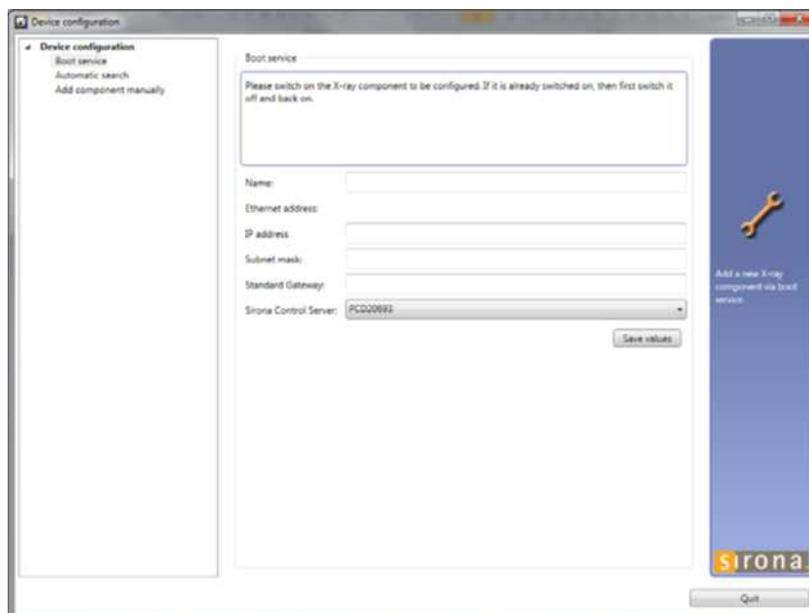


or

- Select the text "Add component" under the desired X-ray component in the "Name" pull-down menu.
- ↳ The password dialog box appears.



6. Enter the service password [→ 188] and confirm your input by clicking the "OK" button.
 - ↳ The "Device configuration" menu opens.
 - ↳ The "Boot service" element is selected automatically.



Boot service

IMPORTANT

Automatic addition and setup of the X-ray component via the boot service functions properly only if the unit is started with the default factory-set IP address.

If the IP address already has been changed, reset it to the factory setting via service routine S037.2 or use the elements *"Automatic search"* or *"Add component manually"* (see section on "Alternatives to the boot service").

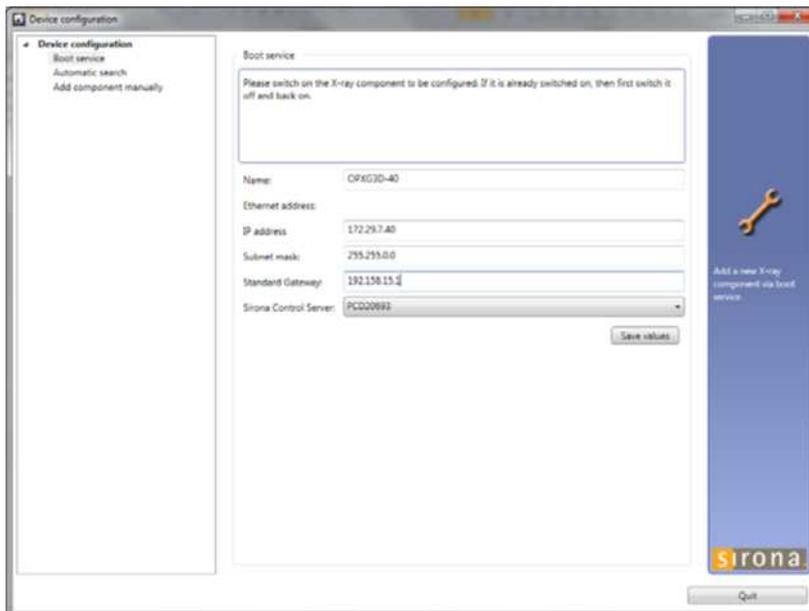
✓ The element *"Boot service"* is selected in the structure tree.

1. Switch the unit on.

- ↳ The unit is detected in the network and the values for the IP address, subnet mask and standard gateway are automatically imported to the input fields of the menu.

IMPORTANT

If the unit is not automatically detected in the network, it is possible to manually assign a static IP address via service routine S037.4.



IMPORTANT

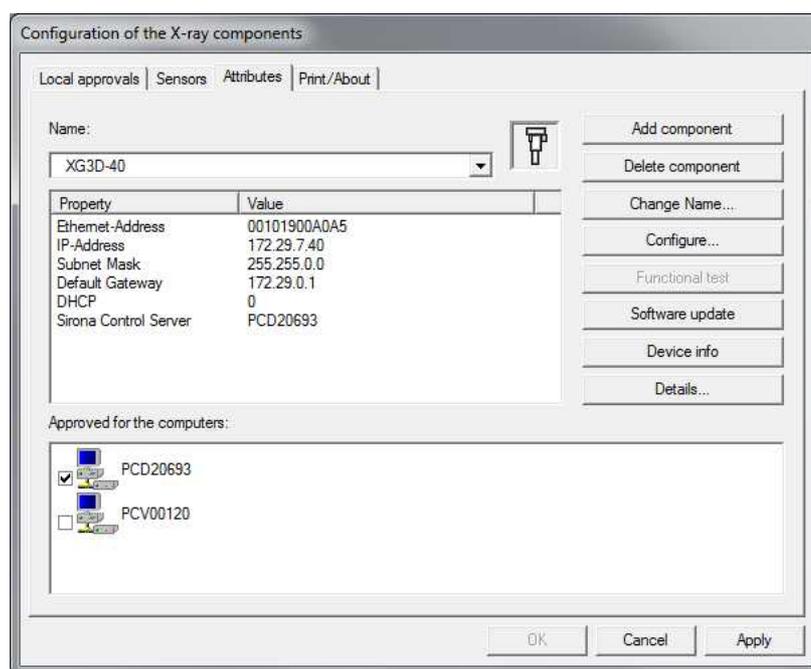
Each unit must be assigned a unique IP address in the network.

2. If you want to, you can enter an individual IP address in the *"IP address"* input field and then click into one of the other input fields with the cursor.

- ↳ Default values suitable for the IP address are automatically entered in the *"Subnet mask"* and *"Standard Gateway"* input fields.

3. You can either overwrite the default values in the input fields or leave them unchanged, depending on the network involved.

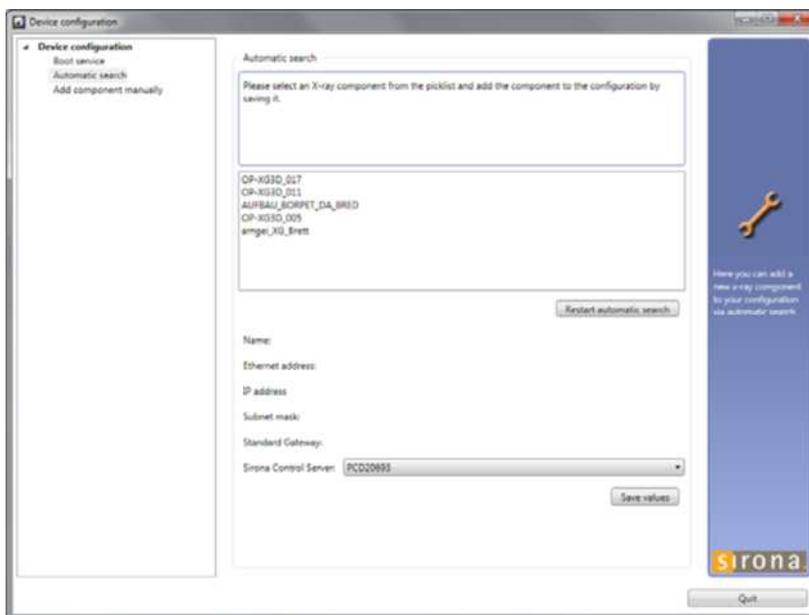
4. Select the desired RCU in the "Sirona Control Server" drop-down menu.
5. Confirm the settings by clicking on the "Save values" button.
 - ↳ The settings are saved.
 - ↳ The "Device configuration" dialog window appears and informs you that the configuration of the X-ray component has been completed successfully.
6. Confirm this dialog by clicking on the "OK" button.
7. Close the "Device configuration" menu by clicking on the "Quit" button.
 - ↳ The new X-ray component appears in the device list of the menu "Configuration of the X-ray component".



Alternatives to the boot service

As an alternative to adding new X-ray components via the boot service, you also can add them via the "Automatic search" or the "Add component manually" function.

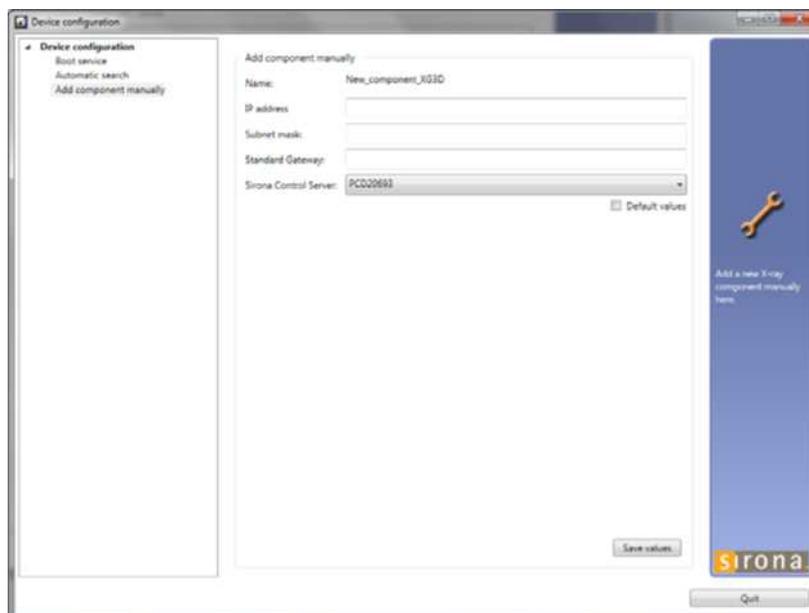
Automatic search



1. Select the *"Automatic search"* element.
 - ↳ The network is searched for existing X-ray components. All X-ray components found appear in the menu list.
2. Select the desired X-ray component from the list.
 - ↳ The values for the IP address, subnet mask and standard gateway are automatically imported to the input fields of the menu.
3. Select the desired RCU in the *"Sirona Control Server"* drop-down menu.
4. Confirm the settings by clicking on the *"Save values"* button.
 - ↳ The settings are saved.
 - ↳ The *"Device configuration"* dialog window appears and informs you that the configuration of the X-ray component has been completed successfully.
5. Confirm this dialog by clicking on the *"OK"* button.
6. Close the *"Device configuration"* menu by clicking on the *"Quit"* button.
 - ↳ The new X-ray component appears in the device list of the menu *"Configuration of the X-ray component"*.



Adding the component manually

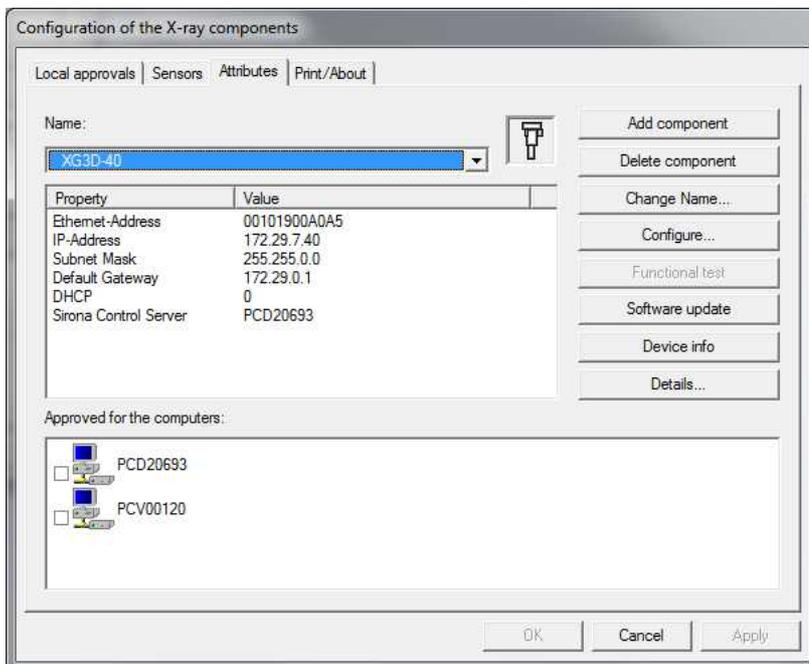


1. Select the "Add component manually" element.
2. Enter the values in the menu input fields manually.
3. Select the desired RCU in the "Sirona Control Server" drop-down menu.
4. Confirm the settings by clicking on the "Save values" button.
 - ↳ The settings are saved.
 - ↳ The "Device configuration" dialog window appears and informs you that the configuration of the X-ray component has been completed successfully.
5. Confirm this dialog by clicking on the "OK" button.
6. Close the "Device configuration" menu by clicking on the "Quit" button.
 - ↳ The new X-ray component appears in the device list of the menu "Configuration of the X-ray component".

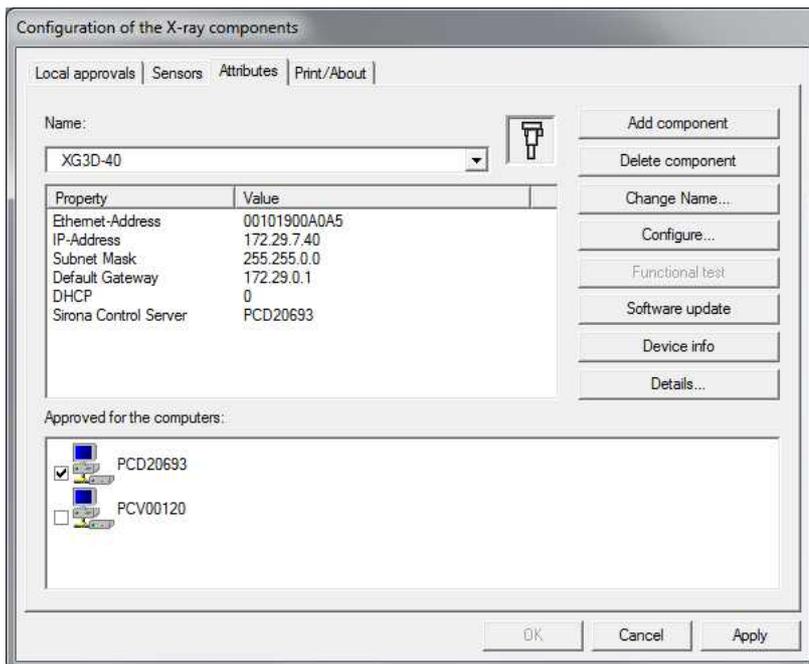


4.4.2 Approval of the X-ray component

- ✓ The X-ray component must have been selected [→ 74] via the "Device configuration" menu.



- Click on the check box in front of the X-ray component that you would like to enable and accept the setting by clicking on the "Apply" button.
 - ↳ The X-ray component is enabled.



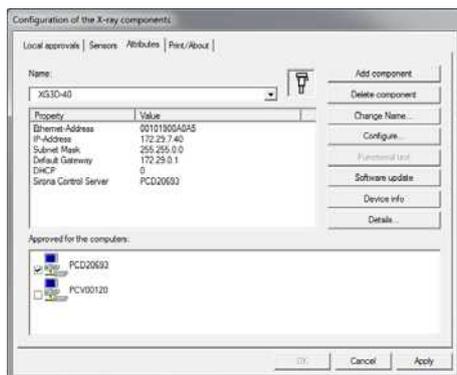
Checking enablement

- To check the communication with the unit, click the *"Device info"* button.
 - ↳ If the unit is communicating, a logfile with information on the unit configuration appears.

```
1 -----
2 ----- Orthophos XG3D configuration -----
3 -----
4 Serialnumber      : 000023199
5 System Software Version: V04.02.06
6 -----
7 Bootmode         : Static
8 Type            : 203
9 Network Name     : XG3D-40
10 MAC Address     : 00:10:19:00:a0:a5
11 IP Address      : 172.29.7.40
12 Subnet Mask     : 255.255.0.0
13 Default Gateway : 172.29.0.1
14 NetAPI Version (comp.) : 1.15
15 NetAPI Version (conn.) : 1.15
16 -----
17 Demomode        : Off
18 Tube Exposures  : 777
19 Total Exposure Load : 2522493
20 Tube Exposures Permanent : 469
21 Tube Exposures Pulsed : 306
22 Tube Exposures DualEnergy : 0
23 Exposure Load Permanent : 2002367
24 Exposure Load Pulsed : 520126
25 Exposure Load DualEnergy : 0
26 -----
27 Active Keys     :
28                : No active keys found
29 -----
30 Time           : 10:00:07
31 Date          : 2010-Nov-18
32 -----
33 -----
34 ----- Standard Configuration DX 11 -----
35 -----
36 Name of flat module: 'DX11 '
37 Code Number:      ' 5925214'
38 Serial Number:    '      329039368'
```

4.4.3 Deleting an X-ray component

1. Switch all networkable X-ray components off.
2. Start the "SIDEXIS Manager" by selecting "start" / "Program Files" / "SIDEXIS".
3. Click "Configuration of the X-ray components".
↳ The "Configuration of the X-ray components" menu opens.
4. Select the "Attributes" tab.
5. Select the name of the desired X-ray component in the "Name" pull-down menu ("XG3D" in the example); then click the Delete component button.



4.5 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.

4.5.1 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:

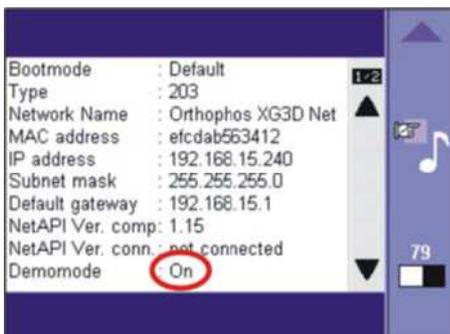
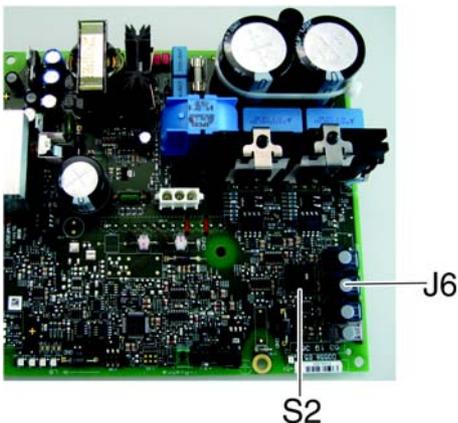
1. Switch off the unit.

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 [→ 41].
3. Remove the cover plate of board DX6 [→ 406].
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.

4.5.2 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 [→ 41].
3. Remove the cover plate of board DX6 [→ 406].
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.

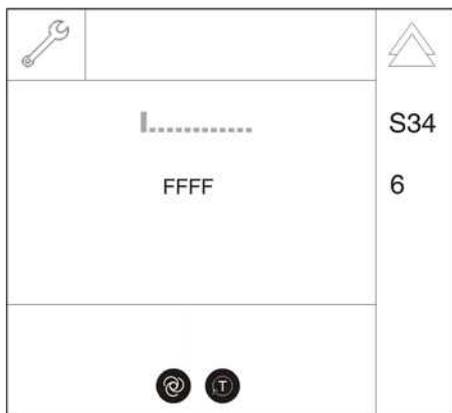
4.5.3 Important information for repacking and transport

IMPORTANT

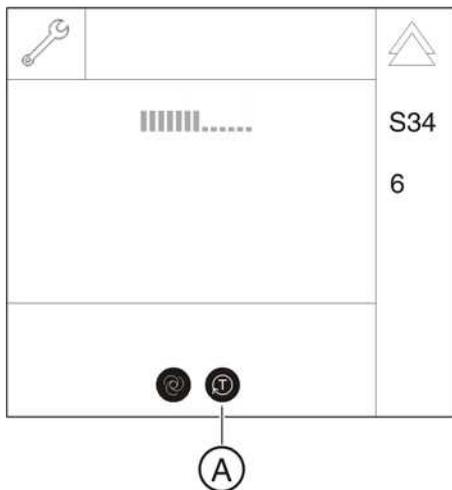
If a used carton on which one of the shockwatch or tiltwatch indicators has already been tripped is used to package the unit, please make an entry to that effect on the delivery note.

Packing the cephalometer

1. Call service routine S034.6 [→ 355].
 ↪ After calling the service routine, an inactive progress indicator is displayed in selection field 1. Selection field 2 shows the characters "FFFF".

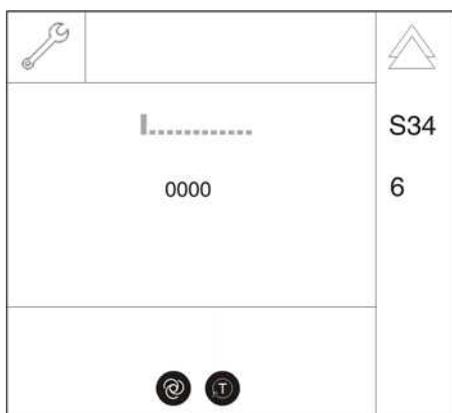


2. Touch the T key (A).
 ↪ The cephalometer moves to the packing position. The procedure is visualized by an active progress indicator in selection field 1.



- ↪ When the cephalometer has reached its packing position, "0000" is displayed in selection field 2.

3. Exit the service routine [→ 262].



Packing the panoramic unit

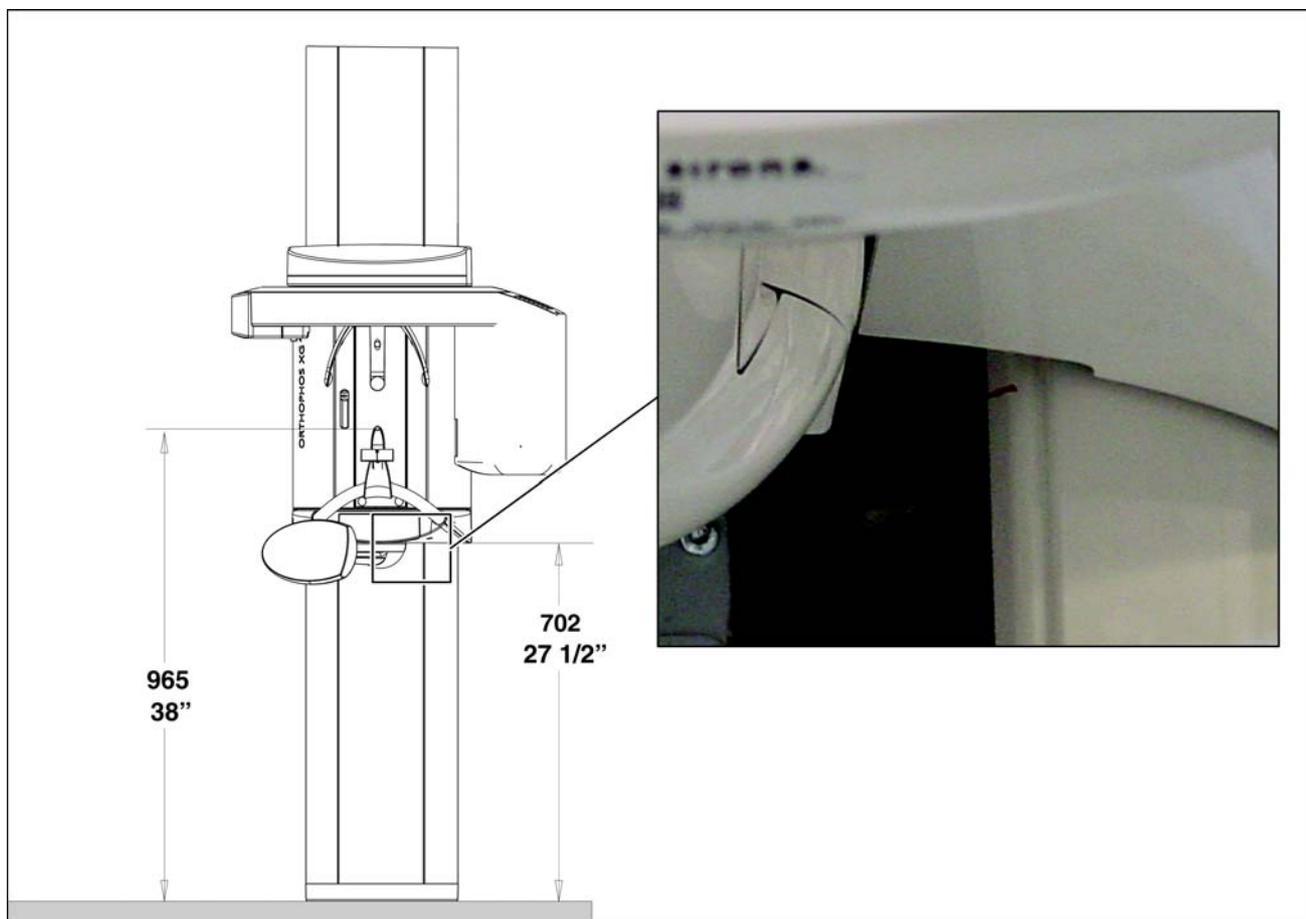
IMPORTANT

The bottom edge of the slide cover must be at the same height as the markings **A** 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 (Packing condition (see section "Delivery")).

Dismantling and packaging the X-ray detector

IMPORTANT

For transport, pack the X-ray detector in its original packaging (for packing condition see section "Delivery").

- To dismantle the X-ray detector, follow the same procedure as Installation in reverse order.

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 Easypad touchscreen
- On the display of the remote control

There are 3 groups of message texts:

Help messages (Hx xx):

- Help messages are caused by operator errors.
- The user must take action.

Error messages (Ex yyxx):

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

System messages (Sxxx):

- System messages inform the user about the current operating status of the unit.
- The user does not have to take any action.

If error messages are displayed on the control panel that are not listed in this section (such as message 1311), these messages come from the Windows system. In such cases, you must check whether the firmware you are using is compatible with the SIDEXIS XG version and run a software update [→ 62] if necessary.

5.1 Help messages

Help messages are displayed as help codes (Hx xx) 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 due to a previous operator error.

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 [→ 94].

Help code	Description	Actions required
H3 01	"R button, move into starting position"	<ul style="list-style-type: none"> • Press the R key. • Unit moves to starting position.
H3 07	"Change bite block"	Remove the occlusal bite block.
H3 20	"R button, confirm exposure data"	<ul style="list-style-type: none"> • Press the R key. • Exposure data are confirmed.
H3 21	"Close the door"	<ul style="list-style-type: none"> • Close door or check door contact. Then press R key to acknowledge the message.
H3 22	"Select quadrant"	<ul style="list-style-type: none"> • Select quadrant
H3 25	"Select region of exposure"	<ul style="list-style-type: none"> • Select the center of rotation.
H4 02	"Plug sensor into Ceph slot"	<ul style="list-style-type: none"> • 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 [→ 160] .
H4 03	"Switch SIDEXIS to ready for exposure state"	<ul style="list-style-type: none"> • Make SIDEXIS XG ready for exposure.
H4 04	"Plug in Ceph sensor"	<ul style="list-style-type: none"> • Plug the ceph sensor into the cephalometer.
H4 06	"R button, move into Ceph starting position"	<ul style="list-style-type: none"> • Press the R key. • Cephalometer moves to starting position.
H4 07	"Correct SIDEXIS preselection"	<ul style="list-style-type: none"> • Perform alternative program setting.
H4 08	"Select SIDEXIS 3D exposure"	Select 3D exposure in SIDEXIS XG.
H4 09	"Select SIDEXIS 2D exposure"	Select 2D exposure in SIDEXIS XG.
H4 20	"Get existing exposure"	<p>IMPORTANT: Do not switch the system off until the help message has disappeared.</p> <ul style="list-style-type: none"> • Get exposure with "Sirona Control Admin" (see SIDEXIS XG "Operator's Manual" (REF 59 62 134).

5.2 System messages

System codes are only displayed on the remote control. System messages are displayed in plain text on the Easypad.

System code	Description	Actions required
S100	<i>"System is starting"</i>	<ul style="list-style-type: none"> • Wait, no action required.
S110	<i>"Exposure not possible"</i>	<ul style="list-style-type: none"> • Restart the unit: <ol style="list-style-type: none"> 1. Switch off the unit. 2. Wait 1 minute. 3. Switch unit on. 4. Repeat procedure

5.3 Status displays

Status display on the Easypad	Description
Ready for exposure	The unit is ready for operation.
Exposure is performed	Radiation is released.
Please wait	Unit waiting for operational readiness.
Ready for exposure in XX seconds	The cooling time countdown is running.

5.4 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.

5.4.1 Error code: Ex yy zz

The error messages are encoded according to the following pattern:

Ex	Error type	“Troubleshooting” classification for the user
yy	Location	Module, subsystem or logical function unit
zz	Consecutive number	Identification of error

5.4.2 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"> Acknowledge the error message. If the error occurs again ... <ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure If the error occurs again ... <ul style="list-style-type: none"> Run an error diagnosis [→ 94].
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"> Acknowledge the error message. Repeat the procedure step after a certain waiting time. If the error occurs again ... <ul style="list-style-type: none"> Extend the waiting time. If the error occurs again ... <ul style="list-style-type: none"> Run an error diagnosis [→ 94].
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"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure If the error occurs again... <ul style="list-style-type: none"> Run an error diagnosis [→ 94].

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"> • Acknowledge the error message and make sure that the movements of the unit are not obstructed. • Repeat the last procedure step or exposure. If the error occurs again ... <ul style="list-style-type: none"> • Run an error diagnosis [→ 94].
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"> • Acknowledge the error message. • Repeat the last procedure step or exposure. If the error occurs again ... <ul style="list-style-type: none"> • Run an error diagnosis [→ 94].
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"> • Acknowledge the error message. • Run an error diagnosis [→ 94]. Further operation of the unit is possible.
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"> • Run an error diagnosis [→ 94].

5.4.3 yy - Location

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

yy	Location/Function unit	Board
06	X-ray tube assembly	DX6
61	Diaphragm control	DX61
07	Easypad user interface	DX7
10	System hardware	DX11/DX1
11	System software	DX11/DX1
12	CAN bus	DX11/DX1
13	Stand peripherals	DX11/DX1
14	Digital extension	DX11/DX1
15	Configuration/update (wrong software, wrong module constellation, etc...)	DX11/DX1
42	Remote control	DX42
81	2D sensor (PAN) or Ceph sensor	DX81
88	Combisensor	DX88
91	Cephalometer	DX91

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).

5.4.4 General handling of error messages

Error messages must always be acknowledged with the R key.

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 [→ 160]"). In some cases, it may make sense to obtain more information on the history and frequency of errors via the error logging memory (S007) and via "SiXABCon" / "Properties" / "Details..." (see section, Opening "Details" [→ 71]) (see also section "Error logging memory [→ 161]").

5.5 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.

5.5.1 Location 06: Tube assembly/DX6

Error code	Description	Actions required	see
E6 06 01	General error during module initialization	<ul style="list-style-type: none"> 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. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> Run service routine S005.2. 	
		<ul style="list-style-type: none"> 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. [→ 62]

Error code	Description	Actions required	see
E6 06 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"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> 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. [→ 62]

Error code	Description	Actions required	see
E6 06 04	Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> 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. [→ 62]

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.	<ul style="list-style-type: none"> Repeat the software update. 	S. [→ 62]
		<ul style="list-style-type: none"> Check the CAN bus. 	S. [→ 163]
		If the error occurs repeatedly or the module is no longer addressable ... <ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

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	<ul style="list-style-type: none"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> 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. [→ 62]

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"> 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"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams) 	
		If 3.3 V present ... <ul style="list-style-type: none"> Replace board DX11. 	S. [→ 428]
		If 3.3 V is not present ... <ul style="list-style-type: none"> Replace board DX1. 	S. [→ 428]
		<ul style="list-style-type: none"> Check cable L6, replace if necessary. 	S. [→ 176] S. [→ 441]
		<ul style="list-style-type: none"> Check tube assembly (DX6), replace if necessary. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 08	General fault detected locally on module (slave side). CAN controller being reinitialized.	<ul style="list-style-type: none"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> Check software versions on the info screen or by running service routine S008.2, perform software update if necessary. 	S. [→ 286], S. [→ 62]
		<ul style="list-style-type: none"> 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. [→ 62]
		<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E7 06 10	Module is stuck in bootloader stage.	<ul style="list-style-type: none"> Check board DX6 (note LED states). 	S. [→ 169]
		If the board remains in the bootloader stage ...	S. [→ 62]
		<ul style="list-style-type: none"> Repeat the software update. Replace the tube assembly. 	S. [→ 406]

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"> Check the CAN bus. 	S. [→ 163]
		If this error occurs in combination with other errors ...	
		<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and observe causal error messages. 	
		<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

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"> Acknowledge error and repeat procedure. 	
		If the error occurs repeatedly ...	S. [→ 406]
		<ul style="list-style-type: none"> Replace the tube assembly. 	

Error code	Description	Actions required	see
E2 06 20	Overtemperature of single tank/ power pack	<ul style="list-style-type: none"> Wait until the X-ray tube assembly has cooled down. 	
		<ul style="list-style-type: none"> Check fan function by running service routine S005.4; replace fan if necessary. 	S. [→ 275], S. [→ 412]
		<ul style="list-style-type: none"> Check temperature sensor in single tank by running service routine S005.5, replace tube assembly if necessary. 	S. [→ 276], S. [→ 406]

Error code	Description	Actions required	see
E6 06 21	Hardware signal of release button not detected.	<ul style="list-style-type: none"> Check cable L5 (optical fiber), replace if necessary. 	S. [→ 176], S. [→ 441]
		<ul style="list-style-type: none"> Replace board DX1. 	S. [→ 428]
		<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 22	Broken temperature sensor	<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E3 06 23	Hardware signal of release button applied during power-on.	<ul style="list-style-type: none"> Check cable L5: <ol style="list-style-type: none"> Switch off the unit. Pull cable L5 off tube assembly. Switch unit on. Perform optical check of L5: 	
		If light is visible ... <ul style="list-style-type: none"> Replace board DX1. 	S. [→ 428]
		If no light is visible ... <ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

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"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> 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. [→ 62]

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"> • Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> • 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. [→ 62]

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"> • Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> • 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. [→ 62]

Error code	Description	Actions required	see
E1 06 40	Tolerance exceeded: Preheating (VH) - nom.	<ul style="list-style-type: none"> • Run service routine S005.2. 	S. [→ 274]
		<ul style="list-style-type: none"> • Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E1 06 41	Tolerance exceeded: kV - nom.	<ul style="list-style-type: none"> • Run service routine S005.2. 	S. [→ 274]
		<ul style="list-style-type: none"> • Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E1 06 42	Tolerance exceeded: mA - nom.	<ul style="list-style-type: none"> • Run service routine S005.2. 	S. [→ 274]
		<ul style="list-style-type: none"> • Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E1 06 43	Tolerance exceeded: Preheating (VH) - act.	<ul style="list-style-type: none"> • Run service routine S005.2. 	S. [→ 274]
		<ul style="list-style-type: none"> • Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E1 06 44	Tolerance exceeded: kV - act.	<ul style="list-style-type: none"> • Check the supply line to the check release button, replace check release button if necessary. 	
		<ul style="list-style-type: none"> • Run service routine S005.2. 	S. [→ 274]
		<ul style="list-style-type: none"> • Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E1 06 45	Tolerance exceeded: mA - act.	<ul style="list-style-type: none"> Check the supply line to the check release button, replace check release button if necessary. 	
		<ul style="list-style-type: none"> Run service routine S005.2. 	S. [→ 274]
		<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 51	VHmax	<ul style="list-style-type: none"> Run service routine S005.2. 	S. [→ 274]
		<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 52	MAmax	<ul style="list-style-type: none"> Run service routine S005.2. 	S. [→ 274]
		<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 53	KVmax	<ul style="list-style-type: none"> Run service routine S005.2. 	S. [→ 274]
		<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 54	Basic heating pulses not applied.	<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 55	Anode voltage too low.	<ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 56	Error during auto-compensation.	<ul style="list-style-type: none"> 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. [→ 62]
		<ul style="list-style-type: none"> Let the tube assembly cool down for approx. 30 mins and repeat this procedure. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace the tube assembly. 	S. [→ 406]

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"> Replace cable L15. Replace board DX1. Replace the tube assembly. 	S. [→ 441], S. [→ 428], S. [→ 406]

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"> Replace the tube assembly. 	S. [→ 406]

Error code	Description	Actions required	see
E6 06 66	Impermissible tube type.	<ul style="list-style-type: none"> Check tube type of tube assembly using extended detail query, replace tube assembly if necessary. 	S. [→ 406]

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"> Check TDI signal: <ol style="list-style-type: none"> Switch off the unit. Disconnect cable L15 at board DX11. Switch unit on. Perform visual check at socket J5: 	
		<ul style="list-style-type: none"> If light is visible: Replace board DX11. If no light is visible: Replace the tube assembly. 	S. [→ 428], S. [→ 406]

5.5.2 Location 07: Easypad/DX7

Error code	Description	Actions required	see
E6 07 01	General error during module initialization	<ul style="list-style-type: none"> 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. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace user interface with electronics (DX7). 	S. [→ 388]

Error code	Description	Actions required	see
E6 07 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> 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. [→ 62]
		<ul style="list-style-type: none"> Acknowledge error and repeat procedure. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace user interface with electronics (DX7). 	S. [→ 388]

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"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> 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. [→ 62]

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"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> 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. [→ 62]

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"> Repeat the software update. 	S. [→ 62]
		<ul style="list-style-type: none"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> Replace user interface with electronics (DX7). 	S. [→ 388]

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"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> 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. [→ 62]
		<ul style="list-style-type: none"> Replace user interface with electronics (DX7). 	S. [→ 388]

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"> Undervoltage on the master side Procedure error in the software Master (DX11) receives no return commanding from the module <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"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams) 	
		<p>If 3.3 V is present ...</p> <ul style="list-style-type: none"> Replace board DX11. 	S. [→ 428]
		<p>If 3.3 V is not present ...</p> <ul style="list-style-type: none"> Replace board DX1. 	S. [→ 428]

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"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> Check software versions on the info screen or by running service routine S008.2, perform software update if necessary. 	S. [→ 286], S. [→ 62]
		<ul style="list-style-type: none"> Replace user interface with electronics (DX7). 	S. [→ 388]
		<ul style="list-style-type: none"> 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. [→ 62]

Error code	Description	Actions required	see
E7 07 10	Module is stuck in bootloader stage.	<ul style="list-style-type: none"> Check user interface with electronics (DX7) (note LED states). 	
		If the board remains in the bootloader stage ... <ul style="list-style-type: none"> Repeat the software update. 	S. [→ 62]
		<ul style="list-style-type: none"> Replace user interface with electronics (DX7). 	S. [→ 388]

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"> Check the CAN bus. 	S. [→ 163]
		This error is a sequential fault. <ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and observe causal error messages. 	

Error code	Description	Actions required	see
E6 07 20	Contact to DX11 interrupted during operation.	<ul style="list-style-type: none"> Note error message on remote control (DX42) and check log memory (via "Details"). 	
		<ul style="list-style-type: none"> Check the CAN bus. 	S. [→ 163]
		<ul style="list-style-type: none"> Check cable L9, replace if necessary. 	S. [→ 176], S. [→ 441]

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"> Start the detail query via SiXABCon. 	
		If DX11 responds ... <ul style="list-style-type: none"> Check the signal path to DX7, repair or replace cables/connectors if necessary. Replace board DX1. 	S. [→ 441], S. [→ 428]
		If DX11 does not respond ... <ul style="list-style-type: none"> Replace board DX11. 	S. [→ 428]

Error code	Description	Actions required	see
E3 07 30	Up/down keys pressed on power-on.	<ul style="list-style-type: none"> • Restart the unit: <ol style="list-style-type: none"> 1. Switch off the unit. 2. Wait 1 minute. 3. Switch unit on. 4. Repeat procedure and observe causal error messages. <p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> • Replace user interface with electronics (DX7). 	S. [→ 388]
E3 07 31	Forehead support key pressed during power-on.		
E3 07 32	Temple support key pressed during power-on.		
E3 07 33	Light localizer key pressed during power-on.		
E3 07 34	T key pressed during power-on.		
E3 07 35	R key pressed during power-on.		
E3 07 36	Touchscreen pressed during power-on.		

Error code	Description	Actions required	see
E7 07 40	No valid language set found.	Check selected language set by running service routine S017.5, correct if necessary.	S. [→ 309]
		Check whether selected language set is already installed, perform software update if necessary.	S. [→ 62]
		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. [→ 62]

5.5.3 Location 10: System hardware

Error code	Description	Actions required	see
E7 10 01	EEPROM cannot be written.	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. 	S. [→ 435]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace board DX11. 	

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"> Replace board DX1. 	S. [→ 429]

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"> Acknowledge error and repeat procedure. 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"> Wait until the error code automatically disappears (approx. 2 - 3 mins). 	

Error code	Description	Actions required	see
E1 10 05	Flash file system is not ready for operation.	<ul style="list-style-type: none"> Execute service routine S009.4 and format flash file system. The contents of the error memory are thus lost.	S. [→ 288]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace board DX11. 	S. [→ 435]

Error code	Description	Actions required	see
E1 10 07	General or unknown error during self-test of 3D image data path.	This error is a sequential fault. <ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and observe causal error messages. 	

Error code	Description	Actions required	see
E1 10 31	Serial number of DX88 on DX11 incorrect.	<ul style="list-style-type: none"> Run service routine S009.8 to synchronize system data. NOTICE! Then a complete unit adjustment and calibration must be performed. 	S. [→ 290]

Error code	Description	Actions required	see
E1 10 32	Flat panel was replaced. NOTICE! The flat panel may be replaced only together with board DX88 (included in the scope of supply).	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		If the error occurs repeatedly: <ul style="list-style-type: none"> Please report this event to the Customer Service Center to help us improve the product. 	

Error code	Description	Actions required	see
E1 10 34	DX88 and FP boards were replaced.	<ul style="list-style-type: none"> Run service routine S009.8 to synchronize system data. NOTICE! Then a complete unit adjustment and calibration must be performed.	S. [→ 290]

Error code	Description	Actions required	see
E1 10 35	Combisensor is unknown, DX88 info data are not available.	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		If the error occurs repeatedly: <ul style="list-style-type: none"> Replace board DX88. Please report this event to the Customer Service Center to help us improve the product. 	S. [→ 429]

Error code	Description	Actions required	see
E1 10 36	Board DX88 was replaced.	<ul style="list-style-type: none"> Run service routine S009.8 to synchronize system data. NOTICE! Then a complete unit adjustment and calibration must be performed.	S. [→ 290]

Error code	Description	Actions required	see
E1 10 37	The chip ID of the flat panel could not be read.	<ul style="list-style-type: none"> • Restart the unit: 1. Switch off the unit. 2. Wait 1 minute. 3. Switch unit on. 4. Repeat procedure and check function. 	
		<p>If the error occurs repeatedly:</p> <ul style="list-style-type: none"> • Check plug connection between board DX88 and flat panel. • Replace board DX88 if necessary. • Replace the 3D module, if necessary. 	<p>S. [→ 429], S. [→ 417]</p>

5.5.4 Location 11: Power PC/Board DX11

Error code	Description	Actions required	see
E6 11 01	Program sequence error.	<ul style="list-style-type: none"> 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. [→ 62]
		<ul style="list-style-type: none"> Acknowledge error and repeat procedure. 	
		If the error occurs again ...	
		<ul style="list-style-type: none"> Reset the entire calibration of the unit and readjust the unit. 	S. [→ 184]
		<ul style="list-style-type: none"> Replace board DX11. 	S. [→ 435]

Error code	Description	Actions required	see
E6 11 02	Watchdog error	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. 	
		If the error occurs repeatedly ...	S. [→ 435]
		<ul style="list-style-type: none"> Replace board DX11. 	

Error code	Description	Actions required	see
E6 11 03	Operating system/resource error.	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. 	
		If the error occurs repeatedly ...	S. [→ 435]
		<ul style="list-style-type: none"> Replace board DX11. 	

Error code	Description	Actions required	see
E7 11 04	Implausible data in EEPROM.	<ul style="list-style-type: none"> Check the unit configuration via service routines S017 and S018 and reconfigure if necessary. 	S. [→ 303], S. [→ 324]
		<ul style="list-style-type: none"> Check calibration with diaphragm test exposures. 	S. [→ 469]
		If the calibration is not OK ...	S. [→ 184]
		<ul style="list-style-type: none"> Recalibrate the unit. 	
		If the calibration is OK ...	
		<ul style="list-style-type: none"> Make the individual unit settings again (e.g. programming of the patient symbol keys; see Operating Instructions). 	

Error code	Description	Actions required	see
E6 11 05	RAM allocation failed.	<ul style="list-style-type: none"> Replace board DX11. 	S. [→ 435]

Error code	Description	Actions required	see
E5 11 06	<p>Error when processing the control image following exposure.</p> <p>Following exposure, the control image is displayed on the Easypad as a quick view.</p> <p>The error usually occurs when there are problems with the image data path. It appears along with other error messages from this area (e.g. with E6 14 10, E6 14 11, E6 14 12).</p>	<ul style="list-style-type: none"> • Pay attention to accompanying error messages (E xx,). Proceed according to the description for these error messages. • Check the image data path. • Check the cable and replace if necessary. • Replace the 2D sensor or Ceph sensor. • Replace board DX1. 	<p>S. [→ 177], S. [→ 176], S. [→ 441], S. [→ 415] S. [→ 429]</p>

Error code	Description	Actions required	see
E7 11 07	<p>Unknown or invalid definition of unit class.</p> <p>Occurs during first power-on after replacement of board DX6 or DX11.</p>	<ul style="list-style-type: none"> • Take the action required after replacing a board. 	<p>S. [→ 432]</p>

Error code	Description	Actions required	see
E7 11 08	<p>The installed control panel does not match the unit.</p>	<ul style="list-style-type: none"> • Installing the Easypad. 	<p>S. [→ 388]</p>

Error code	Description	Actions required	see
E5 11 09	<p>Internal error in program sequence of board DX11.</p>	<ul style="list-style-type: none"> • Acknowledge error and repeat procedure. 	<p>S. [→ 62]</p>
		<p>If the error occurs repeatedly ...</p> <ul style="list-style-type: none"> • Perform a software update (bug fix). 	

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

Error code	Description	Actions required	see
E7 11 11	<p>Wrong unit configuration.</p>	<ul style="list-style-type: none"> • Check the unit configuration by running service routine S017.2 and reconfigure if necessary. 	<p>S. [→ 304]</p>

Error code	Description	Actions required	see
E6 11 13	The release button was not properly detected.	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure 	
		If the error occurs again ... <ul style="list-style-type: none"> Replace release button incl. cable. Replace board DX1. Replace board DX42. 	S. [→ 429]

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"> Install the correct remote control. If necessary, obtain a new remote control from the manufacturer. 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"> Run service routine S018.9. If necessary, run service routine S018.7 to make customer-specific angle settings. 	S. [→ 334], S. [→ 330]

Error code	Description	Actions required	see
E1 11 19	No image data available.	<ul style="list-style-type: none"> Check TDI signal/cable L13, replace cable L13 if necessary. TDI = Signal to start synchronized readout sequence and to prepare the next exposure 	S. [→ 176], S. [→ 441]

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"> Adjust and calibrate the unit. Check serial numbers of flat panel and board DX11. 	S. [→ 184]

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"> Switch the demo mode off. CAUTION! Radiation can be released after the demo mode is switched off! 	S. [→ 84]

5.5.5 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"> Check the CAN bus. 	S. [→ 163]

Error code	Description	Actions required	see
E6 12 02	CAN malfunction (cannot be assigned to module).	<ul style="list-style-type: none"> Check the CAN bus. 	S. [→ 163]

5.5.6 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"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_1 (X802) with service routine S015.5, replace light barrier if necessary. 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. 	S. [→ 302], S. [→ 368]

Error code	Description	Actions required	see
E4 13 02	Actuator 1 has not left pan home position.	<ul style="list-style-type: none"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_1 (X802) with service routine S015.5, replace light barrier if necessary. 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. 	S. [→ 302], S. [→ 368]

Error code	Description	Actions required	see
E5 13 03	Malfunction of actuator 1 during operation.	<ul style="list-style-type: none"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_1 (X802) with service routine S015.5, replace light barrier if necessary. 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. 	S. [→ 302], S. [→ 368]

Error code	Description	Actions required	see
E4 13 04	Actuator 1; position counter error.	<ul style="list-style-type: none"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_1 (X802) with service routine S015.5, replace light barrier if necessary. 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. 	S. [→ 302], S. [→ 368]

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"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and observe causal error messages. 	

Error code	Description	Actions required	see
E6 13 07	Error when activating actuator 1.	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch the unit off. Wait 1 minute. Switch on the unit. Repeat procedure 	
		<ul style="list-style-type: none"> 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. [→ 62]

Error code	Description	Actions required	see
E4 13 11	Actuator 2 has not reached pan home position.	<ul style="list-style-type: none"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_2 (X803) with service routine S015.5, replace light barrier if necessary. 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. 	S. [→ 302], S. [→ 368]

Error code	Description	Actions required	see
E4 13 12	Actuator 2 has not left pan home position.	<ul style="list-style-type: none"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_2 (X803) with service routine S015.5, replace light barrier if necessary. 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. 	S. [→ 302], S. [→ 368]

Error code	Description	Actions required	see
E5 13 13	Malfunction of actuator 2 during operation.	<ul style="list-style-type: none"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_2 (X803) with service routine S015.5, replace light barrier if necessary. 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. 	S. [→ 302], S. [→ 368]

Error code	Description	Actions required	see
E4 13 14	Actuator 2; position counter error.	<ul style="list-style-type: none"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_2 (X803) with service routine S015.5, replace light barrier if necessary. 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. 	S. [→ 302], S. [→ 368]

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"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and observe causal error messages. 	

Error code	Description	Actions required	see
E6 13 17	Error when activating actuator 1.	<ul style="list-style-type: none"> • Restart the unit: <ol style="list-style-type: none"> 1. Switch the unit off. 2. Wait 1 minute. 3. Switch on the unit. 4. Repeat procedure 	
		<ul style="list-style-type: none"> • 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. [→ 62]

Error code	Description	Actions required	see
E4 13 21	Ring motor has not reached home position.	<ul style="list-style-type: none"> • Check the ring drive mechanism manually for smooth and easy running, replace the ring motor or mechanism if necessary. 	S. [→ 381]
		<ul style="list-style-type: none"> • Check light barrier V1_3 (X804), replace if necessary. 	S. [→ 174], S. [→ 426]
		<ul style="list-style-type: none"> • Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E4 13 22	Ring motor has not left pan home position.	<ul style="list-style-type: none"> • Check the ring drive mechanism manually for smooth and easy running, replace the ring motor or mechanism if necessary. 	S. [→ 381]
		<ul style="list-style-type: none"> • Check light barrier V1_3 (X804), replace if necessary. 	S. [→ 174], S. [→ 426]
		<ul style="list-style-type: none"> • Replace board DX1. 	S. [→ 430]

Error code	Description	Actions required	see
E5 13 23	Malfunction of ring motor during operation.	<ul style="list-style-type: none"> • Acknowledge error. 	
		If the error occurs again ... <ul style="list-style-type: none"> • Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E4 13 24	Ring motor; position counter error.	<ul style="list-style-type: none"> • Check the ring drive mechanism manually for smooth and easy running, replace the ring motor or mechanism if necessary. 	S. [→ 381]
		<ul style="list-style-type: none"> • Check light barrier V1_3 (X804), replace if necessary. 	S. [→ 174], S. [→ 426]
		<ul style="list-style-type: none"> • Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E4 13 25	Ring motor has not reached cephalometric home position.	<ul style="list-style-type: none"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		<ul style="list-style-type: none"> Check the ring drive mechanism manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> Replace the ring motor or mechanism. 	S. [→ 381]
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_3 (X804) with service routine S014.4, replace light barrier if necessary. Run service routine S014.3 to check electronic activation and jerk-free running, replace board DX1 if necessary. 	S. [→ 301], S. [→ 174], S. [→ 426], S. [→ 301], S. [→ 429]

Error code	Description	Actions required	see
E4 13 26	Ring motor has not left cephalometric home position.	<ul style="list-style-type: none"> Check the actuator mechanisms manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> manually reset the actuators to the zero position and run a test cycle via P1. 	
		<ul style="list-style-type: none"> Check the ring drive mechanism manually for smooth and easy running. 	
		In case of stiffness ... <ul style="list-style-type: none"> Replace the ring motor or mechanism. 	S. [→ 381]
		If the error occurs again ... <ul style="list-style-type: none"> Check light barrier V1_3 (X804) with service routine S014.4, replace light barrier if necessary. Run service routine S014.3 to check electronic activation and jerk-free running, replace board DX1 if necessary. 	S. [→ 301], S. [→ 174], S. [→ 426], S. [→ 301], S. [→ 429]

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

Error code	Description	Actions required	see
E6 13 28	Error when activating ring motor.	This error is a sequential fault. <ul style="list-style-type: none"> • Restart the unit: <ol style="list-style-type: none"> 1. Switch off the unit. 2. Wait 1 minute. 3. Switch unit on. 4. Repeat procedure and observe causal error messages. 	
		<ul style="list-style-type: none"> • 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. [→ 62]

Error code	Description	Actions required	see
E4 13 29	Inaccurate start position at the start of exposure.	<ul style="list-style-type: none"> • Check the ring drive mechanism manually for smooth and easy running, replace the ring motor or mechanism if necessary. 	S. [→ 381]
		<ul style="list-style-type: none"> • Check light barrier V1_3 (X804), replace if necessary. 	S. [→ 174], S. [→ 426]

Error code	Description	Actions required	see
E4 13 30	No height adjustment motor pulses.	<ul style="list-style-type: none"> • Check cable L16 (X402), replace if necessary. 	S. [→ 176], S. [→ 441]
		<ul style="list-style-type: none"> • Check board DX1, replace if necessary. 	S. [→ 169], S. [→ 429]
		<ul style="list-style-type: none"> • Check filter between height adjustment motor and L16 (acc. to circuit diagram on filter) (current and voltage), replace if necessary. 	
		<ul style="list-style-type: none"> • Check height adjustment motor incl. pulse generator, replace if necessary. 	S. [→ 173], S. [→ 370]
		<ul style="list-style-type: none"> • Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E5 13 31	Unit has traveled to upper limit switch.	<ul style="list-style-type: none"> Check max. travel height with service routine S018.2, adjust if necessary. 	S. [→ 325]
		<ul style="list-style-type: none"> Run HA motor in the other direction with the Up/Down keys and reference (value approx. 1,500). 	
		<ul style="list-style-type: none"> Check light barriers V1_4, replace if necessary. 	S. [→ 174], S. [→ 426]
		<ul style="list-style-type: none"> Check height adjustment motor for overtravel, replace board DX1 if necessary. 	S. [→ 448] S. [→ 429]
		If the error occurs again ... <ul style="list-style-type: none"> 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).	<ul style="list-style-type: none"> Run HA motor in the other direction with the Up/Down keys and reference (value approx. 1500). 	
		<ul style="list-style-type: none"> Check max. travel height with service routine S018.2, adjust if necessary. 	S. [→ 325]
		<ul style="list-style-type: none"> Check light barriers V1_4, replace if necessary. 	S. [→ 174], S. [→ 426]

Error code	Description	Actions required	see
E5 13 35	Height adjustment motor; wrong direction of rotation.	<ul style="list-style-type: none"> Check connector assignment on filter or in front of HA motor, correct if necessary. 	
		<ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

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"> Check cables L9 and L10, replace if necessary. 	S. [→ 176], S. [→ 441]
		<ul style="list-style-type: none"> Check limit switches SE1_1 and SE1_2, replace if necessary. 	
		<ul style="list-style-type: none"> Replace Easypad. 	S. [→ 388]

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"> Check height adjustment motor for overtravel, replace board DX1 if necessary. 	S. [→ 448], S. [→ 429]
		<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		<ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

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

Error code	Description	Actions required	see
E6 13 39	Error when activating height adjustment motor.	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		<ul style="list-style-type: none"> 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. [→ 62]
		<ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E3 13 40	Release signal applied during power-on.	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and observe causal error messages. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check the X-ray signal path. 	S. [→ 177]

Error code	Description	Actions required	see
E3 13 41	Release signal not applied on DX11.	<ul style="list-style-type: none"> Check signal path for interruption according to wiring diagrams, replace component if necessary. 	
		<ul style="list-style-type: none"> Run service routine S017.6 to deactivate remote control. Connect release button directly to board DX41 (instead of using cable L17) and check for proper functioning. 	S. [→ 311]
		<ul style="list-style-type: none"> Check release button. 	
		If the release button is functioning ... <ul style="list-style-type: none"> Check cable L17, replace if necessary. 	S. [→ 176], S. [→ 441]

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"> Check the X-ray signal path. 	S. [→ 177]

Error code	Description	Actions required	see
E5 13 43	The door was opened during the exposure.	<ul style="list-style-type: none"> Check the X-ray signal path. 	S. [→ 177]

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"> Check light barriers V5_1 to V5_4, replace headrest and light barrier if necessary. Check cable L18, replace if necessary. Check board DX5, replace if necessary. 	S. [→ 174], S. [→ 386], S. [→ 426], S. [→ 176], S. [→ 441], S. [→ 169], S. [→ 429]

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"> Check motor M5_1, replace headrest if necessary. Check light barriers V5_1 to V5_4, replace headrest and light barrier if necessary. Check cable L18 and replace if necessary. Check board DX5, replace if necessary. 	S. [→ 173], S. [→ 386], S. [→ 174], S. [→ 426], S. [→ 176], S. [→ 441], S. [→ 169], S. [→ 429]

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"> Check light barriers V5_1 to V5_4, replace if necessary. 	S. [→ 174]

Error code	Description	Actions required	see
E5 13 53	Forehead support; system does not block within setting range.	<ul style="list-style-type: none"> Check headrest mechanics, replace if necessary. 	S. [→ 386]

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

Error code	Description	Actions required	see
E6 13 57	Error when activating forehead support motor	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		<ul style="list-style-type: none"> 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. [→ 62]
		<ul style="list-style-type: none"> Check headrest mechanics, replace if necessary 	S. [→ 386]
		<ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

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"> Acknowledge error. 	
		If the error occurs repeatedly... <ul style="list-style-type: none"> Replace board DX1. Replace board DX11. 	S. [→ 429]

Error code	Description	Actions required	see
E4 13 59	Forehead support drive defective.	<ul style="list-style-type: none"> Replace the headrest. 	S. [→ 386]

Error code	Description	Actions required	see
E5 13 60	Temple supports; have not left home position despite movement pulses.	<ul style="list-style-type: none"> Check light barriers V5_1 to V5_4, replace headrest and light barrier if necessary. 	S. [→ 174], S. [→ 426], S. [→ 386]
		<ul style="list-style-type: none"> Check cable L18, replace if necessary. 	S. [→ 176], S. [→ 441]
		<ul style="list-style-type: none"> Check board DX5, replace if necessary. 	S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E4 13 61	Temple supports; have not left home position and no motor movement.	<ul style="list-style-type: none"> Check motor M5_2, replace headrest if necessary. 	S. [→ 173], S. [→ 386]
		<ul style="list-style-type: none"> Check light barriers V5_1 to V5_4, replace headrest and light barrier if necessary. 	S. [→ 174], S. [→ 426], S. [→ 386]
		<ul style="list-style-type: none"> Check cable L18, replace if necessary. 	S. [→ 176], S. [→ 441]
		<ul style="list-style-type: none"> Check board DX5, replace if necessary. 	S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E5 13 62	Temple supports; have left home position without detected movement pulses.	<ul style="list-style-type: none"> Check light barriers V5_1 to V5_4, replace headrest/light barrier if necessary. 	S. [→ 174], S. [→ 426], S. [→ 386]
		<ul style="list-style-type: none"> Check cable L18, replace if necessary. 	S. [→ 176], S. [→ 441]
		<ul style="list-style-type: none"> Check board DX5, replace if necessary. 	S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E5 13 63	Temple supports; system does not block within setting range.	<ul style="list-style-type: none"> Check headrest mechanics, replace if necessary. 	S. [→ 386]

Error code	Description	Actions required	see
E6 13 64	Temple supports are not ready for operation.	<p>This error is a sequential fault.</p> <ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. 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"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		<ul style="list-style-type: none"> 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. [→ 62]
		<ul style="list-style-type: none"> Check headrest mechanics, replace if necessary. 	S. [→ 386]
		<ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

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"> Acknowledge error. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E4 13 69	Temple support drive defective.	<ul style="list-style-type: none"> Replace the headrest. 	S. [→ 386]

Error code	Description	Actions required	see
E6 13 70	Cables for bite block electronics not connected.	Tip: Service routine S018.8 can be run as an aid. <ul style="list-style-type: none"> Check cabling and plug connection. 	S. [→ 332], S. [→ 176]

Error code	Description	Actions required	see
E1 13 71	Signal error for angle acquisition (incorrect ADC values).	<ul style="list-style-type: none"> Run service routine S18.9 to readjust the values. 	S. [→ 334]
		<ul style="list-style-type: none"> Replace board DX51 in the bite block holder. 	S. [→ 402]
		<ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E6 13 72	Malfunction of the bite block electronics or cabling.	Tip: Service routine S018.8 can be run as an aid. <ul style="list-style-type: none"> Replace board DX51 in the bite block holder. 	S. [→ 332]
		<ul style="list-style-type: none"> Replace board DX51 in the bite block holder. 	S. [→ 402]
		<ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E5 13 73	Malfunction of height adjustment during operation.	<ul style="list-style-type: none"> Acknowledge error. 	
		<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		<ul style="list-style-type: none"> 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. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E5 13 83	Error while generating pulse for sensor.	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		<ul style="list-style-type: none"> 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. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E6 13 87	Error when activating pulse generation.	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		<ul style="list-style-type: none"> 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. [→ 62]

5.5.7 Location 14: Digital extension, SIDEXIS XG

Error code	Description	Actions required	see
E5 14 01	Abort by SIDEXIS XG.	<ul style="list-style-type: none"> Check network connection, XG3D plugin installation and software version. 	

Error code	Description	Actions required	see
E7 14 02	Interface version not compatible with SIDEXIS XG.	<ul style="list-style-type: none"> Check the software versions of the unit (S008.2) and XG3D plugin and perform software update if necessary. 	S. [→ 286]

Error code	Description	Actions required	see
E6 14 03	Inappropriate or incorrect data input from SIDEXIS XG.	<ul style="list-style-type: none"> 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. Check the software versions of the unit (S008.2) and XG3D plugin and perform software update if necessary. 	S. [→ 62]

Error code	Description	Actions required	see
E5 14 04	The network connection was interrupted. This error often occurs if SIDEXIS XG is selected before the unit is ready for selection.	<ul style="list-style-type: none"> Acknowledge error and quit service domain on unit and in SIDEXIS XG. Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> 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).) Check and, if necessary, replace network components (PC network card, Cat5 cable, hub/switch/router, media converter, L25/26). Check the software versions of the unit (on the info screen or by running service routine S008.2) and XG3D_plugin, and perform software update if necessary. 	S. [→ 286], S. [→ 62]

Error code	Description	Actions required	see
E6 14 05	Service of DHCP server is not available.	<ul style="list-style-type: none"> Have network configuration of dental practice checked by the administrator in charge. Ensure proper functioning of the DHCP server. 	

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"> Reconfiguration of network data via SiXABCon required. 	

Error code	Description	Actions required	see
E5 14 07	No AutoIP address could be determined	<ul style="list-style-type: none"> Acknowledge error and quit service domain on unit and in SIDEXIS XG. Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and check function. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check DHCP server and switch to static IP address if necessary. Contact Sirona Customer Service Center. 	S. [→ 286], S. [→ 62]

Error code	Description	Actions required	see
Pan/ceph exposure			
E6 14 10	Clock signals for sensor image transfer not received on board DX1/DX11 (...10).	<ul style="list-style-type: none"> Acknowledge error and, if possible, check function at another slot (pan/ceph) via test image (pan/ceph). 	
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"> 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. 	S. [→ 429]
E6 14 12	Faulty detection of sensor image transfer data signals on board DX1/DX11; recurring (...12).	If only the pan test image is not OK... <ul style="list-style-type: none"> Check 2D data path for pan via service routine S032.10 (2D test image) and replace sensor or cable if necessary. Check cable L13 for crushed spots and kinks and check connectors, repair or replace if necessary. Check connector (X209, X210, X211, X212) on board DX88. Check cable L13a, replace if necessary. Check cable L80, replace if necessary. Check board DX88, replace if necessary. If only the ceph test image is not OK... <i>For E6 14 10 and ceph exposure:</i> <ul style="list-style-type: none"> Check board DX91 and cables L34, L40, replace if necessary. Check 2D data path for ceph via service routine S033.10 (2D test image) and replace sensor or cable if necessary. <i>Otherwise:</i> <ul style="list-style-type: none"> Check cables L35, L38 for crushed spots and kinks and check connectors, repair or replace if necessary. Check board DX1, replace if necessary. Run service routine S033.10. This determines whether the fault is stationary or permanent. Replace sensor or cable if necessary. 	S. [→ 341], S. [→ 176], S. [→ 169], S. [→ 429], S. [→ 441] S. [→ 169], S. [→ 176], S. [→ 429], S. [→ 441], S. [→ 346]

Error code	Description	Actions required	see
3D exposure			
E6 14 10	Clock signals for sensor image transfer not received on board DX1/DX11 (...10).	<ul style="list-style-type: none"> • Check 3D data path via service routine S032.50 (3D test image), replace flat panel if necessary. 	S. [→ 344], S. [→ 417],
E6 14 11	Faulty detection of sensor image transfer data signals on board DX1/DX11; nonrecurring (...11).	<ul style="list-style-type: none"> • Check connector (X209, X210) on board DX88. • Check cable L13a, replace if necessary. 	S. [→ 169], S. [→ 176], S. [→ 441],
E6 14 12	Faulty detection of sensor image transfer data signals on board DX1/DX11; recurring (...12).	<ul style="list-style-type: none"> • Check LED V208 (HSI channel selection). The LED must be lit during image transfer. • Check board DX88, replace if necessary. • Check board DX1, replace if necessary. • HSI = Highspeed Interface) 	S. [→ 429]

5.5.8 Location 15: Configuration, update

Error code	Description	Actions required	see
E7 15 01	Wrong memory modules.	If a DRAM memory module is plugged into board DX11 ... <ul style="list-style-type: none"> • Replace memory module or DX11. 	S. [→ 435]
		If no DRAM memory module is plugged into board DX11 ... <ul style="list-style-type: none"> • Replace board DX11. 	S. [→ 435]

Error code	Description	Actions required	see
E7 15 02	Wrong module constellation for this unit. Incompatible modules were used.	<ul style="list-style-type: none"> • Refer to list of software versions. • Check to make sure the correct modules are installed (e.g. after replacing modules). • Run software update. 	S. [→ 49], S. [→ 368], S. [→ 62]
		If the error occurs repeatedly... <ul style="list-style-type: none"> • Contact the Sirona Customer Service Center (CSC) 	

Error code	Description	Actions required	see
E7 15 03	Wrong software constellation of modules.	<ul style="list-style-type: none"> • Check the software versions of the unit (on the info screen or by running service routing S008.2), and run or repeat software update or downgrade if necessary. 	S. [→ 286], S. [→ 62]

Error code	Description	Actions required	see
E6 15 04	Product activation keys invalid or not available. Occurs after replacement of tube assembly (DX6) or board DX11 and possibly after software updates. See also the section titled Measures following replacement of boards [→ 432].	<ul style="list-style-type: none"> • Enter release key. 	see OI*

*) OI = Operating instructions

Error code	Description	Actions required	see
E6 15 05	Unit serial number invalid or not available. Occurs during first power-on after replacement of board DX6 or DX11. See also the section titled Measures following replacement of boards [→ 432].	<ul style="list-style-type: none"> • Run service routine S008.3 and confirm or enter the unit serial number on the unit. 	S. [→ 286]

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"> Replace board DX11. Replace the X-ray tube assembly. 	S. [→ 435], S. [→ 406]

Error code	Description	Actions required	see
E6 15 07	<p>The user interface or the remote control is not compatible with the unit.</p> <p>An Easypad and a remote control compatible with the unit must be installed.</p>	<ul style="list-style-type: none"> Install the correct user interface or remote control, obtain a new user interface or remote control from the manufacturer if necessary. 	S. [→ 388]

Error code	Description	Actions required	see
E6 15 10	Update file for module is corrupt.	<ul style="list-style-type: none"> Obtain latest update file from the Sirona Customer Service Center (CSC) or the Sirona home page and perform software update. 	S. [→ 62]

5.5.9 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"> 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. Replace board DX42. 	S. [→ 62], S. [→ 429]

Error code	Description	Actions required	see
E6 42 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> 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. Acknowledge error and repeat procedure. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace board DX42. 	S. [→ 429]

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"> Run service routine S008.2 to check software version of DX42 (in relation to main software releases), perform software update if necessary. Check the CAN bus. Check the signal path from board DX1 to board DX42, replace module DX42 if necessary. 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. [→ 286], S. [→ 62], S. [→ 163], S. [→ 429]

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"> Check the CAN bus. 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. [→ 163], S. [→ 62]

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"> Repeat the software update. Check the CAN bus. Replace board DX42. 	S. [→ 62], S. [→ 163], S. [→ 429]

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"> Check the CAN bus. Check the signal path from board DX1 to board DX42, replace module if necessary Replace board DX42. 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. [→ 163], S. [→ 429], S. [→ 62]

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"> Check the CAN bus. Check power supply (3.3 V) of board DX11, replace board DX1 or DX11 if necessary. Check the signal path from board DX1 to board DX42, replace module if necessary Replace board DX42. 	S. [→ 163], S. [→ 429]

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"> Check software versions on the info screen or by running service routine S008.2, perform software update if necessary. Check the CAN bus. Replace board DX42. 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. [→ 286], S. [→ 62], S. [→ 163], S. [→ 429]

Error code	Description	Actions required	see
E7 42 10	Module is stuck in bootloader stage.	<ul style="list-style-type: none"> Check board DX42 (note LED states). 	S. [→ 169]
		If the board remains in the bootloader stage ... <ul style="list-style-type: none"> Repeat the software update. Replace remote control, see Installation Instructions. 	S. [→ 62]

Error code	Description	Actions required	see
E7 42 12	Unit is not ready for operation	<ul style="list-style-type: none"> Make sure the remote control is present and connected properly. Check using the SR017.6 whether operation with the remote control is configured. 	S. [→ 311]

Error code	Description	Actions required	see
E6 42 20	Contact to DX11 interrupted during operation.	<ul style="list-style-type: none"> Check the signal path from board DX1 to board DX42, replace module if necessary Check connection of remote control, see Installation Instructions. Check the CAN bus. Check cable L17, replace if necessary. Check board DX42, replace if necessary. <p>Tip: 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. [→ 429], S. [→ 163], S. [→ 176], S. [→ 441], S. [→ 169]

Error code	Description	Actions required	see
E7 42 21	No CAN bus connection. DX11 does not start. Occurs in the start screen after power-on.	<ul style="list-style-type: none"> Check the signal path from board DX1 to board DX42, replace module if necessary Check the CAN bus. Check remote control by running service routine S017.6, configure if necessary. Start the detail query via SiXABCon. 	S. [→ 429], S. [→ 163], S. [→ 311], S. [→ 71]
		If board DX11 responds ... <ul style="list-style-type: none"> Check the signal path to DX42, repair or replace cables/connectors if necessary. Replace DX1. 	S. [→ 441], S. [→ 429]
		If DX11 does not respond ... <ul style="list-style-type: none"> If error persists: Replace board DX11. 	S. [→ 429]

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

Error code	Description	Actions required	see
E3 42 31	<p>Release button pressed during power-on.</p> <p>The hardware signal for radiation release is applied on board DX42 when the unit is switched on.</p>	<ul style="list-style-type: none"> see section Error analysis of X-RAY control signal path [→ 177]. 	S. [→ 177]

5.5.10 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"> 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. Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 62], S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E6 61 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> 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. Acknowledge error and repeat procedure. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

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.	If the error occurs during the acceptance/constancy test... <ul style="list-style-type: none"> Check filter offset B_f in the "Reset values" menu. If the value is < -500 (e.g. -502), repeat the adjustment of the pan symmetry and check the position of the diaphragm. For software versions $\leq V02.22$, the filter offset value must be < 500 (e.g. ± 450)!	
		If the error occurs in normal mode... <ul style="list-style-type: none"> Check the CAN bus. 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. [→ 163], S. [→ 62]

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"> Check the CAN bus. 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. [→ 163], S. [→ 62]

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"> Repeat the software update. Check the CAN bus. Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 62], S. [→ 163], S. [→ 169], S. [→ 429] S. [→ 404]

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"> Check the CAN bus. Check board DX61, replace board DX61 or diaphragm unit if necessary. 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. [→ 163], S. [→ 169], S. [→ 429], S. [→ 404], S. [→ 62]

Error code	Description	Actions required	see
E6 61 07	TTP timeout error (detected on slave side). 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 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"> Check the CAN bus. Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). 	S. [→ 163]
		If 3.3 V present...	S. [→ 429]
		If 3.3 V not present...	S. [→ 429]

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"> Check the CAN bus. Check software versions on the info screen or by running service routine S008.2, run software update if necessary. Check board DX61, replace board DX61 or diaphragm unit if necessary. 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. [→ 163], S. [→ 286], S. [→ 62], S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E7 61 10	Module is stuck in bootloader stage.	<ul style="list-style-type: none"> Check operating status of board (note LED states). 	S. [→ 169]
		If the board remains in the bootloader stage... <ul style="list-style-type: none"> Repeat the software update. Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 62], S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E7 61 12	Unit is not ready for operation	This error is a sequential fault. <ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and observe causal error messages. Check the CAN bus. Replace diaphragm unit. 	S. [→ 163], S. [→ 404]

Error code	Description	Actions required	see
E5 61 15	Drive overtemperature.	<ul style="list-style-type: none"> Allow unit to cool down. 	
	Can occur after frequent diaphragm travel, e.g. during demo operation at a fair.	If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

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"> Check diaphragm type; perform service routine S017.17 if necessary. Replacing the diaphragm unit 	S. [→ 318] S. [→ 404]

Error code	Description	Actions required	see
E5 61 20	Horizontal motor malfunction during operation.	<ul style="list-style-type: none"> Allow unit to cool down. 	
	Can occur after frequent diaphragm travel, e.g. during demo operation at a fair.	If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E5 61 21	Horizontal motor limit switch error.	<ul style="list-style-type: none"> Check light barrier V61_1 and connectors, replace if necessary. Perform diaphragm adjustment. 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. [→ 174], S. [→ 426], S. [→ 184], S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E5 61 22	Horizontal motor movement error.	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E5 61 30	Vertical motor malfunction during operation.	<ul style="list-style-type: none"> Allow unit to cool down. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E5 61 31	Vertical motor limit switch error.	<ul style="list-style-type: none"> Check light barrier V61_2 and connectors, replace if necessary. Perform diaphragm adjustment. 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. [→ 174], S. [→ 404], S. [→ 184], S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E5 61 32	Vertical motor movement error.	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 404], S. [→ 429]

Error code	Description	Actions required	see
E5 61 40	Filter motor malfunction during operation.	<ul style="list-style-type: none"> Allow unit to cool down. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E5 61 41	Filter motor limit switch error.	<ul style="list-style-type: none"> Check light barrier V61_1 and connectors, replace if necessary. Perform diaphragm adjustment. 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. [→ 174], S. [→ 426], S. [→ 184], S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

Error code	Description	Actions required	see
E5 61 42	Filter motor movement error.	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check board DX61, replace board DX61 or diaphragm unit if necessary. 	S. [→ 169], S. [→ 429], S. [→ 404]

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

Error code	Description	Actions required	see
E5 61 51	Sensor positioning drive limit switch error	<ul style="list-style-type: none"> • Check light barriers V61_4; replace if necessary (X303, X304) • Check connector of motor power supply (V61_4) for correct position, replug if necessary (X203) • Check rotation unit of 3D module by changing between the Pan and 3D operating modes. NOTICE! Do not turn rotation unit manually! • Check board DX61, replace if necessary 	S. [→ 174], S. [→ 426], S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E5 61 55	Rotating element position not reached.	<ul style="list-style-type: none"> • Check light barriers V61_4; replace if necessary (X303, X304) • Check connector of motor power supply (V61_4) for correct position, replug if necessary (X203) • Check rotation unit of 3D module by changing between the Pan and 3D operating modes. NOTICE! Do not turn rotation unit manually! • Check board DX61, replace if necessary 	S. [→ 174], S. [→ 426], S. [→ 169], S. [→ 429]

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

Error code	Description	Actions required	see
E1 61 60	Voltage error on DX61, 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"> Acknowledge error and repeat procedure If the error occurs repeatedly ... <ul style="list-style-type: none"> Check height adjustment (gentle start), replace board DX1 if necessary. Check voltages at X501 on board DX61 according to wiring diagrams, replace diaphragm unit if necessary. Check cable L11, replace if necessary. Check voltage path from DX32 to DX1 (X102) according to wiring diagrams, replace component if necessary. 	S. [→ 448], S. [→ 429], S. [→ 404], S. [→ 176], S. [→ 441]

Error code	Description	Actions required	see
E6 61 70	Error in diaphragm unit configuration	If the error occurs after replacing board DX11... <ul style="list-style-type: none"> Check the configuration of the diaphragm unit by running service routine S017.17, correct the configuration if necessary. If the error occurs after replacing the diaphragm system... <ul style="list-style-type: none"> Check the order number of the diaphragm unit you are using, replace the diaphragm unit if necessary. 	S. [→ 318] S. [→ 404]

5.5.11 Location 81, zz=1-23: Board DX81, pan slot

Error code	Description	Actions required	see
E6 81 01	Pan: General error during module initialization	<ul style="list-style-type: none"> • 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. • Check pan sensor (replacement sensor), replace if necessary. 	S. [→ 62], S. [→ 421]

Error code	Description	Actions required	see
E6 81 02	Pan: Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> • 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. • Acknowledge error and repeat procedure. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> • Check pan sensor (replacement sensor), replace if necessary. 	S. [→ 421]

Error code	Description	Actions required	see
E6 81 03	Pan: 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"> • Check the CAN bus. • If the error is a software error known to the Sirona Customer Service Center (CSC), a software update (bug fix) must be performed. 	S. [→ 163], S. [→ 62]

Error code	Description	Actions required	see
E6 81 04	Pan: Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> • Check the CAN bus. • If the error is a software error known to the Sirona Customer Service Center (CSC), a software update (bug fix) must be performed. 	S. [→ 163], S. [→ 62]

Error code	Description	Actions required	see
E6 81 05	Pan: Data transfer error or dialog error to bootloader of module Only occurs in connection with software update.	<ul style="list-style-type: none"> • Repeat the software update. • Check the CAN bus. • Check pan sensor (replacement sensor), replace sensor if necessary. 	S. [→ 62], S. [→ 163], S. [→ 421]

Error code	Description	Actions required	see
E6 81 06	<p>Pan: Module failed in TTP (detected on master side). TTP = Time Trigger Protocol</p>	<ul style="list-style-type: none"> • Check the CAN bus. • Check pan sensor (replacement sensor), replace if necessary. • 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. 	<p>S. [→ 163], S. [→ 421], S. [→ 62]</p>

Error code	Description	Actions required	see
E6 81 07	<p>Pan: 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</p>	<ul style="list-style-type: none"> • Check the CAN bus. • Check cable L13, replace if necessary. • Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). 	<p>S. [→ 163], S. [→ 441]</p>
		<p>If 3.3 V present...</p> <ul style="list-style-type: none"> • Replace board DX11. 	<p>S. [→ 429]</p>
		<p>If 3.3 V not present...</p> <ul style="list-style-type: none"> • Replace board DX1. 	<p>S. [→ 429]</p>

Error code	Description	Actions required	see
E6 81 08	<p>Pan: General fault detected locally on module (slave side) CAN controller being reinitialized.</p>	<ul style="list-style-type: none"> • Check the CAN bus. • Check software versions on the info screen or by running service routine S008.2, perform software update if necessary. • Check pan sensor (replacement sensor), replace sensor if necessary. • 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. 	<p>S. [→ 163], S. [→ 286], S. [→ 62], S. [→ 421]</p>

Error code	Description	Actions required	see
E7 81 10	Pan: Module is stuck in bootloader stage	<ul style="list-style-type: none"> Check pan sensor (replacement sensor), replace sensor if necessary. 	S. [→ 421]
		If the board remains in the bootloader stage... <ul style="list-style-type: none"> Repeat the software update. Check pan sensor (replacement sensor), replace sensor if necessary. 	S. [→ 62], S. [→ 421]

Error code	Description	Actions required	see
E7 81 12	Pan: Unit is not ready for operation	This error is a sequential fault. <ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and observe causal error messages. 	

Error code	Description	Actions required	see
E5 81 13	Pan: Error when writing to EEPROM. Stored data may be lost.	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. Run software update. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check log memory (via details). Check pan sensor (replacement sensor), replace sensor if necessary. 	S. [→ 71], S. [→ 421]

Error code	Description	Actions required	see
E6 81 20	The sensor type on the unit is not compatible with SIDEXIS XG specifications.	<ul style="list-style-type: none"> Check the SIDEXIS XG specifications with the Sirona Customer Service Center (CSC). Check the version compatibility of the unit software and SIDEXIS XG, perform software update if necessary. Pull sensor out of slot and plug it back in, repeat procedure. 	S. [→ 62]

Error code	Description	Actions required	see
E7 81 21	Pan: File system error on DX81P	<ul style="list-style-type: none"> Run software update. Check pan sensor (replacement sensor), replace sensor if necessary. 	S. [→ 62], S. [→ 421]

Error code	Description	Actions required	see
E6 81 23	Pan: Sensor in pan slot active on CAN bus, but no hardware detection	<ul style="list-style-type: none"> • Check cables L13, L13a and L80, replace if necessary. • Check pan LED (V500) on DX1 (hardware detection of sensor). • Check pan sensor (replacement sensor), replace sensor if necessary. • Check connector X500 on DX1, replace DX1 or DX11 if necessary. • Check boards DX1, DX11 and DX88, replace if necessary. 	S. [→ 176], S. [→ 441], S. [→ 169], S. [→ 421], S. [→ 429]

Error code	Description	Actions required	see
E5 81 24	Pan: Sensor in PAN slot not detected	<ul style="list-style-type: none"> • Check cables L13, L13a and L80, replace if necessary. • Check pan LED (V500) on DX1 (hardware detection of sensor). • Check pan sensor (replacement sensor), replace sensor if necessary. • Check connector X500 on DX1, replace DX1 if necessary. • Check board DX88, replace if necessary. • Check the CAN bus. 	S. [→ 176], S. [→ 441], S. [→ 169], S. [→ 421], S. [→ 429], S. [→ 163]

Error code	Description	Actions required	see
E5 81 25	Pan: Error while synchronizing image data	• Run software update.	S. [→ 62]
		If the error occurs again... • Check pan sensor (replacement sensor), replace sensor if necessary.	S. [→ 421]

Error code	Description	Actions required	see
E5 81 27	Pan: Voltage error detected on sensor (CCD voltages on board DX81P). If this error occurs in connection with other causal error messages (e.g. E6 61 60, E6 91 50), take appropriate action.	<ul style="list-style-type: none"> • Check cable L13, replace if necessary. • Check connector X500 on DX1, replace DX1 if necessary. • Check pan sensor (replacement sensor), replace if necessary. 	S. [→ 176], S. [→ 441], S. [→ 429], S. [→ 421]

Error code	Description	Actions required	see
E5 81 28	Pan: Invalid data at start of exposure	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Run software update. Check the version compatibility of the unit software and SIDEXIS XG, perform software update if necessary. Seek advice from the Sirona Customer Service Center (CSC) with regard to the settings/sensor information in the Xab.ini file. 	S. [→ 62]

5.5.12 Location 81, zz=51-78: Board DX81, ceph slot

Error code	Description	Actions required	see
E6 81 51	Ceph: General error during module initialization	<ul style="list-style-type: none"> 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. Check ceph sensor (replacement sensor), replace if necessary. 	S. [→ 62]

Error code	Description	Actions required	see
E6 81 52	Ceph: Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> 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. Acknowledge error and repeat procedure. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check ceph sensor (replacement sensor), replace if necessary. 	

Error code	Description	Actions required	see
E6 81 53	Ceph: 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"> Check the CAN bus. If the error is a software error known to the Sirona Customer Service Center (CSC), a software update (bug fix) must be performed. 	S. [→ 163], S. [→ 62]

Error code	Description	Actions required	see
E6 81 54	Pan: Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> • Check the CAN bus. • If the error is a software error known to the Sirona Customer Service Center (CSC), a software update (bug fix) must be performed. 	S. [→ 163], S. [→ 62]

Error code	Description	Actions required	see
E6 81 55	Ceph: Data transfer error or dialog error to bootloader of module Only occurs in connection with software update.	<ul style="list-style-type: none"> • Repeat the software update. • Check the CAN bus. • Check ceph sensor (replacement sensor), replace sensor if necessary. 	S. [→ 62], S. [→ 163]

Error code	Description	Actions required	see
E6 81 57	Ceph: 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"> • Check the CAN bus. • Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). 	S. [→ 163]
		If 3.3 V present...	S. [→ 429]
		If 3.3 V not present...	S. [→ 429]

Error code	Description	Actions required	see
E6 81 58	Ceph: General fault detected locally on module (slave side) CAN controller being reinitialized.	<ul style="list-style-type: none"> • Check the CAN bus. • Check software versions on the info screen or by running service routine S008.2, perform software update if necessary. • Check ceph sensor (replacement sensor), replace if necessary. • 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. [→ 163], S. [→ 286], S. [→ 62]

Error code	Description	Actions required	see
E7 81 60	Ceph: Module is stuck in bootloader stage	<ul style="list-style-type: none"> Check ceph sensor (replacement sensor), replace sensor if necessary. 	
		If the board remains in the bootloader stage... <ul style="list-style-type: none"> Repeat the software update. Check ceph sensor (replacement sensor), replace sensor if necessary. 	S. [→ 62]

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

Error code	Description	Actions required	see
E5 81 63	Ceph: Error when writing to EEPROM. Stored data may be lost.	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. Run software update. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check log memory (via details). Check ceph sensor (replacement sensor), replace sensor if necessary. 	S. [→ 71]

Error code	Description	Actions required	see
E7 81 71	Ceph: File system error on DX81C	<ul style="list-style-type: none"> Run software update. 	S. [→ 62]

Error code	Description	Actions required	see
E6 81 73	Ceph: Sensor in ceph slot active on CAN bus, but no hardware detection	<ul style="list-style-type: none"> Check cable L35/L38, replace if necessary. Check connector X500 on board DX1, replace board DX1 if necessary. Check ceph sensor holder, replace if necessary. 	S. [→ 176], S. [→ 169], S. [→ 429], S. [→ 424]

Error code	Description	Actions required	see
E5 81 74	Ceph: Sensor in ceph slot not detected.	<ul style="list-style-type: none"> • Check cable L35/L38, replace if necessary. • Check connector X503 on board DX1, replace board DX1 if necessary. • Check the CAN bus. • Check ceph sensor holder, replace if necessary. 	S. [→ 176], S. [→ 441], S. [→ 169], S. [→ 429], S. [→ 163], S. [→ 424]

Error code	Description	Actions required	see
E5 81 75	Ceph: Error while synchronizing image data	• Run software update.	S. [→ 62]
		If the error occurs again... <ul style="list-style-type: none"> • Check ceph sensor (replacement sensor), replace sensor if necessary. 	

Error code	Description	Actions required	see
E5 81 77	Ceph: Voltage error detected on sensor (CCD voltages on board DX81C). If this error occurs in connection with other causal error messages (e.g. E6 61 60, E6 91 50), take appropriate action.	<ul style="list-style-type: none"> • Check cable L35/L38, replace if necessary. • Check connector X503 on board DX1, replace board DX1 if necessary. • Run software update. • Check ceph sensor holder, replace if necessary. • Check ceph sensor (replacement sensor), replace if necessary. 	S. [→ 176], S. [→ 441], S. [→ 169], S. [→ 429], S. [→ 62], S. [→ 424]

Error code	Description	Actions required	see
E5 81 78	Ceph: Invalid data at start of exposure	• Acknowledge error and repeat procedure.	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> • Run software update. • Check the version compatibility of the unit software and SIDEXIS XG, perform software update if necessary. • Seek advice from the Sirona Customer Service Center (CSC) with regard to the settings/sensor information in the Xab.ini file. 	S. [→ 62]

5.5.13 Location 88: Combisensor

Error code	Description	Actions required	see
E6 88 01	General error during module initialization	<ul style="list-style-type: none"> 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. Check board DX88, replace if necessary. 	S. [→ 62], S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E6 88 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> 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. Acknowledge error and repeat procedure. 	S. [→ 62]
		If the error occurs repeatedly ...	S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E6 88 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"> Check the CAN bus. If the error is a software error known to the Sirona Customer Service Center (CSC), a software update (bug fix) must be performed. 	S. [→ 163], S. [→ 62]

Error code	Description	Actions required	see
E6 88 04	Data transfer error or dialog error to module (master side)	<ul style="list-style-type: none"> Check the CAN bus. If the error is a software error known to the Sirona Customer Service Center (CSC), a software update (bug fix) must be performed. 	S. [→ 163], S. [→ 62]

Error code	Description	Actions required	see
E7 88 05	Data transfer error or dialog error to bootloader of module Only occurs in connection with software update.	<ul style="list-style-type: none"> Repeat the software update. Check the CAN bus. Check board DX88, replace if necessary. 	S. [→ 62], S. [→ 163], S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E6 88 06	Module failed in TTP (detected on master side). TTP = Time Trigger Protocol	<ul style="list-style-type: none"> Check the CAN bus. Check board DX88, replace if necessary. 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. [→ 163], S. [→ 169], S. [→ 429], S. [→ 62]

Error code	Description	Actions required	see
E6 88 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"> Check the CAN bus. Check cable L13/L13A, replace if necessary. Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). 	S. [→ 163], S. [→ 176], S. [→ 441]
		If 3.3 V present... <ul style="list-style-type: none"> Replace board DX11. 	S. [→ 429]
		If 3.3 V not present... <ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

Error code	Description	Actions required	see
E6 88 08	General fault detected locally on module (slave side). CAN controller being reinitialized.	<ul style="list-style-type: none"> Check the CAN bus. Check software versions on the info screen or by running service routine S008.2, perform software update if necessary. Check board DX88, replace if necessary. 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. [→ 163], S. [→ 286], S. [→ 62], S. [→ 169], S. [→ 441]

Error code	Description	Actions required	see
E7 88 10	Module is stuck in bootloader stage.	<ul style="list-style-type: none"> Check board DX88, replace if necessary. 	S. [→ 169], S. [→ 429]
		If the board remains in the bootloader stage... <ul style="list-style-type: none"> Repeat the software update. Check board DX88, replace if necessary. 	S. [→ 62], S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E7 88 12	Unit is not ready for operation Self-test failed.	This error is a sequential fault. <ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Repeat procedure and observe causal error messages. 	

Error code	Description	Actions required	see
E6 88 13	Error when writing to EEPROM. Stored data may be lost.	<ul style="list-style-type: none"> Acknowledge error and repeat procedure. Run software update. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Check log memory (via details). Check board DX88, replace if necessary. 	S. [→ 71], S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E1 88 20	Fault in one of the partial voltages on module DX88.	<ul style="list-style-type: none"> Check cable L13/L13A, replace if necessary. Check LED V201 on DX88 (board voltages), replace board DX88 if necessary. Check LEDs on DX88 (partial voltages), replace board DX88 if necessary. 	S. [→ 176], S. [→ 441], S. [→ 169] S. [→ 429]

Error code	Description	Actions required	see
E7 88 21	Error accessing flash chip on board DX88.	<ul style="list-style-type: none"> 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. Replace board DX88. 	S. [→ 62], S. [→ 429]

Error code	Description	Actions required	see
E7 88 25	Error accessing image memory on board DX88.	<ul style="list-style-type: none"> Check board DX88 (memory modules), replace if necessary. 	S. [→ 169]; S. [→ 429]
		<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch unit on. Check LED V207 on board DX88. 	

Error code	Description	Actions required	see
E7 88 27	A faulty image readout was detected by board DX88 during the exposure.	<ul style="list-style-type: none"> Check flat panel via service routine S032.50 (3D test image), replace flat panel if necessary. 	S. [→ 417]

Error code	Description	Actions required	see
E7 88 28	FPGA on DX88 is defective or does not respond. FPGA = Field Programmable Gate Array	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch the unit on and test it for proper functioning. 	
		If the error occurs again... <ul style="list-style-type: none"> Run software update. Replace board DX88. 	S. [→ 62], S. [→ 429]

Error code	Description	Actions required	see
E1 88 29	Image memory test failed.	<ul style="list-style-type: none"> Restart the unit: <ol style="list-style-type: none"> Switch off the unit. Wait 1 minute. Switch the unit on and test it for proper functioning. 	
		<ul style="list-style-type: none"> Check memory modules on board DX88, replace board DX88 if necessary. 	S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E7 88 30	Error accessing flash chip on board DX88.	<ul style="list-style-type: none"> Replace board DX88. 	S. [→ 429]

Error code	Description	Actions required	see
E6 88 32	Error during exposure synchronization of DX88. Missing or excessive TDI pulses Image acquisition error in combisensor. TDI = Signal to start synchronized readout sequence and to prepare the next exposure	<ul style="list-style-type: none"> Check cable L13/L13A, replace if necessary. Check board DX1, replace if necessary. Check board DX88, replace if necessary. Check flat panel via service routine S032.50 (3D test image), replace flat panel if necessary. 	S. [→ 176], S. [→ 429], S. [→ 169], S. [→ 344], S. [→ 417]

Error code	Description	Actions required	see
E6 88 33	The flat panel is not plugged in.	<ul style="list-style-type: none"> • Check connector for plugging DX88 into flat panel. • Check power supplies on DX88. • Execute service routine S32.50: "FP_CON" LED on board DX88 must be switched on. • Replace flat panel. • Replace board DX88. 	S. [→ 344], S. [→ 417], S. [→ 429]

Error code	Description	Actions required	see
E6 88 34	The combisensor does not support the requested exposure.	<ul style="list-style-type: none"> • Check compatibility with XG3D plugin on PC side and synchronize software versions if necessary. • Update unit software version, support for the requested exposure may be included in the latest software version. 	S. [→ 49], S. [→ 62]

5.5.14 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"> 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. Replace board DX91. 	S. [→ 62], S. [→ 429]

Error code	Description	Actions required	see
E6 91 02	Invalid system data or uninitialized module storage data	<ul style="list-style-type: none"> 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. Acknowledge error and repeat procedure. 	S. [→ 62]
		If the error occurs repeatedly ...	S. [→ 429]
		<ul style="list-style-type: none"> Replace board DX91. 	

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"> Check the CAN bus. 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. [→ 163], S. [→ 62]

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"> Check the CAN bus. 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. [→ 163], S. [→ 62]

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"> Repeat the software update. Check the CAN bus. Replace board DX91. 	S. [→ 62], S. [→ 163], S. [→ 429]

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"> Check the CAN bus. Replace board DX91. 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. [→ 163], S. [→ 429], S. [→ 62]

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"> Check the CAN bus. Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). 	S. [→ 163]
		If 3.3 V present... <ul style="list-style-type: none"> Replace board DX11. 	S. [→ 429]
		If 3.3 V not present... <ul style="list-style-type: none"> Replace board DX1. 	S. [→ 429]

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"> Check the CAN bus. Check software versions on the info screen or by running service routine S008.2, perform software update if necessary. Replace board DX91. 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. [→ 163], S. [→ 286], S. [→ 62], S. [→ 429]

Error code	Description	Actions required	see
E7 91 10	Module is stuck in bootloader stage.	<ul style="list-style-type: none"> Check operating status of board (note LED states). 	S. [→ 169]
		If the board remains in the bootloader stage... <ul style="list-style-type: none"> Repeat the software update. Check DX91, replace if necessary. 	S. [→ 62], S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E7 91 12	Unit is not ready for operation	This error is a sequential fault. <ul style="list-style-type: none"> • Restart the unit: <ol style="list-style-type: none"> 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
E3 91 13	Error when writing to EEPROM. Stored data may be lost.	<ul style="list-style-type: none"> • Check entire unit calibration incl. center position of ceph scan by running service routines S034.4 and S034.5, recalibrate if necessary. • Acknowledge error and repeat procedure. 	S. [→ 348], S. [→ 352], S. [→ 184]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> • Check board DX91, replace if necessary. 	S. [→ 169], S. [→ 429]

Error code	Description	Actions required	see
E5 91 15	Drive overtemperature.	<ul style="list-style-type: none"> • Allow unit to cool down. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> • Check complete mechanics/spindle of motor M91_3 for smooth and easy running, replace if necessary. • Replace board DX91. 	S. [→ 429]

Error code	Description	Actions required	see
E5 91 16	Motor control timeout (M91_2/3).	<ul style="list-style-type: none"> • Replace board DX91. 	S. [→ 428]

Error code	Description	Actions required	see
E5 91 20	Sensor drive malfunction during operation.	<ul style="list-style-type: none"> • Allow unit to cool down. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> • Check complete mechanics/spindle of motor M91_3 for smooth and easy running, replace if necessary. 	S. [→ 448], S. [→ 376]

Error code	Description	Actions required	see
E5 91 21	Sensor drive, opposite light barrier reached prematurely.	<ul style="list-style-type: none"> • Check light barrier V91_2, replace if necessary. • Check cable to light barrier (L21/L24), replace if necessary. • Check board DX91, replace if necessary. • 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. [→ 174], S. [→ 426], S. [→ 176], S. [→ 429], S. [→ 169], S. [→ 62]

Error code	Description	Actions required	see
E5 91 22	Sensor drive timeout	<ul style="list-style-type: none"> • Check motor M91_3 incl. cable and connector, replace if necessary. • Check cable to light barrier (L21/L24), replace if necessary. 	S. [→ 176], S. [→ 441]

Error code	Description	Actions required	see
E5 91 30	Secondary diaphragm drive malfunction during operation	<ul style="list-style-type: none"> • Allow unit to cool down. 	
		If the error occurs repeatedly ... <ul style="list-style-type: none"> • Check motor M91_2 incl. cable and connector, replace if necessary. • Check cable to light barrier (L21/L24), replace if necessary. 	S. [→ 176], S. [→ 441]

Error code	Description	Actions required	see
E5 91 31	Secondary diaphragm drive, opposite light barrier reached prematurely.	<ul style="list-style-type: none"> • Check light barrier V91_2, replace if necessary. • Check cable to light barrier (L21/L24), replace if necessary. • Check board DX91, replace if necessary. • 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. [→ 174], S. [→ 426], S. [→ 176], S. [→ 429], S. [→ 169], S. [→ 62]

Error code	Description	Actions required	see
E5 91 32	Secondary diaphragm drive timeout	<ul style="list-style-type: none"> • Check motor M91_2, replace if necessary. • Check cable to light barrier (L21/L24), replace if necessary. 	S. [→ 173], S. [→ 176], S. [→ 441]

Error code	Description	Actions required	see
E6 91 40	Rotary table pot compensation not yet performed.	<ul style="list-style-type: none"> Perform software update to version V02.25 or higher. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace board DX91. 	S. [→ 429]

Error code	Description	Actions required	see
E6 91 41	Ear plug pot compensation not yet performed.	<ul style="list-style-type: none"> Perform software update to version V02.25 or higher. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace board DX91. 	S. [→ 429]

Error code	Description	Actions required	see
E6 91 42	Nose support pot compensation not yet performed.	<ul style="list-style-type: none"> Perform software update to version V02.25 or higher. 	S. [→ 62]
		If the error occurs repeatedly ... <ul style="list-style-type: none"> Replace board DX91. 	S. [→ 429]

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"> Check height adjustment (gentle start), replace DX1 if necessary. Check cable L36/L39 and adapter, replace if necessary. Check voltages at X103 on board DX91 according to wiring diagrams, replace board DX91 if necessary. Check boards DX1 and DX91, replace if necessary. 	S. [→ 448], S. [→ 429] S. [→ 176], S. [→ 441] S. [→ 169]
		If multiple boards report errors... <ul style="list-style-type: none"> Check board DX32, replace if necessary. 	S. [→ 169], S. [→ 429]

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 Details...

----- Error Logging Data DX 11 -----		
Timestamp	Categorie	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

A
B
C

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

System time	2006-03-06, 20:13:02	System time (clock on DX11)
Entry type	[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
[Compression table]	Compression table	

Entry data [Message]	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 cancelled	Exposure cancelation
	Termination state	Reason for ending exposure
	Value: 0	Exposure completed
	Value: 1	Exposure cancelation by user
	Value: 2	Exposure cancelation due to internal error
	Imagetransfer started	Start of image data transfer
	Imagetransfer stopped	End of image data transfer
	Logbook started	Corresponds to unit switch-on
	Image state switched to Released	Exposure has been delivered to SIDEXIS XG and confirmed by SIDEXIS XG.
	<p>Other entry data which document the occurrence of a rescue event include:</p> <ul style="list-style-type: none"> • Image state switched to Rescue • Rescue request Sidexis Error • Rescue request Sidexis TrackEpilogue • Rescue request Sidexis Timeout <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>	
Entry data [Error]	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-E4MMRJBW	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

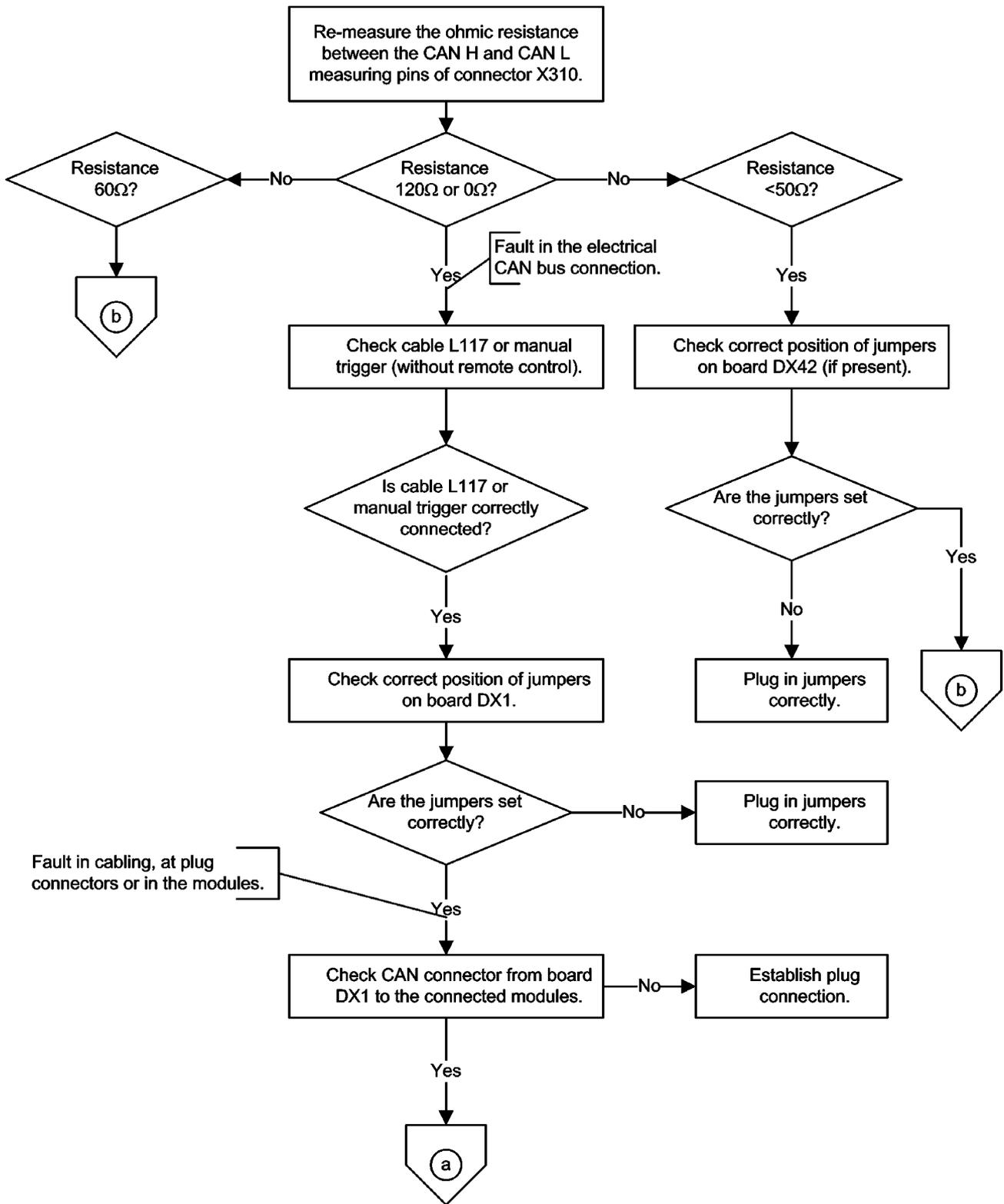
6.2 Checking the CAN bus

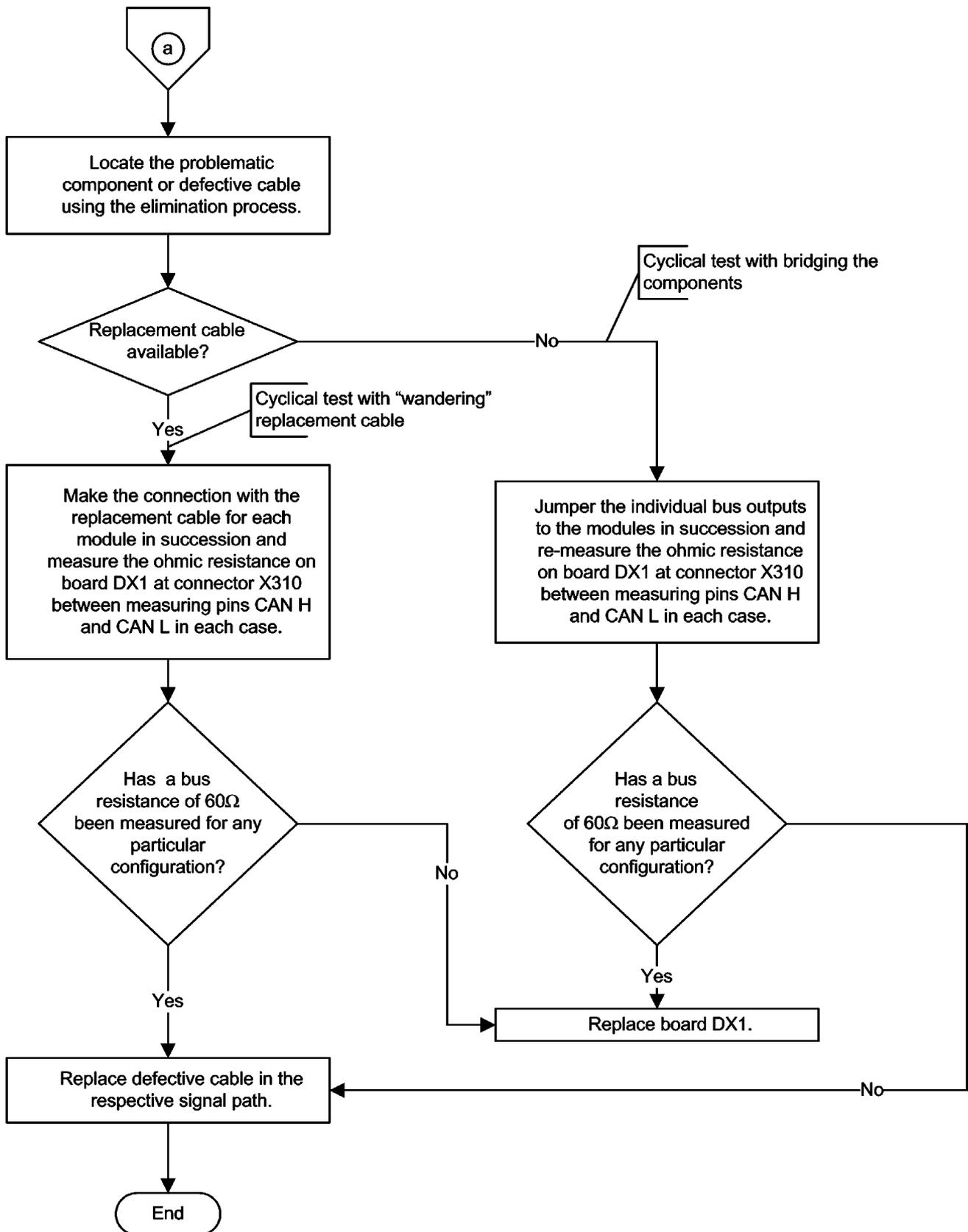
NOTICE

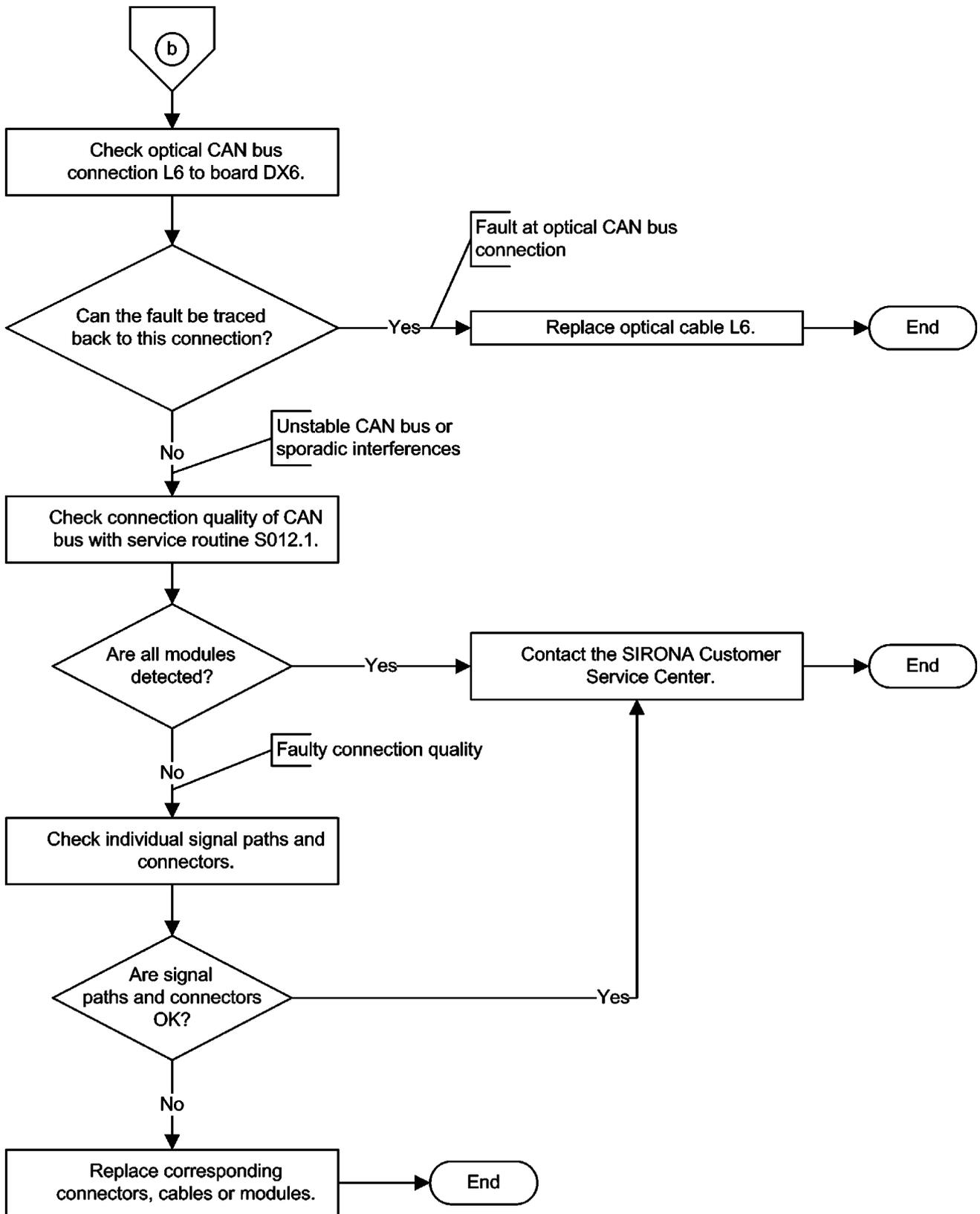
Risk of damage to unit

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.







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

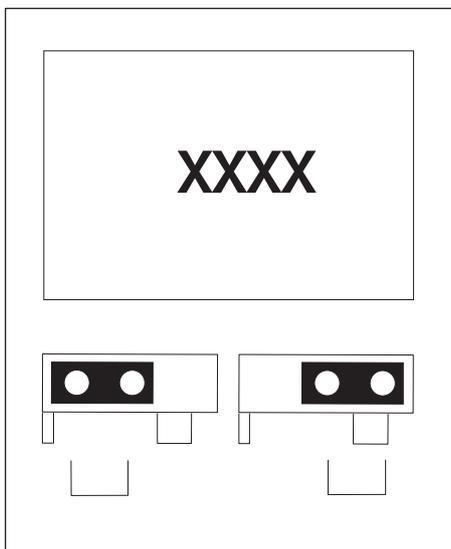
Board DX1 features a diagnostic function for diagnosing malfunctions of the CAN bus via LEDs V700 and V701 (see wiring diagrams). The following table indicates the operating status of the CAN bus and the recommended error correction measures:

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"> • Check cabling. • Check CAN jumpers (Jumper positions in the CAN bus [→ 168])
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"> • 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.
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"> • 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.
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

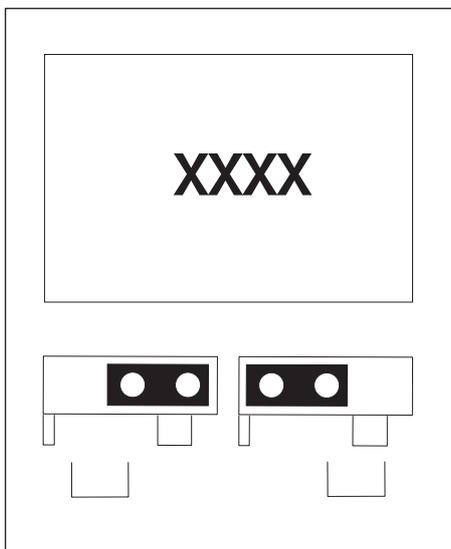
The jumpers are located on board DX1 at sockets X302, X303, X306, X307, X309, X500, and X503 (see also wiring diagrams). If a cable is connected to the socket, the corresponding jumpers must be set to the outer position. If no cable is plugged in, the jumpers must be set to the inner position. If a jumper 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.

Jumper outside



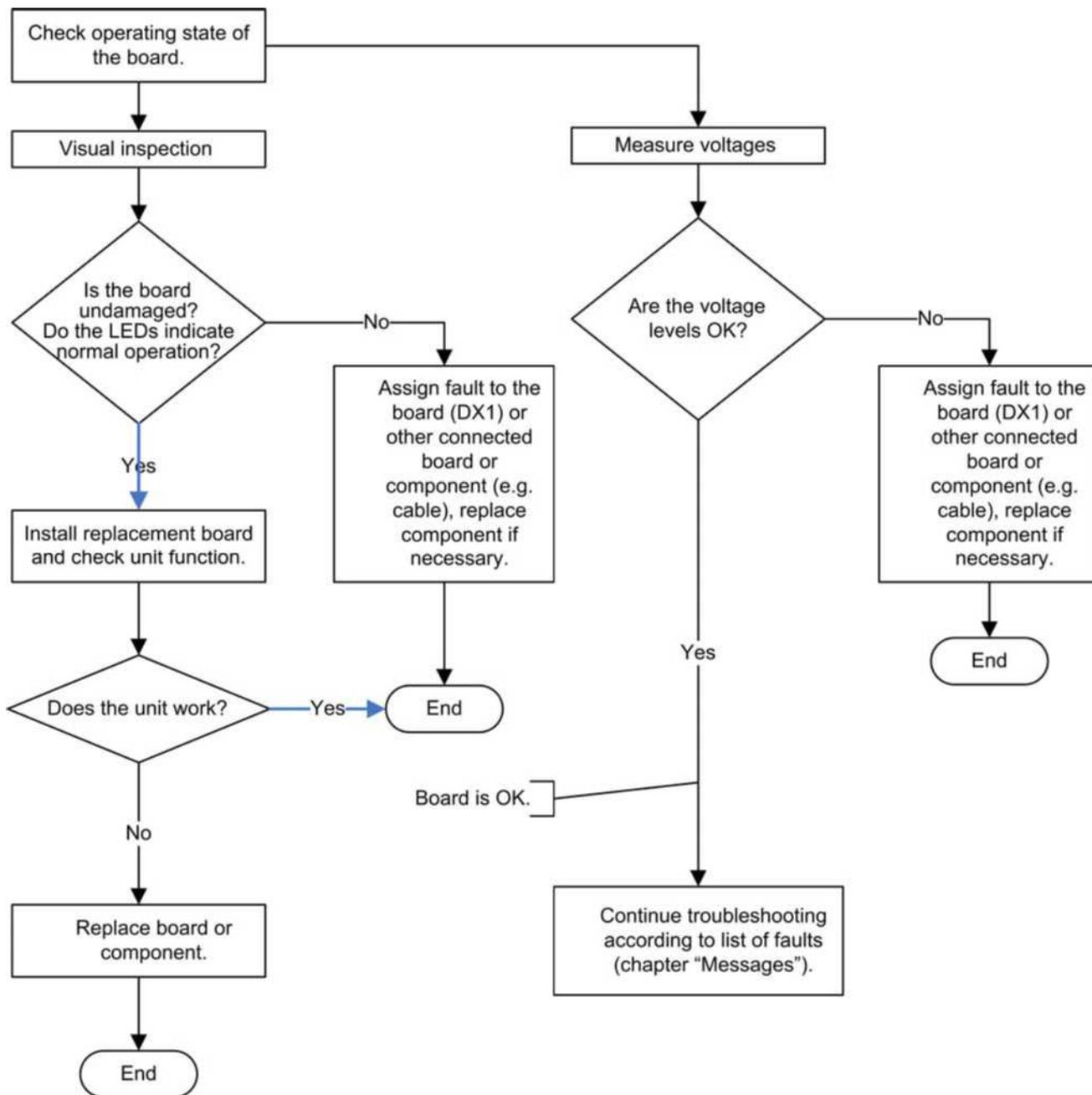
If the jumpers are set to the outer position, the module is connected (i.e. the connector is plugged in).

Jumper inside



If the jumpers are set to the inner position, the module is *not* connected (i.e. the connector is *not* plugged in).

6.3 Checking the boards

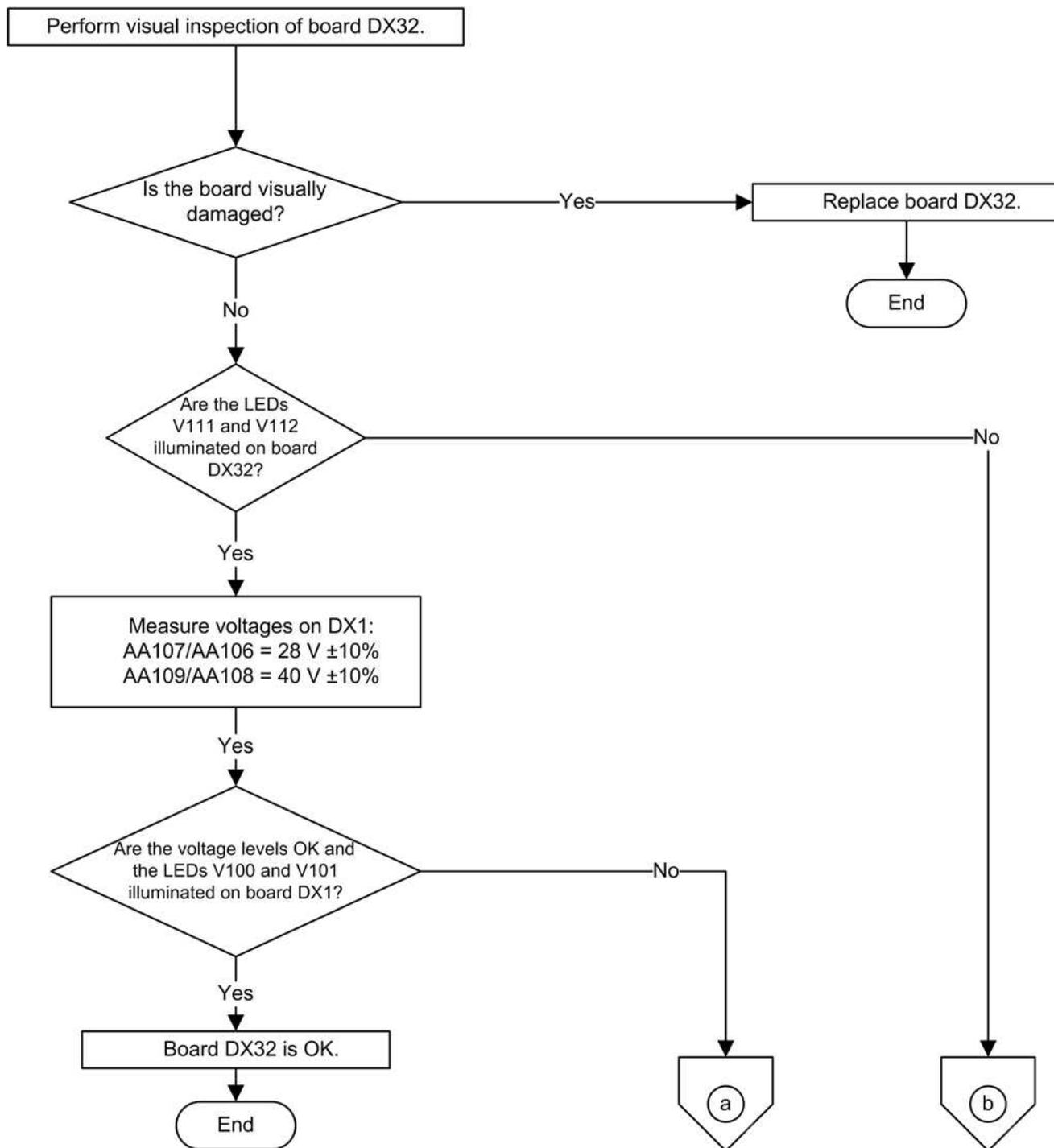


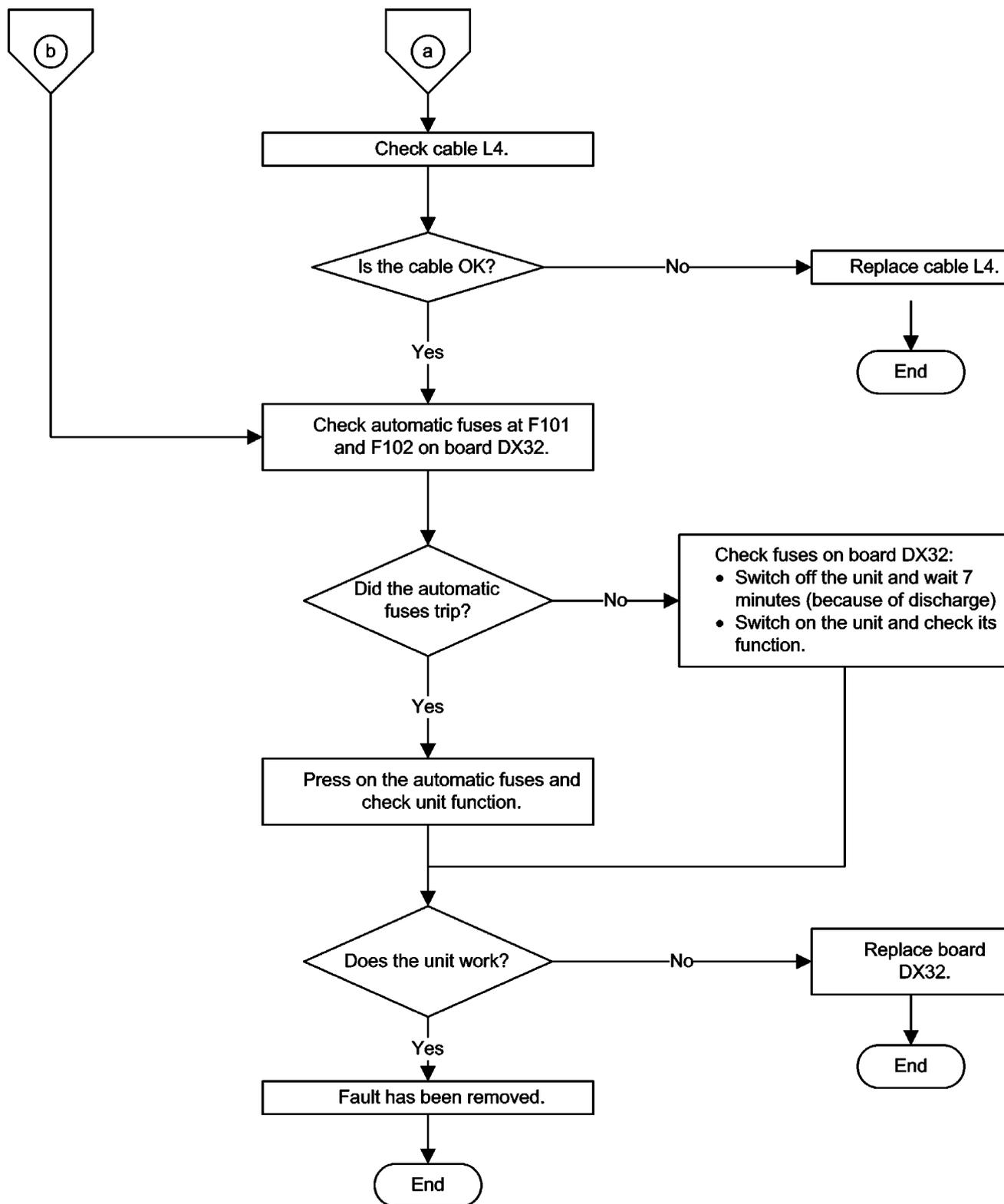
Important LEDs on the boards

(see also wiring diagrams)

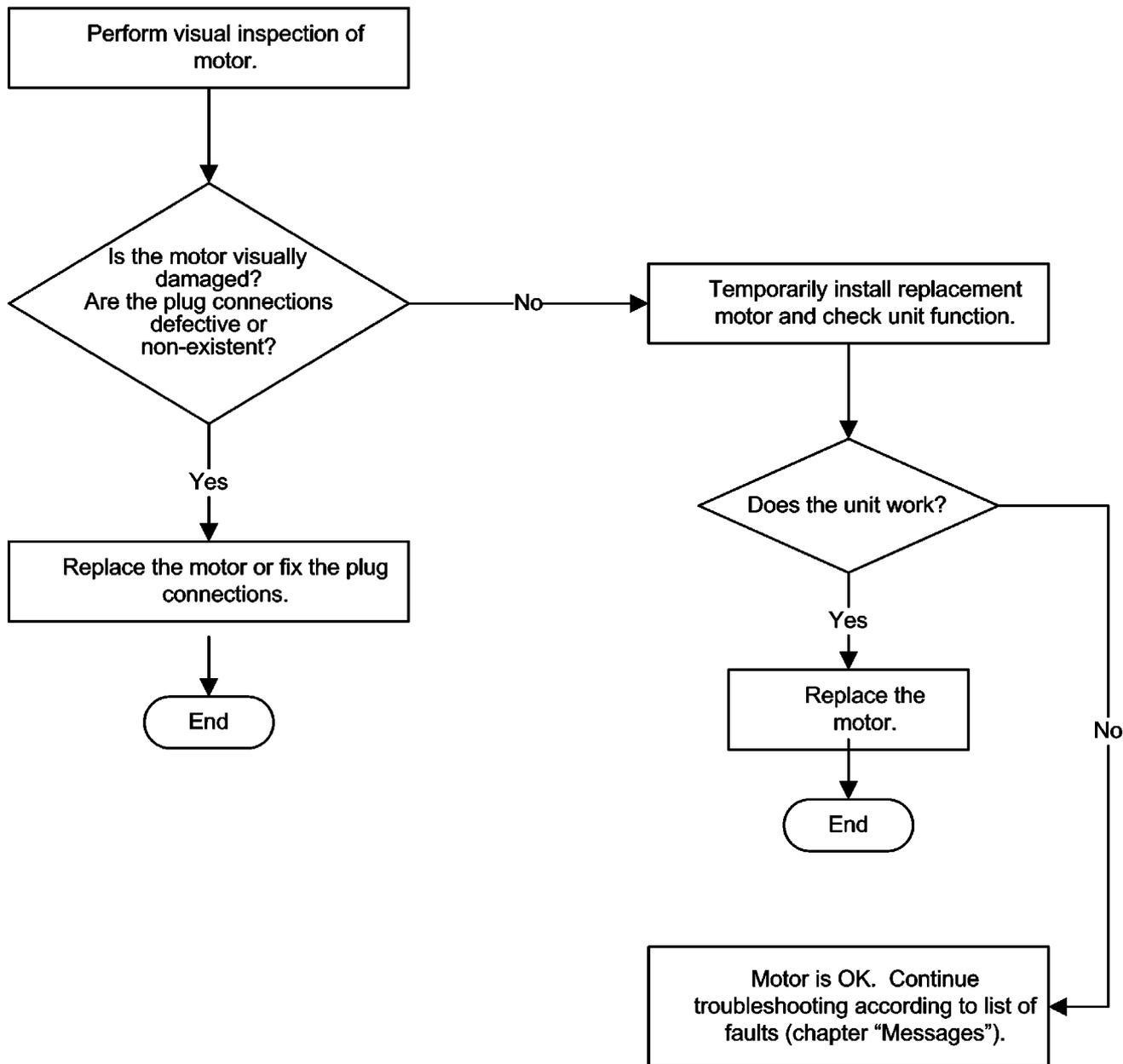
Board	LEDs	Normal mode	Malfunction	Bootloader
DX1 59 24 142	V100	lit	not lit	
	V101	lit	not lit	
	V109	lit	not lit	
	V110	lit	not lit	
	V610	lit	not lit	
DX1 62 82 052	V200	flashing at 1 Hz	lit / not lit	flashing quickly
	V610	lit	not lit	
	V700	flashing at 1 Hz	lit / not lit / flashing quickly	
	V701	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 1.0)	V1	flashing at 1 Hz	not lit	flashing at 2 Hz
	V203	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	
	V107	flashing at 1 Hz	not lit	flashing at 2 Hz
DX88	V202	lit	not lit	
	V203	lit	not lit	
	V204	flashing at 1 Hz	not lit	flashing at 2 Hz
	V207	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

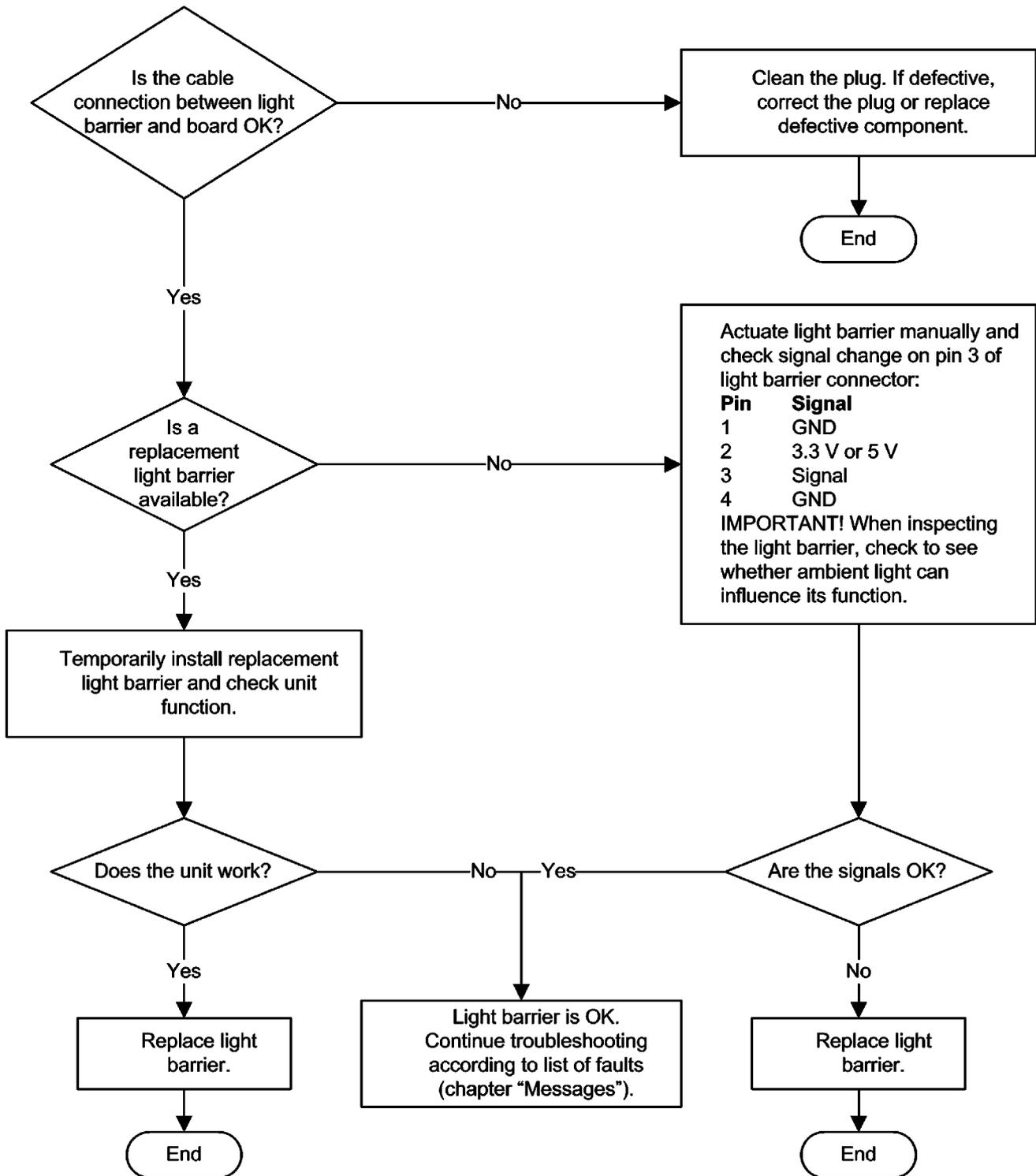




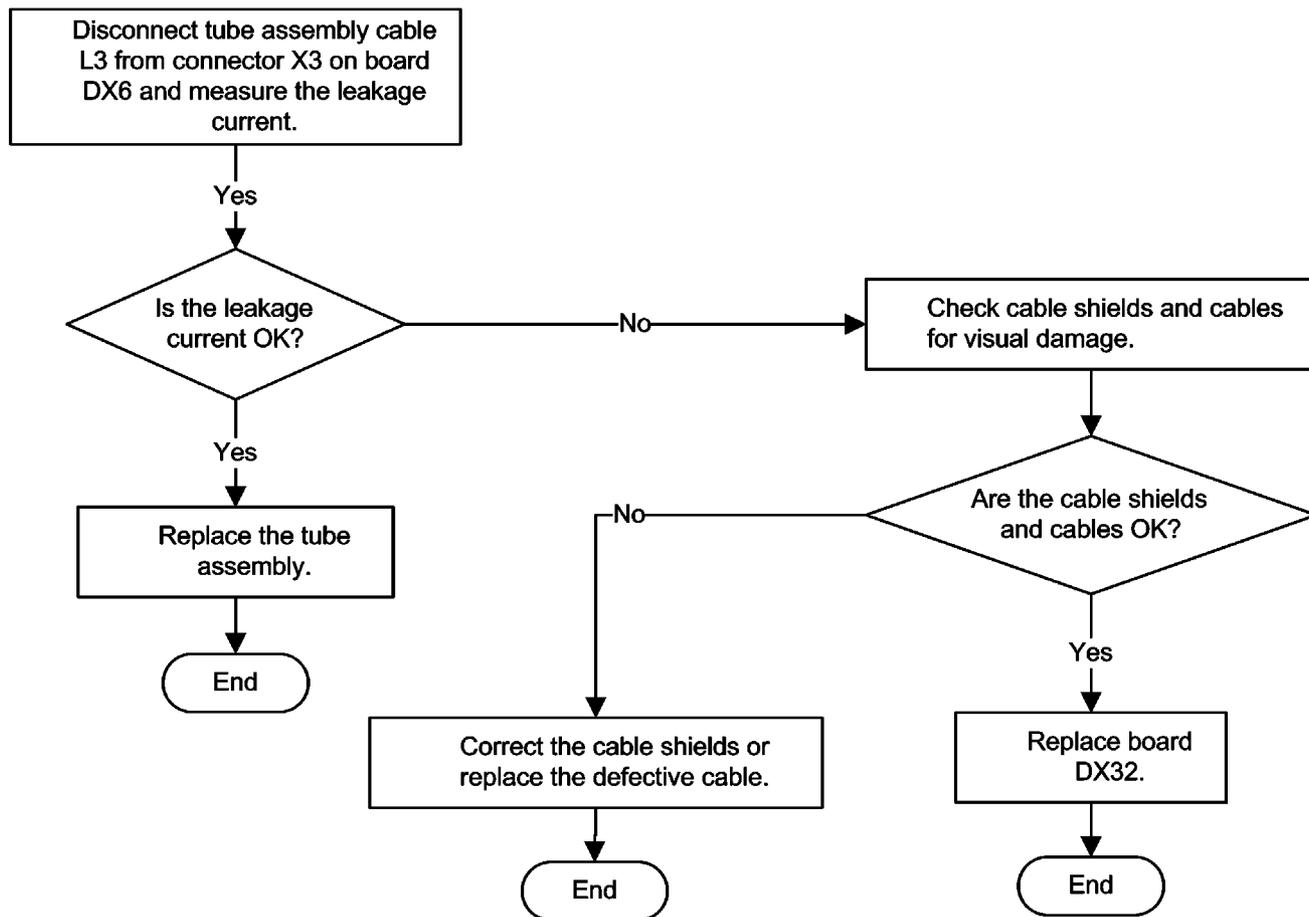
6.4 Checking the motors



6.5 Checking the light barriers



6.6 Device leakage current too high

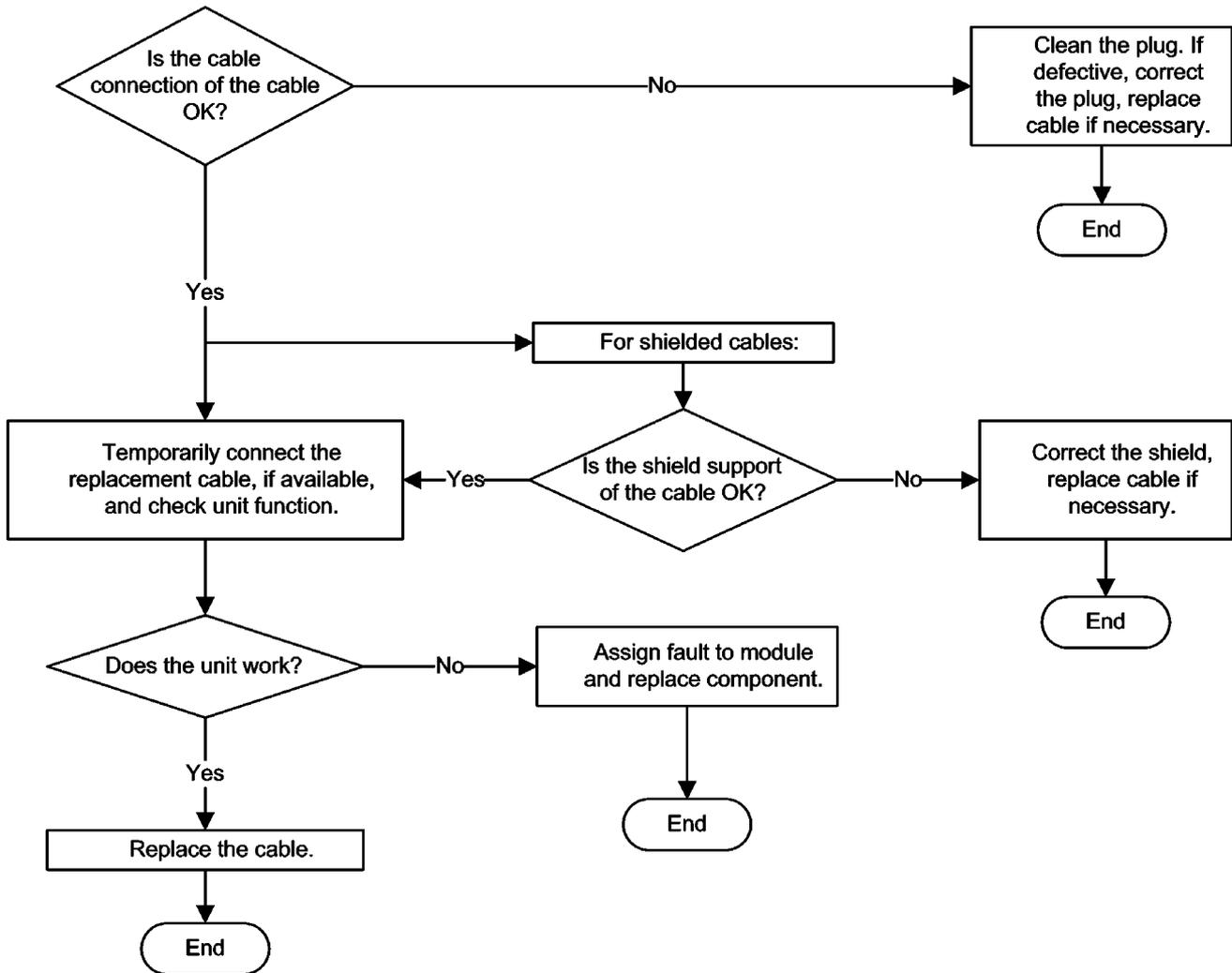


6.7 Checking the cables

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.

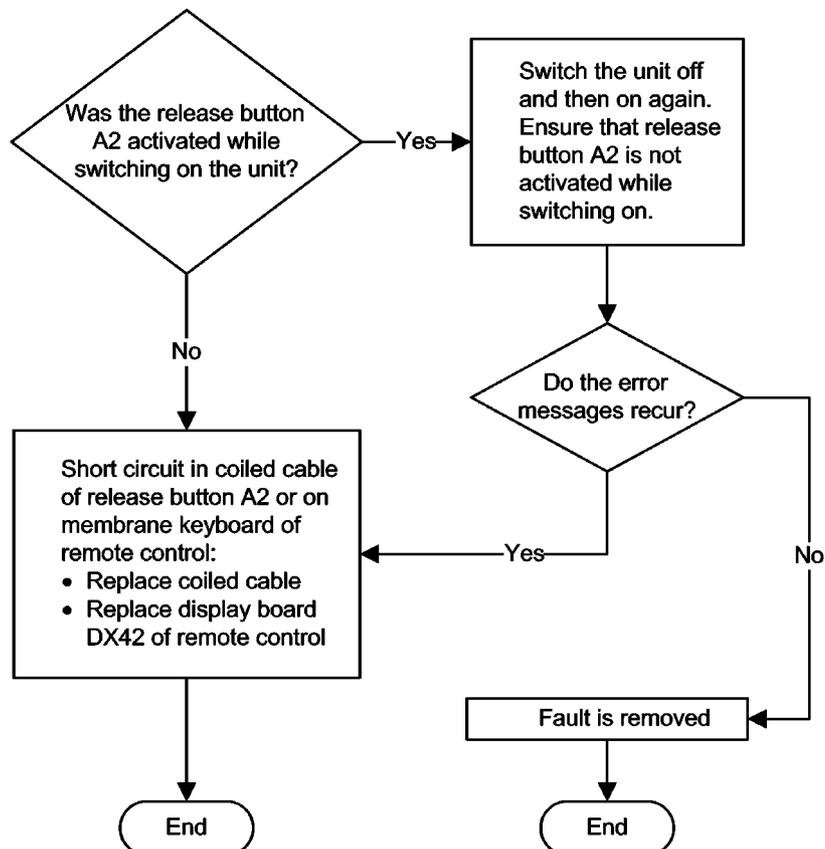
IMPORTANT: Most cables have the same plug at both ends and are connected 1:1.



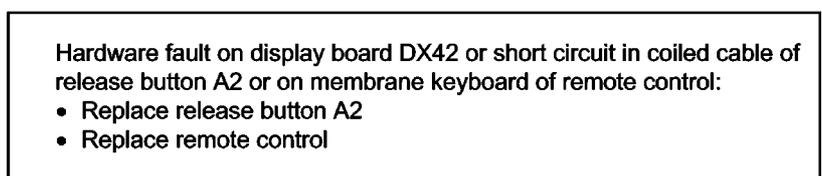
6.8 Error analysis of X-RAY control signal path

Error and help messages *with remote control installed*

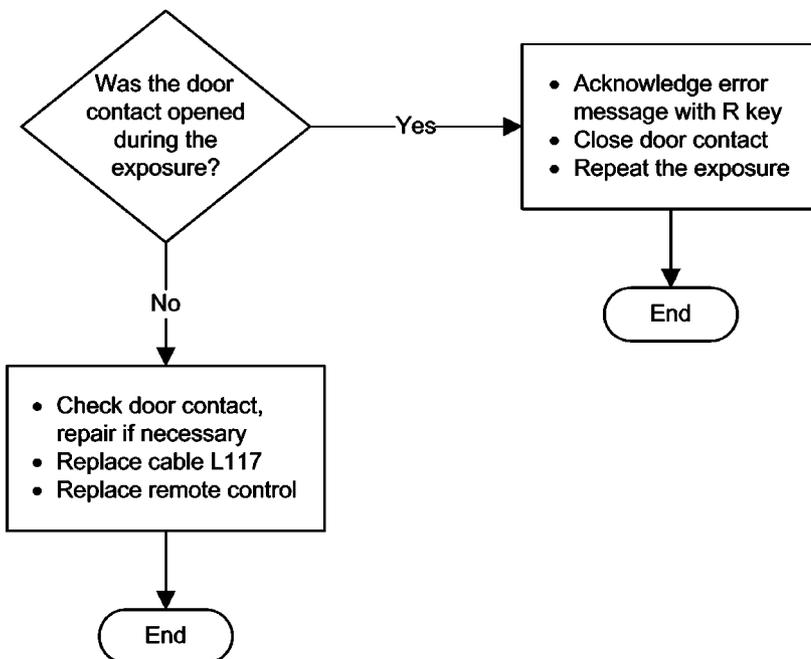
E3 42 31 + E3 13 40 often occur in combination after the unit is switched on:



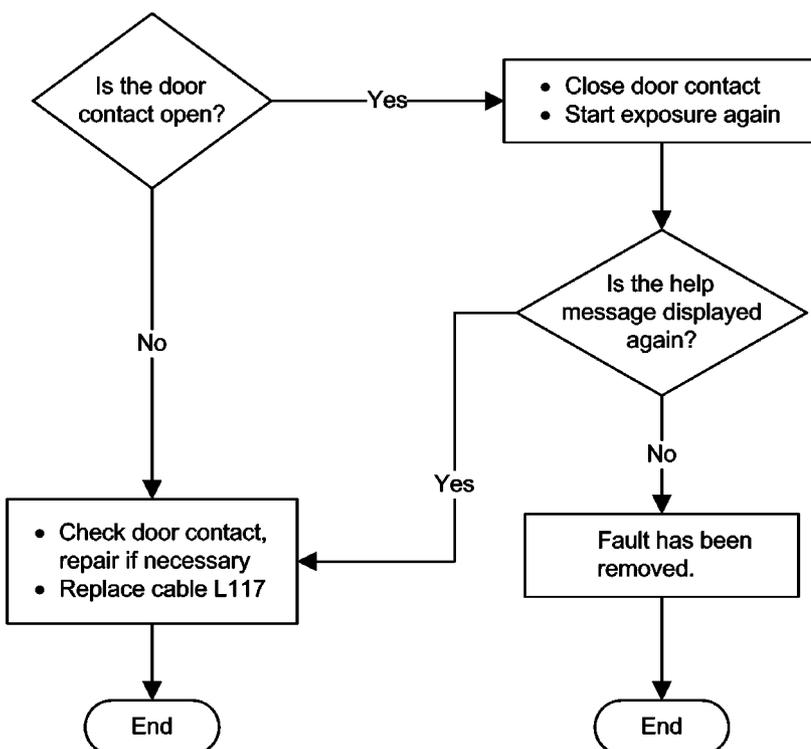
E3 42 31 occurs once after the unit is switched on:



E6 13 43 occurs once during operation of the unit:

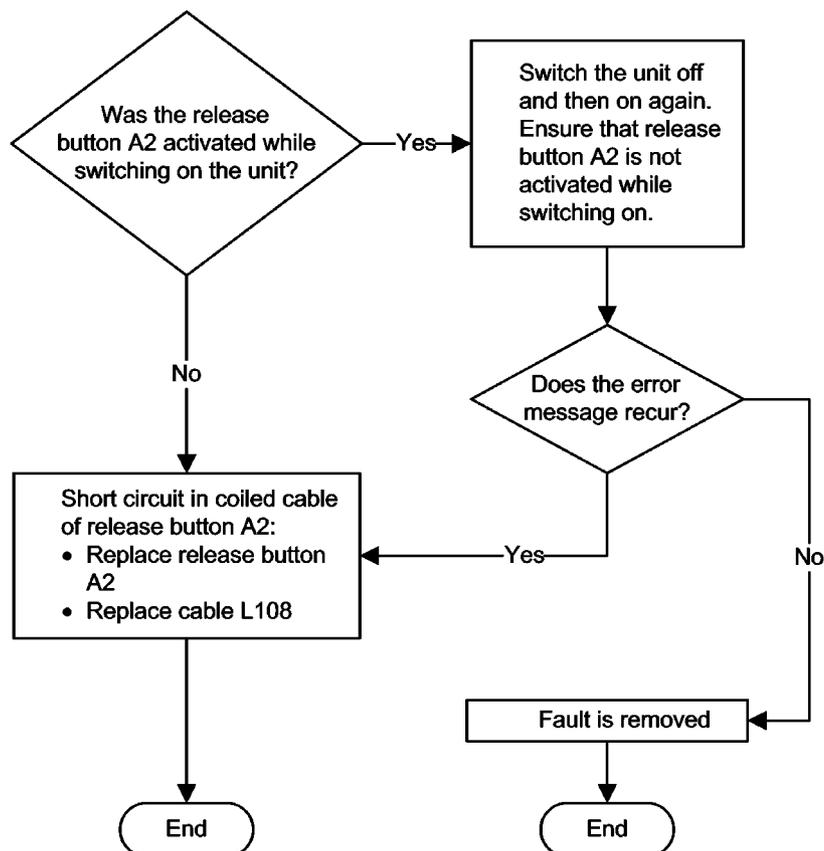


H321 is triggered at start of exposure:



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"> • Replace cable L117 or L108. • Replace board DX1. • Replace board DX11. 	S. [→ 441], S. [→ 429]
E6 13 41	Release signal missing on board DX11 at start of exposure.	<ul style="list-style-type: none"> • Replace cable L117 or L108. • Replace board DX1. • Replace board DX11. 	S. [→ 441], S. [→ 429]
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"> • Replace cable L117 or L108. • Replace board DX1. • Replace board DX11. 	S. [→ 441], S. [→ 429]

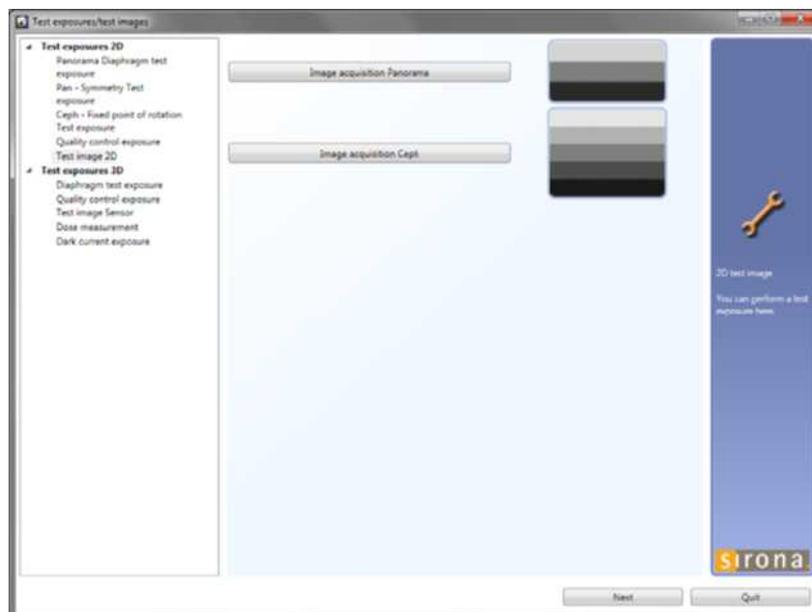
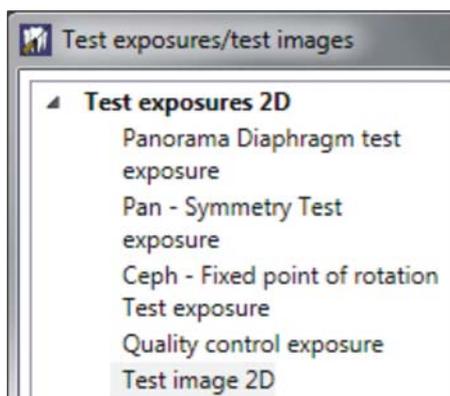
6.9 Checking the data paths

The 2D and 3D data paths can be checked by creating panoramic, ceph and sensor (3D) test images. To create test images, proceed as follows:

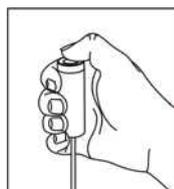
- ✓ SIDEXIS XG must be open.
- In SIDEXIS XG, call the *"Test exposures/test images"* menu: *"Utilities" | "Constancy test..." | "3D" | "Select X-ray device" | "Service exposure" | "Select X-ray component" | "Test exposures/test images"*

6.9.1 Creating 2D test images

- ✓ The menu *"Test exposures/test images"* is called [→ 469].
- 1. In the structure tree, under *"Test exposures 2D"*, select the *"2D test image"* element.
 - ↳ The menu for creating the panoramic and ceph test image appears in the action window.

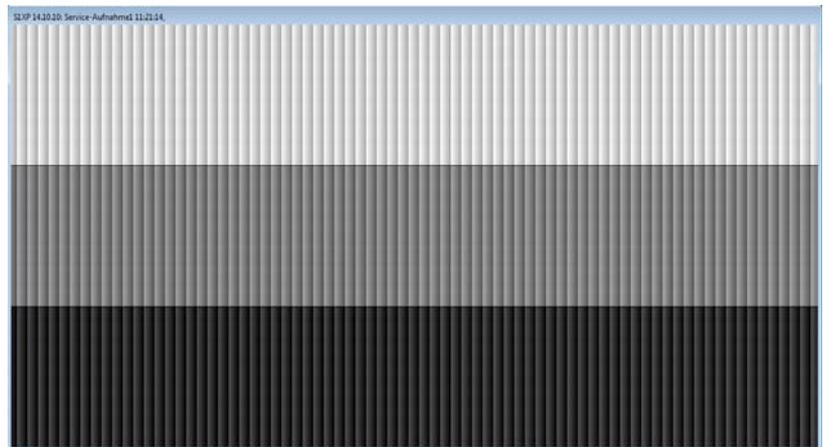


- 2. Click on the *"Image acquisition Panorama"* or *"Image acquisition Ceph"* button to create the appropriate test image.
 - ↳ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.

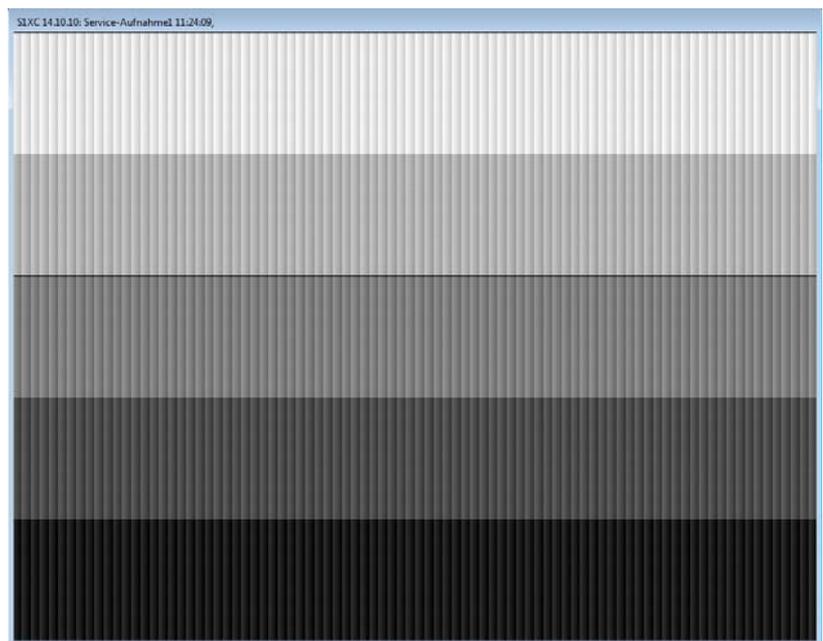


- 3. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal indicating the end of the exposure (double beep) sounds (if it has been configured).
 - ↳ The test image appears in the exposure window.

Panoramic test image



Ceph test image

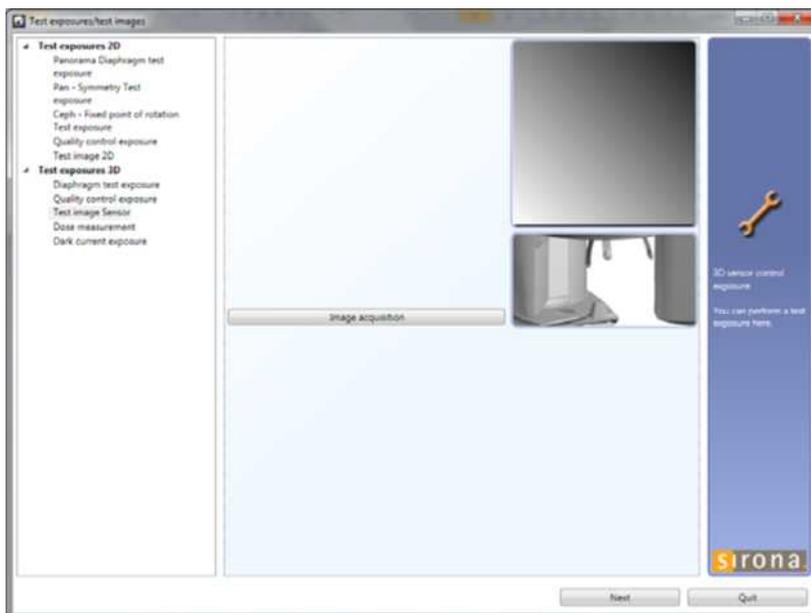
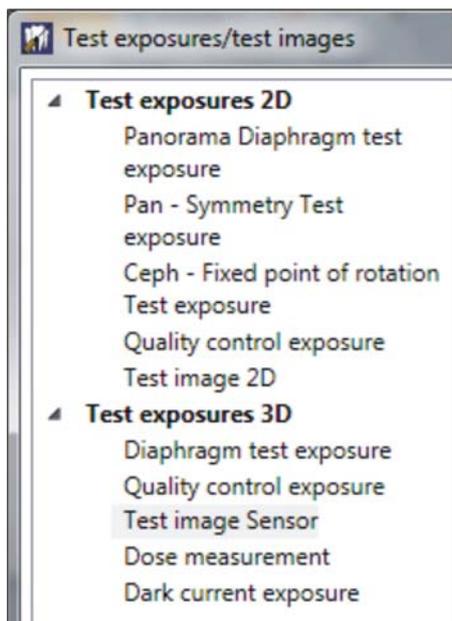


6.9.2 Creating a 3D test image

✓ The "Test exposures/test images" menu is called [→ 180].

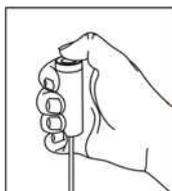
1. In the structure tree, under "Test exposures 3D", select the "Test image Sensor" element.

↳ The menu for creating the test image for the 3D sensor appears in the action window.



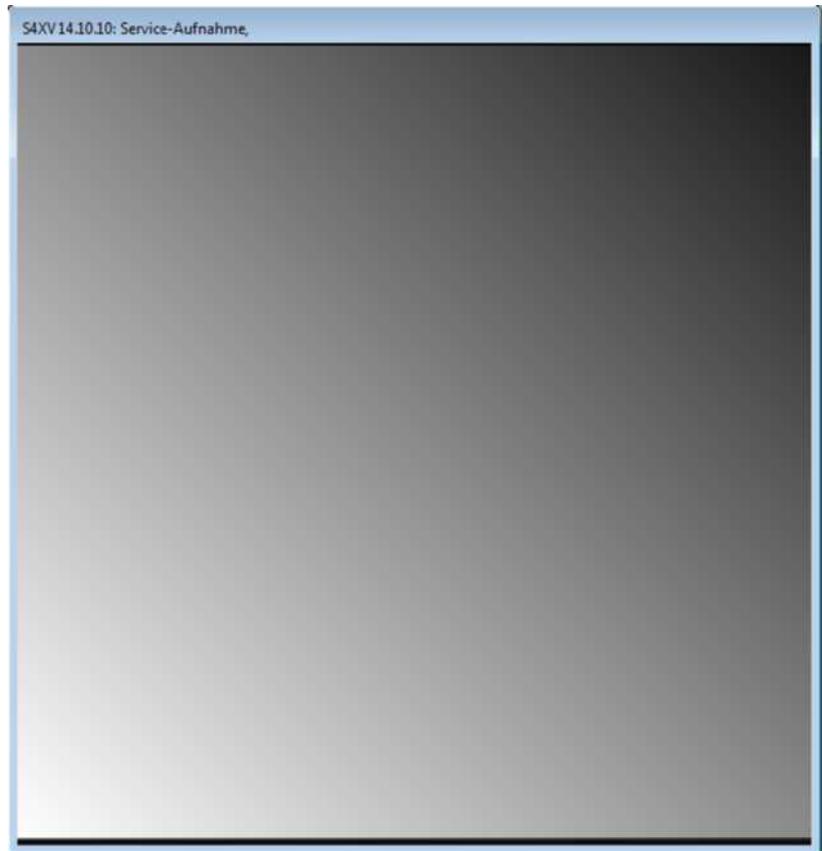
2. Click on the "Image acquisition" button to create the test image.

↳ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.



3. 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 test image appears in the exposure window.



7 Adjusting and calibrating the unit

DANGER

X-rays

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

DANGER

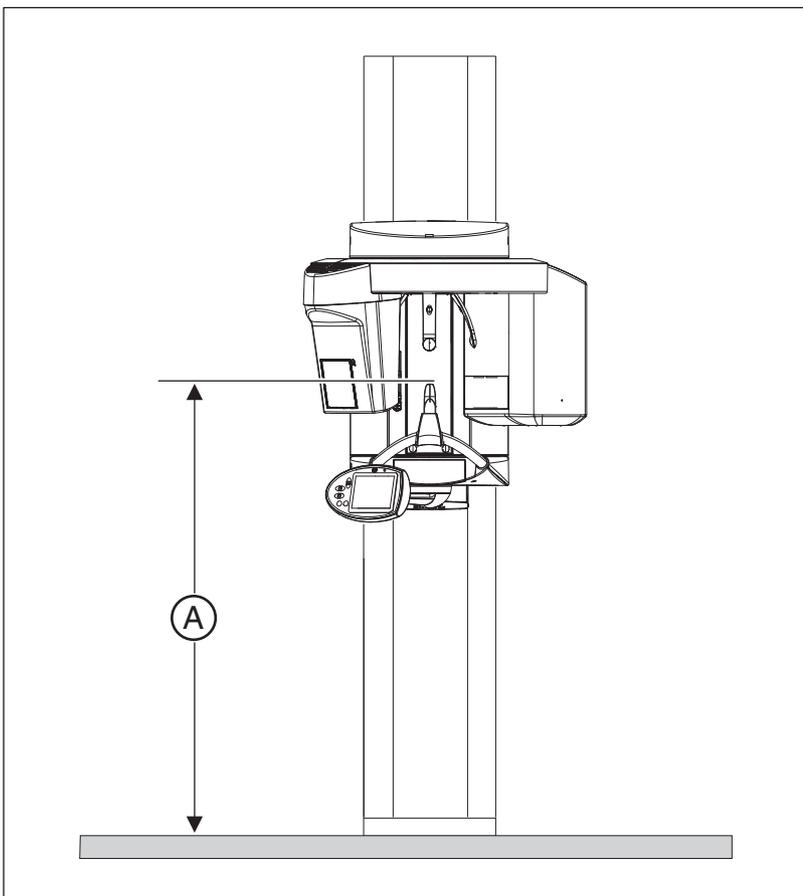
X-rays

"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.

Tip: Move the unit to a typical working height (bite block height (A) = approx. 1520 mm (60")) with the Up/Down keys on the control panel before commencing calibration.



As of unit software version V 03.04.00, you can even adjust the height of the unit during the calibration procedure. If the unit is ready for an exposure (after the *"Image acquisition"* button has been pressed in the SIDEXIS XG *"Adjustment/calibration"* menu), the corresponding service routine (S002.6/S010.10-14/S011.8, and S030.5) is displayed on the control panel. All of these service routines allow the height adjustment menu to be opened by pressing the Test key. The current unit height is displayed in selection field 1 in this menu. You can then set the unit to the desired height using the UP/DOWN keys on the control panel. Press the Service key or the double arrow key to exit the height adjustment menu.

7.1 General information about unit adjustment and calibration

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

2D adjustment (panoramic)

- Pan sensor adjustment
- Pan - Diaphragm
- Pan - Symmetry

If a cephalometer is installed:

- Ceph - Primary diaphragm
- Ceph - Fixed point of rotation
- Ceph - Main X-ray beam direction
- Ceph - Fixed point of rotation for Quickshot
- Ear plug alignment

3D adjustment/calibration (volume)

- Sensor
- Aperture
- Shading
- Shading (5x5)*
- Geometry
- Dosimetry

* Unit SW version V04.07.00 and higher

Tip: It may be helpful to use the SIDEXIS XG coloring function to evaluate the image.

7.1.1 Displays and help messages during adjustment/ 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 XG is not ready for exposure, make unit ready for exposure.

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

H4 06: Move cephalometer to starting position, press the R key.

H5 01: Turn cephalometer into lateral position.

H5 02: Turn cephalometer into AP or PA position.

H6 10: Wait until preview image is acknowledged.

Status messages

- Ready for exposure
- Exposure not possible
- Please wait
- Ready for exposure in XX seconds
- 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 [→ 88].

7.1.2 "Adjustment/Calibration" menu

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

7.1.2.1 Calling the "Adjustment/Calibration" menu

You can call the *"Adjustment/calibration"* menu via SIDEXIS XG:

"Utilities" / "Constancy test..." / "3D" / "Select X-ray device" / "Service exposure" / "Select X-ray component" / "Adjustment/calibration" / Password prompt (see section entitled "Password protection")

The *"Select X-ray device"* and *"Select X-ray component"* prompts are only displayed if more than one unit has been set up in SIDEXIS XG.

Password protection

The *"Adjustment/calibration"* menu is password-protected.

Reverse the number of the month and the number of the day and use them as the password:

March 12th = 03 12 becomes 3021, which is the password of that day.

Service mode

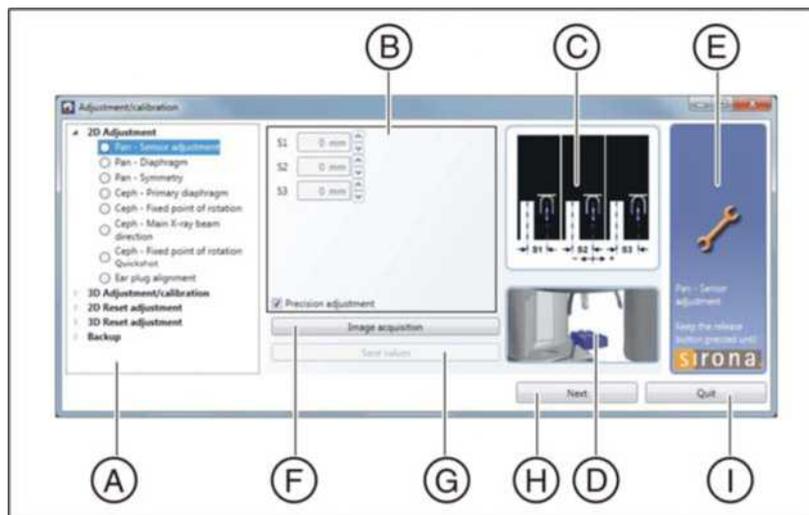
When you open the *"Adjustment/calibration"* menu, the unit switches from user mode to the PC service mode logged by the PC. In PC service mode, the control options that are available on the control panel are determined by SIDEXIS XG and the service routine currently selected. General control of the 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 five areas.



A	Navigation area	Structure tree for adjustment and calibration [→ 190]
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	Message window	Shows messages and information about this stage of the adjustment/calibration procedure.

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

F	Image acquisition	Makes the unit ready for exposure [→ 197].
G	Save values	Saves the current adjustment/calibration values.
H	Next	Switches to the next stage of the adjustment/calibration procedure.
I	Exit	Exits adjustment/calibration and closes the menu.

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. The order in which the elements appear in the structure tree determines the chronological order of the procedure to adjust and calibrate the unit:

2D adjustment

- Pan sensor adjustment
- Pan - Diaphragm
- Pan - Symmetry
- Ceph - Primary diaphragm
- Ceph - Fixed point of rotation
- Ceph - Main X-ray beam direction
- Ceph - Fixed point of rotation for Quickshot
- Ear plug alignment

3D adjustment/calibration

- Sensor
- Diaphragm
- Shading
- Shading (5x5)* (*unit SW version V04.07.00 and higher*)
- Geometry
(*up to unit SW version V04.04.00*)
 - Center of rotation 1
 - Center of rotation 2
 - Center of rotation 3
 - Center of rotation 4
 - Center of rotation 5

or alternatively:

- Geometry
(*unit SW version V04.07.00 and higher*)
 - Center of rotation (8x8) 1
 - Center of rotation (8x8) 2
 - Center of rotation (8x8) 3
 - Center of rotation (8x8) 4
 - Center of rotation (8x8) 5
 - Center of rotation (5x5) 1
 - Center of rotation (5x5) 2
 - Center of rotation (5x5) 3
 - Center of rotation (5x5) 4
 - Center of rotation (5x5) 5

In addition to the elements required for adjustment and calibration of the unit described above, the structure tree also contains three other elements:

NOTICE
 The adjustment data should be reset only in an **absolute emergency**.

Resetting 2D adjustment

- Reset panoramic adjustment
- Reset ceph adjustment

Resetting 3D adjustment

- Resetting the adjustment

Backup

- Calibration data

Validity of existing adjustment/calibration settings

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

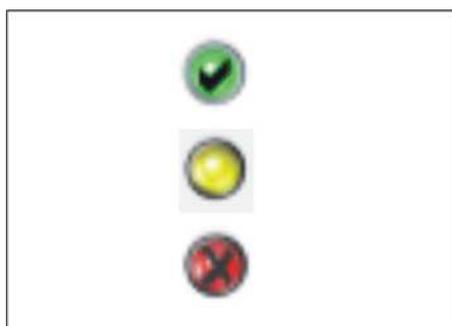
The elements for resetting adjustments (calibrations) are not prefixed by symbols.

2D 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

3D adjustment/calibration



Green and checked	Valid data record; adjustment/calibration is in progress	No adjustment/calibration required
yellow	Data record available, but not yet saved	Data record must be saved
Red	Invalid data record or no record present	Adjustment/calibration required

Working with the structure tree

You can navigate between the elements of the structure tree by clicking on them with the mouse.

NOTICE! You must follow the prescribed sequence in order to obtain a valid adjustment or calibration.

Click with the mouse on the small triangles in front of the elements to collapse and expand the structure tree.

7.1.2.2.2 Coarse and precision adjustment

The "Pan - Sensor Adjustment", "Pan - Diaphragm", and "Ceph - Fixed point of rotation" menus support coarse and precision adjustment (precision adjustment is pre-selected). Always try to use precision adjustment first when adjusting the unit. In most cases, previous coarse adjustment is not necessary. If a coarse adjustment is required, you are informed via a message window.



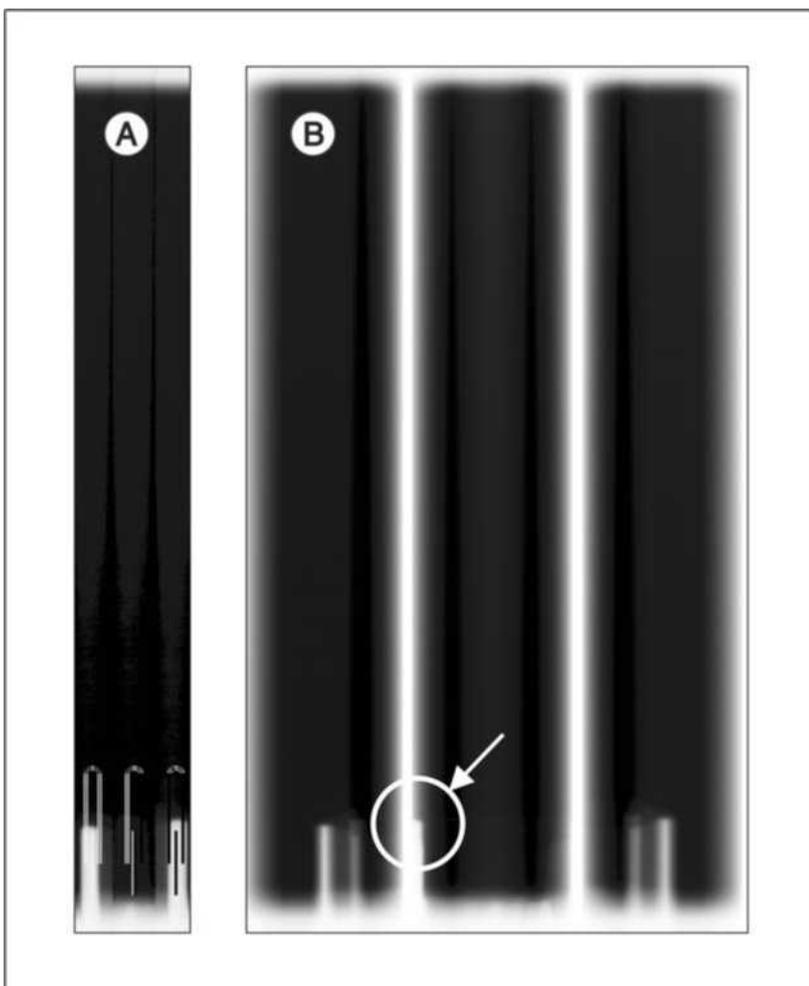
To perform coarse adjustment, uncheck the "Precision adjustment" box and complete the adjustment procedure in the same way as for precision adjustment.

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

Pan - Sensor Adjustment

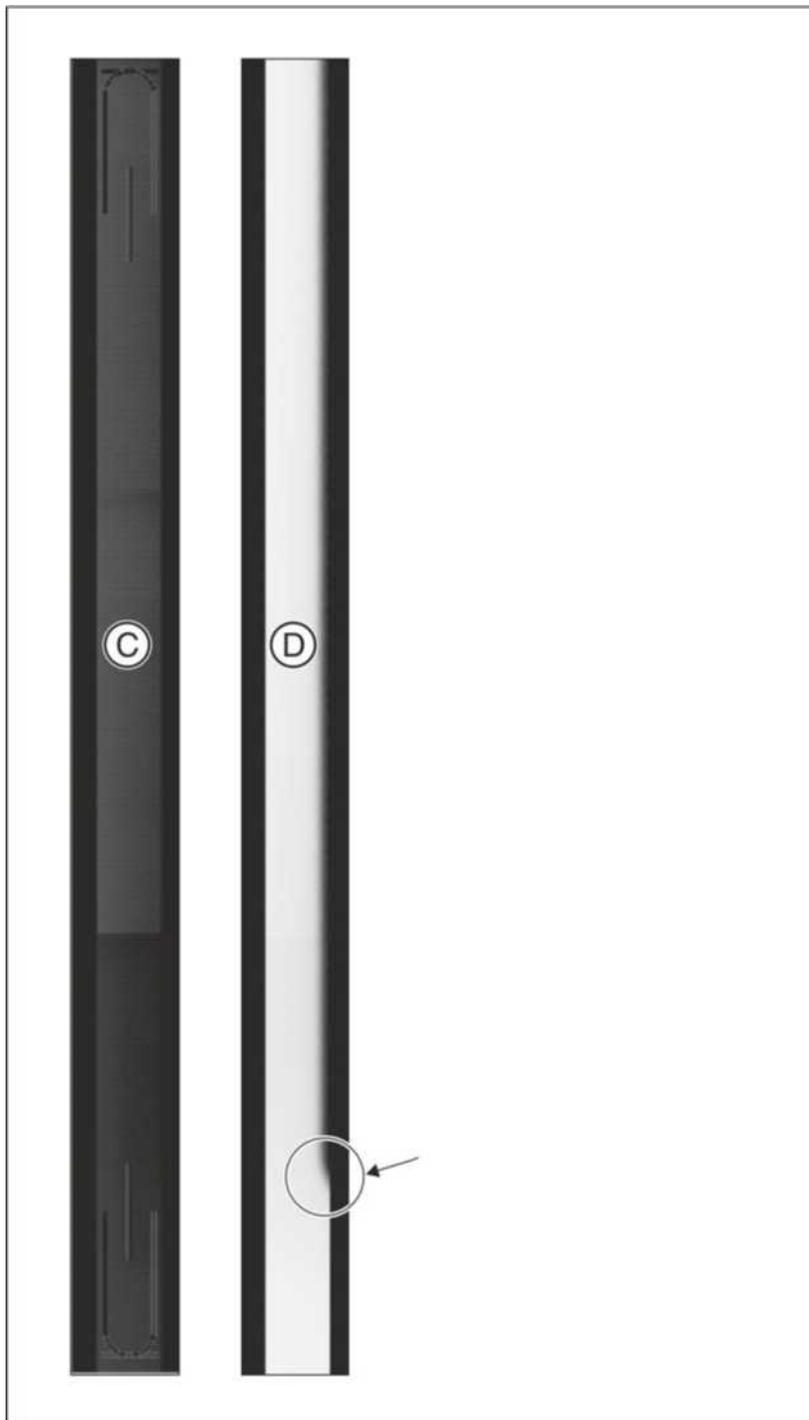
Sensor adjustment can usually be performed directly via precision adjustment. Only in exceptional cases, e.g. if one or several needles are completely outside of the image section in an image acquired with the "Precision adjustment" presetting (A), is it necessary to perform coarse adjustment prior to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

Pan - Diaphragm

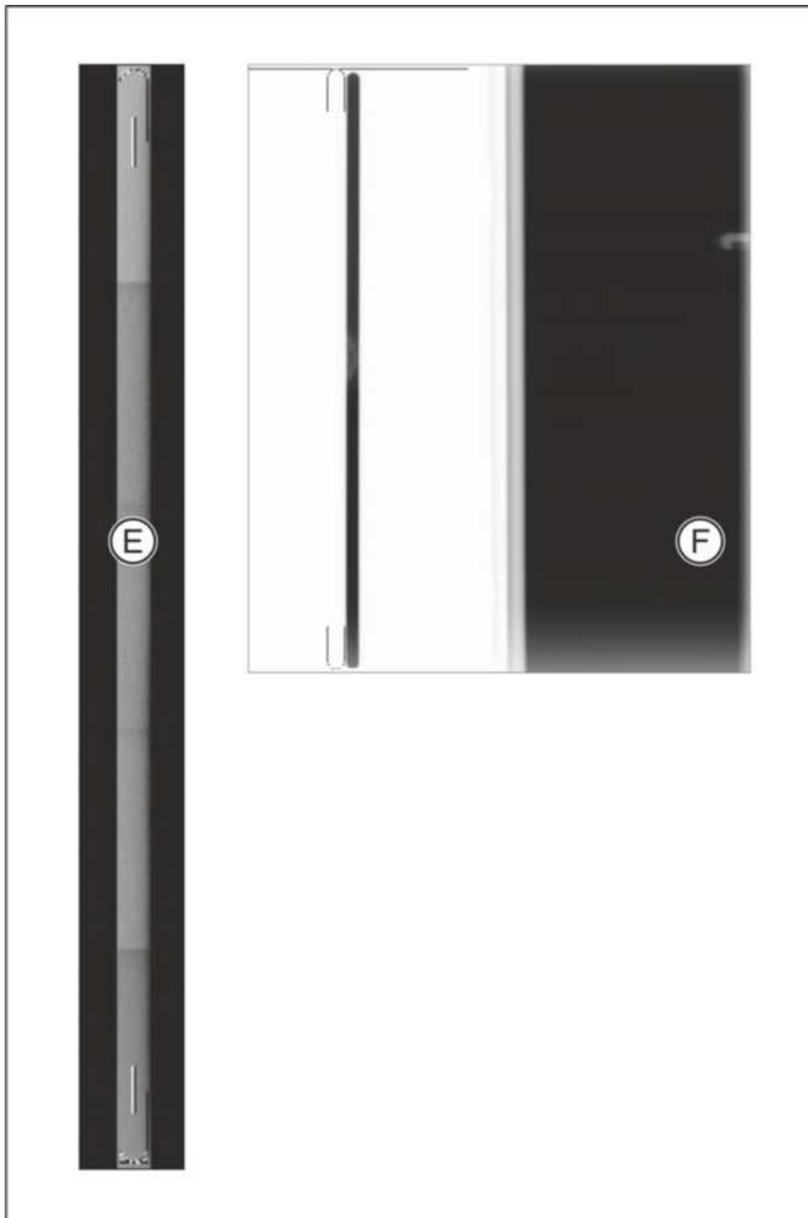
Diaphragm adjustment can usually be performed directly via precision adjustment. Only in exceptional cases, e.g. if the exposed image area is completely outside the image section in an image acquired with the "Precision adjustment" setting (C), is it necessary to perform coarse adjustment prior to precision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

Ceph - Fixed point of rotation

Adjustment of the fixed point of rotation 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 "Precision 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

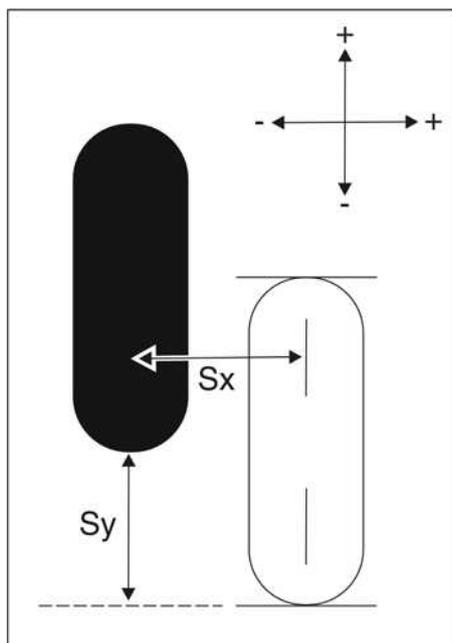
The menus contain a pictographic representation of the expected adjustment image to help you perform software-based adjustment and calibration. The shifting direction indicated by the plus and minus signs located below and next to the pictograph refers to shifting of the exposed image section in the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

During automatic adjustment via the "*Adjustment/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 SIDEXIS measuring ruler and overwrite the default values in the menu. This procedure is described in the following sections.

7.1.3 Enabling exposure readiness

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

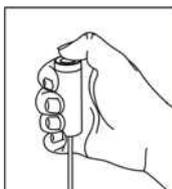
- ✓ Call the "Adjustment/calibration" menu.
- ✓ Select the corresponding element in the structure tree.
- Click on the "Image acquisition" button.



- ↪ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.
- ↪ 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

- ✓ Call the "Adjustment/calibration" menu.
- ✓ Select the corresponding element in the structure tree.
- ✓ SIDEXIS XG must be ready for exposure.
- 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).



7.1.5 Save values

- ✓ Adjustment or calibration must be OK, i.e. the values in the menu's text boxes must be equal to zero.
- To save the adjustment or calibration values, click the "Save values" button.
 - ↪ The adjustment or calibration is saved.
 - ↪ The saved adjustment or calibration is identified in the structure tree by a check mark (2D adjustment) or a green traffic light symbol with a check mark (3D adjustment).

7.1.6 Test phantoms for adjustment and calibration

7.1.6.1 OP XG needle phantom for panoramic adjustment

NOTICE

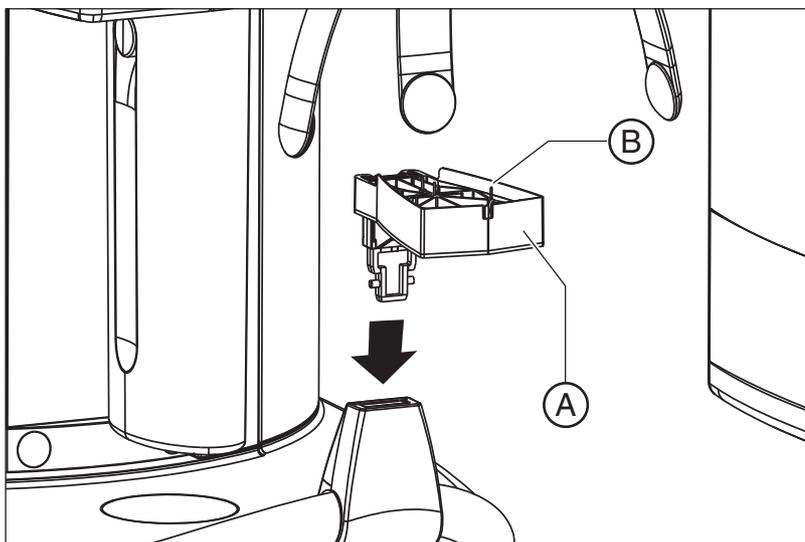
Risk of damage to unit

Make absolutely sure that the OP XG needle phantom is inserted in 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 combisensor and the OP XG needle phantom and thereby damage the unit.

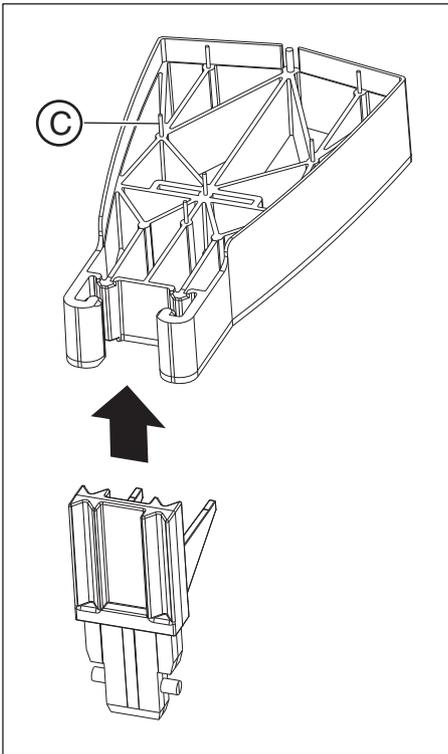
NOTICE

Risk of damage to unit

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

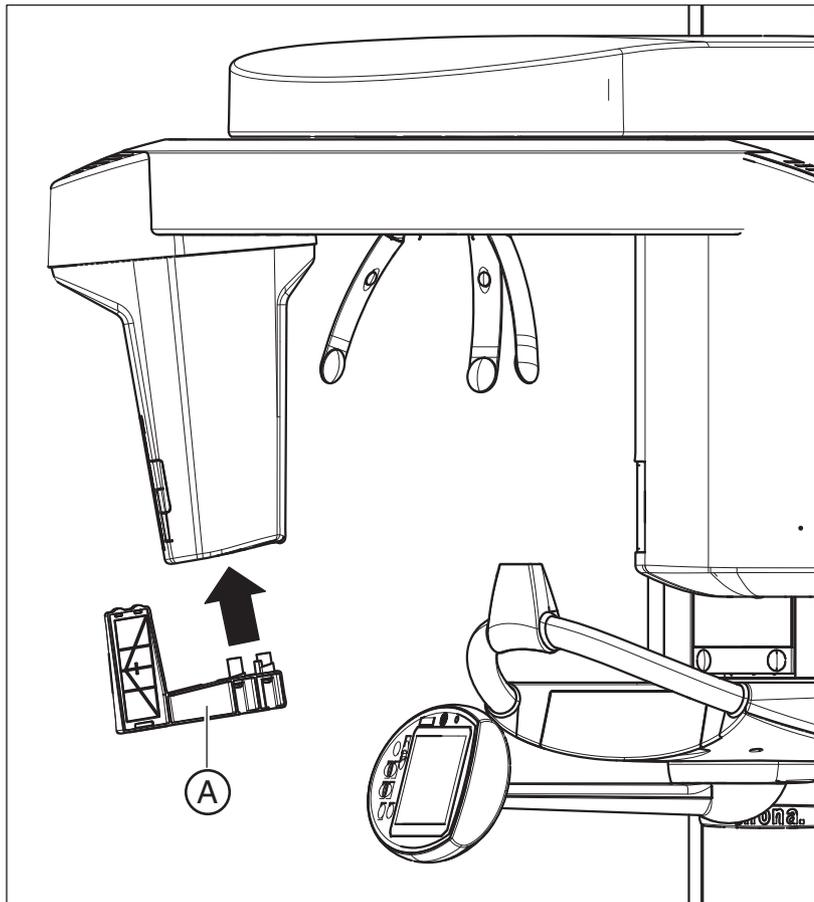


For **panoramic sensor** and **pan symmetry** panorama adjustments, the OP XG needle phantom (**A**) must be inserted into the pan bite block holder of the unit. For **pan diaphragm** panorama adjustment, the needle phantom must be taken out of the bite block holder.



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 OP XG 3D ceph adjustment phantom for the adjustment of the cephalometer



For **ceph diaphragm** and **ceph main X-ray beam direction** 2D adjustment, you must insert the OP XG ceph adjustment phantom (A) into the cover of the dual sensor.

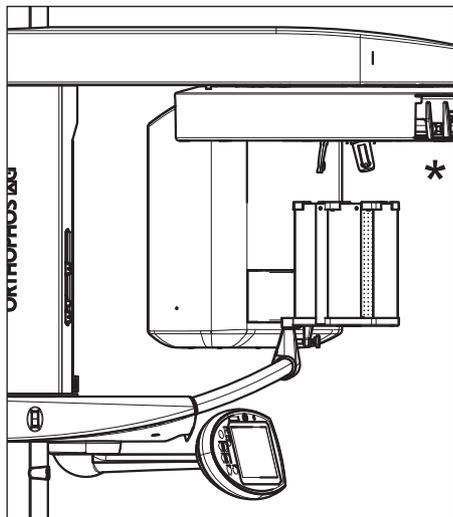
You must take the adjustment phantom back out again for **ceph fixed rotation point** 2D adjustment.

7.1.6.3 Geometry phantom for volume calibration

NOTICE

Risk of damage to unit

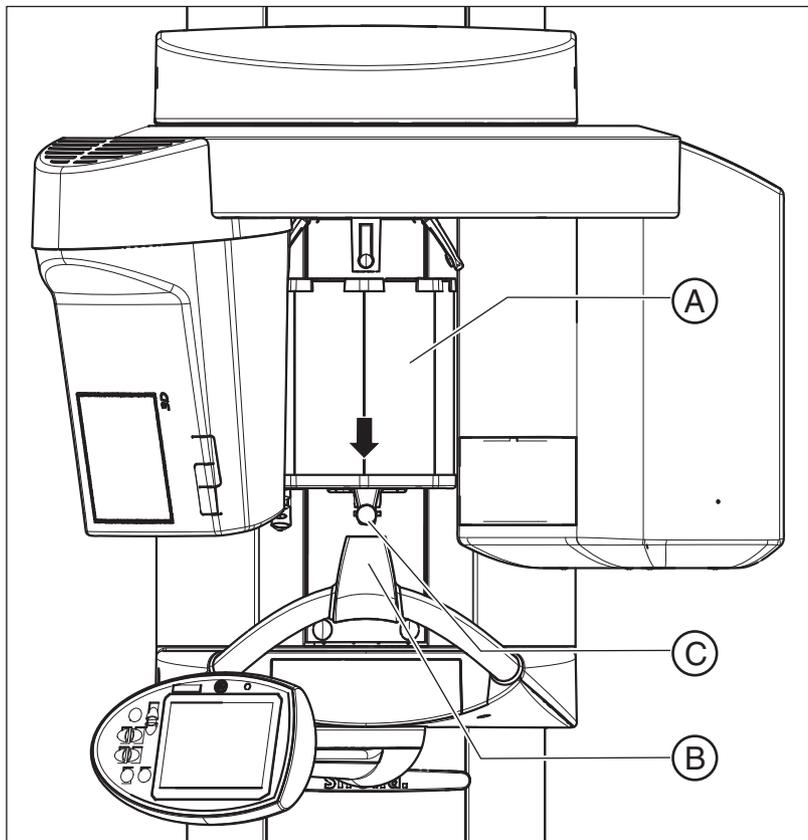
Make absolutely sure that the geometry phantom is inserted in the bite block holder of the unit in such a way that the body of the phantom and the screw (C) point *away from the unit in the direction of the patient* (see figure). Otherwise, this can result in a collision between the combisensor and the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



* For enhanced representation, the unit is shown in the left-hand image without combisensor.

For **sensor** 3D adjustment, as well as for **geometry** 3D calibration, you must insert the geometry phantom (A) into the pan bite block holder (B) on the unit.

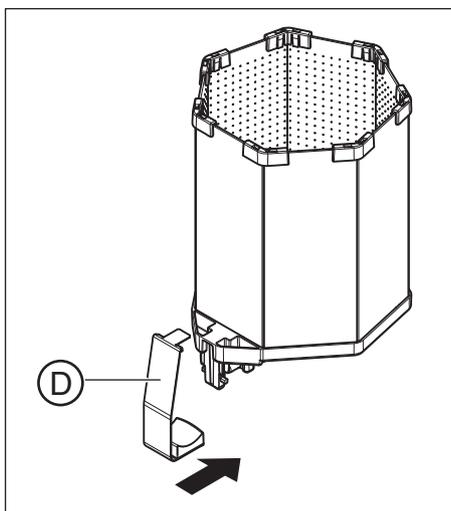
For **diaphragm** 3D adjustment, as well as for **shading** 3D calibration, you must take the geometry phantom back out of the bite block holder.



IMPORTANT

Once it has been inserted into the bite block holder, the geometry phantom must be aligned vertically and horizontally with the spirit level, so that calibration can be performed correctly.

1. Insert the geometry phantom (A) into the pan bite block holder (B) on the unit and secure it with the screw (C).



2. Attach the clip (D) for better stability.

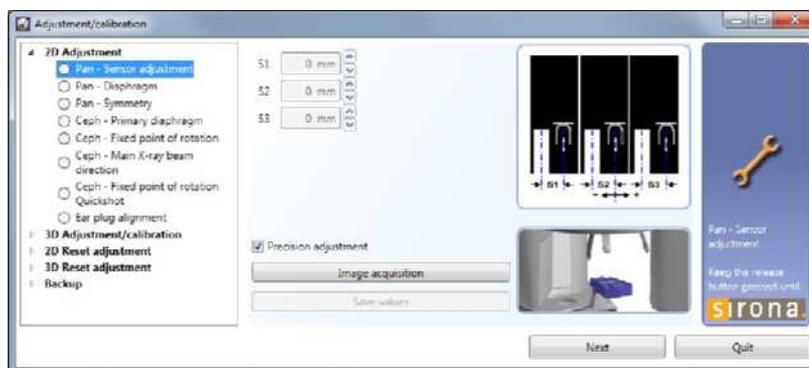
7.2 Adjustment and calibration via the "Unit adjustment/calibration" menu

IMPORTANT

After every adjustment or calibration of the unit, the reference values for the constancy measurement must be recalculated and entered in the "Test results" form, "Reference value" column.

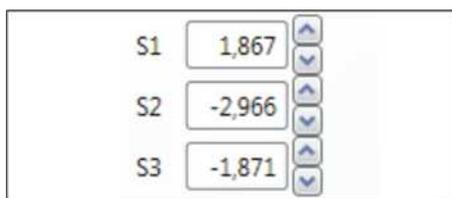
7.2.1 2D adjustment

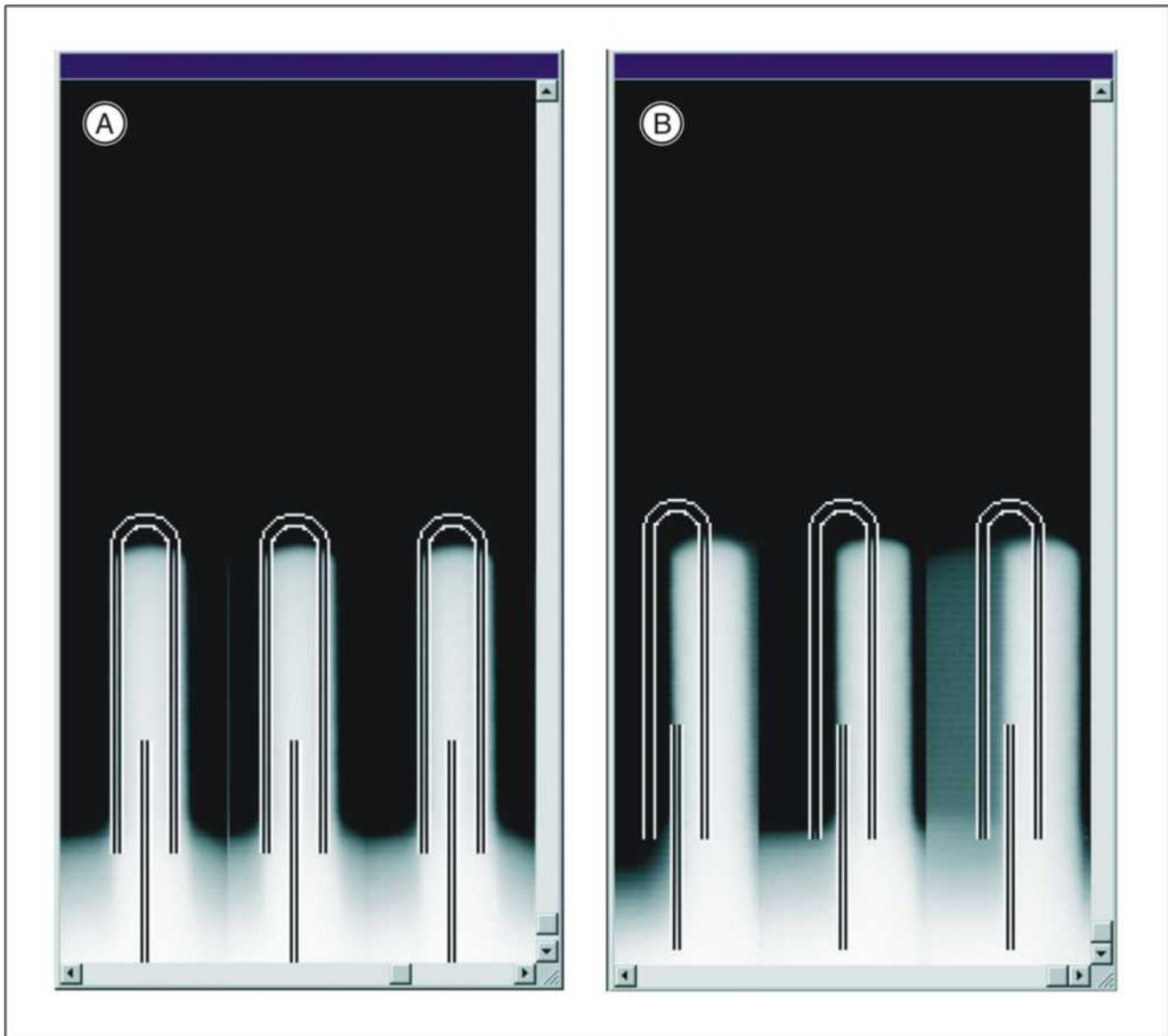
7.2.1.1 Pan sensor adjustment



7.2.1.1.1 Automatic adjustment: Panoramic sensor (standard)

- ✓ The pan sensor is plugged into the pan slot on the unit.
- ✓ The OP XG needle phantom is in the pan bite block holder on the unit [→ 198].
- 1. Call the "Adjustment/calibration" menu [→ 188].
- 2. In the structure tree, under "2D Adjustment", click on the "Pan - Sensor Adjustment" element.
 - ↳ The "Pan - 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.
- 3. Make SIDEXIS XG ready for exposure. [→ 197]
- 4. Take an exposure (60 kV/3 mA; 0.6 s) [→ 197].
 - ↳ SIDEXIS XG calculates the adjustment values **S1**, **S2**, and **S3** automatically from the exposure and enters them in the text boxes of the "Pan - Sensor Adjustment" menu.
 - ↳ The exposure is displayed in the exposure window in SIDEXIS XG.





A	Adjustment OK	<ul style="list-style-type: none"> The three needle images must lie in the center and inside the auxiliary lines.
B	Adjustment not OK	

5. Repeat the procedure starting at Step 3 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.

IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 205].



6. If adjustment is OK (the adjustment values in the text boxes are equal to zero), save the values. [→ 197]

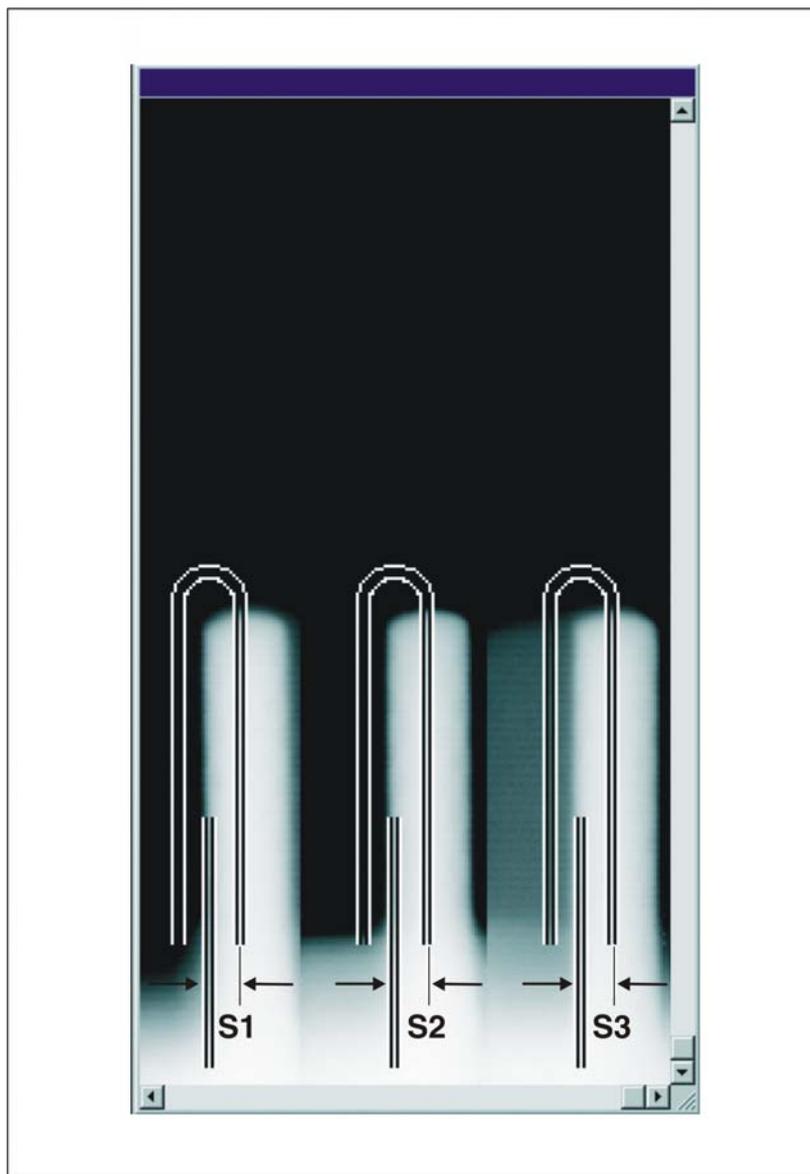
7. Remove the OP XG needle phantom from the pan bite block holder on the unit.

8. Continue with the next stage of the adjustment procedure [→ 206].

7.2.1.1.2 Manual adjustment: Panoramic sensor

The manual adjustment procedure is similar to the one for automatic adjustment [→ 203]. The only difference is that the default adjustment values calculated automatically by SIDEXIS XG in the "*Pan - Sensor Adjustment*" menu are overwritten by adjustment values calculated manually.

1. Start the adjustment procedure as described in the chapter entitled "Automatic adjustment: Panoramic sensor (standard) [→ 203]".



2. After taking the exposure, measure the distances **S1**, **S2** and **S3** with the SIDEXIS XG measuring ruler.

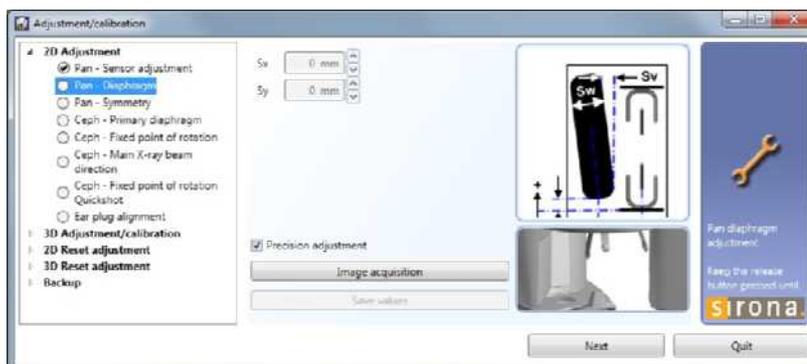
To measure **S1**, **S2** and **S3**, estimate where the horizontal center of the displayed needles is located. Take the measurement in the lower area of the needles if possible, since they may have become slightly bent after repeated use.

Tip: To facilitate the measuring procedure, you can also color the image in SIDEXIS XG (see the SIDEXIS Operator's Manual).

S1	1,867	↑	↓
S2	-2,966	↑	↓
S3	-1,871	↑	↓

3. Overwrite the adjustment values for **S1**, **S2** and **S3** in the text boxes of the "*Pan - 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". Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Panoramic sensor (standard) [→ 203]".

7.2.1.2 Pan diaphragm



7.2.1.2.1 Automatic adjustment: Pan diaphragm (standard)

IMPORTANT

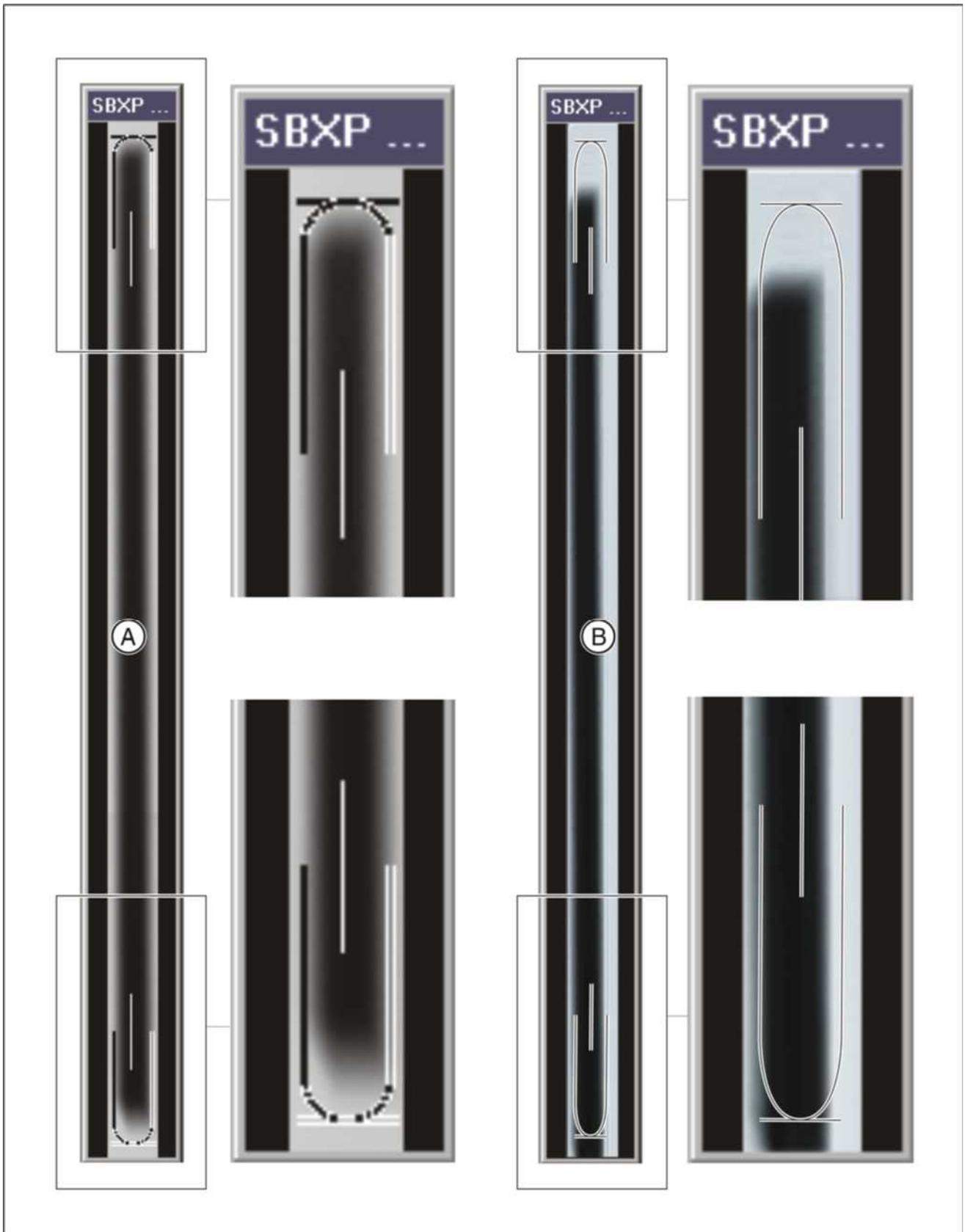
If a message window indicating that the diaphragm is tilted appears in the menu during adjustment "*Pan - Diaphragm*", the primary diaphragm is mechanically maladjusted in the vertical axis. In this case you must take the exposure again.

IMPORTANT

If a message window indicating that another X-ray has to be taken appears in the menu during adjustment "*Pan - Diaphragm*", 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 OP XG needle phantom is *not* in the pan bite block holder on the unit.
1. In the structure tree, under "*2D Adjustment*", click on the "*Pan - Diaphragm*" element (S030.2).
 - ↳ The "*Pan - 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.
 2. Make SIDEXIS XG ready for exposure. [→ 197]
 3. Take an exposure (60 kV/3 mA; 0.2s) [→ 197].
 - ↳ SIDEXIS XG Calculates the adjustment values **Sx** and **Sy** automatically from the exposure and enters them in the text boxes of the "*Pan - Diaphragm*" menu.
 - ↳ The exposure is displayed in the exposure window in SIDEXIS XG.

Sx	0,097	↑	↓
Sy	0	↑	↓



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

4. Repeat the procedure starting at Step 2 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.

IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 209].

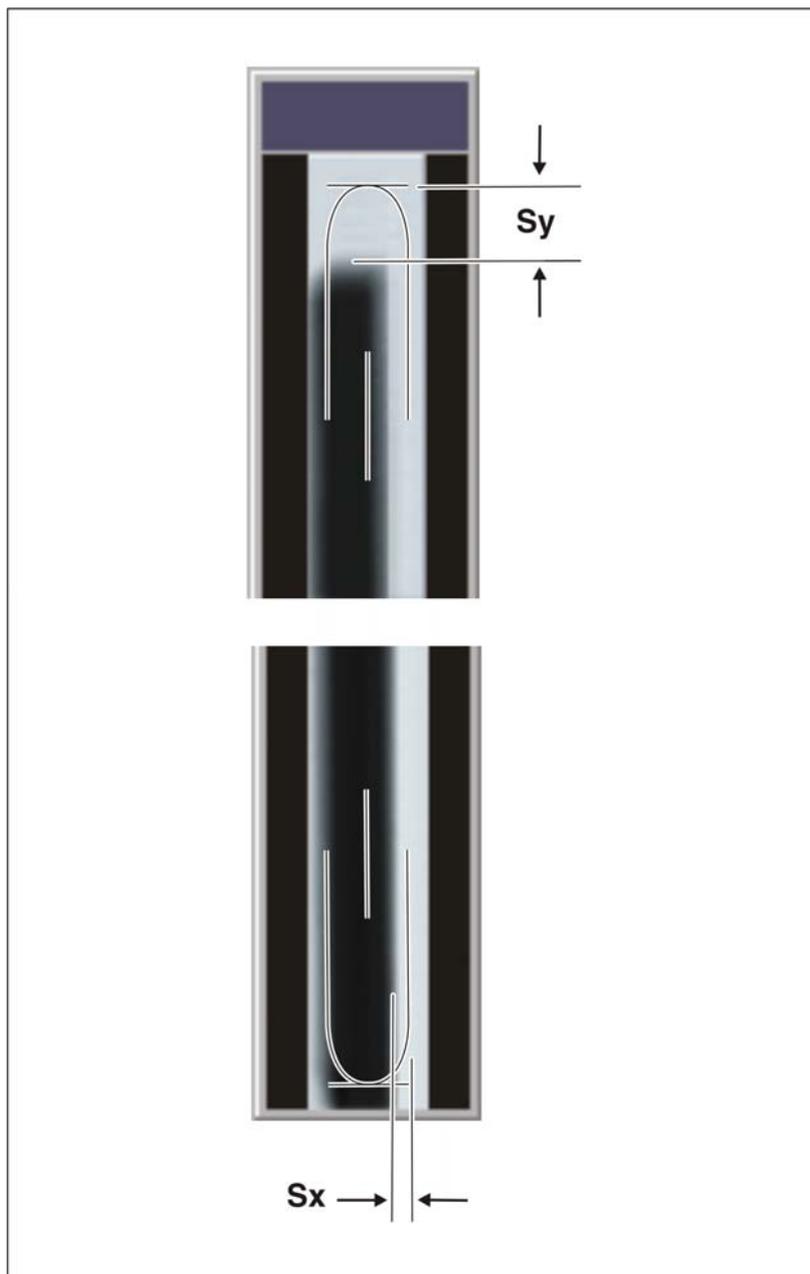
Sx	0	↑ ↓
Sy	0	↑ ↓

5. If adjustment is OK (the adjustment values in the text boxes are equal to zero), save the values. [→ 197]
6. Continue with the next stage of the adjustment procedure. [→ 210]

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 by SIDEXIS XG in the "*Pan - Diaphragm*" menu are overwritten by adjustment values calculated manually.

1. Start the "*Pan - Diaphragm*" adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan diaphragm (standard) [→ 206]".



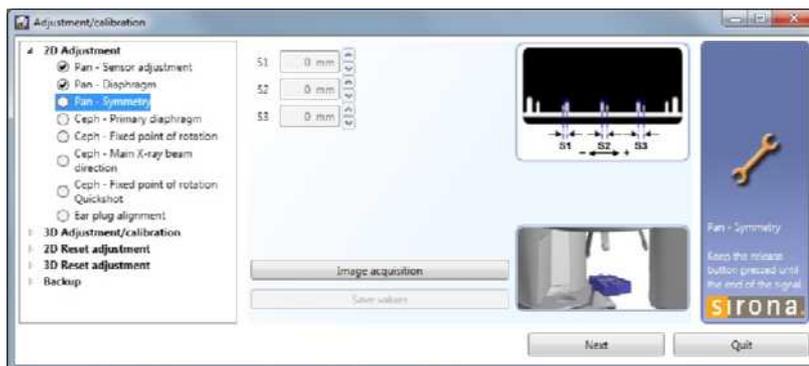
2. Once you have taken the exposure, measure distances **Sx** and **Sy** with the SIDEXIS XG measuring ruler.

Tip: To facilitate the measuring procedure, you can also color the image in SIDEXIS XG (see the SIDEXIS Operator's Manual).

Sx	0,097	▲	▼
Sy	0	▲	▼

3. Overwrite the adjustment values for **Sx** and **Sy** in the text boxes of the "*Pan - Diaphragm*" 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". Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan diaphragm (standard) [→ 206]".

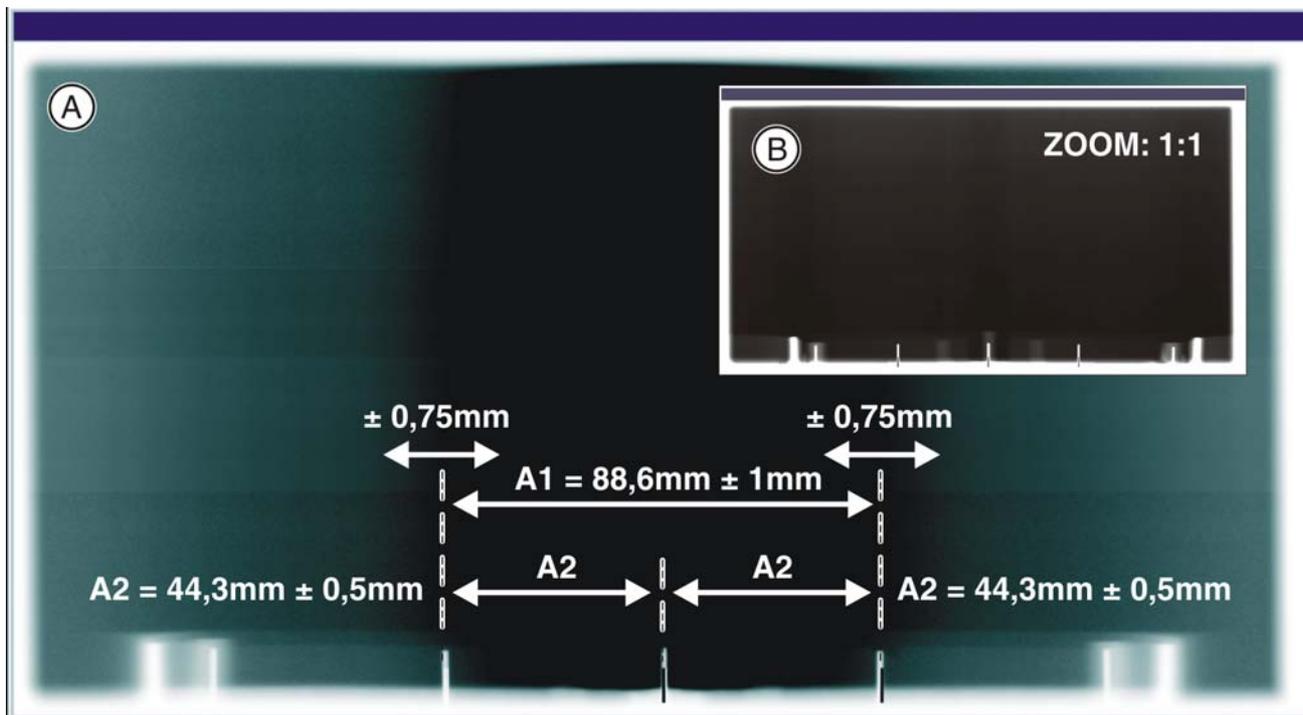
7.2.1.3 Pan symmetry



7.2.1.3.1 Automatic adjustment: Pan symmetry

- ✓ The OP XG needle phantom is in the pan bite block holder on the unit.
1. In the structure tree, under "*2D Adjustment*", click on the "*Pan - Symmetry*" element (S010.2).
↳ The "*Pan - Symmetry*" menu is displayed in the action area.
 2. Make SIDEXIS XG ready for exposure. [→ 197]
 3. Take an exposure (60 kV/3 mA; 14.1 s) [→ 197].
↳ SIDEXIS XG calculates the adjustment values **S1**, **S2**, and **S3** automatically from the exposure and enters them in the text boxes of the "*Pan - Symmetry*" menu.
↳ The exposure is displayed in the exposure window in SIDEXIS XG.

S1	-1,851	▲	▼
S2	-1,198	▲	▼
S3	-0,625	▲	▼

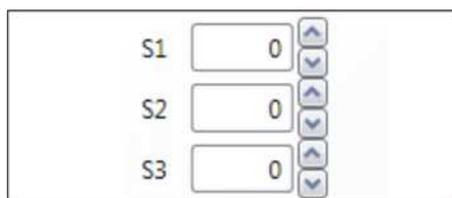


A	Adjustment OK	<ul style="list-style-type: none"> • The shadow of the center needle, the needle image, and the auxiliary lines must be coincident and located one behind the other. A tolerance (offset of needle from the central auxiliary line) of ± 0.75 mm is admissible. • Distance A1 must be 88.6 ± 1 mm. • Distances A2 must be identical, each being 44.3 ± 0.5 mm.
B		<ul style="list-style-type: none"> • A surrounding white border must be present.
C	Adjustment not OK	

4. Repeat the procedure starting at Step 2 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.

IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 213].

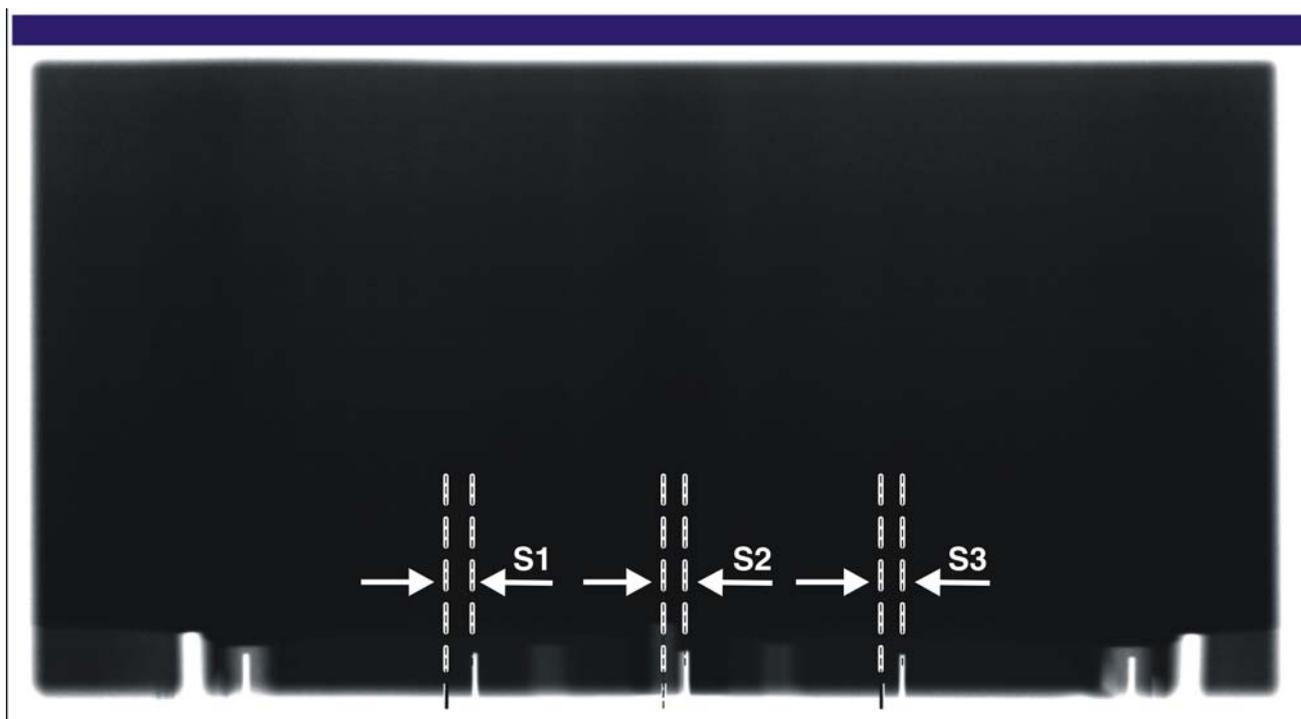
5. If adjustment is OK (the adjustment values in the text boxes are equal to zero), save the values. [→ 197]
6. Remove the OP XG needle phantom from the pan bite block holder on the unit.
7. Continue with the next stage of the adjustment procedure. [→ 214]



7.2.1.3.2 Manual adjustment: Pan symmetry

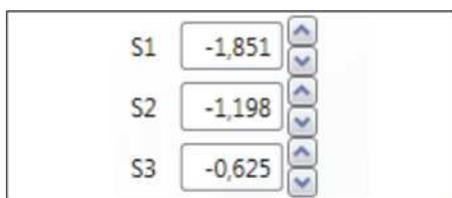
The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment values calculated automatically by SIDEXIS XG in the "Pan - Symmetrie" menu are overwritten by adjustment values calculated manually.

1. Start the "Pan - Symmetrie" adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan symmetry [→ 210]".



2. After taking the exposure, measure the distances **S1**, **S2** and **S3** with the SIDEXIS XG measuring ruler.
If possible, measure in the lower area of the needles since they may be slightly bent after several uses.
Always measure exactly from the center of the auxiliary line to the center of the pin.

Tip: To facilitate the measuring procedure, you can also color the image in SIDEXIS XG (see the SIDEXIS Operator's Manual).



3. Overwrite the adjustment values for **S1**, **S2** and **S3** in the text boxes of the "Pan - Symmetrie" 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". Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Pan symmetry [→ 210]".

7.2.1.4 Ceph - Primary diaphragm



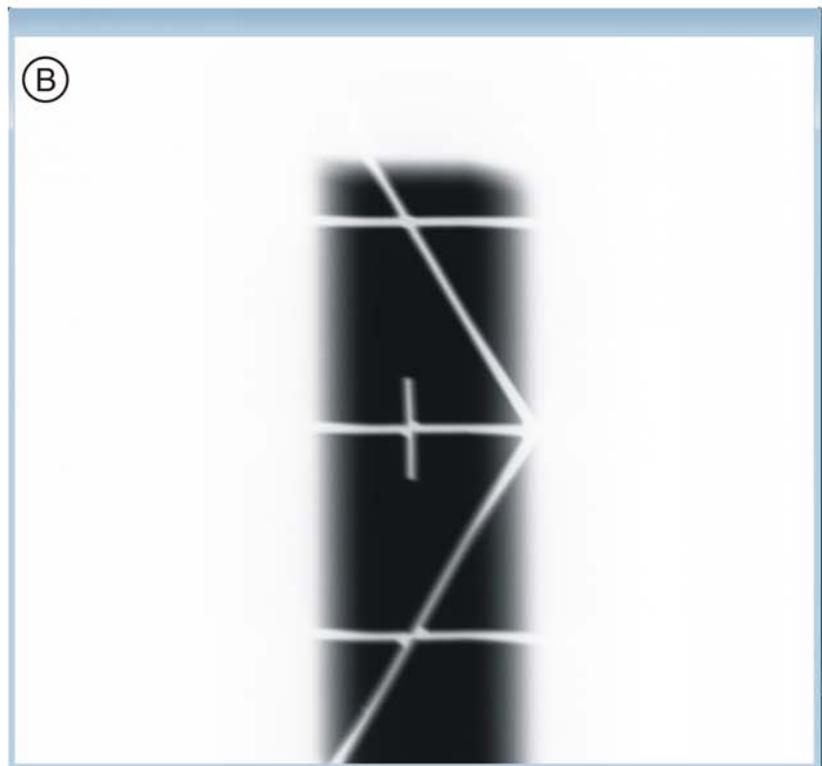
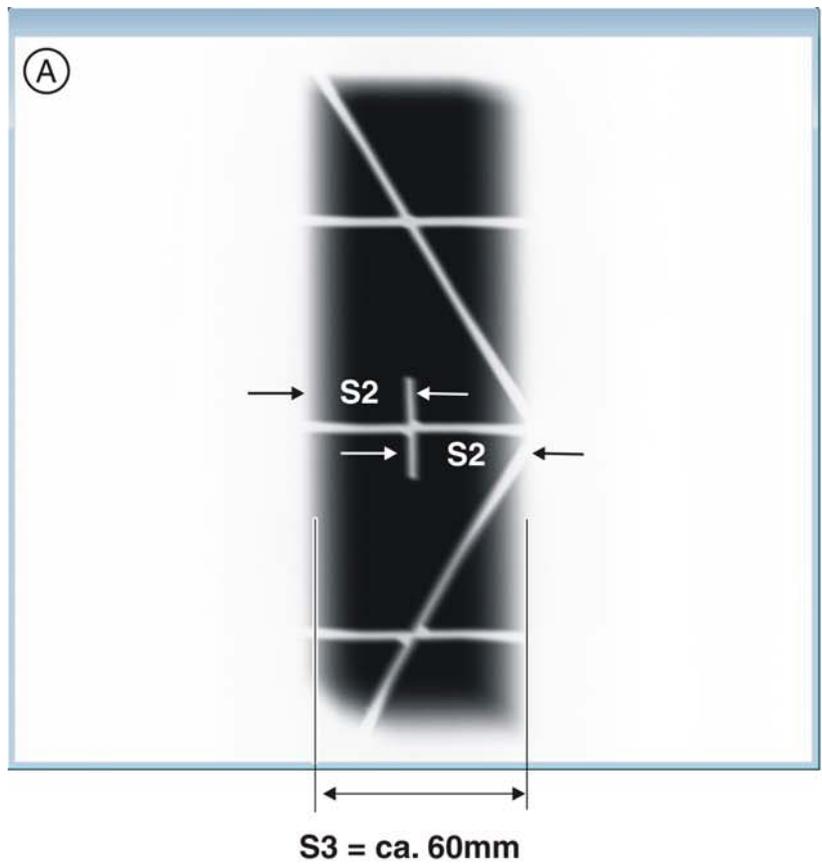
7.2.1.4.1 Automatic adjustment: Ceph - Primary diaphragm (standard)

NOTICE

Risk of damage to unit

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

- ✓ The OP XG needle phantom is *not* in the pan bite block holder on the unit.
 - ✓ The OP XG ceph adjustment phantom is in the pan slot on the unit [→ 200].
 - ✓ 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 "2D Adjustment", click on the "Ceph - Primary diaphragm" element (S010.3).
 - ↳ The "Ceph - Primary diaphragm" menu is displayed in the action area.
 2. Make SIDEXIS XG ready for exposure. [→ 197]
 3. Take an exposure (64 kV/16 mA; 6.1 s) [→ 197].
 - ↳ SIDEXIS XG calculates the adjustment values **S1**, **S2**, **S3**, and **S4** automatically from the exposure and enters them in the text boxes of the "Ceph - Primary diaphragm" menu.
 - ↳ The exposure is displayed in the exposure window in SIDEXIS XG.

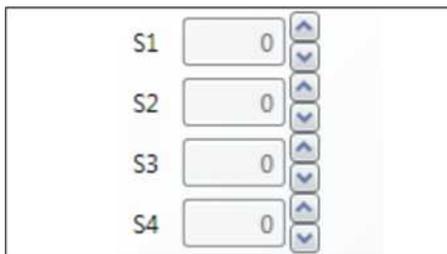


A	Adjustment OK	<ul style="list-style-type: none"> • The vertical pin must be horizontally centered in the exposed image section. A slight vertical offset of the grid is permissible. • A uniform white border surrounding the image on all sides must be visible. • Distance S3 must be approx. 60 mm.
B	Adjustment not OK	IMPORTANT! If S3 is >70 mm, please contact the Sirona Customer Service Center.

4. Repeat the procedure starting at Step 2 until the values in the menu's text boxes are equal to "zero". This means that adjustment was performed successfully.

IMPORTANT: If automatic adjustment fails to produce values equal to zero, calculate the adjustment values manually and overwrite the values in the menu's text boxes with these values [→ 217].

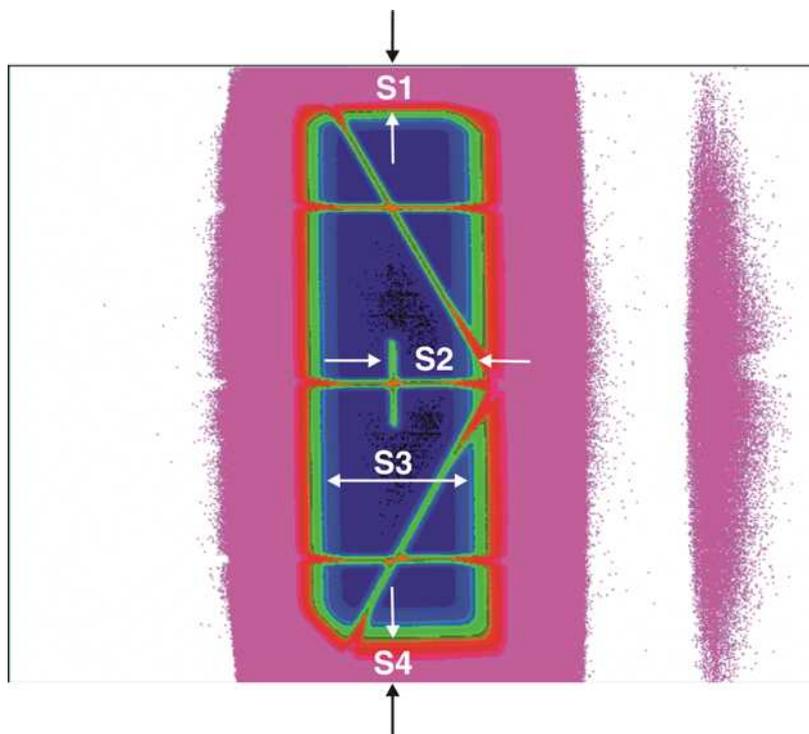
5. If adjustment is OK (the adjustment values in the text boxes are equal to zero), save the values. [→ 197]
6. Remove the OP XG cephal adjustment phantom from the pan slot on the unit.
7. Continue with the next stage of the adjustment procedure. [→ 218]



7.2.1.4.2 Manual adjustment: Ceph - Primary diaphragm

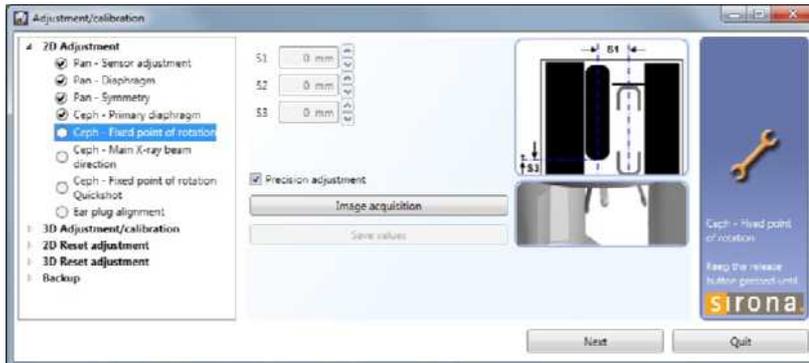
The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment values calculated automatically by SIDEXIS XG in the "Ceph - Primary diaphragm" menu are overwritten.

1. Start the "Ceph - Primary diaphragm" adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Primary diaphragm (standard) [→ 214]".
2. Once you have taken the exposure, measure distances **S1**, **S2**, **S3**, and **S4** with the SIDEXIS XG measuring ruler.
 - 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:** To facilitate the measuring procedure, you can invert or color the image in SIDEXIS XG (see also "SIDEXIS XG Operator's Manual").



3. Overwrite the adjustment values for **S1**, **S2**, **S3**, and **S4** in the text boxes of the "Ceph - Primary diaphragm" menu with the measured values.
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Primary diaphragm (standard) [→ 214]".

7.2.1.5 Ceph - Fixed point of rotation



7.2.1.5.1 Automatic adjustment: Ceph - Fixed point of rotation (standard)

NOTICE

Risk of damage to unit

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

- ✓ The OP XG needle phantom is *not* in the pan bite block holder on the unit.
 - ✓ The OP XG ceph adjustment phantom is *not* in the pan slot on the unit.
1. In the structure tree, under "2D Adjustment", click on the "Ceph - Fixed point of rotation" element (S010.5).
 - ↳ The "Ceph - Fixed point of rotation" 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.
 2. Make SIDEXIS XG ready for exposure. [→ 197]
 3. Take an exposure (80 kV/14 mA; 0.6 s) [→ 197].
 - ↳ SIDEXIS XG calculates the adjustment values **S1**, **S2**, and **S3** automatically from the exposure and enters them in the text boxes of the "Ceph - Fixed point of rotation" menu.



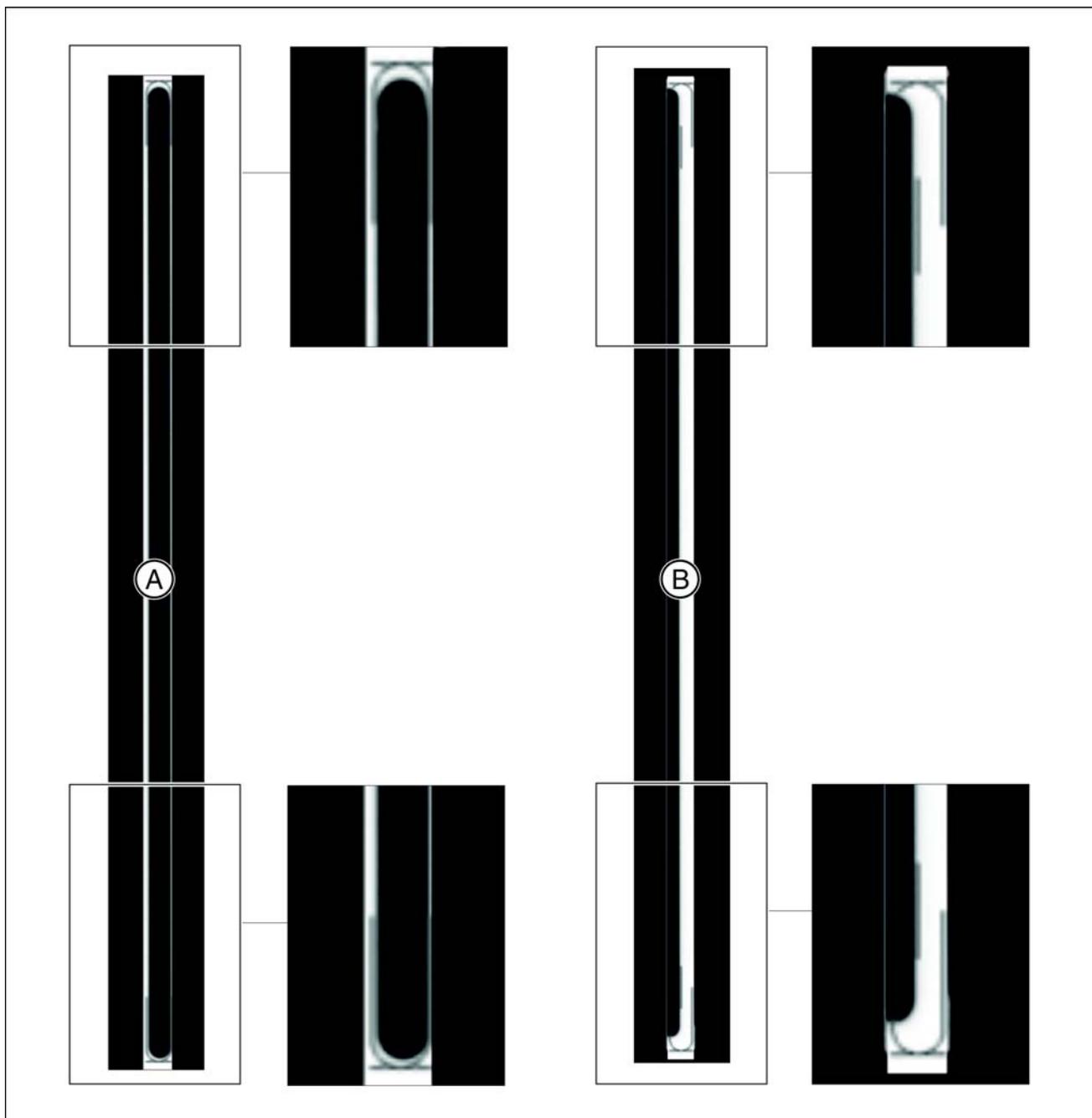
- ↳ At the bottom of the action area, the two values **(L)x** and **(L)y** are suggested for adjusting the ceph secondary diaphragm.

IMPORTANT! If the suggested values are greater than ± 0.5 mm, the diaphragm must be mechanically adjusted.

Positive sign =
Moves the diaphragm to the right or upward

Negative sign =
Moves the diaphragm to the left or downward

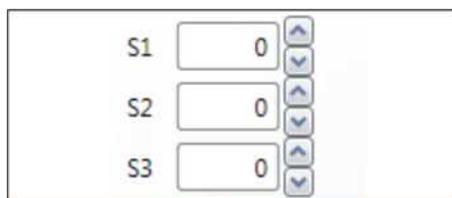
4. If necessary, adjust the diaphragm mechanically at this point [→ 246].
5. Confirm the mechanical correction of the ceph secondary diaphragm by clicking on "OK".
 - ↳ SIDEXIS XG is ready for exposure [→ 197] again.
6. Take an exposure (80 kV/14 mA; 0.6 s) [→ 197].
 - ↳ SIDEXIS XG calculates the adjustment values **S1**, **S2**, and **S3** automatically from the exposure and enters them in the text boxes of the "Ceph - Fixed point of rotation" menu.
 - ↳ The exposure is displayed in the exposure window in SIDEXIS XG.



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

7. 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 [→ 220].



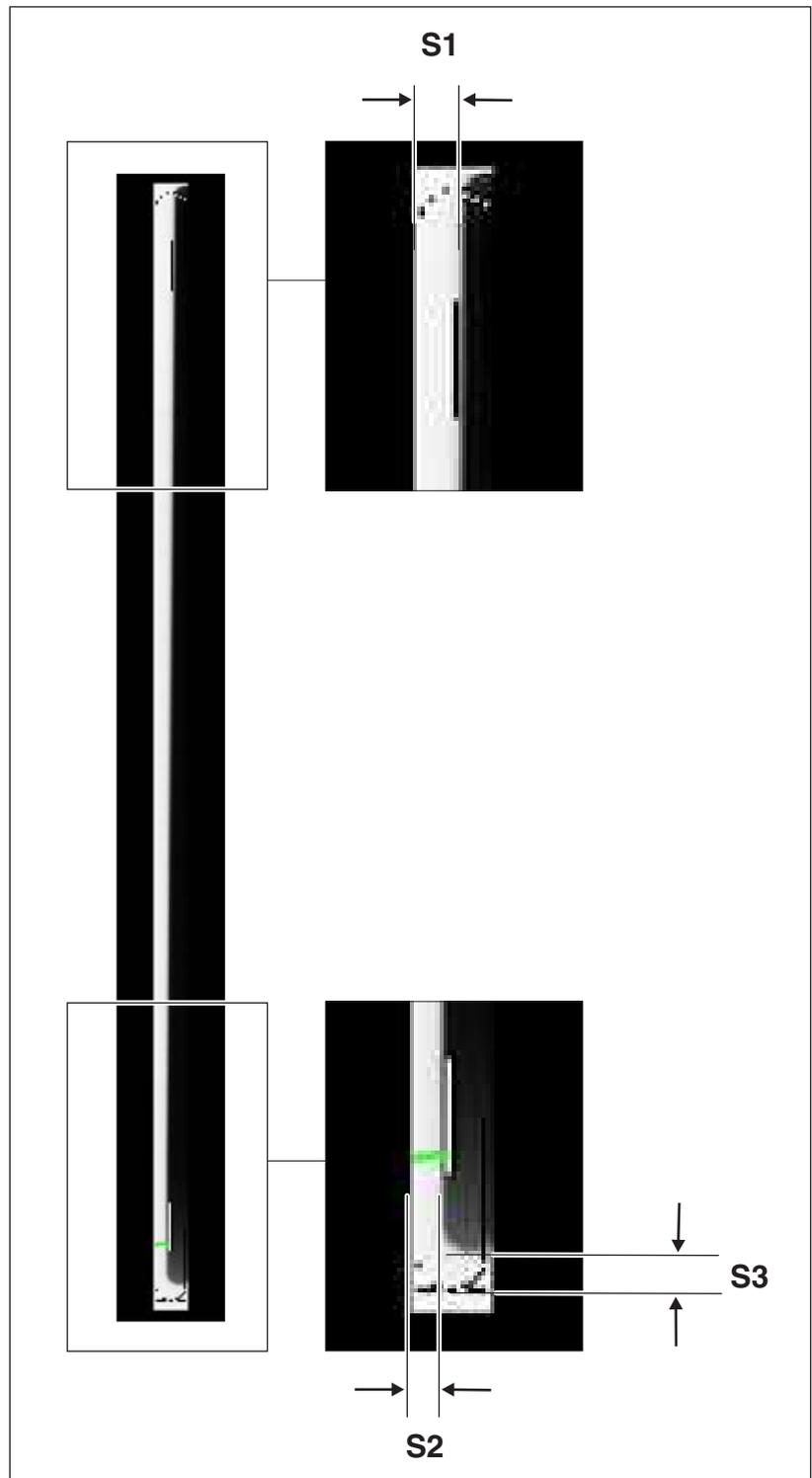
8. If adjustment is OK (the adjustment values in the text boxes are equal to zero), save the values. [→ 197]

9. Continue with the next stage of the adjustment procedure [→ 222].

7.2.1.5.2 Manual adjustment: Ceph - Fixed point of rotation

The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment values calculated automatically by SIDEXIS XG in the "*Ceph - Fixed point of rotation*" menu are overwritten.

1. Start the "*Ceph - Fixed point of rotation*" adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Fixed point of rotation (standard) [→ 218]".

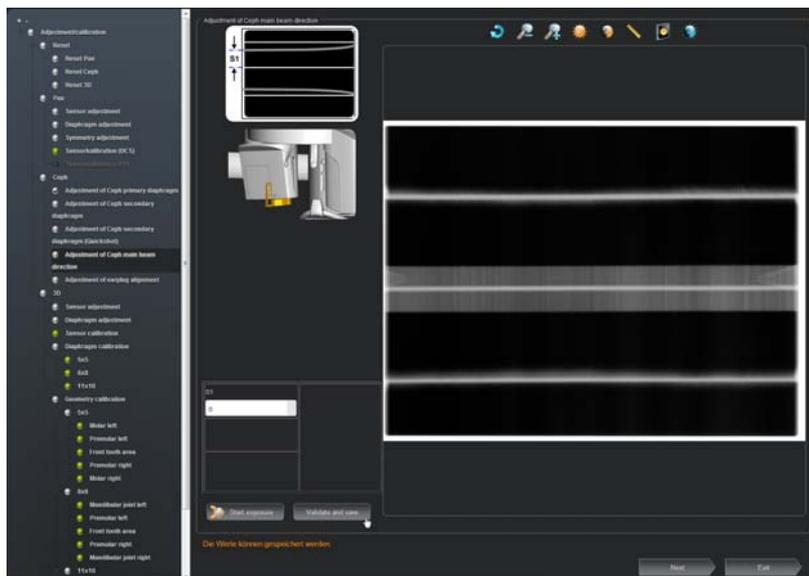


2. Once you have taken the exposure, measure distances **S1**, **S2**, and **S3** with the SIDEXIS XG measuring ruler.

S1	-0,275	↑	↓
S2	-0,311	↑	↓
S3	0	↑	↓

3. Overwrite the adjustment values for **S1**, **S2**, and **S3** in the text boxes of the "*Ceph - Fixed point of rotation*" 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". Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Fixed point of rotation (standard) [→ 218]".

7.2.1.6 Ceph - Main X-ray beam direction



7.2.1.6.1 Automatic adjustment: Ceph - Main X-ray beam direction (standard)

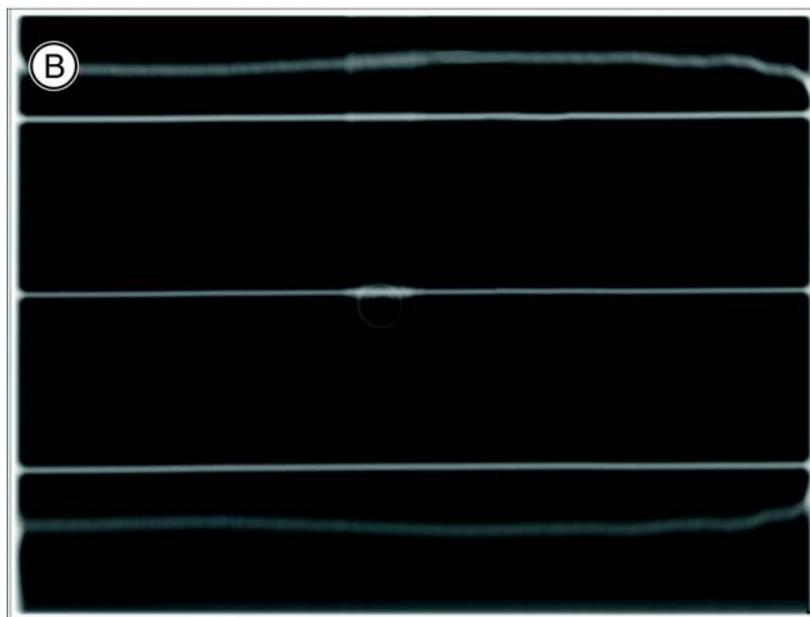
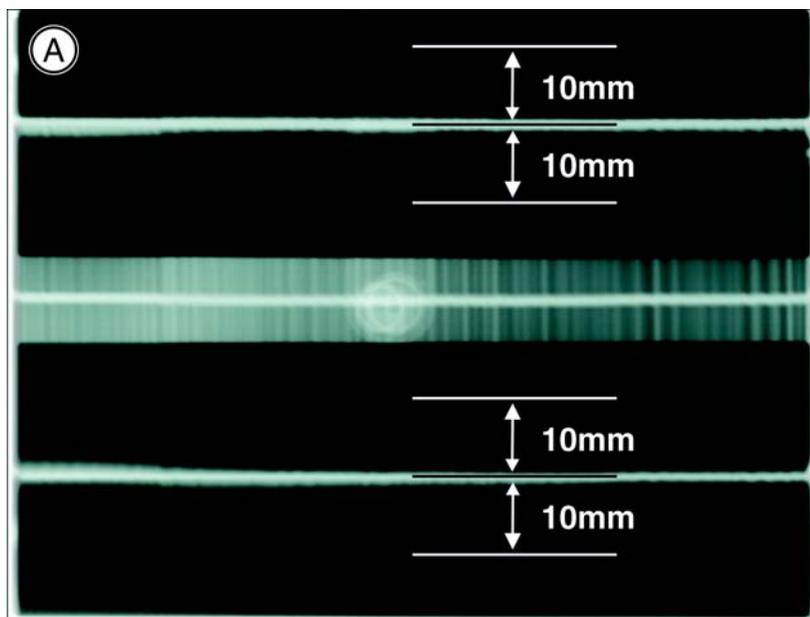
NOTICE

Risk of damage to unit

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

- ✓ The OP XG ceph adjustment phantom is in the pan slot on the unit [→ 200].
 - ✓ The ear plug holders on the ceph arm have been swung out of the beam direction (ap).
1. In the structure tree, under "*2D Adjustment*", click on the "*Ceph - Main X-ray beam direction*" element (S010.6).
 - ↳ The "*Ceph - Main X-ray beam direction*" menu is displayed in the action area.
 2. Make SIDEXIS XG ready for exposure. [→ 197]
 3. Take an exposure (80 kV/14 mA; 14.9 s). [→ 197]
 - ↳ Adjustment value **S1** is calculated automatically by SIDEXIS XG from the exposure and entered in the text box of the "*Ceph - Main X-ray beam direction*" menu.
 - ↳ The exposure is displayed in the exposure window in SIDEXIS XG.

S1	59,09	↑	↓
----	-------	---	---



A	Adjustment OK	<ul style="list-style-type: none"> A horizontal bar must be visible in the center of the image. If this bar is visible, the exposure is OK, and the two beams on the image are within the tolerance range of ± 10 mm.
B	Adjustment not OK	

- 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.



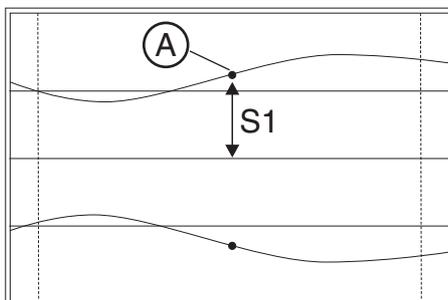
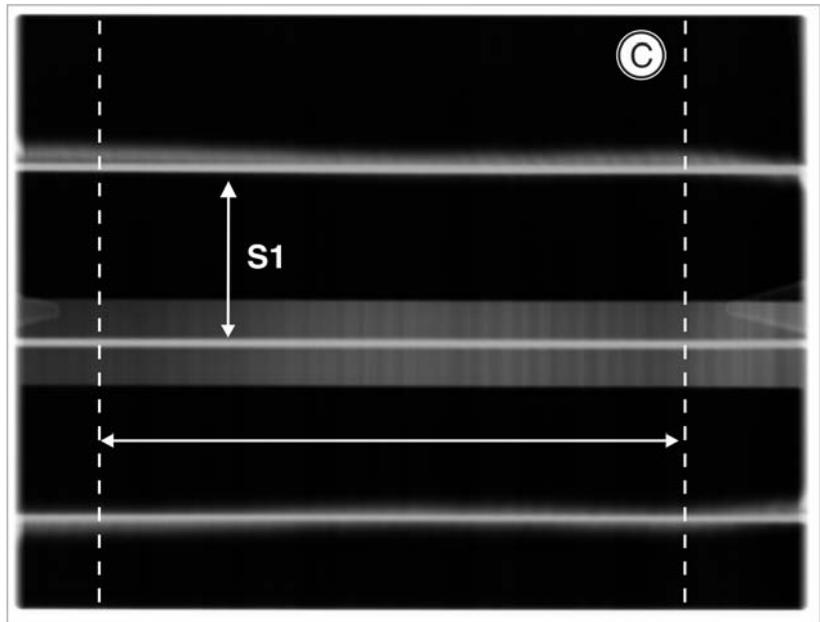
IMPORTANT: If automatic adjustment fails to produce a value equal to zero, calculate the adjustment value manually and overwrite the value in the menu's text box with this value [→ 224].

5. If adjustment is OK (the adjustment value in the text box is equal to zero), save the value [→ 197].
6. Remove the OP XG cephal adjustment phantom from the pan slot on the unit.
7. Continue with the next stage of the adjustment procedure [→ 225].

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

The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment value calculated automatically by SIDEXIS XG in the text box of the "Ceph - Main X-ray beam direction" menu is overwritten.

1. Start the "Ceph - Main X-ray beam direction" adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Main X-ray beam direction (standard) [→ 222]".



2. Once you have taken the exposure, measure the distance **S1** with the SIDEXIS XG measuring ruler. 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 "Ceph - Main X-ray beam direction" menu with the measured value.
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - Main X-ray beam direction (standard) [→ 222]".

7.2.1.7 Ceph - Fixed point of rotation for QuickShot



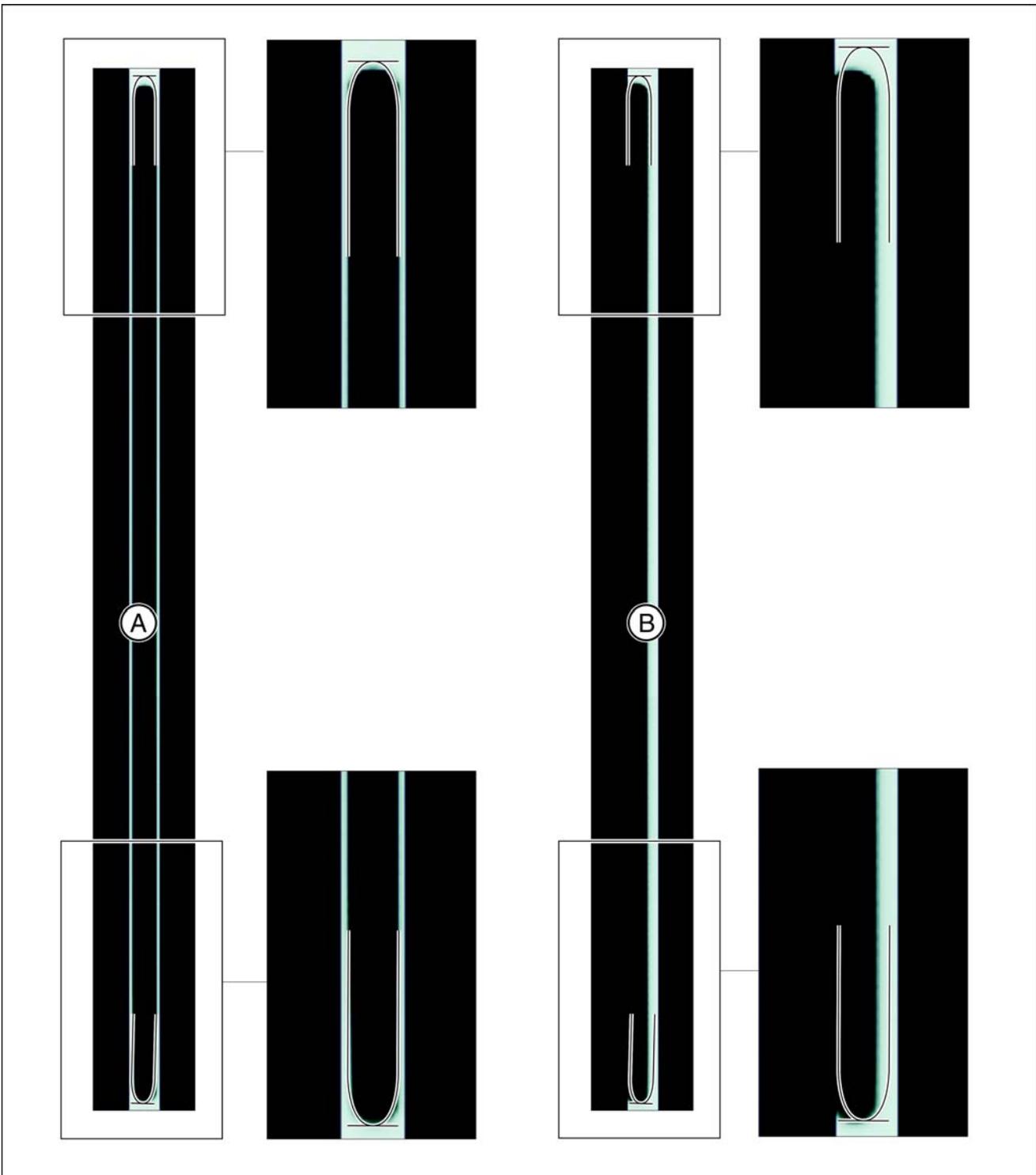
7.2.1.7.1 Automatic adjustment: Ceph - QuickShot fixed point of rotation (standard)

NOTICE

Risk of damage to unit

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

- ✓ The OP XG ceph adjustment phantom is *not* in the pan slot on the unit.
- 1. In the structure tree, under "2D Adjustment", click on the "Ceph - Fixed point of rotation Quickshot" element (S010.8).
 - ↳ The "Ceph - Fixed point of rotation Quickshot" menu is displayed in the action area.
- 2. Make SIDEXIS XG ready for exposure. [→ 197]
- 3. Take an exposure (80 kV/14 mA; 0.3 s) [→ 197].
 - ↳ Adjustment value **S1** is calculated automatically by SIDEXIS XG from the exposure and entered in the text box of the "Ceph - Fixed point of rotation Quickshot" menu.
 - ↳ The exposure is displayed in the exposure window in SIDEXIS XG.



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

- 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 a value equal to zero, calculate the adjustment value manually and overwrite the value in the menu's text box with this value [→ 227].
- If adjustment is OK (the adjustment value in the text box is equal to zero), save the value [→ 197].
- Continue with the next stage of the adjustment procedure [→ 234].

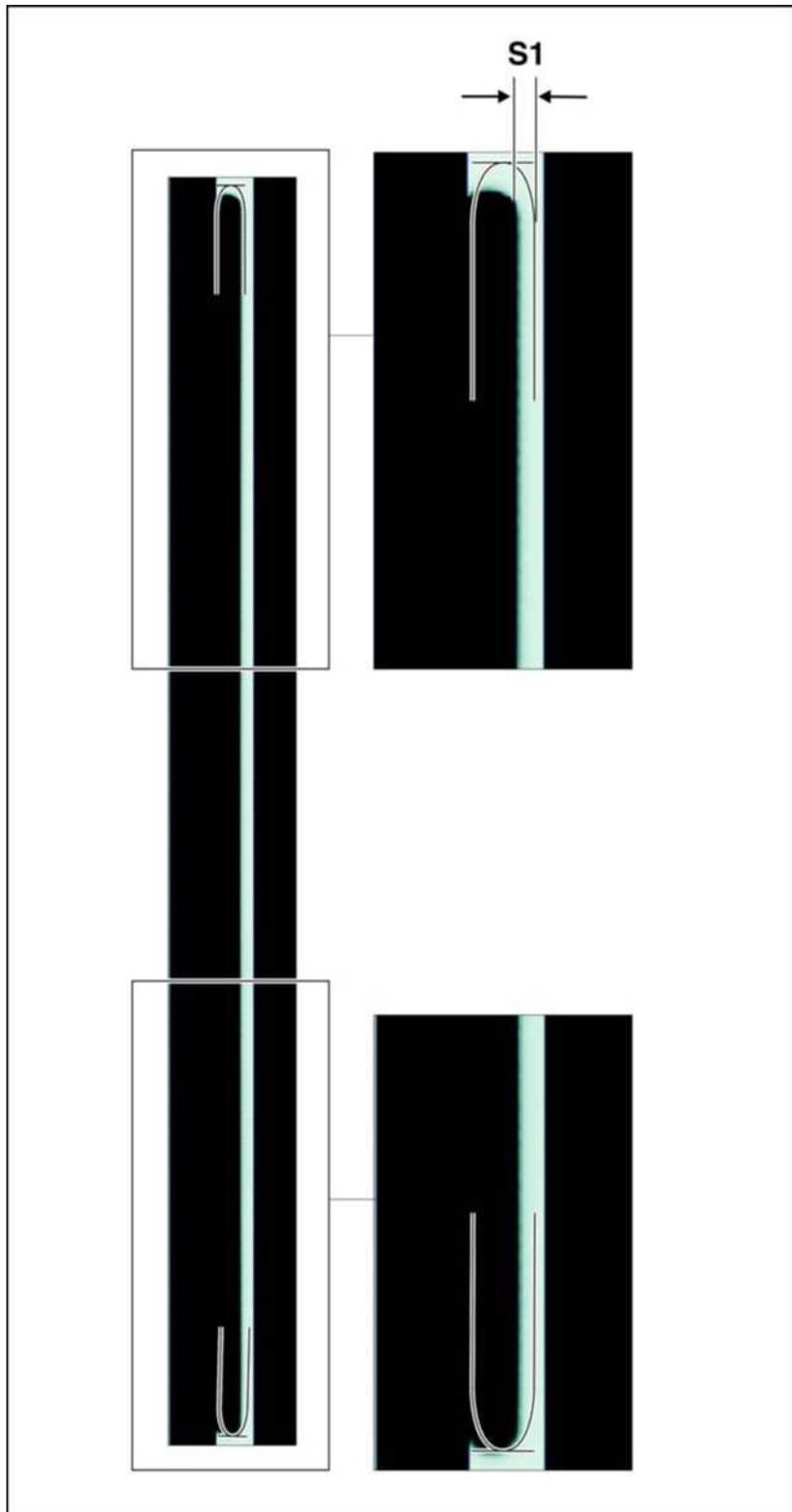


7.2.1.7.2

Manual adjustment: Ceph - Fixed point of rotation for QuickShot

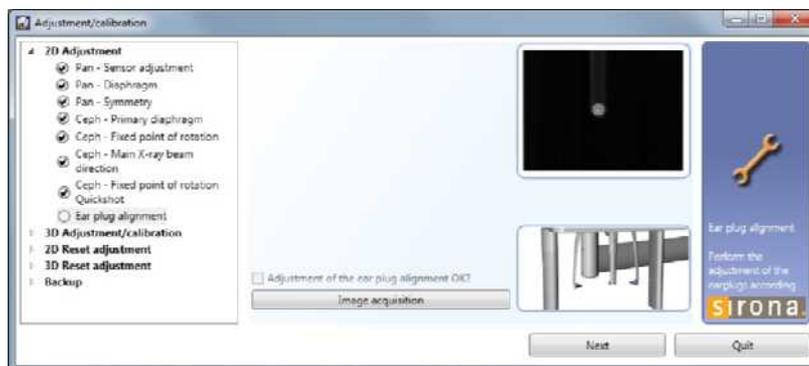
The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment value calculated automatically by SIDEXIS XG in the "Ceph - Fixed point of rotation Quickshot" menu is overwritten.

- Start the "Ceph - Fixed point of rotation Quickshot" adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - QuickShot fixed point of rotation (standard) [→ 225]".



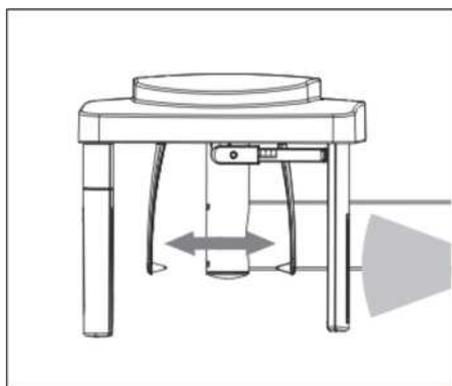
2. Once you have taken the exposure, measure distance **S1** with the SIDEXIS XG measuring ruler.
3. Overwrite the adjustment value for **S1** in the text box of the "Ceph - Fixed point of rotation Quickshot" menu with the measured value. For information about the shifting direction (input of +/- sign in the menu), see the chapter entitled "Shifting direction of the exposed image area". Use points as decimal separators!
4. Continue with the adjustment procedure as described in the chapter entitled "Automatic adjustment: Ceph - QuickShot fixed point of rotation (standard) [→ 225]".

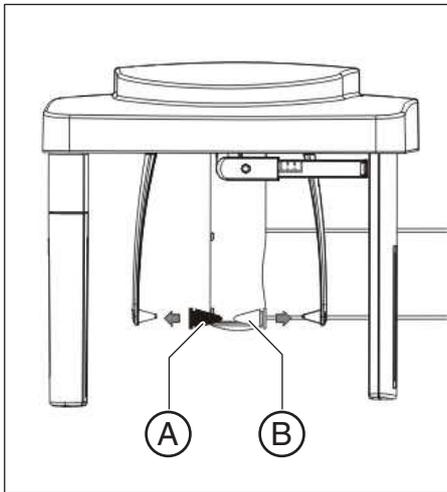
7.2.1.8 Ear plug alignment



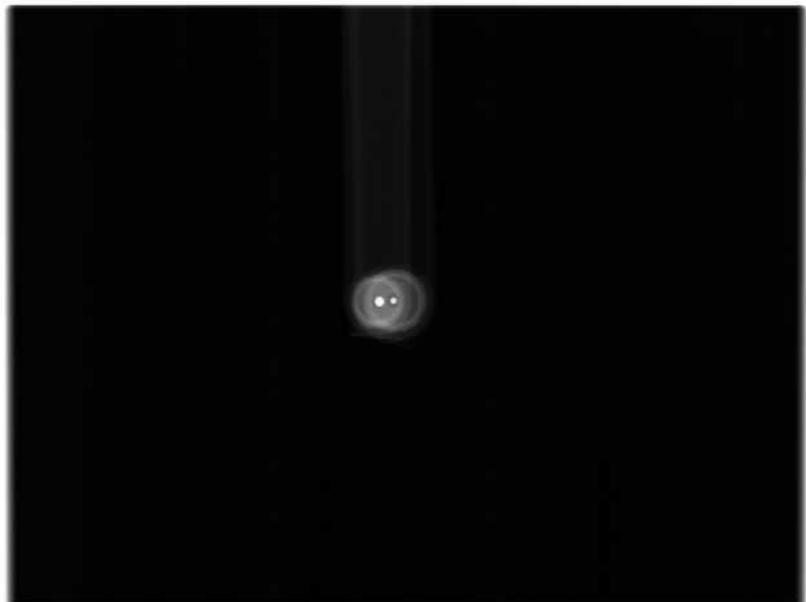
7.2.1.8.1 Checking the ear plug alignment

- ✓ "Ceph" operating mode is selected on the control panel.
 - ✓ The ceph sensor is plugged into the ceph slot on the unit.
1. In the structure tree, under "2D Adjustment", click on the "Ear plug alignment" element.
 - ↳ The "Ear plug alignment" menu is displayed in the action area.
 2. Move the ear plug holders completely apart and swing them into the beam direction.



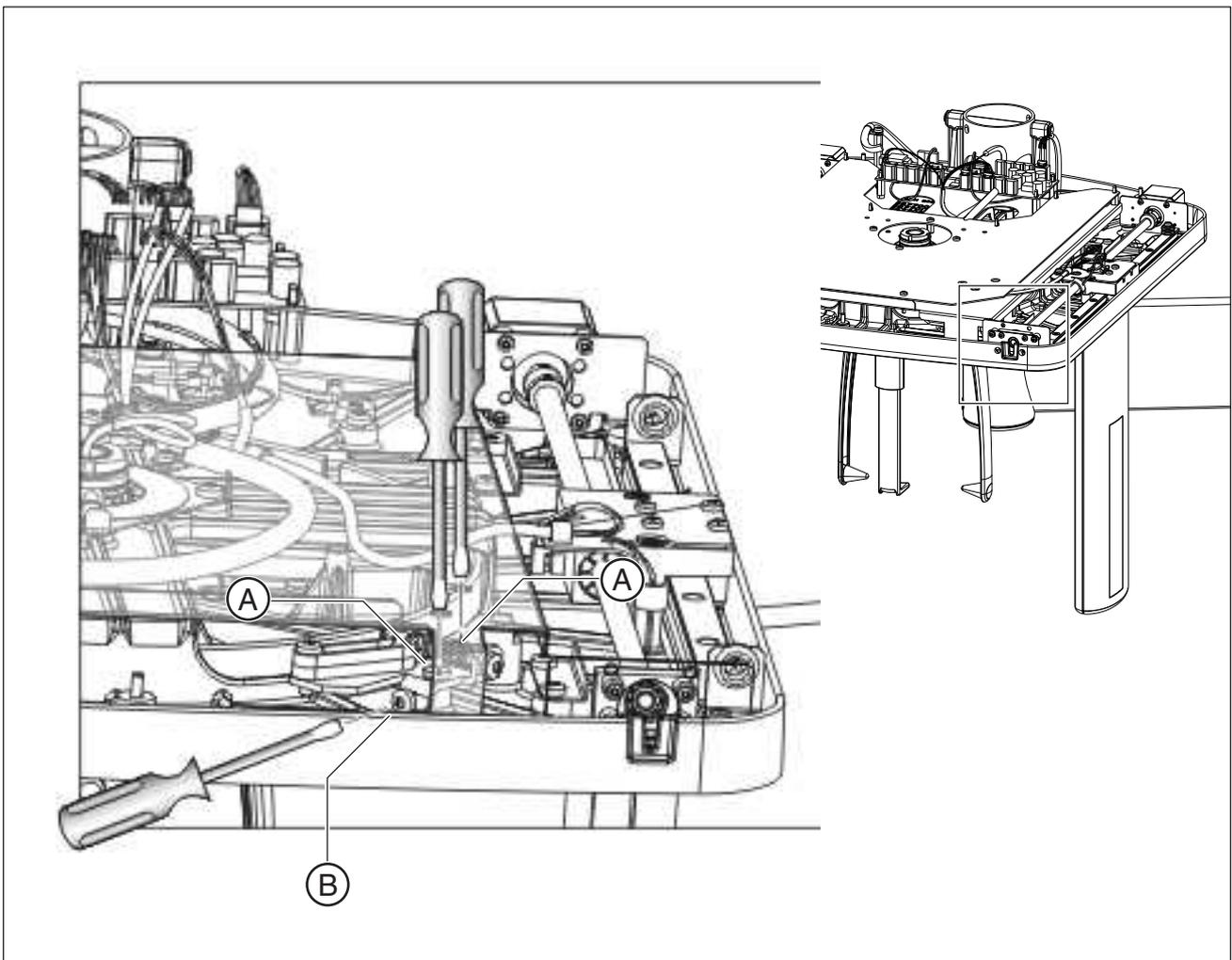
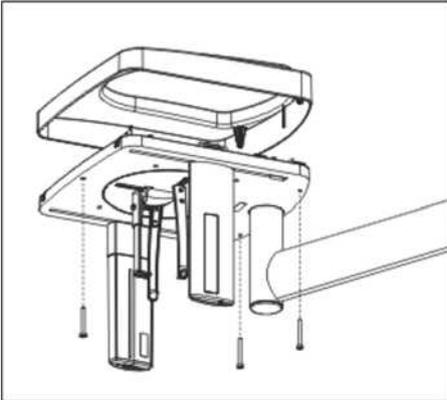


3. Fit the adjusting caps (A) to the ear plugs and secure them with adhesive tape.
Black adjusting cap: on the outside (sensor side)
Transparent adjusting cap: on the inside (tube assembly side)
4. Make SIDEXIS XG ready for exposure. [→ 197]
5. Take an exposure (80 kV/14 mA; 14.9 s) [→ 197].
 - ↪ The exposure is displayed in the exposure window in SIDEXIS XG.
 - ↪ The lead balls in the adjusting caps appear as dots on the image.
 - ↪ The two dots must be coincident.
 - ↪ If the two dots are not coincident, the ear plug alignment must be adjusted.



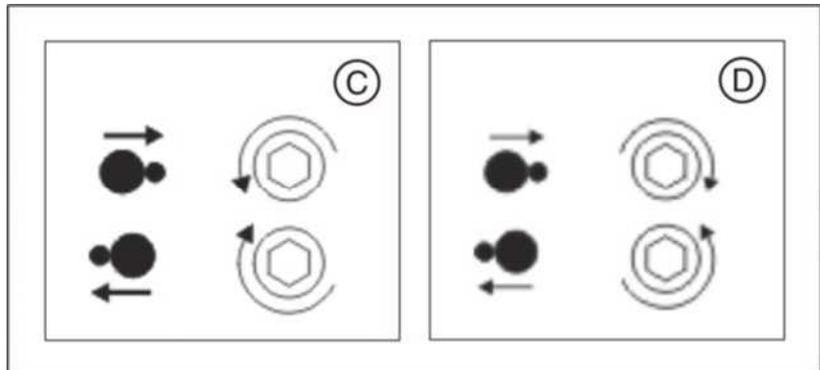
7.2.1.8.2 Adjusting the ear plug alignment

- Unscrew the cover from the cephalometer.



Horizontal correction

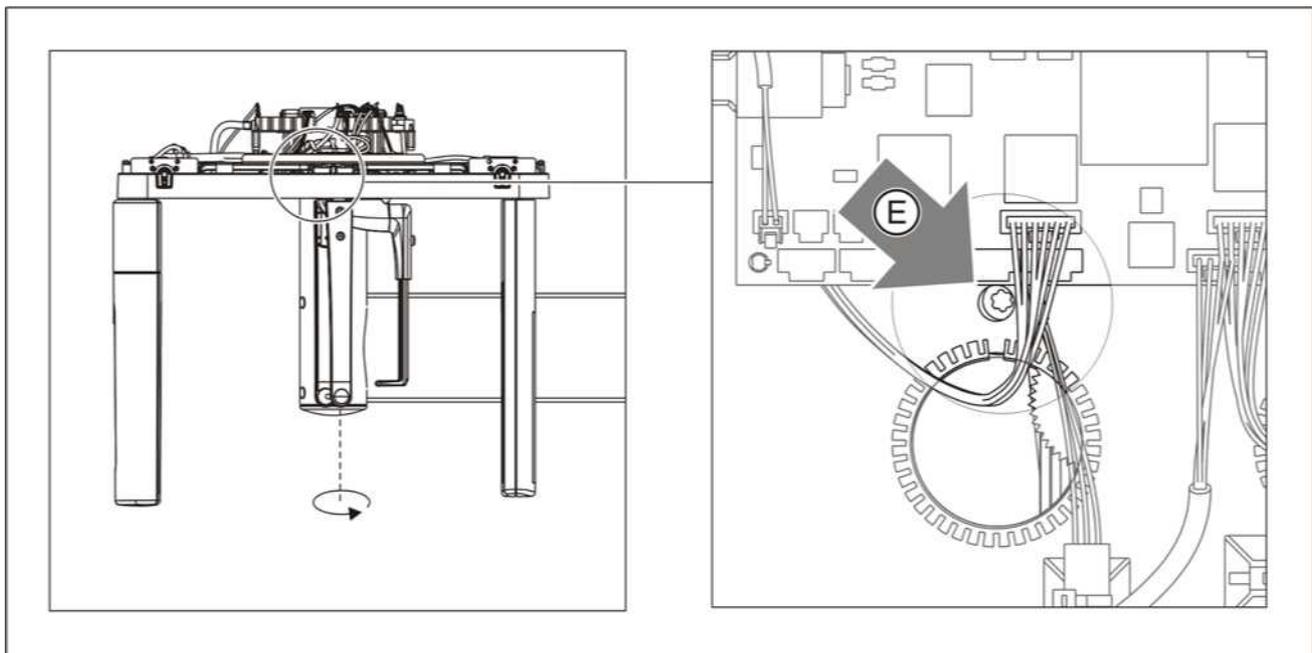
1. Loosen the screws (A) slightly (approx. 2 - 3 turns).
Tip: Do not unscrew them fully!
2. Adjust the ear plugs in the horizontal direction by turning the screw (B) counterclockwise or clockwise. The direction of rotation for left-arm (C) and right-arm (D) versions is shown in the drawing below.



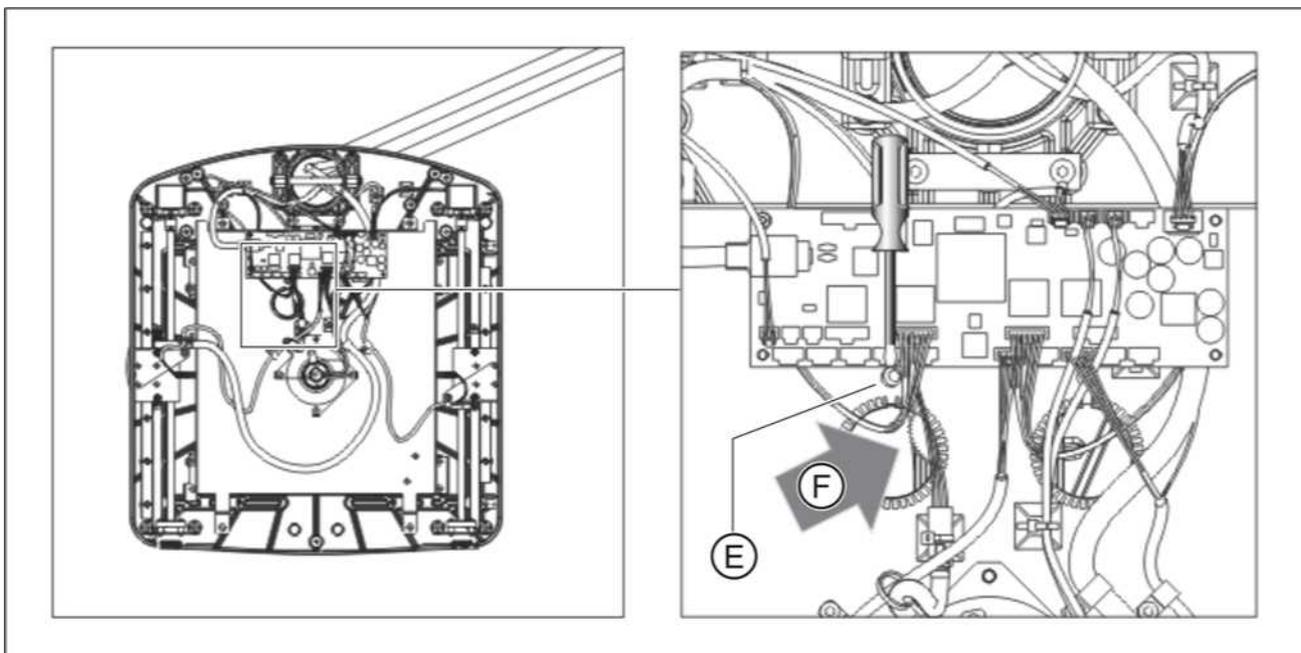
3. Retighten screws (A) firmly.

Vertical correction

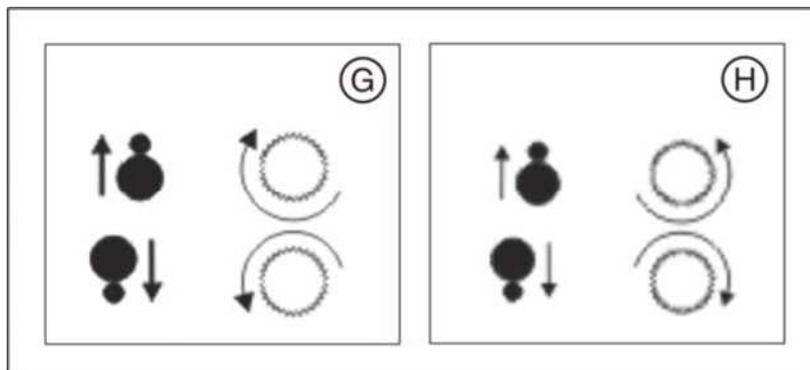
1. Turn the rotary table counterclockwise approx. 100 degrees until you can see the screw (E) through the opening in the cover plate.



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.

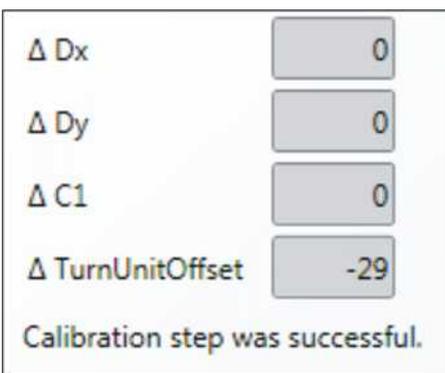
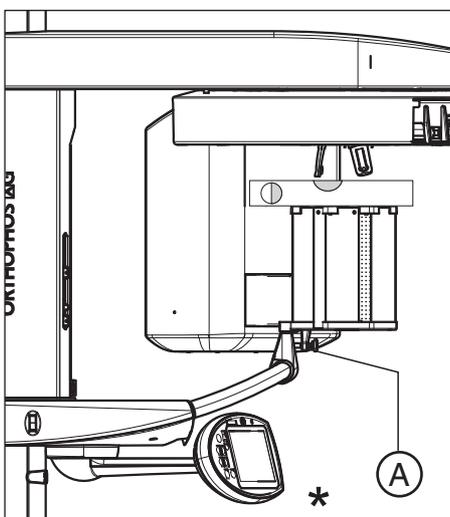
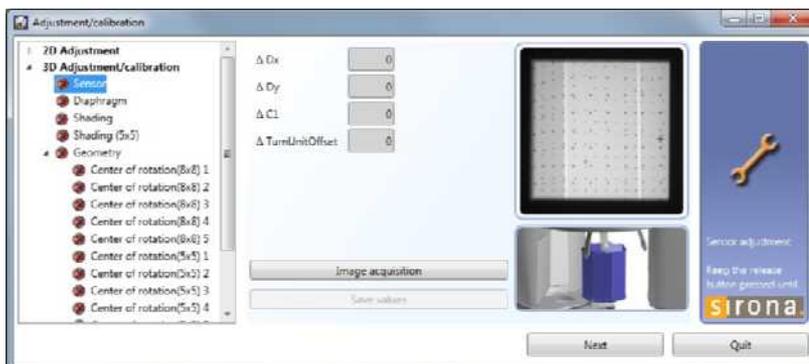


4. Tighten the screw (E) firmly.
1. Swing the ear plug holders back into the beam direction (**black adjusting cap on the outside**).
2. Check the adjustment of the ear plug alignment [→ 229].

Following adjustment

7.2.2 3D adjustment/calibration

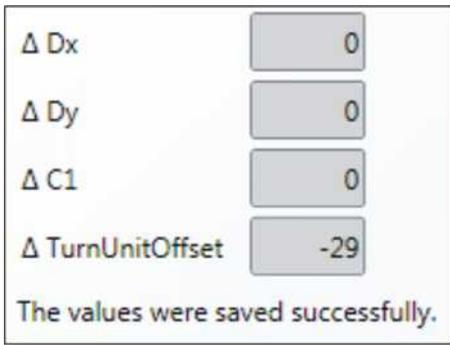
7.2.2.1 Sensor



1. Insert the geometry phantom in the pan bite block holder of the unit [→ 198].
2. Align the geometry phantom with the spirit level and tighten the screw (A).
 * For enhanced representation, the unit is illustrated without the combisensor.
3. Call the "Adjustment/calibration" menu [→ 188].
4. In the structure tree, under "3D Adjustment/calibration", click on the "Sensor" element.
 Once the menu has been selected via the button, the "Sensor" element (S010.20) is automatically pre-selected in the structure tree.
5. Make SIDEXIS XG ready for exposure. [→ 197]
6. Take an exposure (85kV/23mAs) [→ 197].

↪ A message is displayed in the action window to indicate whether adjustment has been successful and the traffic light symbol in front of the "Sensor" element in the structure tree responds accordingly:
 Adjustment not OK = traffic light stays red
 Adjustment OK = traffic light turns yellow

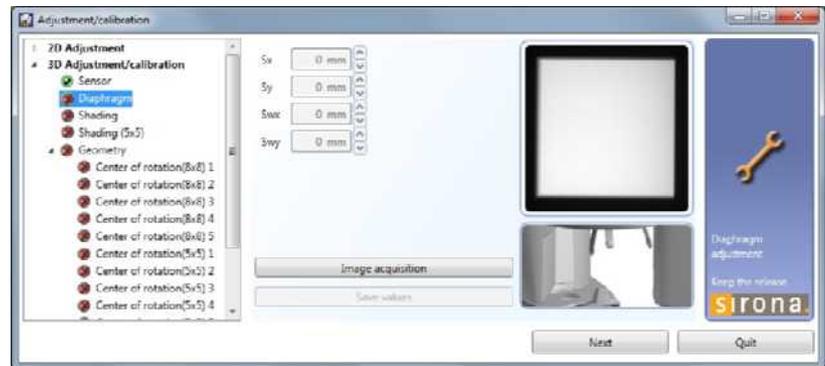
7. Repeat the procedure starting at Step 5 until adjustment is successful.
8. When adjustment is OK, save the values.



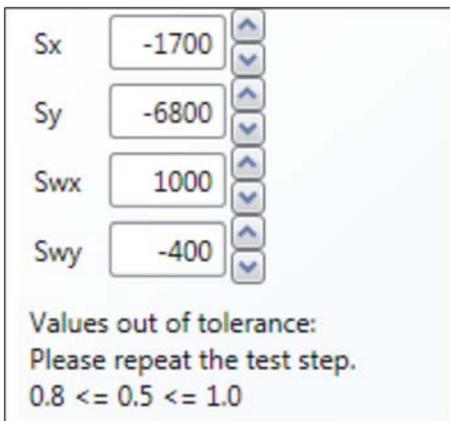
- ↪ A message is displayed in the action window to indicate that the values have been successfully saved.
- ↪ The traffic light symbol in front of the "Sensor" element in the structure tree changes color to green (with check mark). This indicates that the adjustment settings are valid.

9. Remove the geometry phantom from the pan bite block holder on the unit.
10. Continue with the next stage of the adjustment procedure [→ 235].

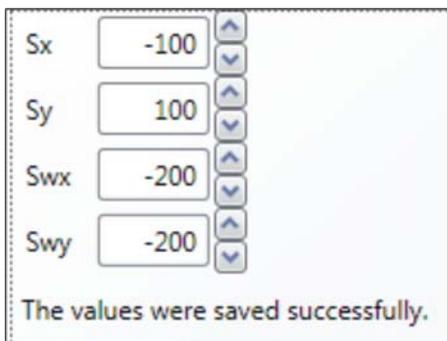
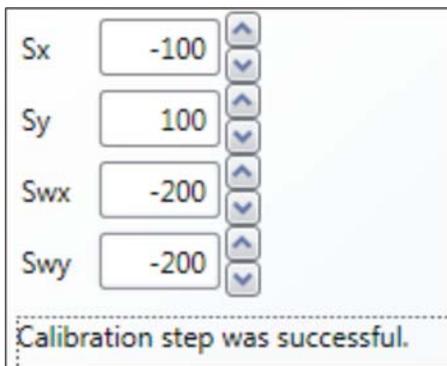
7.2.2.2 Aperture



- ✓ The geometry phantom *is not* in the pan bite block holder on the unit.
1. In the structure tree, under "3D Adjustment/calibration", click on the "Diaphragm" element (S030.10).
 2. Make SIDEXIS XG ready for exposure. [→ 197]
 3. Take an exposure (85kV/0.33 mAs) [→ 197].



- ↪ A message is displayed in the action window to indicate whether adjustment has been successful and the traffic light symbol in front of the "Diaphragm" element in the structure tree responds accordingly:
 Adjustment not OK = traffic light stays red
 Adjustment OK = traffic light turns yellow



4. Repeat the procedure starting at Step 2 until adjustment is successful.

5. When adjustment is OK, save the values.

↪ A message is displayed in the action window to indicate that the values have been successfully saved.

↪ The traffic light symbol in front of the "Diaphragm" element in the structure tree changes color to green (with check mark). This indicates that the adjustment settings are valid.

6. Continue with the next stage of the calibration procedure [→ 237].

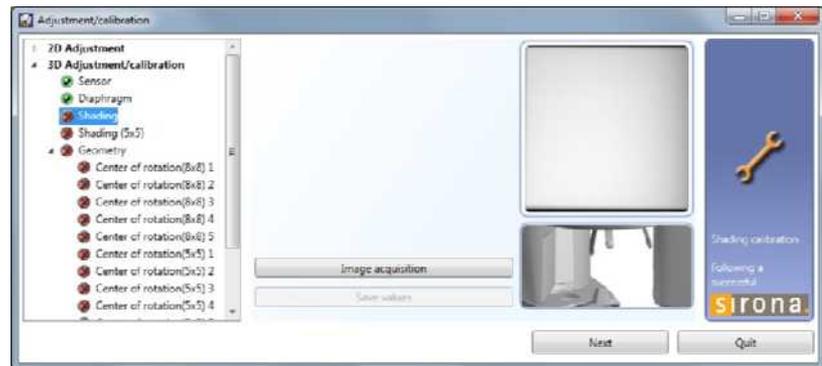
7.2.2.3 Shading



Calibration step was successful.

- ✓ The geometry phantom *is not* in the pan bite block holder on the unit.
- 1. In the structure tree, under "3D Adjustment/calibration", click on the "Shading" element (S010.22).
- 2. Make SIDEXIS XG ready for exposure. [→ 197]
- 3. Take an exposure (85kV/18mAs) [→ 197].
 - ↳ A message is displayed in the action window to indicate whether adjustment has been successful and the traffic light symbol in front of the "Shading" element in the structure tree responds accordingly:
Calibration not OK = traffic light stays red
Calibration OK = traffic light turns yellow
- 4. Repeat the procedure starting at Step 2 until calibration is successful.
- 5. When calibration is OK, save the values.
 - ↳ The traffic light symbol in front of the "Shading" element in the structure tree changes color to green (with check mark). This indicates that the calibration settings are valid.
- 6. Continue with the next stage of the calibration procedure [→ 239].

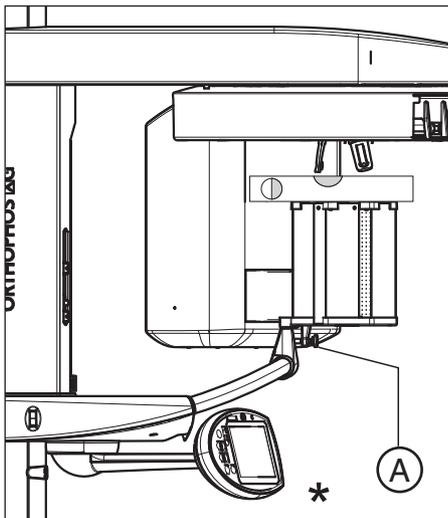
7.2.2.4 Shading (5x5)



- ✓ The geometry phantom *is not* in the pan bite block holder on the unit.
- 1. In the structure tree, under "*3D Adjustment/calibration*", click on the Shading element (S010.18).
- 2. Make SIDEXIS XG ready for exposure. [→ 197]
- 3. Take an exposure (85kV/18mAs) [→ 197].
 - ✎ A message is displayed in the action window to indicate whether adjustment has been successful and the traffic light symbol in front of the Shading element in the structure tree responds accordingly:
 - Calibration not OK = traffic light stays red
 - Calibration OK = traffic light turns yellow
- 4. Repeat the procedure starting at Step 2 until calibration is successful.
- 5. When calibration is OK, save the values.
 - ✎ The traffic light symbol in front of the Shading element in the structure tree changes color to green (with check mark). This indicates that the calibration settings are valid.
- 6. Continue with the next stage of the calibration procedure [→ 239].

Calibration step was successful.

7.2.2.5 Geometry

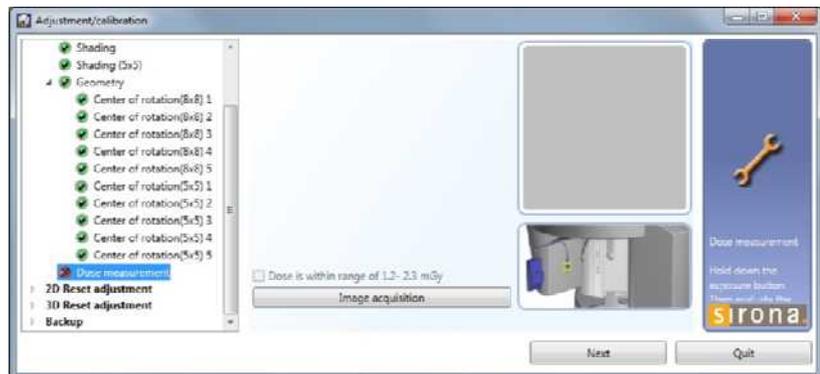


Calibration step was successful.

1. Insert the geometry phantom in the pan bite block holder of the unit [→ 198].
2. Align the geometry phantom with the spirit level and tighten the screw (A).
 * For enhanced representation, the unit is illustrated without the combisensor.
3. In the structure tree, under "3D Adjustment/calibration", click on the "Center of rotation (8x8) 1" element (S010.25-29 and S010.35-39).
4. Make SIDEXIS XG ready for exposure. [→ 197]
5. Take an exposure (85kV/23mAs) [→ 197].
 ↳ A message is displayed in the action window to indicate whether adjustment has been successful and the traffic light symbol in front of the "Center of rotation (8x8) 1" element in the structure tree responds accordingly:
 Calibration not OK = traffic light stays red
 Calibration OK = traffic light turns yellow
6. Repeat the procedure starting at Step 4 until calibration is successful.
7. When calibration is OK, save the values.
 ↳ The traffic light symbol in front of the "Center of rotation (8x8) 1" element in the structure tree changes color to green (with check mark). This indicates that the calibration settings are valid.
8. Repeat the calibration procedure for the remaining centers of rotation 2-5 (8x8) and 1-5 (5x5).
9. Remove the geometry phantom from the pan bite block holder on the unit.

7.2.2.6 Dosimetry

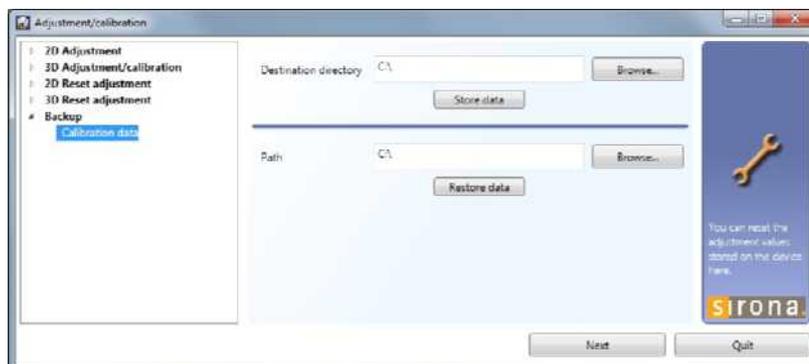
A dosimeter for pulsed radiation (e.g. Mult-O-Meter 512L) is required for dosimetry.



1. In the structure tree, under "3D Adjustment/calibration", click on the "Dose measurement" element.
2. Attach the Mult-O-Meter sensor in the middle of the combisensor.
3. Make SIDEXIS XG ready for exposure. [→ 197]
4. Take an exposure (85kV/35mAs) [→ 197].
5. Read the dose shown on the Mult-O-Meter.
6. Note down the dose for later recording.
7. If the measured dose is between 1.2 and 2.3 mGy, check the box in the action area next to the text "Dose is within range of 1,2 - 2,3 mGy".
 - ↳ The traffic light symbol in front of the "Dose measurement" element in the structure tree changes color to green (with check mark).
8. Remove the Mult-O-Meter from the dual sensor.

7.2.3 Saving adjustment/calibration data

The "Backup" menu offers the option of saving the adjustment/calibration data to a freely selectable directory or importing saved adjustment/calibration data to the unit from a directory.



1. Call menu "Adjustment/calibration" [→ 188].
2. In the structure tree, under "Backup", click on the "Calibration data" element.
 - ↳ The menu for saving and importing adjustment/calibration data is displayed in the action area.

Saving adjustment/calibration data

1. Click the "Browse" button in the upper part of the action area and select a target directory.
- or
- Enter the path of the target directory directly in the "Destination directory" text box.
2. To save the adjustment or calibration data to the selected directory, click the "Store data" button.

Importing adjustment/calibration data to the unit

1. Click the "Browse" in the lower part of the action area and select the path under which the desired adjustment or calibration data were saved.
- or
- Enter the path directly in the "Path" text box.
2. To import the adjustment or calibration data from the selected directory, click the Restore data button.

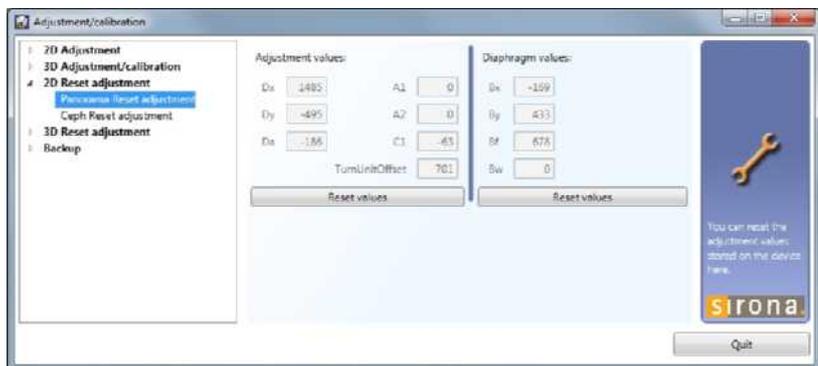
7.2.4 Resetting adjustment/calibration

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.

CAUTION

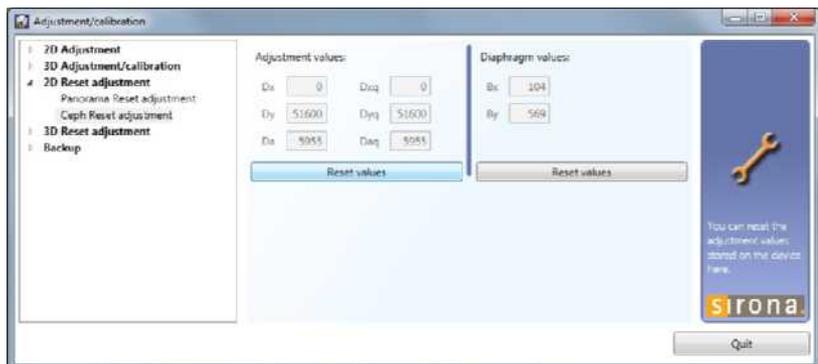
You must make a note of the values displayed in the text boxes of the menus before changing them. If necessary, you can then reset the adjustment values to the factory settings. Contact the Sirona Customer Service Center for more information (or to enable the menu).

Reset panoramic adjustment



1. To reset panoramic adjustment, click on the "Panorama Reset adjustment" element in the structure tree under "2D Reset adjustment".
2. To reset the adjustment values, click on the corresponding button.

Reset ceph adjustment

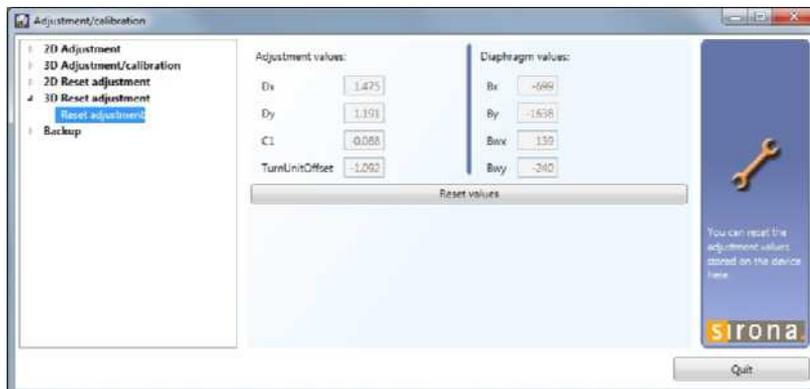


1. To reset ceph adjustment, click on the "Ceph - Reset adjustment" element in the structure tree under "2D Reset adjustment".
2. To reset the adjustment values, click the corresponding button.

Resetting 3D adjustment

IMPORTANT

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

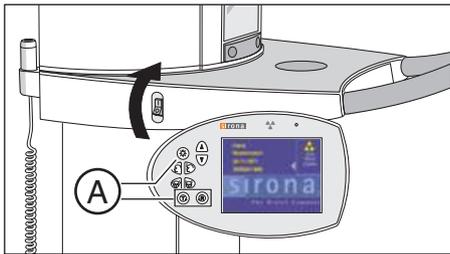


1. To reset 3D adjustment, click on the "Reset adjustment" element in the structure tree under "3D Reset adjustment".
2. To reset the adjustment values, click the corresponding button.

After resetting the values

Once the adjustment/calibration values have been reset, the unit must be readjusted/recalibrated.

7.3 Checking and adjusting the touchscreen



1. Switch the unit on.
 - ↳ Once the unit software has started up, the start screen is displayed on the touchscreen.
2. As soon as the start screen appears, press the 3 keys **light localizer**, **T**, and **R** simultaneously (see **(A)**).
IMPORTANT: These keys must be pressed while the unit is booting and the start screen is still displayed.
 - ↳ The **first adjustment screen** appears on the display.
 - ↳ You can abort the adjustment procedure at any time by pressing the "Abort" button.
3. Touch the **top left** corner of the screen.
 - ↳ The **second adjustment screen** appears on the display.



4. Touch the **bottom right** corner of the screen.
 - ↳ The **third adjustment screen** appears on the display.



5. Touch the center of the green square in the **top right** corner of the screen.
IMPORTANT: Touch the green squares as close to the center as possible so that the black dots that then appear will be positioned exactly in the center of the squares.
 - ↳ The **fourth adjustment screen** appears on the display.





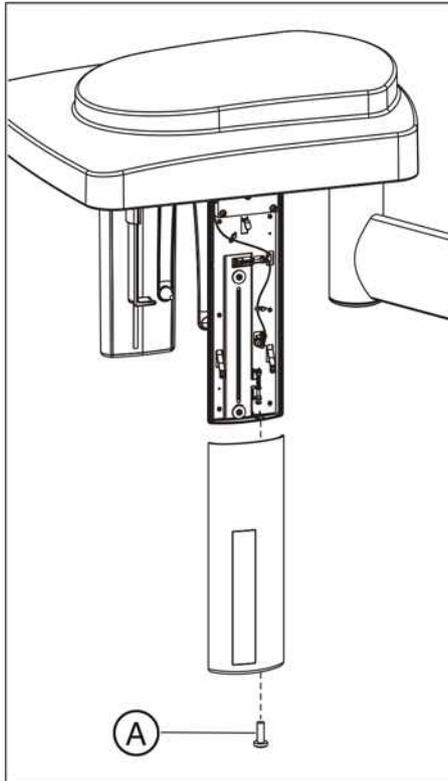
6. Touch the center of the green square in the **bottom left** corner of the screen.
 - ↳ The **fifth adjustment screen** appears on the display.



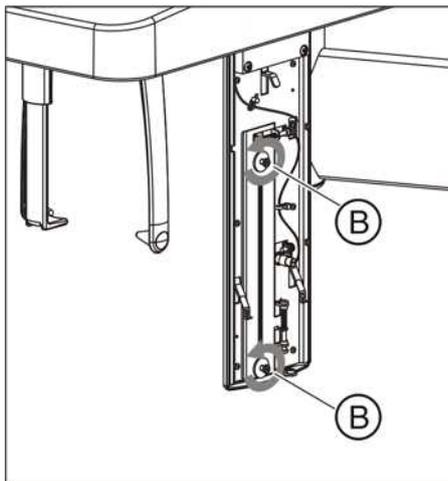
7. Confirm the adjustment settings by clicking the "Yes" button.
 - ↳ The touchscreen is now adjusted.
 - ↳ To repeat the adjustment procedure, touch the "No" button.
 - ↳ To abort the adjustment procedure, touch the "Abort" button.

7.4 Mechanical adjustments

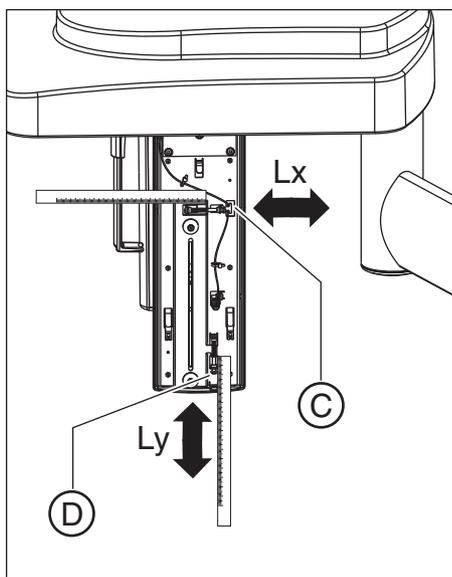
7.4.1 Mechanical adjustment: Ceph secondary diaphragm



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).

8 Perform service routines via the control panel

8.1 Overview of service routines

8.1.1 List of all service routines available for selection

Service routine	Function	see
S001	Radiation without rotary movement, fixed maximum radiation time	S. [→ 263]
S002	Radiation without rotary movement, selectable kV/mA level and maximum radiation time	S. [→ 265]
S002.1	Radiation without rotary movement; selectable kV/mA level and maximum radiation time; primary diaphragm in last position selected	S. [→ 265]
S002.3	Radiation without rotary movement; selectable kV/mA level and maximum radiation time; primary diaphragm fully opened with respect to PAN position.	S. [→ 267]
S002.4	Radiation without rotary movement; selectable kV/mA level and maximum radiation time; the primary diaphragm is set to a widened opening symmetrical to the PAN setting so that the step filter still remains covered.	S. [→ 269]
S002.5	Radiation without rotary movement; selectable kV/mA level and maximum radiation time; primary diaphragm and rotation unit are in 3D position.	S. [→ 271]
S005	General X-ray tube assembly service	S. [→ 272]
S005.1	Read/select tube type	S. [→ 272]
S005.2	Automatic adjustment of preheating	S. [→ 272]
S0005.3	(for internal Sirona purposes only)	
S005.4	Fan test	S. [→ 275]
S005.5	Temperature sensor test, single tank	S. [→ 276]
S005.6	Switch off cool-down interval of the single tank	S. [→ 276]
S005.7	Setting continuous operation of the tube assembly fan	S. [→ 278]
S007	Error logging memory	S. [→ 280]
S007.1	Display error logging memory	S. [→ 280]
S007.2	Clearing error logging memory	S. [→ 282]
S007.5	Enable the CAN bus logging in the Miniweb	S. [→ 283]
S008	Update service	S. [→ 286]
S008.2	Overview of the module software versions	S. [→ 286]
S008.3	Input/confirmation of unit serial number	S. [→ 287]
S008.4	Not required in the current unit version.	–
S009	Flash file system	S. [→ 288]
S009.4	Formatting flash file system	S. [→ 288]
S009.5	Test flash file system	S. [→ 289]
S009.8	Save/restore DX88 data	S. [→ 290]

Service routine	Function	see
S011	Dosimetry (without ring movement)	S. [→ 291]
S011.14	Dosimetry with continuous radiation	S. [→ 291]
S011.24	Dosimetry with pulsed radiation	S. [→ 293]
S012	CAN bus service	S. [→ 294]
S012.1	Presence display of modules	S. [→ 294]
S012.2	Inquiry of the CAN status register of the modules	S. [→ 296]
S012.3	Resetting the CAN status register of the modules	S. [→ 297]
S012.4	Display of CAN bus cycle on the LEDs of the modules	S. [→ 298]
S014	Rotation motor service	S. [→ 299]
S014.1	Travel of rotational drive to the Pan home position	S. [→ 299]
S014.2	Travel of rotational drive to the ceph home position	S. [→ 300]
S014.3	Free travel of rotational drive	S. [→ 301]
S014.4	Display of light barrier signals of rotational drive	S. [→ 301]
S015	Actuator service	S. [→ 302]
S015.5	Functional test of actuators 1 + 2	S. [→ 302]
S017	Configuration service	S. [→ 303]
S017.2	Configure hardware version (Ceph, Pan, 3D)	S. [→ 304]
S017.3	Enter the country group code	S. [→ 307]
S017.4	Select a language	S. [→ 308]
S017.5	Select a language set	S. [→ 309]
S017.6	Activate the remote control display	S. [→ 311]
S017.8	Selecting the kV/mA level series	S. [→ 312]
S017.12	Preview image, enable/disable	S. [→ 313]
S017.13	Enable/disable the welcome screen	S. [→ 314]
S017.14	Enable/disable certain lines of the welcome screen	S. [→ 315]
S017.15	Activate/deactivate the acoustic signal for end of exposure	S. [→ 317]
S017.17	Save/restore DX61 data	S. [→ 318]
S017.18 (for occlusal bite block)	Activation/deactivation of occlusal bite block function <i>This routine may only be selected for units with occlusal bite block; otherwise, the unit will malfunction.</i>	S. [→ 321]
S017.21	Configuration of angle pre-selection (temporomandibular joint) for the TM1 and TM2 user programs	S. [→ 323]
S018	Service for height adjustment	S. [→ 324]
S018.2	Set the maximum travel height	S. [→ 325]
S018.3	Undo the maximum travel height setting	S. [→ 326]
S18.4	Check the height adjustment sensor system	S. [→ 327]
S018.5	Setting the minimum travel height	S. [→ 328]
S018.6	Undoing the minimum travel height setting	S. [→ 329]

Service routine	Function	see
S018.7 (for occlusal bite block)	Set the nominal angle for the occlusal bite block as required by the customer. <i>This routine may only be selected for units with occlusal bite block; otherwise, the unit will malfunction.</i>	S. [→ 330]
S018.8 (for occlusal bite block)	Functional check of the occlusal bite block <i>This routine may only be selected for units with occlusal bite block; otherwise, the unit will malfunction.</i>	S. [→ 332]
S018.9 (for occlusal bite block)	Adjustment of the AD acceptance angle values and the zero point <i>This routine may only be selected for units with occlusal bite block; otherwise, the unit will malfunction.</i>	S. [→ 334]
S018.10 (for occlusal bite block)	Setting the PWM values for the height adjustment creep speed <i>This routine may only be selected for units with occlusal bite block; otherwise, the unit will malfunction.</i>	S. [→ 336]
S020	Service for temple support	S. [→ 337]
S020.1	Programming the switching thresholds of the temple support	S. [→ 337]
S021	Service for motor-driven diaphragm	S. [→ 339]
S021.1	Initialization of diaphragm axis	S. [→ 339]
S032	Test of PAN/3D image path without SIDEXIS	S. [→ 341]
S032.10	Test function for sensor in pan slot	S. [→ 341]
S032.50	Signal tests for sensor in flat panel slot	S. [→ 344]
S032.56	Temperature sensor test, DX88	S. [→ 345]
S033 (Ceph units only)	Test of Ceph image path without SIDEXIS	S. [→ 346]
S033.10	Signal tests for sensor in ceph slot	S. [→ 346]
S034	Service for the digital cephalometer	S. [→ 348]
S034.4	Calibrating / displaying the center position of ceph scan sensor axis	S. [→ 348]
S034.5	Display/calibrate center position of Ceph scan secondary diaphragm axis	S. [→ 352]
S034.6	Moving to the Ceph packing position	S. [→ 355]
S034.8	User-specific determination of the shadowing limit for C1 and C2	S. [→ 356]
S034.9	User-specific determination of the shadowing limit for C3 and C3 30x23	S. [→ 358]
S037	Network service	S. [→ 360]
S037.1	Displaying the network data	S. [→ 360]
S037.2	Setting the default IP address, default gateway address and default subnet mask	S. [→ 362]
S037.3	Configuring boot mode: DYNAMIC (DHCP/AutoIP) / STATIC (fixed address)	S. [→ 364]
S037.4	Manual input of static network settings (IP address, default gateway address, and subnet mask)	S. [→ 365]

8.1.2 Alphabetical list of service routine functions

Function	Service routine	see
Shadowing limit for C1 and C2, user-specific determination	S034.8	S. [→ 356]
Shadowing limit for C3 and C3 30x23, user-specific determination	S034.9	S. [→ 358]
AD acceptance angle values (occlusal bite block), adjust	S018.9	S. [→ 334]
Actuator, service	S015	S. [→ 302]
Actuators 1 + 2, function test	S015.5	S. [→ 302]
Acoustic signal for end of exposure, activate/deactivate	S017.15	S. [→ 317]
Modules, presence display	S012.1	S. [→ 294]
Module software version, show overview	S008.2	S. [→ 286]
Welcome screen, enable/disable	S017.13	S. [→ 314]
Welcome screen, enable/disable lines	S017.14	S. [→ 315]
Diaphragm (motor-driven), service	S021	S. [→ 339]
Diaphragm, axis initialization	S021.1	S. [→ 339]
Configuring boot mode: DYNAMIC (DHCP/AutoIP) / STATIC (fixed address)	S037.3	S. [→ 364]
CAN bus logging in the web interface, enable	S007.5	S. [→ 283]
CAN bus cycle, display on the LEDs of the modules	S012.4	S. [→ 298]
CAN bus, service	S012	S. [→ 294]
CAN status register for the modules, query	S012.2	S. [→ 296]
CAN status register for the modules, reset	S012.3	S. [→ 297]
Ceph image path, test without SIDEXIS	S033	S. [→ 346]
Ceph image path, test without SIDEXIS	S033.10	S. [→ 346]
Cephalometer (digital), service	S034	S. [→ 348]
Default gateway address, set to defaults	S037.2	S. [→ 362]
Default gateway address, manual input	S037.4	S. [→ 365]
Dosimetry (without ring movement)	S011	S. [→ 291]
Dosimetry with pulsed radiation	S011.24	S. [→ 293]
Dosimetry with continuous radiation	S011.14	S. [→ 291]
DX61 data, save/restore	S017.17	S. [→ 318]
Save/restore DX88 data	S009.8	S. [→ 290]
Single tank, switch off cool-down interval	S005.6	S. [→ 276]
Error logging memory	S007	S. [→ 280]
Error logging memory, display	S007.1	S. [→ 280]
Error logging memory, clear	S007.2	S. [→ 282]
Remote control, enable/disable display	S017.6	S. [→ 311]
Flash file system	S009	S. [→ 288]
Flash file system, format	S009.4	S. [→ 288]
Flash file system, test	S009.5	S. [→ 289]
Unit serial number, enter/confirm	S008.3	S. [→ 287]

Function	Service routine	see
Hardware version, configure (Ceph, Pan, 3D)	S017.2	S. [→ 304]
Country group code, enter	S017.3	S. [→ 307]
Height adjustment, sensor system test	S18.4	S. [→ 327]
Height adjustment, service	S018	S. [→ 324]
IP address, set to defaults	S037.2	S. [→ 362]
IP address, enter manually	S037.4	S. [→ 365]
Configuration, service	S017	S. [→ 303]
Preview image, enable/disable	S017.12	S. [→ 313]
kV/mA levels, test; kV/mA level selectable, maximum radiation time fixed (max. 14 s), primary diaphragm in last position selected	S001	S. [→ 263]
kV/mA level series, select	S017.8	S. [→ 312]
Fan, set continuous operation	S005.7	S. [→ 278]
Fan, test	S005.4	S. [→ 275]
Center position of ceph scan secondary diaphragm axis, display/calibrate	S034.5	S. [→ 352]
Center position of ceph scan sensor axis, display/calibrate	S034.4	S. [→ 348]
Network, service	S037	S. [→ 360]
Network data, display	S037.1	S. [→ 360]
Zero point (occlusal bite block), adjust	S018.9	S. [→ 334]
Occlusal bite block function, activate/deactivate	S017.18	S. [→ 321]
Occlusal bite block, function test	S018.8	S. [→ 332]
Occlusal bite block, set nominal angle, as required by the customer	S018.7	S. [→ 330]
X-ray beam, test; kV/mA level selectable, radiation time fixed (max. 14 s), primary diaphragm in last position selected	S001	S. [→ 263]
Read/select tube type	S005.1	S. [→ 272]
Temple support, program switching thresholds	S020.1	S. [→ 337]
Temple support, service	S020	S. [→ 337]
Height adjustment creep speed, set PWM values	S018.10	S. [→ 336]
Sensor test, PAN/3D image path without SIDEXIS	S032	S. [→ 341]
Sensor test, PAN slot	S032.10	S. [→ 341]
Sensor test, flat panel slot	S032.50	S. [→ 344]
Select a language set	S017.5	S. [→ 309]
Select a language	S017.4	S. [→ 308]
Radiation without rotary movement, selectable kV/mA level and maximum radiation time (max. 14 s)	S002	S. [→ 265]
Radiation without rotary movement; selectable kV/mA level and maximum radiation time (max. 14 s); primary diaphragm in last position selected.	S002.1	S. [→ 265]
Radiation without rotary movement; selectable kV/mA level and maximum radiation time (max. 14 s); primary diaphragm fully opened with respect to PAN position.	S002.3	S. [→ 267]

Function	Service routine	see
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. [→ 269]
Radiation without rotary movement; selectable kV/mA level and maximum radiation time (max. 14 s); primary diaphragm and rotation unit are in 3D position	S002.5	S. [→ 271]
Tube assembly service, general	S005	S. [→ 272]
Subnet mask, set to defaults	S037.2	S. [→ 362]
Subnet mask, manual input	S037.4	S. [→ 365]
Temperature sensor test, DX88	S032.56	S. [→ 345]
Temperature sensor test, single tank	S005.5	S. [→ 276]
UDP boot mode, toggle DEFAULT/STATIC	S037.3	S. [→ 364]
Rotational drive, display light barrier signals	S014.4	S. [→ 301]
Rotational drive, free travel	S014.3	S. [→ 301]
Rotational drive, move to Ceph home position	S014.2	S. [→ 300]
Rotational drive, move to pan home position	S014.1	S. [→ 299]
Rotation motor, service	S014	S. [→ 299]
Update, service	S008	S. [→ 286]
Maximum travel height, set	S018.2	S. [→ 325]
Maximum travel height, undo setting	S018.3	S. [→ 326]
Minimum travel height, set	S018.5	S. [→ 328]
Minimum travel height, undo setting	S018.6	S. [→ 329]
Packing position (ceph), move to	S034.6	S. [→ 355]
Preheating, automatic adjustment	S005.2	S. [→ 272]
Configuration of angle pre-selection (temporomandibular joint) for the TM1 and TM2 user programs	S017.21	S. [→ 323]

8.2 Service menu and service routines

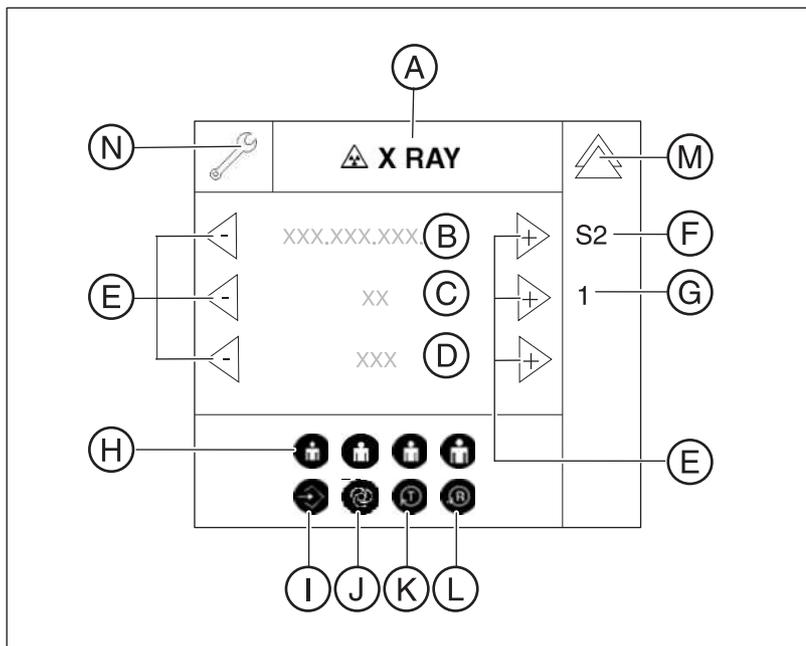
You can use the service routines to check the function of certain unit components and modules, as well as to set important unit parameters.

This chapter describes all service routines that can be selected and started via the service menu on the control panel. Service routines S010 and S030 cannot be selected manually and, therefore, are not described here. They are used solely for unit adjustment and calibration.

8.2.1 Displays and symbols in the service menu

8.2.1.1 Easypad

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 [→ 261].
F	S1 - S37	Selected service routine.
G	1 - n	Selected test step.
H	Patient symbol keys	Different functions, depending on service routine.
I	Memory key	Save selection.
J	Service key	Different functions, depending on service routine. Most, however, confirm a selection or the activation of the next test step.
K	T(est rotation) key	Start a test.
L	R(eturn) key	Move the unit to the starting position or confirm a save operation.
M	Double arrow key	Return to the main menu.
N	Wrench symbol	Displayed if level 4 (service menu) is activated.

8.3 Basic operating procedures in the service menu

8.3.1 Activating the service menu

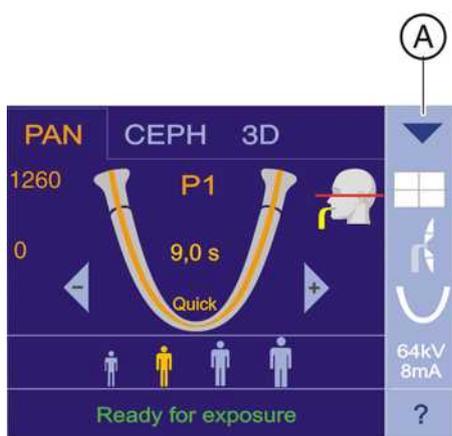
8.3.1.1 Easypad

The structure of the touchscreen user interface on the control panel is subdivided into 4 levels:

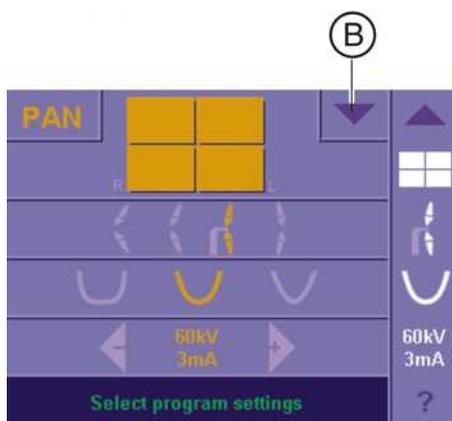
- **Level 1:** Main menu
- **Level 2:** Program Settings
- **Level 3:** Basic Settings
- **Level 4:** Service menu

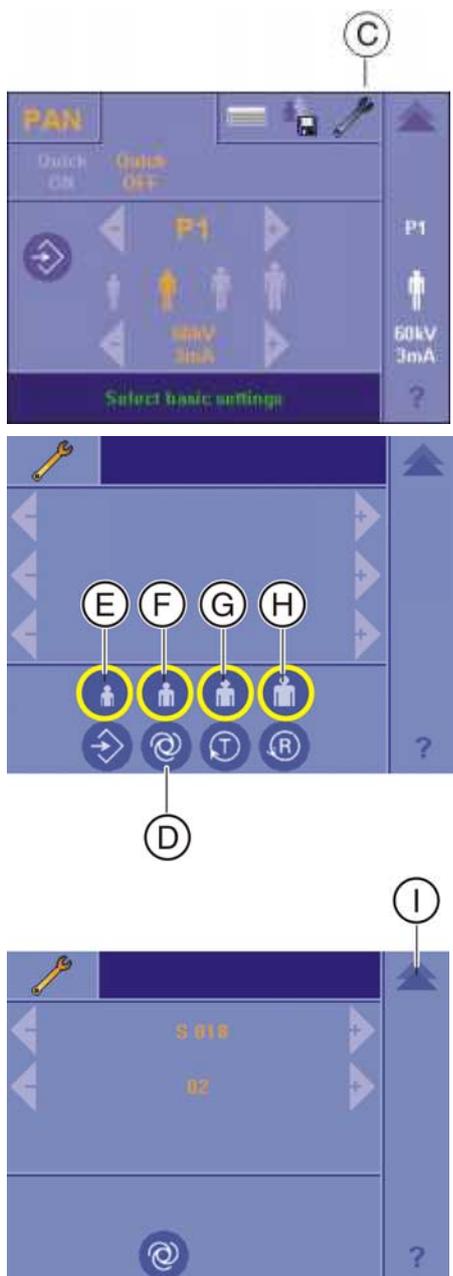
When the unit starts up, the main menu appears on the touchscreen.

1. To select **level 2** ("*Select program settings*"), touch the blue arrow in the top right corner of the touchscreen (**A**).



2. To select **level 3** ("*Select basic settings*"), touch the left-hand blue arrow in the top right corner of the touchscreen (**B**).





3. To select **level 4** (service menu/access), touch the wrench symbol (C).

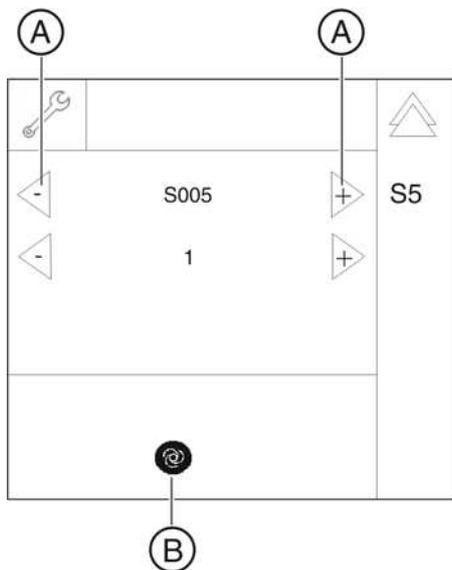
4. Switch to the service menu:
Press and hold down the Service key (D) until the patient symbol keys light up (E-H) (approx. 2 s). Then press the patient symbol keys in the sequence F – H – E within the next 4 s.

↪ After you have entered the key combination correctly, the service menu is displayed. You can return to the next higher level with the double arrow key (I) at any time.

8.3.2 Selecting service routines and test steps

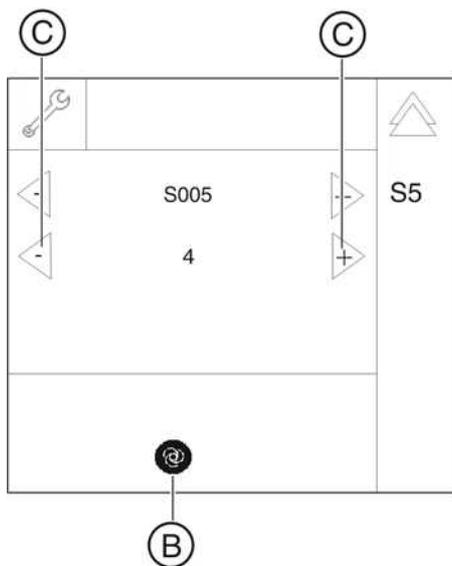
8.3.2.1 Selecting a service routine

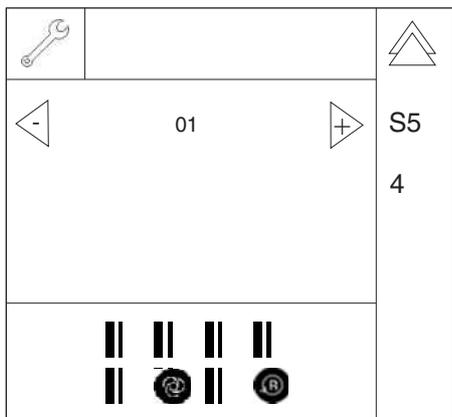
- ✓ The service menu must be selected.
- Select the desired service routine via the arrow keys in the selection field 1 (A) and confirm the selection via the service key (B).
If the selected service routine has several test steps, the first selectable test step is displayed in selection field 2 (test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



8.3.2.2 Selecting a test step

- ✓ The service menu must be selected.
- ✓ The required service routine must be selected.
- Select the required test step in selection field 2 with the arrow keys (C) and confirm your selection by pressing the 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).

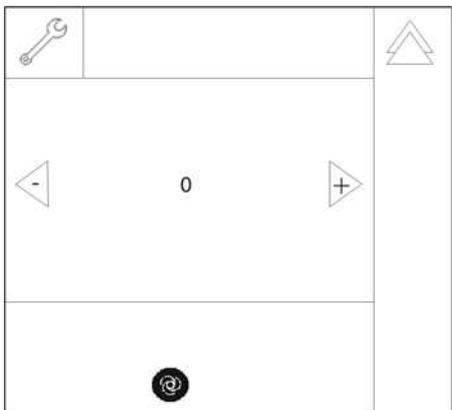
8.3.2.3 Service routines with security access

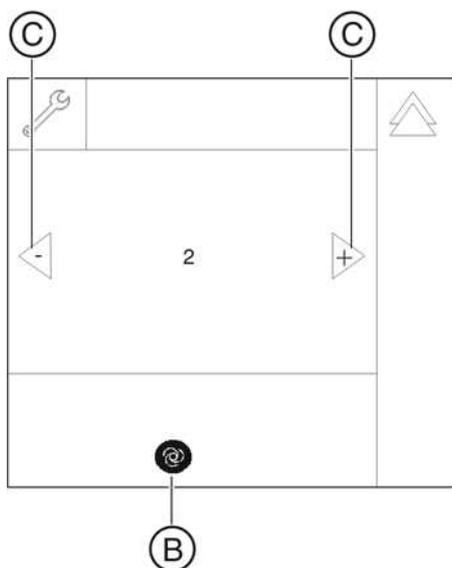
A security code is required for accessing service routines involving functions such as radiation release or editing of configuration data or stored values. This procedure prevents the inadvertent selection or activation of these service routines.

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

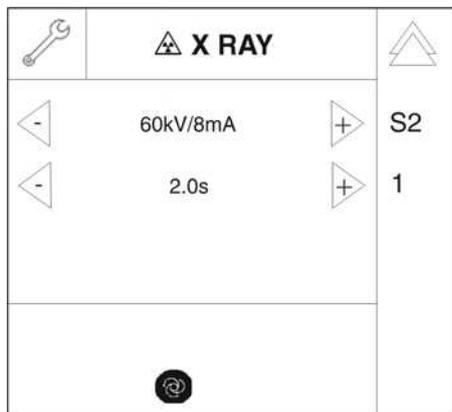
1. Select the service routine or the test step, and confirm your selection with the Service key.

↪ 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.

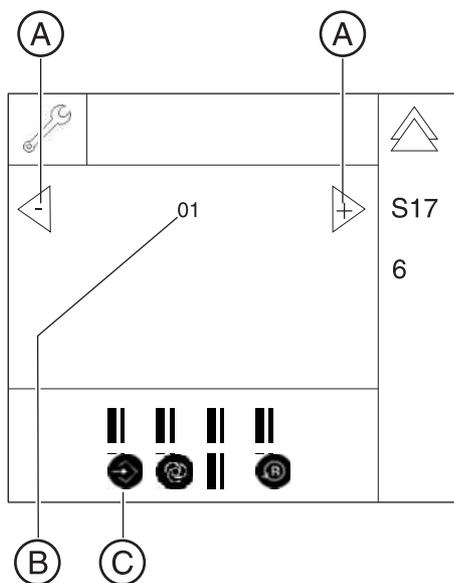
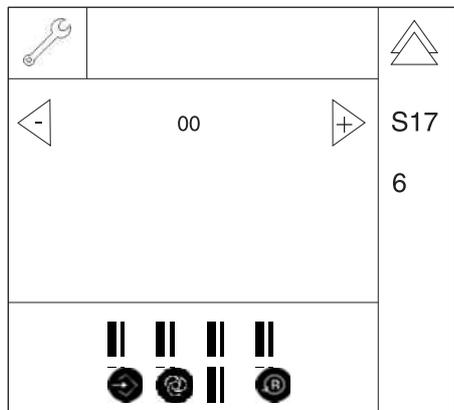


- ↳ Following this double selection and confirmation via the Service key, the service routine is activated.

8.3.3 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 "00" is pre-selected for the "Remote control disabled" option.

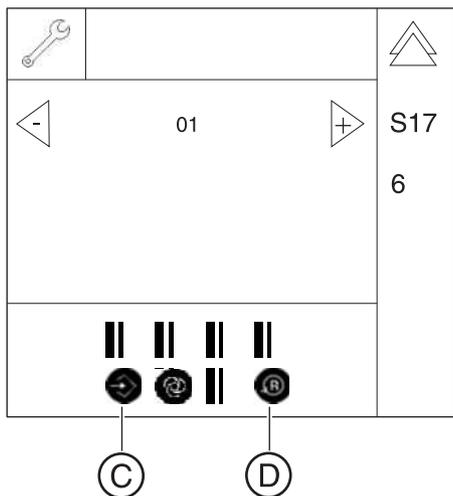
- Touch the + or - arrow keys (A) to select the code 01 (B) for the "Remote control enabled" option.
 - ↪ Once the selected parameter has been changed (in this case the code for the activation of the remote control), the Memory key (C) lights up.

8.3.4 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.

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

Example



✓ The Memory key (C) lights up.

1. Touch the Memory key (C).

↳ The R key (D) lights up.

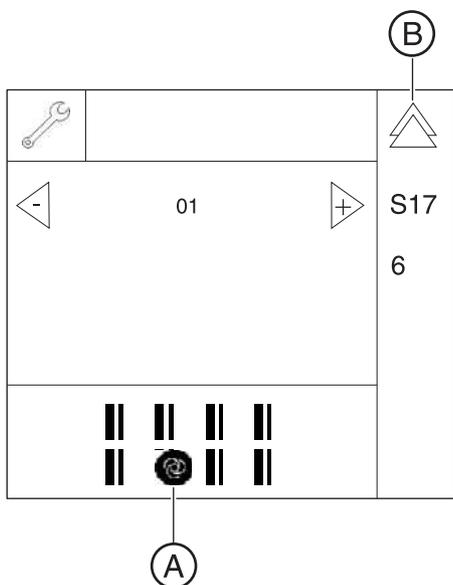
2. Touch the R key (D).

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

8.3.5 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.



Exception: Service routine S017

In service menu S017, touch the Service key (A) to go to the next test step in the service routine.

8.4 S001: Radiation without rotary movement, fixed maximum radiation time

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

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

WARNING

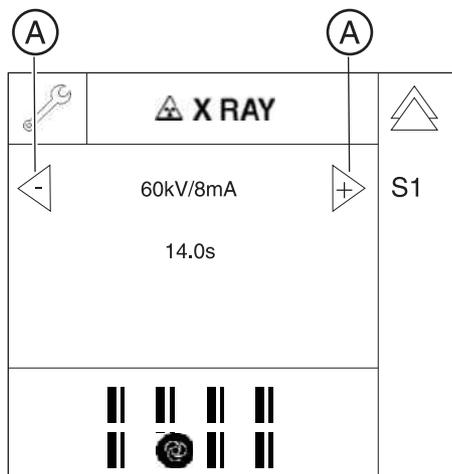
Unit is radiating X-rays

Excess exposure to X-rays is detrimental to health.

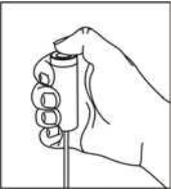
- Use the prescribed accessories for radiation protection.
- Do not stay in the X-ray room during exposure. Move as far away from the unit as the coiled cable for the release button allows you to.

Selection field	Parameter/Display	Range of values
1	kV/ma level	60 kV/8 mA* – 85kV / 7mA
2	Radiation time	14s

* Factory setting



1. Call service routine S001.
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 [→ 262].

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

SR*	SHZ**	Function
S002		X-ray beam test Explanation: <ul style="list-style-type: none"> • Radiation with selected kV/mA level • Maximum radiation time selectable • Radiation from any position
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.
S002.5	Yes	Primary diaphragm and rotation unit are in 3D position.

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

8.5.1 S002: Test step 1

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

WARNING

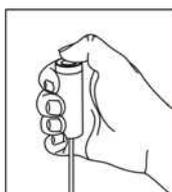
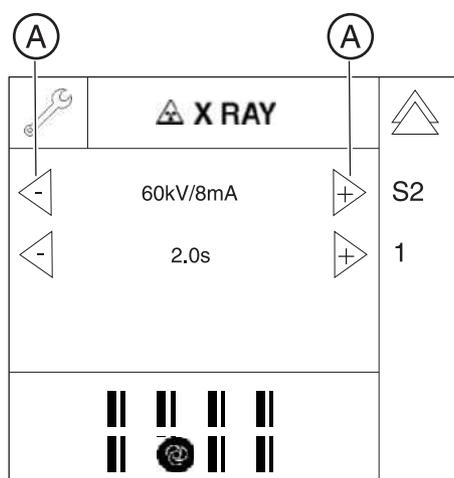
Unit is radiating X-rays.

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	60kV/3mA – 90kV/12mA –
2	Radiation time	0.1s – 4s

Factory settings: 60kV/8mA, 2s



1. Call service routine S002.1.
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 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 [→ 262].

8.5.2 S002: Test step 3

Radiation without rotary movement; selectable kV/mA level and maximum radiation time (max. 14 s); primary diaphragm fully opened with respect to PAN position

WARNING

Unit is radiating X-rays.

Excess exposure to X-rays is detrimental to health.

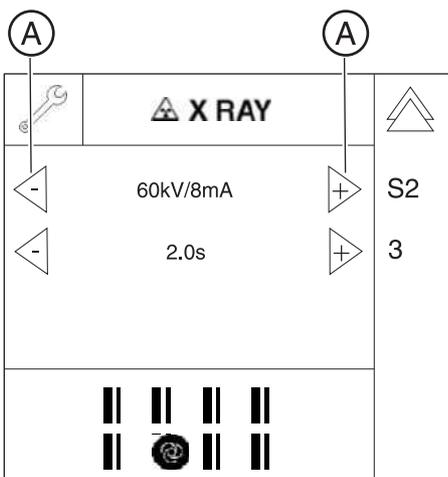
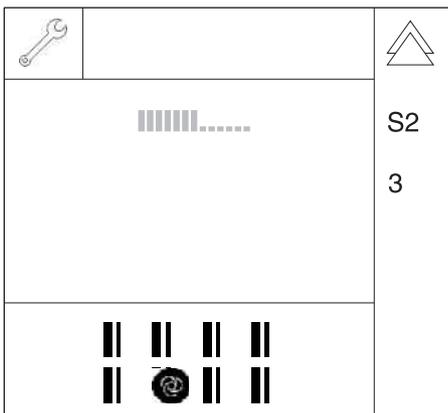
- Use the prescribed accessories for radiation protection.
- Do not stay in the X-ray room during exposure. Move as far away from the unit as the coiled cable for the release button allows you to.

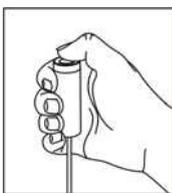
Selection field	Parameters	Range of values
1	kV/mA level	60kV/3mA – 90kV/12mA –
2	Radiation time	0.1s – 4s

Factory settings: 60kV/8mA, 2s

1. Call service routine S002.3.
 - ↳ 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 [→ 262].

8.5.3 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.

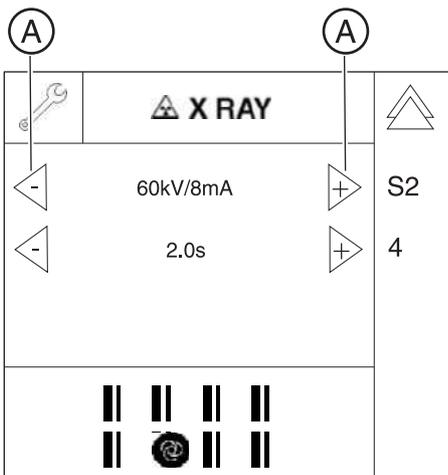
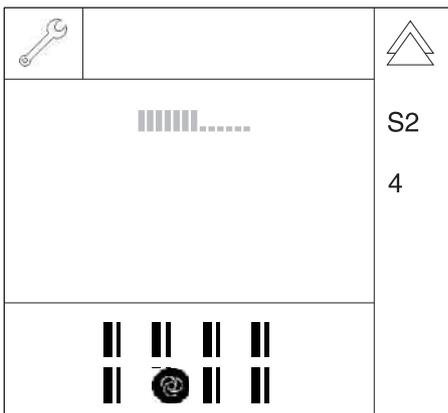
Excess exposure to X-rays is detrimental to health.

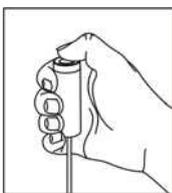
- Use the prescribed accessories for radiation protection.
- Do not stay in the X-ray room during exposure. Move as far away from the unit as the coiled cable for the release button allows you to.

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.
 - ↳ 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 [→ 262].

8.5.4 S002: Test step 5

Radiation without rotary movement with selectable kV/mA level and selectable maximum radiation time; primary diaphragm and sensor rotation unit are in 3D position.

WARNING

Unit is radiating X-rays.

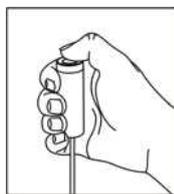
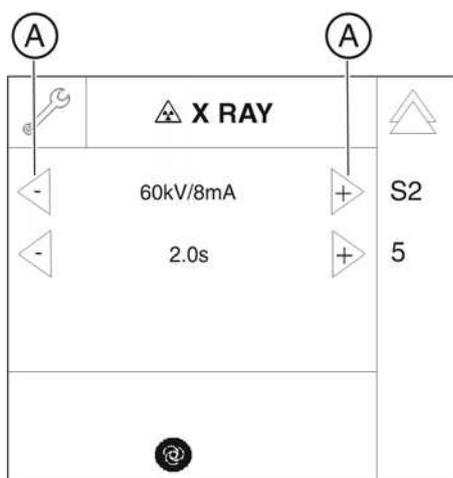
Excess exposure to X-rays is detrimental to health.

- 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/8 mA – 85kV/7mA*
2	Radiation time	0.1 s – 5.0 s*

* factory settings

1. Call service routine S002.5.
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 [→ 262].

8.6 S005: General X-ray tube assembly service

SR*	SA**	Function
S005		General X-ray tube assembly service
S005.1	No	<i>If tube type is valid:</i> Read out tube type
	Yes	<i>If tube type is not valid:</i> Select tube type
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, ** SHZ=security access

8.6.1 S005: Test step 1

Read or select the X-ray tube assembly type

IMPORTANT

Only Siemens tube 90/15 (code 04) is valid for operation with the ORTHOPHOS XG 3D volume tomograph!

Selection field	Code	Tube type
1	00	Siemens tube 90/15
	01	CEI OPX 100
	02	Toshiba tube DO 56
	03	CB tube D 151 R
	04	Siemens tube 90/15 in 3D single tank*

* Factory setting

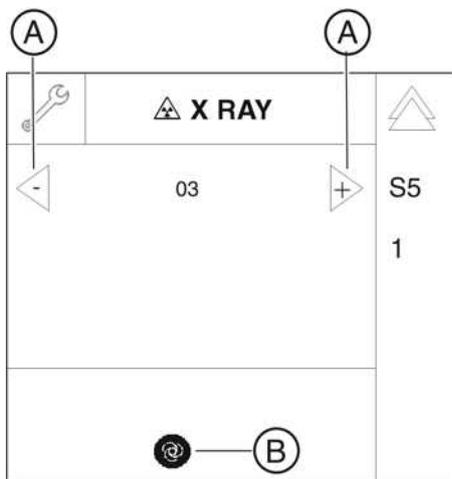
- Call service routine S005.1.
 - ↳ Selection field 1 shows the indicator number of the installed tube type.

IMPORTANT

The X-ray tube assembly automatically queries the tube type information. If no defined value is saved, the security access will be shown instead of the tube type.

If the tube type is invalid ...

1. Confirm the security access.
 - ↳ Selection field 1 shows the indicator number of the (invalid) tube type detected by the X-ray tube assembly.



2. Use the arrow keys in selection field 1 to select the code for the tube type (see table).
↳ The Memory key (**B**) lights up.
3. Save the selected parameter [→ 262].
4. Exit the service routine [→ 262].

After calling the service routine S005.1 again, the security access is no longer requested and the stored tube type is displayed.

8.6.2 S005: Test step 2

Automatic adjustment of preheating

WARNING

Unit is radiating X-rays.

Excess exposure to X-rays is detrimental to health.

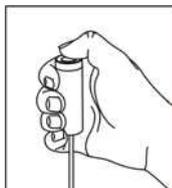
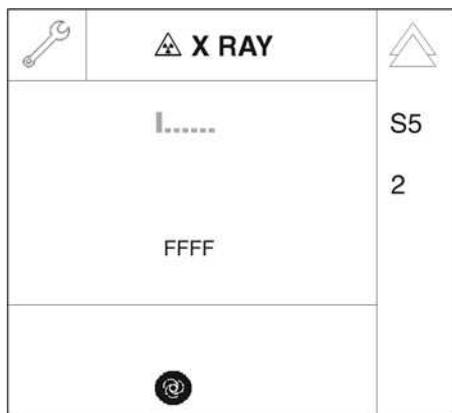
- Use the prescribed accessories for radiation protection.
- Do not stay in the X-ray room during exposure. Move as far away from the unit as the coiled cable for the release button allows you to.

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 60/9.

1. Call service routine S005.2.

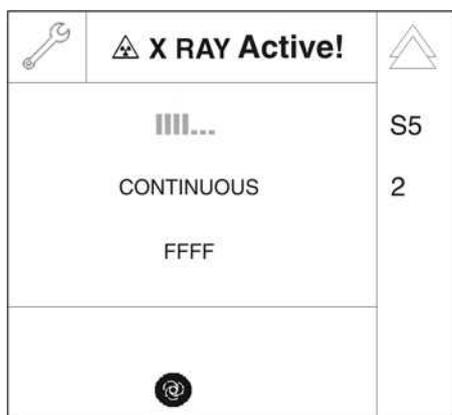
- ↪ An inactive progress indicator in selection field 1 and the message "FFFF" in selection field 3 signal that the system is ready for compensation.

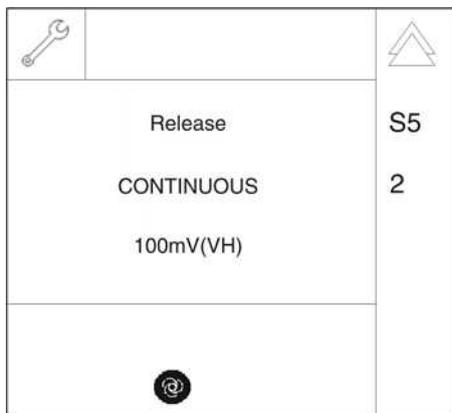


2. Start automatic adjustment by releasing radiation.

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 [→ 262].

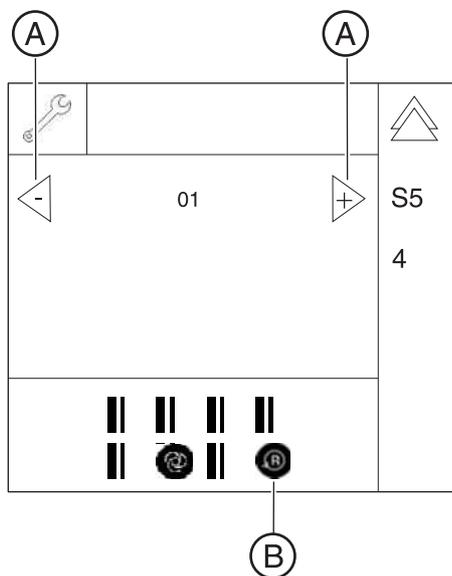
8.6.3 S005: Test step 4

Fan test

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

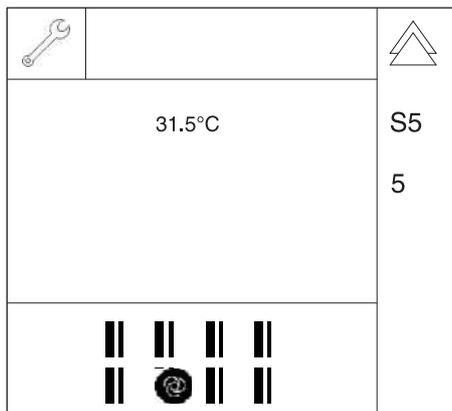
* factory settings

1. Call service routine S005.4.
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 [→ 262].
 Upon exiting the service routine, the fan is automatically switched off again.



8.6.4 S005: Test step 5

Temperature sensor test, single tank



1. Call service routine S005.5.
 - ↳ 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 [→ 262].

8.6.5 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.

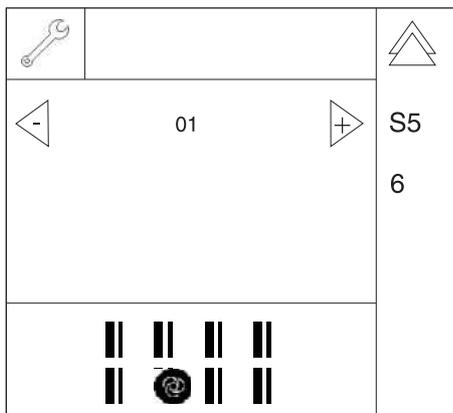
IMPORTANT

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".

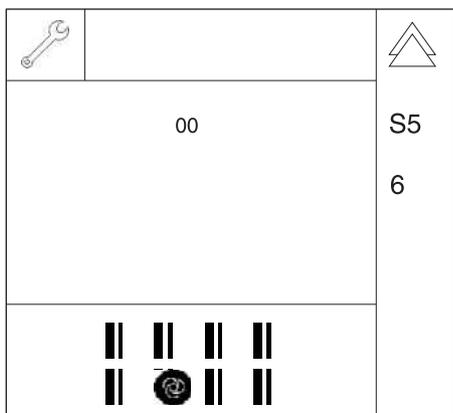
Selection field	Code	Function
1	00	Pulse/pause monitoring inactive
	01	Pulse/pause monitoring active*

* factory settings

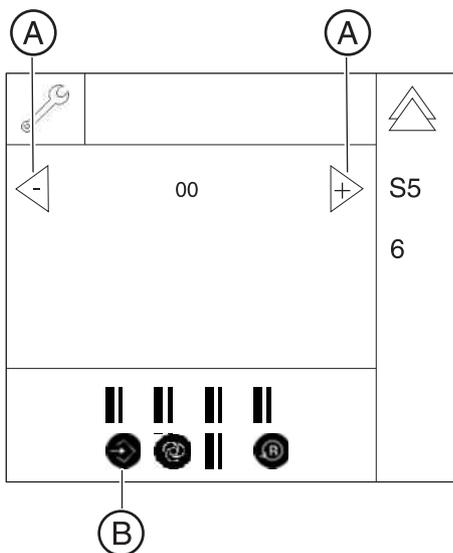
1. Call service routine S005.6.



↪ 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 [→ 262].
 - ↪ **PulsePause monitoring is irreversibly disabled.**
4. Exit the service routine [→ 262].

8.6.6 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

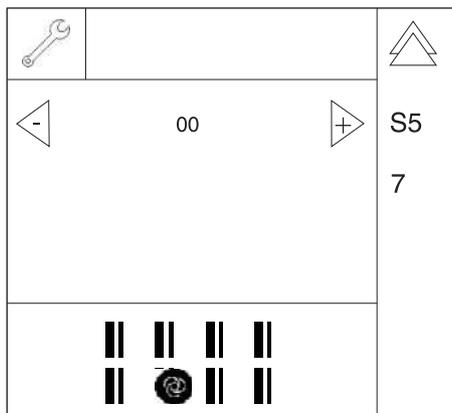
The tube assembly fan can be configured for continuous operation at the express wish of the customer. This can be done by running this service routine. The customer should be informed in advance about the increased noise generation to be expected. A demonstration of the fan noise can be made with service routine S005.4 [→ 275].

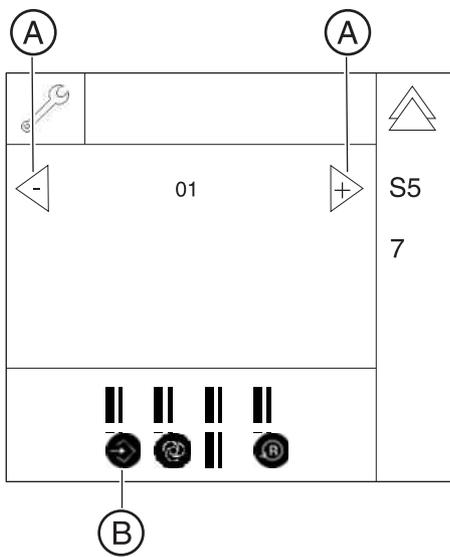
Selection field	Code	Function
1	00	Fan switches to continuous operation
	01	Fan switches off (controlled operation)*

* factory settings

1. Call service routine S005.7.

↳ 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 [→ 262].
4. Exit the service routine [→ 262].

8.7 S007: Error logging memory

SR*	SHZ**	Function
S007		Error logging memory
S007.1	No	Display error logging memory
S007.2	Yes	Clearing error logging memory
S007.5	No	Enabling CAN bus logging in the web interface

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

8.7.1 S007: Test step 1

Display error logging memory

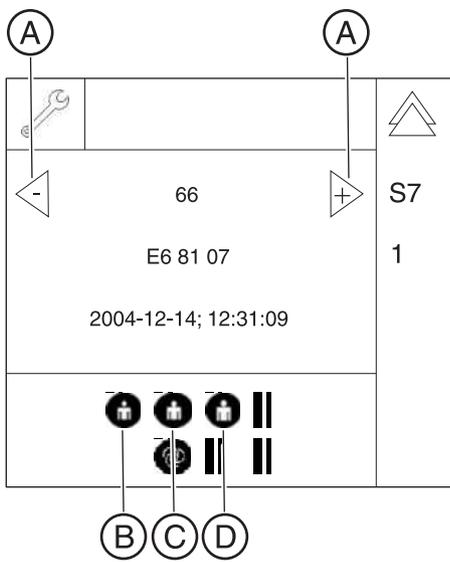
In addition to service routine S007.1, you can also use the extended detail query in SiXABCon to check the error logging memory.

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 setting

1. Call service routine S007.1.
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.



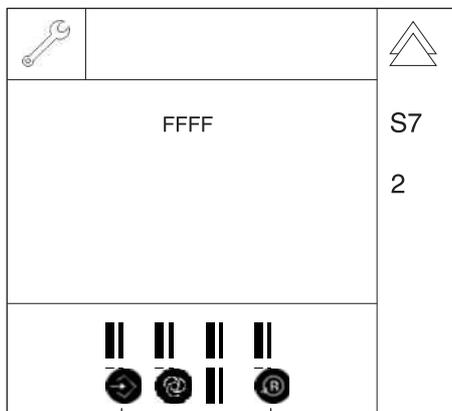
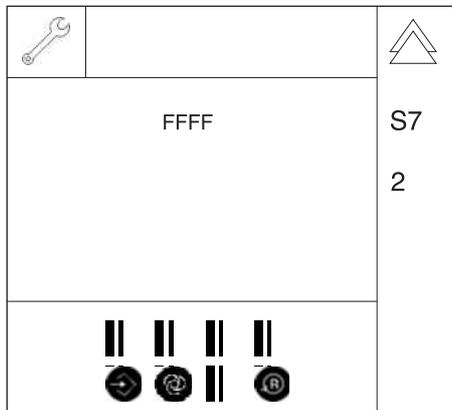
3. Use the arrow keys (A) in selection field 1 to select the required error event (66 in the example).
 - ↳ The corresponding error message is displayed in selection field 2 [→ 88].
 - ↳ Selection field 3 displays the date and time of the error event.
4. Exit the service routine [→ 262].

8.7.2 S007: Test step 2

Clearing error logging memory

1. Call service routine S007.2.

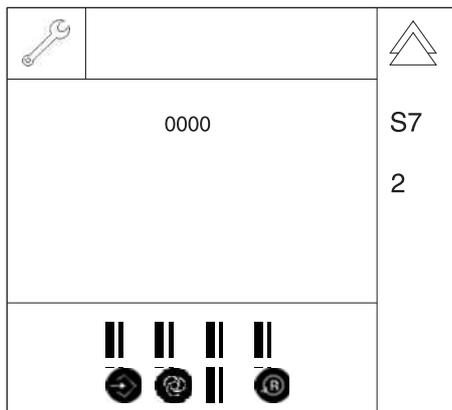
↳ The system's readiness to clear the memory is indicated by the display message "FFFF" in selection field 1. If the error logging memory does not contain any data, "0000" is displayed.



(A)

(B)

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 [→ 262].

8.7.3 S007: Test step 5

Enabling CAN bus logging in the web interface

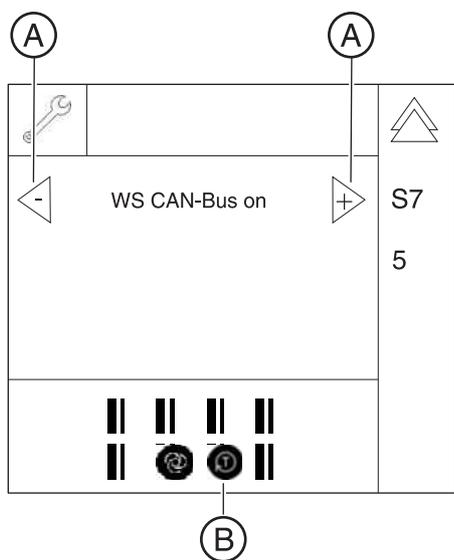
NOTICE

This service routine may only be called up subject to the approval of and with the support of the Sirona Customer Service Center (CSC).

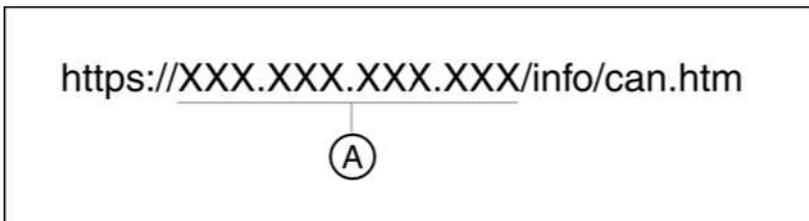
Selection field	Parameters	Function
1	WS CAN bus off	Logging off*
	WS CAN bus on	Logging on
	WS CAN bus ex. on	Extended logging on

* Factory setting

1. Call service routine S007.5.
2. Use the arrow keys (A) to select the required setting (see table).
 ↳ Once the required setting has been made, the T key (B) lights up.
3. Touch the T key (B) to enable the selected setting.
 ↳ All CAN bus events occurring from now on during operation of the unit will be logged and can be displayed with a web browser (e.g. Internet Explorer). This log will help you when consulting the Sirona Customer Service Center (CSC) for error diagnosis.
4. Exit the service routine [→ 262].



8.7.3.1 Displaying the log with a web browser



1. Enter the following web address on a PC (with internet access) integrated in a system network:
A: IP address of the unit

Transmit Interrupt	unsaved
Receive Interrupt	disabled

Miscellaneous	
Clock divider (CDR)	0xc0
CAN-Mode	PeiCAN-Mode
RX ErrorCounter	0
TX ErrorCounter	0
ErrorCodeCapture	0x00
Bus-Timing 0 (BTR0)	0x03
Bus-Timing 1 (BTR1)	0x18

Error Counter				
ErrCnt	ErrCnt0	ErrCnt1	ErrCnt2	ErrCnt3
0	0	0	0	0

Status Register

Device	Error Comp.	Overrun Error	Receiver Warning	Receiver Error	Transmitter Warning	Transmitter Error	Bus Off
DX41	0	0	0	0	0	0	0
DX42	0	0	0	0	0	0	0
DX6	0	0	0	0	0	0	0
DX61	0	0	0	0	0	0	0
DX7	0	0	0	0	0	0	0
DX81P	0	0	0	0	0	0	0
DX88	0	0	0	0	0	0	0

Display the [CAN Bus trace](#)
Attention: This page will take about 2 minutes to be displayed completely!

👉 The CAN bus browser opens.

2. In the lower area, select the "CAN bus" link.

CAN-Bus Trace

TimeStamp	Type	ID	Len	Data
0183006.776	Rx	0x401	0x08	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0183010.785	Rx	0x481	0x08	0x00 0x00 0x00 0x00 0x00 0x01 0x00 0x00
0183012.778	Rx	0x181	0x08	0x00 0x00 0x00 0x00 0x00 0x02 0x00 0x00
0183020.802	Tx	0x001	0x08	0x18 0x27 0x09 0x19 0x01 0x6f 0x00 0x00
0183022.780	Tx	0x080	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183024.803	Tx	0x100	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183026.794	Tx	0x200	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183028.781	Tx	0x280	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183030.801	Tx	0x300	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183032.806	Tx	0x400	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183034.798	Tx	0x500	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183036.788	Tx	0x480	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183038.802	Tx	0x180	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183040.784	Tx	0x700	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183042.784	Tx	0x780	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183046.790	Rx	0x081	0x08	0x00 0x00 0x00 0x00 0x00 0x00 0x04 0x00
0183048.790	Rx	0x101	0x08	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0183050.809	Rx	0x201	0x08	0x00 0x00 0x00 0x00 0x00 0x04 0x00 0x00
0183054.791	Rx	0x301	0x08	0x00 0x00 0x00 0x00 0x00 0x03 0x00 0x00
0183056.800	Rx	0x401	0x08	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0183060.793	Rx	0x481	0x08	0x00 0x00 0x00 0x00 0x00 0x01 0x00 0x00
0183062.808	Rx	0x181	0x08	0x00 0x00 0x00 0x00 0x00 0x02 0x00 0x00
0183070.812	Tx	0x001	0x08	0x18 0x27 0x09 0x19 0x01 0x6f 0x00 0x00
0183072.794	Tx	0x080	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0183074.806	Tx	0x100	0x08	0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55

↳ The CAN bus protocol is displayed in the browser and can be saved as an HTML page, printed out, or sent to the Sirona Customer Service Center (CSC).

8.8 S008: Update service

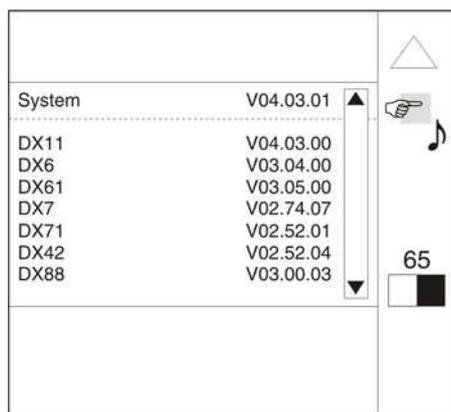
SR*	SHZ**	Function
S008		Checking the software versions
S008.2	No	Overview of the module software versions
S008.3	No	Input/confirmation of unit serial number
S008.4	No	Not required in the current unit version.

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

8.8.1 S008: Test step 2

Overview of module software versions

1. Call service routine S008.2.
 - ↳ The software versions currently installed on the modules are displayed on an info screen on the touchscreen display.
2. Exit the service routine [→ 262].



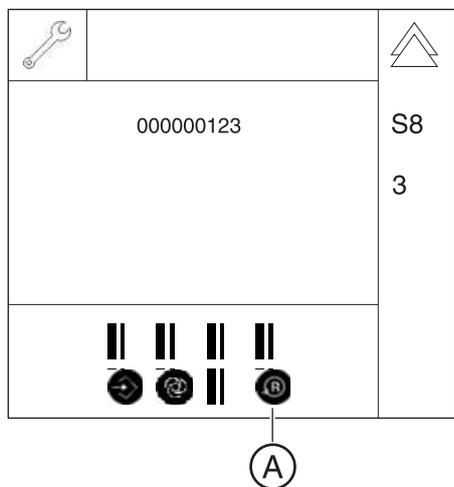
System	V04.03.01
DX11	V04.03.00
DX6	V03.04.00
DX61	V03.05.00
DX7	V02.74.07
DX71	V02.52.01
DX42	V02.52.04
DX88	V03.00.03

8.8.2 S008: Test step 3

Confirming the unit serial number

IMPORTANT

If the backup copy of the old unit serial number does not match the new one after replacing a module, the entry of the serial number is activated. If an incorrect serial number is entered, the message "FFFF" appears on the display. In this case, the service routine can be run again.



1. Call service routine S008.3.
2. Confirm the serial number displayed by pressing the R key (A).
3. Exit the service routine [→ 262].

8.9 S009: Flash file system

IMPORTANT

The unit has to be completely recalibrated after formatting the flash file system [→ 184]. When the flash file system is formatted, the content of the error logging memory is lost.

SR*	SHZ**	Function
S009		Flash file system
S009.4	Yes	Initializing the flash file system
S009.5	No	Test flash file system
S009.8	Yes	Save/restore DX88 data

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

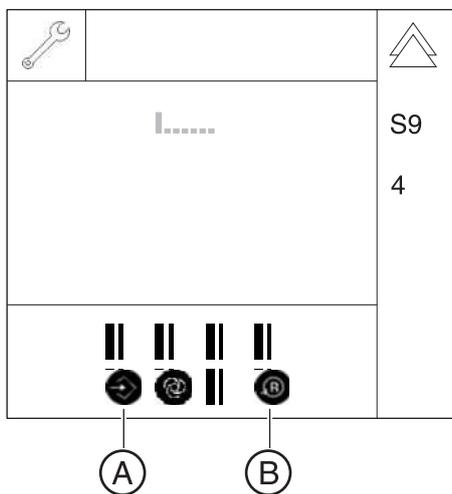
8.9.1 S009: Test step 4

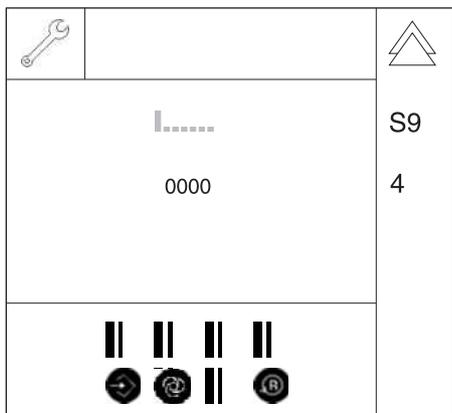
Formatting flash file system

IMPORTANT

After formatting the file system with service routine S9.4, the service routine S9.8 [→ 290] must also be called.

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





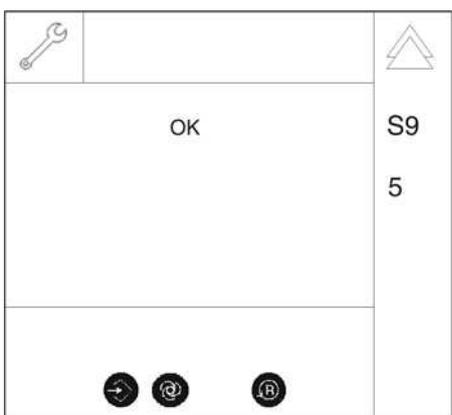
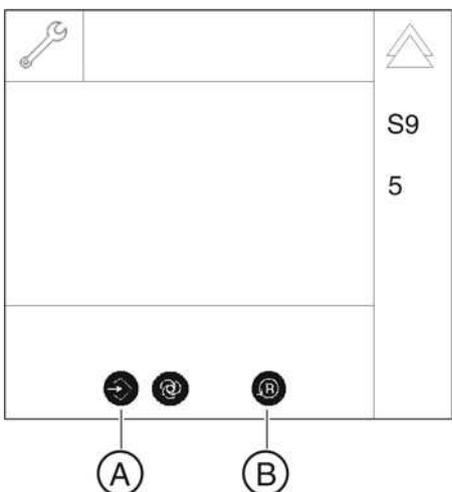
↪ Flash file system formatting in progress. This process takes approx. 5-6 mins and is visualized by a progress indicator. The end of this process is indicated by the message "0000" in selection field 2.

3. Exit the service routine [→ 262].

8.9.2 S009: Test step 5

Test flash file system

1. Call service routine S009.5.
2. To test the flash file system, press the Memory key (A), followed by the R key (B).



↪ Once the system has passed the test without errors, "OK" appears in selection field 1.

↪ If the test fails, "ERROR" is displayed. In this case, the flash file system must be formatted with service routine S009.4 [→ 288].

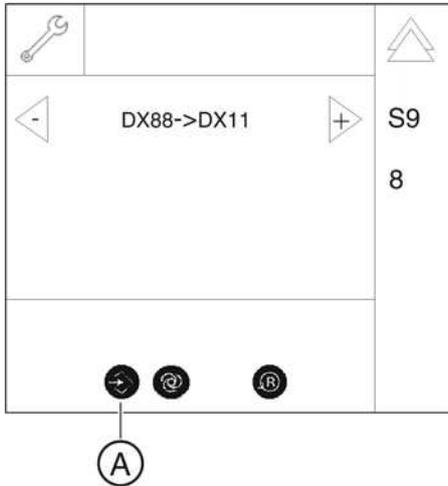
3. Exit the service routine [→ 262].

8.9.3 S009: Test step 8

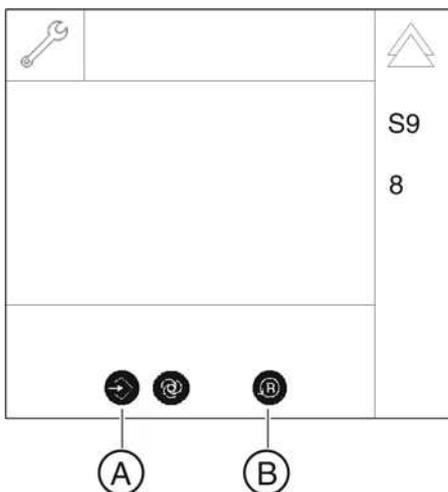
Save/restore DX88 data

1. Call service routine S009.8.

- ↳ After selecting this service routine, the following can be displayed in selection field 1:
DX88 → DX11:
Data are transferred from DX88 to DX11, Memory key (A) lights up.
DX11 → DX88:
Data are transferred from DX11 to DX88, Memory key (A) lights up.
"---":
Data on both boards (DX11 and DX88) are valid or data transfer is impossible; all keys remain dark.
Important: Only one useful transfer direction is offered. If both locations contain valid data, "---" is displayed.

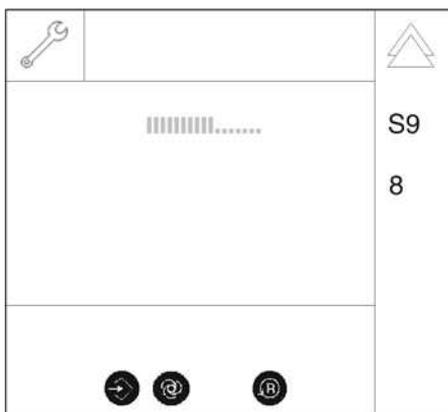


2. To trigger the memory process, press the Memory key (A) (R key (B) lights up), followed by the R key (B).



- ↳ The data are transferred. During the data transfer, a progress indicator is displayed in selection field 1.

3. Exit the service routine [→ 262].



8.10 S011: Dosimetry (without ring movement)

 WARNING
<p>Unit is radiating X-rays</p> <p>Excess exposure to X-rays is detrimental to health.</p> <ul style="list-style-type: none"> ➤ 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

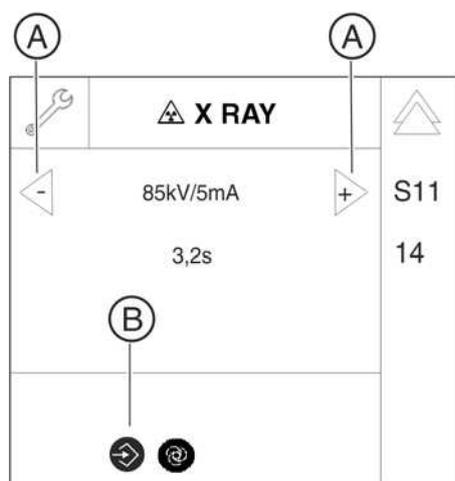
8.10.1 S011: Test step 14

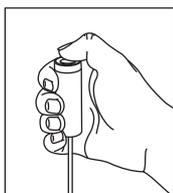
Dosimetry with continuous radiation

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 dosimeter sensor in the middle of the combisensor.
2. Call service routine S011.14 [→ 258].
 - ↪ 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 [→ 262].





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 dosimeter.
7. Exit the service routine [→ 262].
8. Remove the dosimeter sensor from the combisensor.

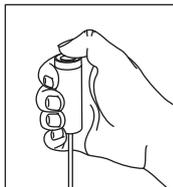
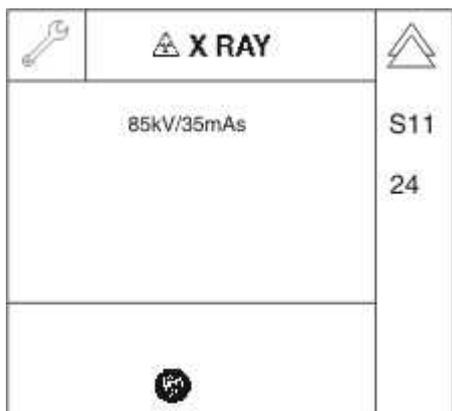
8.10.2 S011: Test step 24

Dosimetry with pulsed radiation

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

1. Attach the Multi-O-Meter sensor in the middle of the combisensor.
2. Call service routine S011.24 [→ 261].

↳ 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 Multi-O-Meter.
5. Exit the service routine [→ 262].
6. Remove the Multi-O-Meter sensor from the combisensor.

8.11 S012: CAN bus service

SR*	SHZ**	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 LEDs of modules

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

IMPORTANT

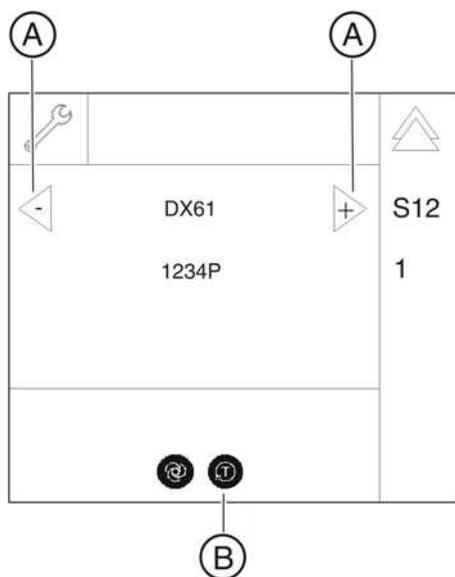
The CAN bus service is not yet implemented for the module DX11!

8.11.1 S012: Test step 1

Presence display of modules

Selection field	Parameter/Display	Range of values
1	Subassembly	DX1 - DX88
2	<ul style="list-style-type: none"> Counter value of CAN bus events Presence code behind the counter value: P = module present L = module lost 	

Checking the module



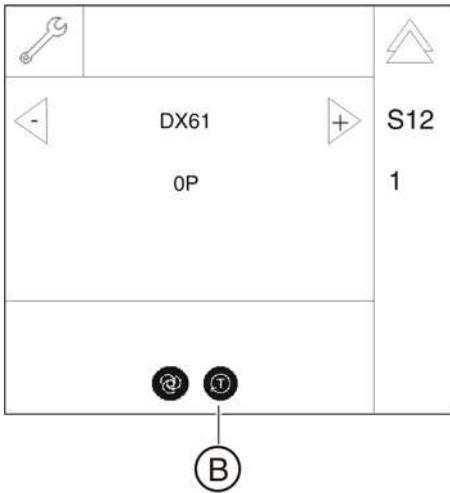
➤ Call service routine S012.1.

➤ 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



1. To delete the counter, press the T key (B).
↳ The counter is then reset to "0".
2. Exit the service routine [→ 262].

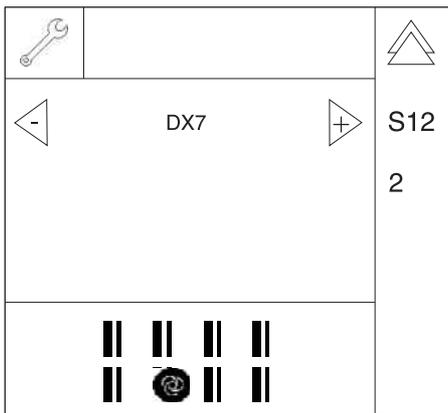
8.11.2 S012: Test step 2

Querying the CAN status register for the modules

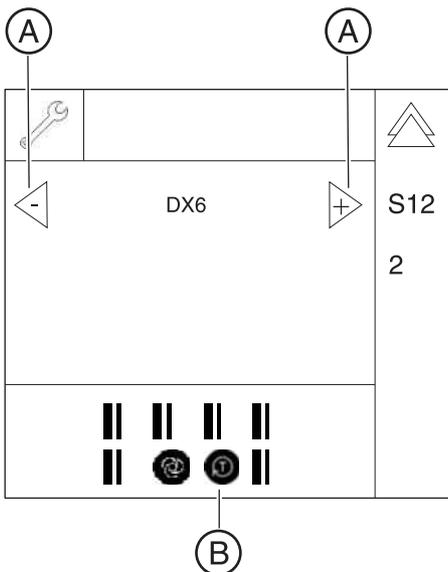
IMPORTANT

Before querying the CAN status register for the modules, you should first run service routine S012.3 to reset the registers [→ 297].

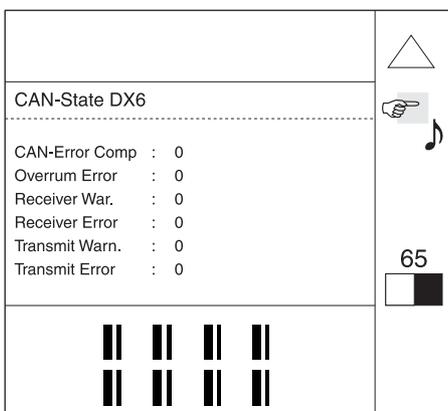
1. Call service routine S012.2.
 - ↳ The currently selected module is displayed in selection field 1 (DX7 in the example).



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).



4. Exit the service routine [→ 262].
 - ↳ 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.

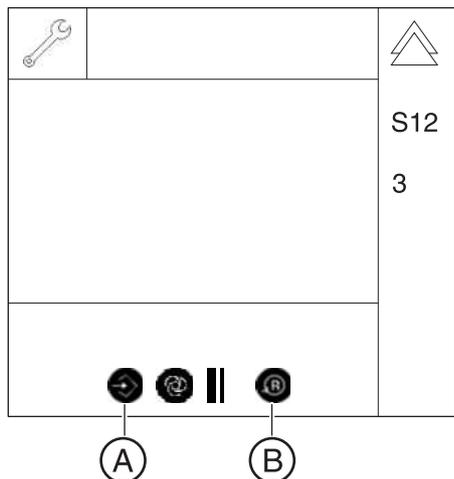


8.11.3 S012: Test step 3

Resetting the CAN status registers

IMPORTANT

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



1. Call service routine S012.3.
 - ↳ 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 [→ 262].

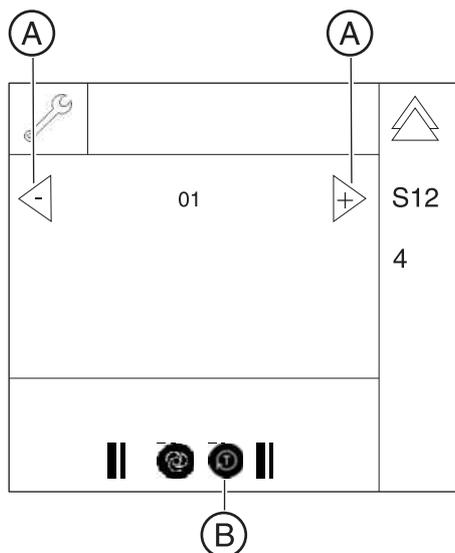
8.11.4 S012: Test step 4

Display of CAN bus cycle on LEDs of modules

Selection field	Code	Function
1	00	LED display on the modules is switched off*
	01	LED display on the modules is switched on

* Factory setting

1. Call service routine S012.4.
 - ↳ 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 [→ 262].



The LEDs on the modules normally flash slowly (1 Hz) (for code 00). When code 01 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.

8.12 S014: Rotation motor service

SR*	SHZ**	Function
S014		Rotation motor service
S014.1	No	Travel of rotational drive to the Pan home position
S014.2	No	Travel of rotational drive to the ceph home position
S014.3	No	Free travel of rotational drive
S014.4	No	Display of light barrier signals of rotational drive

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

8.12.1 S014: Test step 1

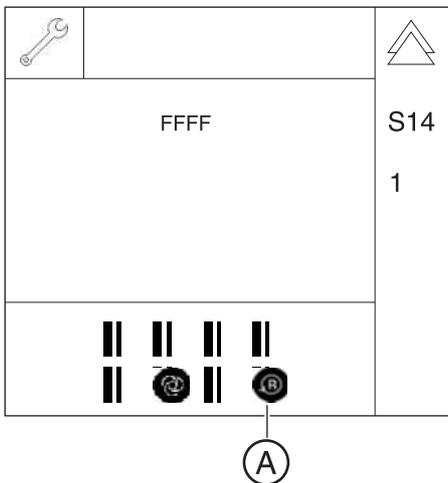
This test step is no longer offered in all software versions.

Travel of rotational drive to the Pan home position

Selection field	Display	Meaning
1	FFFF	Position of rotation unknown
	0000	Pan home position reached
	EEEE	Pan home position not reached (error condition)

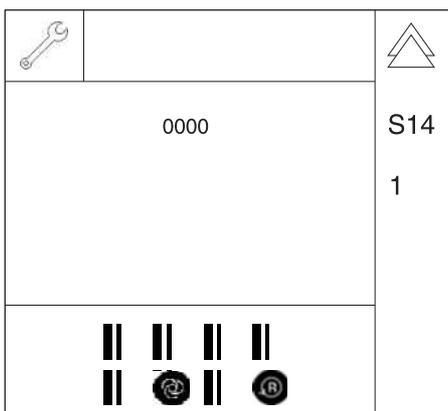
This service routine implements "isolated" travel of the rotation motor to the pan home position. Actuators 1 and 2 remain in their current positions.

1. Call service routine S014.1.
 - ↳ Once the service routine has been selected, the current status is displayed in selection field 1 (see table).
2. Touch the R key (A) to move the ring to the pan home position.



↳ When the pan home position is reached, "0000" is displayed in selection field 1.

3. Exit the service routine [→ 262].



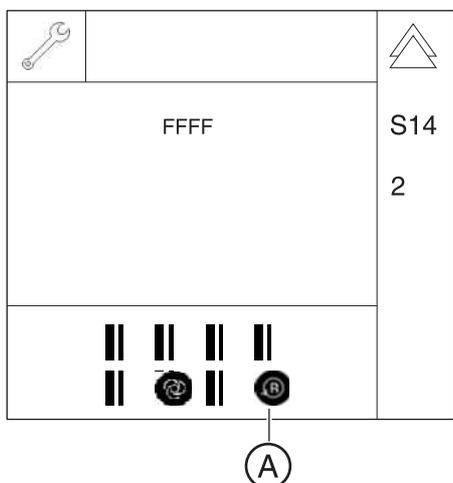
8.12.2 S014: Test step 2

This test step is no longer offered in all software versions.

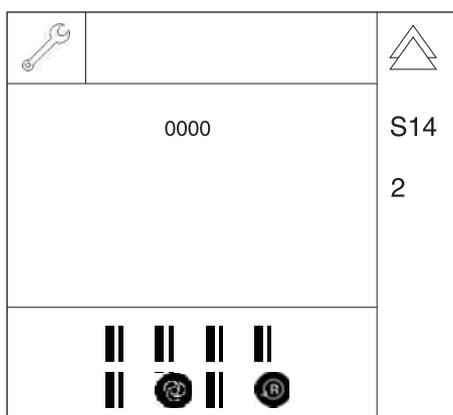
Travel of rotational drive to the ceph home position

This service routine implements "isolated" travel of the rotation motor to the ceph home position (with the arm in the right or the left position, depending on the configuration). Actuators 1 and 2 remain in their current positions. The ceph home position can also be approached even if the hardware version has not been configured for cephalometer operation.

Selection field	Display	Meaning
1	FFFF	Position of rotation unknown
	0000	Ceph home position reached
	EEEE	Ceph home position not reached (error condition)



1. Call service routine S014.2.
 - ↳ Once the service routine has been selected, the current status is displayed in selection field 1 (see table).
2. Touch the R key (A) to move the ring to the ceph home position.
 - ↳ When the ceph home position is reached, "0000" is displayed in selection field 1.

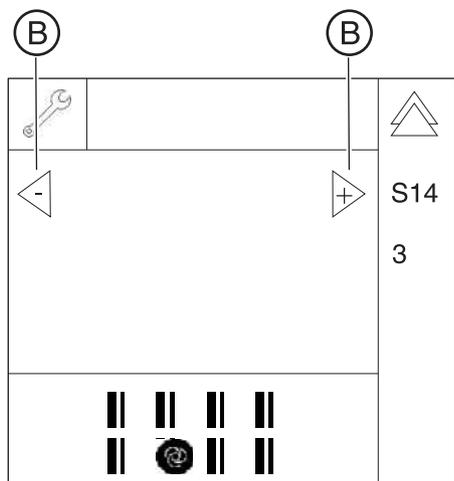


3. Exit the service routine [→ 262].

8.12.3 S014: Test step 3

Free travel of rotational drive

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

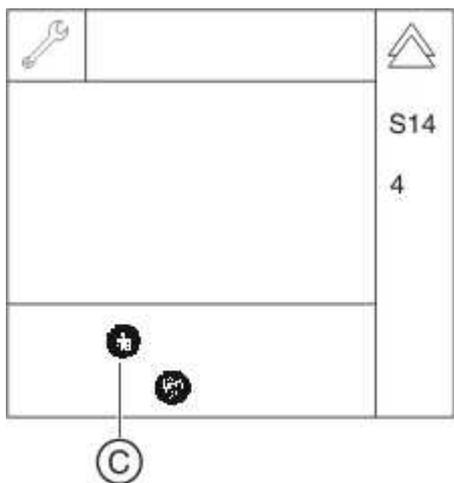


1. Call service routine S014.3.
 - ↳ Once the service routine has been selected, the arrow keys (B) are displayed in selection field 1.
2. Touch the arrow keys (B) to move the ring to the right (+) or to the left (-). The ring keeps moving as long as you touch the key.
3. Exit the service routine [→ 262].

8.12.4 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.
 - ↳ Once the service routine has been selected, both the Service key and patient symbol key 1 (C) are displayed on the control panel.
2. Turn the ring manually. Patient symbol key 1 (C) lights up to indicate that the light barrier has been released.
3. Exit the service routine [→ 262].

8.13 S015: Actuator service

SR*	SHZ**	Function
S015		Actuator service
S015.15	No	Testing of actuators 1 and 2

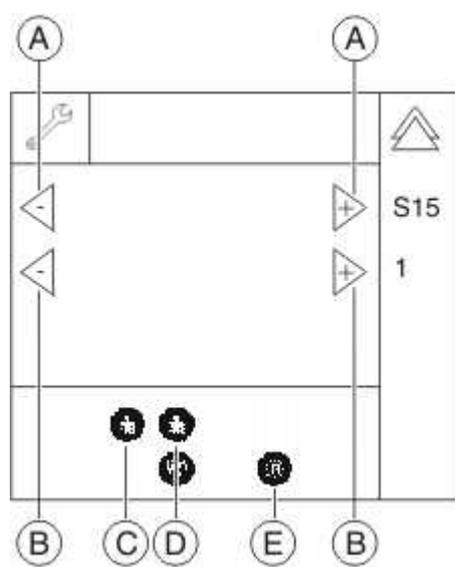
* SR=service routine, ** SHZ=security access

8.13.1 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.
 - 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 [→ 262].

8.14 S017: Configuration service

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
S017.5	yes	Select a language set
S017.6	yes	Enable/disable the remote control
S017.8	yes	Selecting the kV/mA level series
S017.12	yes	Preview image, enable/disable
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
S017.17	yes	Trigger save/restore function for DX61 data
S017.18	yes	Activation of the occlusal bite block function (for occlusal bite block only) NOTICE! This service routine may be selected only for units with an occlusal bite block; otherwise, the unit will malfunction!
S017.21	yes	Configuration of angle pre-selection (temporomandibular joint) for the TM1 and TM2 user programs

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

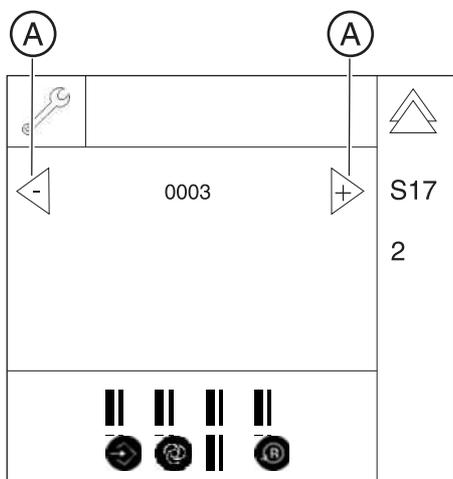
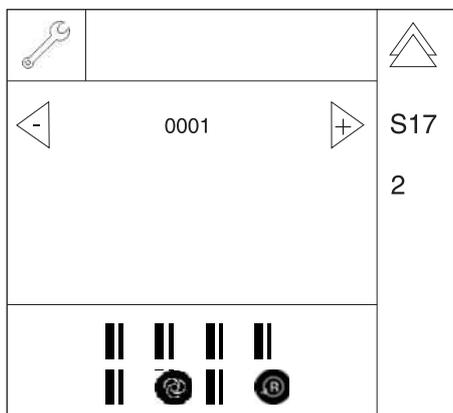
8.14.1 S017: Test step 2

Configuring the hardware version

Selection field	Code	Function
1	0001	Panoramic digital
	0003	Panoramic digital, ceph left digital
	0005	Panoramic digital, ceph right digital
	0201	XG 3D + panoramic digital*
	0203	XG 3D + panoramic digital, ceph left digital
	0205	XG 3D + panoramic digital, ceph right digital

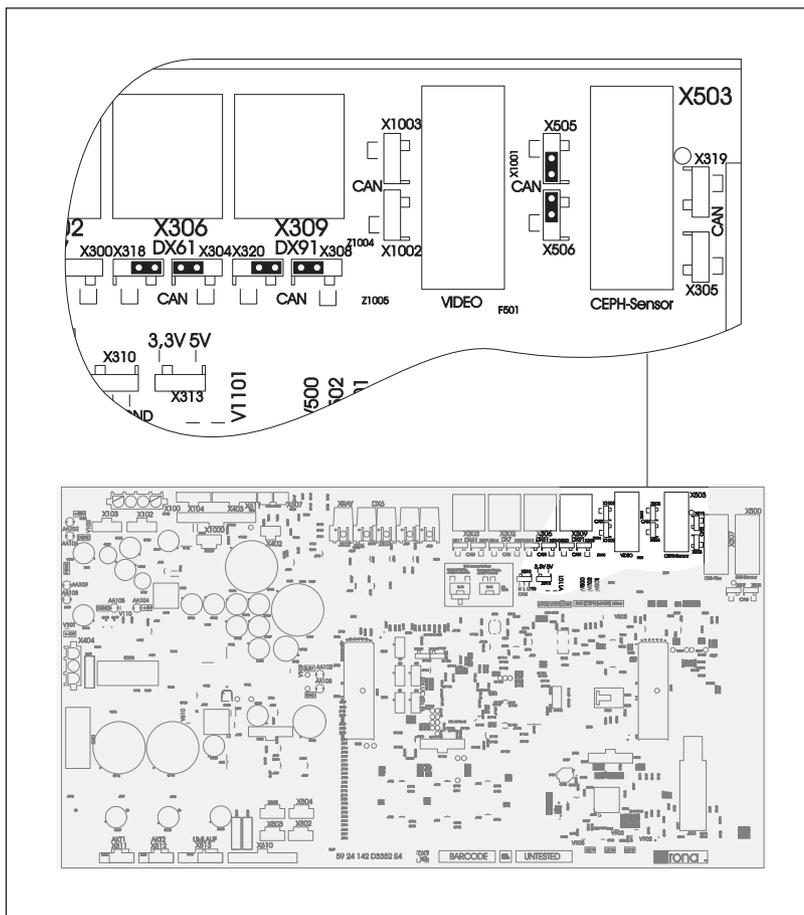
* Factory setting

1. Call service routine S017.2.
 - 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 hardware version in selection field 1 (see table).
 - Once the hardware version has been selected, the Memory key lights up.
3. Save the setting [→ 262].
4. Exit the service routine [→ 262].

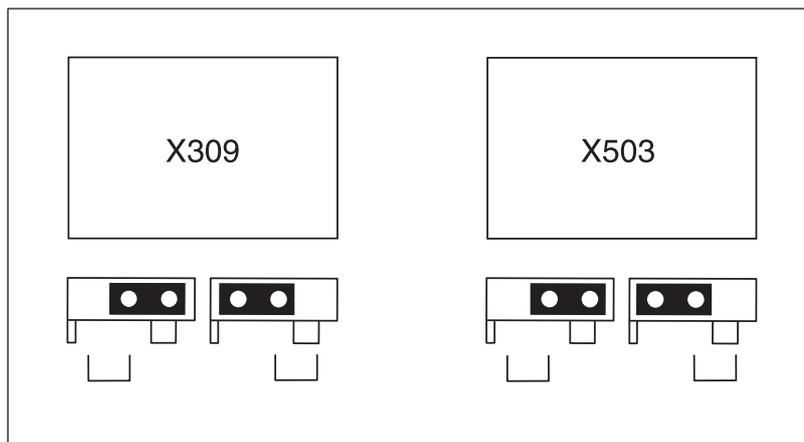
Checking the jumper position on board DX1



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

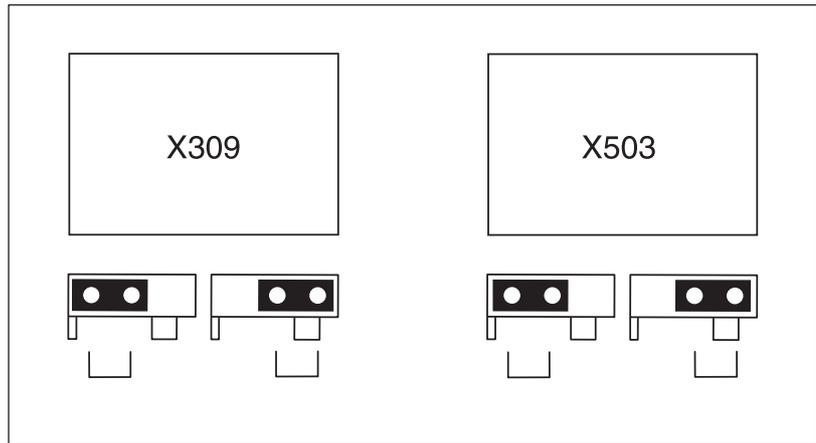
0001 = Panoramic digital

Jumper inside: Cephalometer not connected, i.e. connector not plugged in.



0003 and 0005 = Panoramic digital, ceph left and ceph right respectively

Jumper outside: Cephalometer connected, i.e. connector plugged in.



8.14.2 S017: Test step 3

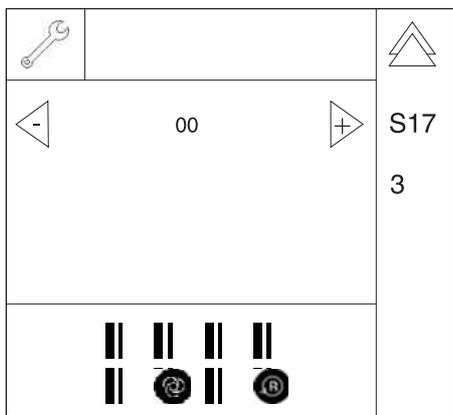
Enter the country group code

Selection field	Code	Function
1	00	Worldwide*
	01	Asia
	02	USA
	03	France CTDI-DAP

* 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.

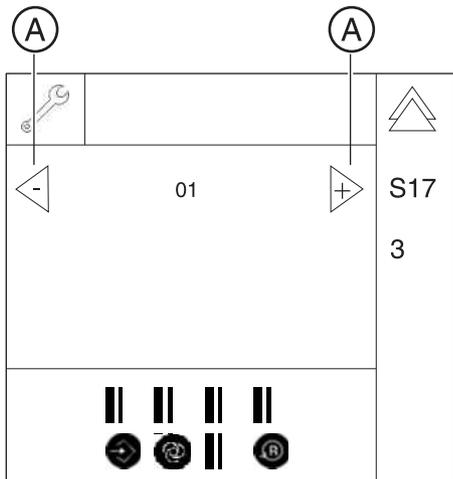


2. Use the arrow keys (A) to select the required country group code in selection field 1 (see table).

↳ Once the country group code has been selected, the Memory key lights up.

3. Save the setting [→ 262].

4. Exit the service routine [→ 262].



8.14.3 S017: Test step 4

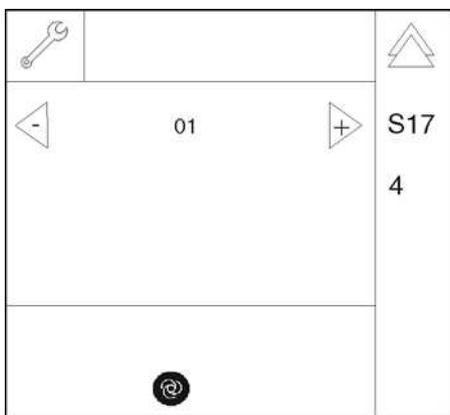
Select a language

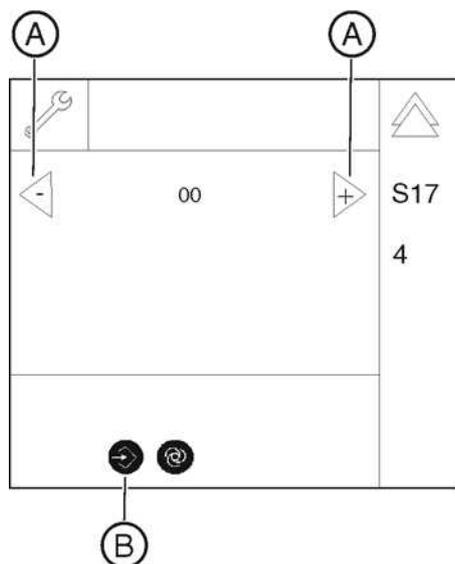
Selection field	Code	Function*
1	00	English
	01	German
	02	French
	03	Italian
	04	Dutch
	05	Spanish
	06	Russian
	08	Portuguese
	10	Chinese (PRC)
	11	Korean
	12	Japanese
	13	Chinese (Taiwan)

* Factory setting varies by order

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 [→ 262].
IMPORTANT: If the selected language is not in the installed language set (S017: Test step 5 [→ 309]), "English" is set by default.
4. Exit the service routine [→ 262].

8.14.4 S017: Test step 5

Select a language set

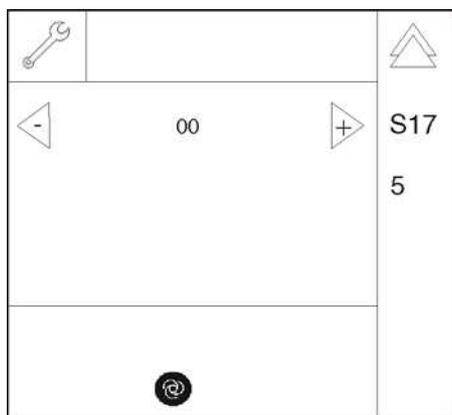
IMPORTANT

A software update must be performed [→ 62] every time the language set changes, in order to install the corresponding languages in the system.

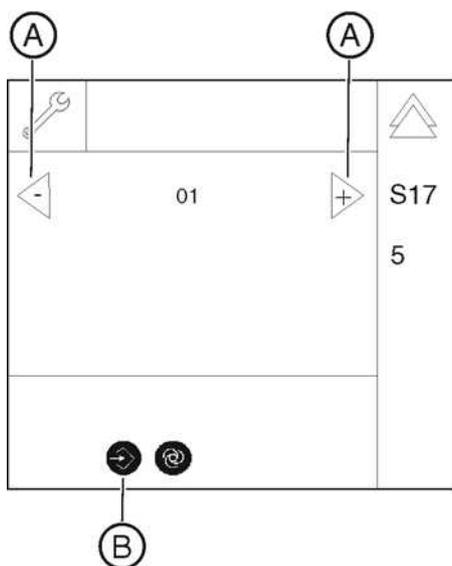
Selection field	Code	Function*
1	00	German, English, French, Italian
	01	German, English, French, Dutch
	02	German, English, Spanish, Russian
	03	German, English, Korean, Japanese
	04	German, English, Spanish, Portuguese
	05	German, English, Chinese (PRC), Chinese (Taiwan)

* Factory setting varies by order

1. Call service routine S017.5.



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 set in selection field 1 (see table).
 - Once the language set has been selected, the Memory key (B) lights up.
3. Save the setting [→ 262].
4. Exit the service routine [→ 262].

8.14.5 S017: Test step 6

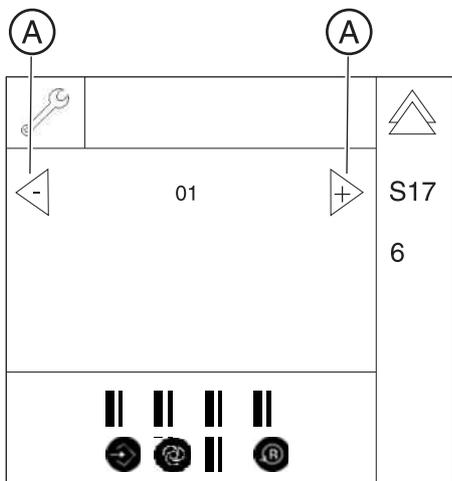
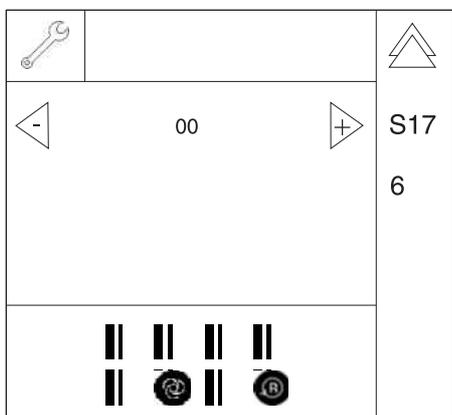
Activate / deactivate the remote control display

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 lights up.

3. Save the setting [→ 262].

4. Exit the service routine [→ 262].

8.14.6 S017: Test step 8

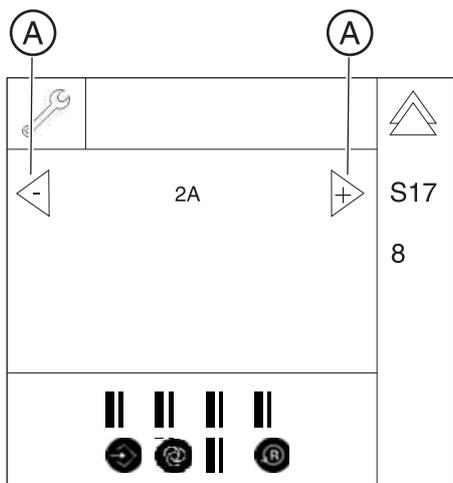
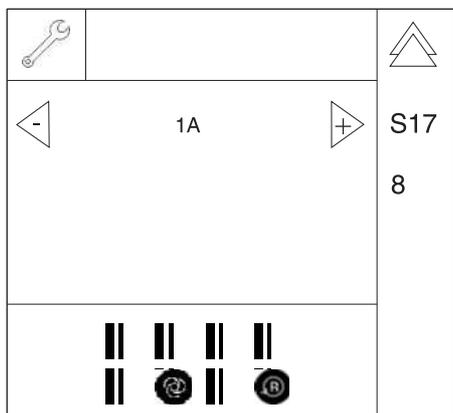
Selecting the kV/mA level series

Selection field	Code	Function
1	1A	16 mA series for pan 16 mA series for ceph
	2A	8 mA series for pan 16 mA series for ceph
	4A*	8 mA/16 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 lights up.

3. Save the setting [→ 262].

4. Exit the service routine [→ 262].

8.14.7 S017: Test step 12

Enabling/disabling the preview image

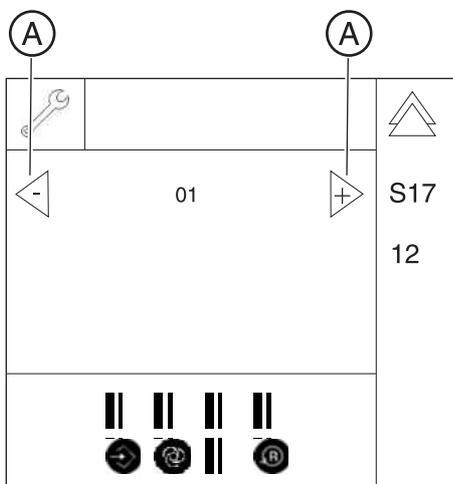
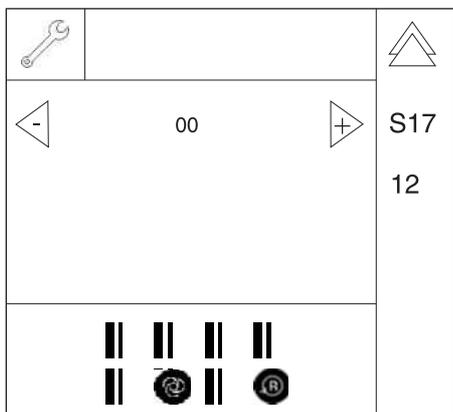
IMPORTANT

The preview image is automatically disabled for volume exposures, regardless of the setting in service routine S017.12.

Selection field	Code	Function
01	00	Preview image disabled
	01	Preview image enabled*

* Factory setting

- Call service routine S017.12.
 - Once the service routine has been selected, the code for the current setting is displayed in selection field 1.
- 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 lights up.
- Save the setting [→ 262].
- Exit the service routine [→ 262].



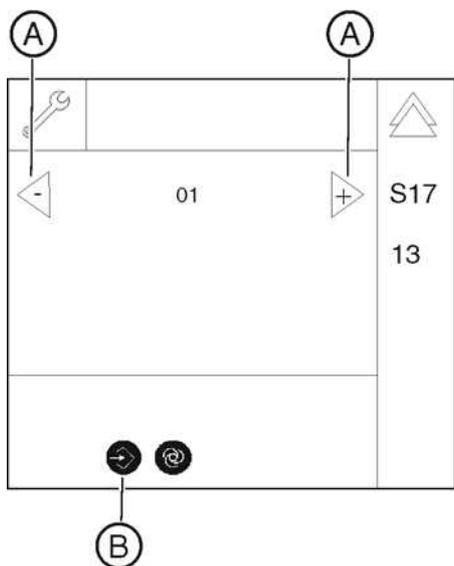
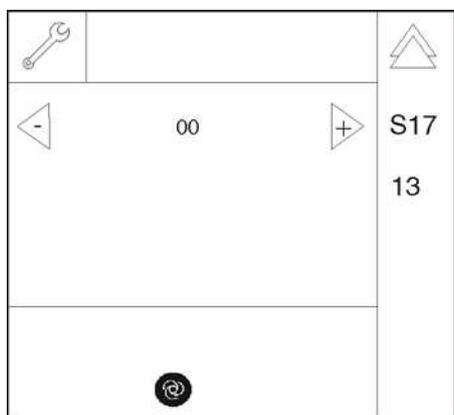
8.14.8 S017: Test step 13

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 [→ 262].
4. Exit the service routine [→ 262].

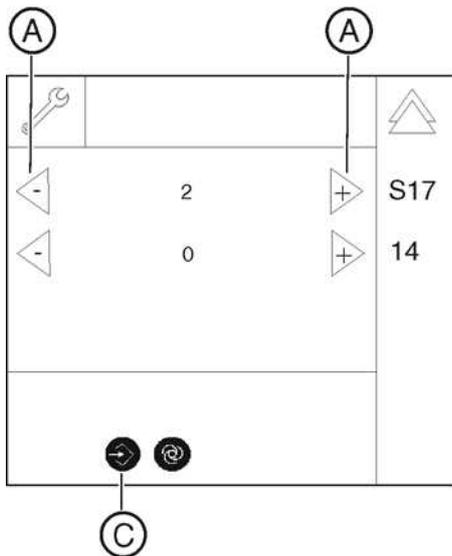
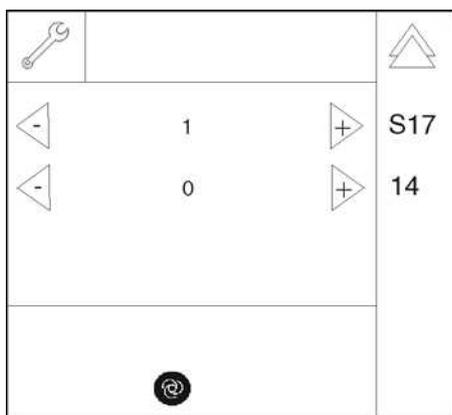
8.14.9 S017: Test step 14

Enable/disable certain lines of the welcome screen

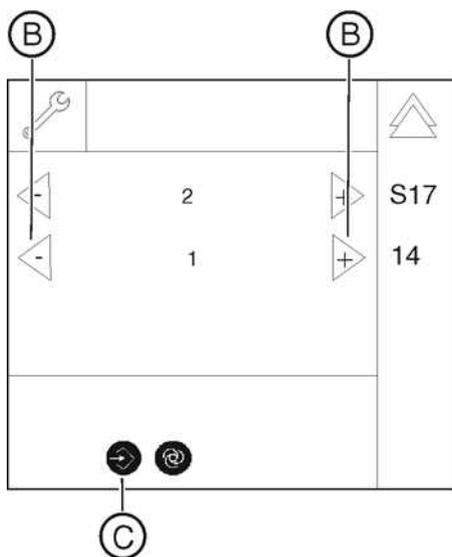
Selection field	Code	Meaning/Function
1	1	First name
	2	Last name
	3	Date of birth
	4	Patient number
2	0	Inactive*
	1	Active

* 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 the 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 [→ 262].
5. Exit the service routine [→ 262].

8.14.10 S017: Test step 15

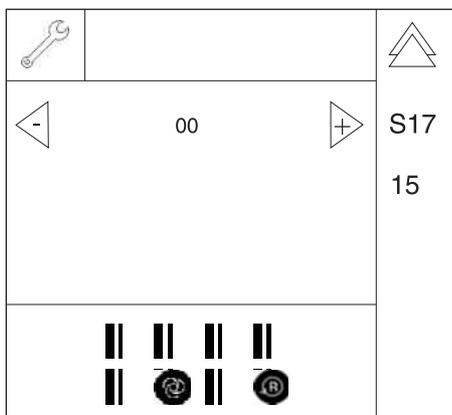
Selection field	Code	Function
1	00	Acoustic signal indicating the end of the exposure is disabled
	01	Acoustic signal indicating the end of the exposure is enabled*

* 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.

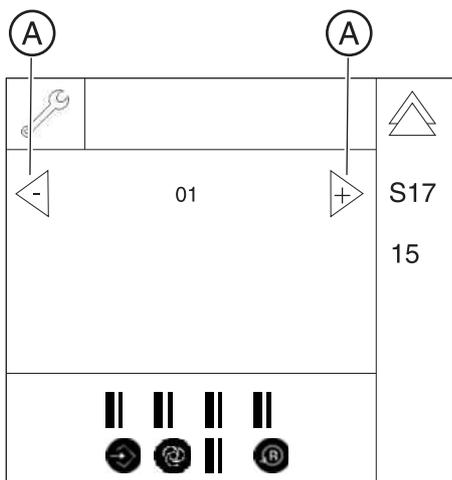


2. Use the arrow keys (A) to select the required setting in selection field 1 (see table).

↳ Once the required setting has been selected, the Memory key lights up.

3. Save the setting [→ 262].

4. Exit the service routine [→ 262].



8.14.11 S017: Test step 17

Trigger save/restore function for DX61 data

Selection field	Parameter/Display	Meaning/Range of values
1	FILTER	Type of filter*
	MECHANICS	Type of mechanics
2	For FILTER setting:	
	01	0.8 mm Cu (worldwide)
	02	1.8mm Cu (BRD)*
	For MECHANICS setting:	
	01	ORTHOPHOS XG3D ^{ready}
	02	ORTHOPHOS XG 3D*
3	61 → 11	Direction of data transfer = DX61 → DX11
	11 → 61	Direction of data transfer = DX11 → DX61

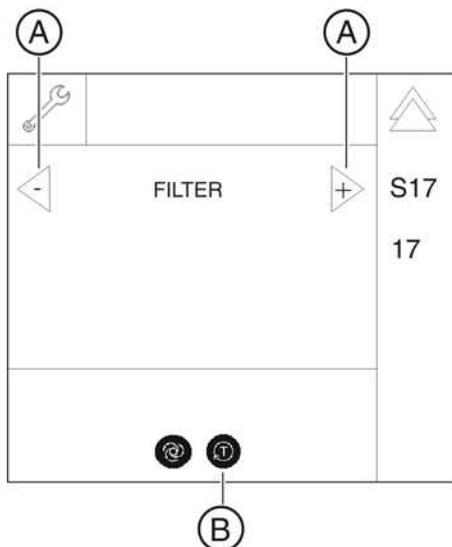
* factory settings

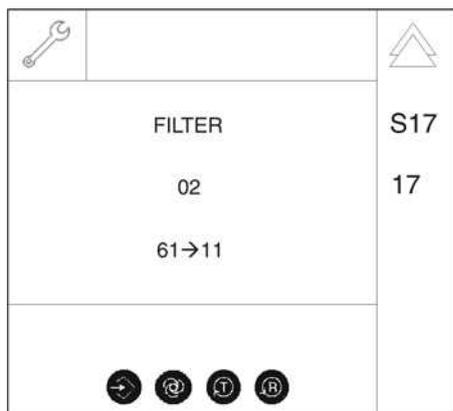
IMPORTANT

Filter type "02" (1.8 mm Cu) and mechanics type "02" (ORTHOPHOS XG 3D) must be set in the ORTHOPHOS XG 3D volume tomograph.

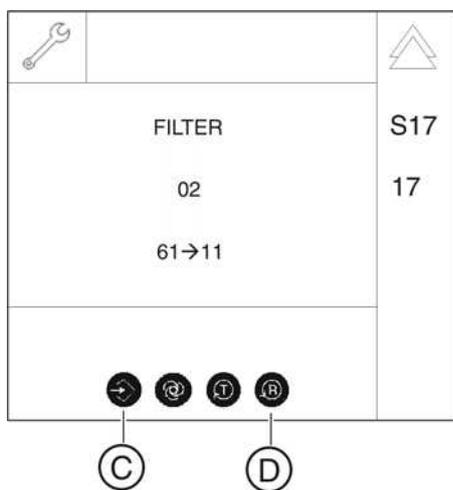
1. Call service routine S017.17.
 - Once the service routine has been selected, "FILTER" is displayed in selection field 1.
2. Use the arrow keys (A) to select which type ("FILTER" or "MECHANICS") you wish to check in selection field 1.

NOTICE! Check the need for adjustment for both "FILTER" and "MECHANICS" one after the other.





The filter or mechanics type configuration is not identical on modules DX11 and DX61.



3. Confirm your selection by pressing the T key (B).
 - ↳ The code for the standard setting (filter, and mechanics type) is displayed in selection field 2 (see table).
 - ↳ The transfer direction for the subsequent recovery (adjustment) of the data is displayed in selection field 3 (see table). Pressing the T key (B) reverses the data transfer direction.
4. Perform the adjustment for the second type ("FILTER" or "MECHANICS").

IMPORTANT

Adjustment can only be performed once for each type ("FILTER" or "MECHANICS"). If the configuration on both modules is identical, it is only displayed but cannot be modified.

Scenario 1: After replacing the DX11 board or the complete diaphragm mechanism ex works: In a scenario like this, the data must be transferred from the DX61 board to the DX11 board.

1. Touch the T key (B) to set the transfer direction "DX61 → DX11".
2. To transfer and save the DX61 data to board DX11, press the Memory key (C) (R key (D) lights up) followed by the R key (D).
 - ↳ The data is saved from board DX61 to board DX11.

Scenario 2: After replacing the DX61 board in an installed diaphragm mechanism. In a scenario like this, the data must be transferred from the DX11 board to the DX61 board.

1. Touch the T key (B) to set the transfer direction "DX11 → DX61".
2. To transfer and save the DX11 data to board DX61, press the Memory key (C) (R key (D) lights up) followed by the R key (D).
 - ↳ The data is saved from board DX11 to board DX61.
3. Exit the service routine [→ 262].

IMPORTANT

If no valid information is available on the DX11 board, "initial" is displayed as the filter type on the Easypad. This value cannot be transferred; it can only be overwritten.

The filter or mechanics type configuration is identical on modules DX11 and DX61.

		
FILTER		S17
02		17
		

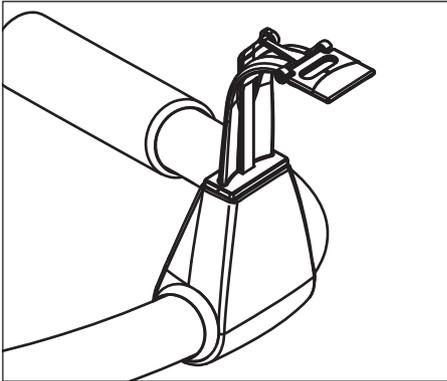
The configuration is read-only and cannot be edited.

The filter or mechanics type configuration is not valid on either module, DX11 or DX61.

If there is not a valid configuration on either of the two modules, use the arrow keys (A) to select the filter or mechanics type manually in selection field 2.

8.14.12 S017: Test step 18 (occlusal bite block only)

Activation of occlusal bite block function



When the occlusal bite block function is activated, all previously existing calibration values are overwritten with default data (factory setting) where applicable. Once the function has been activated, the unit sends error message E1 11 18 to indicate the need for adjustment.

Following activation of the function, service routine S018.9 also has to be run to check or execute the adjustment function [→ 334].

A check also has to be made to ascertain whether the creep speed required for operation has been configured on this unit. To do this, run service routine S018.10 [→ 336].

Error message E1 11 18 disappears as soon as the two service routines mentioned above have been performed.

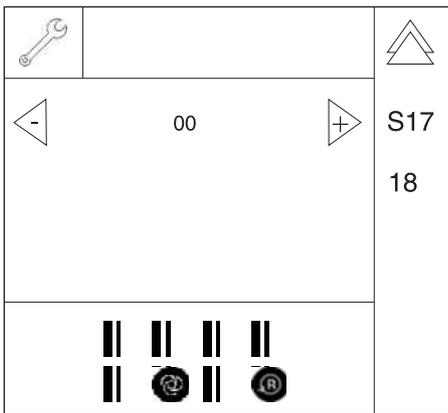
Should the customer wish to set a nominal angle deviating from the factory setting (7°), make the corresponding configuration settings via service routine S018.7 [→ 330]).

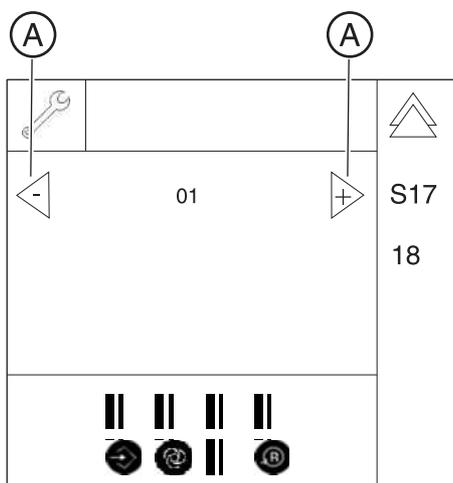
Selection field	Code	Function
1	00	Occlusal bite block function deactivated*
	01	Occlusal bite block function activated

* Factory setting

1. Call service routine S017.18 [→ 321].

↳ 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 lights up.
3. Save the setting [→ 262].
4. Exit the service routine [→ 262].

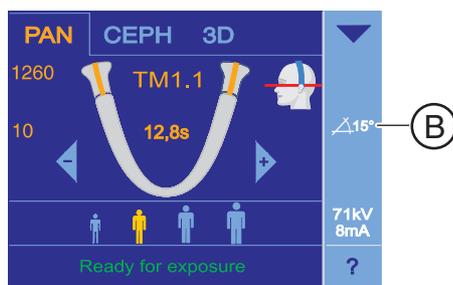
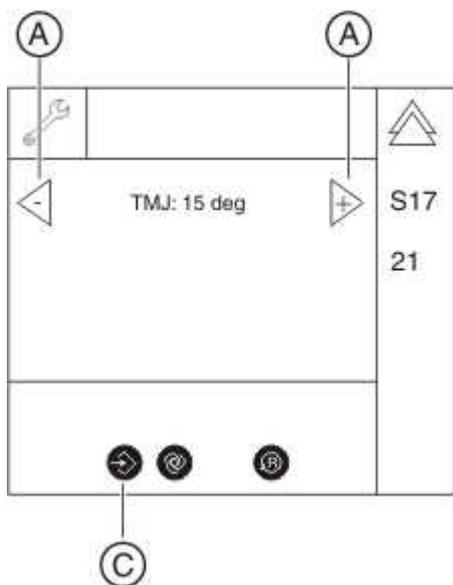
8.14.13 S017: Test step 21

Configuration of angle pre-selection (temporomandibular joint) for the TM1 and TM2 user programs

Selection field	Parameter	Function
1	Angle pre-selection	00 deg* 05 deg 10 deg 15 deg

* Factory setting

1. Call service routine S017.21.
 - Once the service routine has been selected, the current angle pre-selection setting is displayed in selection field 1.
2. Use the arrow keys (A) to select the required angle pre-selection in selection field 1 (see table).
 - Once the country group code has been selected, the Memory key (C) lights up.
3. Save the setting [→ 262].



- Once the angle pre-selection is displayed on the touchscreen on the control panel (B) (see also Operating Instructions).
4. Exit the service routine [→ 262].

8.15 S018: Service for height adjustment

SR*	SHZ**	Function
S018		Service for height adjustment
S018.2	No	Setting the maximum travel height
S018.3	No	Undoing the maximum travel height setting
S018.4	No	Checking 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	Setting the nominal angle for the occlusal bite block (as required by the customer) (occlusal bite block only) NOTICE! This routine may only be selected for units with occlusal bite block; otherwise, the unit will malfunction!
S018.8	No	Function test of the occlusal bite block (occlusal bite block only) NOTICE! This routine may only be selected for units with occlusal bite block; otherwise, the unit will malfunction!
S018.9	No	Adjustment of the AD acceptance angle values and the zero point NOTICE! This routine may only be selected for units with occlusal bite block; otherwise, the unit will malfunction!
S018.10	No	Setting the PWM values for the height adjustment creep speed (PWM=Pulse Width Modulation) NOTICE! This routine may only be selected for units with occlusal bite block; otherwise, the unit will malfunction!

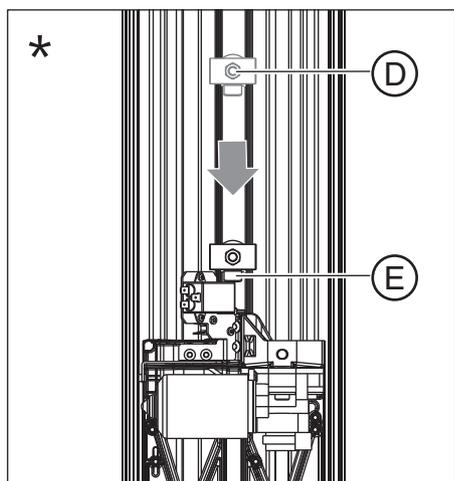
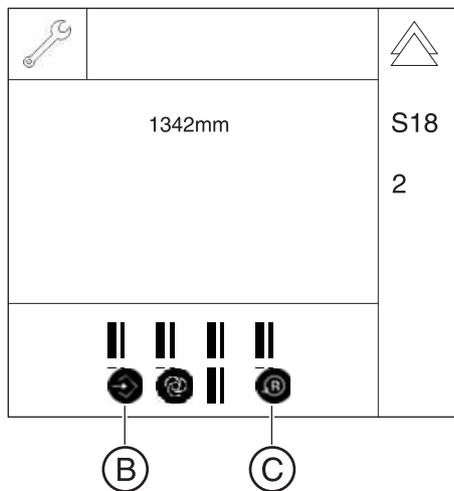
* SR=service routine, ** SHZ=security access

8.15.1 S018: Test step 2



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**).

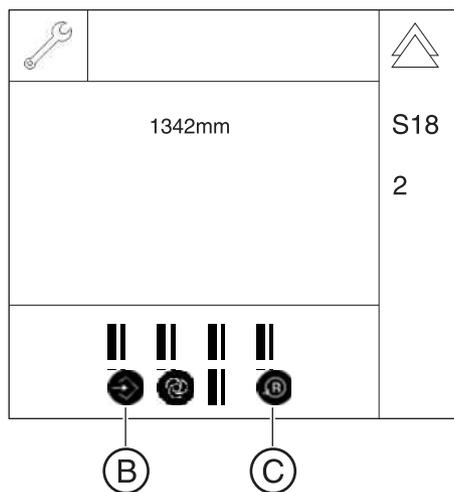


4. Set the mechanical limit stop at the unit:
Loosen nut (**D**) and move mechanical limit stop (**E**) for the limit switch until it engages. Tighten the nut (**D**) again.
The next time the UP key is pressed, the unit stops 10 mm below the limit switch.
5. Exit the service routine [→ 262].

8.15.2 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 maximum travel height stored is displayed in selection field 1.
 - ↳ The Memory key (**B**) lights up.
2. To lift the limit for the maximum travel height setting, touch the Memory key (**B**) (R key (**C**) lights up) followed by the R key (**C**).
3. Exit the service routine [→ 262].

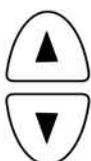
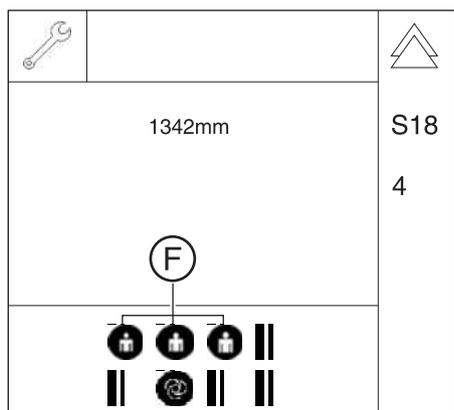


8.15.3 S018: Test step 4

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

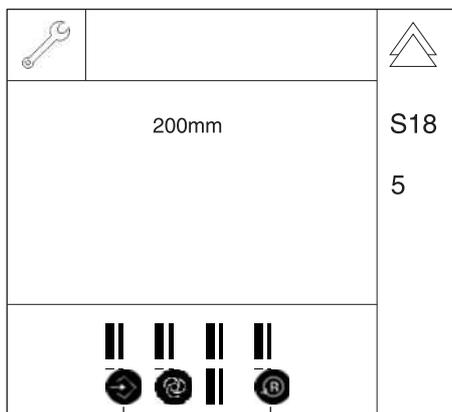
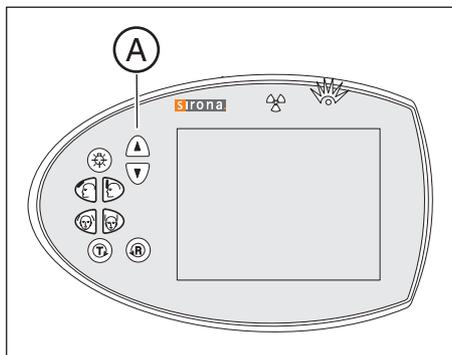


1. Call service routine S018.4.
 - ↳ Once the service routine has been selected, the current height position is displayed in selection field 1.
 - ↳ Patient symbol keys 1 to 3 (F) show the switching state of the limit switches (see table)
 If the patient symbol key is lit, the corresponding switch is activated, i.e. the unit is at a position value greater than 1500.
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 [→ 262].

8.15.4 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)!



(B)

(C)

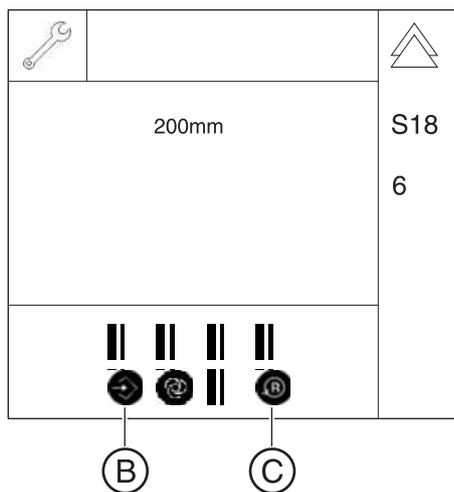
1. In user mode, move the unit to the required minimum travel height by pressing the Up/Down keys (A).
2. Call service routine S018.5.
 - ↳ Once the service routine has been selected, the current height position is displayed in selection field 1.
 - ↳ The Memory key (B) lights up.
3. To save the minimum travel height, touch the Memory key (B) (R key (C) lights up) followed by the R key (C).
4. Exit the service routine [→ 262].

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!

8.15.5 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 minimum travel height stored is displayed in selection field 1.
 - ↳ The Memory key (**B**) lights up.
2. To undo the minimum travel height setting, touch the Memory key (**B**) (R key (**C**) lights up) followed by the R key (**C**).
3. Exit the service routine [→ 262].



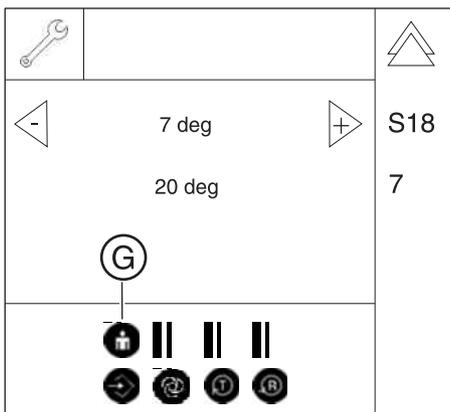
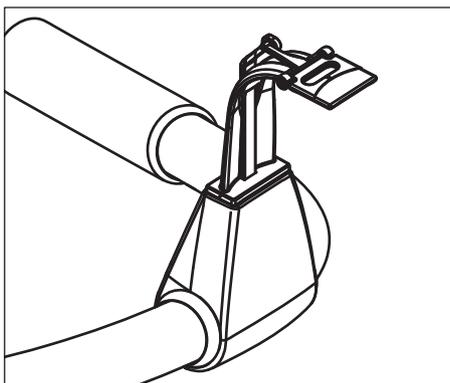
8.15.6 S018: Test step 7 (occlusal bite block only)

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

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

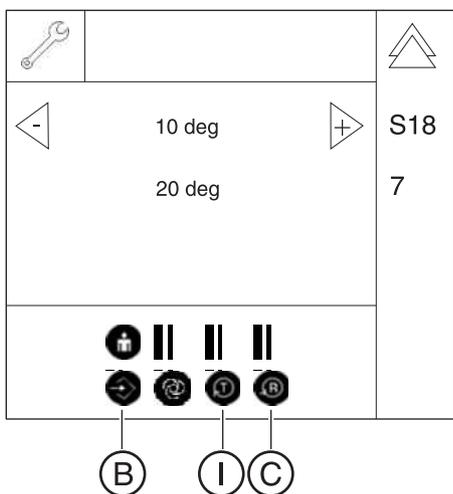
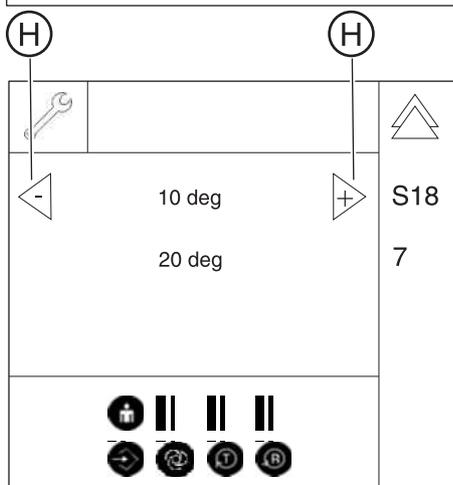
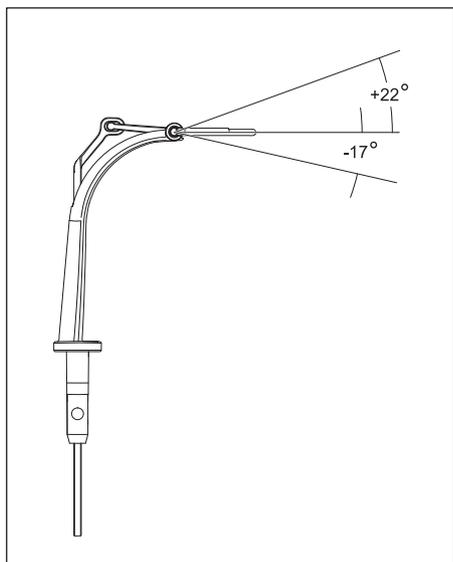
Symbol on the control panel	Status	Meaning
Patient symbol key 1 (G)	visible	Occlusal bite block connected
	not visible	Occlusal bite block not connected

Selection field	Parameter/Display	Range of values
1	Nominal angle of the bite block plate	-17° to +22°
2	Measured deflection of the bite block plate	-17° to +22°



1. Call service routine S018.7.

- ↪ The currently measured angle of the bite block plate is displayed and permanently updated in selection field 2 (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) to set the required nominal angle in selection field 1 (possible range: -17° to $+22^{\circ}$).

Tip: You can also set the required angle manually on the occlusal bite block and transfer this angle to selection field 1 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.

3. To save the nominal value, touch the Memory key (B) (R key (C) lights up) followed by the R key (C).
4. Exit the service routine [→ 262].

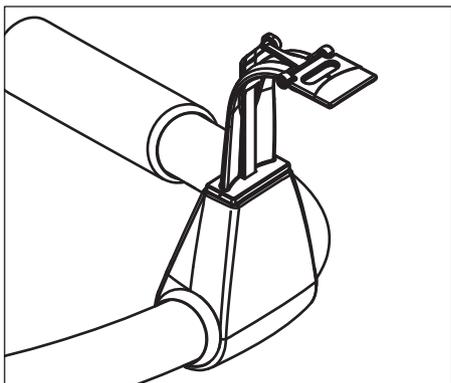
8.15.7 S018: Test step 8 (occlusal bite block only)

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

Functional test of the occlusal bite block

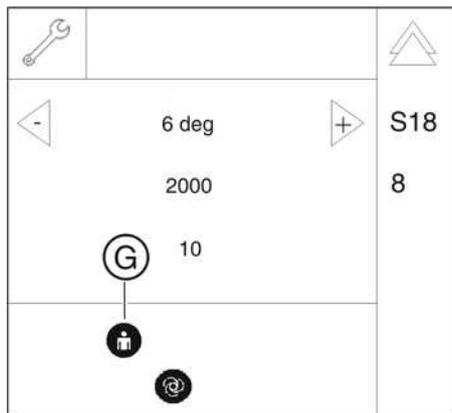
Symbol on the control panel	Status	Meaning
Patient symbol key 1 (G)	lit	Occlusal bite block connected
	not lit	Occlusal bite block not connected

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 [→ 333]



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 [→ 333]").
- ↪ The display of patient symbol key 1 (G) indicates whether or not the bite block is connected (see table).

2. Exit the service routine [→ 262].

8.15.7.1 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. Check cabling and plug connections on board DX1 and occlusal bite block electronics.
03	Persistent ADC values	
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	
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

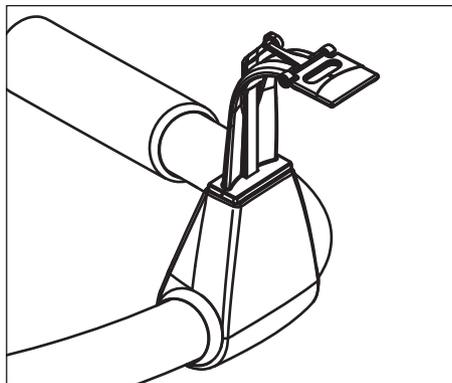
-17° → AD = 3124

The settings may differ unit specifically.

8.15.8 S018: Test step 9 (occlusal bite block only)

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

Adjustment of the AD acceptance angle values and the zero point

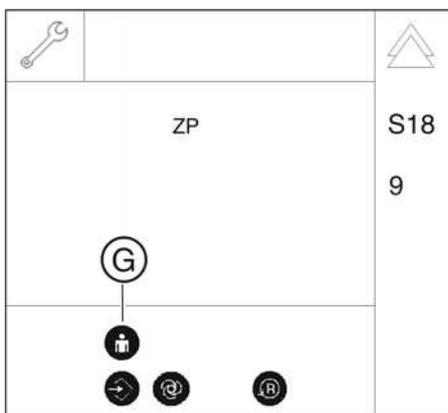


In the adjustment of the AD acceptance angle values, three AD values must be adjusted and saved:

- *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)	lit	Occlusal bite block connected
	not lit	Occlusal bite block not connected

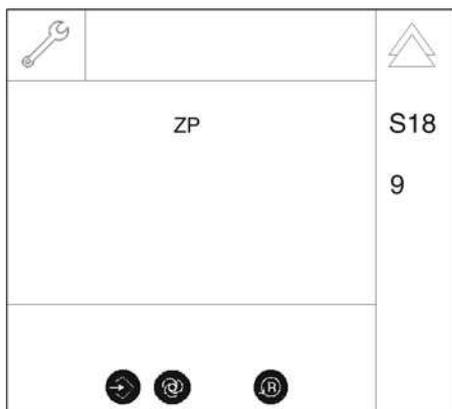
Selection field	Display	Meaning
1	ZP	Zero point
2	U	Upper value
3	S	Lower value



➤ Call service routine S018.9.

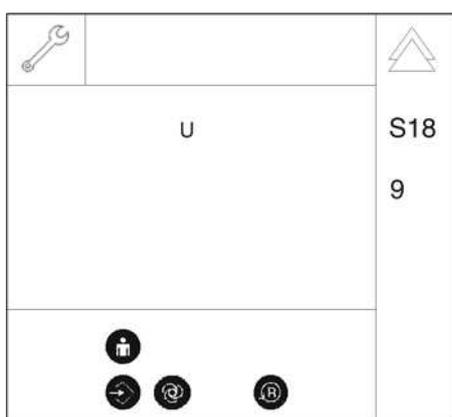
- ↪ The data type intended for the next storage function is displayed in selection field 1.
- ↪ The display of patient symbol key 1 (G) indicates whether or not the bite block is connected (see table).

ZP: Adjusting and saving the zero point



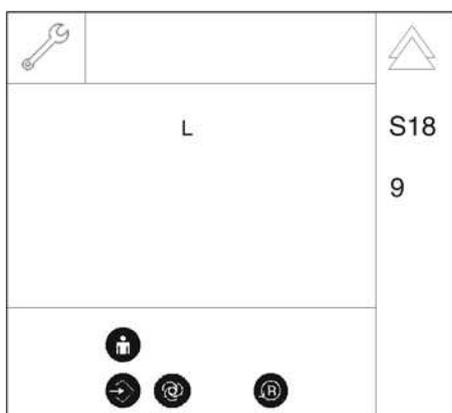
1. Take the occlusal bite block out of the bite block holder.
 - ↳ "ZP" (for zero point) is displayed in selection field 1.
 - ↳ The Memory key lights up.
2. To save the zero point "ZP", first press the Memory key (the R key lights up) and then the R key.
 - ↳ The value for the zero point "ZP" is accepted.

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.

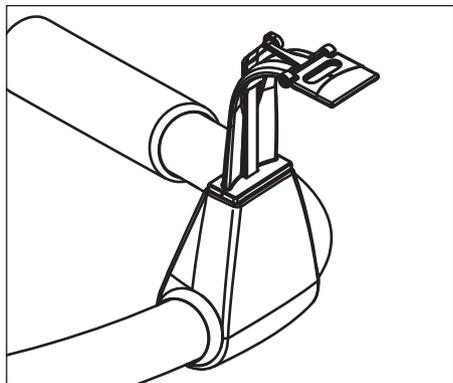
Checking the adjustment

1. Check the adjustment via service routine S018.7 [→ 330]. To do this, move the bite block plate and check whether the adjustment range is between -17° and $+22^{\circ}$.
2. Exit the service routine [→ 262].

8.15.9 S018: Test step 10 (occlusal bite block only)

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

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.

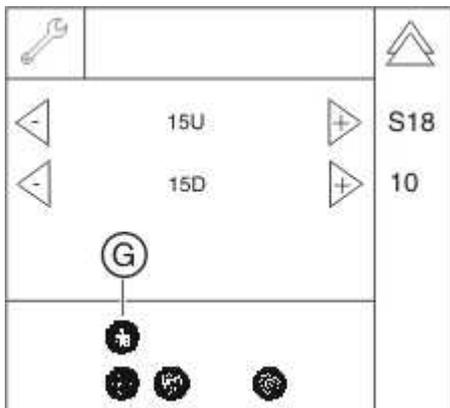
Symbol on the control panel	Status	Meaning
Patient symbol key 1 (G)	lit	Occlusal bite block connected
	not lit	Occlusal bite block not connected

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 [→ 262].



8.16 S020: Service for temple support

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

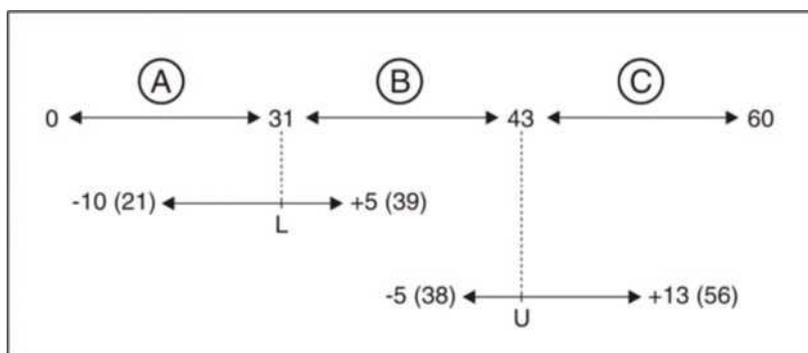
* SR=service routine, ** SA=security access

8.16.1 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.



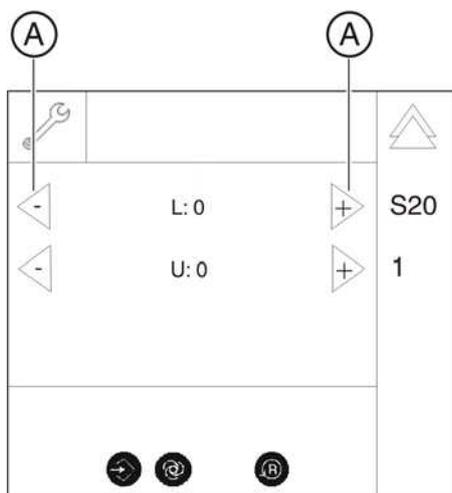
The switch-over point between large ↔ normal is referred to as the lower switch-over point (marked L = Lower) and the switch-over point between normal ↔ small as the upper switch-over point (marked U = Upper).

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

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

* factory settings

1. Call service routine S020.1.
 - ↳ 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 [→ 262].
4. Exit the service routine [→ 262].

8.17 S021: Service for motor-driven diaphragm

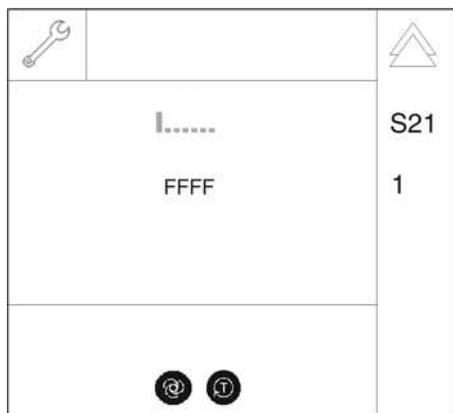
SR*	SHZ**	Function
S021		Service for motor-driven diaphragm
S021.1	No	Initialization of diaphragm axis

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

8.17.1 S021: Test step 1

Initialization of diaphragm axis

Selection field	Display	Meaning
1	Inactive progress indicator	Ready for initialization
	Active progress indicator	Initialization is running
2	FFFF	Ready for initialization
	0000	Initialization OK
	EEEE	Initialization faulty

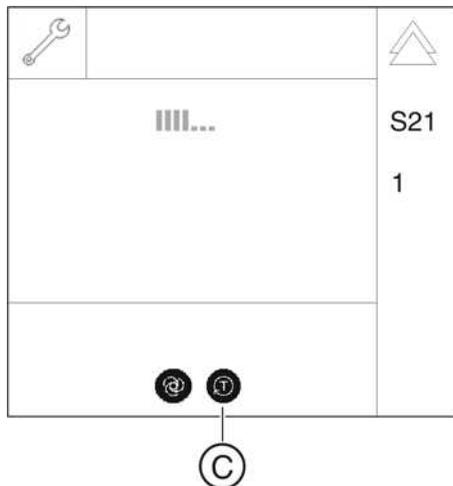


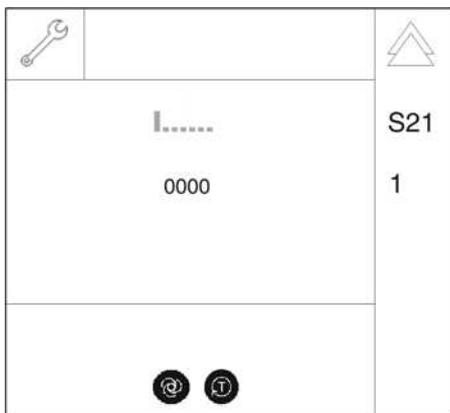
1. Call service routine S021.1.

↳ An inactive progress indicator in selection field 1 and the message "FFFF" in selection field 2 signal that the system is ready for initialization of the diaphragm axis.

2. Touch the T key (C).

↳ Automatic axis initialization of the diaphragm starts.





↪ When the axis initialization is completed, the result is displayed in selection field 2 (see table). The initialization can be restarted at any time by touching the T key.

3. Exit the service routine [→ 262].

8.18 S032: Sensor test

SR*	SA**	Function
S032		Test function for sensor
S032.10	No	Signal test for sensor in pan slot (combisensor)
S032.50	No	Self-test of 3D image data path
S032.56	No	Temperature sensor test, DX88

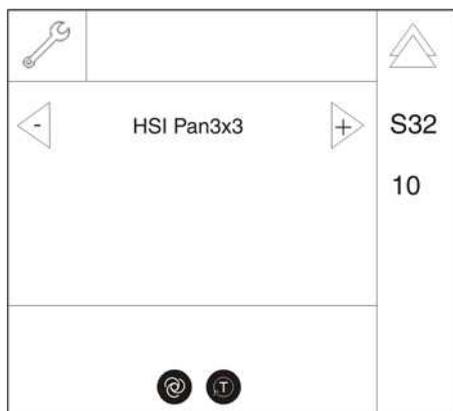
8.18.1 S032: Test step 10

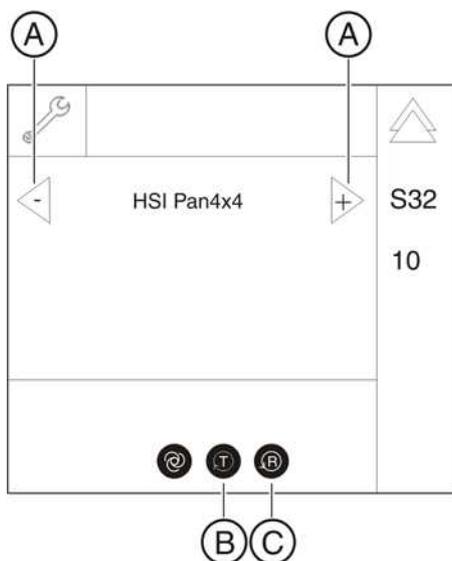
Signal tests for sensor in pan slot (combisensor)

Selection field	Parameters	Function
1	HSIPan3x3	Sensor in Pan mode with synchronized readout sequence 3x3 clocked out
	HSIPan4x4	Sensor in Pan mode with synchronized readout sequence 4x4 clocked out

1. Call service routine S032.10.

↳ After the service routine is selected, selection field 1 displays the current selection for synchronized readout sequence (see table).





2. Use the arrow keys (A) in selection field 1 to select the mode of the required synchronized readout sequence.
 - ↳ Once the mode for the synchronized readout sequence has been selected, the T key (B) lights up. If the R key (C) should light up first, the sensor holder must first be moved to the corresponding position. To do so, press the R key.

IMPORTANT

The sensor must be plugged in for at least 15 seconds before starting the synchronized readout sequence.

NOTICE

Risk of damage to electronics

The sensor must not be pulled out during active synchronized readout sequence! Otherwise the electronics can be damaged.

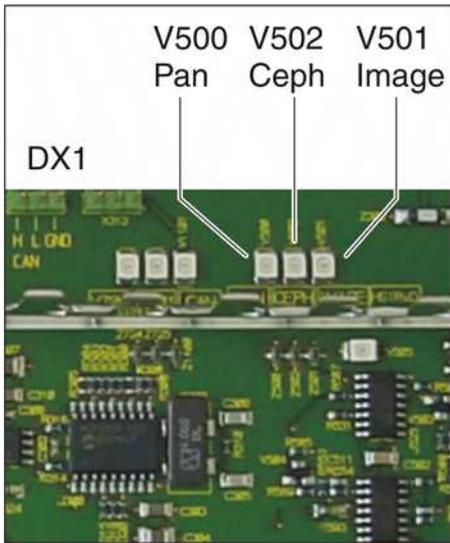
3. Touch the T key (B).
 - ↳ The synchronized readout sequence starts.
 For additional information, see S032: Test step 10: Explanations on the test procedure [→ 343].
 - ↳ The result of the synchronized readout sequence is displayed (top image: incorrect synchronized readout sequence, bottom image: correct synchronized readout sequence) (see also S032: Test step 10: Result of synchronized readout sequence [→ 343]).

HSI-State		65
Image Size	: NOK : 26320	
Row Length	: OK : 1314	
Nr of Rows	: NOK : 10	
CRC Errors	: NOK : 10	
Exp.-ThermTMO	: NOK : 1	
Exp.-ThermCRC	: OK : 0	

HSI-State		65
Image Size	: OK : 8134964	
Row Length	: OK : 2185	
Nr of Rows	: OK : 1859	
CRC Errors	: OK : 0	
Exp.-ThermTMO	: OK : 0	
Exp.-ThermCRC	: OK : 0	

4. Exit the service routine [→ 262].

8.18.1.1 **S032: Test step 10: 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, ceph) during the synchronized readout sequence.

Image LED V501

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

Ceph LED V502

LED is lit	Sensor in ceph slot / standby mode
LED not lit	No sensor in ceph slot / standby mode
LED not lit	Sensor in ceph slot / synchronized readout sequence active

Pan LED V500

LED is lit	Sensor in pan slot / standby mode
LED not lit	No sensor in pan slot / standby mode
LED not lit	Sensor in pan slot / synchronized readout sequence active

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

8.18.1.2 **S032: Test step 10: Result of synchronized readout sequence**

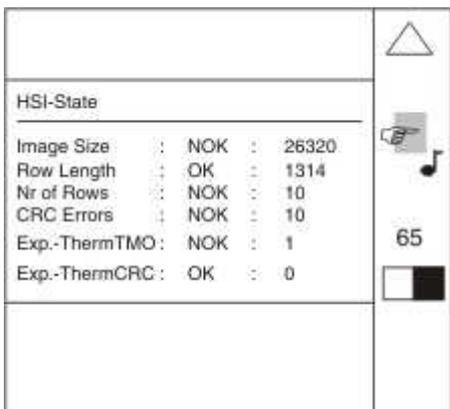
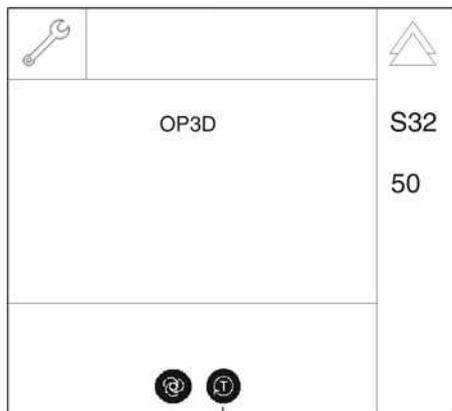


Image size	Overall size of the image
Row length	Image height in pixels
No of rows	Number of image rows
CRC errors	Number of recognized CRC errors during the synchronized readout sequence
Exp.-therm TMO	Exposure was canceled due to a timeout while reading the image data
Exp.-therm CRC	Exposure was canceled due to an excessive number of CRC errors

8.18.2 S032: Test step 50

Self-test of 3D image data path



1. Call service routine S032.50.
 - ↳ "OP3D" is displayed in selection field 1.
2. Press the T key to start the DX88 self-test.
 - ↳ The self-test lasts approx. 10-15 seconds. A progress bar is displayed as long as the self-test is active.



- ↳ After the self-test is complete, the result of the test is shown in selection field 1.
3. Analyze the result and take any troubleshooting measures, if necessary (see Possible results of self-test and troubleshooting measures [→ 344]).
4. Exit the service routine [→ 262].

8.18.2.1 Possible results of self-test and troubleshooting measures

"Success"

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

"ETimeout"

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

"Unknown"

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

"No Image"

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 CAN bus [→ 163], specifically the CAN bus connection to DX88
- Replace board DX88.
- Replacing board DX11

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

"Transfer"

No image could be retrieved from DX88 during the self-test. If no further error messages (see title bar of Easypad) occur, please implement the following tests and measures:

- Check CAN bus [→ 163], specifically the CAN bus connection to DX88
- Replace board DX88.
- Replacing board DX11

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

"Data"

The content of the image data received was incorrect. If no further error messages (see title bar of Easypad) occur, please implement the following tests and measures:

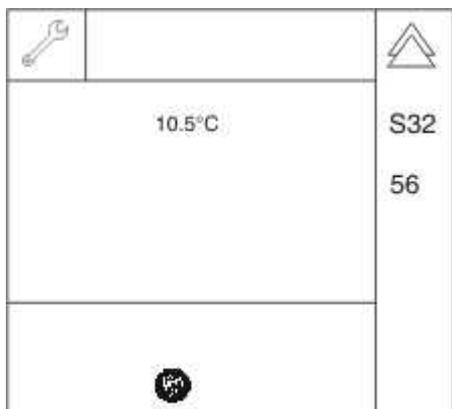
- Check cable connection to board DX88
- Replace board DX88.
- Replace board DX1 / DX11

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

8.18.3 S032: Test step 56

Temperature sensor test, DX88

1. Call service routine S032.56.
 - ↳ After the service routine has been selected, selection field 1 displays the temperature value in °C on the board DX88. The display is updated once per second.
2. Exit the service routine [→ 262].



8.19 S033: Test of ceph image path without SIDEXIS XG (for ceph units only)

SR*	SHZ**	Function
S033		Test of ceph image path without SIDEXIS XG
S033.10	No	Signal tests for sensor in ceph slot

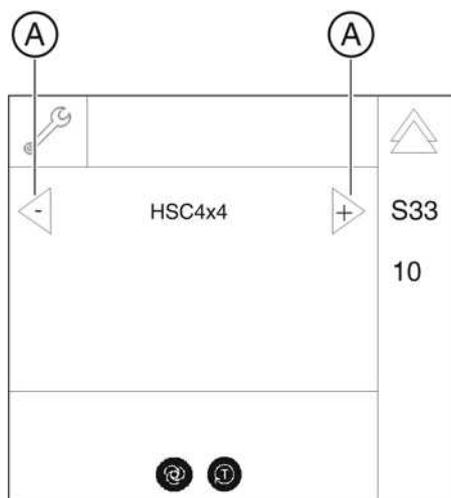
* SR=service routine, ** SHZ=security access

8.19.1 S033: Test step 10

Signal tests for sensor in ceph slot

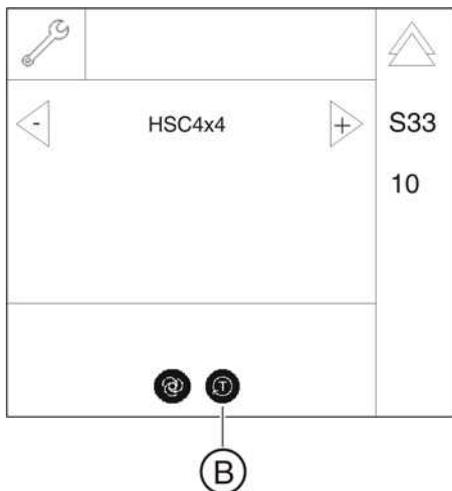
Selection field	Parameters	Function
1	H5IC4x4	Sensor in ceph mode with synchronized readout sequence 4x4 clocked out without ceph scan
	H5IC4x4M	Sensor in ceph mode with synchronized readout sequence 4x4 clocked out with ceph scan

1. Call service routine S033.10 [→ 262].
 - ↳ 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.

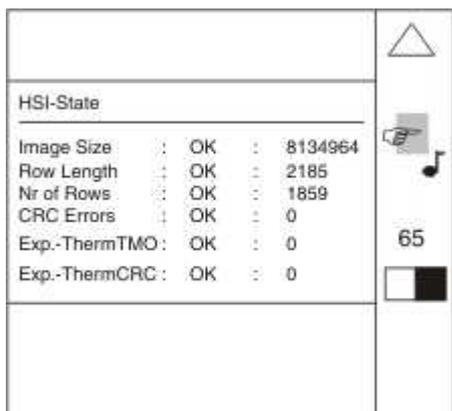


IMPORTANT

If 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 [→ 343].
4. Exit the service routine [→ 262].

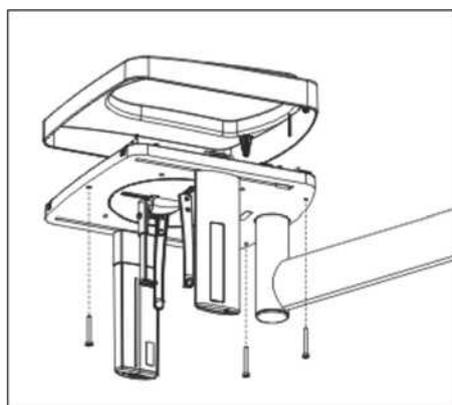
8.20 S034: Service for the digital cephalometer

SR*	SHZ**	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 C3F

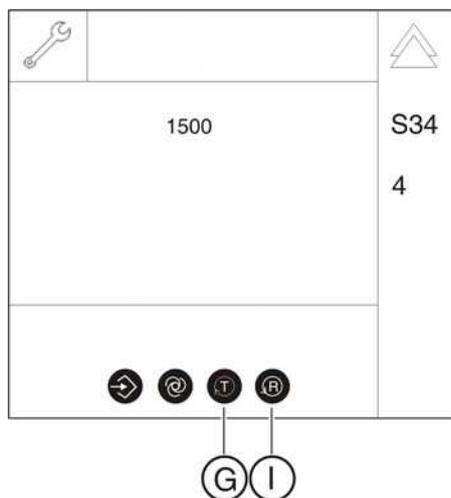
* SR=service routine, ** SHZ=security access

8.20.1 S034: Test step 4

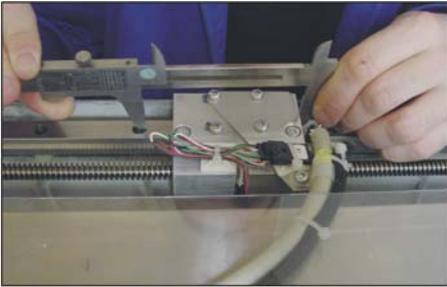
Display/calibrate center position of Ceph scan sensor axis



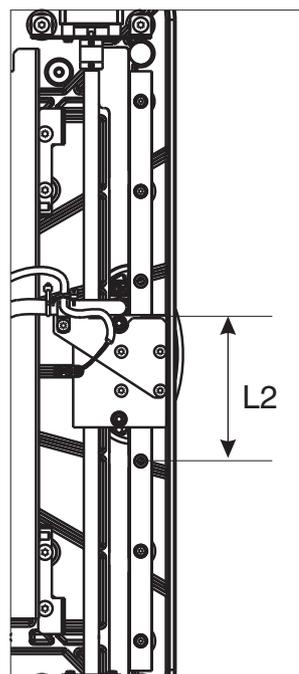
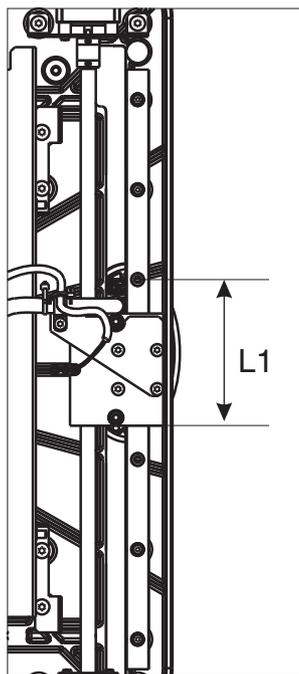
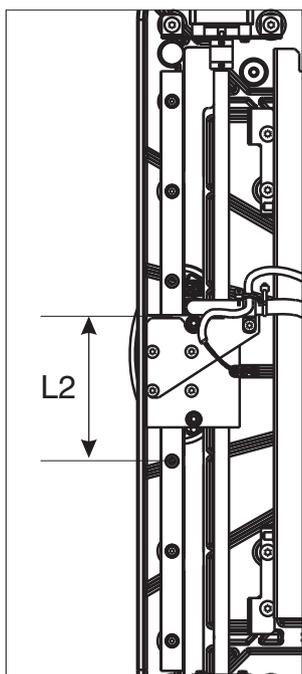
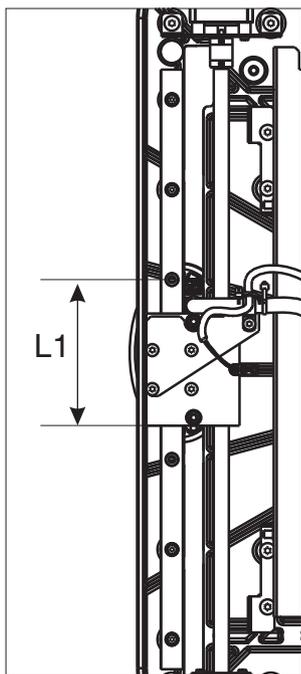
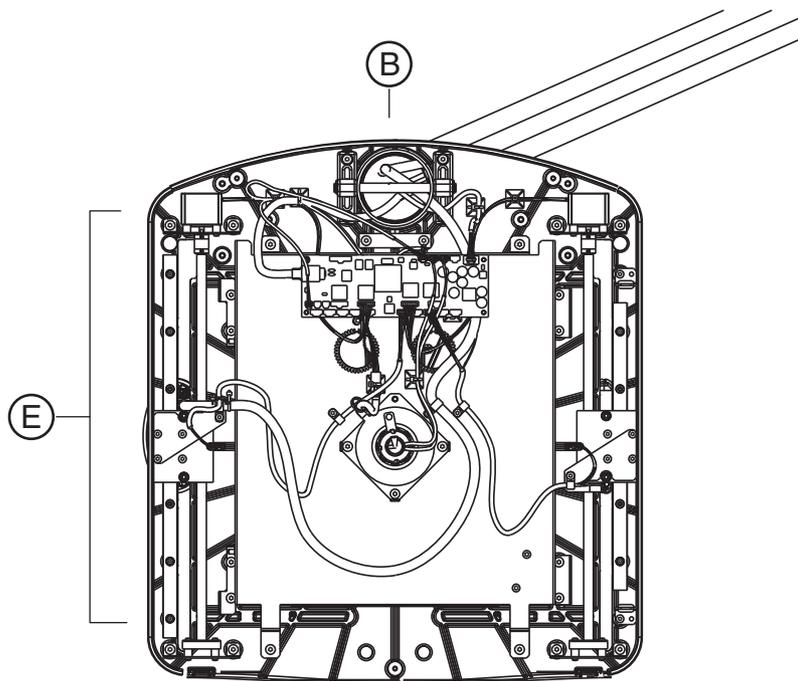
1. Detach the cover to the cephalometer [→ 41].
2. Call service routine S034.4 [→ 262].



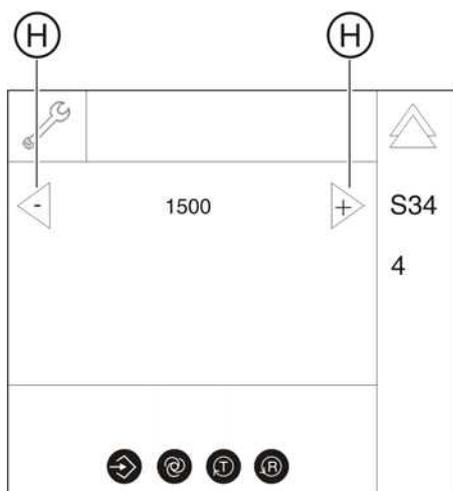
- ↳ After selecting the service routine, the current offset value for the center position of the ceph scan *sensor axis* is displayed in selection field 1.
3. Touch the T key (G).
 - ↳ The test mode is activated.
 - ↳ In the test mode, travel to the center position of the ceph scan sensor axis is initially performed without offsets. The T key lights up and indicates the test mode.
4. Move the sensor to its front position by touching the R key (I). The sensor can always be moved back and forth between its front and center positions with the R key.
5. Move the sensor to its center position by touching the R key.



6. Measure distances **L2** and **L1** with a slide gage.



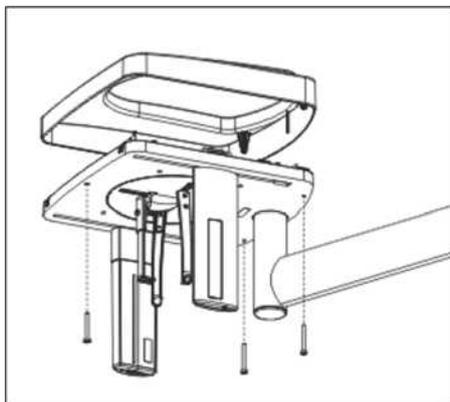
A	Room side
B	Wall side
C	Ceph arm mounted on left-hand side
D	Ceph arm mounted on right-hand side
E	Sensor side



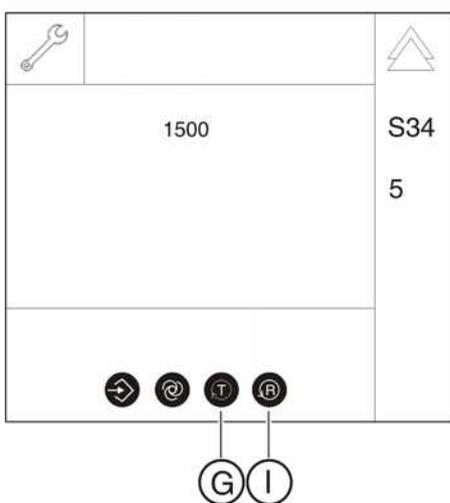
7. Calculate the offset value according to the following formula:
For left-side arm: $(L2 - L1) \div 2 = \text{offset value}$
For right-side arm: $(L1 - L2) \div 2 = \text{offset value}$
8. Use the arrow keys (H) in selection field 1 to select an offset value. The offset value may have a positive or 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 [→ 262].
10. Touch the T key (G).
 - ↳ The test mode is deactivated again.
 - ↳ The offset settings are taken into account in normal operation.
11. Move the sensor to its reference position by touching the R key (I). The sensor 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 [→ 262].
14. Reattach the cover to the cephalometer [→ 41].

8.20.2 S034: Test step 5

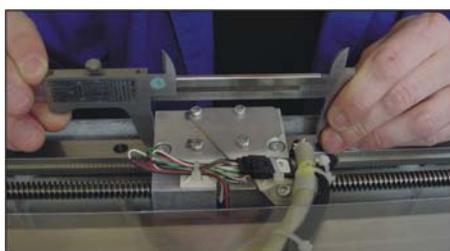
Display/calibrate center position of Ceph scan secondary diaphragm axis

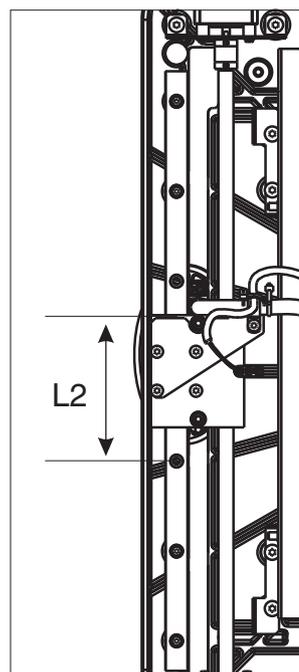
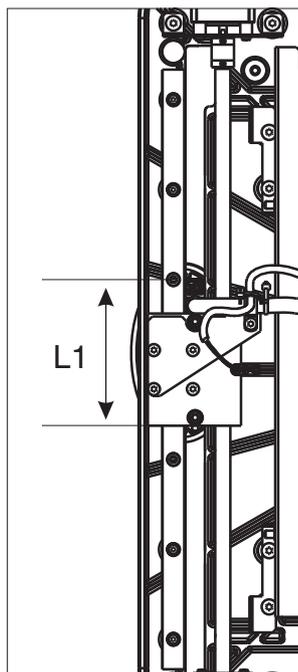
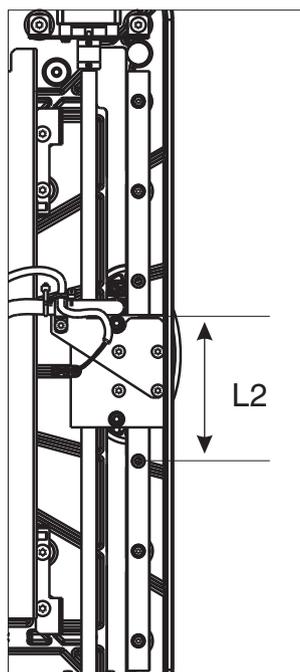
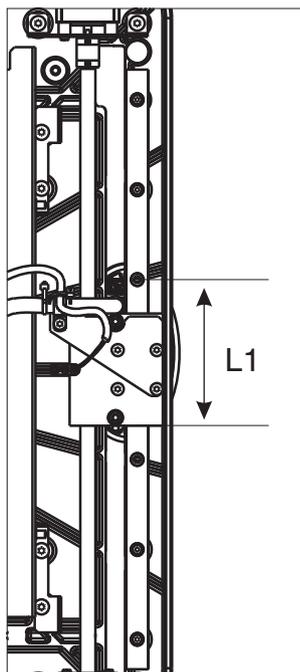
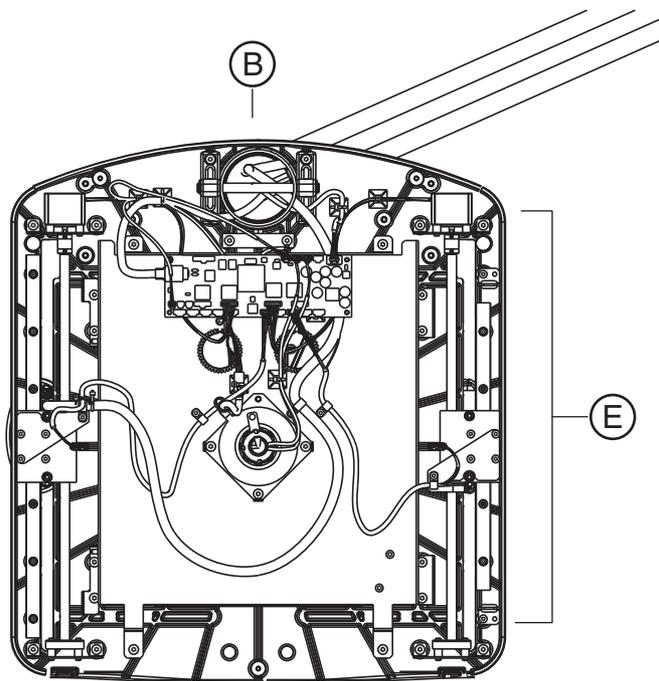


1. If not already done, detach the cover to the cephalometer [→ 41].
2. Call service routine S034.5 [→ 262].



3. Touch the T key (G).
 - ↳ 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.
 - ↳ 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 (I). 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.



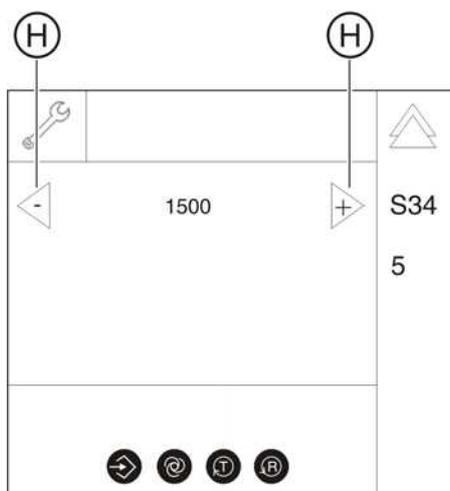


C

A

D

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

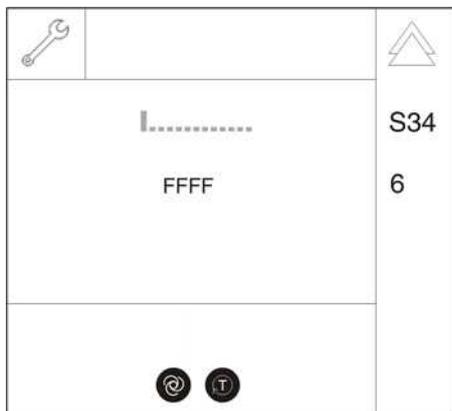


7. Calculate the offset value according to the following formula:
For left-side arm: $(L2 - L1) \div 2 = \text{offset value}$
For right-side arm: $(L1 - L2) \div 2 = \text{offset value}$
8. Use the arrow keys (H) in selection field 1 to select an offset value. The offset value may have a positive or 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 [→ 262].
10. Touch the T key (G).
 - ↳ 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 (I). 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 [→ 262].
14. Reattach the cover to the cephalometer [→ 41].

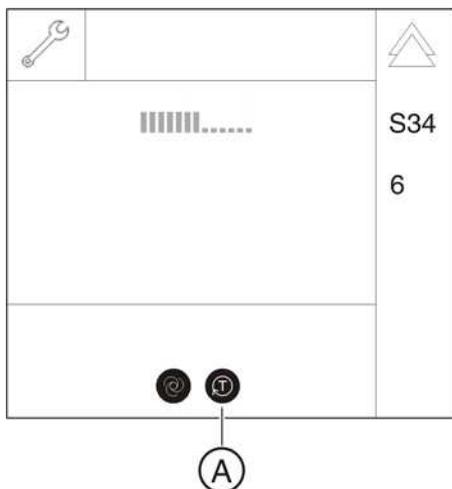
8.20.3 S034: Test step 6

Moving to the Ceph packing position

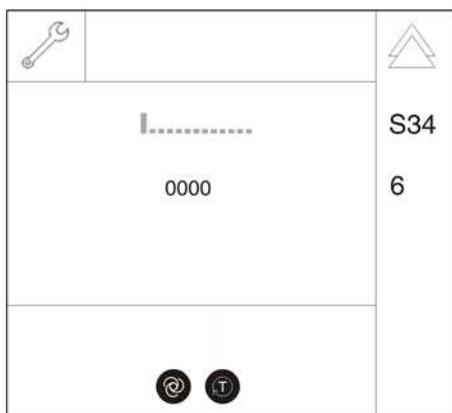
1. Call service routine S034.6 [→ 262].
 - ↳ After calling the service routine, an inactive progress indicator is displayed in selection field 1. Selection field 2 shows the characters "FFFF".



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.



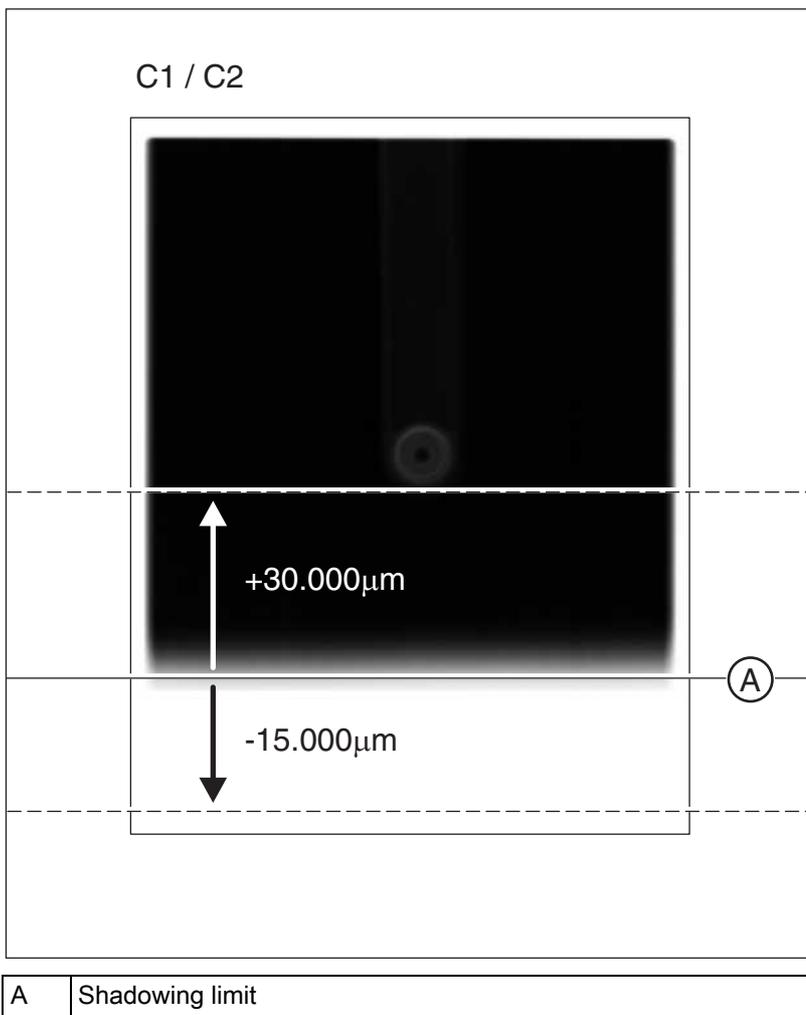
3. Exit the service routine [→ 262].
 - ↳ When the cephalometer has reached its packing position, "0000" is displayed in selection field 2.



8.20.4 S034: Test step 8

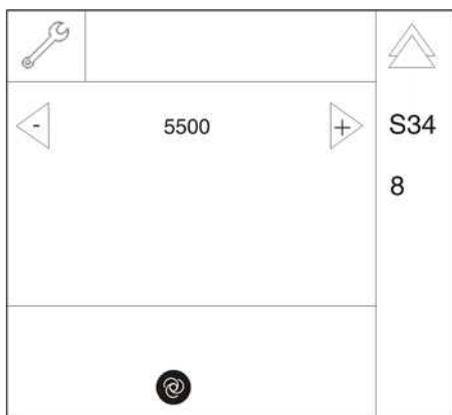
User-specific determination of the shadowing limit for C1 and C2

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.

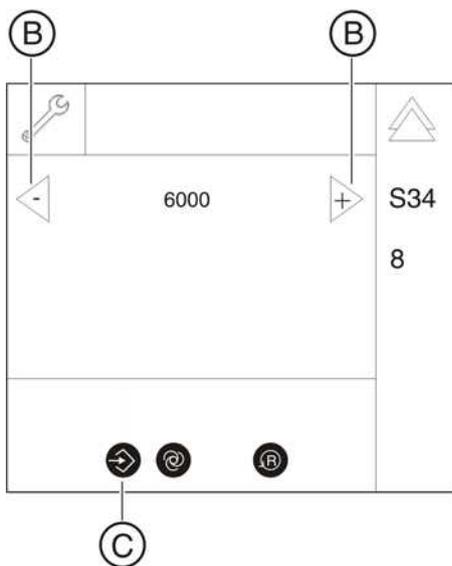


The offset must be determined by reference to an existing exposure. Based on the default setting, an offset in the range of +30,000 µm to -15,000 µm can be selected and saved.

1. Call service routine S034.8.



↪ The current offset value is displayed in selection field 1.

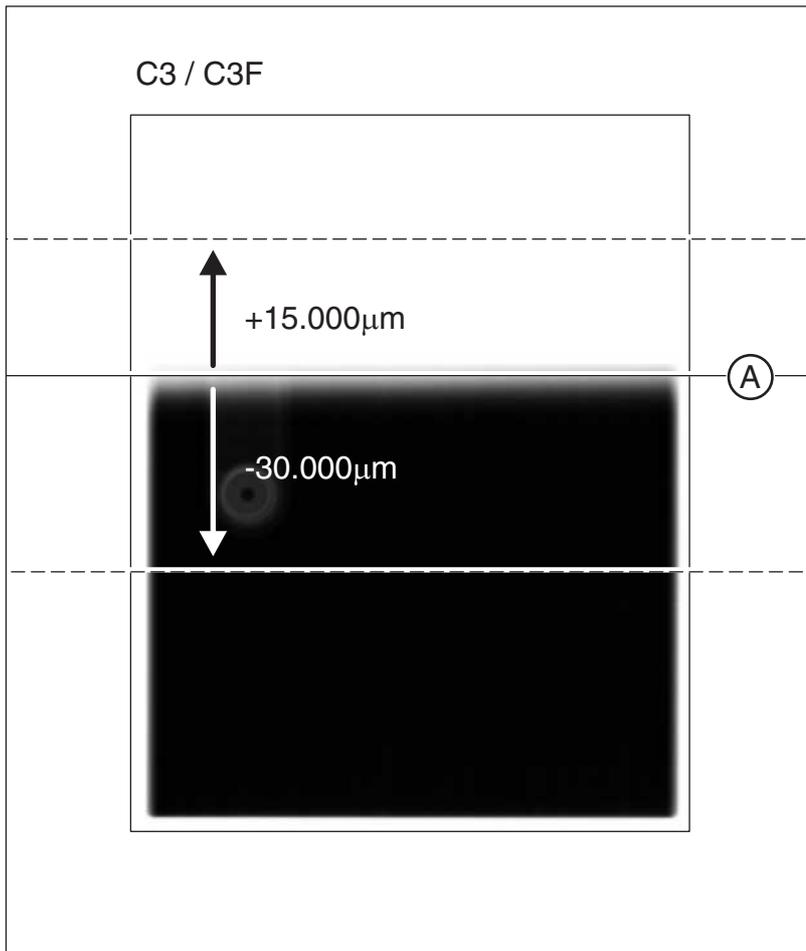


2. Select the desired offset value using the arrow keys (**B**) in selection field 1 (step width = 500, offset value = 1000 corresponds to a 1 mm shift of the shadowing limit).
↪ Once the required setting has been selected, the Memory key (**C**) lights up.
3. Save the setting [→ 262].
4. Exit the service routine [→ 262].

8.20.5 S034: Test step 9

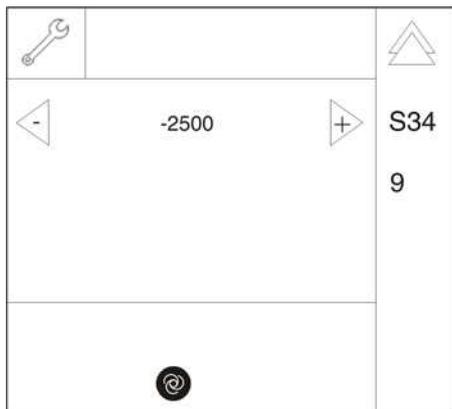
User-specific determination of the shadowing limit for C3 and C3 30x23

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.



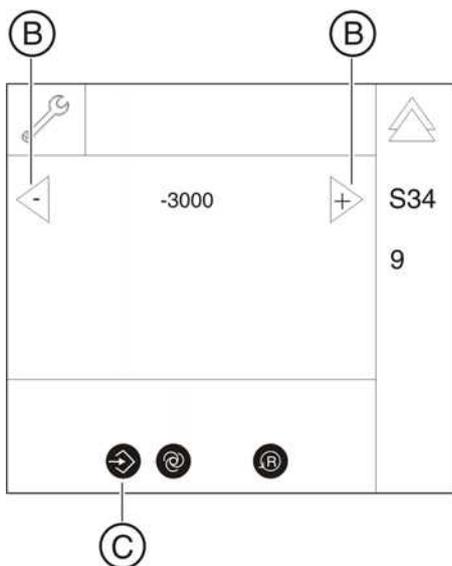
A	Shadowing limit
---	-----------------

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 S034.9.

↳ The current offset value is displayed in selection field 1.



2. Select the desired offset value using the arrow keys (B) 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 (C) lights up.

3. Save the setting [→ 262].

4. Exit the service routine [→ 262].

8.21 S037: Network service

SR*	SA**	Function
S037		Network service
S037.1	No	Displaying the network data
S037.2	Yes	Delete network addresses or set them to factory defaults
S037.3	Yes	Set 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, ** SHZ=security access

8.21.1 S037: Test step 1

Displaying the network data

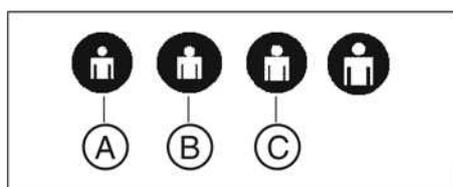
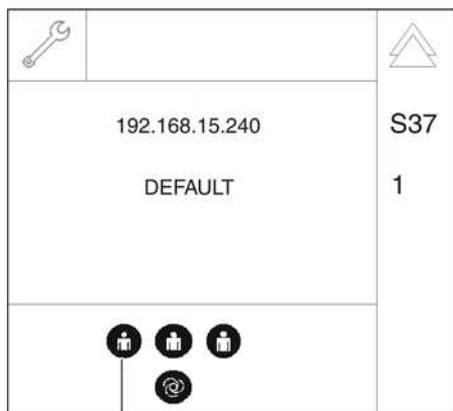
If all network data is set to default, the system is in UDP boot mode.

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 setting

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 setting



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 [→ 262].

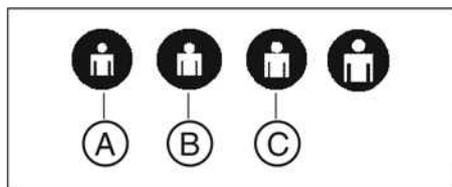
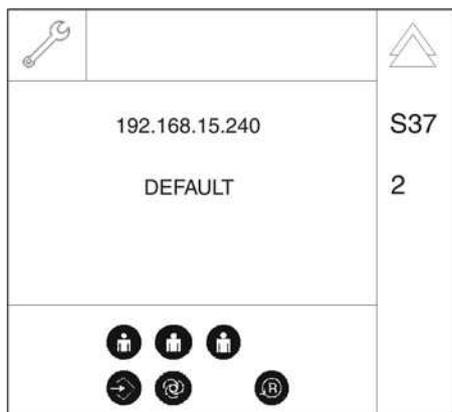
8.21.2 S037: Test step 2

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

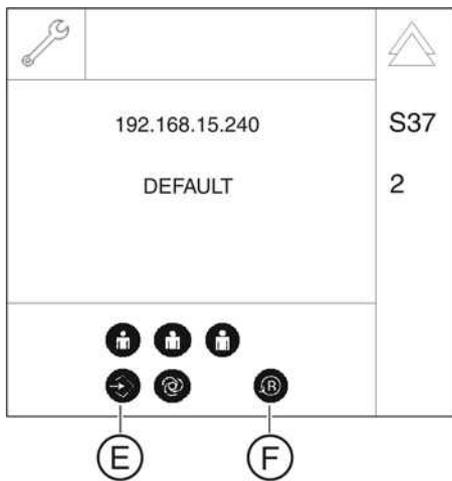
IMPORTANT

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



- Call service routine S037.2.
 - Once the service routine has been selected, the network data is displayed as in test step 1.
 - The Memory key and the R key also become visible.
 - The Memory key lights up.
- 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 switch between the displays of the different network data, proceed as in test step 1.
4. Exit the service routine [→ 262].
5. Perform a restart of the unit.

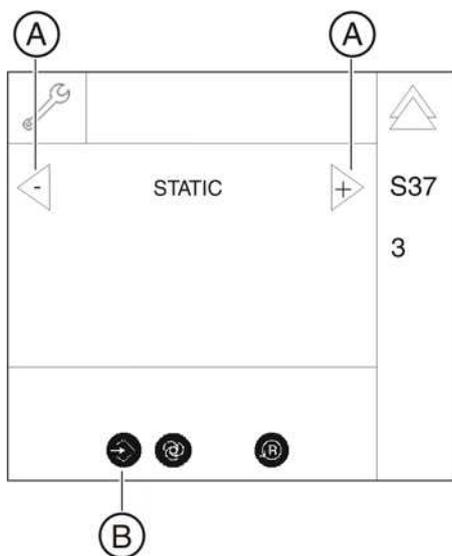
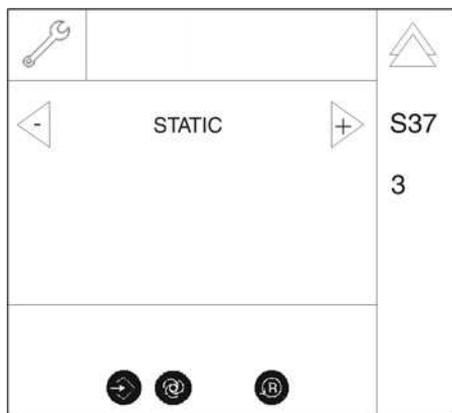
8.21.3 S037: Test step 3

Configuring boot mode

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

* factory settings

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 [→ 262].
4. Exit the service routine [→ 262].
5. Perform a restart of the unit.

8.21.4 S037: Test step 4

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

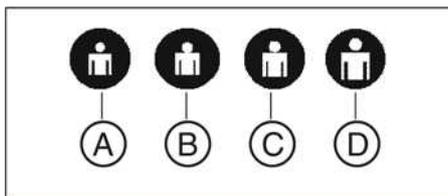
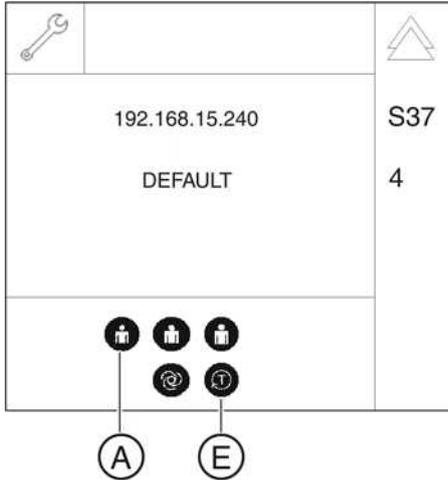
This service routine cannot run in DYNAMIC mode (T key is blocked).

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

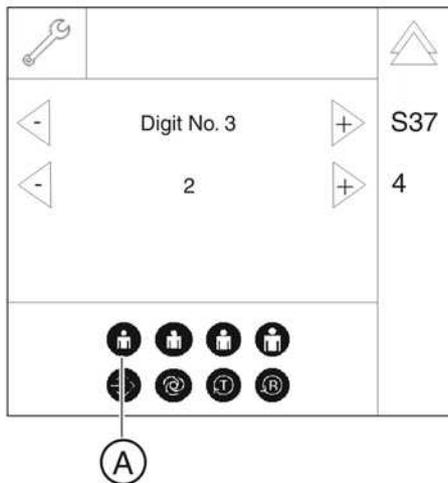
* Factory setting

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 setting



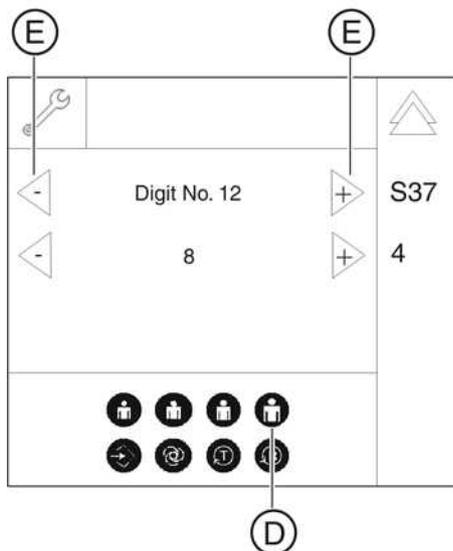
Digit No. 1 2 3
 192.168.015.178
 B1 B2 B3 B4



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).

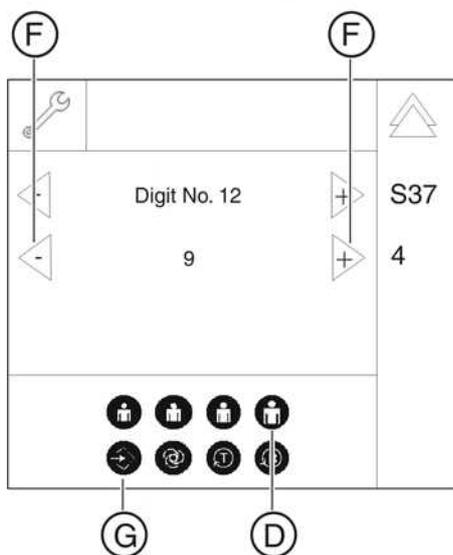
Important: The number of the digit always refers to the currently selected number pad.
 - ↳ The current value of the corresponding digit is displayed in selection field 2 ("2" in the example).

Digit No. 12
 192.168.015.178
 B4



5. Use arrow keys (E) 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 [→ 262].
8. Exit the service routine [→ 262].
9. Perform a restart of the device.

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 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.

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

In SIDEXIS XG, call the *"2D Reset adjustment"* or *"3D Reset adjustment"* menu as appropriate and make a note of the old adjustment values before commencing with the replacement of boards or modules (containing 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 or using the extended detail query in SiXABCon. 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. V03.03.01*).

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.

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:
 - Intermediate piece
 - Profile covers (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 [→ 370].

9.2.1.1 Moving the slide manually

CAUTION

Risk of injury due to uncontrolled movement of the slide

If the slide can no longer be moved electrically, it must be moved mechanically.

The position of the slide must be secured to ensure that no uncontrolled downward movement occurs during service, in cases where the carriage has fewer self-locking properties.

For this purpose, Sirona recommends using the height adjustment service kit,

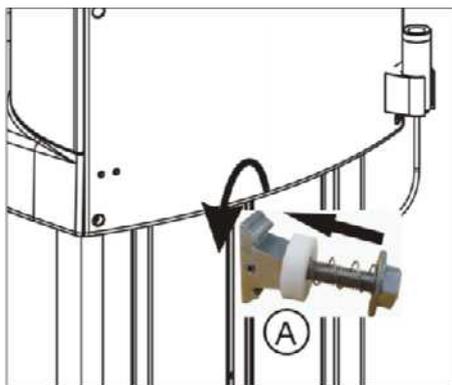
REF. 62 57 518. This service kit is used to prevent automatic downward movement of the slide during service by fixing the slide and the spindle holder.

The clamp (**A**) should be clamped under the slide. The locking pin (**B**) is used to secure the spindle holder against twisting.

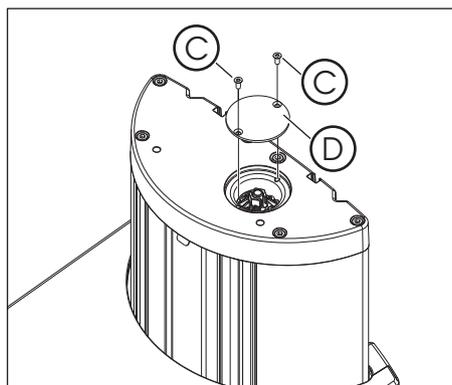
It must be ensured that no one is located underneath the ring arm during the repair.

9.2.1.1.1 Moving the slide with the "height adjustment" service kit, REF. 62 57 518

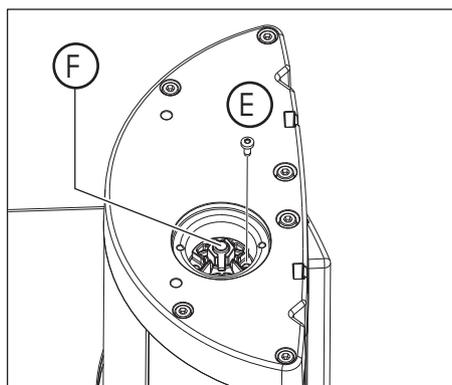
Move the slide



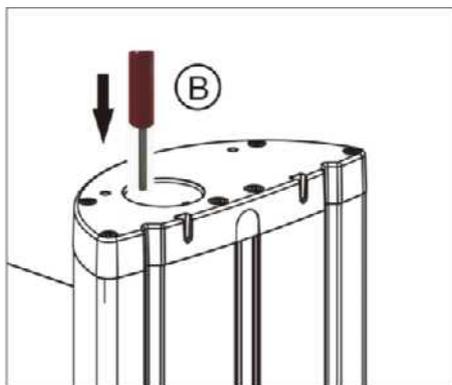
1. Insert the clamp through the opening (A) in the stand and rotate it 90°. Tighten the nut securely.



2. Loosen the two screws (C) and remove the cover (D).



3. Remove the 1st screw (E) on the spindle holder (F).



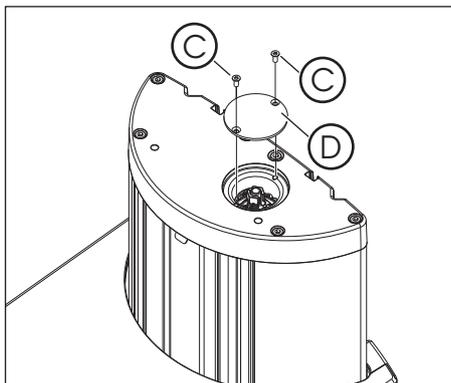
4. Insert the locking pin (B) into this opening.
5. Remove the 2nd screw (E) on the spindle holder.
6. Attach the socket wrench (SW19) to the spindle. Remove the locking pin and then turn the slide up to the desired height using the socket wrench.
Clockwise rotation of spindle = slide moves up
Counterclockwise rotation of spindle = slide moves down
7. Reinsert the locking pin.

Locking the slide

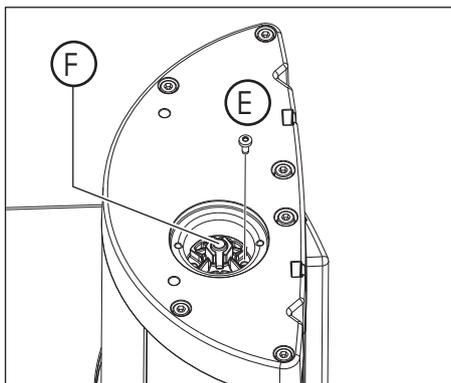
- Now move the clamp (A) directly underneath the slide.
☞ The slide is now locked in this position for further repair work.

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.

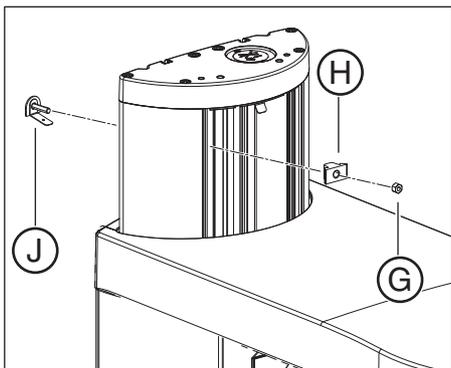
Clockwise rotation of spindle = slide moves up

Counterclockwise rotation of spindle = slide moves down

5. After reaching the desired target position, secure the position again using the two screws (E).

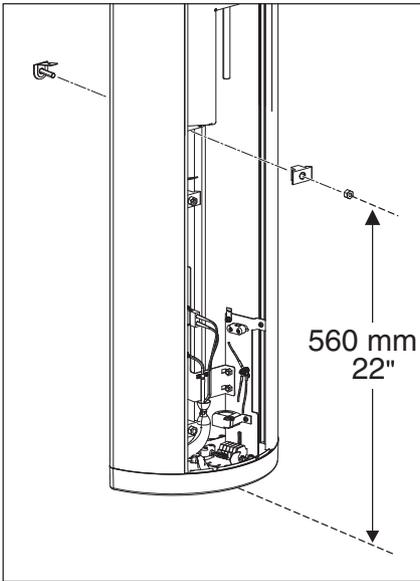
CAUTION! Before replacing the height adjustment motor, the slide must be secured in this position.

Locking the slide



1. Make a mark at the position of the upper limit stop.

2. Loosen nut (G) on the upper profile clamp (H) and remove the upper limit stop (J) from the stand.

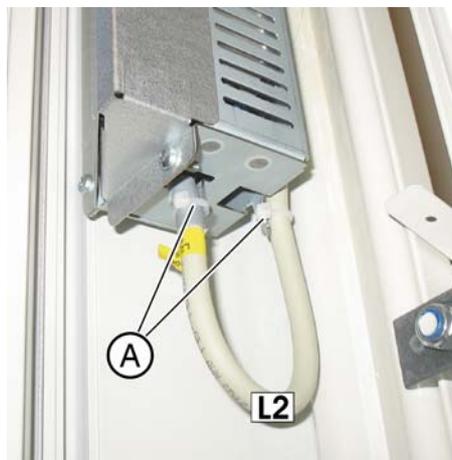


3. Install this limit stop (J) above the lower limit stop so that there is a *distance of approx. 56 cm* between the lower edge of the unit and the lower edge of the limit stop.

9.2.2 Removing board DX32



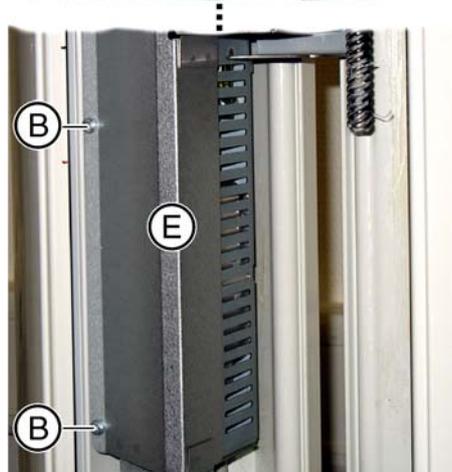
1. Unscrew the bracket (C). The bracket (C) is located in front of board DX32.
2. Move the stand to a height of 1260 (control panel display)
3. **DANGER!** Potentially lethal shock hazard! Disconnect the unit from the junction box of the building installation.

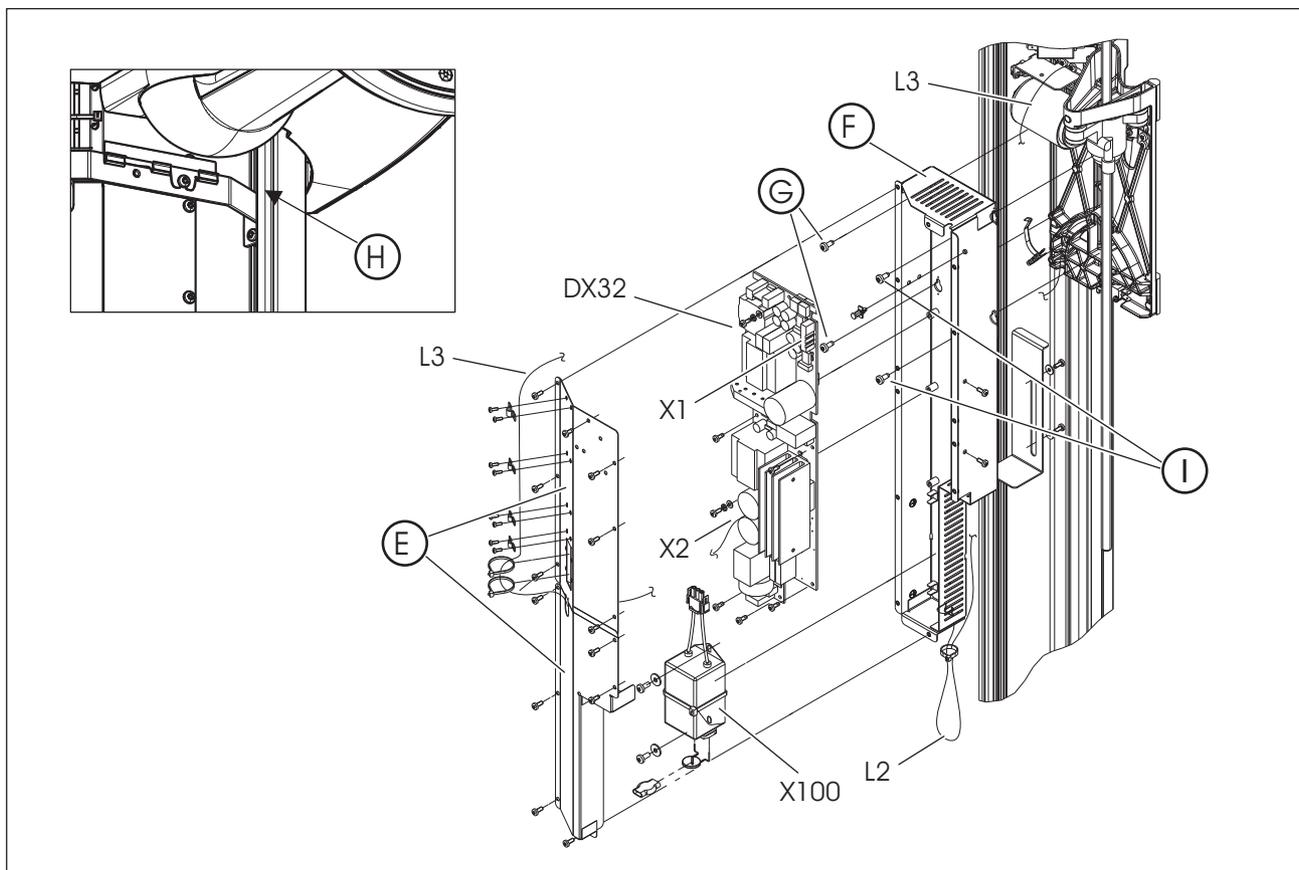


4. Remove the cable ties (A) from cable L2.

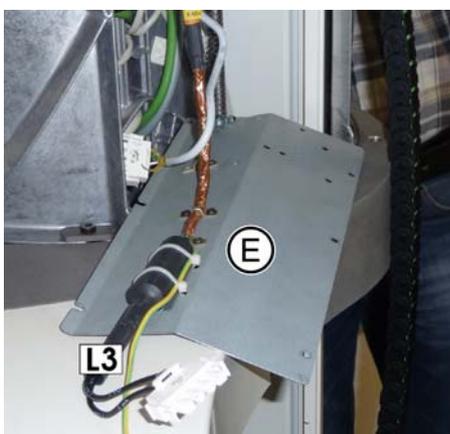


5. Loosen all the left-hand screws (B) of the protective plates (E).



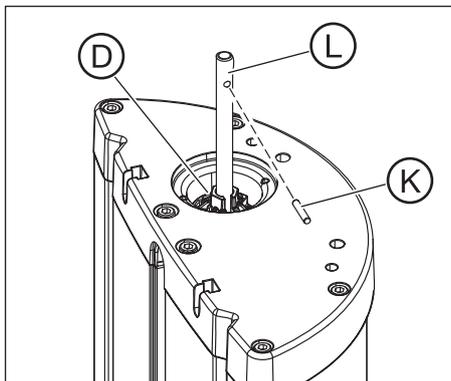


6. Unscrew the remaining screws from the protective plates (E).
7. Remove the covering plates (E) (top and bottom) from the connection box (F) of board **DX32**.
8. The cable **L3** can stay on the top covering plate (E).
9. Remove connector **X2** from board **DX32** and remove the protective conductor.
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**.



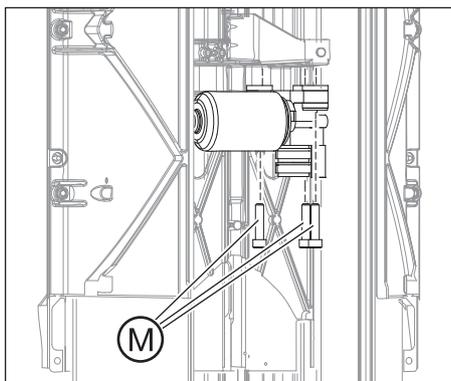
9.2.3 Replacing the height adjustment motor/spindle

Removing the spindle



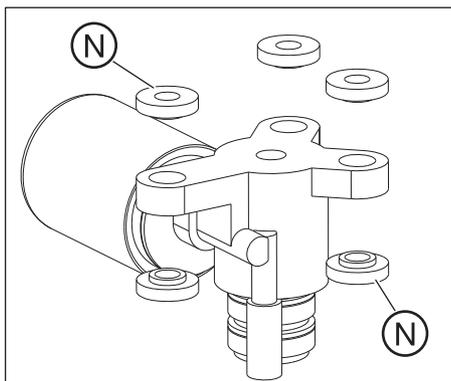
1. Loosen the two screws (E) on the spindle holder (F) (if you have not already done so) [→ 370].
2. Turn spindle holder (D) (with an 18 mm A/F socket wrench) counterclockwise until the motor comes to rest on the limit stop and spindle (L) has been turned all the way out of the motor.
3. Remove the straight 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

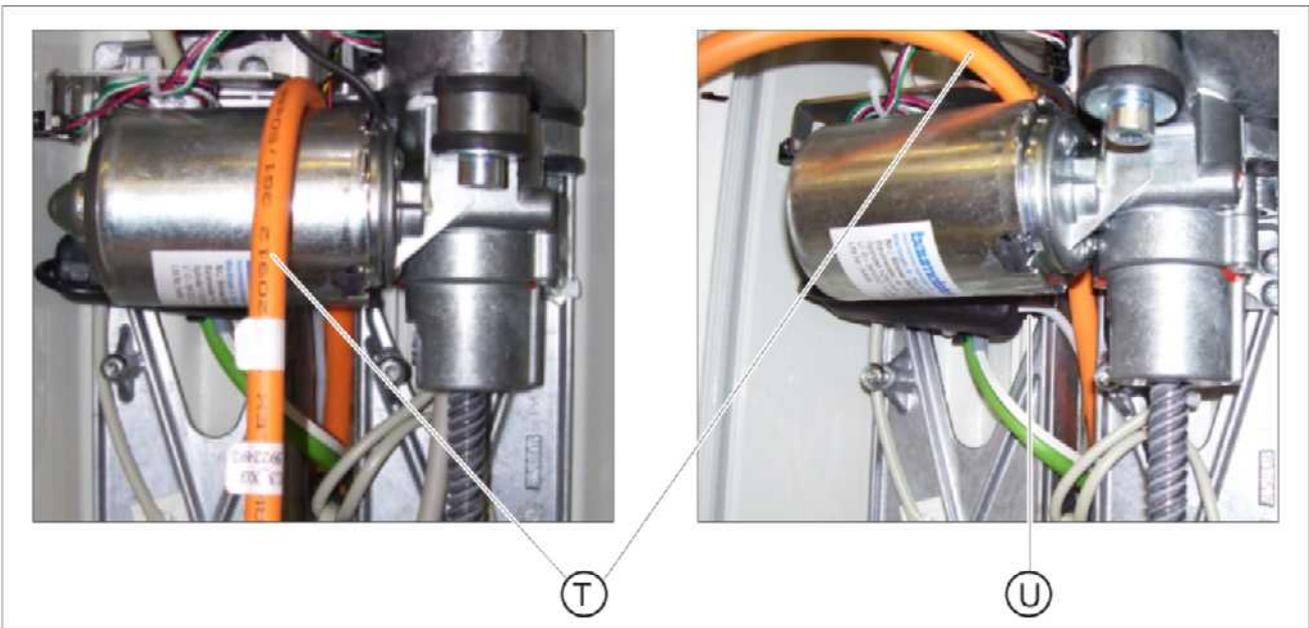
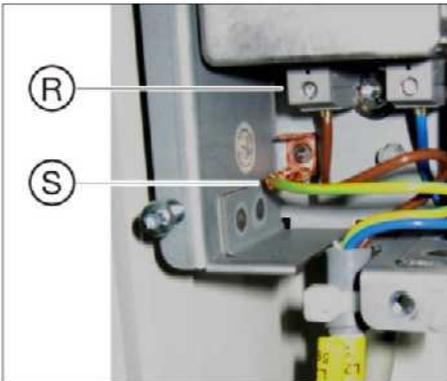
1. Attach the spindle holder (F) with the two screws (E).
2. Attach the cover (D).
3. Reattach the upper limit stop to the previously marked position.
4. Only then should you check the travel function of the slide.

9.2.4 Laying of cables when replacing the height adjustment motor

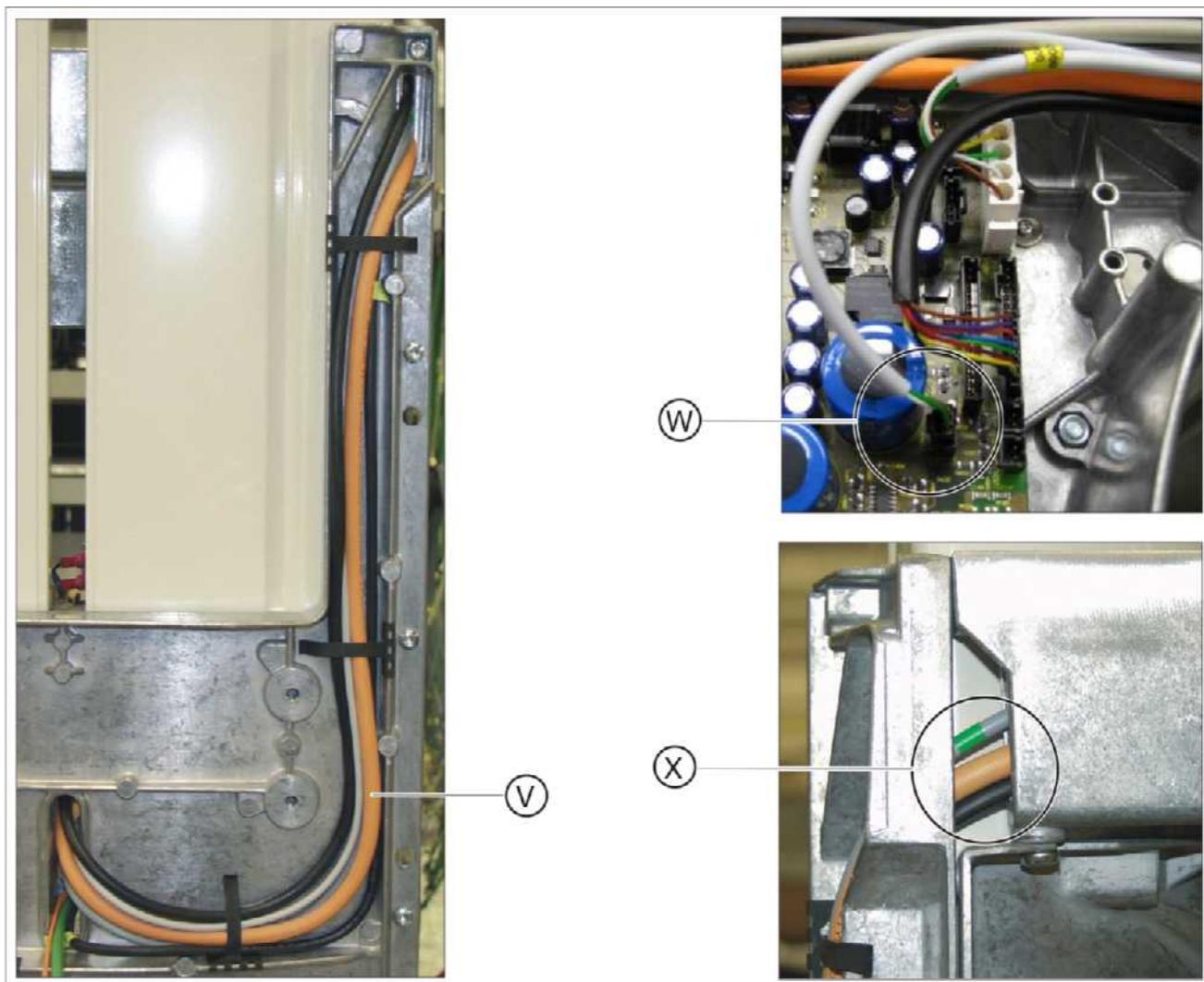
1. Plug connector **X2 (O)** into board **DX32**.
2. Connect the protective ground wire (**P**) and lay it as shown in the photo.



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.

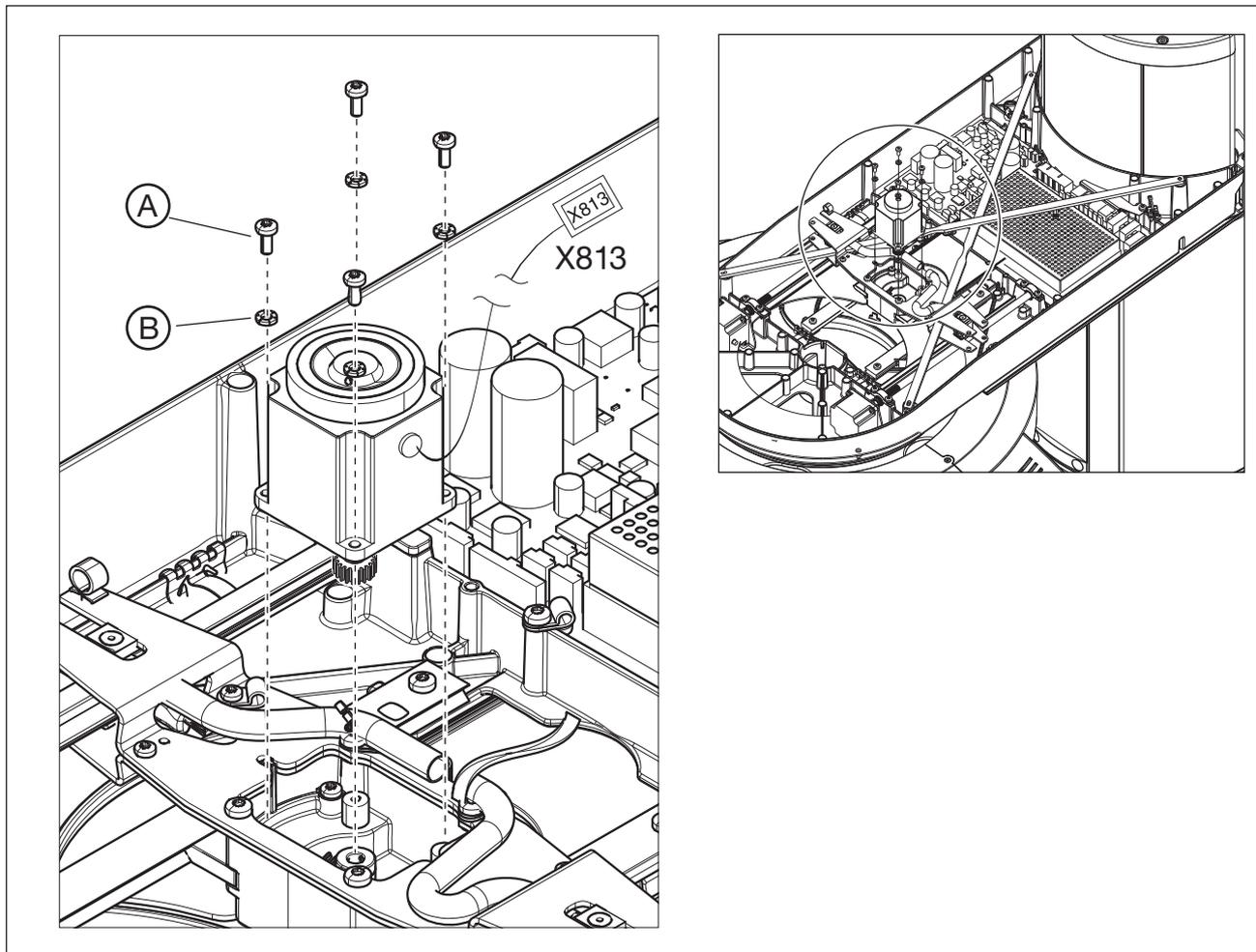
9.3 Ring motor (M1_3)

9.3.1 Replacing the ring motor

Removing the covers

- Remove the "arm cover".

Removing the defective motor



Installing the new motor

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**).
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

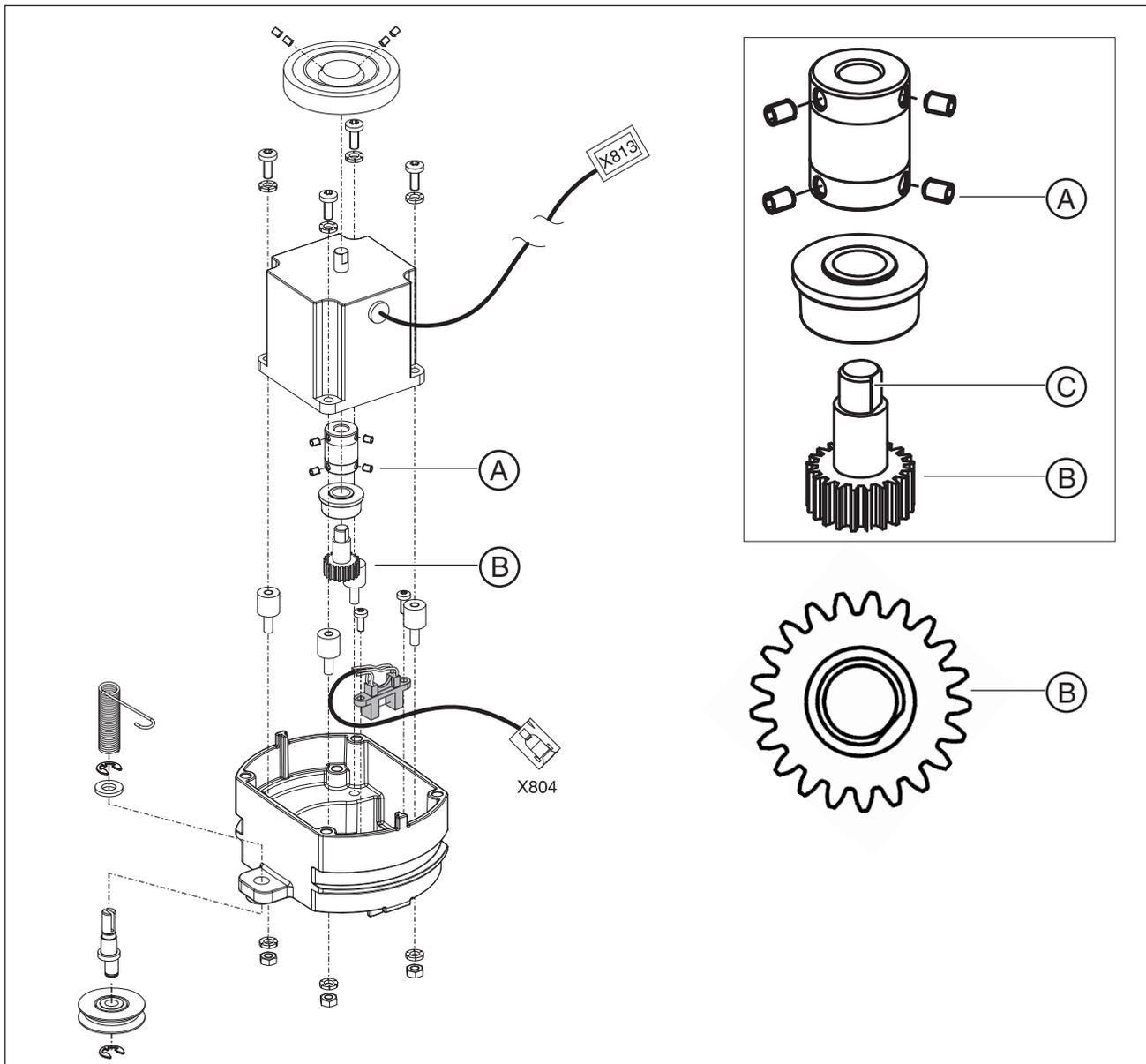
- Reattach the covers.

9.3.2 Replacing the pinion at the ring motor

Removing the covers

Removing the motor

- Remove the "arm cover".
- Remove the ring motor as described in the chapter Replacing the ring motor [→ 381] .



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).

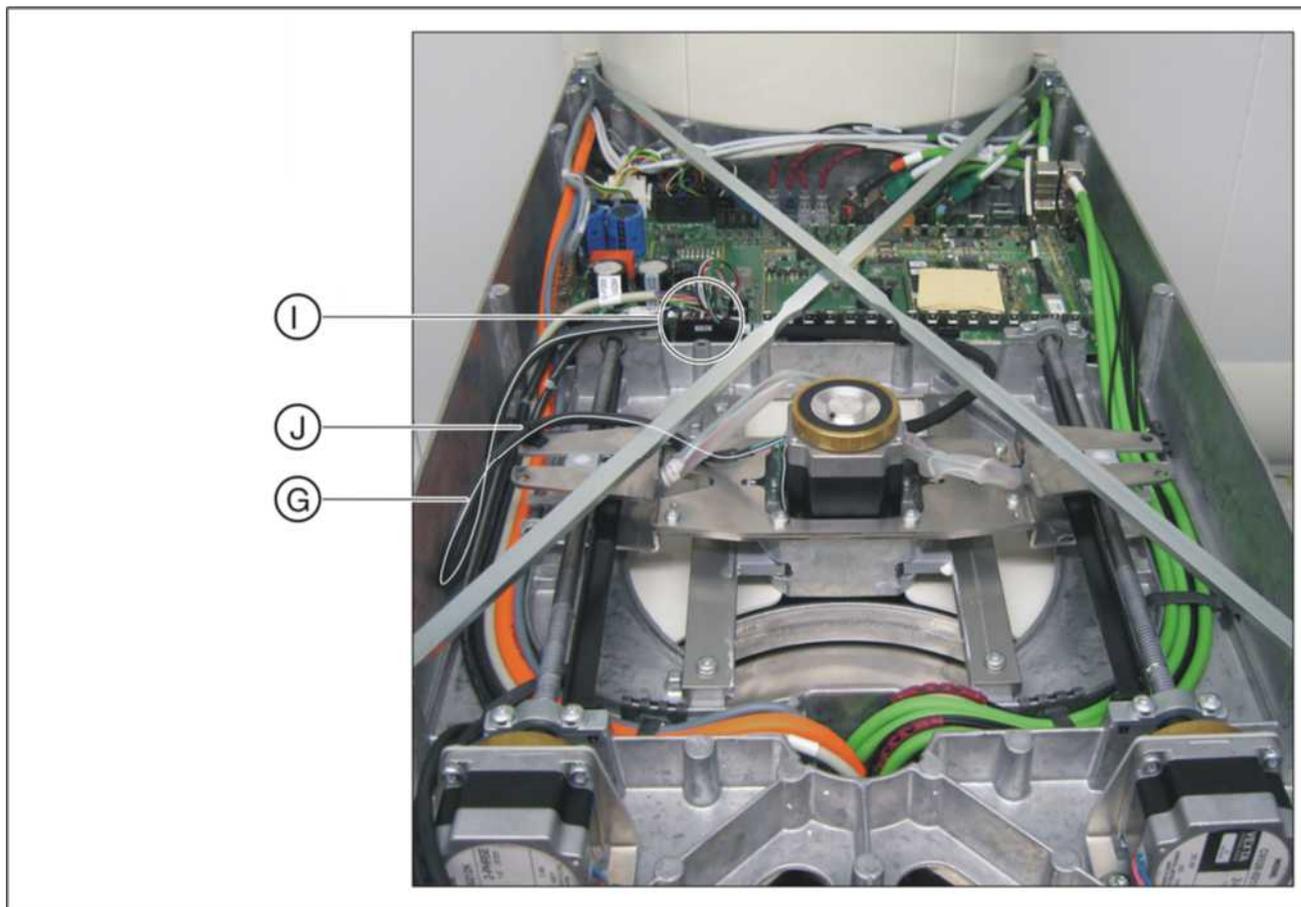
Installing the motor

- Reinsert the motor in the ring, route the cable and connect the motor as described in the chapter Replacing the ring motor [→ 381] .

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?

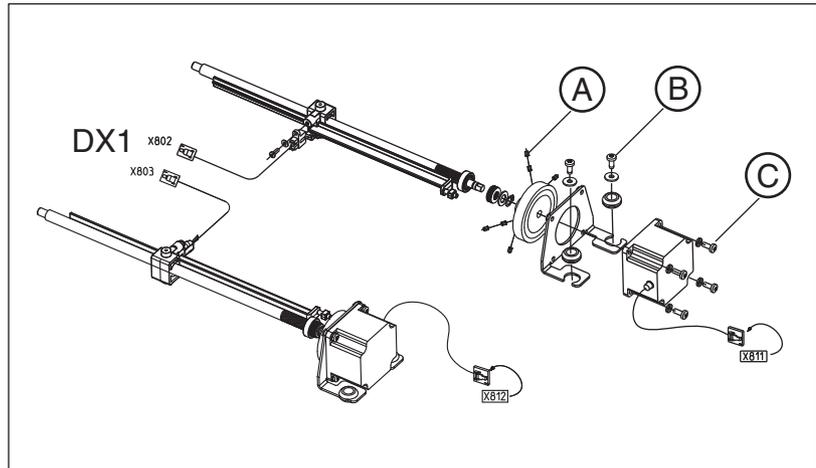
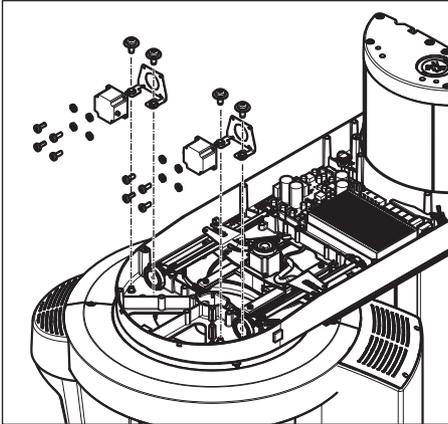
1. Check the function of the ring motor.
2. Perform complete unit adjustment or calibration [→ 184].

9.4 Pan actuators (M1_1/2)

9.4.1 Replacing actuators

Removing the covers

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)

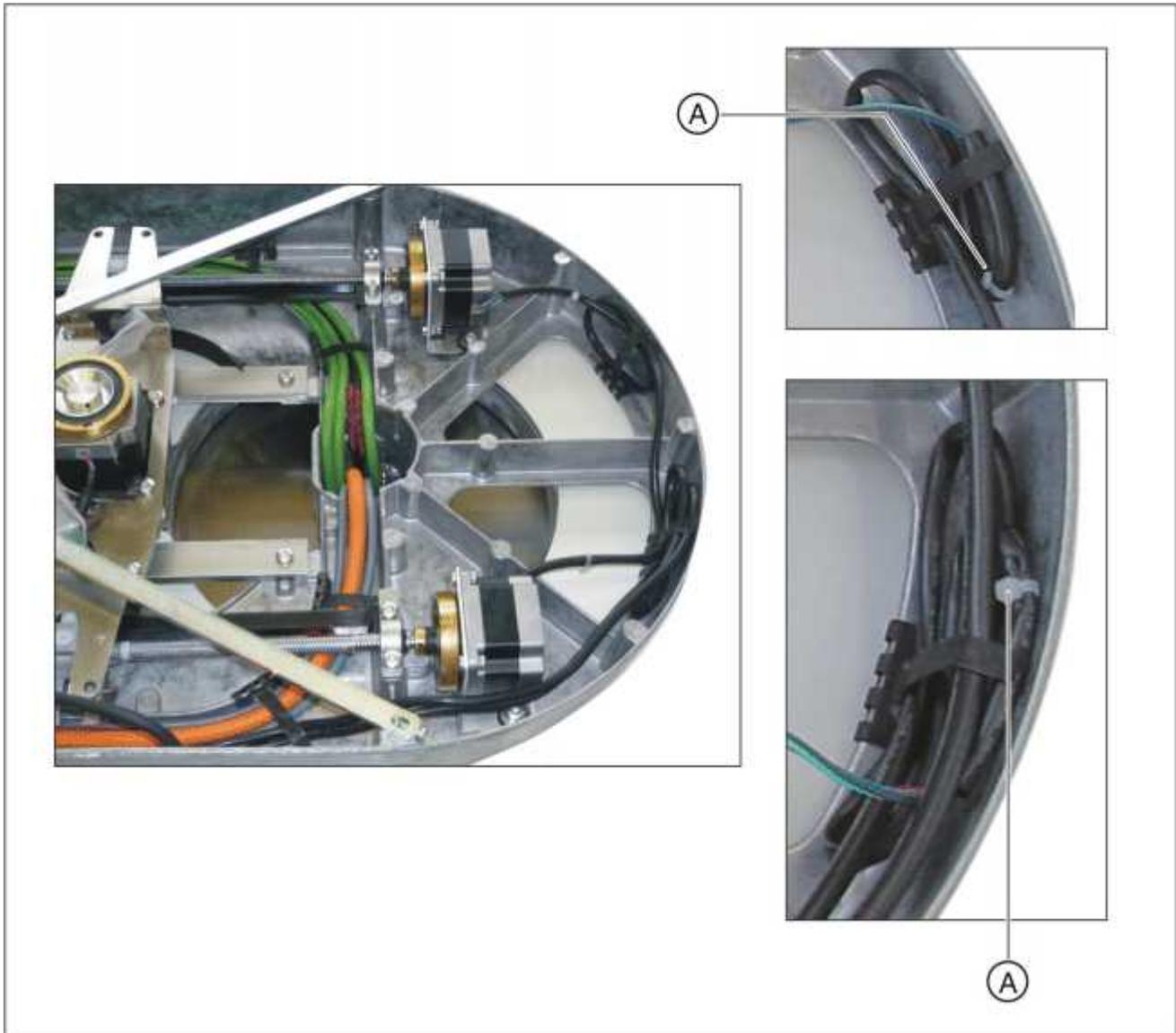
Installing the new actuator

IMPORTANT

Remember to plug connectors **X811** and **X812** back in, lay the cables in their original positions, and reattach all cable ties and clamps [→ 385].

- **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



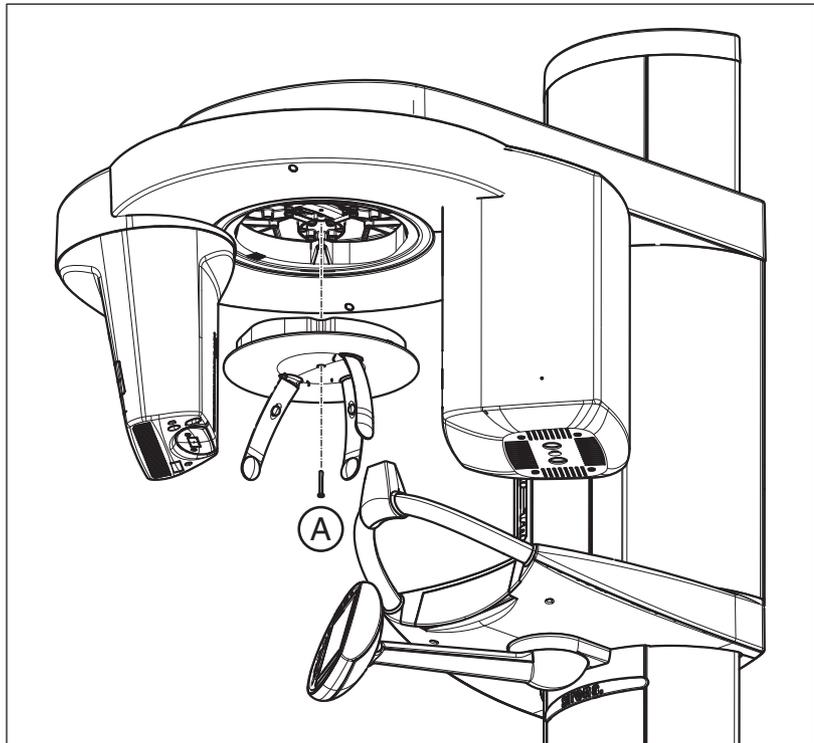
- Lay the cables in a loop and secure the loop with the cable ties (A).

9.4.3 What has to be done after replacing the actuators?

1. Check the function of the actuators.
2. Perform complete unit adjustment or calibration [→ 184].

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.

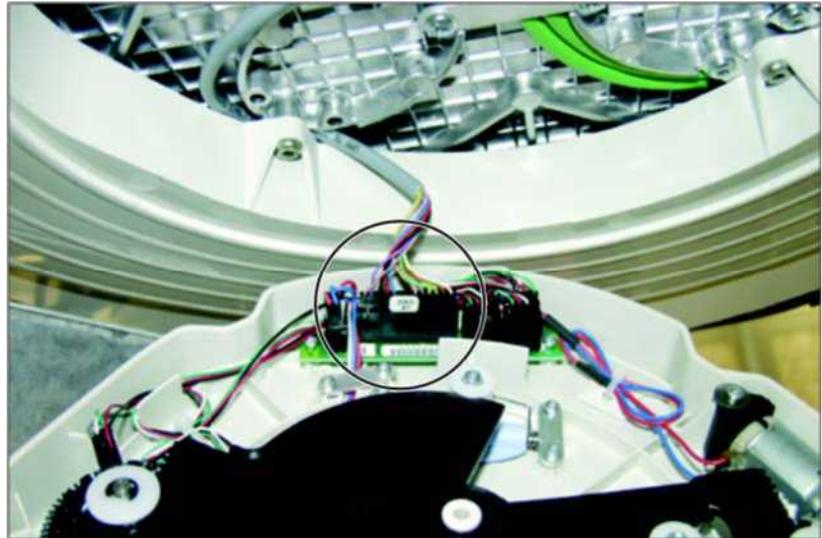
Installing the new headrest

2. Pull cable L18 off connector X1 on board DX5 [→ 387].
1. Plug cable L18 into connector X1 on board DX5 of the new headrest [→ 387].
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) firmly.

9.5.2 Laying of cables when replacing the headrest



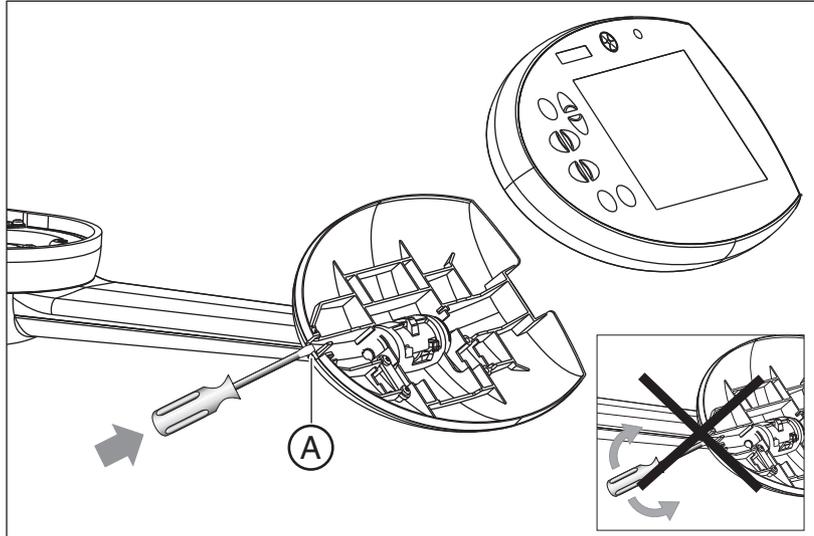
- Plug cable L13 into connector X1 on board DX5.

9.5.3 What has to be done after replacing the headrest?

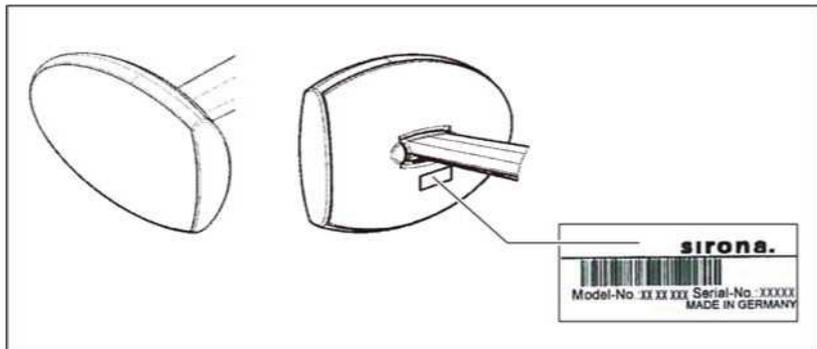
- Use the forehead and temple support keys on the control panel to check the function of the headrest.

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. 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?

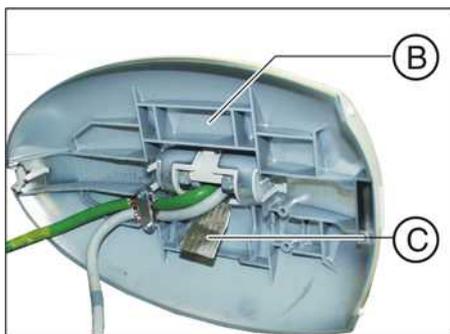
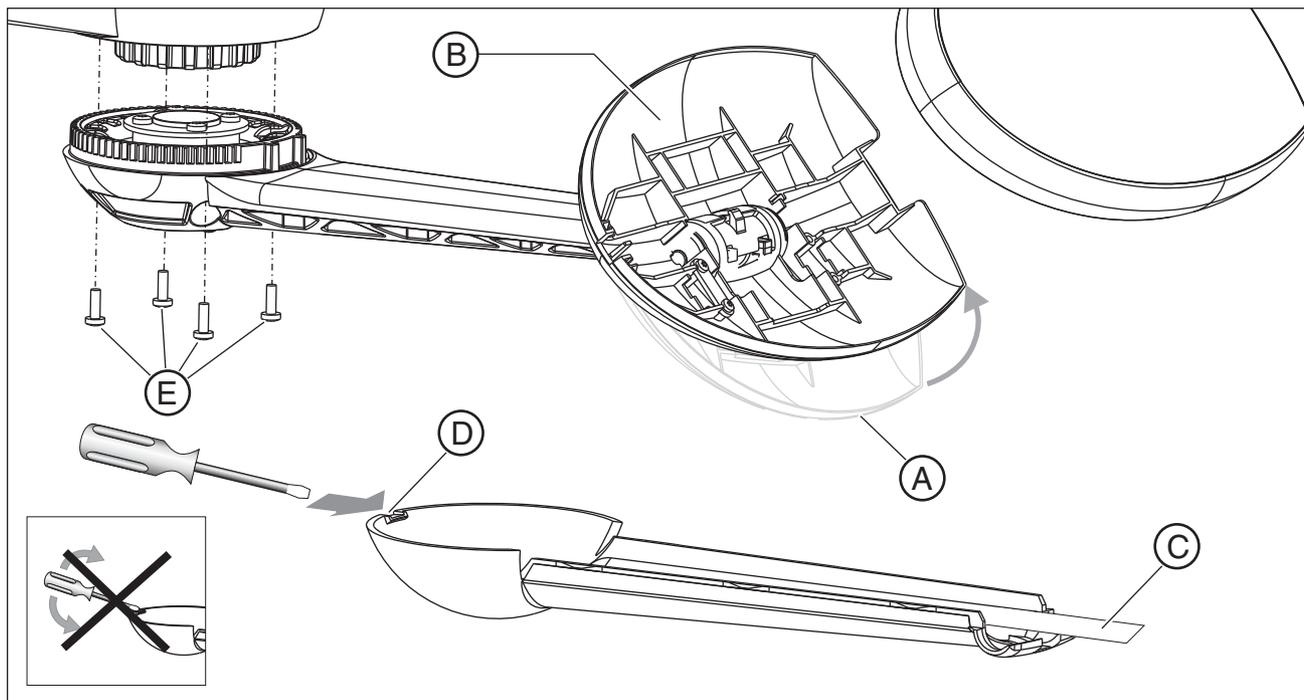
IMPORTANT: So that the board is also replaced with the user interface, you **MUST** also follow the instructions in the chapter titled "Measures following replacement of boards [→ 432]".

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 [→ 62].

Following replacement of the user interface, the language set on board DX7 is set to the factory setting by default (00 = German, English, French, Italian). If the configured unit language set (which can be queried by running service routine S017.5 or using the "extended detail query" in SiXABCon) has a configuration other than 00, this configuration will be copied to board DX7 by the update function.

9.6.2 Replacing the control panel

1. Remove the user interface [→ 388].



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 for control panel replacement [→ 391]).
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 [→ 388].

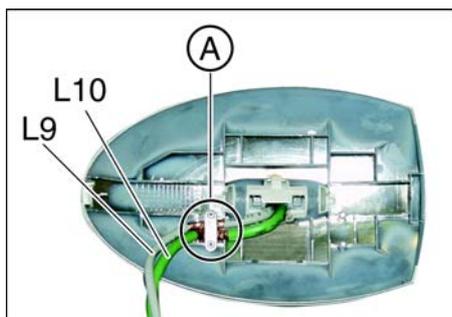
9.6.2.1 What has to be done after replacing the control panel?

IMPORTANT

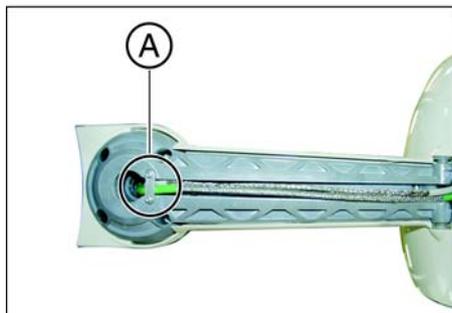
Use the most current software version available on the ORTHOPHOS XG3D CD.

1. Switch the unit on.
2. Perform a software update to the current unit software version [→ 62].
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.

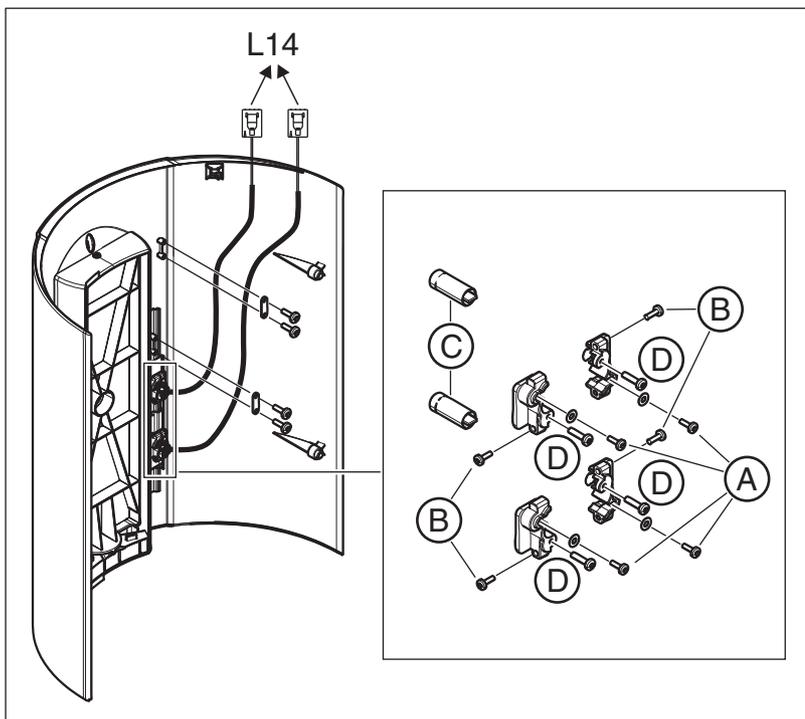
Keep a distance of at least 4" (10 cm) between eye and laser. Do not look into the laser beam.



9.7.1 FH double laser light localizer (pan)

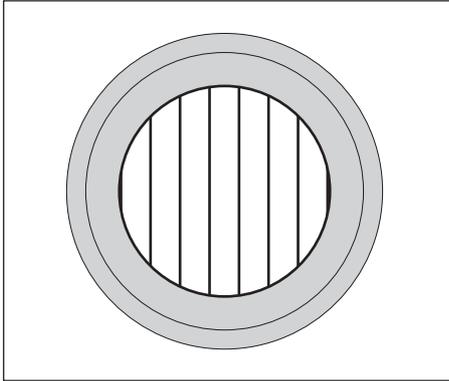
9.7.1.1 Replacing the laser module in the FH double laser light localizer (pan)

1. Loosen the "front slide" [→ 41] cover, and carefully pull it off toward the front together with the FH light localizer.



2. Pull off the cables of the FH laser modules from cable **L14**.
3. Detach the cables of the laser modules from the strain reliefs.
4. Loosen the screws (**A**) and remove the holder including the laser module (FH).

5. Loosen the screws (B) and carefully pull the laser module (C) out of the holder toward the front.
6. Insert the new laser module (FH) in the holder and retighten screws (B).

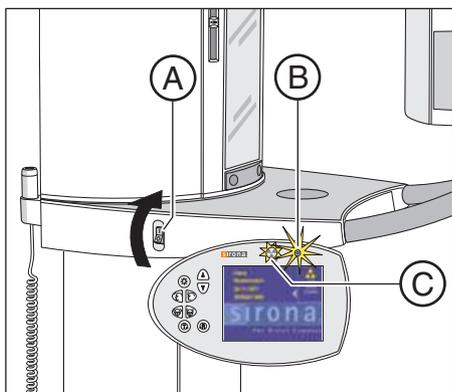


IMPORTANT

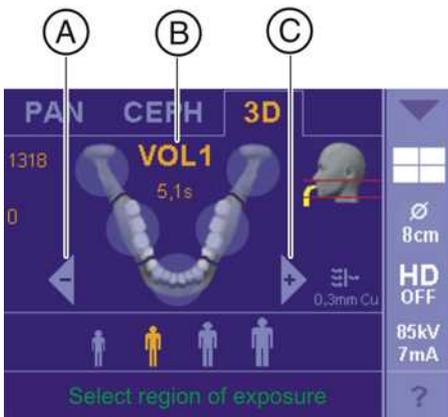
Make sure that the lines in the laser module run vertically.

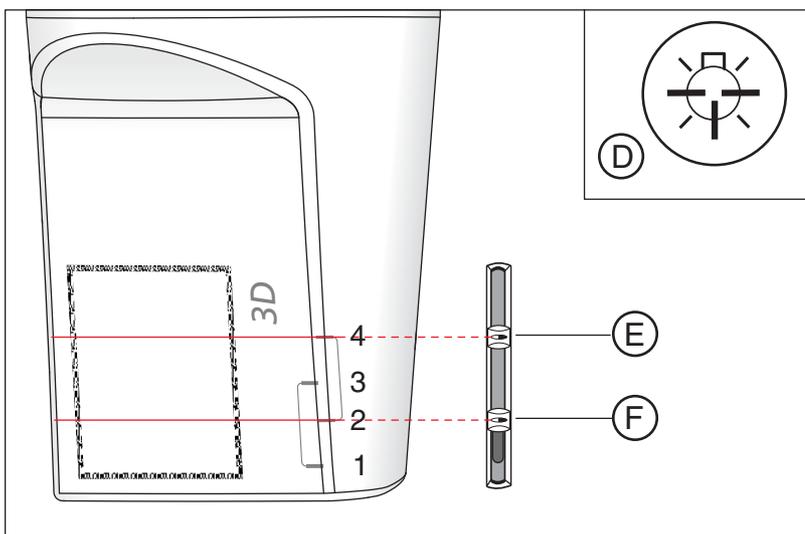
7. Screw the holder securely back onto the cover with screws (A) and reattach the strain reliefs.
8. Set the "Front slide" cover down on the "Top support" cover.
9. Plug the cables of the FH laser modules into the sockets of cable L14.
10. Next, adjust the double laser light localizer [→ 393].
11. Reattach the "Front slide" cover [→ 41].

9.7.1.2 Adjusting the FH double laser light localizer (PAN)

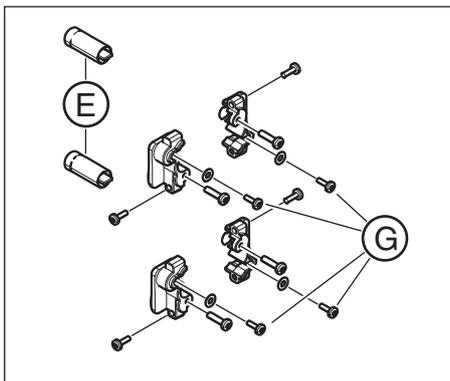


- ✓ The "Front slide" cover must have been removed [→ 41].
1. Switch the unit on via the switch (A) (see also Operating Instructions).
 - ↪ The X-Ray radiation indicator (B) lights up briefly.
 - ↪ After approx. 2 seconds, the green LED (C) in the upper part of the control panel lights up. This LED remains 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 exposure program VOL1 is displayed.
 3. Press the R key.
 - ↪ The diaphragm and the sensor move into the starting position for volume exposures.





4. Press the light localizer key (D) on the control panel.
 - ↳ The laser light localizers are switched on.
5. Move the upper horizontal laser beam by moving the top slide control (E) into the upper area of the 3D sensor area.
 - ↳ The laser beam must be parallel to the top border marking of the 3D sensor area.
6. Slightly loosen the screws (G) of the upper laser module and align the laser module (E) incl. holder so that the FH laser beam runs parallel to the top border marking of the 3D sensor area.
7. Firmly tighten the screws (G) of the top laser module.
8. Move the lower horizontal laser beam by moving the bottom slide control (F) into the lower area of the 3D sensor area.
 - ↳ The laser beam must be parallel to the bottom border marking of the 3D sensor area.
9. Slightly loosen the screws (G) of the lower laser module and align the laser module (E) incl. holder so that the FH laser beam runs parallel to the bottom border marking of the 3D sensor area.
10. Firmly tighten the screws (G) of the bottom laser module.
11. Switch the laser light localizers off again.



9.7.2 FH laser light localizer (Ceph)

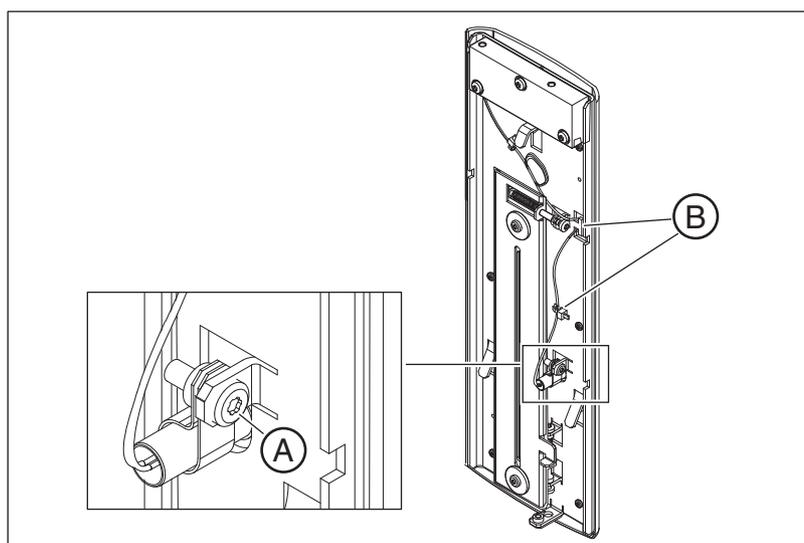
9.7.2.1 Replacing the ceph laser module in the FH laser light localizer (ceph)

1. Remove the covers "Cephalometer cover" and "Outside secondary diaphragm" [→ 41].

IMPORTANT

Do not under any circumstances remove or move the secondary diaphragm!
Otherwise the system will require readjustment.

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.

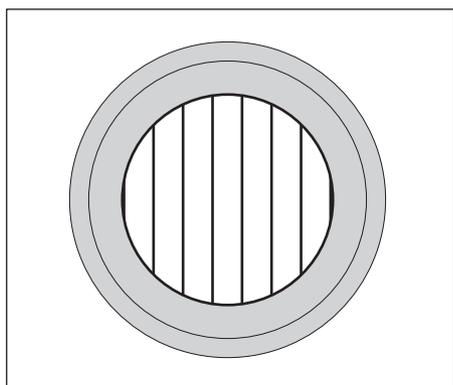


3. Loosen the screw (**A**) and remove the FH laser module (Ceph).
4. Insert the new laser module (FH) and retighten screw (**A**).

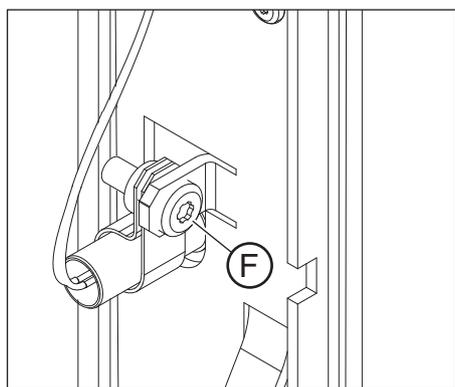
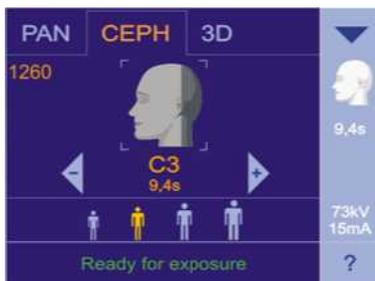
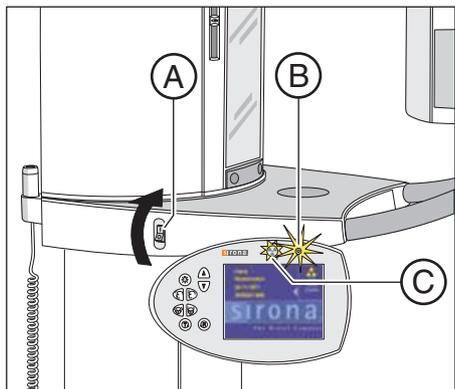
IMPORTANT

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". [→ 41]
8. Next, adjust the FH laser light localizer (Ceph) [→ 396].
9. Reattach the "Outside secondary diaphragm" cover [→ 41].



9.7.2.2 Adjusting the FH laser light localizer (Ceph)



✓ The "Outside secondary diaphragm" cover must have been removed [→ 41].

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.

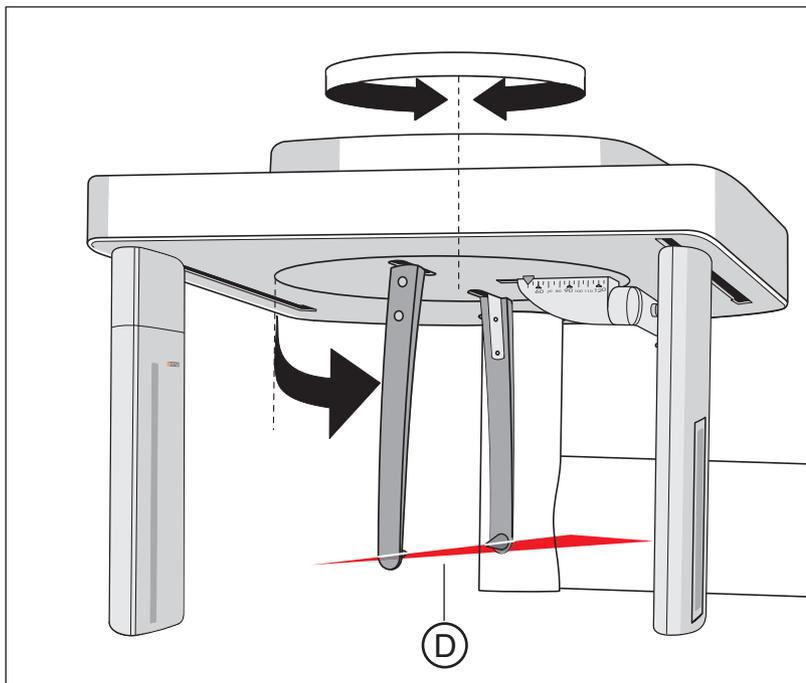
3. Press the R key.

- ↪ The diaphragm and the sensor move into the starting position for ceph exposures.

4. Press the light localizer key on the control panel.

- ↪ Then light localizers are switched on.
- ↪ The FH laser beam (D) must run horizontally between the ear plugs (tolerance: ± 1.5 mm).

5. Loosen the screw (F) of the laser module.

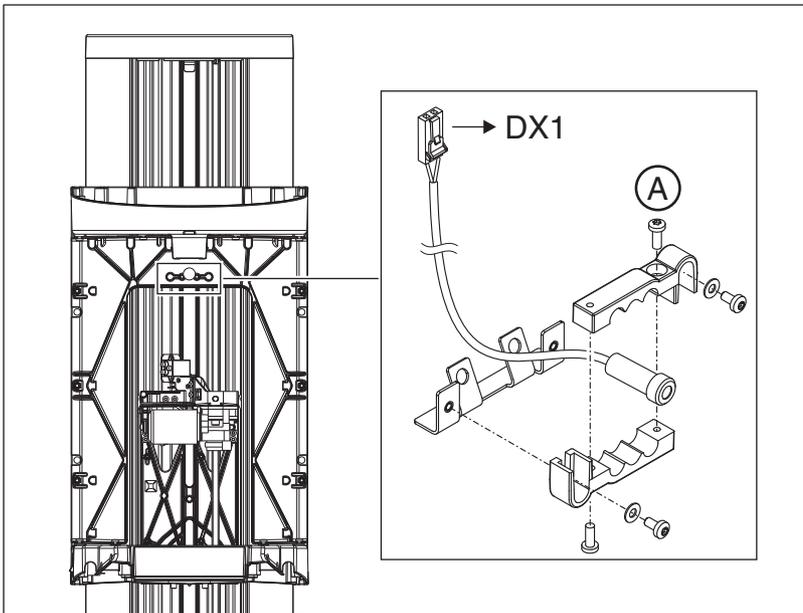


6. Align the Ceph (FH) laser module so that FH light beam (**D**) runs horizontally between the ear plugs (tolerance: ± 1.5 mm).
7. **NOTICE! Ensure that you do not turn the laser module while tightening the screws.**
Firmly tighten the screws (**F**) of the laser module.
8. Switch the laser light localizers off again.
9. Check the light localizer again and perform a correction if necessary.

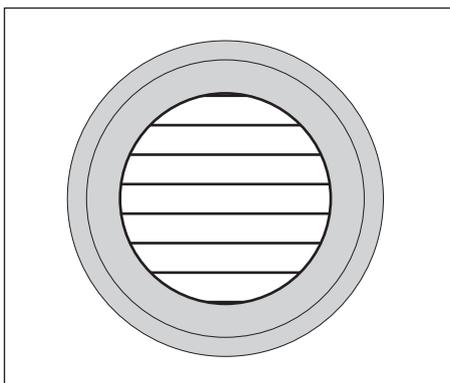
9.7.3 MS laser light localizer (pan)

9.7.3.1 Replacing the laser module in the MS laser light localizer (pan)

1. Remove the "Top arm" cover [→ 41].



2. Pull the cable of the MS laser module off connector **X811** on board **DX1**.
3. Loosen the "Front slide" [→ 41] cover, and carefully pull it off toward the front together with the FH double laser light localizer.
4. Pull off the cables of the FH laser modules from cable **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 reinsert the screws (**A**) (do not tighten yet!).



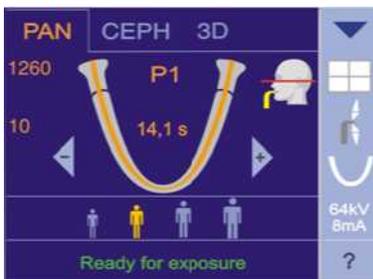
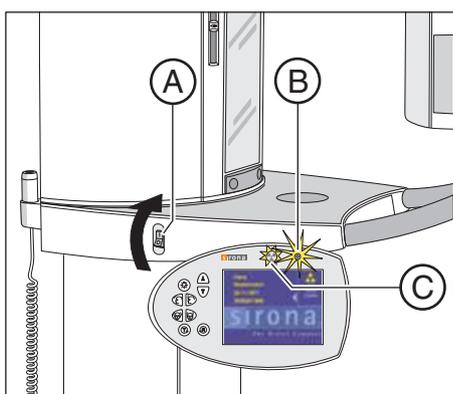
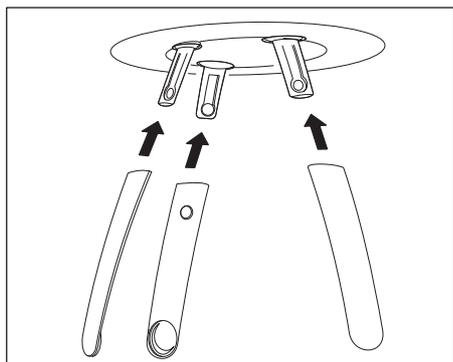
IMPORTANT

Make sure that the lines in the laser module run horizontally.

8. Retighten screws (**A**) firmly.
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 [→ 399].
11. Set the "Front slide" cover down on the "Top support" cover.
12. Plug the cables of the FH laser modules into the sockets of cable **L14**.
13. Reattach the "Front slide" and "Top arm" covers [→ 41].

9.7.3.2 Adjusting the MS laser light localizer (PAN)

✓ The "Front slide" cover must have been removed [→ 41].



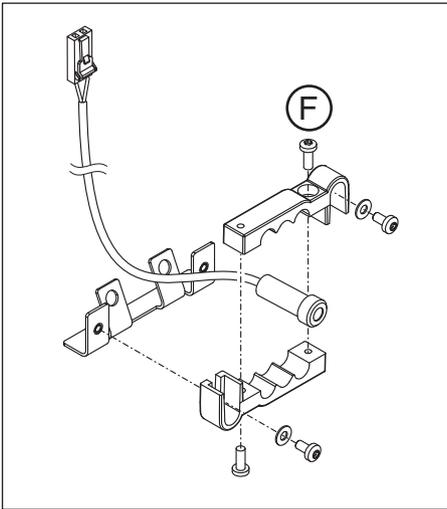
1. Insert the forehead and temple supports (see also Operating Instructions).

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. Press the R key.
 - ↪ The diaphragm and the sensor move into the starting position for panoramic exposures.

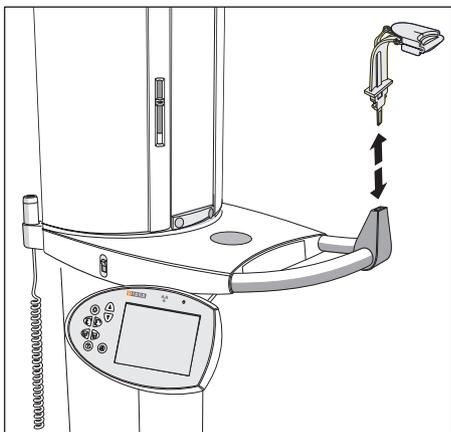
5. Press the light localizer key on the control panel.
 - ↪ The light localizers are switched on.
 - ↪ The vertical laser beam must be displayed in the center of the forehead support and the bite block holder.



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.

9.8 Occlusal bite block

9.8.1 Replacing the occlusal bite block



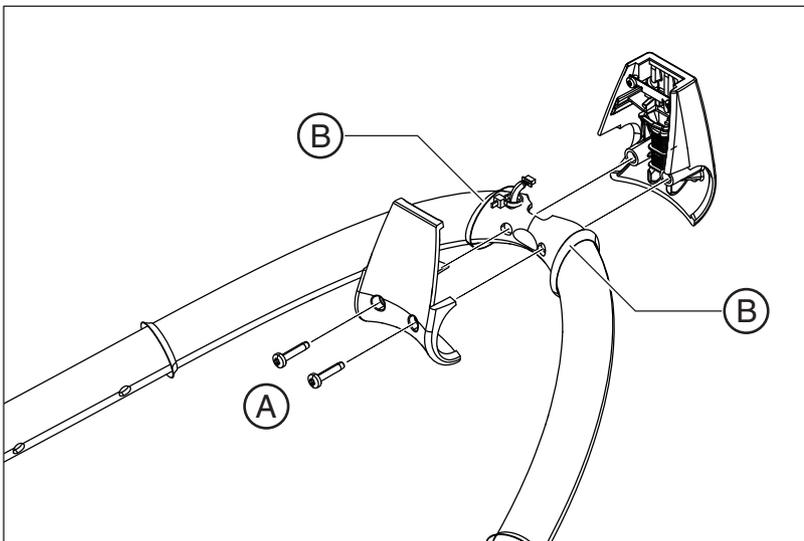
- Replace the defective occlusal bite block with the new one.

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 [→ 334].
3. Check the function of the occlusal bite block.

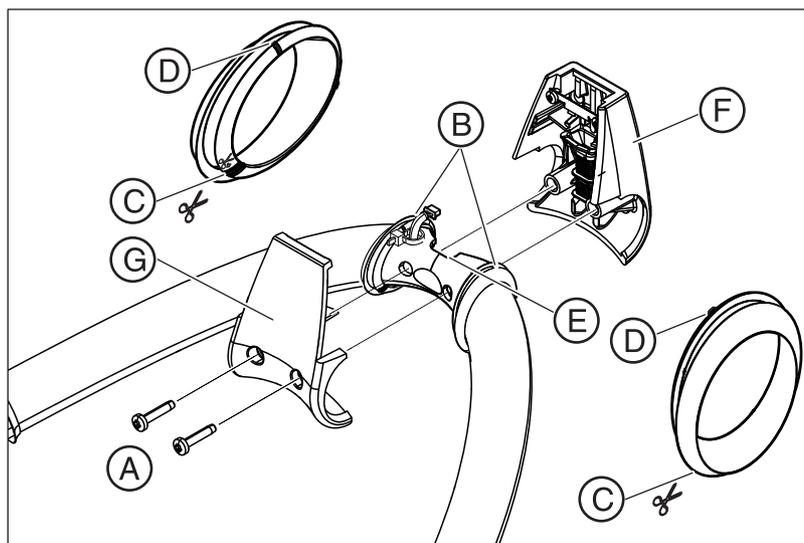
9.9 Bite block holder

9.9.1 Replacing the bite block holder



1. Loosen the two screws (A) and remove the bite block holder.
2. *For units with an occlusal bite block only:*
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 [→ 403]").
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 [→ 402]".

1. Loosen the two screws **A** and remove the bite block holder.
2. *For units with an occlusal bite block only:*
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 symmetry test exposure*" test exposure (see [→ 472]).
2. Perform a 2D unit adjustment, if necessary.

9.10 Diaphragm unit

9.10.1 Replacing the diaphragm unit

IMPORTANT

Only the diaphragm unit of ORTHOPHOS XG 3D may be installed! Note the dependency of the diaphragm unit on device serial numbers in the spare parts list.

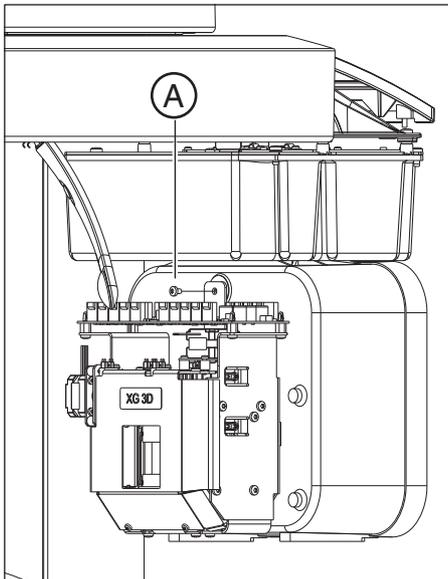
IMPORTANT

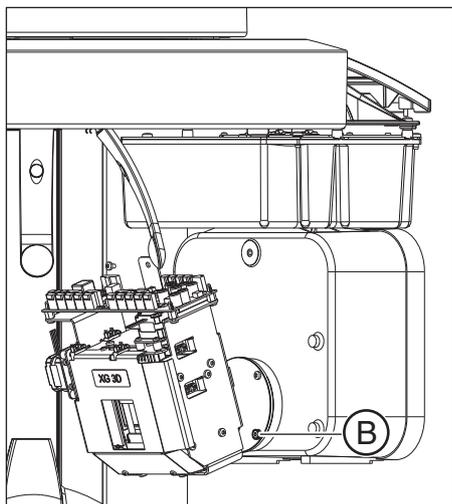
The diaphragm unit may be replaced only as a complete module.

IMPORTANT

Depending on the device serial number or tube assembly version, the tube assembly installed in your device may differ slightly from the figures in this section.

1. Remove the "Rear tube assembly" cover [→ 41].
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. Loosen the screw (**A**) at the top flap of the diaphragm unit and unhook the defective diaphragm unit from the brass rings (**B**) at the tube assembly.





- 5. NOTICE! Ensure that the new diaphragm unit is securely hooked into the tube assembly with the bottom two flaps.**
Hook the new diaphragm unit with the bottom two flaps into the brass rings (B) on the tube assembly and fix them again with the screw (A).
- 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 DX6.**
- 8. Reattach the "Rear tube assembly" cover [→ 41].**

9.10.2 What has to be done after replacing the diaphragm unit?

IMPORTANT

Use the most current software version available on the ORTHOPHOS XG3D CD.

1. Switch the unit on.
2. Perform a software update to the current unit software version [→ 62].
3. Switch the unit off.
Wait approx. 1 minute. Then switch the unit on again.
👉 All modules are updated in accordance with the configuration.

IMPORTANT

If error message E7 61 17 is displayed:

Perform service routine S017.17.

4. Perform a complete unit adjustment or calibration [→ 184].
5. *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

compatibility

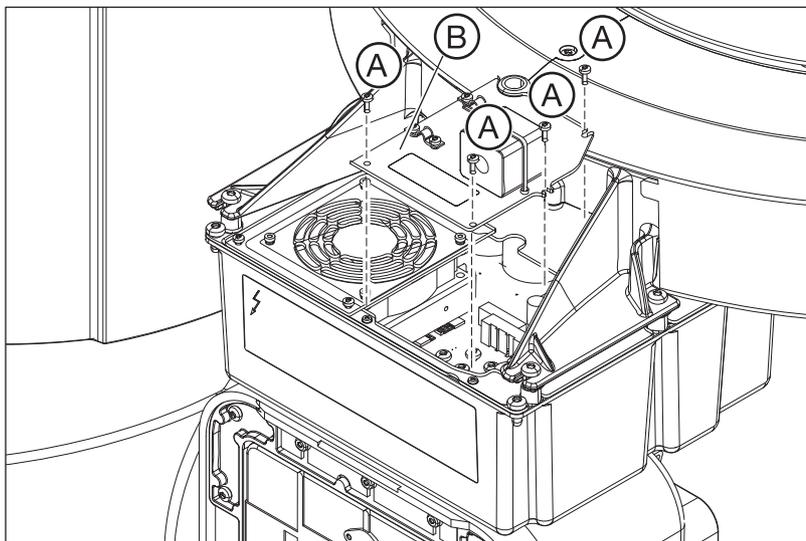
Check that the tube assembly is compatible with your device:

Device type	Serial number	Tube assembly version
ORTHOPHOS XG 3D	< 629600	1.0
ORTHOPHOS XG 3D/Ceph	< 649323	1.0
ORTHOPHOS XG 3D	≥ 629601	2.0
ORTHOPHOS XG 3D/Ceph	≥ 649324	2.0

IMPORTANT

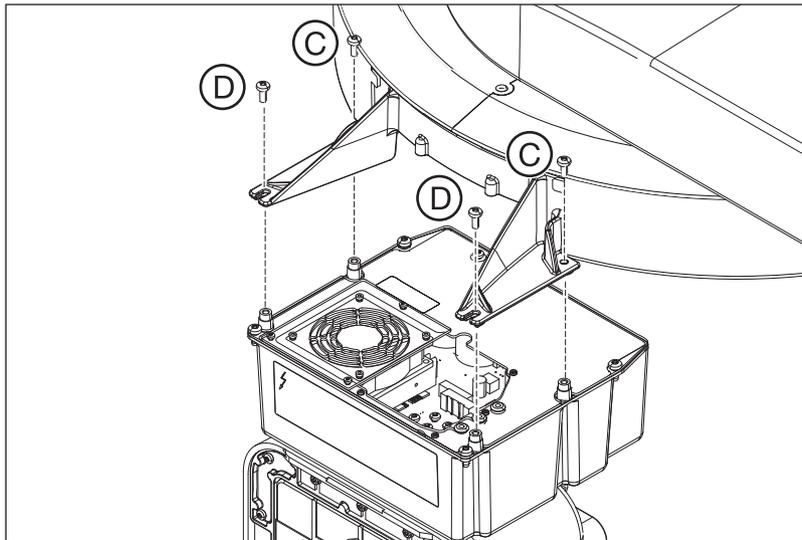
Depending on the device serial number or tube assembly version, the tube assembly installed in your device may differ slightly from the figures in this section.

1. Remove the "Front tube assembly" and "Rear tube assembly" covers [→ 41].
2. Remove the diaphragm unit as described in the chapter entitled Replacing the diaphragm unit [→ 404].



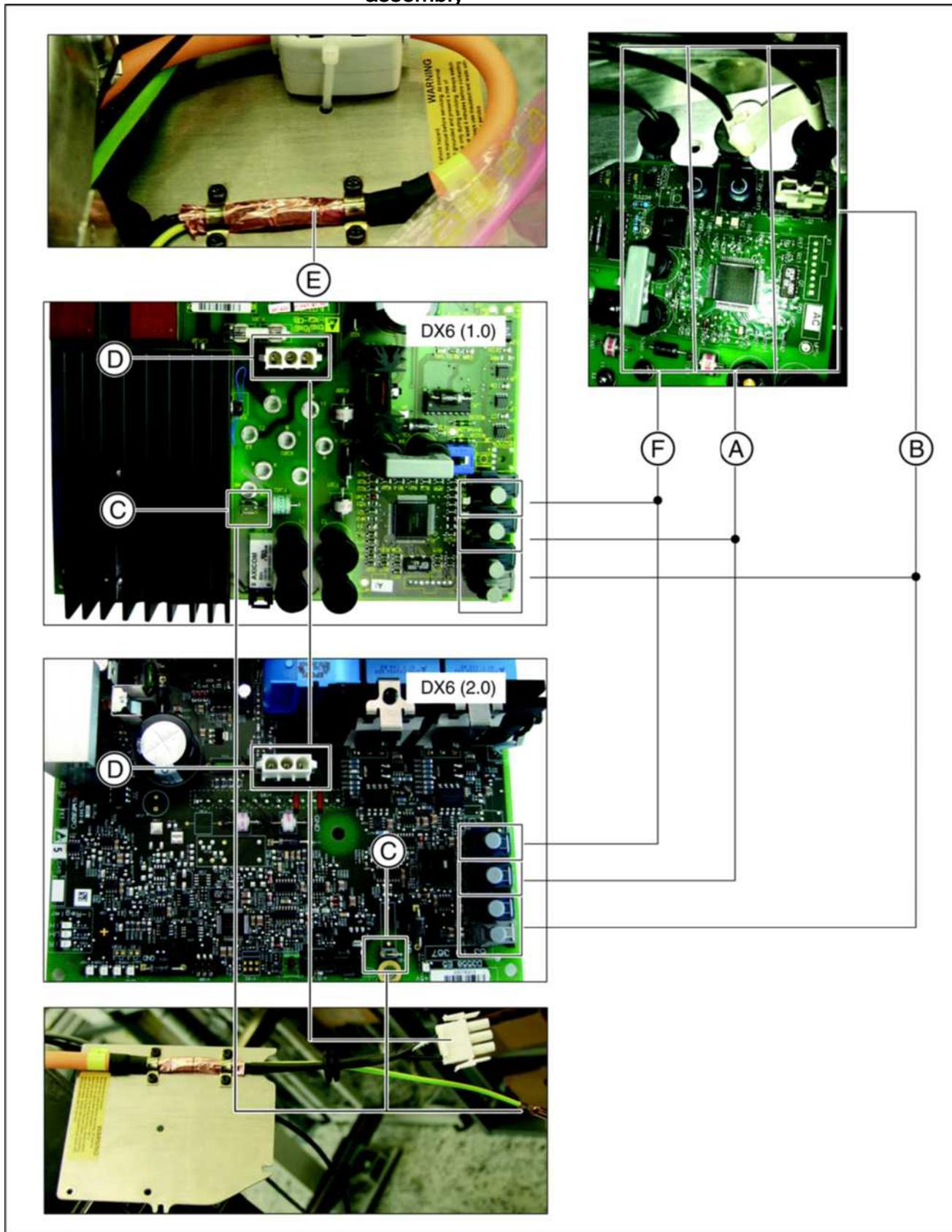
3. Remove the ferrite core and cable shielding from the cover plate.
4. Loosen the four screws (A) and remove cover plate B incl. the cable shielding (L3). Caution! Also pull cable L3 off connector X3 and the ground cable off connector X304 (tube assembly 1.0) or X103 (tube assembly 2.0) on board DX6.

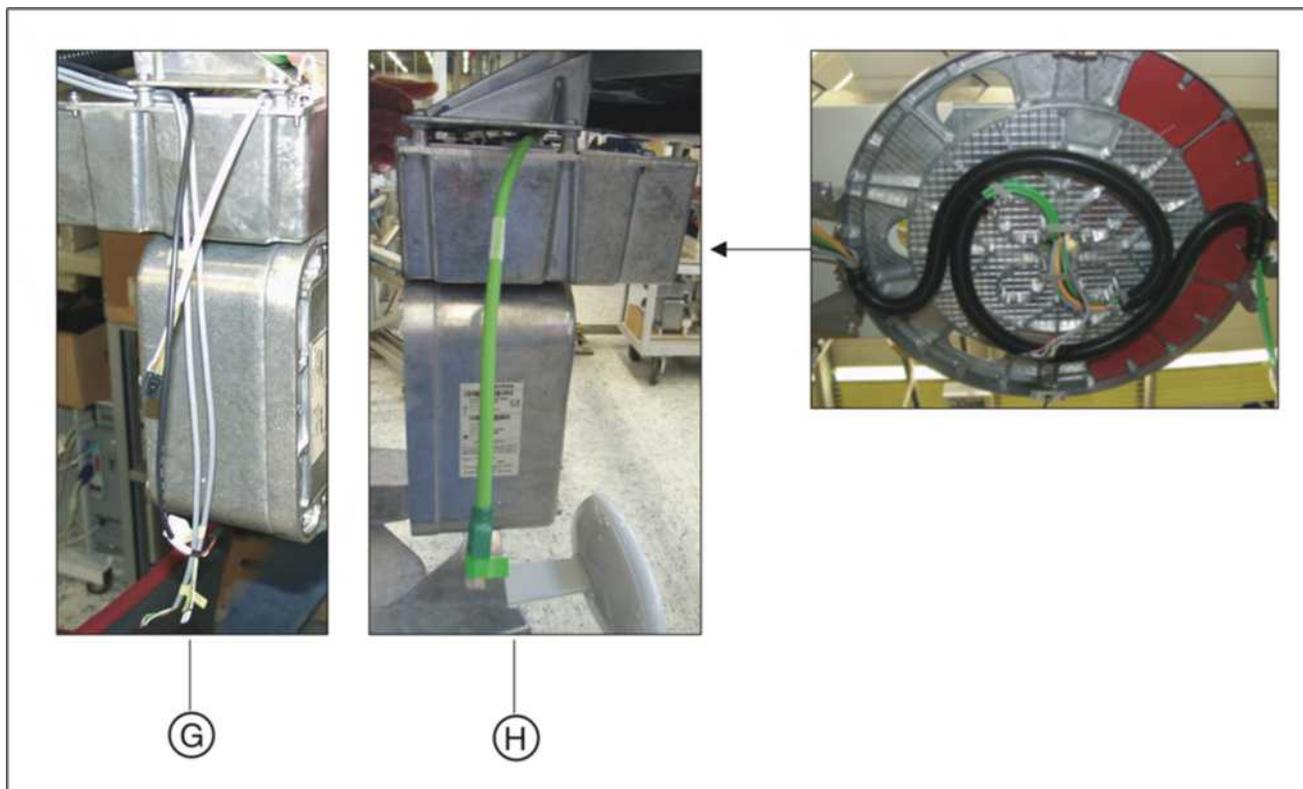
5. Detach cables **L5** and **L6** from the rubber grommets and pull the cables out of sockets **J6** (L5) and **J2-J3** (L6) on board **DX6**.



6. Loosen the two rear screws (**C**) on the tube assembly.
7. **CAUTION! (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.
8. Hang the new tube assembly on the two front screws of the rotating element and tighten them securely.
9. Insert the two rear screws and tighten them firmly.
10. Plug cables **L3**, **L5** and **L6** as well as the ground cable back onto board **DX6** and reattach the cables to the rubber grommets.
11. Reattach the cover plate.
12. Reassemble the diaphragm unit [→ 404].
13. Reattach the covers "Front tube assembly" and "Rear tube assembly" [→ 41].
14. *Tube assembly 1.0 only:*
Update the nameplate on the tube assembly cover by affixing the supplied label as shown in the figure.

9.11.2 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 → Connector 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.

9.11.3 What has to be done after replacing the X-ray tube assembly?

IMPORTANT

The tube assembly may be replaced only as a complete module.

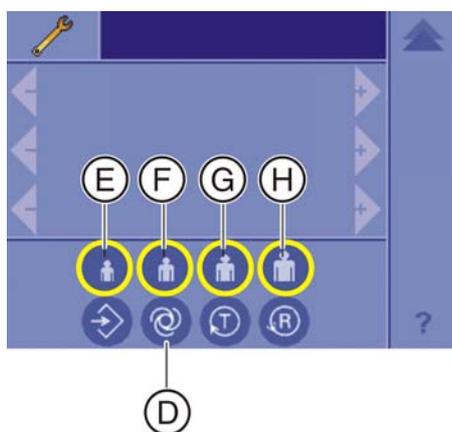
IMPORTANT

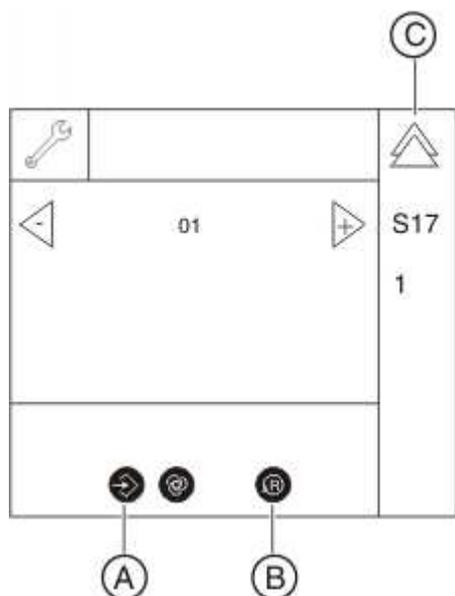
Note the dependency of the tube assembly on device serial numbers in the spare parts list.

IMPORTANT

Use the most current software version available on the ORTHOPHOS XG3D CD.

1. Switch the unit on.
NOTICE! Do not acknowledge any error messages at this time.
2. If the software status of the newly installed DX6 board is not compatible with the current overall system software version, perform a software update to the current system version.
The current update file is located on the ORTHOPHOS XG3D Firmware CD. It is delivered with each DX6 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 Product Info/X-ray Systems): www.sirona.com
3. Switch the unit off.
Wait approx. 1 minute. Then switch the unit on again.
↳ Error message **E6 11 07** (undefined system class) is displayed.
4. Acknowledge the error message with the R key.
↳ The access level for the service menu (level 4) is automatically started.
5. Press and hold down the service key (D) until the patient symbol keys light up (approx. 2 s).



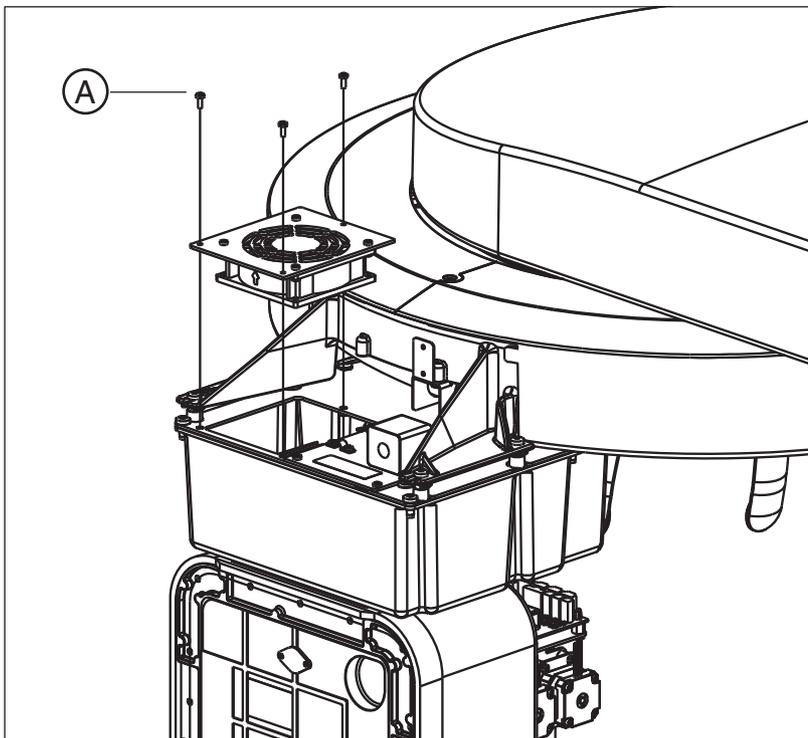


6. Then press the patient symbol keys in the sequence **F – H – E** within the next 4 s.
 - ↳ Once the key combination has been entered correctly, service routine S017.1 (select/confirm unit class) is started automatically.
 - ↳ The memory key (**A**) lights up.
7. Confirm the unit class "01":
 To do so, touch the memory key (**A**) (R key on the touchscreen lights up) and then the R key on the Touchscreen (**B**).
8. Exit the service routine with the double-arrow key (**C**).
9. Switch the unit off.
 Wait approx. 1 minute. Then switch the unit on again.
 - ↳ 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 **E6 1505** (undefined unit serial number) is displayed.
10. Acknowledge the error message using the R key on the control panel.
11. Call the service menu.
12. Call service routine S008.3.
13. 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!
14. Confirm the serial number using service routine S008.3 [→ 287].
15. Perform a software update to the current software version [→ 62].
 - ↳ All modules are updated in accordance with the configuration.
16. Switch the unit off.
 Wait approx. 1 minute. Then switch the unit on again.
17. Perform a complete unit adjustment or calibration [→ 184].
18. *Only for Germany, Austria, Switzerland and France:*
 Perform an acceptance check without consulting an expert.
19. Select the "Extended details [→ 71]" via SiXABCon.
 - ↳ This generates a new XML file (with the system parameters) which is filed under the network name of the unit in the PDATA/.../P2K_Config folder [→ 71].
- ↳ The process is completed.

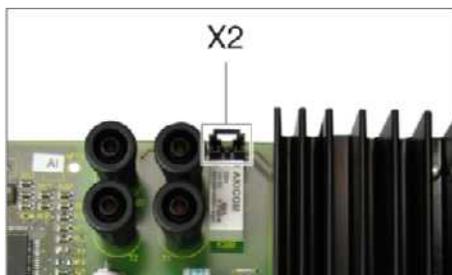
9.12 Fan (X-ray tube assembly)

9.12.1 Replacing the fan (tube assembly 1.0)

1. Remove the "Rear tube assembly cover".



2. **NOTICE! Cable!** Loosen the three screws (A) and carefully remove the cover plate including the fan.
3. Pull the fan cable off connector X2 on board DX6.
4. Install the new fan in the reverse order of removal.

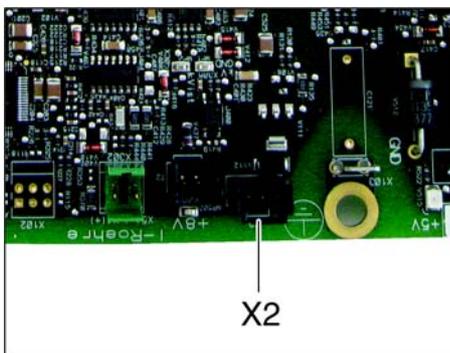
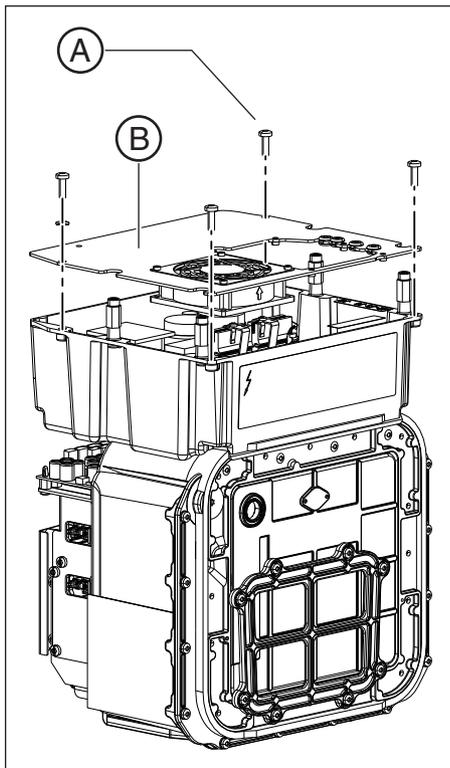


9.12.2 Replacing the fan (tube assembly 2.0)

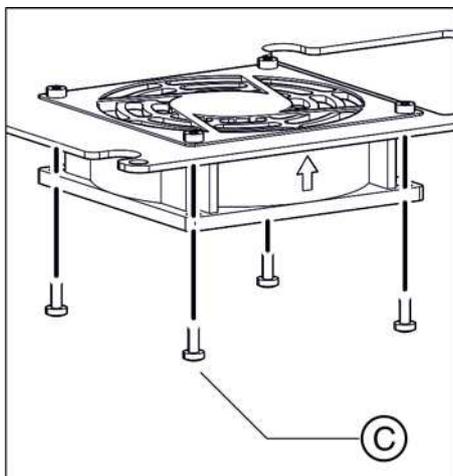
IMPORTANT

As the X-ray tube assembly has to be disassembled when replacing the fan on tube assembly version 2.0, after replacing the fan, the device must be fully readjusted (recalibrated) [→ 184].

1. Disassemble the tube assembly [→ 406].
2. **NOTICE! Cable!** Loosen the four screws (A) and carefully remove the cover plate (B) including the fan.



3. Pull the fan cable off of connector X2 on board DX6.



4. Loosen the four screws (C) and remove the faulty fan from the cover plate.
5. Install the new fan, the cover plate, and the tube assembly in the reverse order of removal.

9.12.3

What has to be done after replacing the fan?

Replacing the fan on tube assembly 1.0

Replacing the fan on tube assembly 2.0

- Check the function of the fan using service routine S005.4 [→ 275].
1. Check the function of the fan using service routine S005.4 [→ 275].
 2. Perform a complete unit adjustment or calibration. [→ 184]

9.13 Combisensor

9.13.1 Replacing the rotation unit

CAUTION

The unit is rotated via a motor drive.

Never turn the rotation unit manually, as this could damage the gearing.

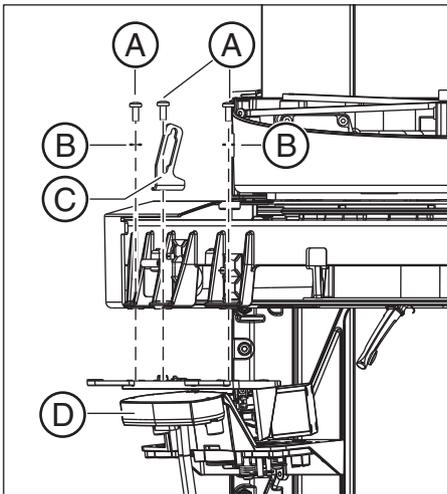


L13

L13a

1. Loosen the screws of cables **L13** and **L13a** and remove the connector and bushing from the connector plate (**C**).
2. Loosen the cable ties on the ring and remove the motor cable **L20** and the two light barrier cables **L21** from connectors **X203** (L20) and **X303** (L21) on the ring.



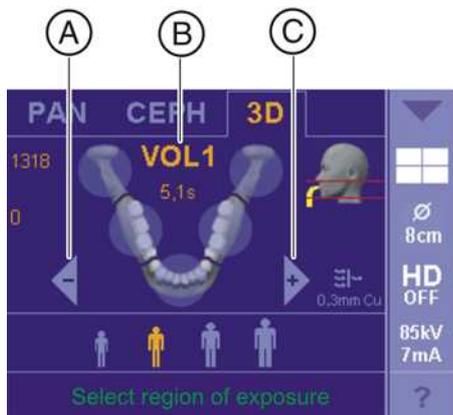


3. Loosen the three screws (A) and washers (B), and remove the connector plate (C) and rotation unit (D).
4. Install the new rotation unit by following the instructions for removal in reverse and attach new cable ties.

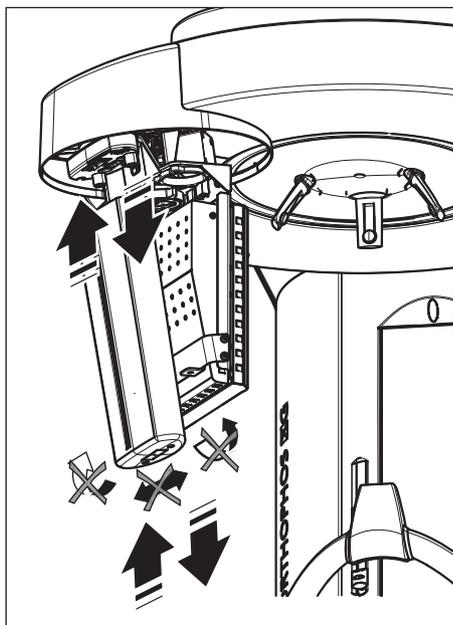
9.13.2 Replacing the 3D module

NOTICE

The 3D module may not be replaced without the board DX88!



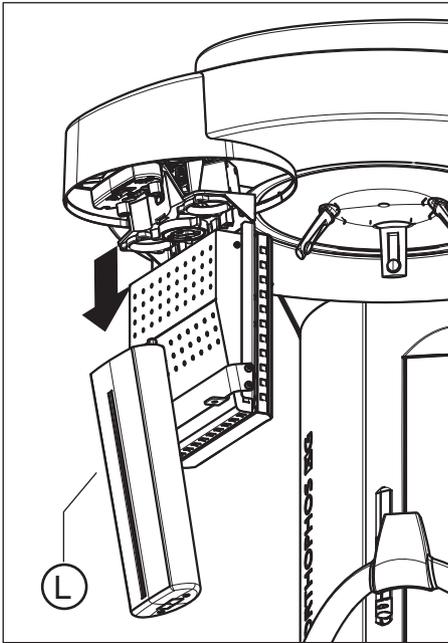
1. Switch the unit on [→ 60].
2. Touch the 3D symbol at the top of the touchscreen.
↳ The exposure program VOL1 is displayed.
3. Press the R key.
↳ The diaphragm and the sensor move into the starting position for volume exposures.
4. Switch the unit off again.
5. Remove the "Bottom 3D module" cover [→ 41].



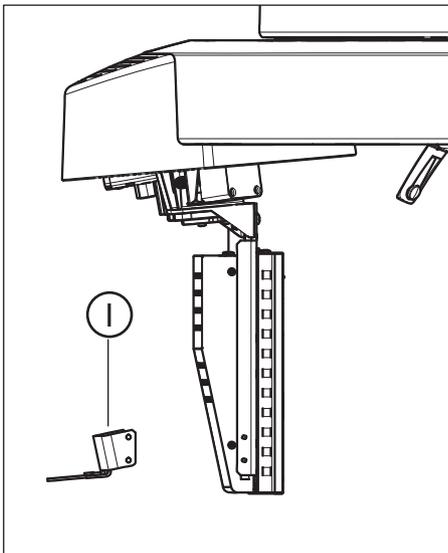
NOTICE

Damage to the rotation unit

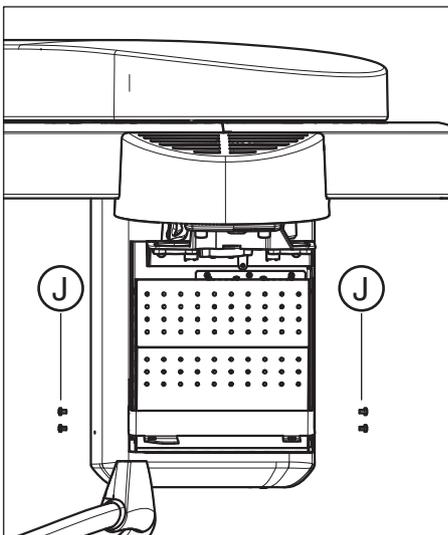
Avoid unnecessary leverage while inserting or removing the 2D sensor since the rotation unit could be damaged.

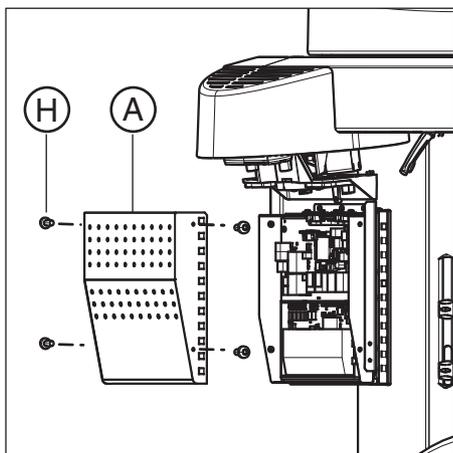


6. Remove the 2D sensor (Pan) (L).

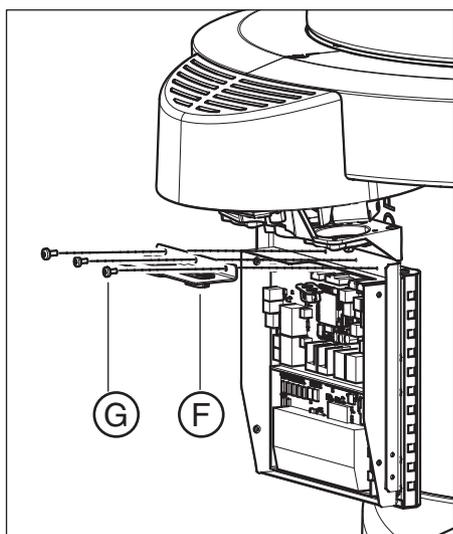


7. Loosen the 4 screws (J) and remove the support bracket (I).

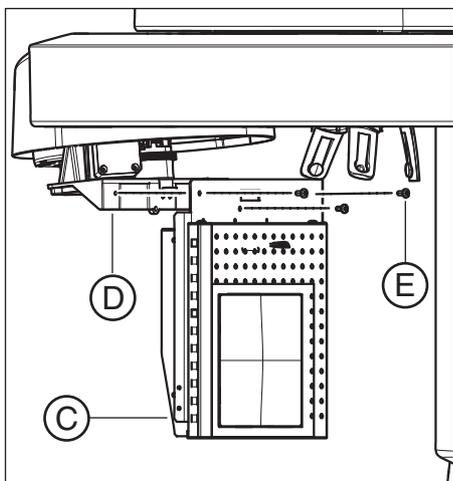




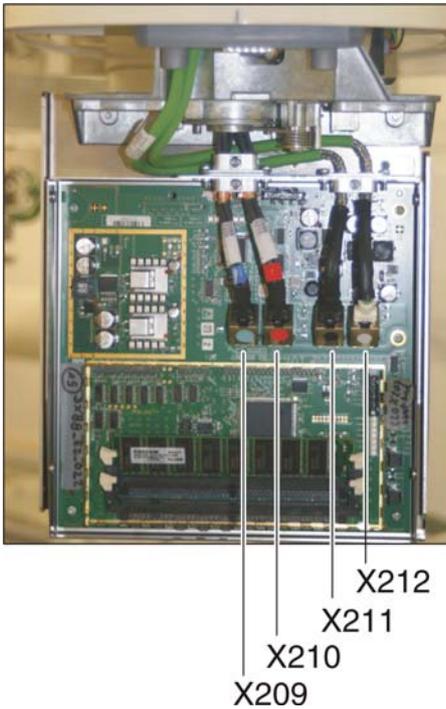
8. Loosen the 4 screws (H) and remove the EMC cover (A).
9. Unplug the cables from the sockets of board DX88.



10. Loosen the 3 screws (G) and remove the sheet metal bracket (F) (incl. cable and strain reliefs).



11. **CAUTION! Hold the flat panel firmly in place while loosening the screws to prevent it from falling down.**
Loosen the 3 screws (E) and remove the 3D module (C) from the rotation unit (D).



12. Install the new 3D module in reverse order of the removal (see also Installation Instructions).
Observe the color codings when plugging the cables into the sockets of board **DX88**:
X212 = white
X211 = black
X210 = red
X209 = blue

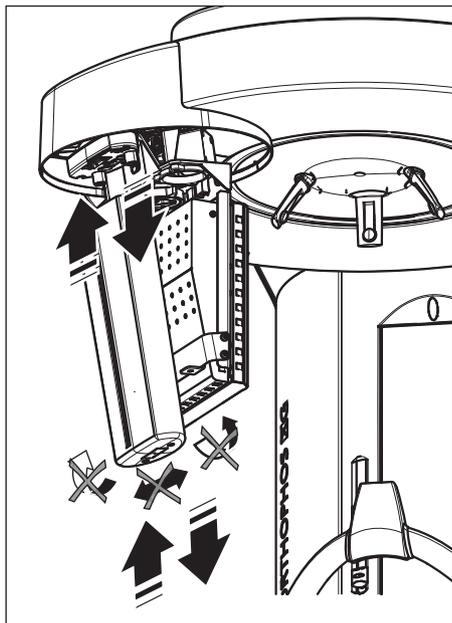
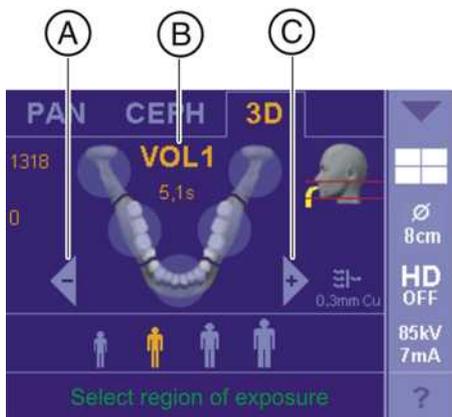
9.13.2.1 What has to be done after replacing the 3D module?

IMPORTANT

Use the most current software version available on the ORTHOPHOS XG3D CD.

1. Switch the unit on.
2. Perform a software update to the current unit software version [→ 62].
3. Restore the configuration data of board DX88 by using service routine S009.8 [→ 290].
4. Check the rotation unit for a smooth rotation by switching between the operating modes *Pan* and *3D* via the control panel.
5. Perform a complete unit adjustment or calibration [→ 184].
6. *Only for Germany, Austria, Switzerland and France:*
Perform an acceptance check without consulting an expert.

9.13.3 Replacing the 2D sensor (Pan)

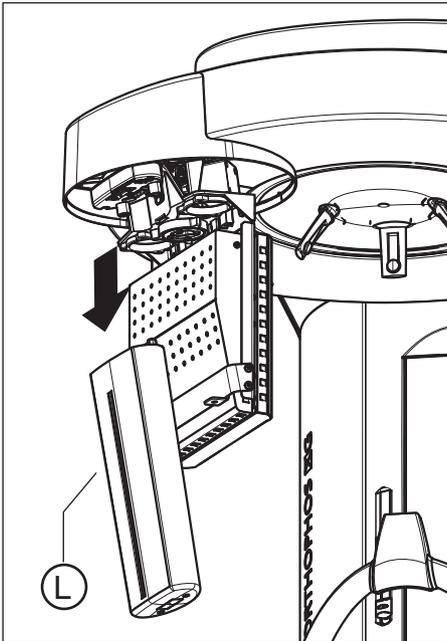


1. Switch the unit on [→ 60].
2. Touch the 3D symbol at the top of the touchscreen.
↳ The exposure program VOL1 is displayed.
3. Press the R key.
↳ The diaphragm and the sensor move into the starting position for volume exposures.
4. Switch the unit off again.
5. Remove the "Bottom 3D module" cover [→ 41].

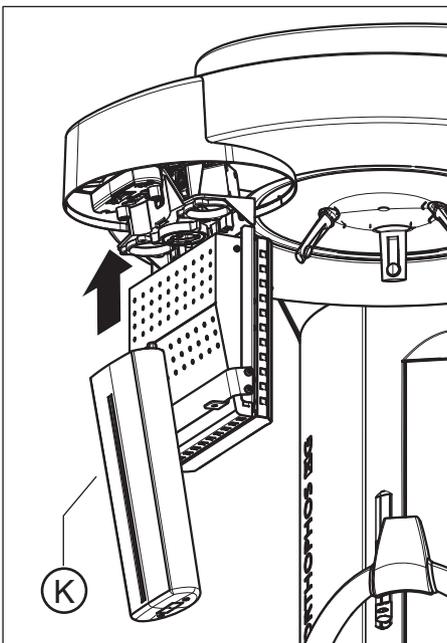
NOTICE

Damage to the rotation unit

Avoid unnecessary leverage while inserting or removing the 2D sensor since the rotation unit could be damaged.



6. Remove the defective 2D sensor (Pan) (L).



7. Insert the new 2D sensor (Pan) (K).

8. Reattach the "Bottom 3D module" cover [→ 41].

9.13.3.1 What has to be done after replacing the 2D sensor (Pan)?

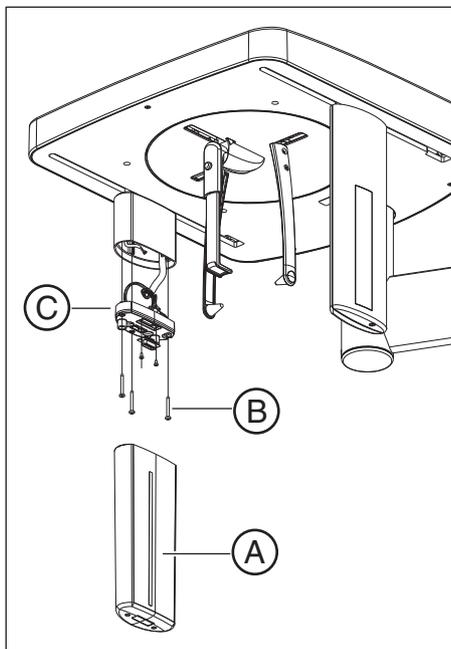
IMPORTANT

Use the most current software version available on the ORTHOPHOS XG 3D CD.

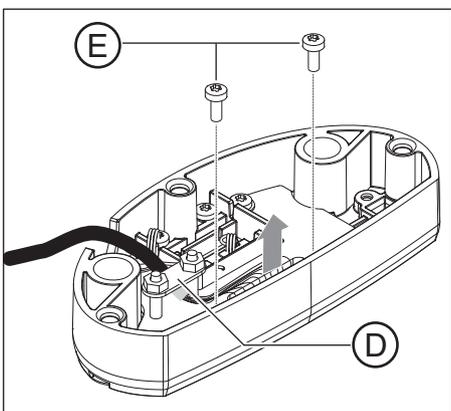
1. Switch the unit on.
2. Perform a software update to the current unit software version [→ 62].
↳ All modules are updated in accordance with the configuration.
3. Switch the unit off.
Wait approx. 1 minute. Then switch the unit on again.
4. Perform a complete unit adjustment or calibration [→ 184].
5. *Only for Germany, Austria, Switzerland and France:*
Perform an acceptance check without consulting an expert.

9.14 Cephalometer

9.14.1 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.

9.14.1.1 What has to be done after replacing the ceph sensor holder?

- Perform the ceph unit adjustment (see Adjustment and calibration via the "Unit adjustment/calibration" menu).

9.14.2 Replacing the ceph sensor

Removal and insertion of the ceph sensor is described in the Operating Instructions of the unit.

9.14.2.1 What has to be done after replacing the ceph sensor?

IMPORTANT

Use the most current software version available on the ORTHOPHOS XG3D CD.

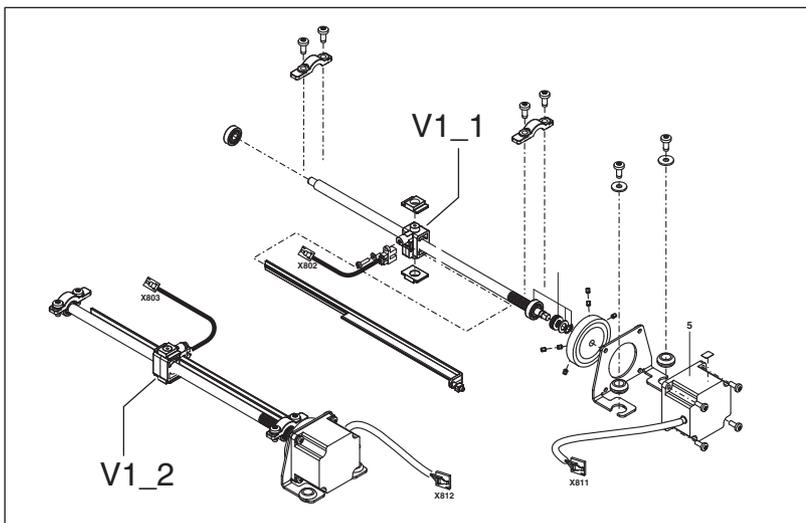
1. Switch the unit on.
2. Perform a software update to the current unit software version [→ 62].
↳ All modules are updated in accordance with the configuration.
3. Switch the unit off.
Wait approx. 1 minute. Then switch the unit on again.
4. Check the ceph adjustment using the test exposure Ceph - Fixed point of rotation test exposure (2D) [→ 475]. If necessary, perform a ceph unit adjustment [→ 184].
5. *Only for Germany, Austria, Switzerland and France:*
Perform an acceptance check without consulting an expert.

9.15 Light barriers

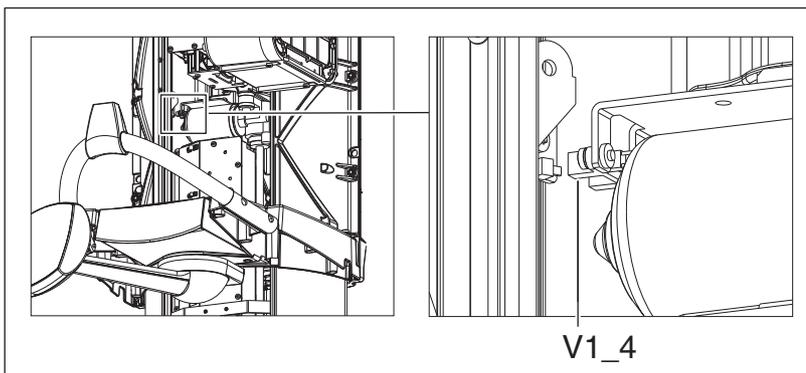
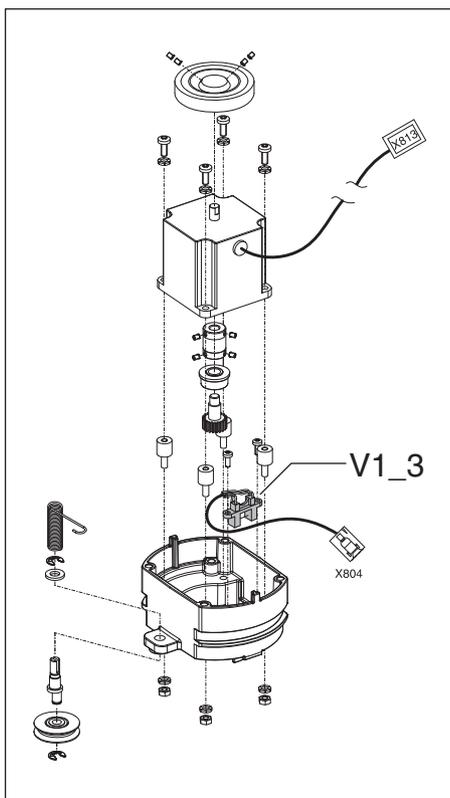
9.15.1 Replacing the light barriers

The following light barriers can be replaced (see also Spare parts list):

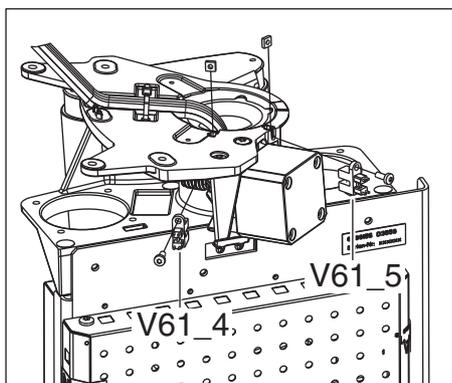
Panoramic unit



- 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**

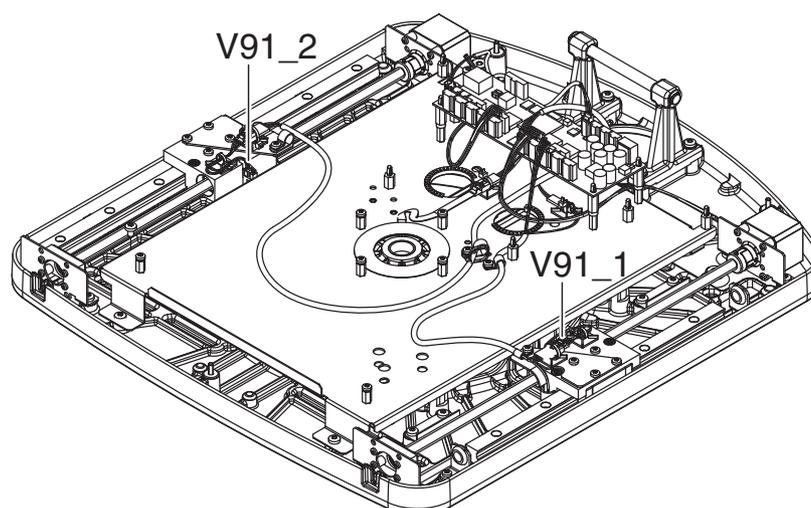


- Light barrier at HA motor, height adjustment: **V1_4**



- Light barrier at combisensor (rotation unit), 3D/Ceph position: **V61_4**
- Light barrier at combisensor (rotation unit), 2D position: **V61_5**

Cephalometer



- Light barrier for patient diaphragm position detection, ceph: **V91_1**
- Light barrier for sensor position detection, ceph: **V91_2**

9.15.2 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.
 - Perform a function check.
 - Perform a complete unit adjustment or calibration.
1. Perform service routines S034.4 [→ 348] and S034.5 [→ 352].
 2. Check the ceph adjustment using the test exposure Ceph - Fixed point of rotation test exposure.
 3. Perform a ceph unit adjustment, if necessary.

9.16 Boards

9.16.1 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.

Prior to replacing boards

In SIDEXIS XG, call up the *"Reset adjustment"* menus and record the adjustment values before you start replacing boards.

Be sure to observe the information in chapter "Measures following replacement of boards [→ 432]. This chapter describes all measures required after the replacement of modules or boards, provided they were known at the time of publication. You will find even more up-to-date information and supplements concerning this subject on the latest ORTHOPHOS XG3D Firmware CD 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.

Replacing the boards DX6 (X-ray tube assembly) and DX11 or DX88 and DX11

Never replace these boards at the same time. After replacing one of these boards, you must first perform the measures specified in the chapter Measures following replacement of boards [→ 432] and then restart the unit. Only then may you begin replacement of the other module.

Prior to replacing board DX11

If the old DX11 is still working:

Call up the "Extended Details" via [→ 71] search for the "Language Set ID" (under "Extended Configuration DX7") and record the configuration of the language set index. If it deviates from 00, the language set index must be configured again after inserting a new DX11 using service routine S017.5 [→ 309].

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.

Connector designations on the boards

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.

9.16.2 Replacing boards

⚠ CAUTION

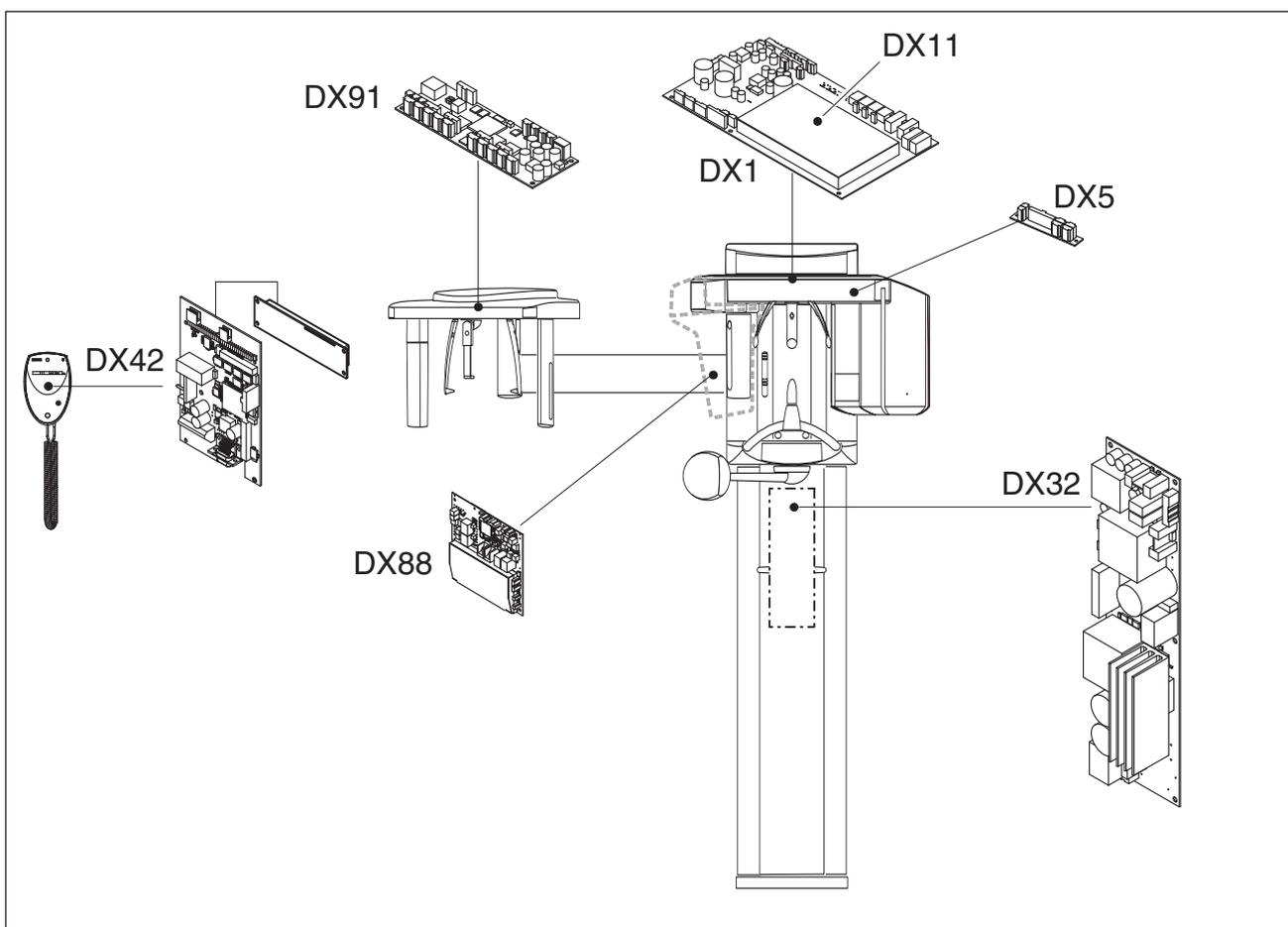
Risk of damage to boards

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.

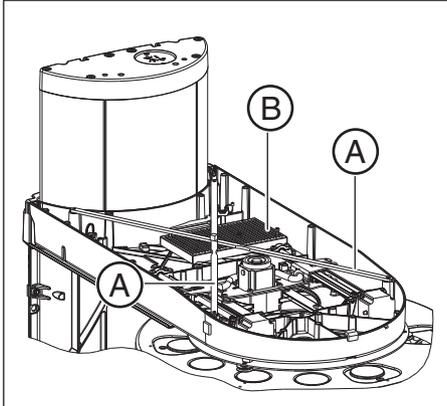
Tip: Check the designations on the connectors when pulling off the cables and label them correctly if necessary.



9.16.2.1 Replacing PC board DX1

IMPORTANT

The software version of the "DX1/DX11 board" must be compatible with the main software version of the unit [→ 49].



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) of the board DX11.
4. Pull all cables off of board DX1.
5. Disassemble and remove the defective board DX1.
6. **NOTICE! You must observe the notes in the chapter titled Replacing board DX11 [→ 431]**
Install the DX11 board from the defective DX1 on the new DX1.
7. Reinstall the DX1 board in the unit and reattach the connectors.
8. Reassemble both cross braces (A).
9. Reattach the covers.

NOTICE! Once you have removed the cross braces (A), the unit must be completely readjusted or recalibrated.

After replacing the board DX1, you must observe the notes provided in the chapter Measures following replacement of boards [→ 432] .

9.16.2.2 Replacing board DX11

IMPORTANT

The software version of the "DX1/DX11 board" must be compatible with the main software version of the unit [→ 49].

IMPORTANT

The cover plates of the DX1 (REF 59 24 142 and REF 62 82 052) board versions are not compatible with each other.

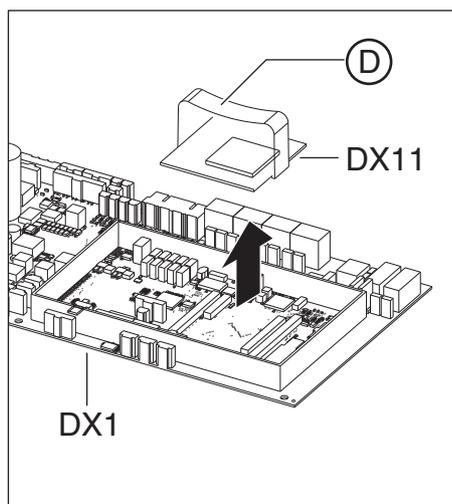
9.16.2.2.1 In the case of boards with REF 59 24 142 (DX1) and REF 59 25 214 (DX11)

- ✓ The cover plate of board **DX11** must be removed [→ 430].
- 1. **CAUTION! Touch a ground point to discharge static electricity before touching any boards.**
Pull the defective **DX11** board to remove it from the **DX1** board.
- 2. Insert the new **DX11** board on the **DX1** and reattach the cover plate.

9.16.2.2.2 In the case of boards with REF 62 82 052 (DX1) and REF 63 17 056 (DX11)

- ✓ The cover plate of board **DX11** must be removed [→ 430].
- 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 the board **DX11**, you must observe the notes provided in the chapter Measures following replacement of boards [→ 432] .



9.16.2.3 Replacing board DX32

The removal of the board **DX32** is described in the chapter Removing board DX32 [→ 374] . Install the board by following the same procedure in reverse order.

After replacing the board **DX32**, you must observe the notes provided in the chapter Measures following replacement of boards [→ 432] .

9.16.3 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 system.

The software versions of the modules can be queried by running service routine S008.2 [→ 286] or using the extended detail query in SiXABCon. 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 [→ 62].

Always carry out the measures described below exactly in the order specified and do not perform any other actions in between.

The following table provides an overview of various possible replacement situations and cross-references to detailed descriptions of the actions required for the corresponding situations following board replacement:

Board	Constellation	Measures	see
DX1	Inserting a new DX1		
	Unit software version V04.04.00 or higher	<ul style="list-style-type: none"> Switch the unit on. 	
		<ul style="list-style-type: none"> Perform a complete unit adjustment or calibration. 	S. [→ 184]
For units with an occlusal bite block:	<ul style="list-style-type: none"> Perform adjustment of the AD acceptance angle values using service routine S018.9. 	S. [→ 334]	
DX11	Inserting a new DX11		
	<p>IMPORTANT: Observe the current information concerning the software compatibility with SIDEXIS XG (see Release Notes on the accompanying CD or on the Internet page of the SIRONA dealer).</p> <p>IMPORTANT: Use the most current software version available on the ORTHOPHOS XG3D CD.</p>		
	Unit software version V04.04.00 or higher	<ul style="list-style-type: none"> Proceed exactly as described in the section titled "". 	S. [→ 435]
DX32	Inserting a new DX32		
	Unit software version V04.04.00 or higher	<ul style="list-style-type: none"> No further action is required. 	

Board	Constellation	Measures	see
DX42	Inserting a new DX42		
	NOTICE! Use the most current software version available on the ORTHOPHOS XG3D CD.		
	Unit software version V04.04.00 or higher	<ul style="list-style-type: none"> Switch the unit on. IMPORTANT: After installing the module, the first displays are incorrect. A correct display is possible only after the software update. 	
		<ul style="list-style-type: none"> Perform a software update to the current unit software version. 	S. [→ 62]
<ul style="list-style-type: none"> Perform a restart of the device. 			
DX5	Inserting a new DX5		
	Unit software version V04.04.00 or higher	<ul style="list-style-type: none"> Switch the unit on. 	
		<ul style="list-style-type: none"> Perform adjustment of the AD acceptance angle values using service routine S018.9. 	S. [→ 334]
<ul style="list-style-type: none"> Check the function of the occlusal bite block. 			
DX61	Using a new diaphragm unit (incl. DX61)		
	NOTICE! Note the dependency of the diaphragm unit on device serial numbers in the spare parts list.		
	Unit software version V04.04.00 or higher	<ul style="list-style-type: none"> Check the compatibility between the software version of the modules and that of the overall system. 	S. [→ 49]
		<ul style="list-style-type: none"> Perform an update or a downgrade if necessary. 	S. [→ 62]
	Installation of a new DX61 in a previously installed diaphragm unit		
	Unit software version V04.04.00 or higher	<ul style="list-style-type: none"> Check the compatibility between the software version of the modules and that of the overall system. 	S. [→ 49]
<ul style="list-style-type: none"> Perform an update or a downgrade if necessary. 		S. [→ 62]	
<ul style="list-style-type: none"> Perform service routine S017.17. 		S. [→ 318]	

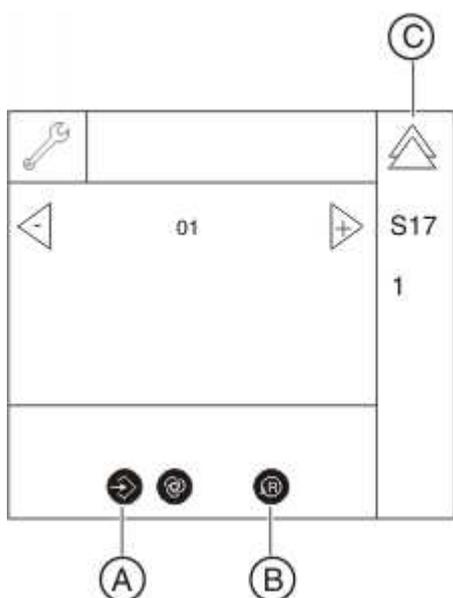
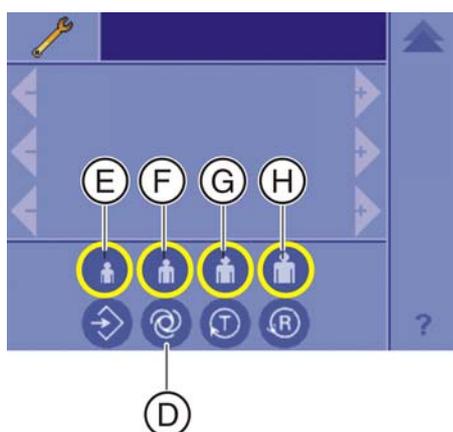
Board	Constellation	Measures	see
DX88	Inserting a new DX88		
	IMPORTANT: Use the most current software version available on the ORTHOPHOS XG3D CD.		
	Unit software version V04.04.00 or higher	<ul style="list-style-type: none"> Switch the unit on. 	
		<ul style="list-style-type: none"> Perform a software update to the current unit software version. 	S. [→ 62]
		<ul style="list-style-type: none"> Restore the configuration data of board DX88 by using service routine S009.8. 	S. [→ 290]
<ul style="list-style-type: none"> Perform a diaphragm test exposure with the setting "Original 3D diaphragm". 		S. [→ 480]	
	Only in Germany, Austria, Switzerland and France: <ul style="list-style-type: none"> Perform an acceptance test without calling in an expert. 		
DX91	Inserting a new DX91		
	Unit software version V04.04.00 or higher	<ul style="list-style-type: none"> Perform service routines S034.4 and S034.5. 	S. [→ 348] S. [→ 352]
		<ul style="list-style-type: none"> Perform a ceph adjustment. 	S. [→ 184]

9.16.3.1 After changing the DX11 board

IMPORTANT

After a new DX11 is inserted, the IP address is initially reset to the factory setting. Before you set the unit to a new IP address, make sure that the IP address you're assigning has not been assigned to any other unit.

1. Switch the unit on.
 - ↳ Error message **E6 11 07** (undefined system class) is displayed.
2. Acknowledge the error message with the R key.
 - ↳ The access level for the service menu (level 4) is automatically started.
3. Press and hold down the service key (D) until the patient symbol keys light up (approx. 2 s).
4. Then press the patient symbol keys in the sequence F – H – E within the next 4 s.



- ↳ Once the key combination has been entered correctly, service routine S017.1 (select/confirm unit class) is started automatically.
 - ↳ The memory key (A) lights up.
5. Confirm the unit class "01":
 To do so, touch the memory key (A) (R key on the touchscreen lights up) and then the R key on the Touchscreen (B).
 6. Exit the service routine with the double-arrow key (C).
 7. Switch the unit off.
 Wait approx. 1 minute. Then switch the unit on again.
 8. Call the service menu [→ 256].
 9. Call service routine S037.4.
 10. Set the IP address for the unit. [→ 365]
 11. Switch the unit off.
 Wait approx. 1 minute. Then switch the unit on.
NOTICE! Do not acknowledge any error messages at this time.
 12. Use the "Automatic" update mode to perform an automatic software update [→ 62] to the current unit software version.
 The current update file is located on the ORTHOPHOS XG3D Firmware 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 Product Info/X-ray Systems): www.sirona.com

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.

13. Switch the unit off.
Wait approx. 1 minute. Then switch the unit on again.
14. Call the service menu.
15. Call service routine S008.3.
16. 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!
17. Confirm the serial number using service routine S008.3 [→ 287].
18. Switch the unit off.
Wait approx. 1 minute. Then switch the unit on again.
19. Check whether the directory PDATA/.../P2K_Config contains an XML file with the network name of the unit. This file contains up-to-date information about the previous system configuration! See also the chapter Opening "Details" [→ 71].
20. Call the service menu.
21. Call service routine S017 and perform the unit configuration using service routines S017.2 - S017.18.
IMPORTANT: For service routine S017.17, set the data direction to "DX61 → DX11".
22. Switch the unit off.
Wait approx. 1 minute. Then switch the unit on again.
 - ↳ The error message **E1 1031** (identification data of 3D module not adjusted) is displayed.
23. Call service routine S009.8 [→ 290].
24. If the travel height of the unit has to be limited:
Set the travel height with service routine S018.2 [→ 325].
25. Perform a software update to the current software version [→ 62].
 - ↳ All modules are updated in accordance with the configuration.
26. Perform a complete unit adjustment or calibration. [→ 184]
27. *For units with occlusal bite block:*
Call service routine S018.9 and perform adjustment of the AD acceptance angle values [→ 334].
28. *For units with occlusal bite block:*
If customer-specific angle settings exist (see the txt file in the directory PDATA/.../P2K_Config (see also the chapter Opening "Details" [→ 71]) then adjust them with service routine S018.7 [→ 330].
29. Select the "Details" via SiXABCon.
 - ↳ This generates a new txt file (with the system parameters) which is filed under the network name of the unit in the PDATA/.../P2K_Config folder [→ 71].
 - ↳ The process is completed.

9.17 Cable

9.17.1 Replacing energy chain 1 completely

Removing the defective energy chain

IMPORTANT

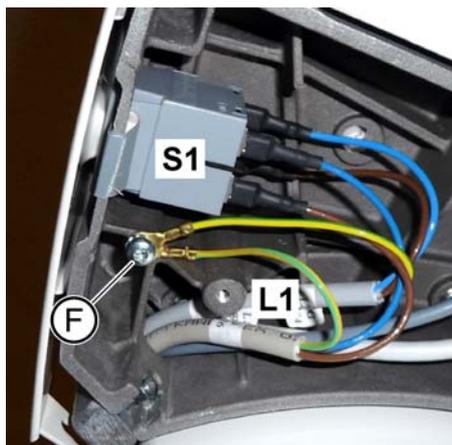
Remove cable ties

For the following steps, all necessary cable ties should be removed with wire cutters.

DANGER

Danger of fatal electrocution!

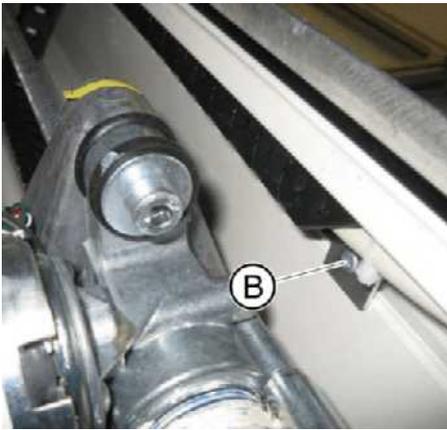
➤ Before you remove the energy chain, switch off the power supply.



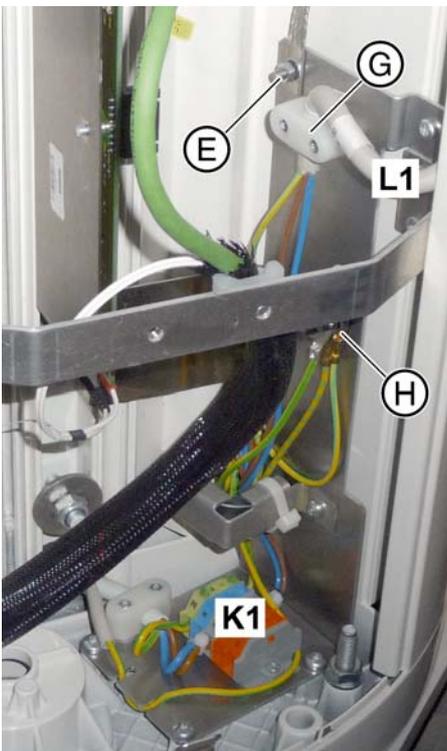
1. Disconnect cable L1 from switch S1.
2. Disconnect cable L1 from the ground point (F).



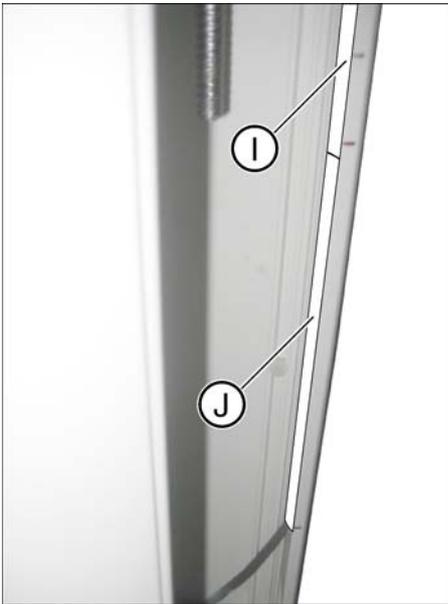
3. Loosen the two screws (A).



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.

IMPORTANT

Assembly instructions

- Pay attention to the energy chain's rolling direction.



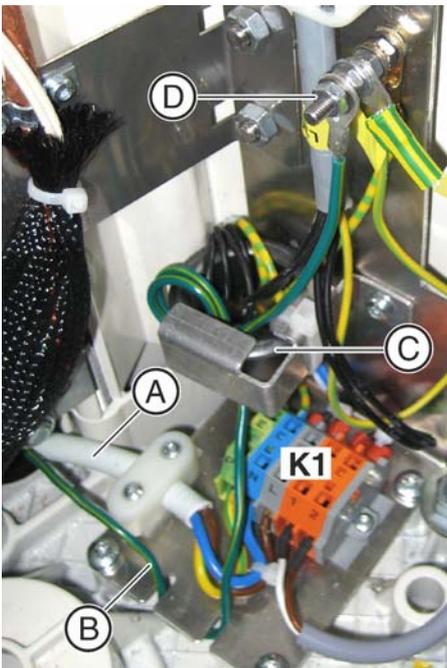
IMPORTANT

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).

9.17.2 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 [→ 176].

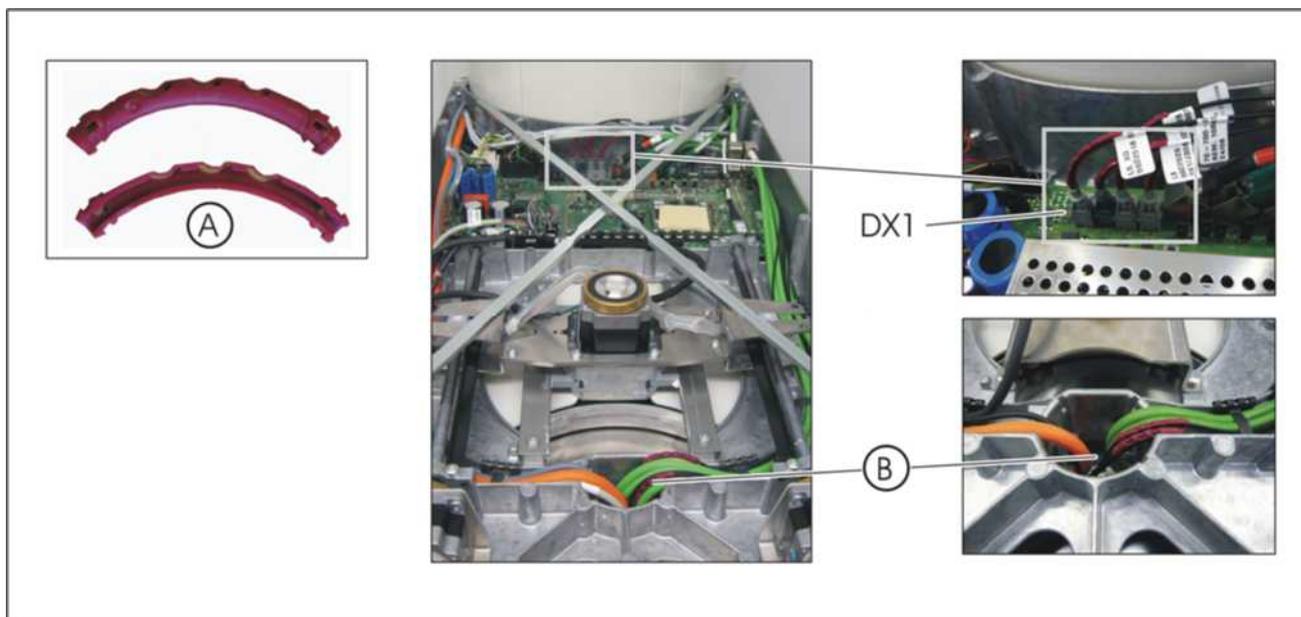
The cables are labeled with small flags. They specify the designation and part number of the cable. The plugs and sockets on the cables are designated both on the boards and cables. Check the designation when you pull off the cables.

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].

9.17.2.1 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.

9.17.2.2 Cable exchange (L3, L5, L6, L11, L12, and L15)/Laying the cable/corrugated tube at the rotation unit

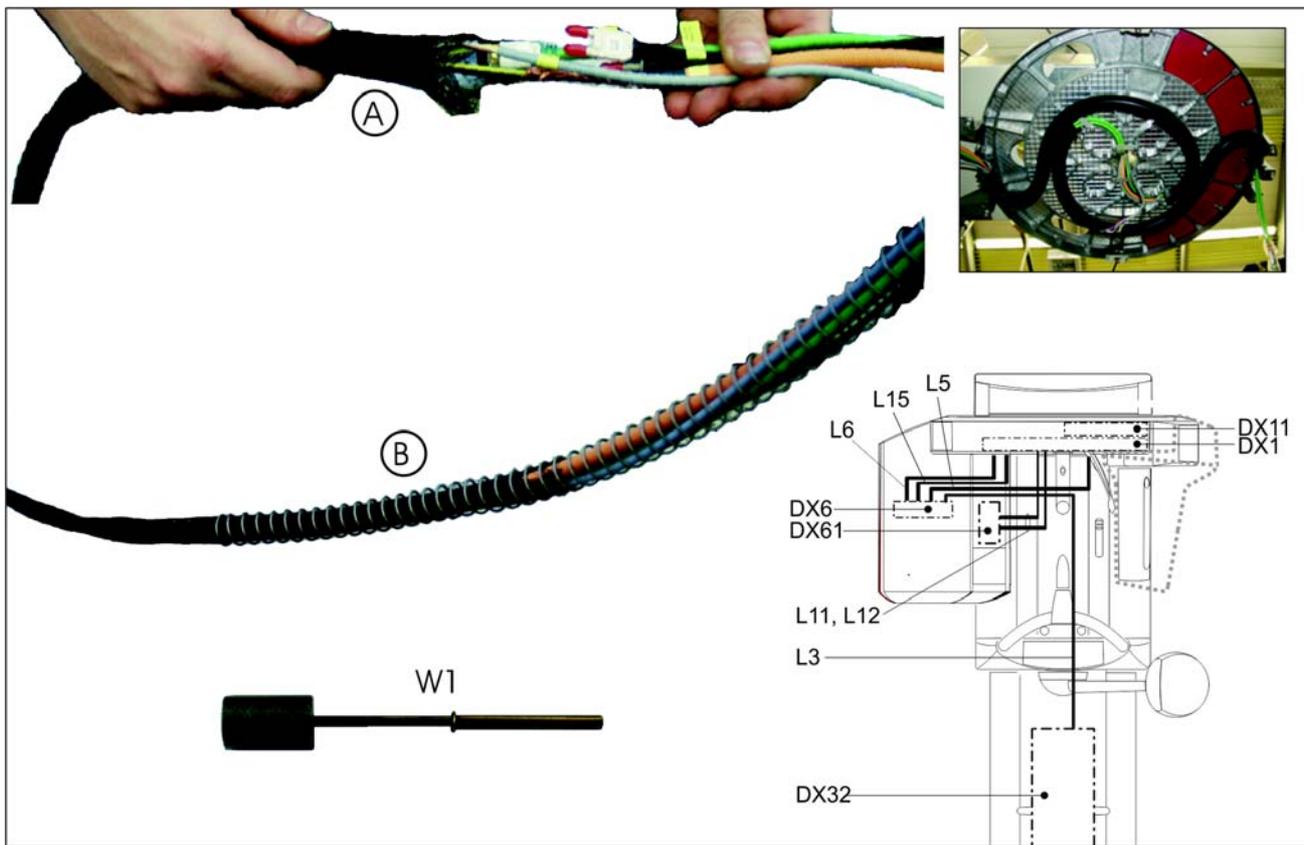
NOTICE

The connectors and cables must be protected by inserting them in the fabric tube (A) supplied with the cables.

Prepare the cable exchange

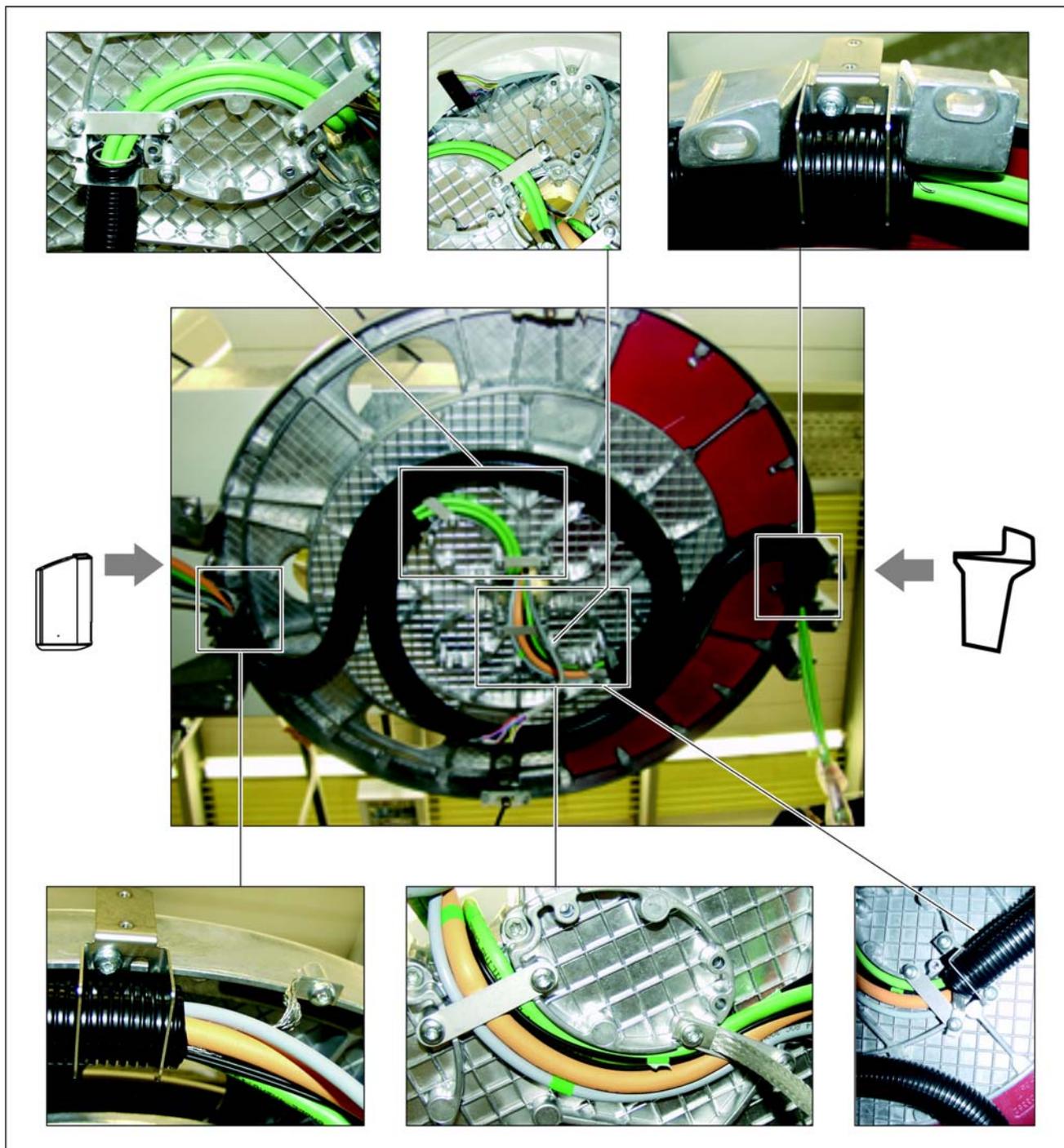
1. Remove the covers.
2. Pull the connectors off board DX6.

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).



9. Slide the corrugated tube over the spiral spring.
10. Remove the fabric tube and the pull wire.

Laying the corrugated tube or cable at the rotation unit

1. Lay the corrugated tubes and cables back in their original position.
2. Plug the connectors back in again.
3. Reattach the covers.

9.17.2.3 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" [→ 41].
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. [→ 370]
9. Switch the unit off again.
10. Remove the covers "Intermediate piece" and "Profile (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.
11. Remove board **DX32** (Removing board DX32 [→ 374]).
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.

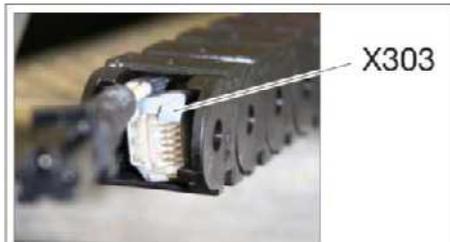


14. Remove the motor-side end piece from the cable track.



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).

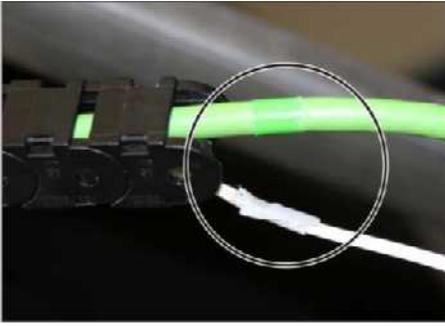
Carefully pull both cables (together) out of the cable track and the fabric tube.

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.

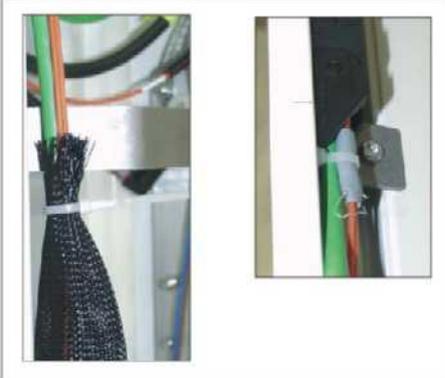


20. Fasten the two (new) cables together with adhesive tape above the flag labels.



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.

9.17.2.4 Replacing cable L1 or grounding strap in cable track 1

The procedure for replacing cable L1 and the grounding strap is basically analogous to the procedure described in chapter Replacing cable L7 or L108 in cable track 2.

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

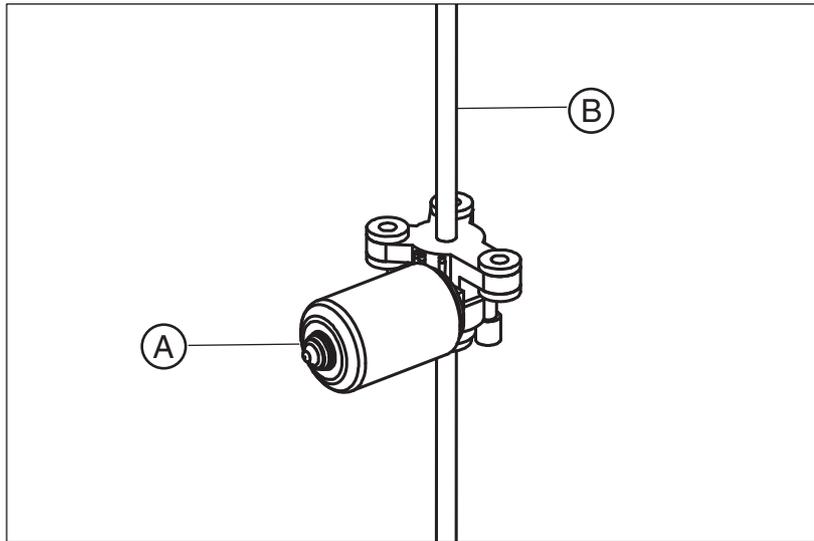
Keep to the prescribed cool-off periods if several exposures have to be taken to check a measured value.

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

10.1 Calibrating the unit

The device calibration is described in detail in the chapter Adjusting and calibrating the device.

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 [→ 370].

Check whether the height adjustment produces atypical running noises

- Use the Up/Down keys on the control panel 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 [→ 370].

Check whether precise, jolt-free height adjustment is possible

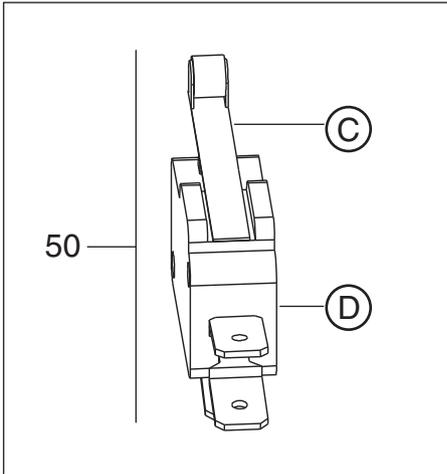
If the unit is not used for a longer period of time, a slight jolt may occur the first time it starts moving. However, the next time it starts moving, it must execute a jolt-free soft start.

- 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

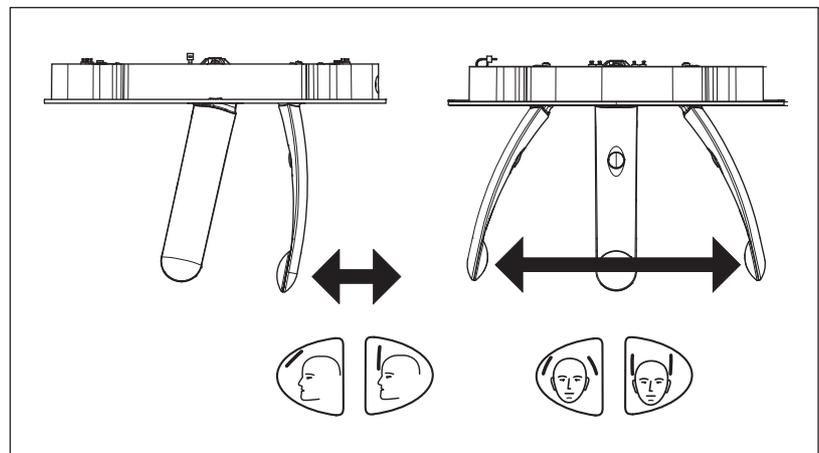


Check whether an audible signal can be heard during height adjustment

- 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.

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 [→ 386].

- Move the temple supports and observe the position.
If the temple supports cannot be adjusted jerk-free and symmetrically:
 - ↪ Replace the headrest [→ 386].

10.4 Checking the rotation unit of the combisensor for smooth and easy running



✓ The unit must be switched on.

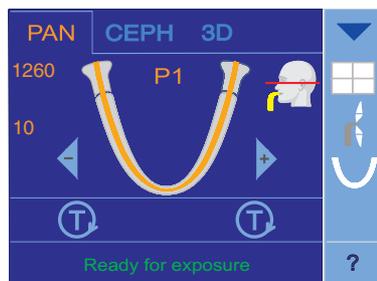
1. To switch from the PAN or CEPH program group to the 3D program group (or the other way around), touch the icons at the top edge of the touchscreen.
2. Confirm your selection with the R key.
 - ↳ The rotation unit moves from the 2D to the 3D position or vice versa.
3. Pay attention to unusual running noises. If unusual running noises should occur during the test cycle or the rotation unit stops due to increased resistance:
 - ↳ Check the installation of the 3D module.
 - ↳ Replace the rotation unit [→ 417].

10.5 Testing the rotating unit for smooth running

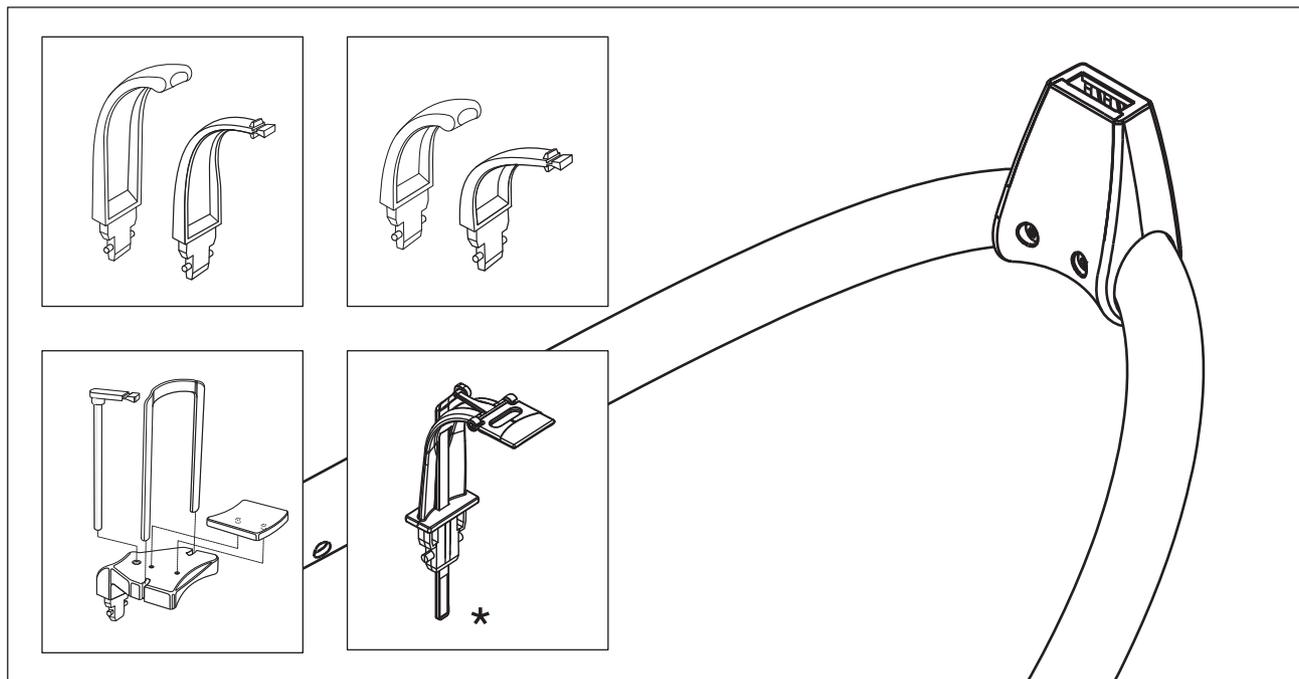
The mechanical function of the rotating unit (ring movement) is checked via a 3D test cycle. The test cycle is executed without radiation. The test cycle is used to check that the unit is functioning correctly and to ensure that a smooth cycle of the rotation unit is possible. The unit stops automatically if the resistance increases.

✓ The unit must be switched on.

1. Press the T key.
 - ↳ 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 again.
 - ↳ The program exits test cycle mode.



10.6 Inspecting the bite block holder



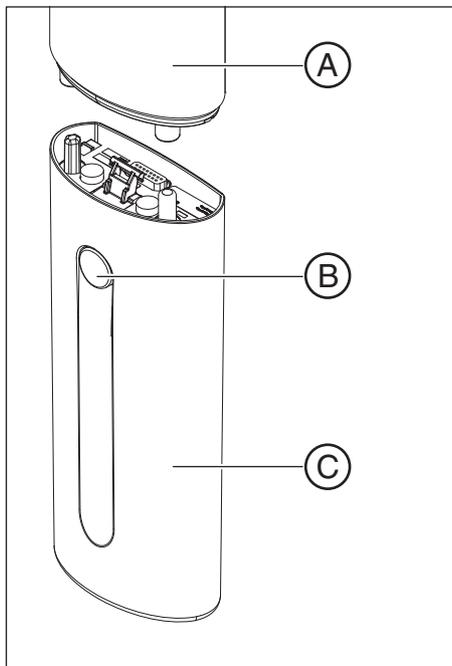
Check whether the bite block, contact segment and chin rest can be fitted securely in the bite block holder

* only for units with an occlusal bite block

- 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 [→ 402].

10.7 Checking the cephalometric 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 [→ 424].
 - ↪ Replace the sensor (see Operating Instructions).

10.8 Checking the laser light localizers

CAUTION

Risk of injury to eyes.

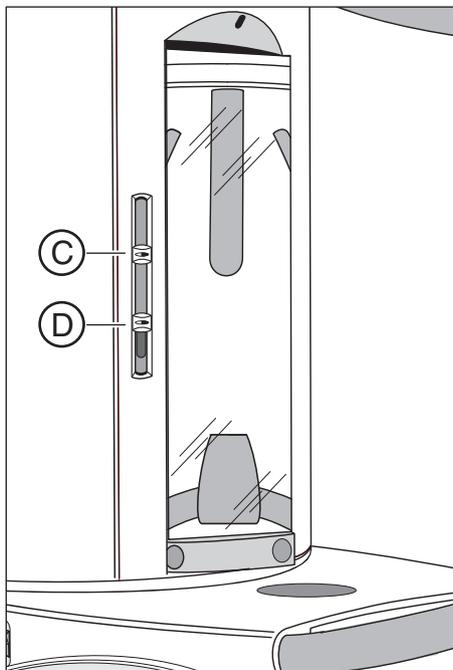
The unit contains lasers of Class 1.

Keep a distance of at least 4" (10 cm) between eye and laser. Do not look into the laser beam.



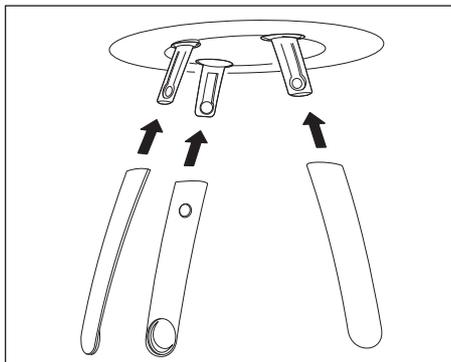
Check whether the FH double laser light localizer can be adjusted easily

- Adjust the FH double light localizer with the sliders (C and D).
If the light localizer cannot be moved easily:
 - ↳ Lubricate the slider (rail) with a light coat of Vaseline.



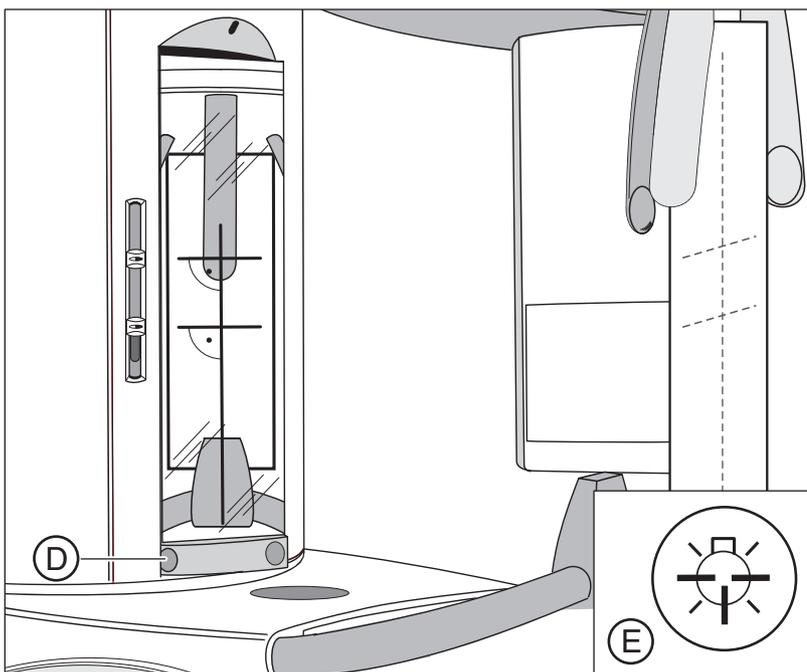
Checking the MS and FH laser light localizers (Pan/Ceph)

Preparing the test



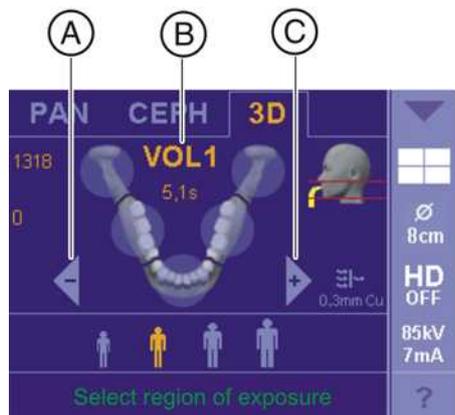
Checking the vertical laser beam (MS)

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. Press the R key.
 - ↳ The unit moves to its starting position.

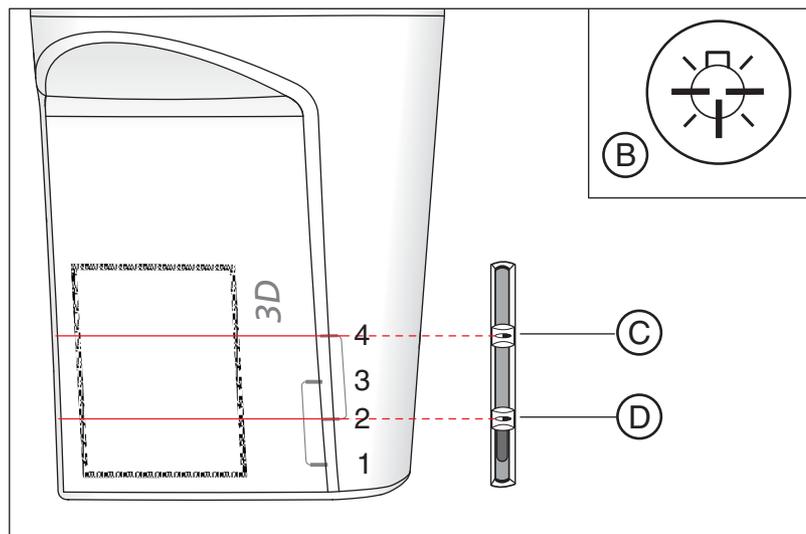


1. Affix a piece of white cardboard between the temple supports.
2. Rotate the mirror by pressing into the left depression (D) of the toolbar.
3. Press the light localizer key (E) on the control panel.
 - ↳ Then light localizers are switched on.
 - ↳ The laser beam is displayed on the cardboard by a red line.
 - ↳ The vertical laser beam 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.
4. Switch the light localizers off.

Checking the horizontal laser beam (FH/ Pan)



1. Touch the 3D symbol at the top of the touchscreen.
 - ↳ The exposure program VOL1 is displayed.
2. Press the R key.
 - ↳ The diaphragm and the sensor move into the starting position for volume exposures.



3. Press the light localizer key (B) on the control panel.
 - ↳ Then light localizers are switched on.
4. Move the upper horizontal laser beam by moving the top slides (C) into the upper area of the 3D sensor area.
 - ↳ The laser beam must be parallel to the top border marking of the 3D sensor area. If this is not the case, adjust the double laser light localizer.
 - ↳ Minimum and maximum distances apply between the two laser localizers. If the action of moving the slide controls causes these distances to be undershot or exceeded, the slide controls must act in tandem with one another. In other words, as soon as the minimum or maximum distance is undershot or exceeded, whenever the top control moves, the bottom control must move along with it.
 - If the dual laser light localizer does not respond as required, replace it.

5. Move the lower horizontal laser beam by moving the bottom slider (**D**) into the lower area of the 3D sensor area.

- ↳ The laser beam must be parallel to the bottom border marking of the 3D sensor area. If this is not the case, adjust the double laser light localizer.

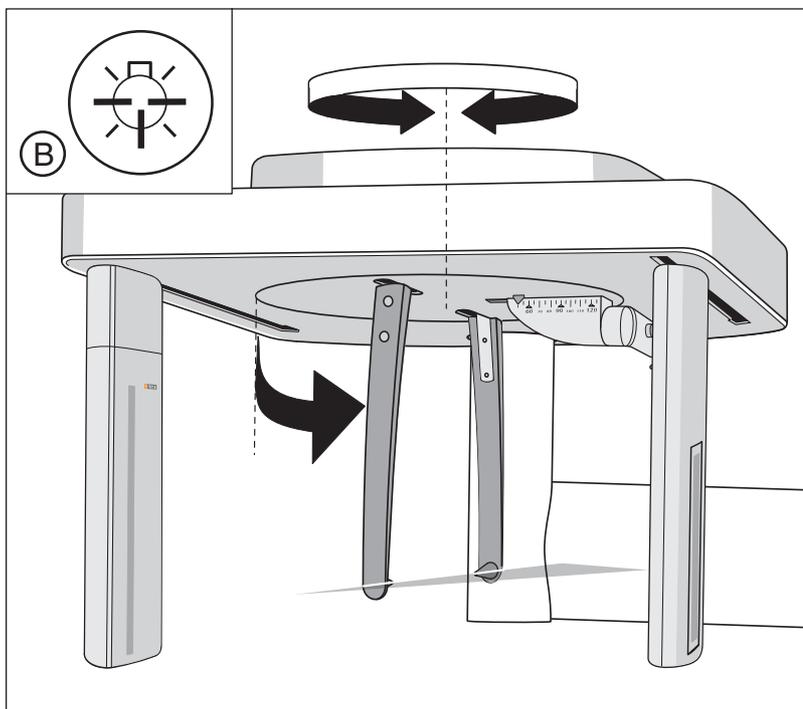
- ↳ Minimum and maximum distances apply between the two laser localizers. If the action of moving the slide controls causes these distances to be undershot or exceeded, the slide controls must act in tandem with one another. In other words, as soon as the minimum or maximum distance is undershot or exceeded, whenever the top control moves, the bottom control must move along with it.

If the dual laser light localizer does not respond as required, replace it.

6. Switch the light localizers off.

Checking the horizontal laser beam (FH/Ceph)

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



1. Press the light localizer key (**B**) on the control panel.
 - ↳ Then 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.

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 the adjustment or calibration and readjust or recalibrate, if necessary.

10.10 Checking the tube data

10.10.1 Checking the tube voltage

10.10.1.1 Checking the tube voltage characteristic during exposure (tube assembly 1.0)

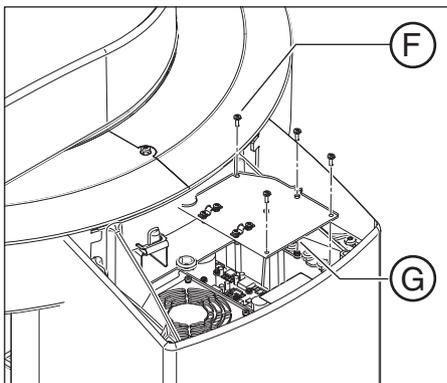
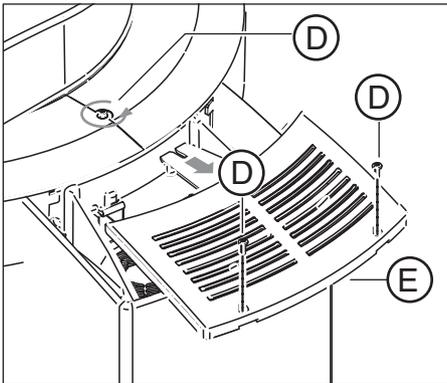
NOTICE

Damage to the measuring unit

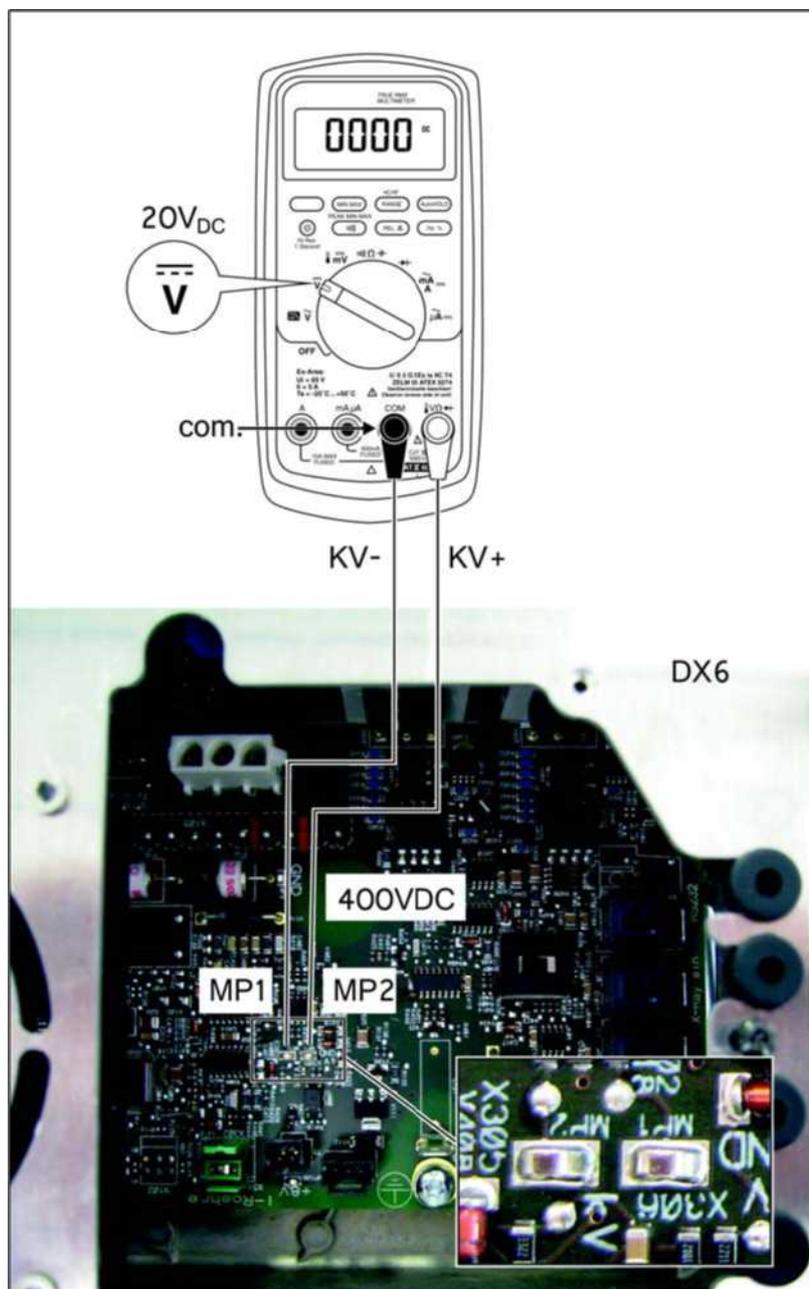
The ring assembly and the tube assembly move during the measurement.

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.

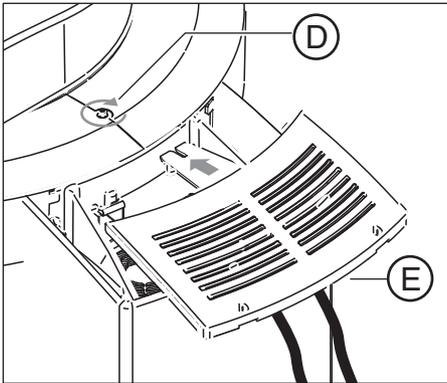
Preparing the measurement



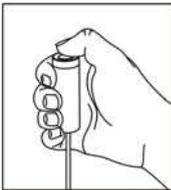
1. **DANGER!** After switching off the unit, wait at least 4 minutes (LED V203 must not be on) before removing the cover at the tube assembly!
Switch the unit off (see Operating Instructions).
2. Loosen the 3 screws (D) and remove the "front tube assembly" cover (E).
3. Loosen the 4 screws (F) and remove the cover plate (G).



4. **DANGER!** Only use fully insulated measuring wires.
Connect the digital multimeter with the measuring wires to test points **MP1 (KV-)** and **MP2 (KV+)** on the **DX6** board.
5. Select the **20 VDC** voltage measuring range at the digital multimeter.



Performing measurements



Analyzing measurements

6. NOTICE! If the "front tube assembly" cover is not attached, the ring circulation is impeded and the unit can be damaged.
 Temporarily install the "front tube assembly" cover (E) on the unit using the screw (D).

1. **DANGER! Do not touch any live components!**
 Set the main switch (A) to I (see also Operating Instructions).
2. Wait for approx. 1 minute.
3. Press the R key.
 ↪ The unit moves to its starting position.

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

➤ Read the voltage values on the display of the multimeter.

IMPORTANT

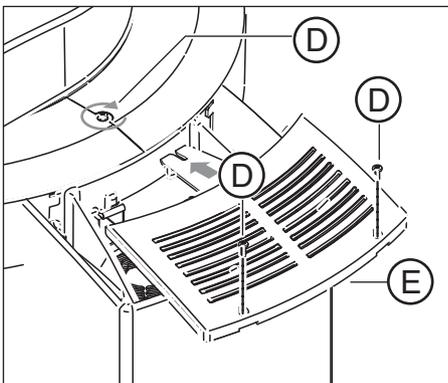
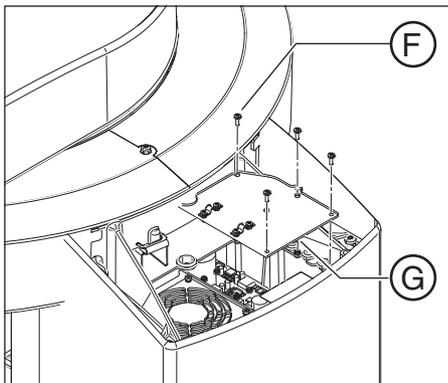
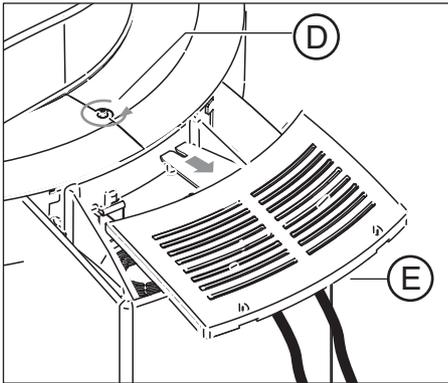
62kV correspond to a measured value of 3.1V. The permissible tolerance is ± 10 %.

- ↪ If the measured values do *not fall within the permissible tolerance range* (see the following table or the kV chart), replace the *tube assembly* (see Service Manual).
- ↪ If the measured values fall within the permissible tolerance range (see the following table or the kV chart), finalize the measurement.

Permissible measured values (see also kV chart):

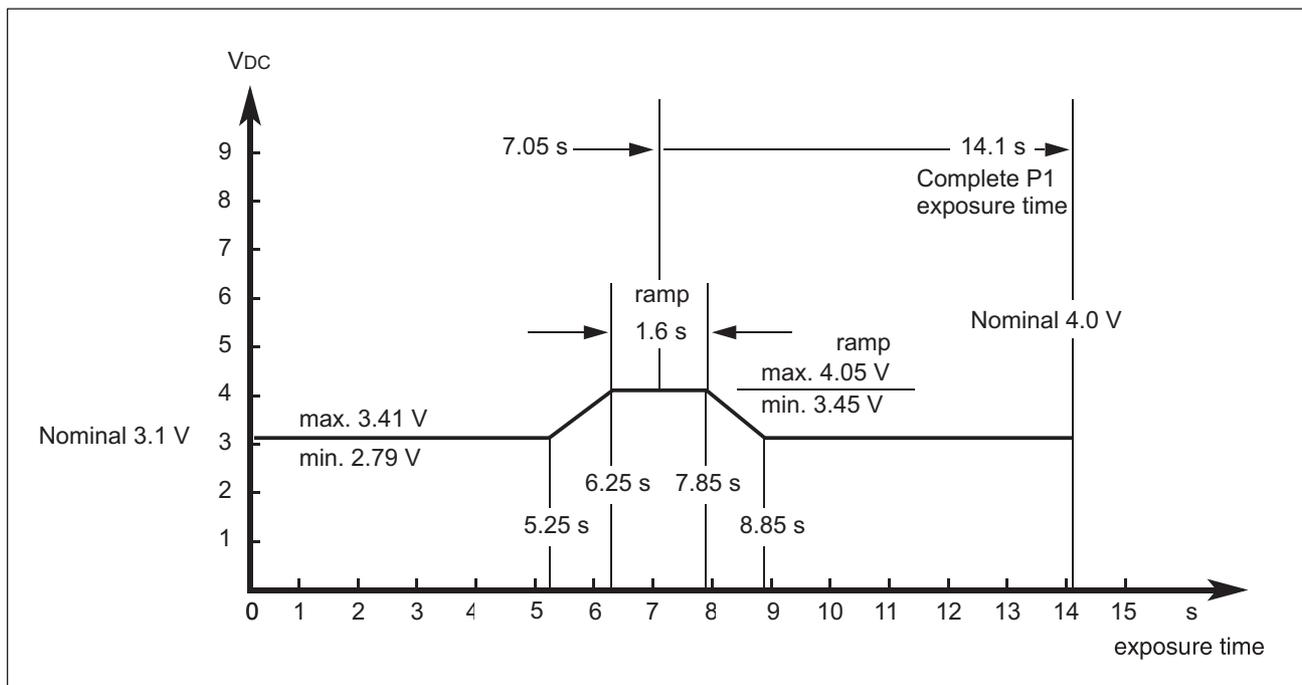
Time	Voltage
up to 5.25s	3.1 V ± 0.3V
from 6.25 to 7.85s kV increase	e.g. 4 V ± 0.4V
after 8.25s	3.0 V ± 0.3V

Concluding the measurement



1. Switch the unit on via switch (A) (see also Operating Instructions).
2. Loosen the screw (D) and remove the "front 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 jumper 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 "front tube assembly" cover (E) to the unit and secure it with the 3 screws (D).

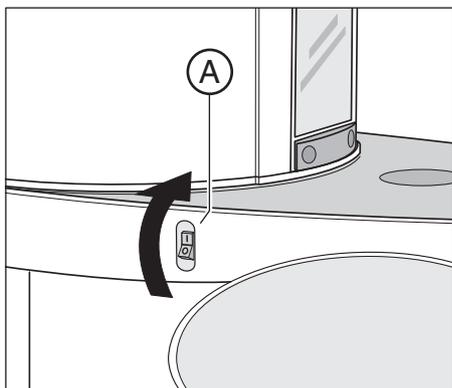
kV ramp chart



- Exposure program P1
- 62kV/8mA
- Temple support fully opened

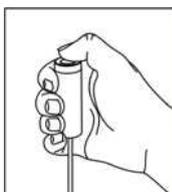
10.10.1.2 Testing the tube voltage (tube assembly 2.0)

Preparing the measurement



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

Performing measurements



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

Analyzing measurements

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

IMPORTANT

The measured tube voltage must correspond with the tube voltage set of 62kV. The permissible tolerance is $\pm 10\%$.

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

Concluding the measurement

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

10.10.2 Checking the tube current

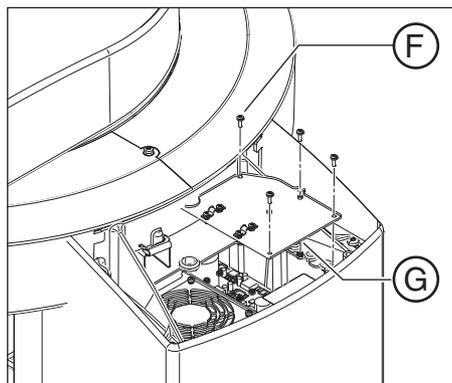
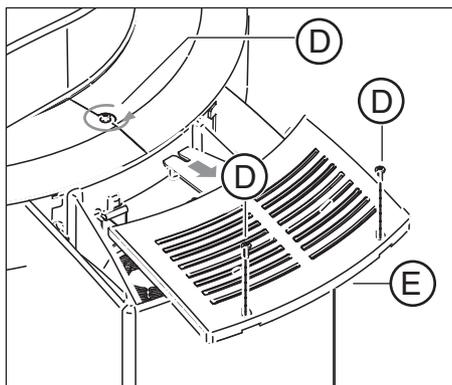
NOTICE

Damage to the measuring unit

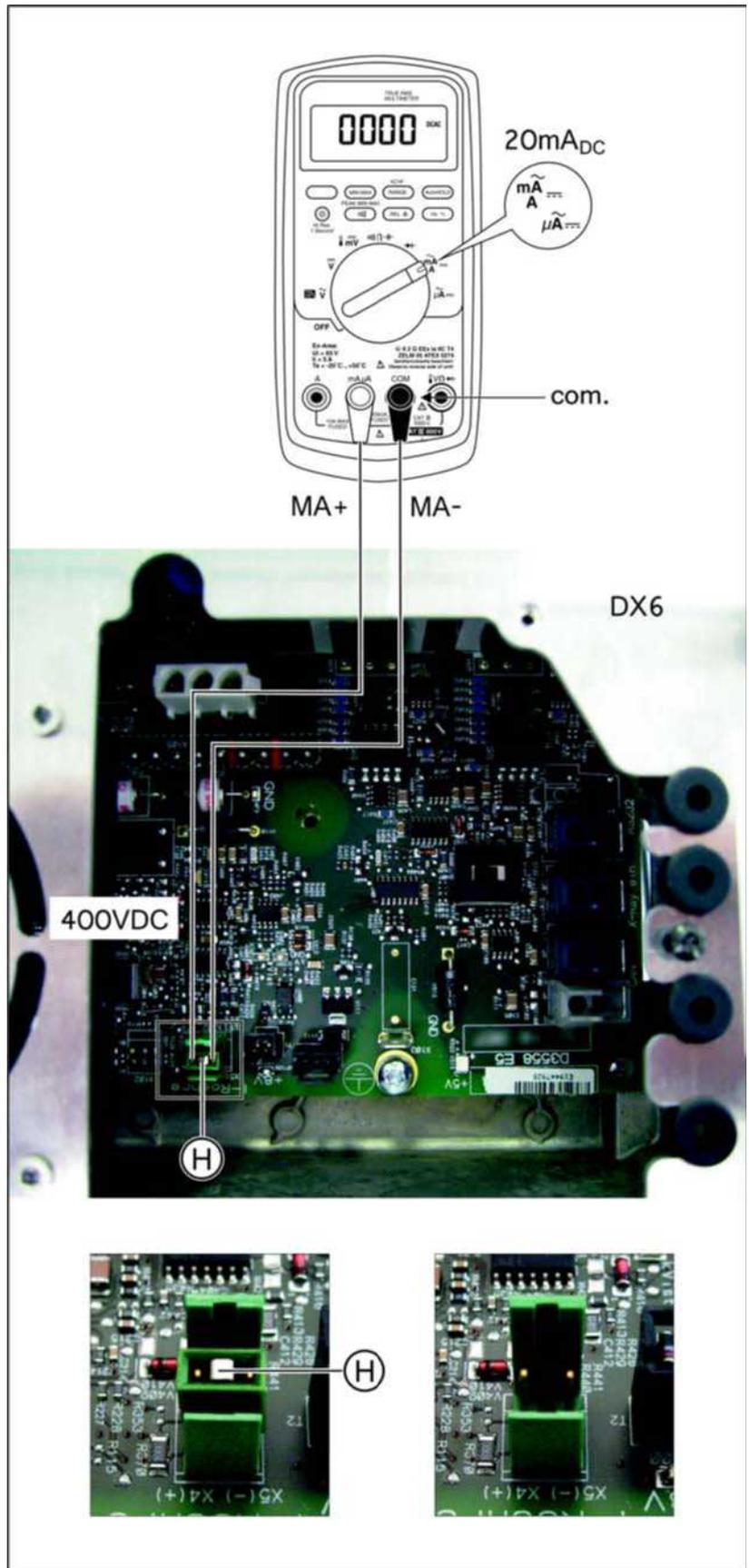
The ring assembly and the tube assembly move during the measurement.

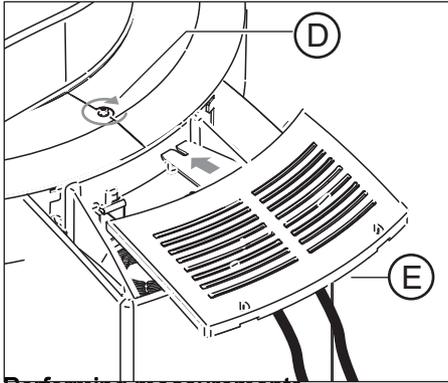
Make sure that the measuring wires are sufficiently long to allow for the ring movement and that the measuring unit is in a secure position so that it will not fall down.

Preparing the measurement

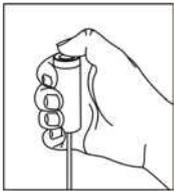


1. Switch off the unit (see Operating Instructions).
DANGER! After switching off the unit, wait at least 4 minutes (LED V500 on the DX6 must no longer be on) before removing the cover on the tube assembly.
2. Loosen the 3 screws (D) and remove the lid of the tube assembly cover (E).
3. Loosen the 4 screws (F) and remove the cover plate (G).



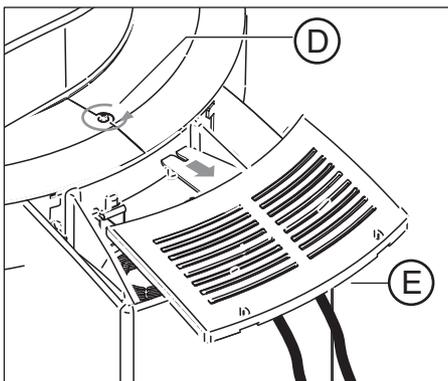


Performing measurements



Analyzing measurements

Concluding the measurement

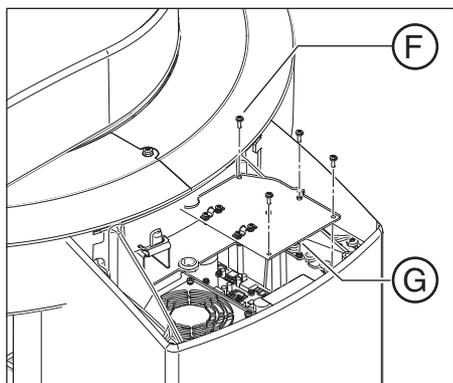


4. **DANGER!** After switching off the unit, wait at least 4 minutes (LED V500 on the DX6 must no longer be on) before removing jumper H from the DX6 board.
 Remove the jumper (H) from connector X302 on the DX6 board.
 5. **DANGER!** Only use fully insulated measuring wires.
 Connect the digital multimeter 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. Press the R key.
 - ↪ The unit moves to its starting position.
1. Select the **P1** program (see Operating Instructions).
 2. Set the highest kV/mA level, **66kV/8mA** (see Operating Instructions).
 3. Make ready for exposure in SIDEXIS (see Operating Instructions).
 4. **CAUTION!** Activating the release button triggers X-rays.
 Start the exposure by pressing the release button. Hold down the release button until image acquisition is completed and the acoustic signal that indicates the end of the exposure can be heard.

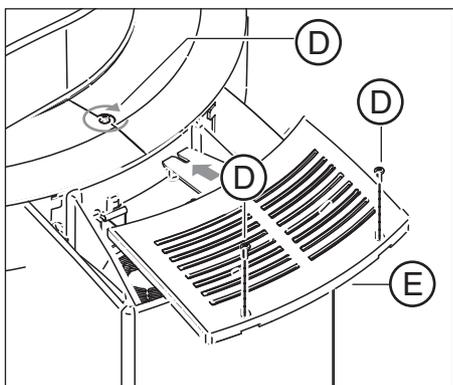
IMPORTANT

1 mA corresponds to a tube current of 1 mA. The permissible tolerance is $\pm 20\%$.

- Read the voltage value on the display of the multimeter.
 - ↪ The tube current must be **8mA \pm 1.6mA**.
 - ↪ If the measured value does *not* fall within the permissible tolerance, replace the *tube assembly* (see Service Manual).
 - ↪ If the measured value falls within the permissible tolerance, conclude the measurement.
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).



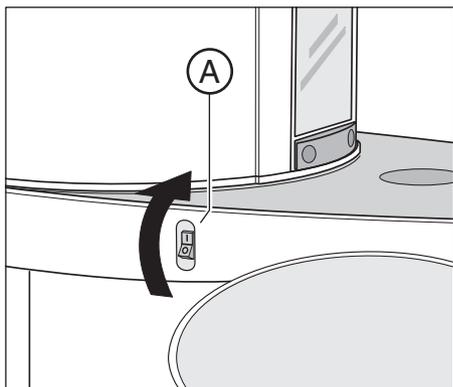
4. Reattach the cover plate (G) to the tube assembly with the 4 screws (F).



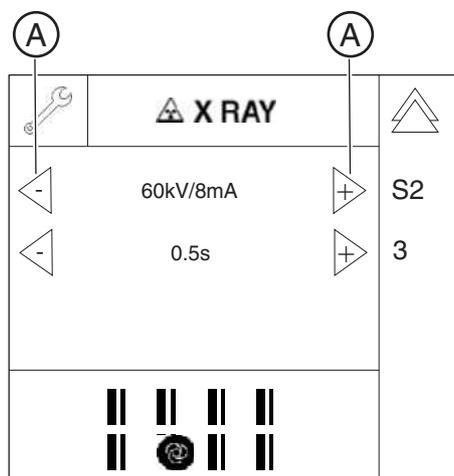
5. Reattach the lid of the tube assembly cover (E) to the unit and secure it with the 3 screws (D).

10.10.3 Checking the radiation time

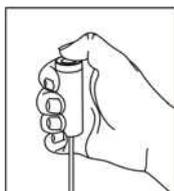
Preparing the measurement



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



Performing measurements



Analyzing measurements

Finalizing the measurement

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**.

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

➤ 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.

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

10.10.4 Checking the fan and temperature sensor

Check whether the fan is functioning

- Check the function of the fan using service routine S005.4 [→ 275].
 - ↪ If the fan is defective: Replace the fan [→ 412].

Check whether the temperature sensor is supplying plausible values

- Read the temperature in the single tank with service routine S005.5 [→ 276].
 - ↪ If the displayed temperature reading is not plausible: Replace the tube assembly. [→ 412]

10.11 Test exposures/Test images

DANGER

X-rays

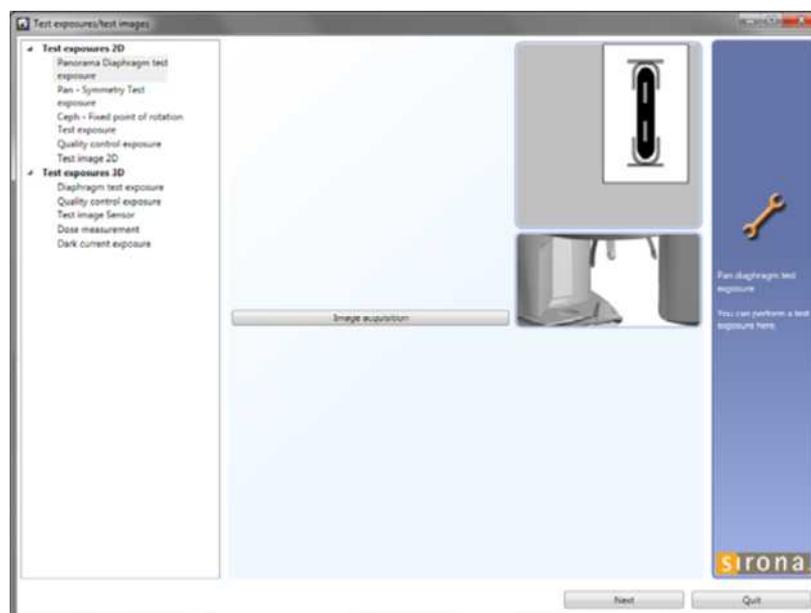
When performing the following tests, be sure to observe the radiation protection regulations applicable in your country (see Operating Instructions).

DANGER

X-rays

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

The 2D and 3D test exposures and test images are used to quickly check the adjustment or calibration of the unit.



The following test exposures are available:

2D test exposures

- Panoramic diaphragm test exposure [→ 470]
- Pan - Symmetry test exposure [→ 472]
- Ceph - Fixed point of rotation test exposure [→ 475]
- Quality test exposure [→ 477]
- 2D test pattern [→ 478]

3D test exposures

- Aperture test exposure [→ 480]
- Quality test exposure [→ 484]
- Sensor test image [→ 485]
- Dosimetry [→ 487]
- Dark current exposure [→ 488]

The menu can be called up without a service password, so test exposures can thus be performed by the user as well.

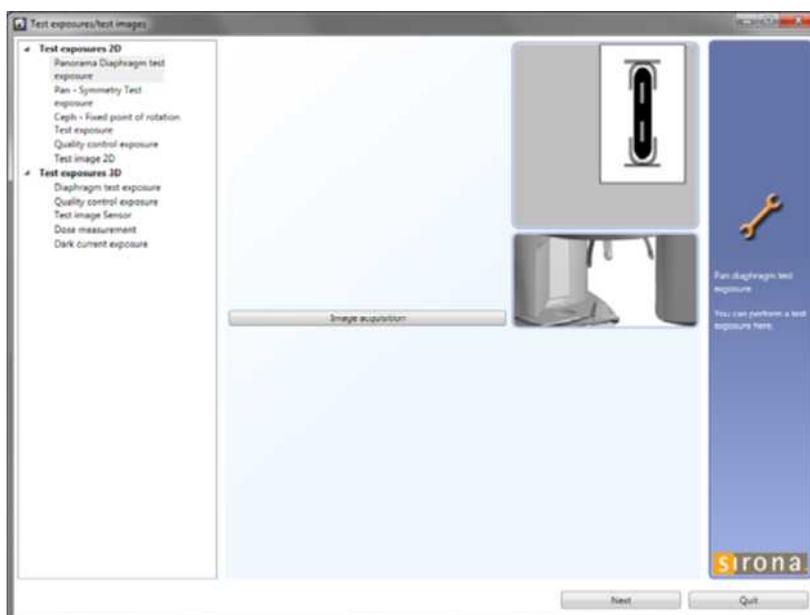
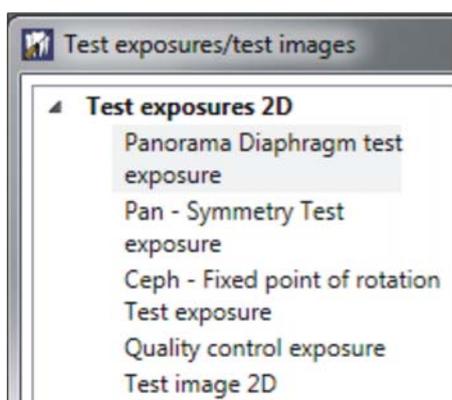
- Call the "Test exposures/test images" menu:
 "Utilities" | "Constancy test..." | "2D" | "Select X-ray device" |
 "Service exposure" | "Diaphragm test exposure" | "Select X-ray
 component" | "Test exposures/test images"

10.11.1 2D test exposures

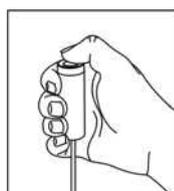
10.11.1.1 Panoramic diaphragm test exposure (2D)

You can use the "Pan diaphragm test exposure" to check the adjustment of the panoramic diaphragm.

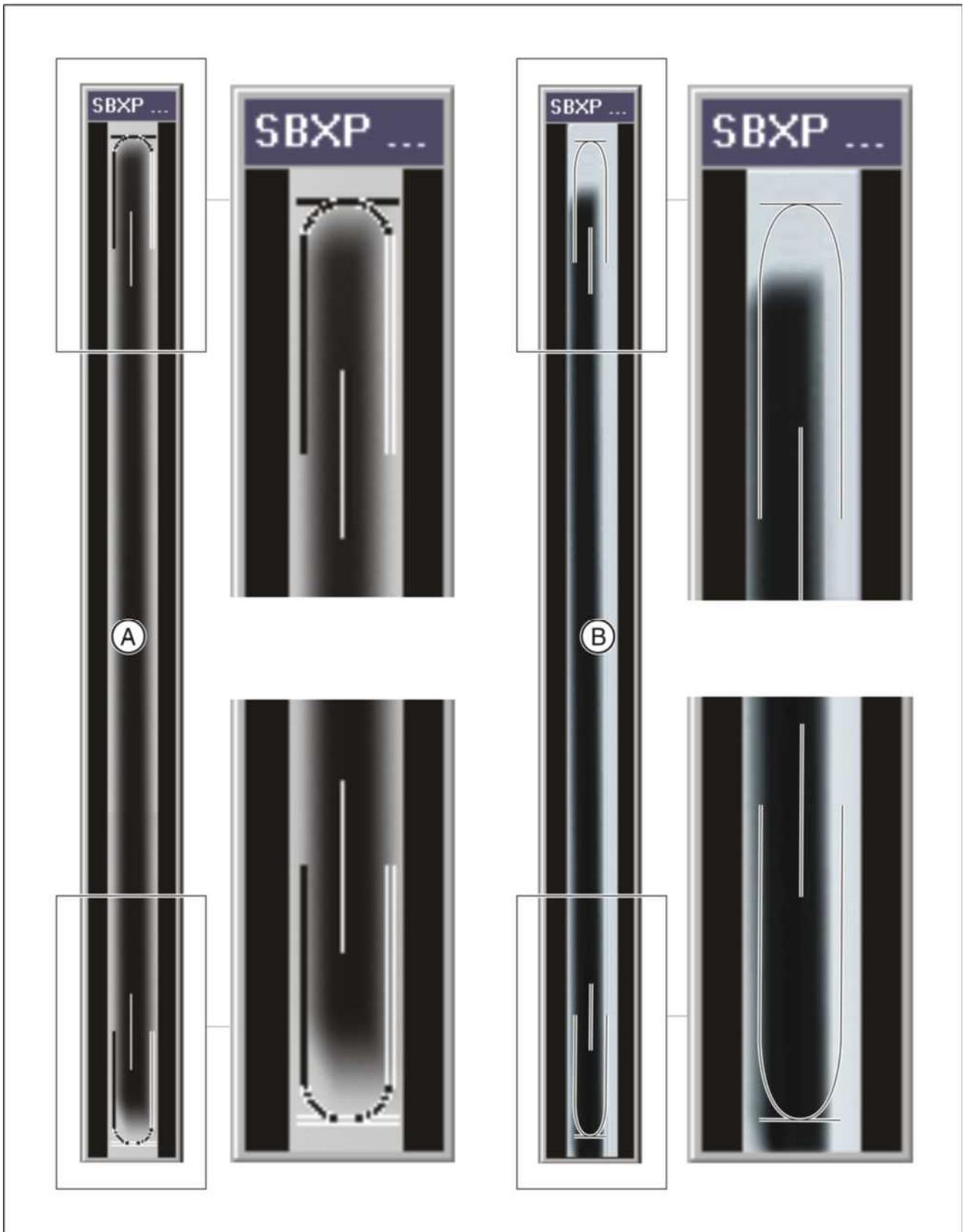
1. Call the "Test exposures/test images" menu: [→ 469].
2. Select the "Pan diaphragm test exposure" element in the structure tree under "Test exposures 2D".
 - ↳ The menu for creating the "Pan diaphragm test exposure" appears in the action window.



3. Click on the "Image acquisition" button.
 - ↳ The exposure window opens in SIDEXIS. It indicates the current status of exposure readiness.



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 appears in the SIDEXIS exposure window.

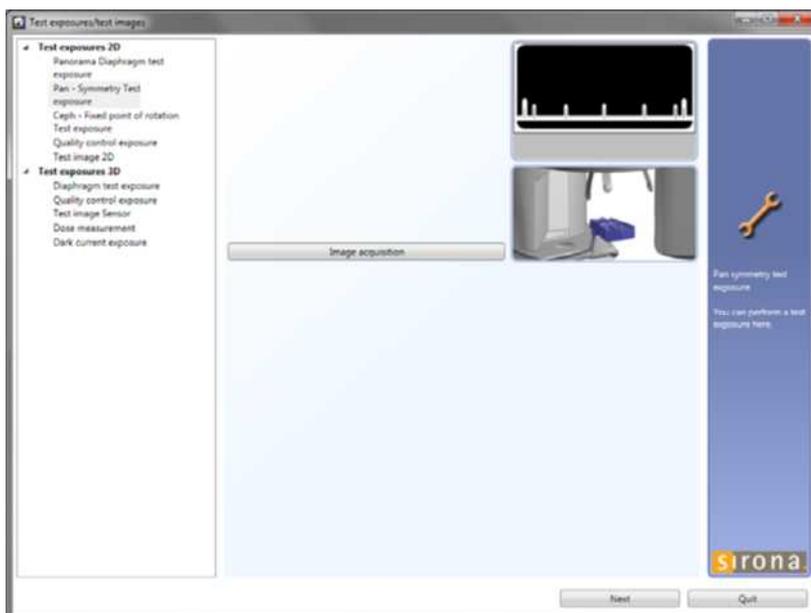
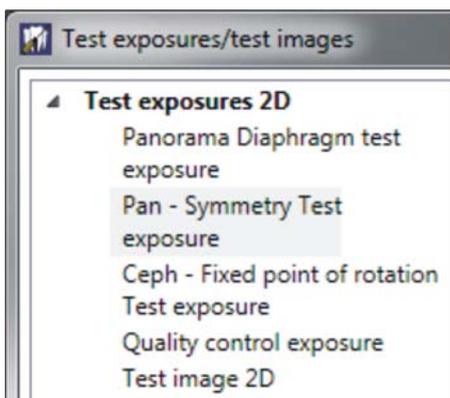


A	Adjustment OK	<ul style="list-style-type: none"> • The exposed diaphragm area must lie horizontally centered in the image section as well as inside the auxiliary lines. • A surrounding white border must be present. • The maximum density must lie in the center of the diaphragm area.
B	Adjustment not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

10.11.1.2 Pan - Symmetry test exposure (2D)

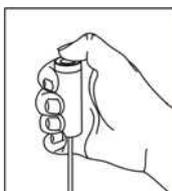
You can use the *"Pan symmetry test exposure"* to check the adjustment of the panoramic symmetry.

1. Insert the needle phantom in the bite block holder of the unit [→ 198].
2. Call the *"Test exposures/test images"* menu:[→ 469].
3. Select the *"Pan symmetry test exposure"* element in the structure tree under *"Test exposures 2D"*.
 - ↳ The menu for creating the *"Pan symmetry test exposure"* appears in the action window.

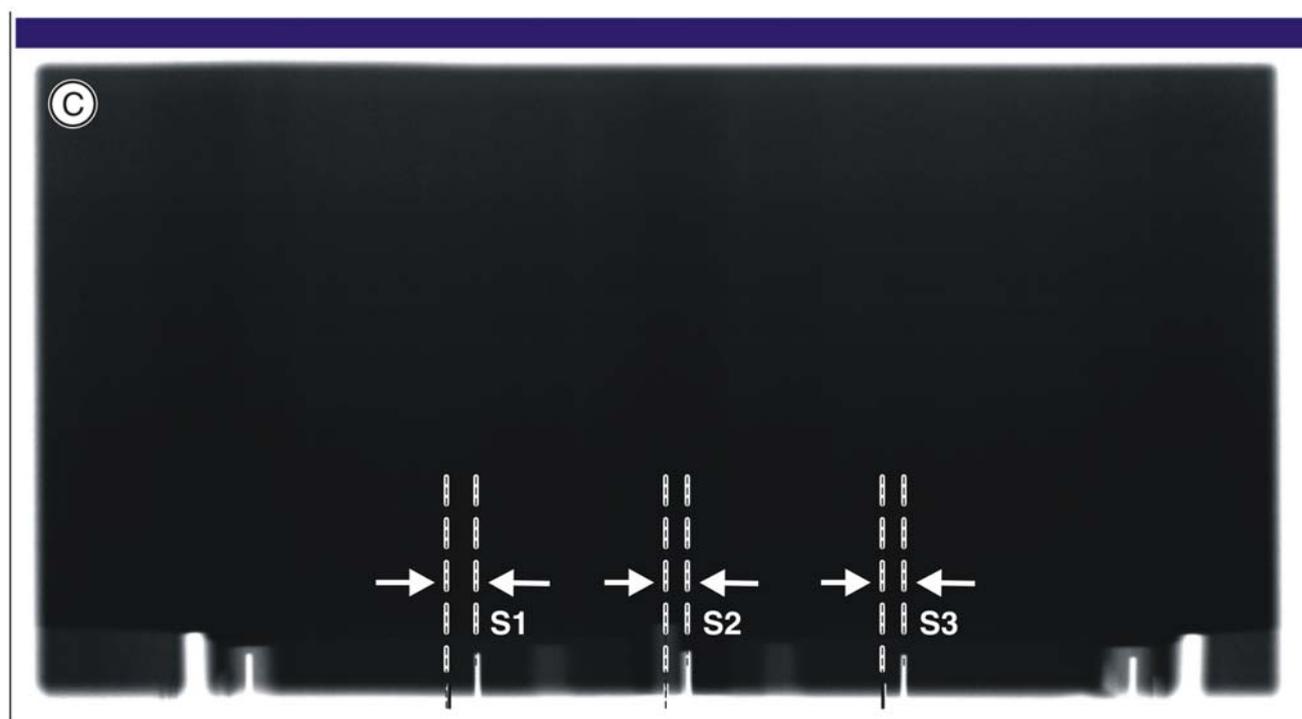
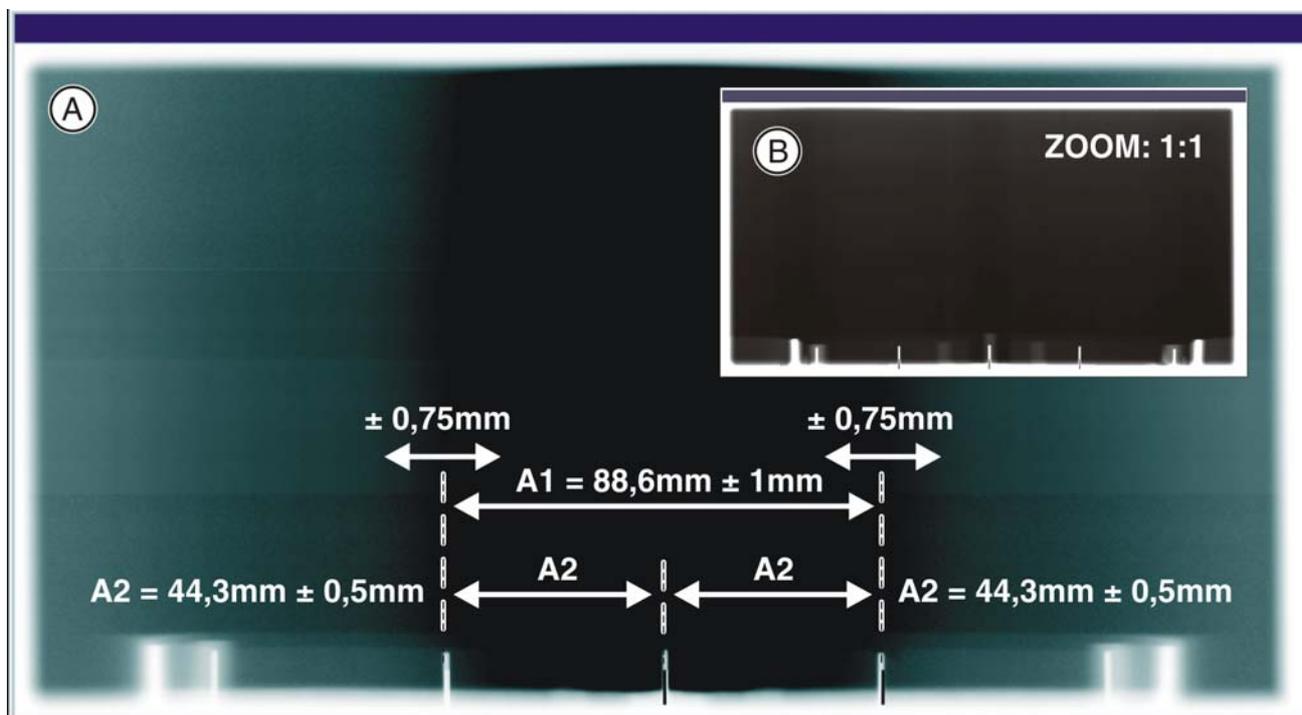


4. Click on the *"Image acquisition"* button.
 - ↳ The exposure window opens in SIDEXIS. It indicates the current status of exposure readiness.





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 appears in the SIDEXIS exposure window.



A	Adjustment OK	<ul style="list-style-type: none"> • The shadow of the center needle, the needle image, and the auxiliary lines must be coincident and located one behind the other. A tolerance (offset of needle from the central auxiliary line) of ± 0.75 mm is admissible. • Distance A1 must be 88.6 ± 1 mm. • Distances A2 must be identical, each being 44.3 ± 0.5 mm.
B		<ul style="list-style-type: none"> • A surrounding white border must be present.
C	Adjustment not OK	

6. Remove the needle phantom again.

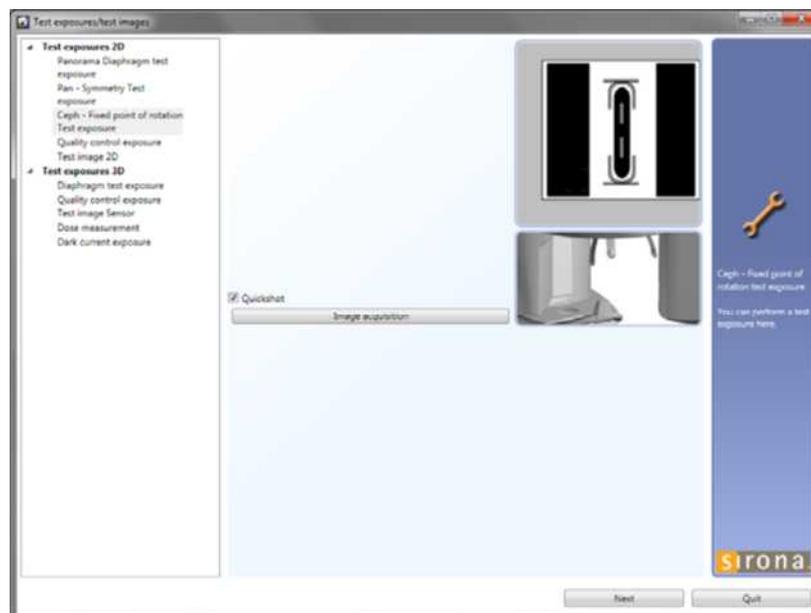
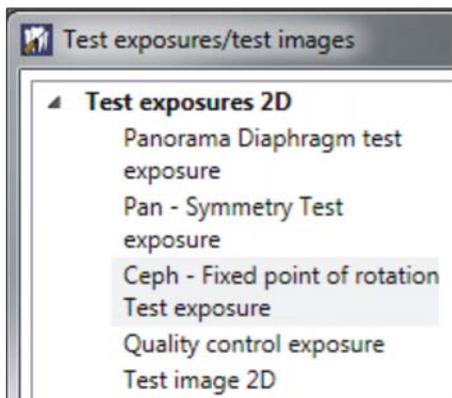
10.11.1.3 Ceph - Fixed point of rotation test exposure (2D)

IMPORTANT

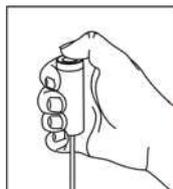
This function is only available for units with a cephalometer.

You can use the *"Ceph - Fixed point of rotation test exposure"* to check the adjustment of the ceph fixed point of rotation.

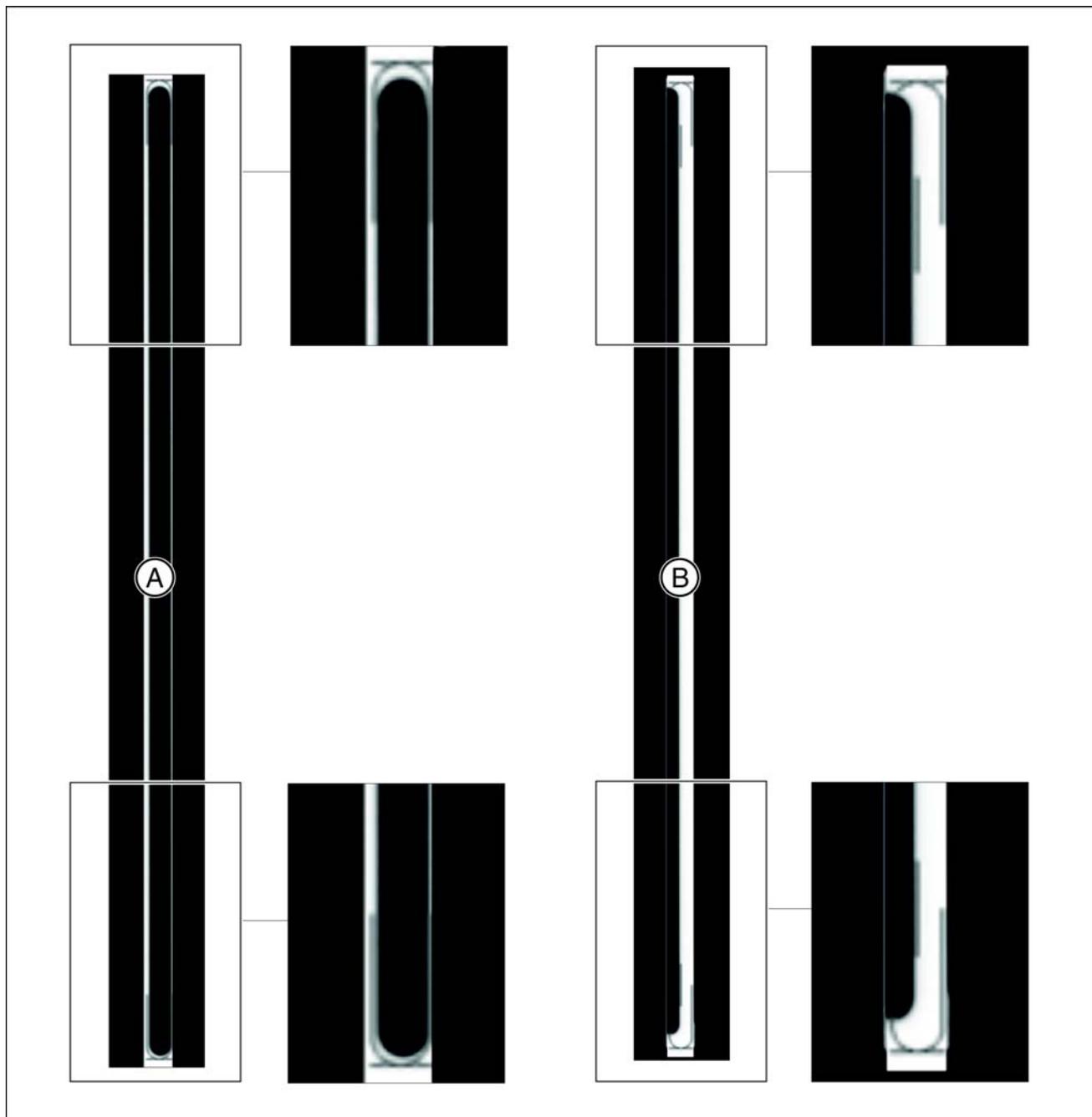
1. Call the *"Test exposures/test images"* menu: [→ 469].
2. Select the *"Ceph - Fixed point of rotation test exposure"* element in the structure tree under *"Test exposures 2D"*.
 - ↳ The menu for creating the *"Ceph - Fixed point of rotation test exposure"* appears in the action window.



3. Click on the *"Image acquisition"* button.
 - ↳ The exposure window opens in SIDEXIS. It indicates the current status of exposure readiness.



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 appears in the SIDEXIS exposure window.

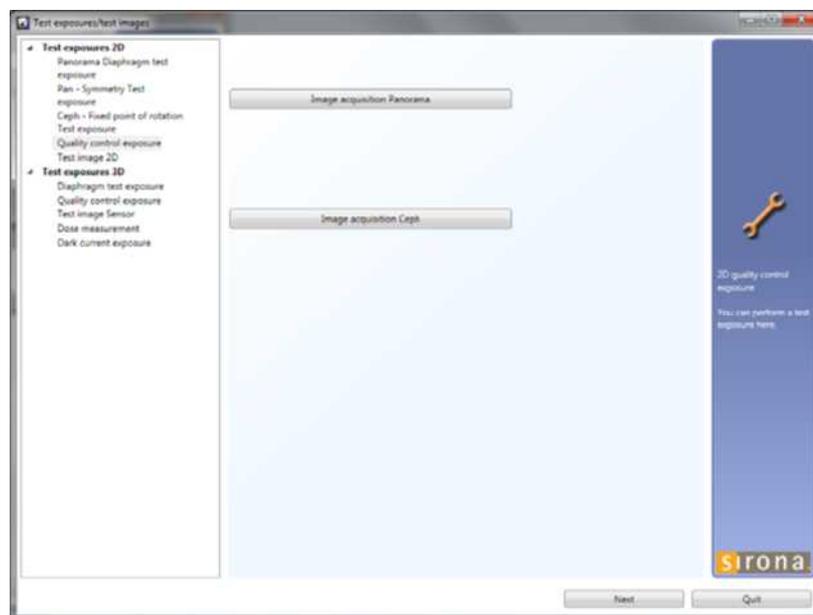
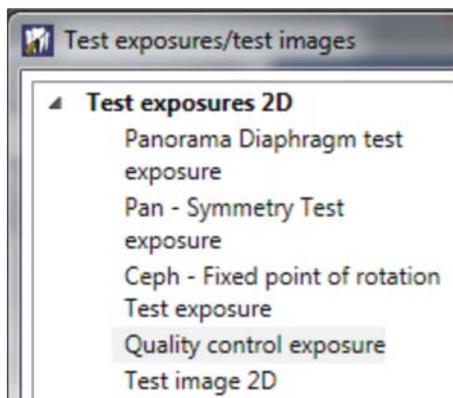


A	Adjustment OK	<ul style="list-style-type: none"> • The exposed diaphragm area must lie centered and straight in the image section as well as inside the superimposed auxiliary lines. • A surrounding white border must be present. • The maximum density must lie in the center of the diaphragm area.
B	Adjustment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

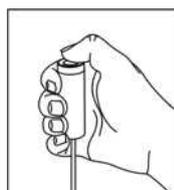
10.11.1.4 Quality test exposure (2D)

You can use the "Quality control exposure" to create a panoramic or cephalometric 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. Call the "Test exposures/test images" menu [→ 469].
2. In the structure tree, under "Test exposures 2D", select the "Quality control exposure" element.
 - ↳ The menu for creating the "Quality control exposure" appears in the action window.



3. Click the "Image acquisition Panorama" or "Image acquisition Ceph" button, depending on what type of exposure you want to create.
 - ↳ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.



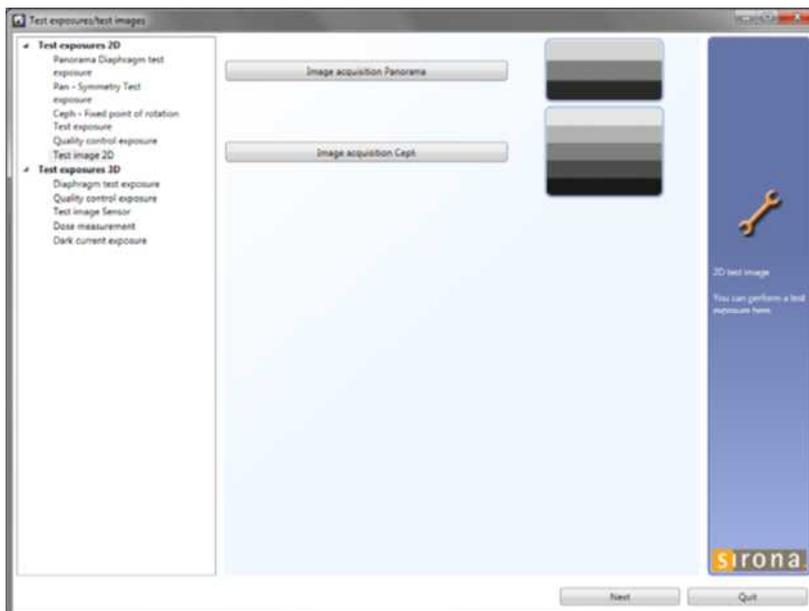
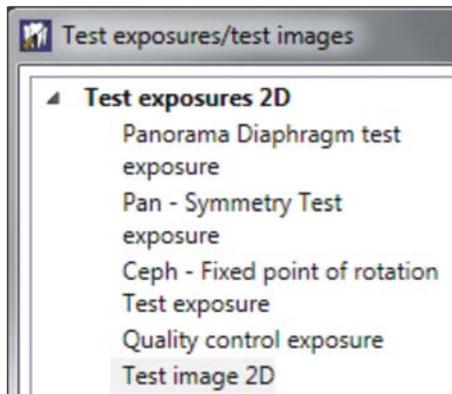
4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if it has been configured).
 - ↳ The exposure is displayed in the exposure window in SIDEXIS XG.

10.11.1.5 2D test pattern

You can use the "2D test image" menu to check the 2D data path of the unit and the operability of the sensors.

1. Call the "Test exposures/test images" menu [→ 469].
2. In the structure tree, under "Test exposures 2D", select the "2D test image" element.

↳ The menu for creating the panoramic and cephalometric test image appears in the action window.



3. Click on the "Image acquisition Panorama" or "Image acquisition Ceph" button to create the appropriate test image.

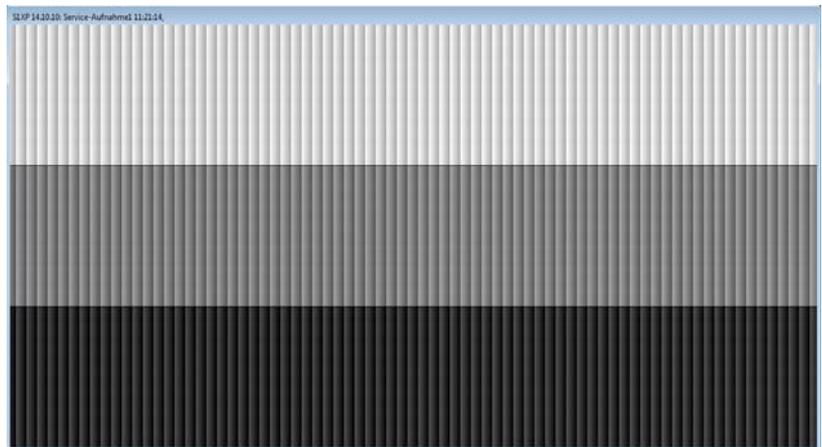
↳ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.



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 test image appears in the exposure window.

Panoramic test image



Ceph test image



10.11.2 3D test exposures

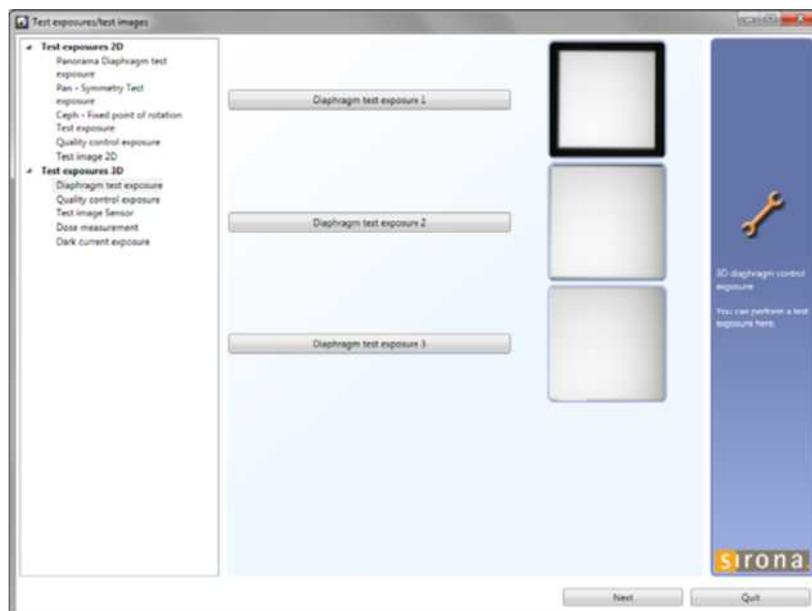
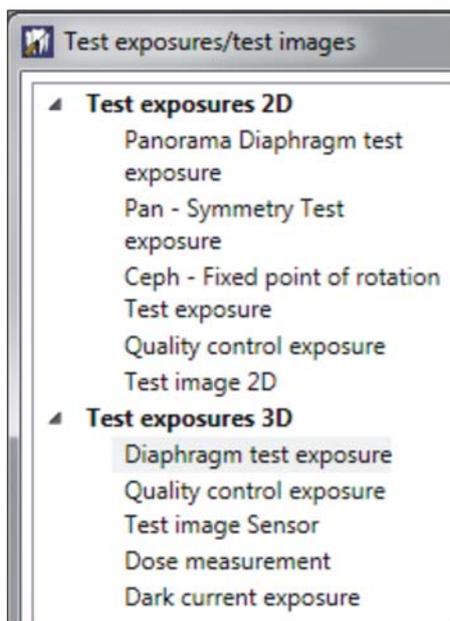
10.11.2.1 Diaphragm test exposure (3D)

You can use the *"Diaphragm test exposure"* to check the adjustment of the panoramic diaphragm. Three different diaphragm settings are available for the 3D diaphragm exposure:

- Diaphragm test exposure 1 =
Reduced diaphragm aperture for checking the drop in dose on all sides
- Diaphragm test exposure 2 =
Original 3D diaphragm for checking the surrounding edge
- Diaphragm test exposure 3 = Open diaphragm for overexposure

1. Call the *"Test exposures/test images"* menu [→ 469].
2. In the structure tree, under *"Test exposures 3D"*, select the *"Diaphragm test exposure"* element.

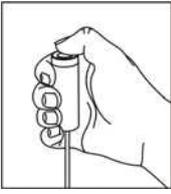
↳ The menu for creating the *"Diaphragm test exposure"* appears in the action window.



3. Click the *"Diaphragm test exposure 1"*, *"Diaphragm test exposure 2"*, or *"Diaphragm test exposure 3"* button, depending on which diaphragm setting you want to use for the exposure.

↳ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.





Reduced diaphragm aperture

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).

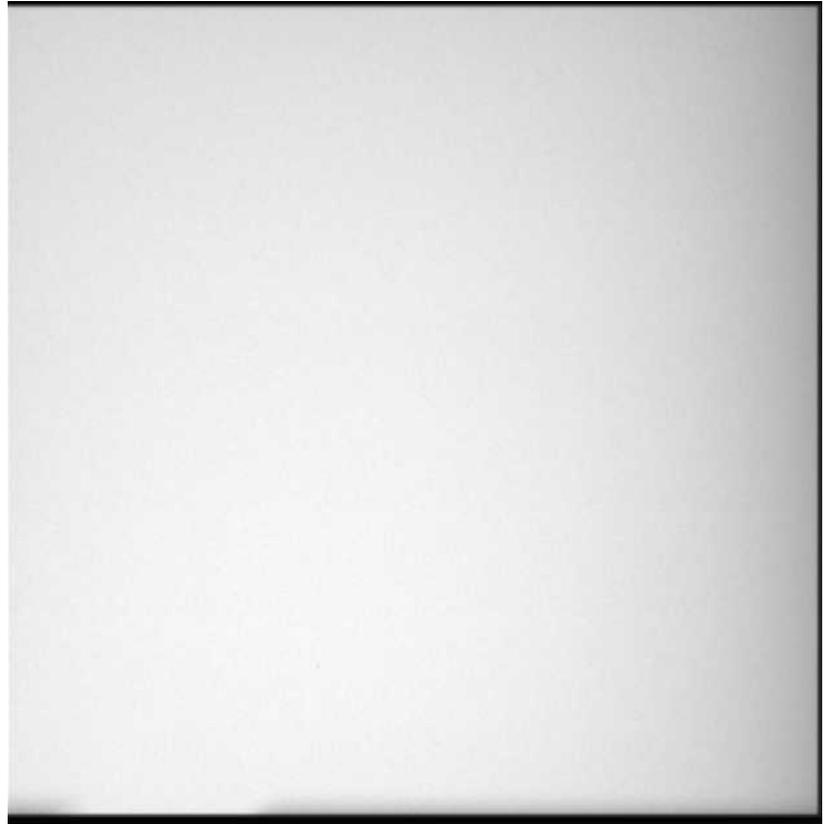
↳ The exposure is displayed in the exposure window in SIDEXIS XG.



Original 3D diaphragm

The diaphragm is correctly adjusted if a black surrounding edge can be detected.

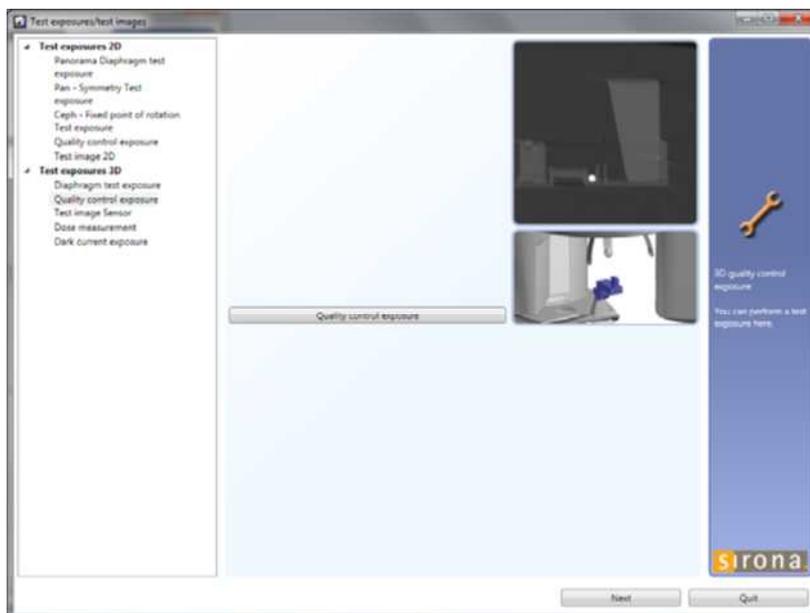
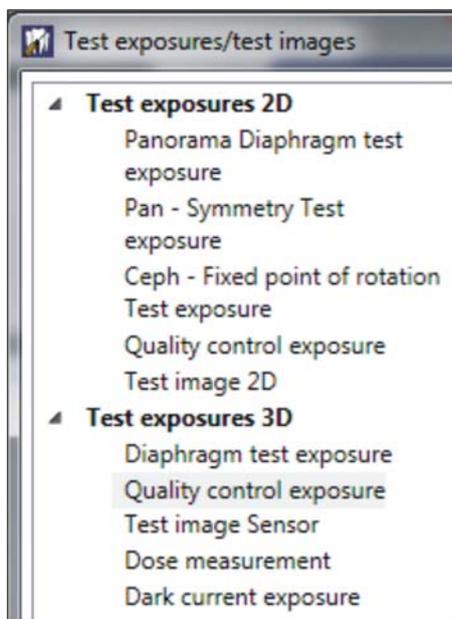
Open diaphragm



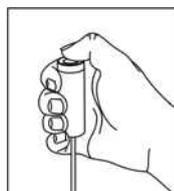
10.11.2.2 Quality test exposure (3D)

You can use the "Quality control exposure" to create a volume exposure with a full rotation. This function enables you to simulate a quality test, for example, similar to an acceptance/constancy test.

1. Call the "Test exposures/test images" menu [→ 469].
2. In the structure tree, under "Test exposures 3D", select the "Quality control exposure" element.
 - ↳ The menu for creating the "Quality control exposure" appears in the action window.



3. Click on the "Quality control exposure" button in the menu.
 - ↳ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.

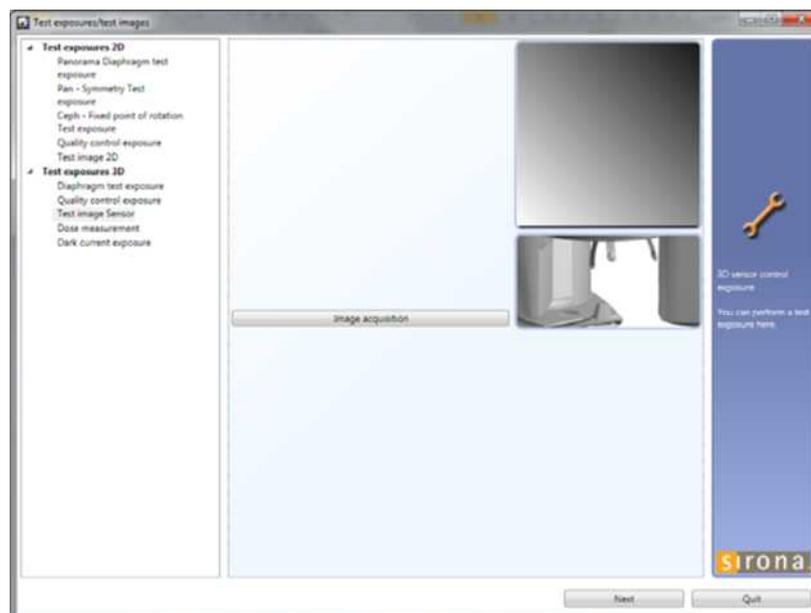
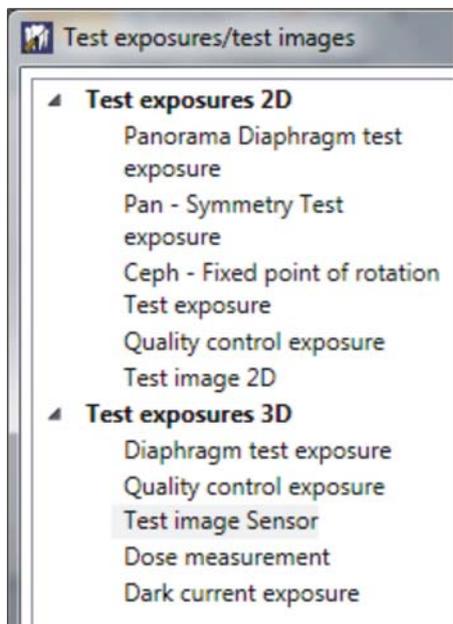


4. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if it has been configured).
 - ↳ The exposure is displayed in the exposure window in SIDEXIS XG.

10.11.2.3 Sensor test image (3D)

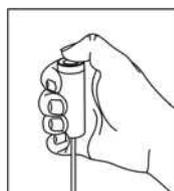
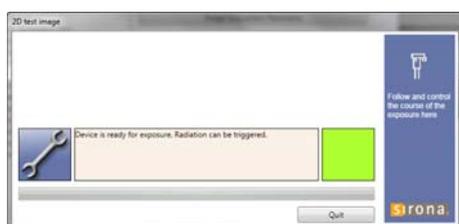
You can use the "Test image Sensor" menu to check the 3D data path of the unit and the operability of the sensor.

1. Call the "Test exposures/test images" menu [→ 469].
2. In the structure tree, under "Test exposures 3D", select the "Test image Sensor" element.
 - ↳ The menu for creating the test image for the 3D sensor appears in the action window.

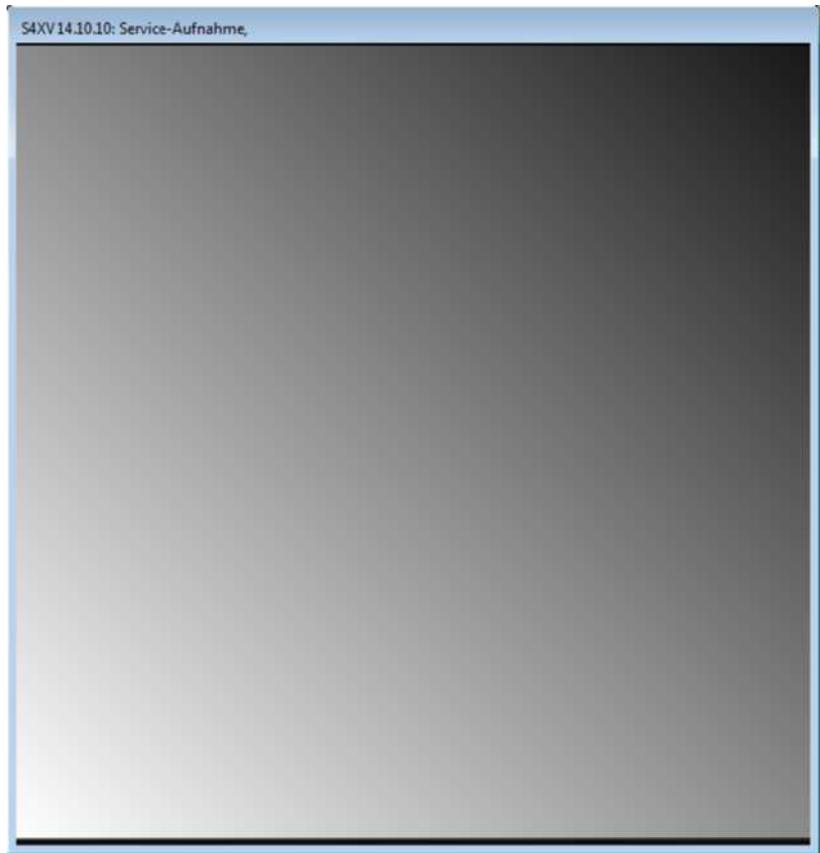


3. Click on the "Image acquisition" button to create the test image.

↳ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.



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 test image appears in the exposure window.



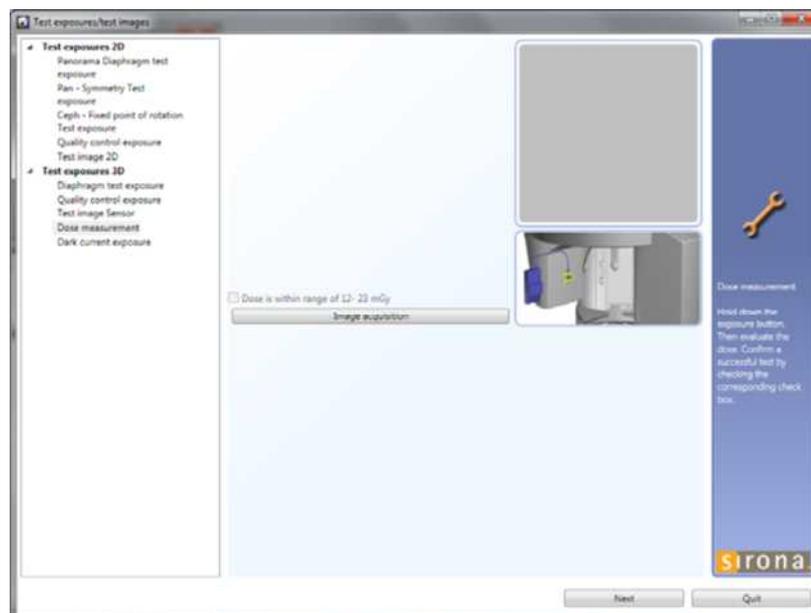
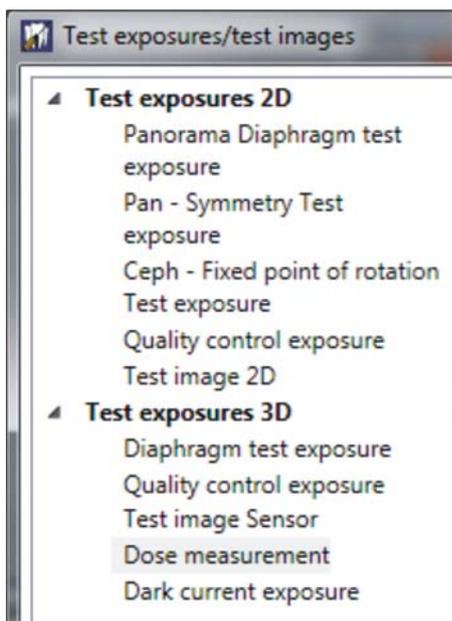
10.11.2.4 Dosimetry (3D)

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

You can use the "Dose measurement" menu to perform dosimetry independently of the unit adjustment or calibration.

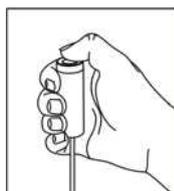
1. Attach the Mult-O-Meter sensor in the middle of the combisensor.
2. Call the "Test exposures/test images" menu [→ 469].
3. In the structure tree, under "Test exposures 3D", select the "Dose measurement" element.

↳ The menu for the "Dose measurement" appears in the action window.



4. Click on the "Image acquisition" button.

↳ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.

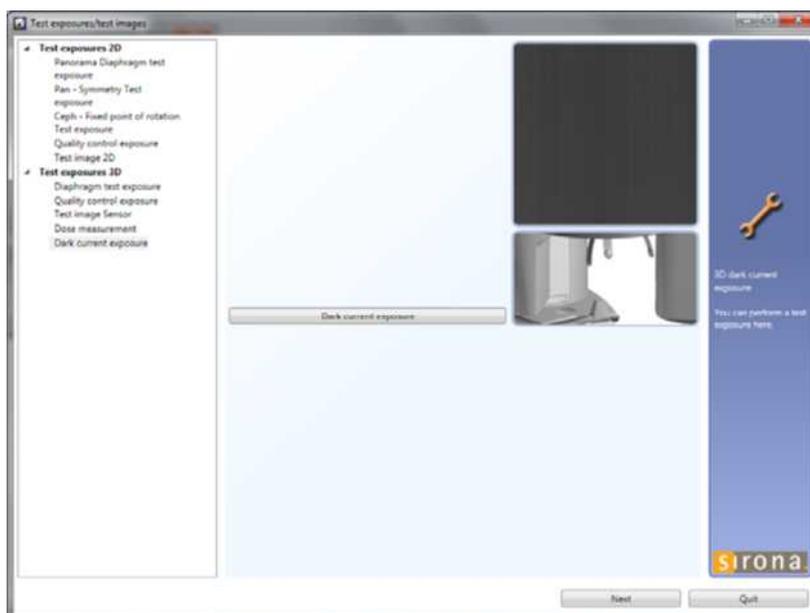
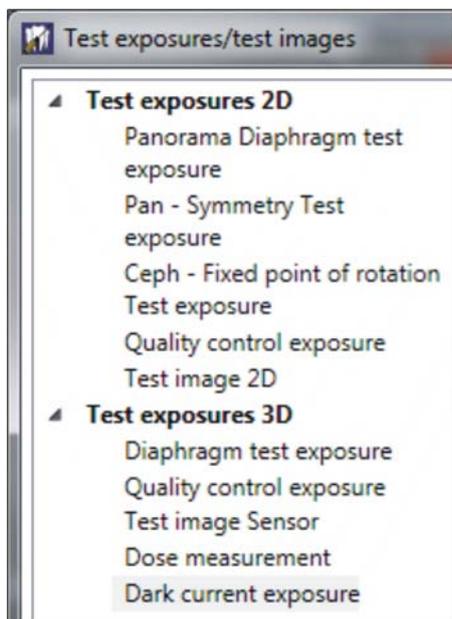


5. Press the release button. Press and hold down the button until the exposure is complete, the preview image is displayed in the exposure window, and the acoustic signal that indicates the end of the exposure (double beep) sounds (if it has been configured).
6. Read the dose shown on the Mult-O-Meter.
7. Remove the Mult-O-Meter from the dual sensor.

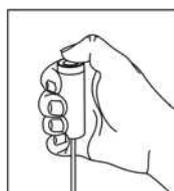
10.11.2.5 Dark current exposure (3D)

You can use the "Dark current exposure" to check the 3D sensor.

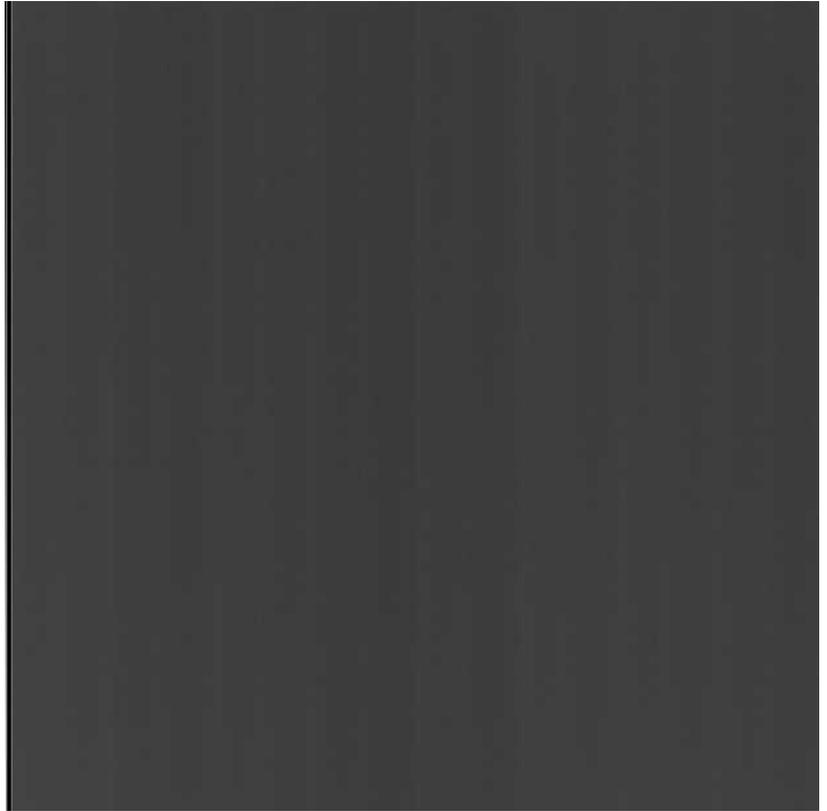
1. Call the "Test exposures/test images" menu [→ 469].
2. In the structure tree, under "Test exposures 3D", select the "Dark current exposure" element.
 - ↳ The menu for creating the "Dark current exposure" appears in the action window.



3. Click on the "Image acquisition" button.
 - ↳ The exposure window opens in SIDEXIS XG. It indicates the current status of exposure readiness.



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 in SIDEXIS XG.

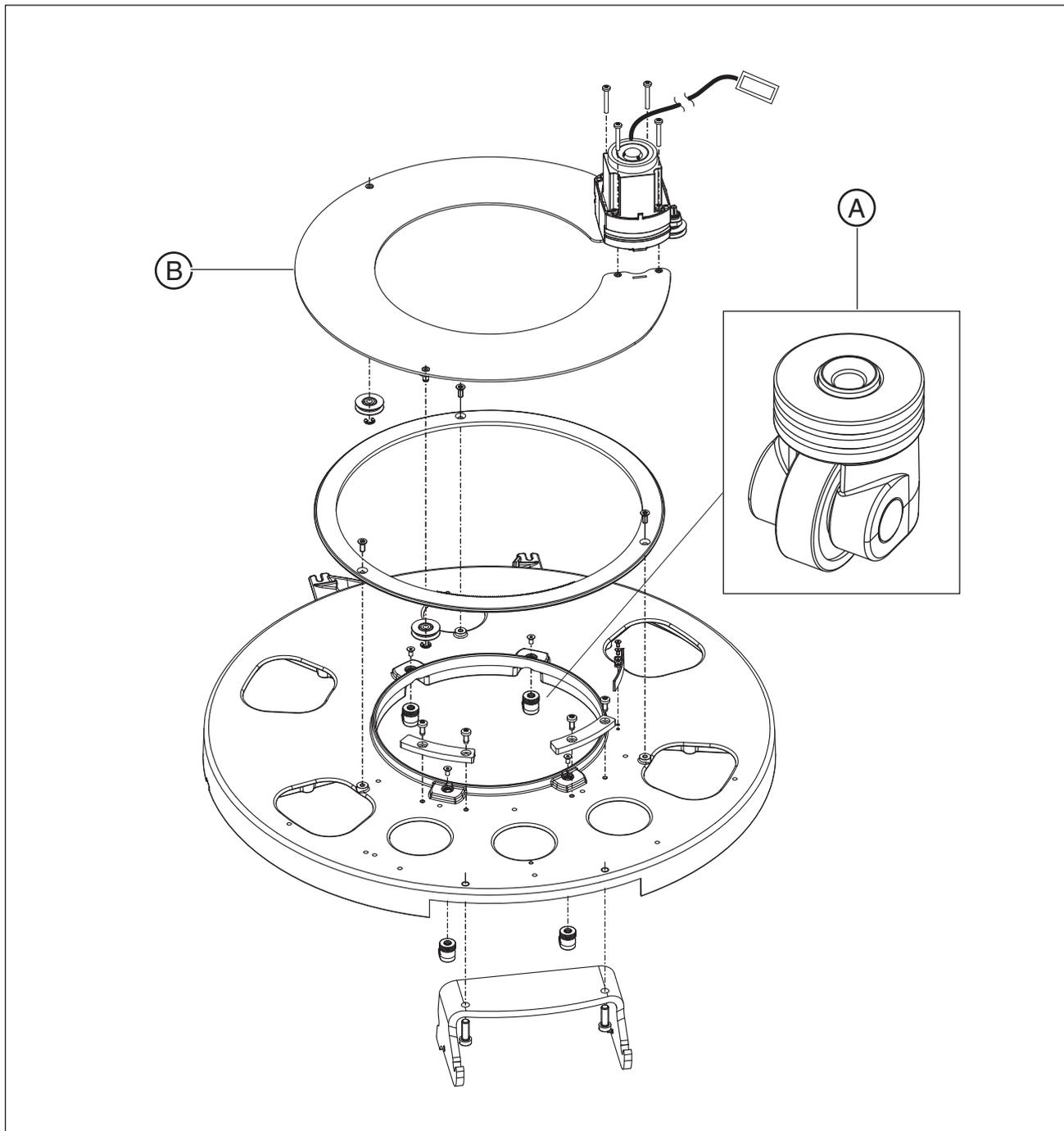


10.12 Checking the cables for damage

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 [→ 441].

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

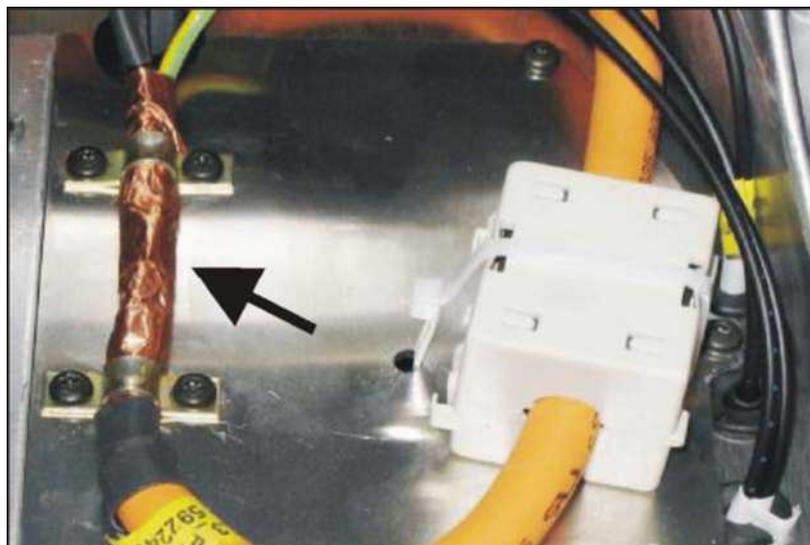


Check whether the grounding straps have complete and firm contact

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

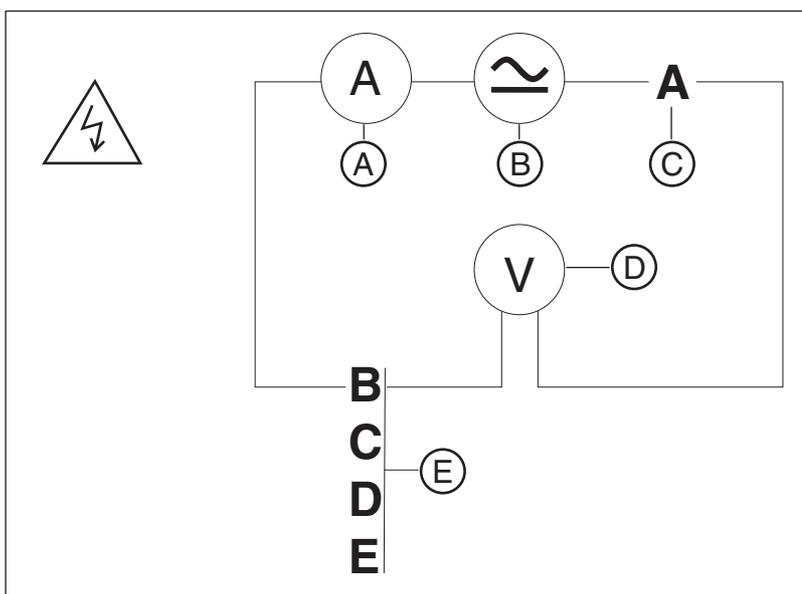
DANGER

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.

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

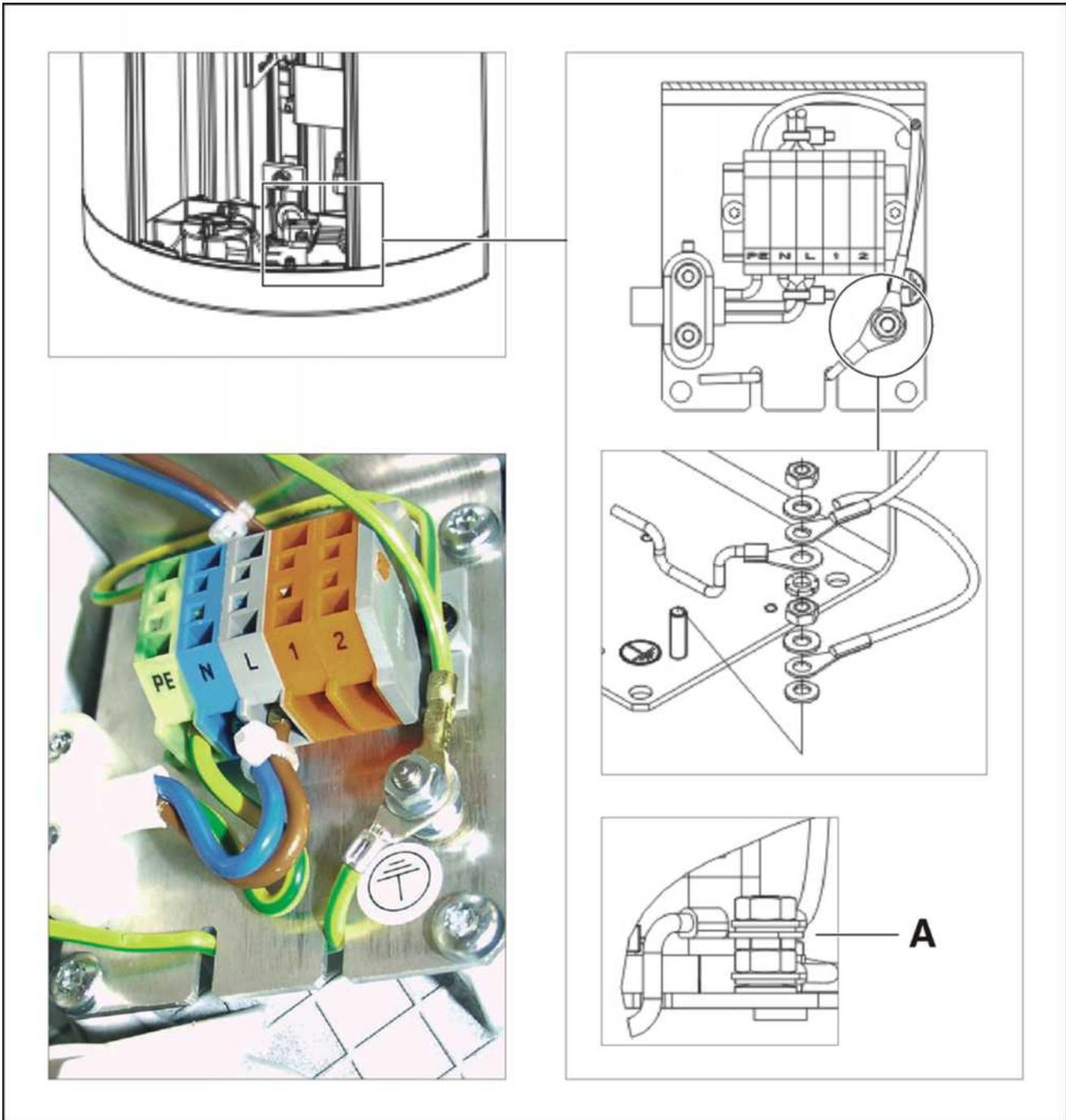
Check whether the ground wire resistance complies with the specifications

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

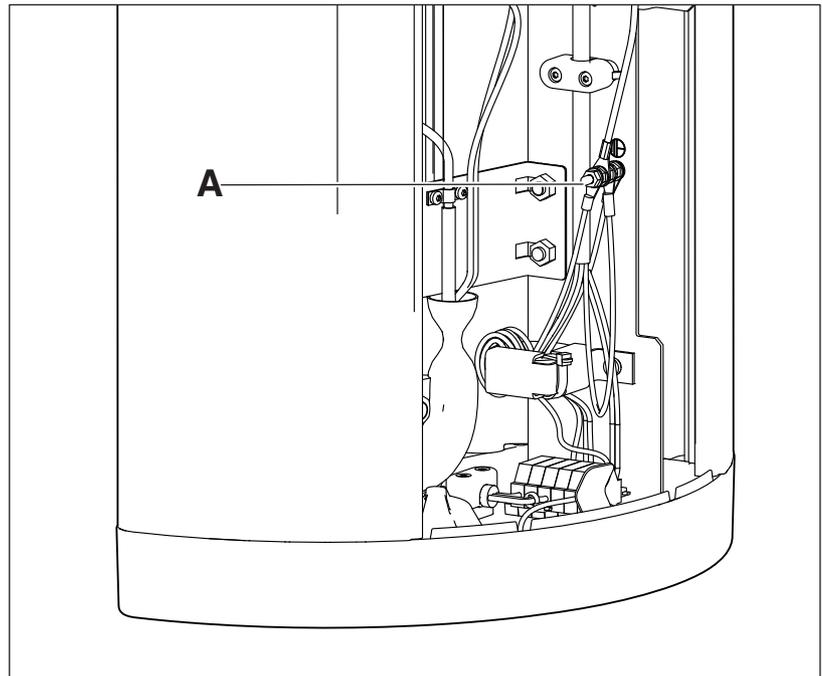
- ✓ A power source with a current of at least 0.2 A , a no-load voltage of 24 V max. and 4 V min. is required.
- 1. Connect the power source between the measuring points specified in the table for at least 5 s.
- 2. Measure the voltage drop with the voltmeter, measure the current with the ammeter, and 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.

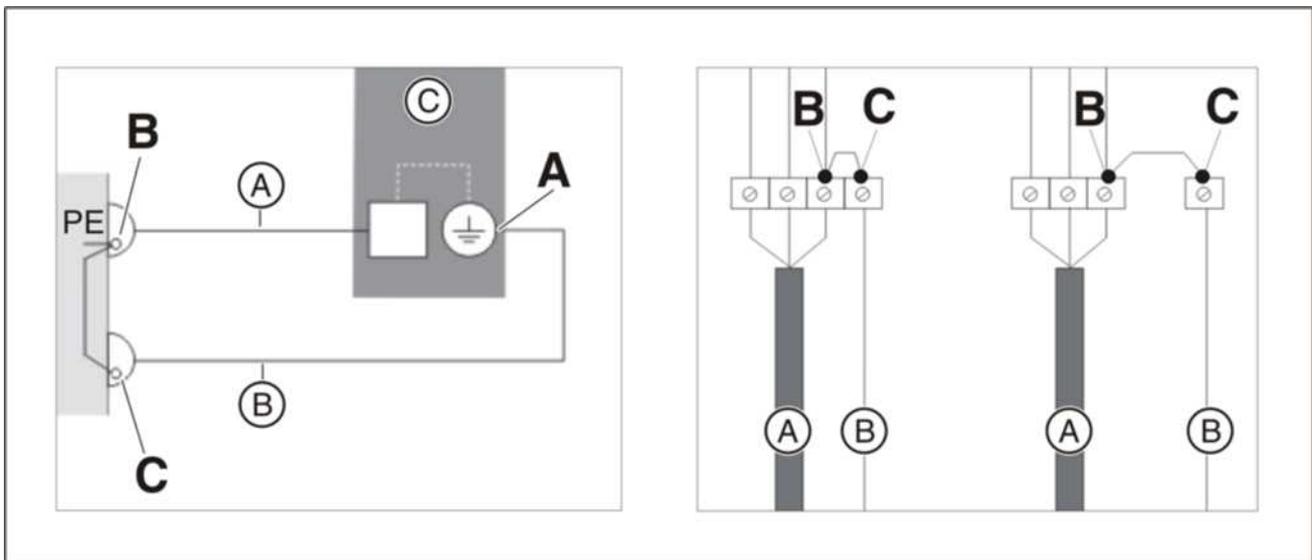
Measuring point A: Central ground wire



Measuring point A: Central protective ground wire

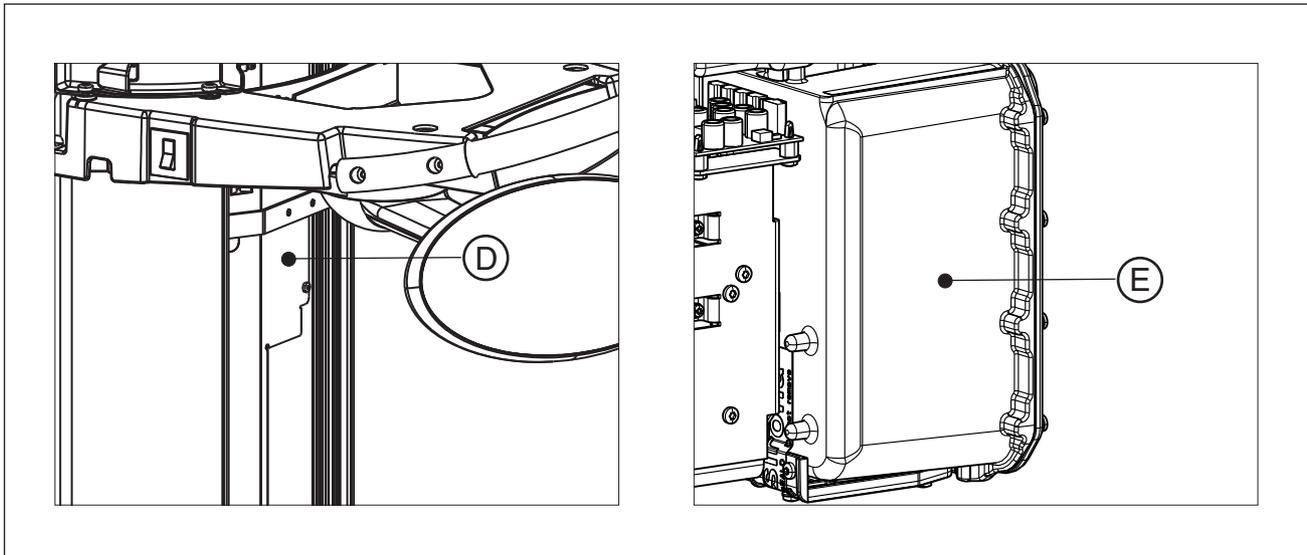


Measuring points B and C: GNYE power connection and 2nd ground wire



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 at 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 63 03 601) 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).
- Alternatively, you can also contact enretec GmbH directly.

enretec GmbH
Kanalstraße 17
16727 Velten

Tel.: +49 3304 3919-500
E-Mail: eom@enretec.de

In accordance with the national disposal regulations regarding old electrical and electronic devices (ElektroG), as the manufacturer, we assume the costs for disposing of the electrical and electronic devices in question. Disassembly, transport and packaging costs shall be borne by the owner / operator.

Prior to disassembly / disposal of the 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

Version 1:	Software version V04.03.00, short version of the Service Manual (Description of messages)
Version 2:	Software version V04.03.01, full version
Version 3:	Software version V04.04.00, new DX1/11 board, new tube holders on rotary ring, chapter titled "Replacing the rotation unit" and "Mechanical adjustment: Ceph secondary diaphragm" inserted, other corrections implemented
Version 4:	Software version V04.07.00, further corrections implemented
Version 5:	Software version V04.07.01
Version 6:	Software version V04.09.01
Version 7:	Software version V04.09.02, tube assembly 2.0
Version 8:	Software version V04.14.00
Version 9:	Adjustment phantom / quality phantom, worldwide (outside Germany)
Version 10:	Software versions V04.14.01 and V04.14.02 complemented, section Checking the unit leakage current [→ 499] revised, test phantom names updated
Version 11:	Chapter Functional check [→ 17] added. Service routine S11.14 added. Software version V04.14.03; further corrections made

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

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