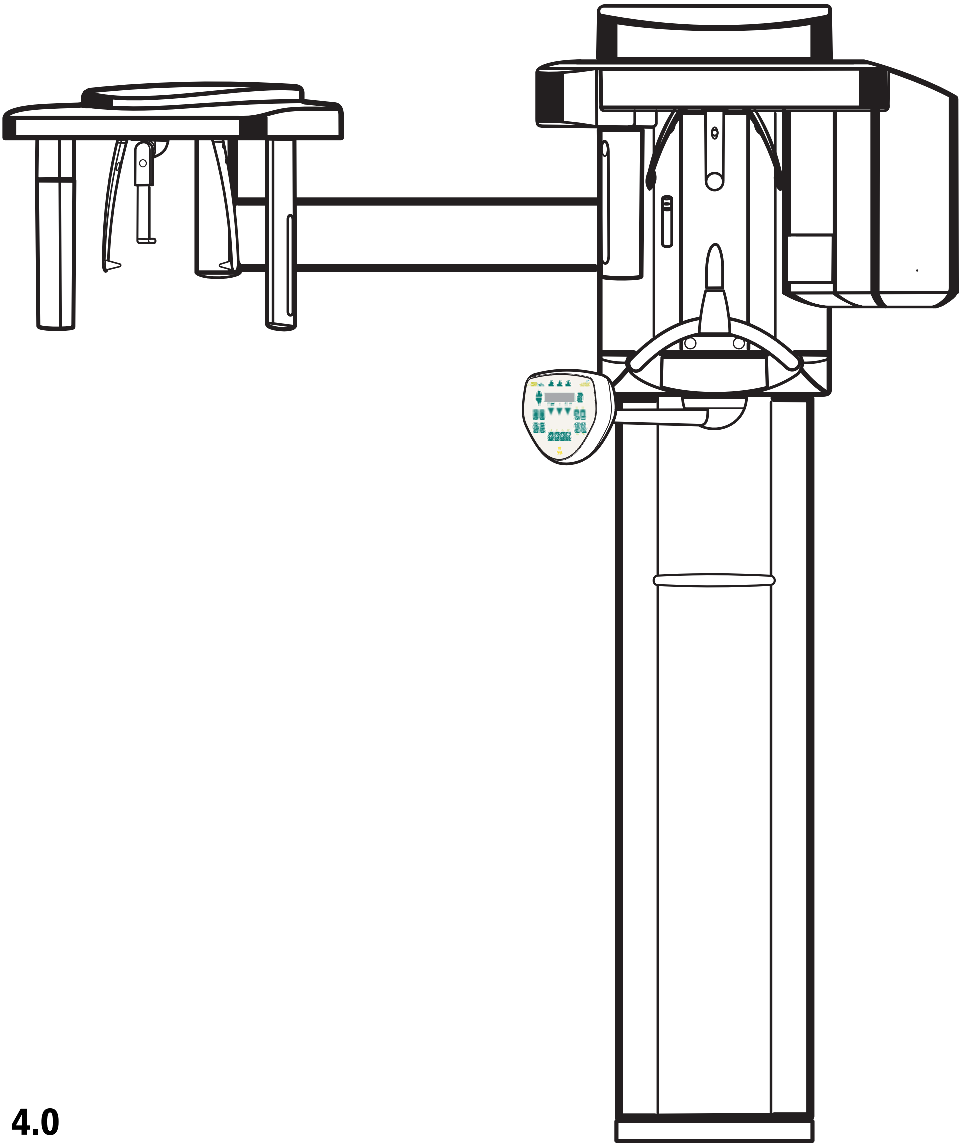
schick

CDR PanElite

Service Manual

English



Version 4.0

About the Service Manual:

- **This Service Manual is valid for the following unit versions:**
  - CDR PanElite
  - CDR PanElite / Ceph

In addition, you also require:

- **Spare parts list: Part No. 61 90 131**
  - CDR PanElite / Ceph

- **Wiring diagrams: Part No. 61 88 044**
  - CDR PanElite / Ceph

- **Installation Instructions: Part No. 61 87 962**
  - CDR PanElite / Ceph

- **Tools**
  - Screwdriver, medium sized
  - Torx offset screwdrivers TX10, TX20, TX25
  - Open-end wrench, 13 mm A/F
  - Socket wrench, 13 mm A/F
  - Side cutters
  - Spirit level

- **Auxiliary devices**
  - Digital multimeter, Accuracy Class 1
  - Soldering tool for repairing cables
  - Cable ties
  - Teflon tape
  - Loctite

1 General information

Contents

1 General information

1.1 Safety

It is essential that you comply with the warning and safety information contained in this Service Manual.

All such information is highlighted by one of three signal words, i.e. CAUTION, WARNING or DANGER.

⚠ ***CAUTION***

Failure to comply may result in minor physical injuries or material damage and malfunctions.

⚠ ***WARNING***

Failure to comply may lead to serious physical injury or death.

⚠ ***DANGER***

Immediate danger to life and limb. Threat of serious physical injury or death.

1.2 Operation notes

Rated line voltage

The CDR PanElite X-ray unit can be operated in the following rated line voltage ranges:

- 200 V - 240V
- 50/60 Hz

The permissible line voltage fluctuations are as follows:

- 200 - 240 V: +10 %

The internal line impedance must not exceed max. 0.8 Ω.

Remote control

The system can be equipped with...

- a 1 - 3 m coiled cable with exposure switch inside the treatment room or ...
- a remote control with or without coiled cable located outside the X-ray room (see installation instructions).

Warm-up time

After it is switched ON, the system requires a warm-up time of approx. 1 min.

Self-adjustment routine

At power up, a mechanical and electronic self-adjustment routine is executed. If a button is pressed during the self-adjustment routine, an error message is displayed on the Control Pad.

Cooling period

The cooling period between two exposures is maintained by an automatic exposure blocking function according to the pulse/pause ratio. A countdown of the waiting time is displayed on the Control Pad.

Turn-off time

The unit should be off at least 60s prior to power up.

Demo units

If the X-ray unit is to be presented as a demo unit at trade fairs or exhibitions, radiation emission should be blocked (see “Demo mode – Operation without radiation release” on page 1-6).

Software version

The CDR PanElite system software version is determined by the software statuses of the EEPROMs on the boards (see “List of software versions” on page 1-9).

Wireless phone interference with medical electrical equipment

To ensure safe operation of medical electrical equipment, the use of mobile wireless phones in practice or hospital environments is prohibited.

Disposal

The X-ray tube assembly contains a tube with potential implosion hazard, a small amount of beryllium, a lead lining as well as mineral oil.

Error messages

Error messages are displayed on the single-line display of the Control Pad.

Help messages in case exposure readiness cannot be attained

Help messages are displayed on the single-line display of the Control Pad.

If you have to remove covers from the unit

Proceed according to section "1.11 Removing the 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!

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

CAUTION

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

Reattach the covers.

Secondary diaphragm

Do not manually move or otherwise exert force on the secondary diaphragm (e.g. when removing it from its packaging).

Measurements

Always switch the unit OFF before connecting a measuring instrument.

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

Perform continuity tests only on units which are switched off.

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

The pulse/pause ratio is 1: 10, i.e. a 10-second pause is maintained for each second of radiation emission. The pulse/pause ratio is automatically maintained (automatic exposure blocking).

A pulse/pause ratio of 1:20 is better for the X-ray tube.

WARNING

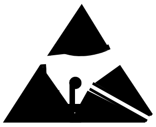
It is essential that you observe the radiation protection regulations applicable in your country prior to radiation release.

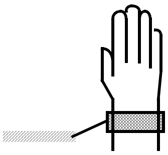
The test rotations triggered by pressing the T key on the Control Pad and then the exposure switch are executed without radiation.

When replacing parts

Switch the unit OFF before replacing parts.

The unit must be disconnected from the junction box of the building installation before replacing any parts near the power supply, power switch, board DX 32 or the X-ray tube assembly!





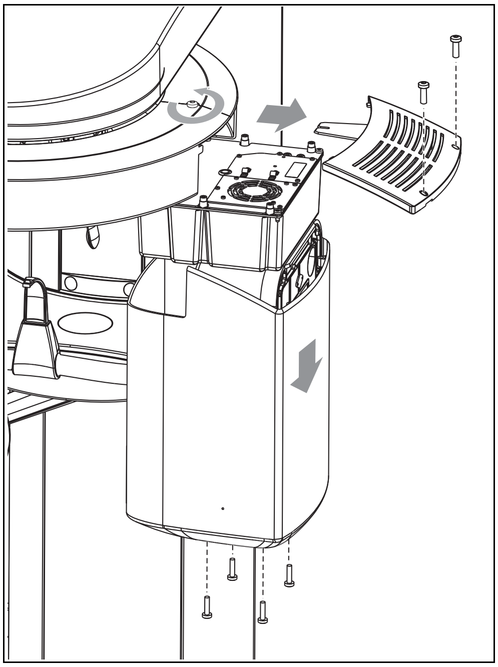
Please always wear an ESD wrist band to protect sensitive components on printed circuit boards (ESD).

Always check the system and adjust it as required after replacing a board or the X-ray tube assembly.

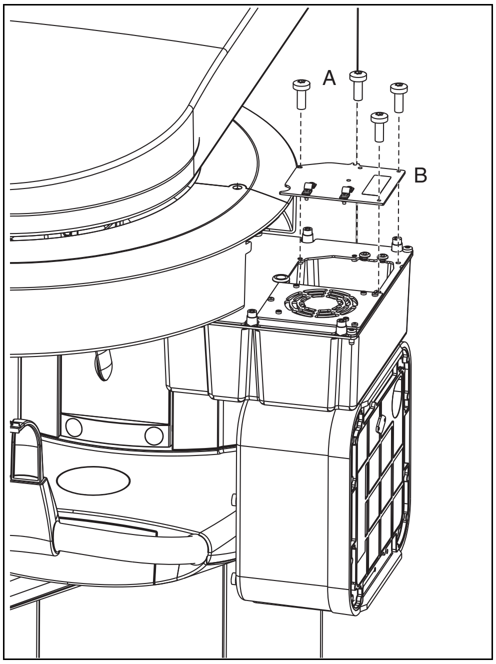
The part numbers for ordering spare parts can be found in the spare parts list, Order No. 61 901 31. The diagrams contained in the spare parts list provide a useful guide when replacing parts.

1.3 Demo mode – Operation without radiation release

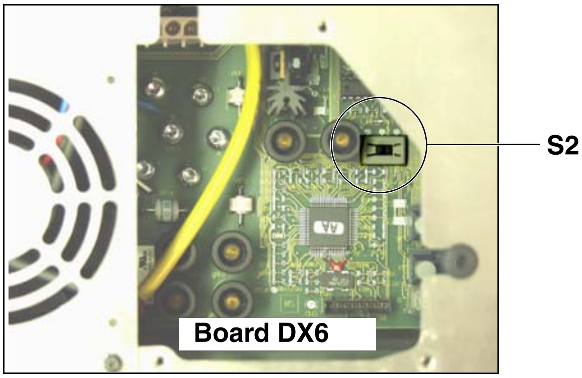
1.



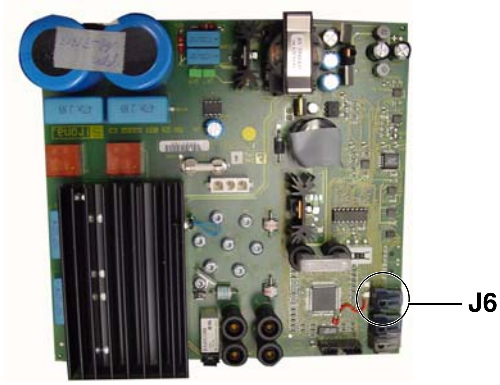
2.



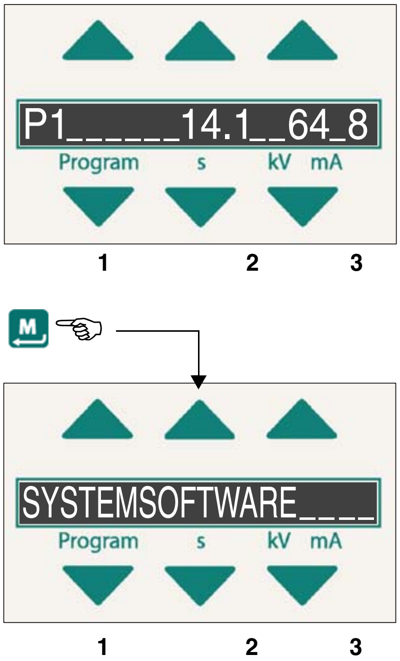
3.



4.



5.



Scroll through the list until the demo mode is displayed

1.3.1 Switching the demo mode ON

When operated in demo mode, the unit must not release any radiation. For this reason, you must take the following safety measures:

- Switch the unit OFF.

1. Remove the cover of the tube assembly.
2. Loosen screws **A** and remove cover plate **B**.
3. Set dip switch **S2** (DX6) to **position 2**.
4. Remove cable **L5** (X-RAY) from connector **J6** (DX6).
   Radiation release is now no longer possible.
5. Switch the unit ON and check the mode with the info menu.
   Demo mode: ON means that: The demo mode is switched ON (Radiation release is not possible)
   Demo mode: OFF means: The demo mode is switched OFF (Radiography, X-ray radiation are possible!)

- Switch the unit OFF again and reattach cover plate **B** and the tube assembly covers by following the dismantling procedure in reverse order.

1.3.2 Switching the demo mode OFF

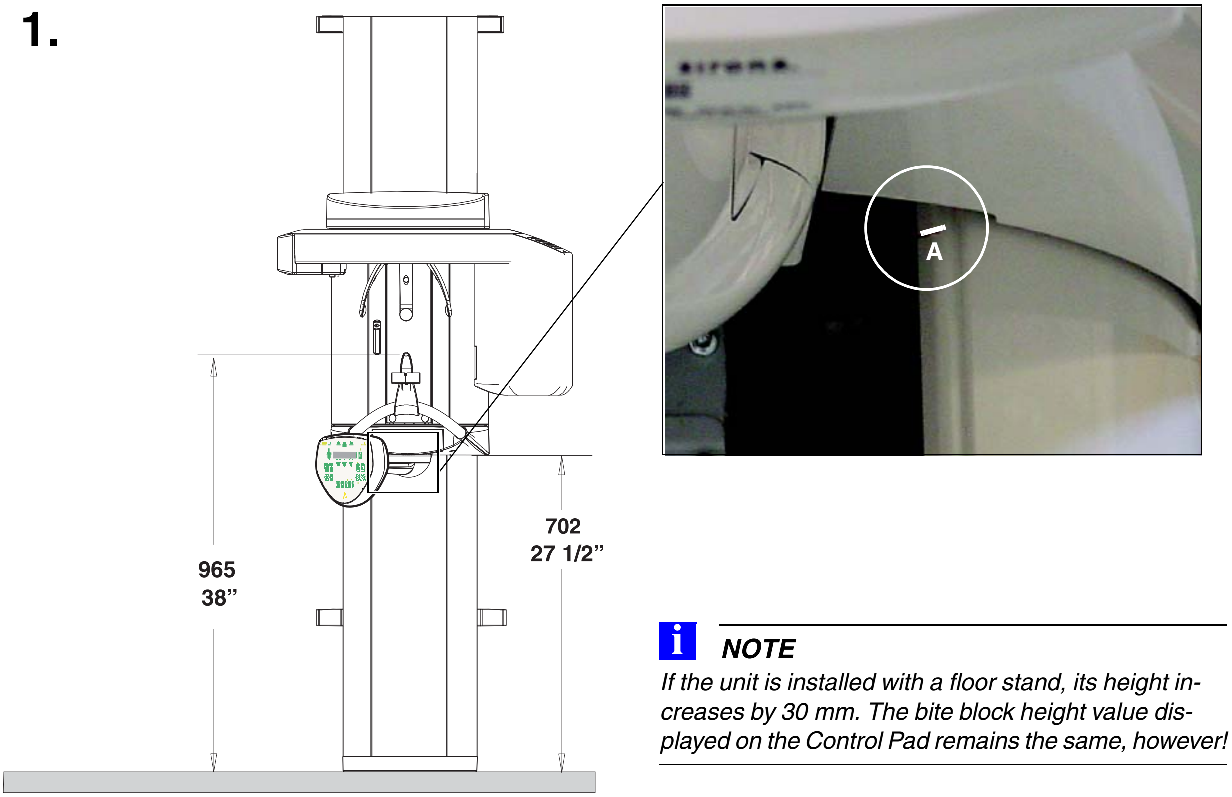
- Switch the unit OFF.

1. Remove the cover of the tube assembly.
2. Loosen screws **A** and remove cover plate **B**.
3. Set dip switch **S2** (DX6) to **position 1**.
4. Replace cable **L5** (X-RAY) on connector **J6** (DX6).
   Radiation release is now once again possible.
5. Switch the unit ON and check the mode with the info menu.
   Demo mode: ON means that: The demo mode is switched ON (Radiation release is *not* possible)
   Demo mode: OFF means: The demo mode is switched OFF (Radiography, X-ray radiation are possible!)

- Switch the unit OFF again and reattach cover plate **B** and the tube assembly covers by following the dismantling procedure in reverse order.

1.4 Demo mode – Repacking and transport

1.



NOTE

If the unit is installed with a floor stand, its height increases by 30 mm. The bite block height value displayed on the Control Pad remains the same, however!

Panoramic X-ray unit

- Switch the panoramic X-ray unit ON and move it to its packing height by pressing the **UP/DOWN** keys on the Control P.
  - Bite block height = 965 mm (displayed as height on Control Pad
  - Bottom edge of slide cover = 702 mm

NOTE

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

Cephalometer

- Start service routine S034, test step 6.
- Move the cephalometer to the packing position (see page 5-81).

- For information on packing the units and on the packing condition, see the relevant installation instructions.

1.5 List of software versions

NOTE

Any software combinations other than those listed here are not allowed.
If the software version of any particular module does not match the overall software version, the overall software version will be marked with an asterisk on the info screen (e.g. 02.30).*

Panoramic unit						**Cephalometer**	**Remarks**
Board	**DX6**	**DX71**	**DX11**	**DX61**	**DX81**	**DX91**	
Overall software V 02.30.00	02.60	02.33	02.42	02.34	02.33	02.43	CDR Software V4.3
Overall software V 02.31.00	02.60	02.33	02.42	02.34	02.33	02.44	CDR Software V4.3
Overall software V 02.32.00	02.60	02.33	02.43	02.35	02.33	02.44	CDR Software V4.3

Remote control		**Remarks**
Board	**DX42**	
Overall software V 02.30.00	02.31	
Overall software V 02.31.00	02.31	
Overall software V 02.32.00	02.31	

1.6 Software update

1.6.1 Important information on the software update

NOTE

Read the information provided on the CDR PanElite Support CD. It contains the latest information on the software update.

CAUTION

Important for units with the following serial numbers or higher:

	without Ceph	**with Ceph**
PanElite	200000	220000

A downgrade to a software version < V02.32 cannot be performed on these units.

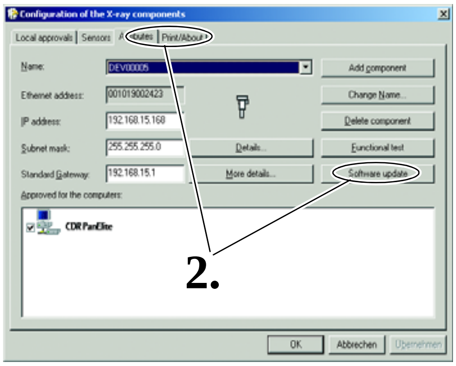
1.6.2 Performing a software update

Opening SIXABCON.exe

1. Open the SIXABCON utility program in the CDR PanElite program folder.
   Click on SIXABCON.exe.

to open the SOFTWARE UPDATE menu

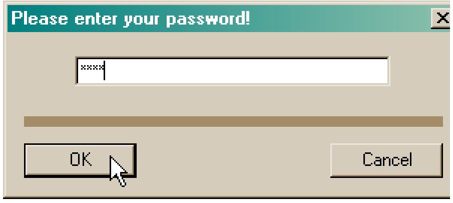
2. Open the **SOFTWARE UPDATE** menu.
   Click the **ATTRIBUTES** tab and then **SOFTWARE UPDATE**.
   The dialog box for entering the service password appears on the screen.



Name: DEV00005
Ethernet address: 001019002423
IP address: 192.168.15.168
Subnet mask: 255.255.255.0
Standard Gateway: 192.168.15.1
Approved for the computers:
☑ CDR PanElite

Entering the password

3. Enter the service password.



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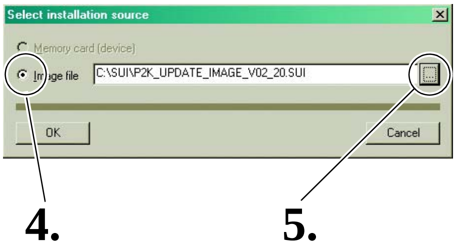
> **NOTE**
>
> *As a service password, enter the first 4 digits of the current system date in reverse order (e.g. on 05/24/1995, 5042 must be entered as the service password.*
>
> *If an incorrect service password or no password at all is then entered, the limited update menu for users will then be started. This includes only the possibility for an automatic update (see page 1-12).*

The dialog box for selecting the installation source opens.

Selecting an installation source

4. **IMAGE FILE** is preset as the installation source for the software update.
5. Select the path and the desired update file and confirm your selection by clicking **OPEN**.
   Click on **NAME UPDATE** and **OPEN**.



○ Memory card (device)
● Image file C:\SUI\P2K_UPDATE_IMAGE_V02_20.SUI

> **NOTE**
>
> *The update file can be found on the CDR PanElite Support CD. It is delivered with each DX11 replacement board.*

Selecting the update mode

6. Select the mode for the software update.

You can select two different update modes via the index tabs:

- **Automatic**

  The software of all components is automatically updated a **higher software version**.

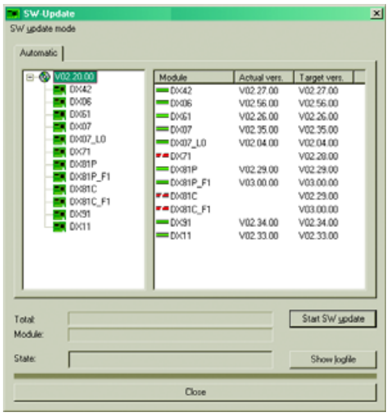
- **Main version**

  The software can be **upgraded or downgraded** to the **desired version**.

  This update mode is required e.g. if a replacement component delivered out of stock has a newer status than the prevailing overall system status. In this case, a main version update to the overall system status (displayed on the info screen) must be performed for the corresponding component with the appropriate update file (*.SUI). The module is then reprogrammed.

(For more information on the update mode, see the next page.)

User domain

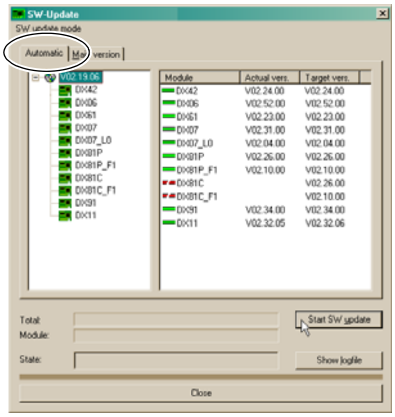


Module	Actual vers.	Target vers.
🟩 DX42	V02.27.00	V02.27.00
🟩 DX06	V02.56.00	V02.56.00
🟩 DX61	V02.26.00	V02.26.00
🟩 DX07	V02.35.00	V02.35.00
🟩 DX07_LO	V02.04.00	V02.04.00
🟥 DX71		V02.28.00
🟩 DX81P	V02.29.00	V02.29.00
🟩 DX81P_F1	V03.00.00	V03.00.00
🟥 DX81C		V02.29.00
🟥 DX81C_F1		V03.00.00
🟩 DX91	V02.34.00	V02.34.00
🟩 DX11	V02.33.00	V02.33.00

Automatic

(Accessible without password.)

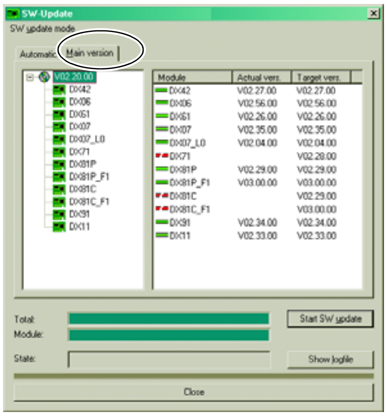
Service domain



Module	Actual vers.	Target vers.
🟩 DX42	V02.24.00	V02.24.00
🟩 DX06	V02.52.00	V02.52.00
🟩 DX61	V02.23.00	V02.23.00
🟩 DX07	V02.31.00	V02.31.00
🟩 DX07_LO	V02.04.00	V02.04.00
🟩 DX81P	V02.26.00	V02.26.00
🟩 DX81P_F1	V02.10.00	V02.10.00
🟥 DX81C		V02.26.00
🟥 DX81C_F1		V02.10.00
🟩 DX91	V02.34.00	V02.34.00
🟩 DX11	V02.32.05	V02.32.06

Automatic

A list of modules, their installed software version and the latest software version offered by the update function is displayed in the right pane.



Module	Actual vers.	Target vers.
🟩 DX42	V02.27.00	V02.27.00
🟩 DX06	V02.56.00	V02.56.00
🟩 DX61	V02.26.00	V02.26.00
🟩 DX07	V02.35.00	V02.35.00
🟩 DX07_LO	V02.04.00	V02.04.00
🟥 DX71		V02.28.00
🟩 DX81P	V02.29.00	V02.29.00
🟩 DX81P_F1	V03.00.00	V03.00.00
🟥 DX81C		V02.29.00
🟥 DX81C_F1		V03.00.00
🟩 DX91	V02.34.00	V02.34.00
🟩 DX11	V02.33.00	V02.33.00

Main version

(E.g. if modules have a newer version status than the overall system following module replacement.)

NOTE

🟩 *Modules which are connected and whose program status agrees with that of the current main program version are marked by a continuous green bar.*

🟥 🟥 *Modules which are not elements of the current system configuration or, as a removable medium (e.g. sensors) are not connected, are marked by a broken red bar.*

If the actual status of the module could not be polled forthe update, the actual SW version will then 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 the **MAIN VERSION** mode.*

7. Select the update mode and the update or component.

Starting the update

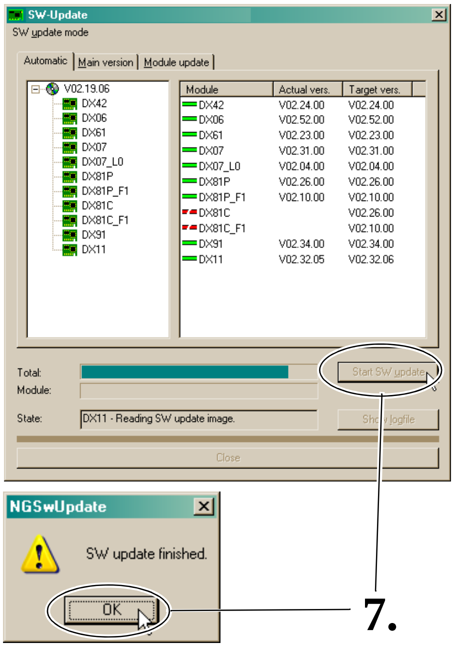
8. Start the update by clicking **START UPDATE**.

NOTE

Before starting the software update, make sure that no unit movements are active (especially any diaphragm movements)! Otherwise the system may become inoperable in rare cases.

All of the sensors located in the unit (Pan or Ceph) must be inserted in the corresponding slots. Exposure readiness must be deselected in the CDR Service program and the system must not be in the service mode already.

The update is started. A message box informs you when the update process is completed. Confirm the update with **OK**.



Module	Actual vers.	Target vers.
DX42	V02.24.00	V02.24.00
DX06	V02.52.00	V02.52.00
DX61	V02.23.00	V02.23.00
DX07	V02.31.00	V02.31.00
DX07_L0	V02.04.00	V02.04.00
DX81P	V02.26.00	V02.26.00
DX81P_F1	V02.10.00	V02.10.00
DX81C		V02.26.00
DX81C_F1		V02.10.00
DX91	V02.34.00	V02.34.00
DX11	V02.32.05	V02.32.06

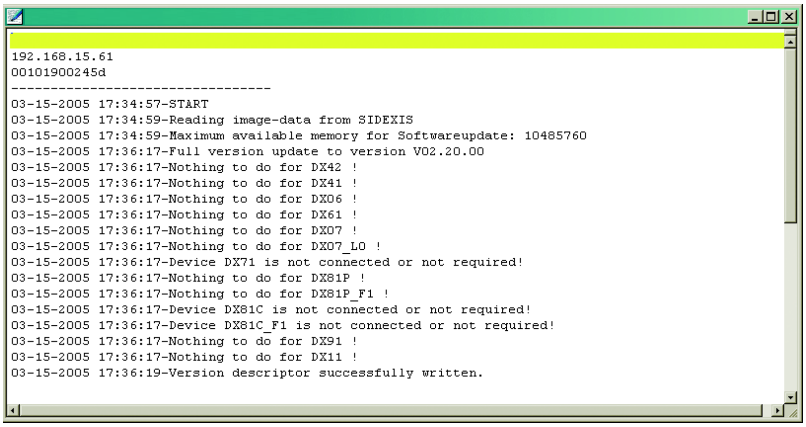
State: DX11 - Reading SW update image.

SW update finished.

Checking the log file

9. Check the log file to make sure that the update was completed successfully.

Click **SHOW LOGFILE**.



```
192.168.15.61
00101900245d
---------------------------------
03-15-2005 17:34:57-START
03-15-2005 17:34:59-Reading image-data from SIDEXIS
03-15-2005 17:34:59-Maximum available memory for Softwareupdate: 10485760
03-15-2005 17:36:17-Full version update to version V02.20.00
03-15-2005 17:36:17-Nothing to do for DX42 !
03-15-2005 17:36:17-Nothing to do for DX41 !
03-15-2005 17:36:17-Nothing to do for DX06 !
03-15-2005 17:36:17-Nothing to do for DX61 !
03-15-2005 17:36:17-Nothing to do for DX07 !
03-15-2005 17:36:17-Nothing to do for DX07_L0 !
03-15-2005 17:36:17-Device DX71 is not connected or not required!
03-15-2005 17:36:17-Nothing to do for DX81P !
03-15-2005 17:36:17-Nothing to do for DX81P_F1 !
03-15-2005 17:36:17-Device DX81C is not connected or not required!
03-15-2005 17:36:17-Device DX81C_F1 is not connected or not required!
03-15-2005 17:36:17-Nothing to do for DX91 !
03-15-2005 17:36:17-Nothing to do for DX11 !
03-15-2005 17:36:19-Version descriptor successfully written.
```

NOTE

If messages such as ***Update of DXxx failed!*** *appear there, please perform the update again. Repeat this procedure as often as necessary until the "failed" messages no longer appear.*

10. Reboot the system.

CAUTION

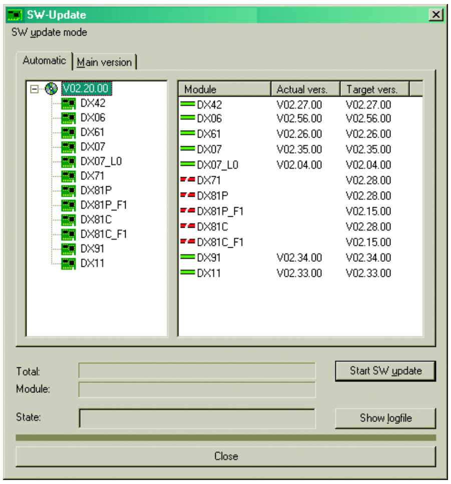
It is always necessary to reboot the system after any software update.

NOTE

Any errors with the consecutive numbers 01, 03, 04, 06 and/or 07 displayed immediately following the software update may be ignored. If these messages appear again after the unit is rebooted, perform troubleshooting according to Section 2.4.

If anything conspicuous occurs in connection with system handling on completion of the software update, please repeat the software update as the first measure. Also check whether the system software version is displayed without an asterisk (*) on the info screen.

Checking the program versions



Module	Actual vers.	Target vers.
🟩 DX42	V02.27.00	V02.27.00
🟩 DX06	V02.56.00	V02.56.00
🟩 DX61	V02.26.00	V02.26.00
🟩 DX07	V02.35.00	V02.35.00
🟩 DX07_L0	V02.04.00	V02.04.00
🟥 DX71		V02.28.00
🟥 DX81P		V02.28.00
🟥 DX81P_F1		V02.15.00
🟥 DX81C		V02.28.00
🟥 DX81C_F1		V02.15.00
🟩 DX91	V02.34.00	V02.34.00
🟩 DX11	V02.33.00	V02.33.00

SW Update Manager

11. Check whether all modules contain the current program version via the SW Update Manager or service routine S008.2 (see page 5-35). Program version included.

NOTE

🟩 *Modules which are connected and whose program status agrees with that of the current main program version are marked by a continuous green bar.*

🟥 *Modules which are not elements of the current system configuration or, as a removable medium (e.g. sensors) are not connected, are marked by a broken red bar.*

If the actual status of the module could not be polled forthe update, the actual SW version will then 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 the ***MAIN VERSION*** *mode.*

12. Open the "Extended Details“ via SIXABCON.

This generates an XML file (with the system parameters) which is filed under the network name of the system as XML file under the network name of the unit in the PDATA/P2K_Config folder (see also page 1-15).

1.6.3 Perform a software update (if necessary)

NOTE

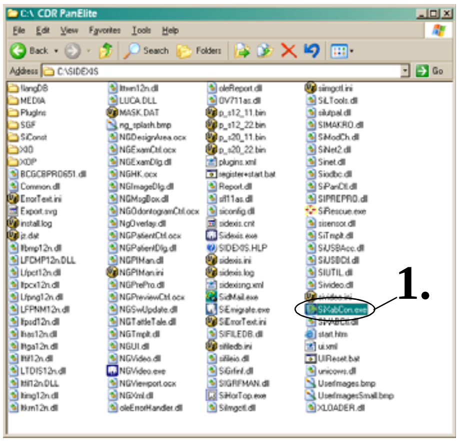
If the sensors previously used are to be used in the future as well, plug them into the slots on the panoramic unit and/or cephalometer before you begin the update.

1. Switch the unit ON.
2. Perform the software update (automatic update) as described on page 1-9.
3. Switch the unit OFF.
   Wait for approx. 1 minute. Then switch the unit ON again.

1.7 Selecting More details

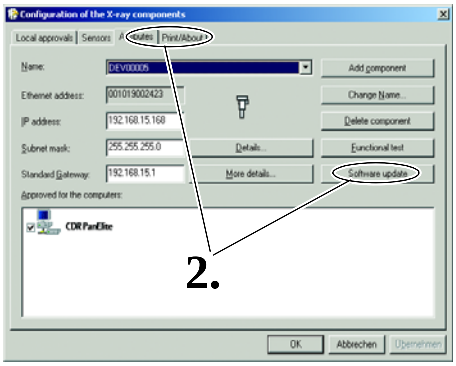
Opening SIXABCON.exe

1. Open the SIXABCON utility program in the CDR PanElite program folder.
   Click on SIXABCON.exe (see screen shot).



Opening the EXTENDED DETAILS menu

2. Open the **EXTENDED DETAILS** menu.
   Click the **ATTRIBUTES** tab and then **EXTENDED DETAILS**.
   The current parameters are read from the PDATA/P2K_Config folder.
   This process can take up to 30 seconds.



Configuration of the X-ray components

Name: DEV00005

Ethernet address: 001019002423

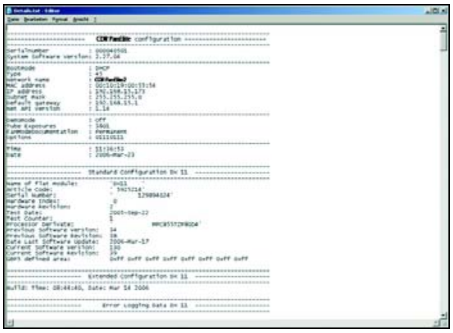
IP address: 192.168.15.168

Subnet mask: 255.255.255.0

Standard Gateway: 192.168.15.1

Approved for the computers:

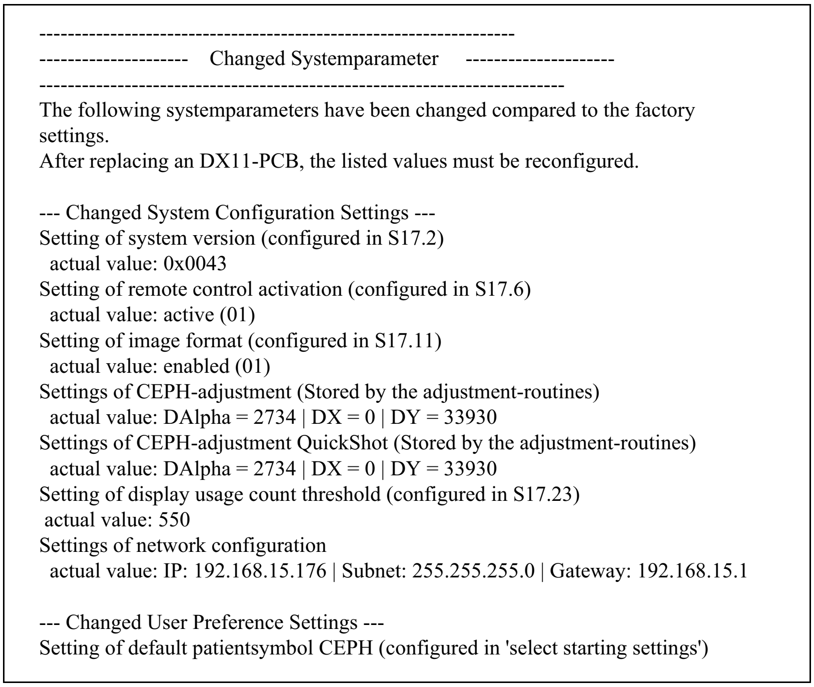
☑ CDR PanElite



After the parameters are read, an editor displaying the XML file is opened automatically.

NOTE

You can scroll down further in the file using the scroll bar. The "Changed system parameters", i.e. the system parameters that were modified in relation to the factory setting, are displayed there. This is especially interesting after a module change. The parameter settings can thus be easily traced.

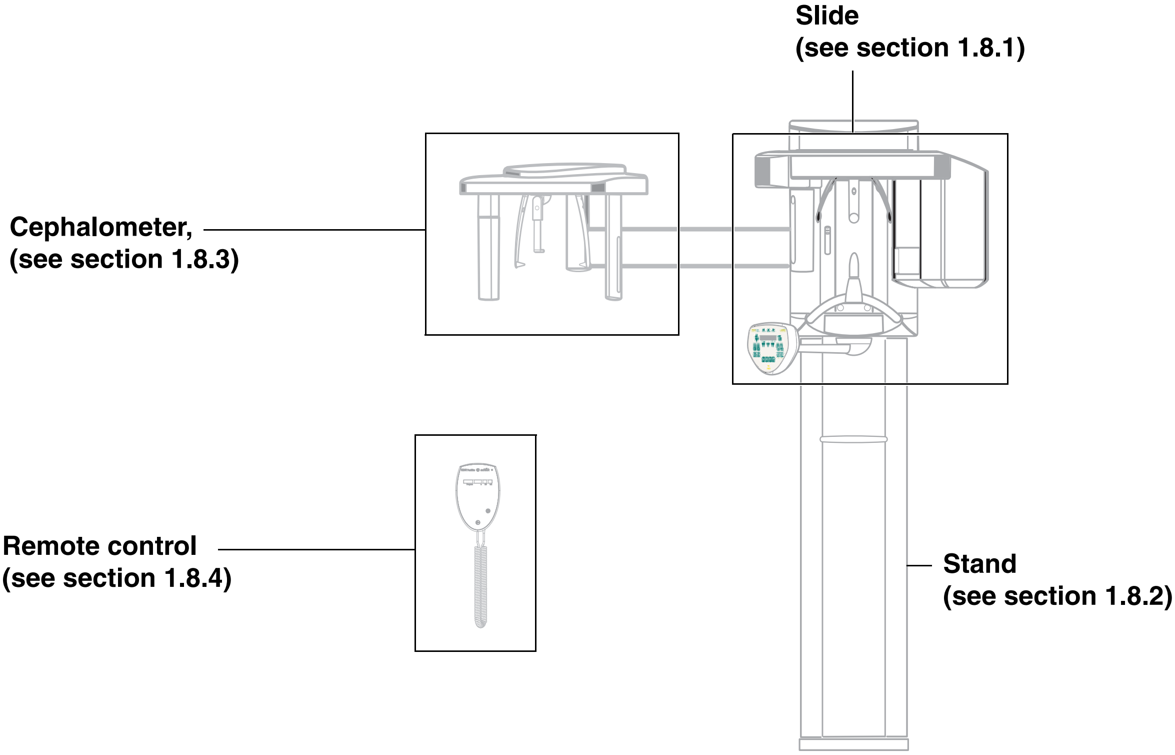


```
-------------------------------------------------------------------
---------------------   Changed Systemparameter    ---------------------
---------------------------------------------------------------------------
The following systemparameters have been changed compared to the factory
settings.
After replacing an DX11-PCB, the listed values must be reconfigured.

--- Changed System Configuration Settings ---
Setting of system version (configured in S17.2)
  actual value: 0x0043
Setting of remote control activation (configured in S17.6)
  actual value: active (01)
Setting of image format (configured in S17.11)
  actual value: enabled (01)
Settings of CEPH-adjustment (Stored by the adjustment-routines)
  actual value: DAlpha = 2734 | DX = 0 | DY = 33930
Settings of CEPH-adjustment QuickShot (Stored by the adjustment-routines)
  actual value: DAlpha = 2734 | DX = 0 | DY = 33930
Setting of display usage count threshold (configured in S17.23)
 actual value: 550
Settings of network configuration
  actual value: IP: 192.168.15.176 | Subnet: 255.255.255.0 | Gateway: 192.168.15.1

--- Changed User Preference Settings ---
Setting of default patientsymbol CEPH (configured in 'select starting settings')
```

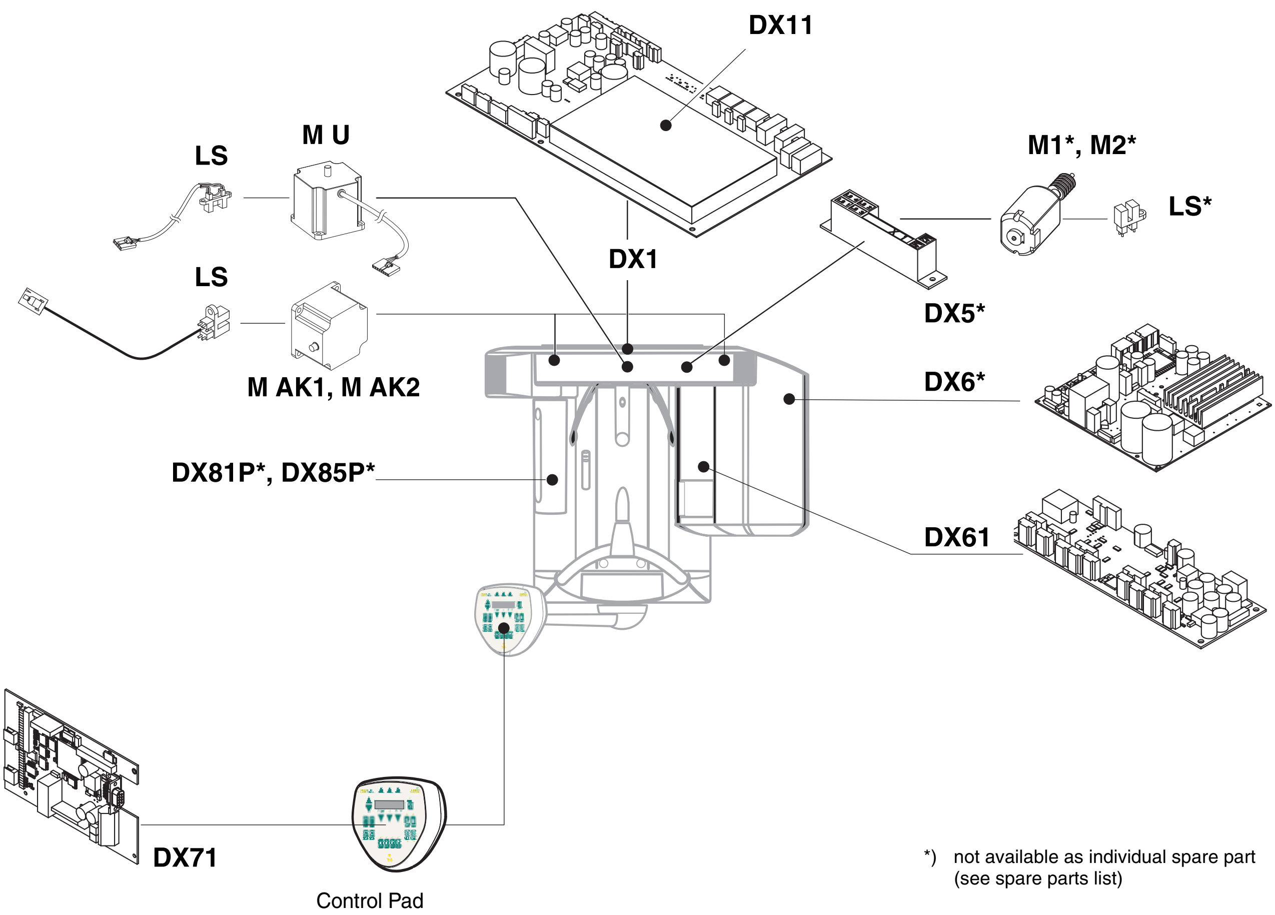
1.8 The most important modules and components

The X-ray system comprises the following main modules:

- Slide with rotary unit
- Stand
- Cephalometer
- Remote control (optional)



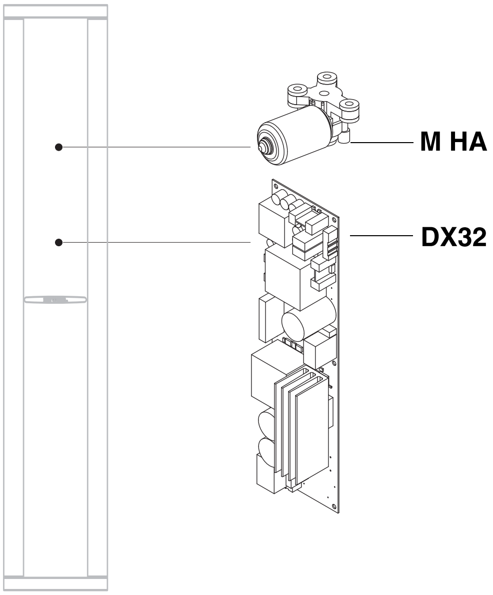
1.8.1 Slide



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

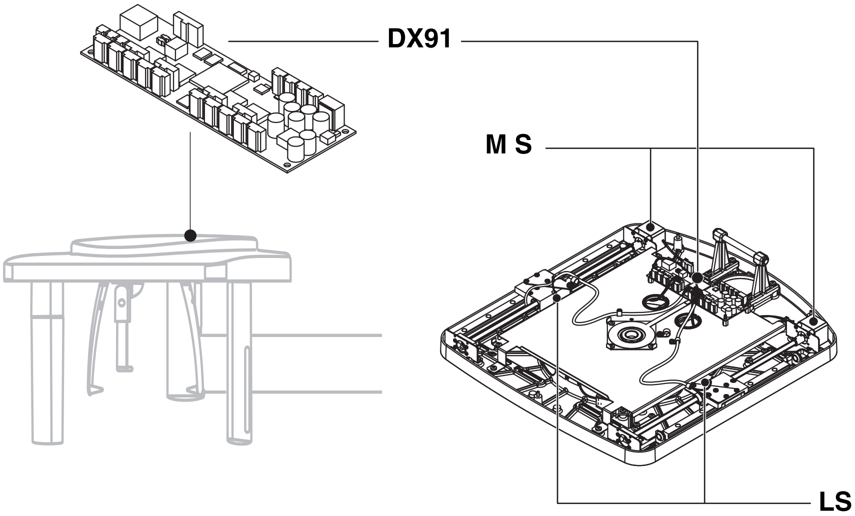
Component	Designation	Function
Boards	DX1	Open-loop/automatic control in general
	DX11	Controller board
	DX5*	Headrest adapter
	DX6*	Open-loop/automatic control for tube assembly
	DX71	LED display on Control Pad
	DX61	Diaphragm control
	DX81P	Digital sensor
	DX85P*	Digital sensor power supply
Motors	M1*, M2*	Linear movement of headrest
	M U	Rotary movement of rotating element
	AK1, AK2	Linear movement of rotating element
Light barriers	LS	Position check

1.8.2 Stand



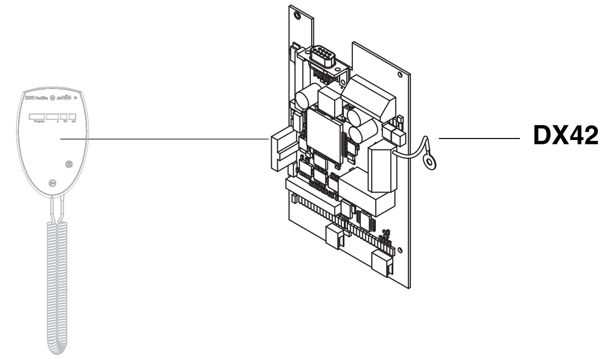
Component	Designation	Function
Boards	DX32	Power supply board
Motors	M HA	Linear movement of height adjustment

1.8.3 Cephalometer



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

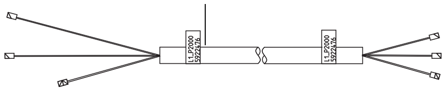
1.8.4 Remote control



Component	Designation	Function
Boards	DX42	Display board for remote control

1.9 Cabling overview

1



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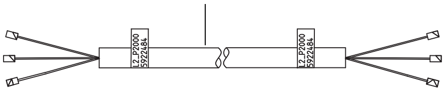

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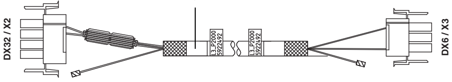

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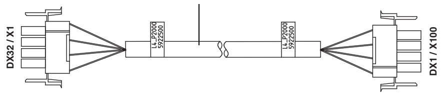

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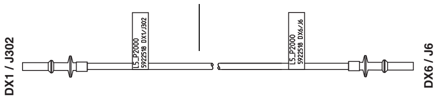

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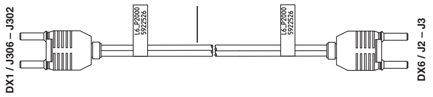

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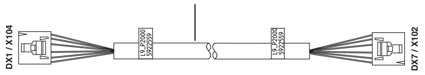

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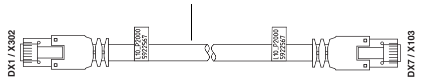

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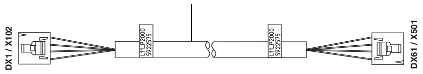
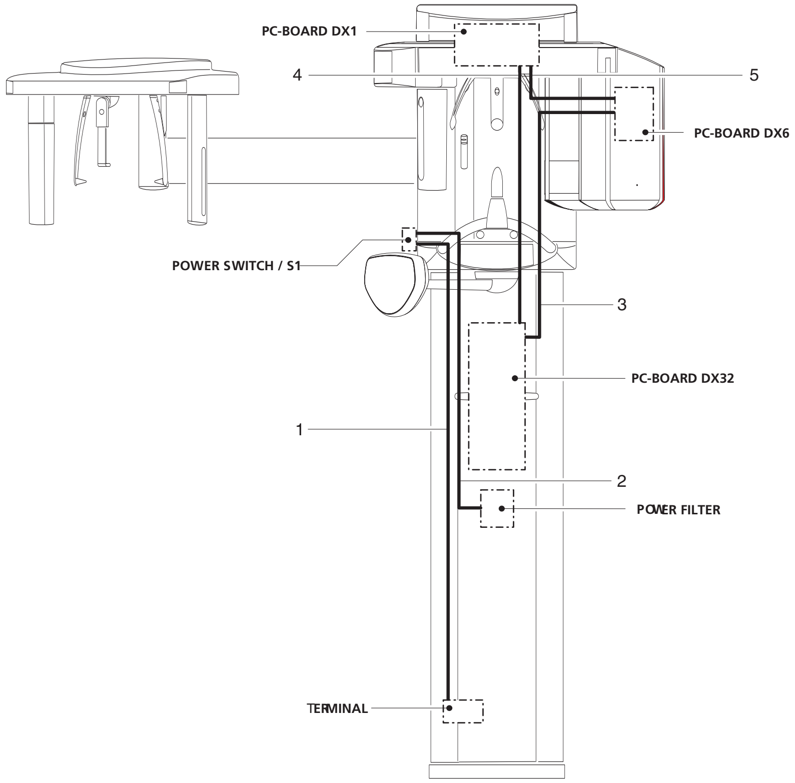
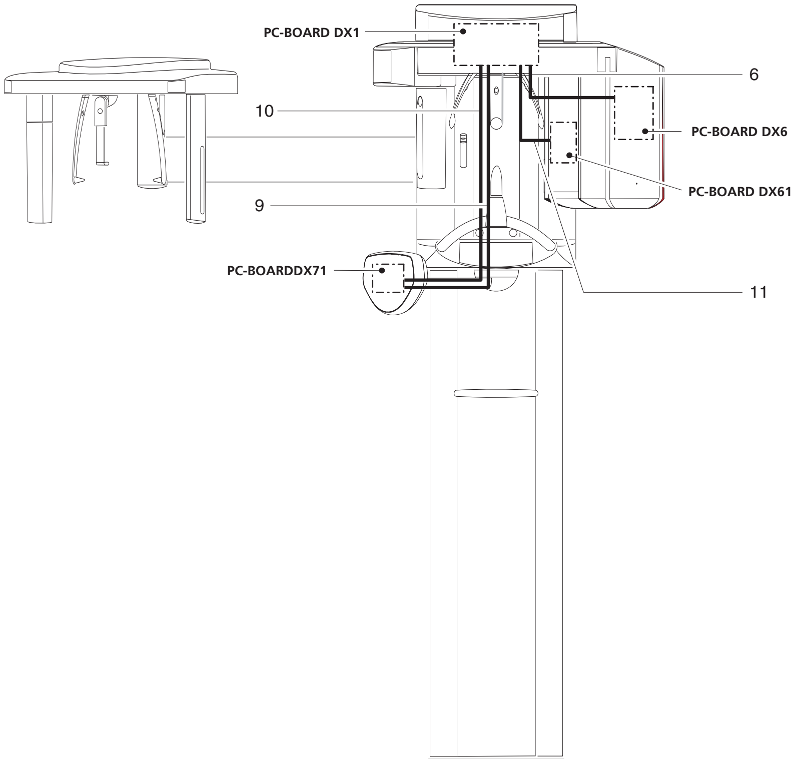
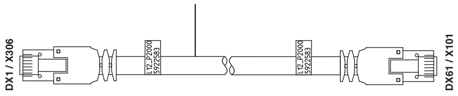




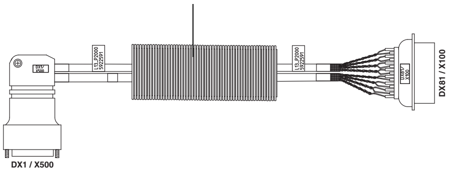


1.9 Cabling overview

12



13/13.1



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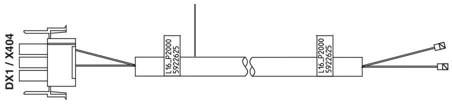

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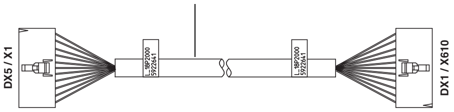

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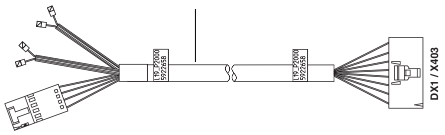

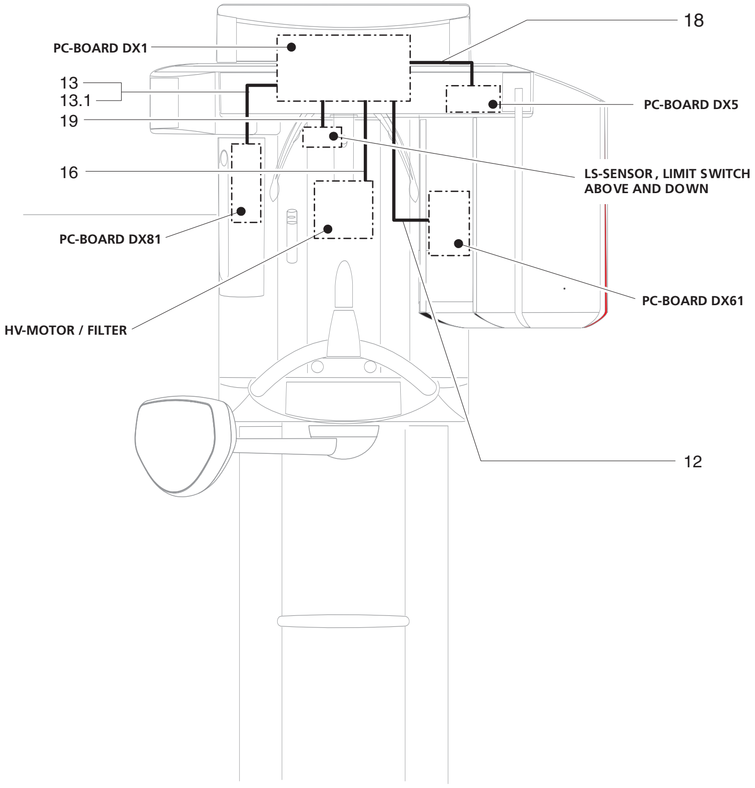

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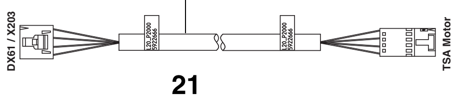

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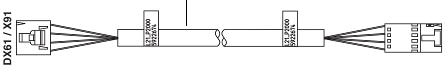

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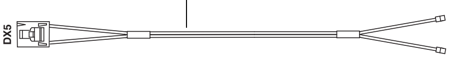

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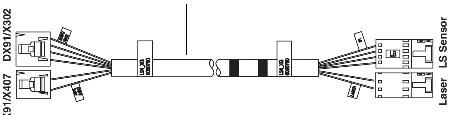

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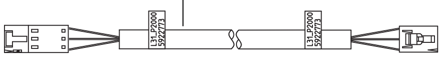

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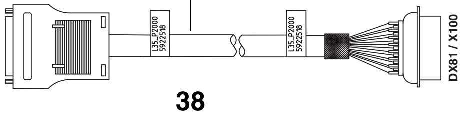

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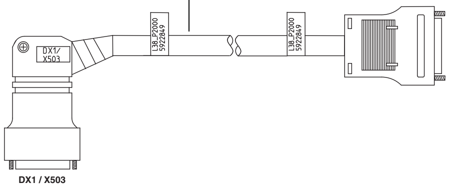
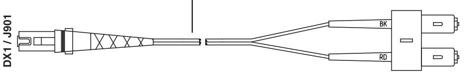
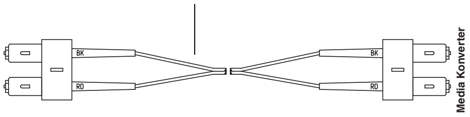


7



25/26



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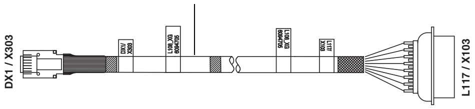

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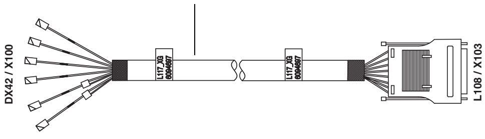
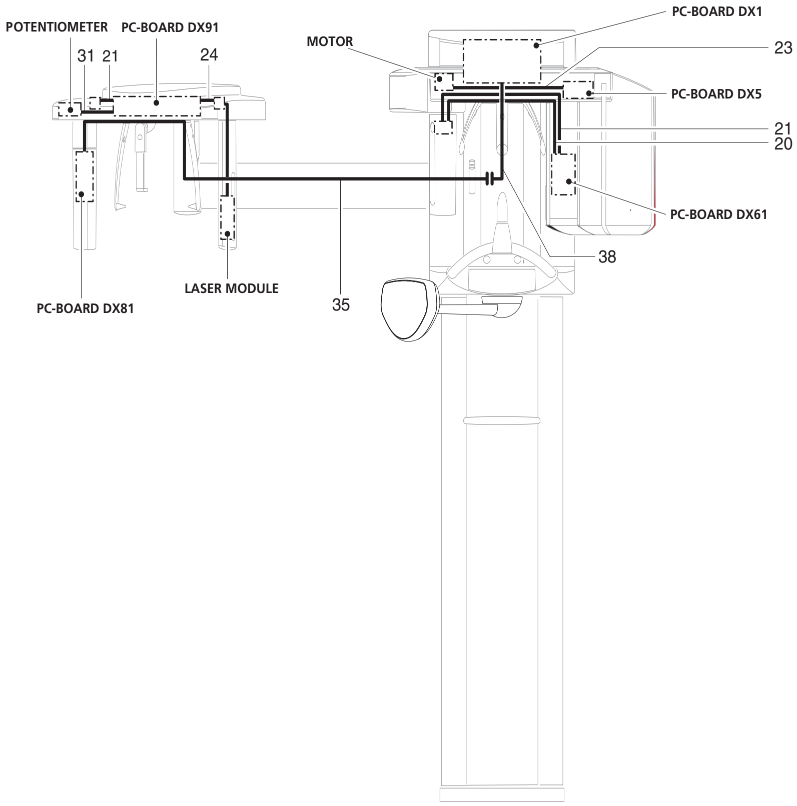
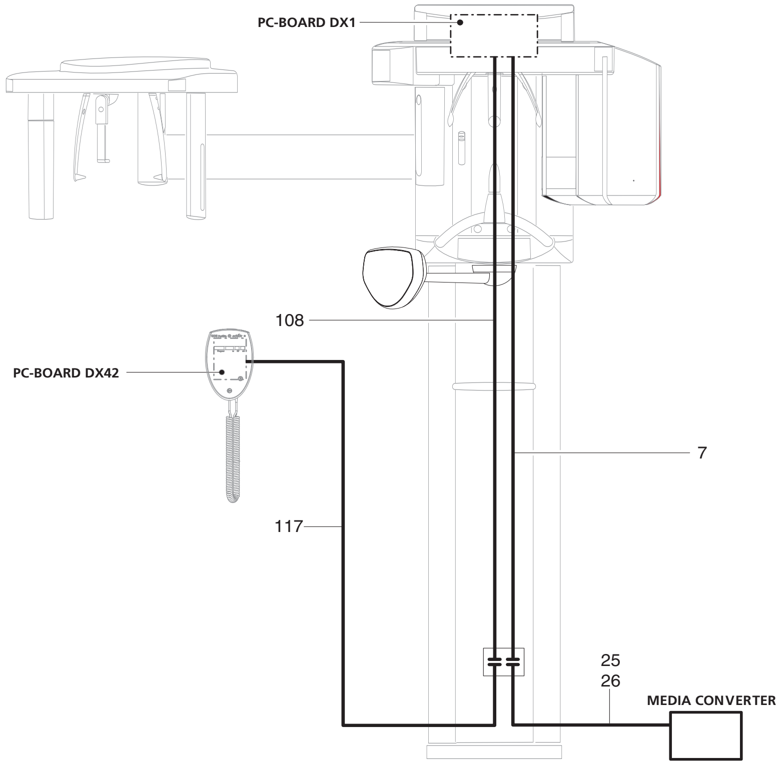
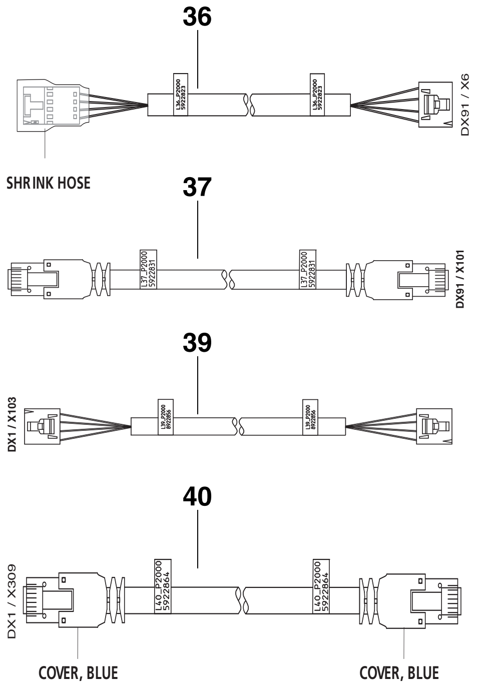
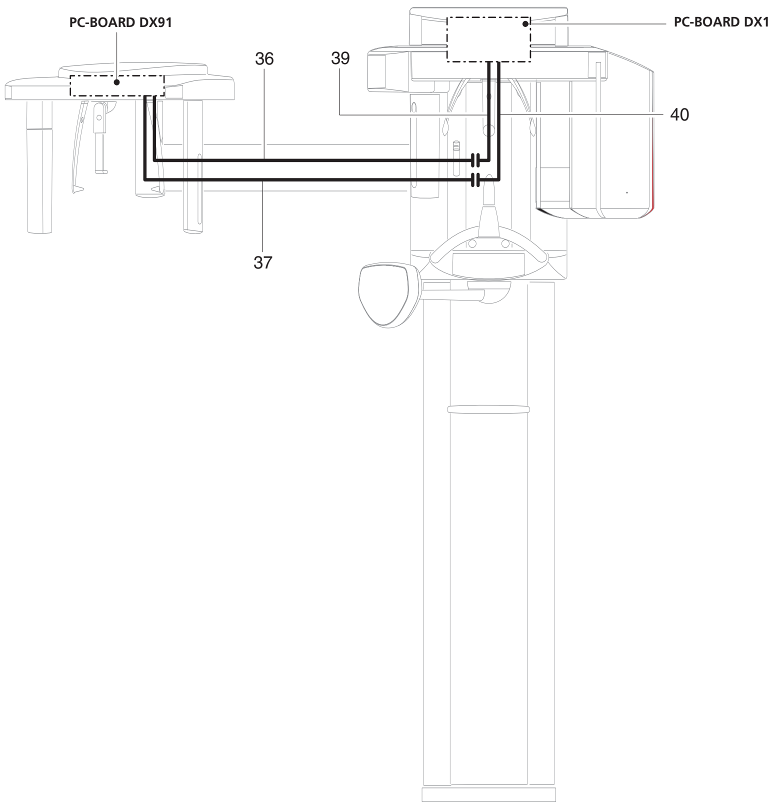






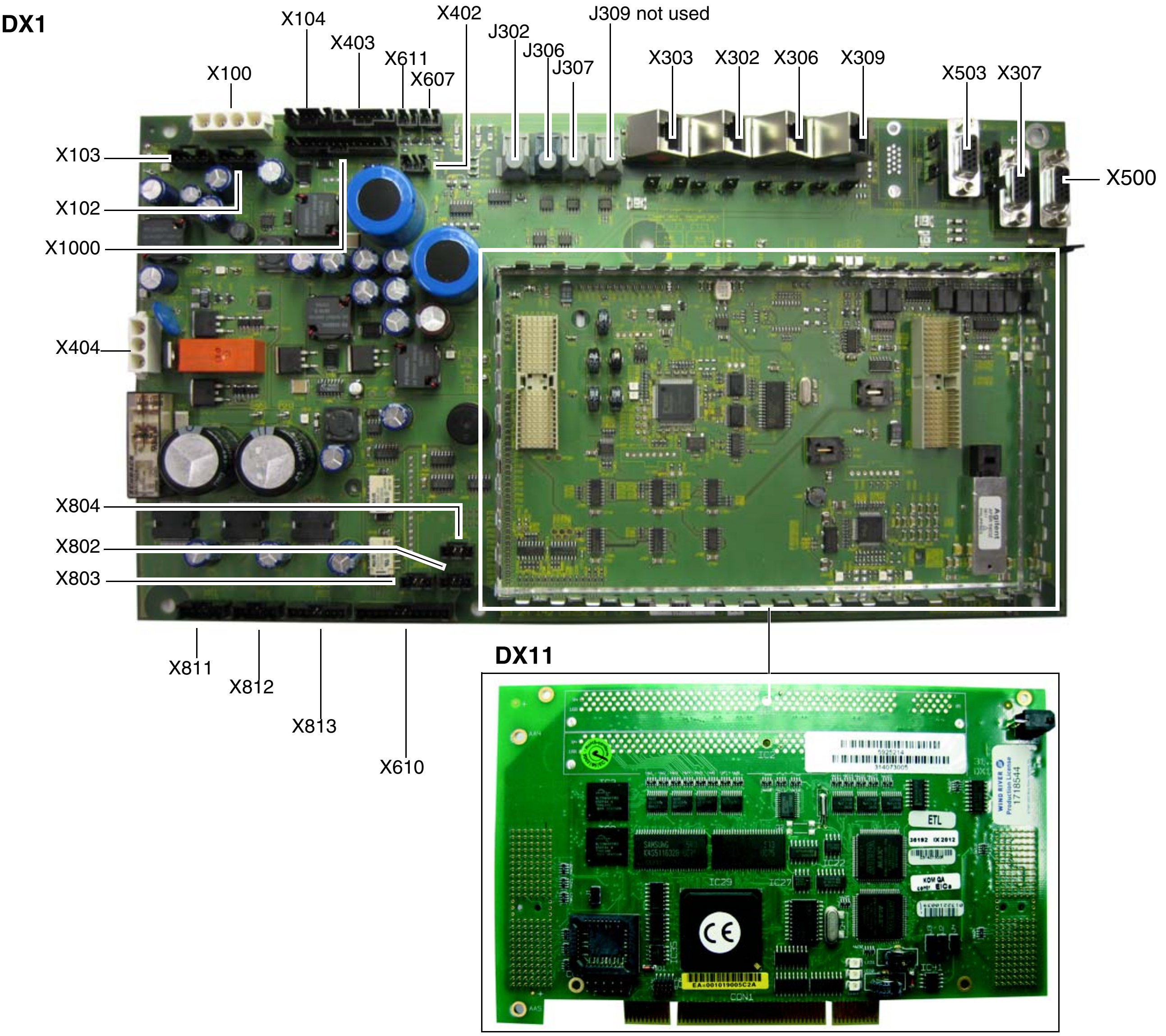

36
L36_P2000
5922823
L36_P2000
5922823
DX91 / X6
SHRINK HOSE
37
L37_P2000
5922831
L37_P2000
5922831
DX91 / X101
39
DX1 / X103
L39_P2000
8922856
L39_P2000
8922856
40
DX1 / X309
L40_P2000
5922864
L40_P2000
5922864
COVER, BLUE
COVER, BLUE


PC-BOARD DX91
PC-BOARD DX1
36
39
40
37

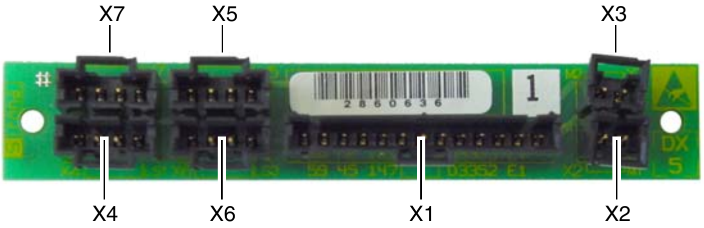
1.10 Illustrations of boards

1.10.1 Boards in the slide

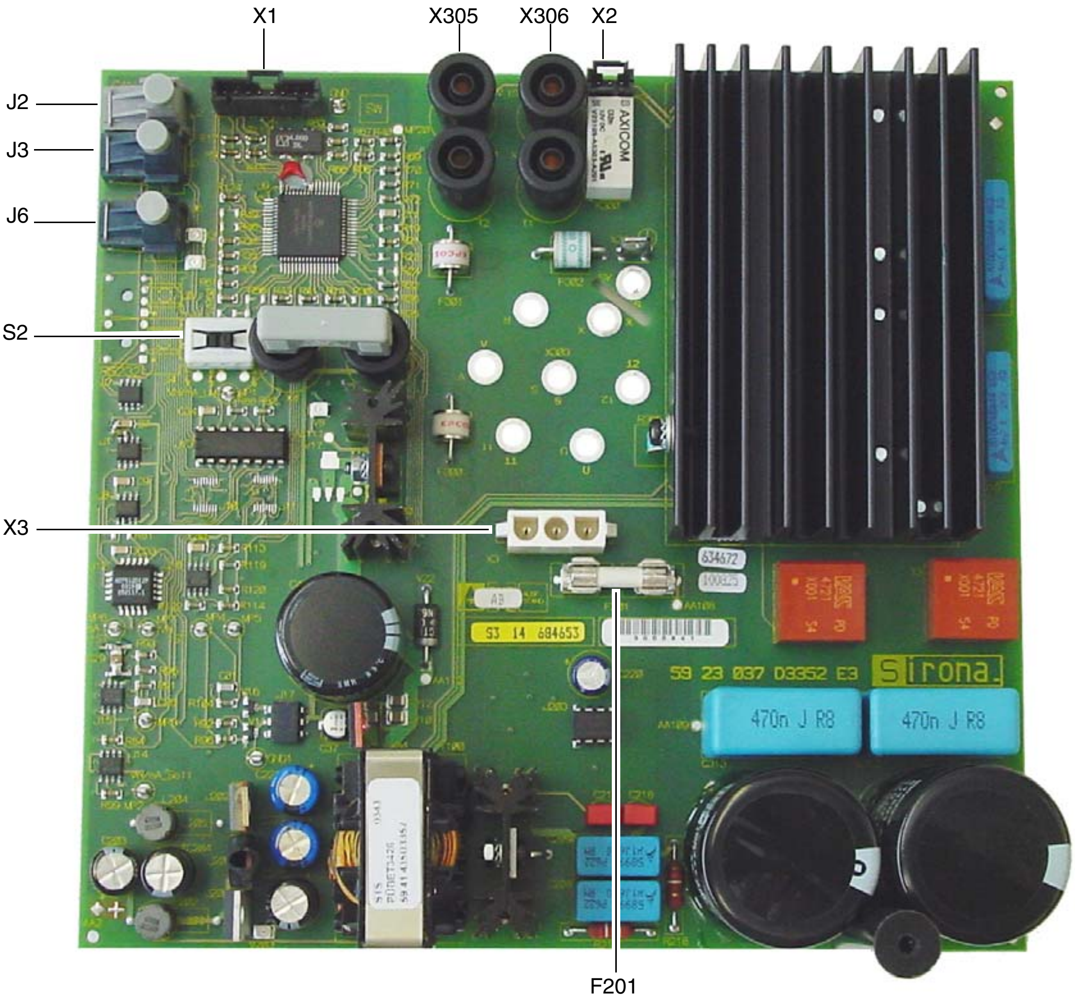
Boards DX1 / DX11



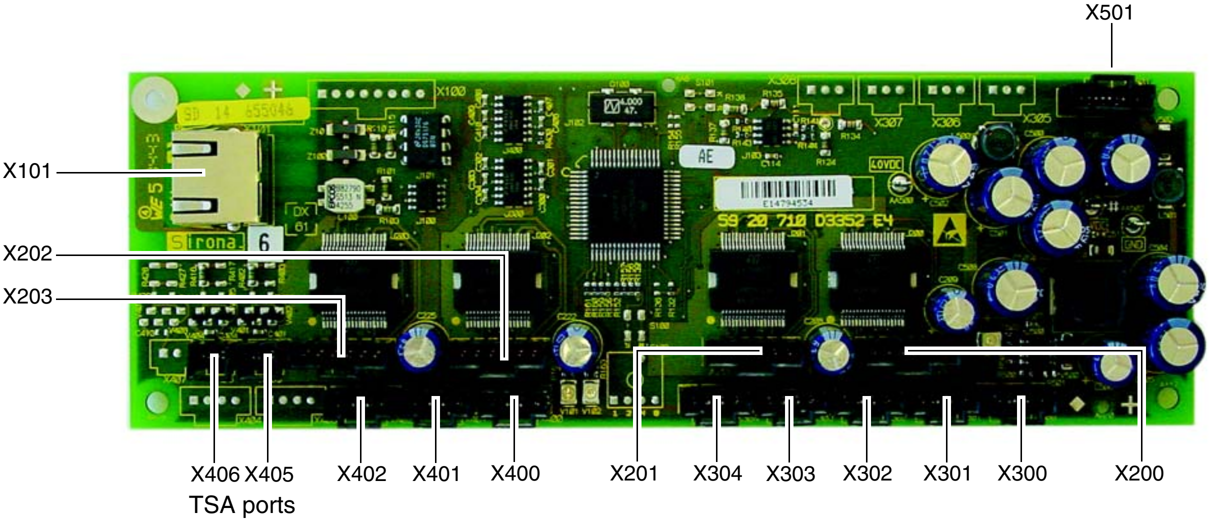
Board DX5



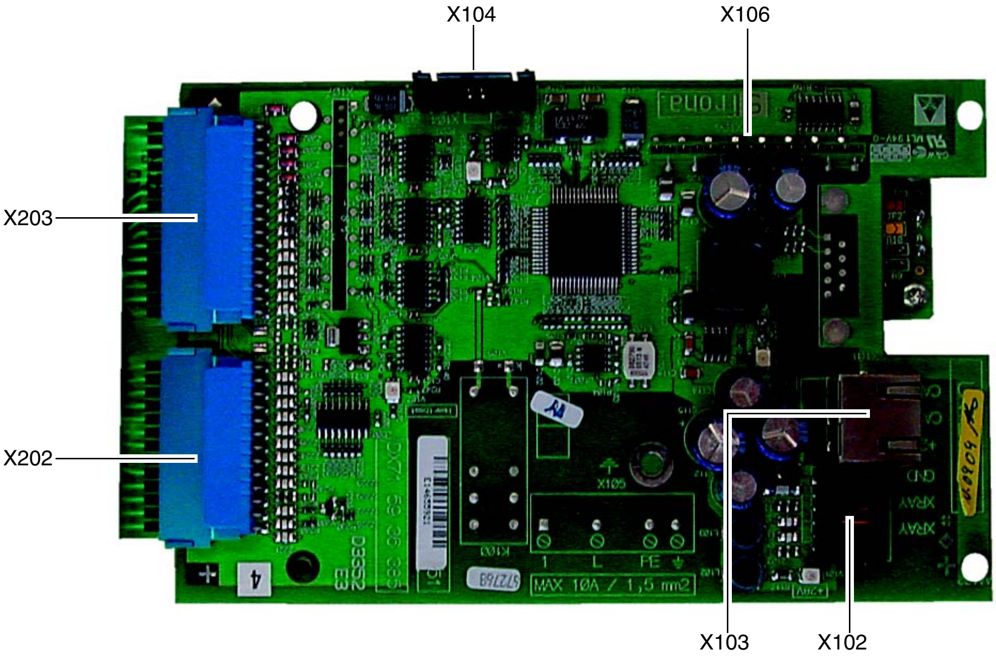
Board DX6 (not available as spare part)



Board DX61



Board DX71

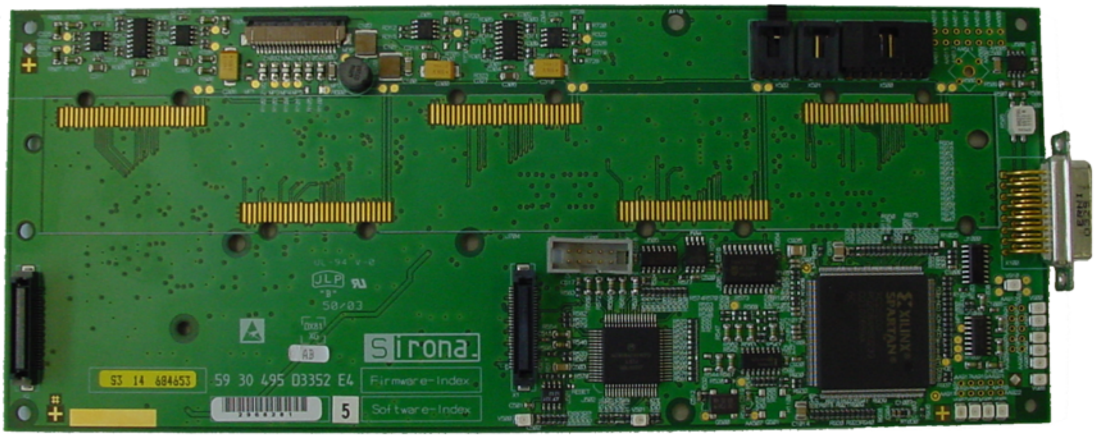


NOTE

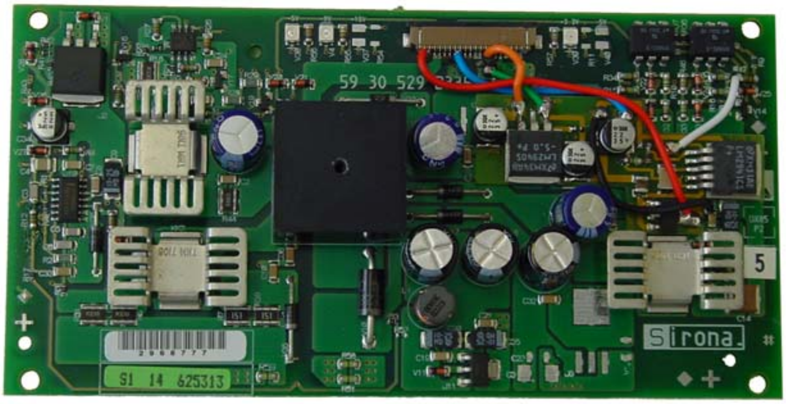
Board DX71 is shown here only for enhanced clarity. ***The Control Pad may be replaced only as a complete unit!***

Boards DX81P / DX85P (not available as repair parts)

DX81



DX85



NOTE

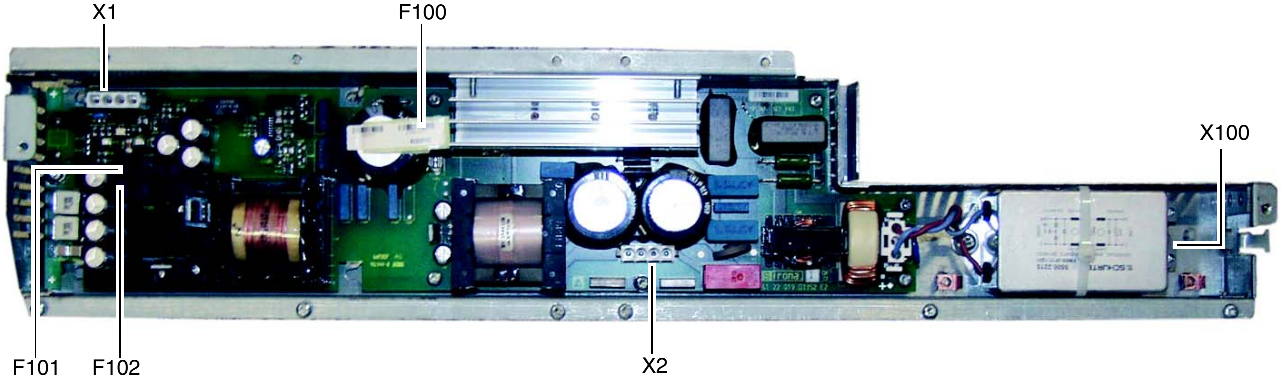
Boards DX81 and DX85 are shown here only for enhanced clarity.

CAUTION

Do not open the sensor! The sensor may be replaced only as a complete unit!

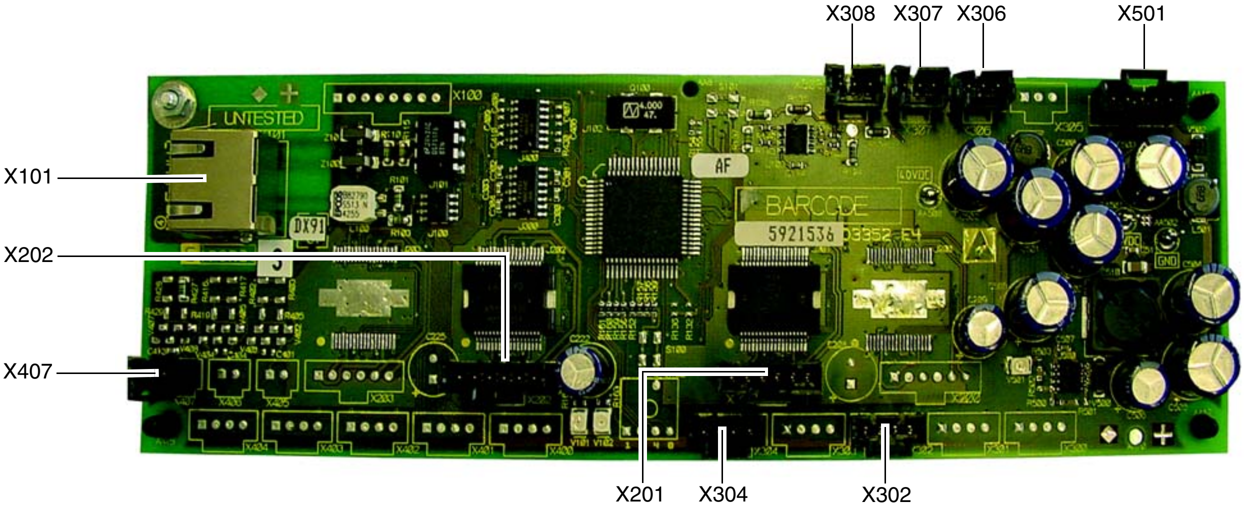
1.10.2 Boards in the stand

Board DX32



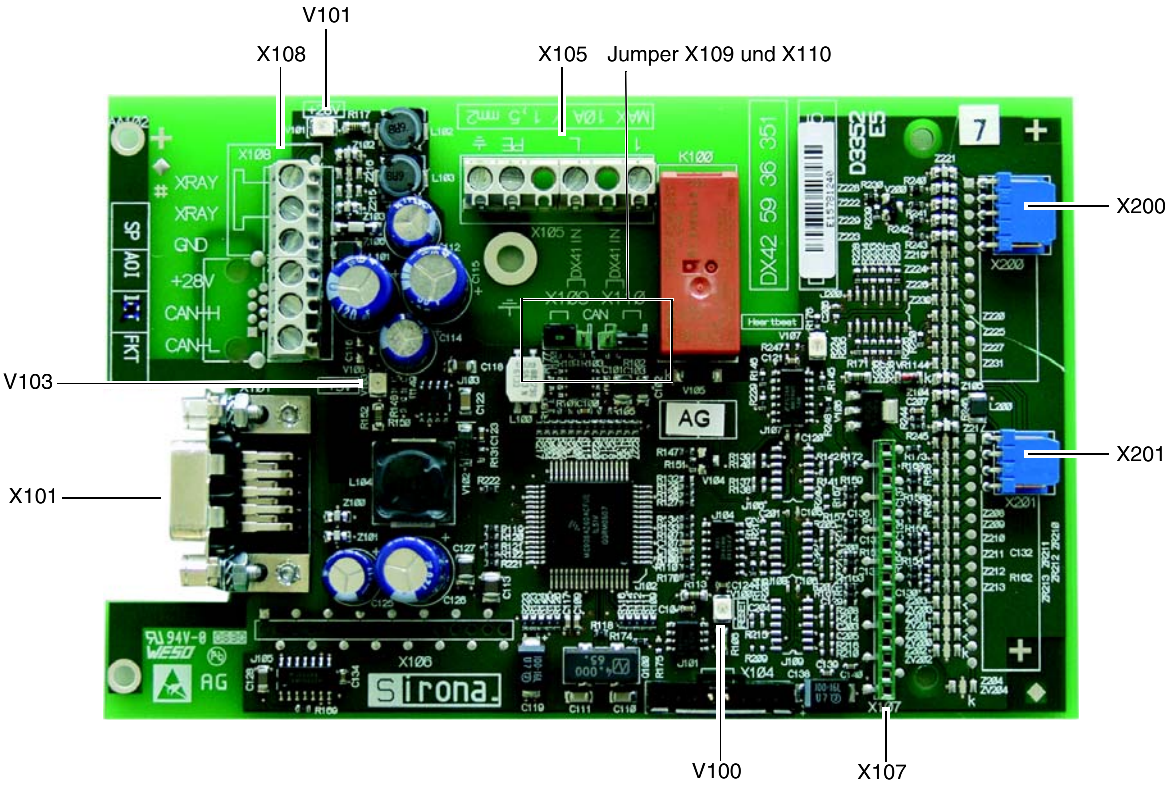
1.10.3 Boards in the cephalometer

Board DX91

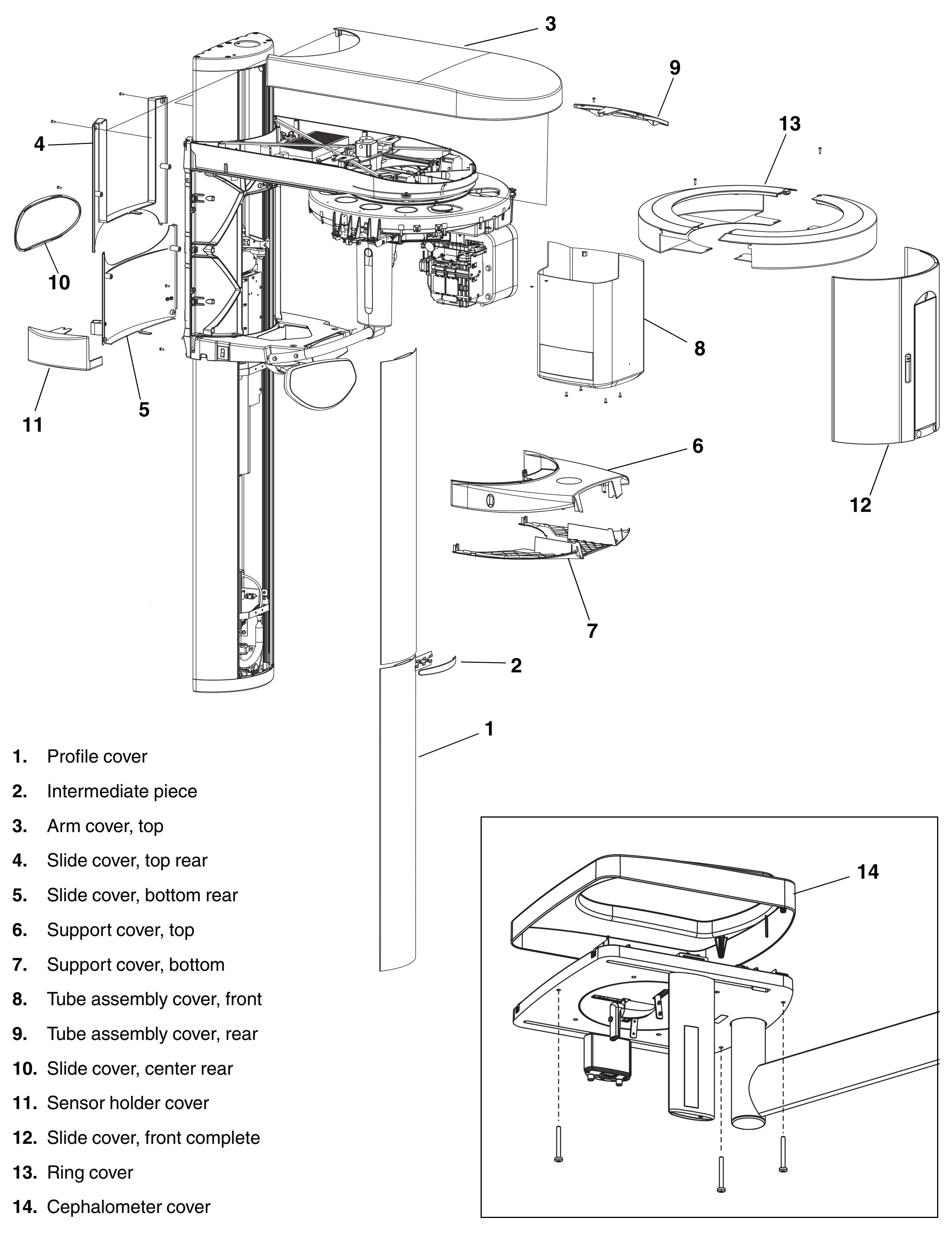


1.10.4 Boards in the remote control

Board DX42



1.11 Removing the covers



1. Profile cover
2. Intermediate piece
3. Arm cover, top
4. Slide cover, top rear
5. Slide cover, bottom rear
6. Support cover, top
7. Support cover, bottom
8. Tube assembly cover, front
9. Tube assembly cover, rear
10. Slide cover, center rear
11. Sensor holder cover
12. Slide cover, front complete
13. Ring cover
14. Cephalometer cover

2 Messages

Contents

Messages

The different message texts are displayed on the Control Pad display and 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 yy zz)**
  - Error messages indicate system 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 system
  - The user is not required to take action

2.1 Help messages

Help messages are displayed as help codes (Hxxx) on the display of the Control Pad and 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:

Help code	Description	Actions required
H3 01	The rotating element on the panoramic unit is not located in its starting position.	● Press the R key: Panoramic unit moves to starting position.
H3 10	The system is performing an action.	● Wait until the system is ready.
H3 20	The exposure parameters have not been acknowledged yet.	● Press the R key: Exposure data are confirmed.
H3 21	The X-ray room door contact is not detected.	● Close the door or check door contact.
H4 01	The sensor on the panoramic unit is not properly plugged in or is missing.	● Plug sensor into PAN slot. ***NOTE*** *If this message does not disappear after the sensor is plugged in, this indicates a system error. Perform error diagnosis according to Section 3.4.*
H4 02	The sensor on the cephalometer is not properly plugged in or is missing.	● Plug sensor into Ceph slot. ***NOTE*** *If this message does not disappear after the sensor is plugged in, this indicates a system error. Perform error diagnosis according to Section 3.4.*
H4 03	CDR Software ore the CDR PanElite Service Program is not ready for exposure.	● Make CDR Software or the CDR PanElite Service Program ready for exposure.
H4 04	The sensor does not match the selected exposure type.	● Plug in the ceph sensor.
H4 06	The cephalometer is not located in its starting position.	● Press the R key: Cephalometer moves to starting position.
H4 10	The sensor is being polled.	● Wait until the message disappears.

Help code	Description	Actions required
H4 20	The image could not be transferred to CDR PanElite Software. **_CAUTION_** *Do not switch the system off until the help message has disappeared.*	- Retrieve the exposure with CDR PanElite Rescue (see CDR PanElite Operating Instructions).

NOTE

The above measures clear those help messages that result from operator errors. If it is not possible to clear the help message by taking the above measures, another type of error is the cause. To identify the error, proceed as described in section 2.4 .

2.2 System messages

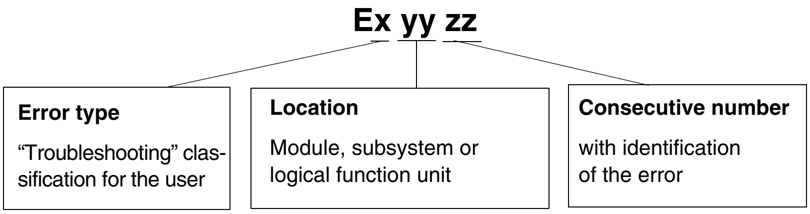
System code	Description	Actions required
S100	CDR PanElite is started.	- Wait, no action required.
S110	Exposure cannot be performed.	- Quit readiness for exposure, switch unit OFF, wait for 30 sec., switch unit back ON and observe error messages displayed after switch-on. - Repeat procedure if necessary.

2.3 Error messages

Error messages are displayed as error codes **(Ex yy zz)** on the display of the Control Pad or on the remote control display (if available).
The codes provide you with error type, error location and troubleshooting information.

Error code: Ex yy zz

The error messages are encoded according to the following pattern:


Ex yy zz
Error type
"Troubleshooting" classification for the user
Location
Module, subsystem or logical function unit
Consecutive number
with identification of the error

The error messages are sorted by modules in the table on page 2-6.

2.3.1 Ex yy zz

Identifier x is supposed to help you quickly reach a decision on how to proceed with this 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.	● Acknowledge the error message to continue system operation. If the error occurs repeatedly, switch the system OFF and back ON. If the error occurs again: Identify the error by proceeding as described in section 2.4.
2	Errors caused by system overload	This error group includes states that indicate e.g. temporary overtemperatures or the like. The cause of the error disappears automatically after a certain waiting time.	● Acknowledge the error message. ● Repeat the procedure step after a certain waiting time. – If the error message reappears, prolong the waiting time. – If the error state persists: Identify the error by proceeding as described in section 2.4.
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.	● Switch unit OFF and ON again. If the error occurs again, identify the error by proceeding as described in section 2.4.
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.	● 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 reoccurs without any identifiable cause: Identify the error by proceeding as described in section 2.4.
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.	● Acknowledge the error message. ● Repeat the last procedure step or exposure. If the error occurs again: Identify the error by proceeding as described in section 2.4.
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.	● Acknowledge the error message. ● Identify the error by proceeding as described in section 2.4. **Note:** The unit can no longer be operated.
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 sure that continued system operation is not possible.	● Identify the error by proceeding as described in section 2.4.

2.3.2 Ex **yy** zz

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

yy	Location/Function unit	Board
06	Tube assembly	DX6
61	Diaphragm control	DX61
71	User interface on the Control Pad	DX71
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 configuration, etc...)	DX11/DX1
42	Remote control	DX42
81	Sensor (Pan slot: zz = 1-23; Ceph slot: zz = 51-73)	DX81
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).

2.3.3 Ex yy **zz**

The identifier **zz** represents a consecutive number with the error identification.

2.3.4 General handling of error messages

Error messages always must be acknowledged with the **R key**.

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

If error messages reoccur or occur frequently, identify the error as described in section 2.4 and take appropriate action to eliminate the corresponding error or fault.

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 **SIXABCON‡PROPERTIES‡EXTENDED DETAILS** (see section 1.7 on page 1-15) (see also section 3.1).

2.4 List of error messages

NOTE

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.

Location 06: Tube assembly/Board DX6

Error code	Description	Actions required	see page
E6 **06** 01	General error during module initialization	● Please contact dealer tech support to see if a software update is necessary. ● If the error occurs frequently, replace the X-ray tube assembly.	**1-9** **6-36**
E6 **06** 02	Invalid system data or uninitialized module storage data	● Run service routine S005.2 ● Please contact dealer tech support to see if a software update is necessary.	**6-21** **1-9**
E6 **06** 03	Invalid response of control data, CAN bus error **Note:** 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.	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **06** 04	Data transfer error or dialog error to module (master side)	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **06** 05	Data transfer error or dialog error to bootloader of module **Note:** Occurs only in connection with software update	● Repeat software update. ● Check CAN bus. ● If the error occurs repeatedly or the module is no longer addressable, replace the tube assembly.	**1-9** **3-6** **6-36**

Error code	Description	Actions required	see page
E6 **06** 06	Module failed in TTP* (detected on master side) **Note:** 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.	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary. ● If the error occurs repeatedly or the module is no longer addressable, replace the tube assembly	**3-6** **1-9** **6-36**
E6 **06** 07	TTP* timeout error (detected on slave side) **Note:** The module was temporarily not addressed by the master: - Undervoltage on the master side - Procedure error in the software - Master (DX11) receives no return response from the module **Note:** 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.	● Check CAN bus. ● Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). – If 3.3 V are present, replace board DX11 – If 3.3 V are not present, replace board DX11 – Check cable L6, replace if necessary – Check tube assembly (DX6) replace if necessary	**3-6** **6-55** **6-55** **3-17** **6-65** **6-36**
E6 **06** 08	General fault detected locally on module (slave side). CAN controller being reinitialized	● Check CAN bus. ● Check software versions via info screen or service routine S008.2, perform a software update if necessary. ● Please contact dealer tech support to see if a software update is necessary. ● Replace the X-ray tube assembly.	**3-6** **5-35** **1-9** **1-9** **6-36**
E7 **06** 10	Module is stuck in bootloader stage	● Check board DX6 (note LED states). If the board remains in the bootloader stage... ● Repeat software update. ● Replace the X-ray tube assembly.	**3-12** **1-9** **6-36**

Error code	Description	Actions required	see page
E7 **06** 12	Unit is not ready for operation **Note:** 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.	● Check CAN bus. If this error occurs in combination with other errors ● Unit restart: Switch the unit OFF. Wait 30 sec. Switch unit ON. Repeat procedure and observe causal error messages. ● Replace the X-ray tube assembly.	**3-6** **6-36**
E6 **06** 13	Error when writing to EEPROM **Note:** Stored data may be lost	● Acknowledge error and repeat procedure. If the error occurs again... ● Replace the X-ray tube assembly.	 **6-36**
E2 **06** 20	Overtemperature of single tank/power pack	● Wait until the X-ray tube assembly has cooled down. ● Check fan function using service routine S005.4; replace fan if necessary. ● Check temperature sensor in single tank Check service routine S005.5, replace tube assembly if necessary.	 **5-23** **6-40** **5-24** **6-36**
E6 **06** 21	Hardware signal of exposure switch not detected	● Check cable L5 (fiber optic cable), replace if necessary. ● Replace board DX1. ● Replace the X-ray tube assembly.	**3-17** **6-65** **6-55** **6-36**
E6 **06** 22	Broken temperature sensor	● Replace the X-ray tube assembly.	**6-36**
E3 **06** 23	Hardware signal of exposure switch applied during power-on	● Check cable L5: – Switch unit OFF – Pull cable L5 off of tube assembly – Switch the unit ON – Perform optical check of L5: - If light is visible: Replace board DX1 - If no light is visible, replace the tube assembly	 **6-55** **6-36**
E5 **06** 30	Total radiation time exceeded	If a CAN bus error had been reported before... ● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	 **3-6** **1-9**

Error code	Description	Actions required	see page
E5 **06** 31	Partial radiation time exceeded	If a CAN bus error had been reported before... ● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	 **3-6** **1-9**
E5 **06** 32	Minimum preheating time not observed	If a CAN bus error had been reported before... ● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	 **3-6** **1-9**
E1 **06** 40	Tolerance exceeded: Preheating (VH) - nom.	● Run service routine S005.2. ● Replace the X-ray tube assembly.	**5-21** **6-36**
E1 **06** 41	Tolerance exceeded: kV - nom.	● Run service routine S005.2. ● Replace the X-ray tube assembly.	**5-21** **6-36**
E1 **06** 42	Tolerance exceeded: mA - nom.	● Run service routine S005.2. ● Replace the X-ray tube assembly.	**5-21** **6-36**
E1 **06** 43	Tolerance exceeded: Preheating (VH) - act.	● Run service routine S005.2. ● Replace the X-ray tube assembly.	**5-21** **6-36**
E1 **06** 44	Tolerance exceeded: kV - act.	● Run service routine S005.2. ● Replace the X-ray tube assembly.	**5-21** **6-36**
E1 **06** 45	Tolerance exceeded: mA - act.	● Run service routine S005.2. ● Replace the X-ray tube assembly.	**5-21** **6-36**

Error code	Description	Actions required	see page
E6 **06** 50	Undervoltage in intermediate circuit (400 V)	● Check fuse F201 on board DX6 (see wiring diagrams), replace if necessary. ● Check cable L3 (tube assembly), replace if necessary. ● Check electronic fuse on board DX32: – Switch unit OFF – Wait for at least 7 minutes (due to electronic fuse) – Switch unit back ON – Check functioning If the error occurs again... ● Check board DX32, replace if necessary.	**3-17** **6-65** **3-12** **6-55**
E6 **06** 51	VHmax	● Run service routine S005.2. ● Replace the X-ray tube assembly.	**5-21** **6-36**
E6 **06** 52	MAmax	● Run service routine S005.2. ● Replace the X-ray tube assembly.	**5-21** **6-36**
E6 **06** 53	KVmax	● Run service routine S005.2. ● Replace the X-ray tube assembly.	**5-21** **6-36**
E7 **06** 54	Basic heating pulses not applied	● Replace the X-ray tube assembly.	**6-36**
E6 **06** 56	Error during auto-compensation	● Please contact dealer tech support to see if a software update is necessary. ● Let the tube assembly cool down for approx. 30 min and repeat this procedure. If the error occurs again... ● Replace the X-ray tube assembly.	**1-9** **6-36**

*) *TTP = Time Trigger Protocol*

Location 10: System hardware

Error code	Description	Actions required	see page
E7 **10** 01	EEPROM cannot be written	● Acknowledge error and repeat procedure. If the error occurs again... ● Replace board DX11.	 **6-55**
E7 **10** 02	FPGA* of DX1 is not addressable	● Replace board DX1.	**6-55**
E1 **10** 03	The flash file system must be formatted **Note:** Occurs after replacement of board DX11.	● Acknowledge error ***NOTE*** *The flash file system is formatted and error message E1_10_04 is displayed.*	
E1 **10** 04	Flash file system formatting in progress	● Wait until the message automatically disappears (approx. 2 - 3 min.).	
E1 **10** 05	Flash file system is not ready for operation	● Run service routine S009.4 and format flash file system. ***NOTE*** *The contents of the error memory are thus lost.* If the error occurs again... ● Replace board DX11.	**5-41** **6-55**

*) *FPGA = Field Programmable Gate Array*

Location 11: Power PC, board DX11

Error code	Description	Actions required	see page
E6 **11** 01	Program sequence error	● Please contact dealer tech support to see if a software update is necessary. ● Acknowledge error and repeat procedure. If the error occurs again... ● Reset the entire unit adjustment and readjust the unit. ● Replace board DX11.	**1-9** **4-3** **6-55**
E6 **11** 02	Watchdog error	● Acknowledge error and repeat procedure. If the error occurs again... ● Replace board DX11.	**6-55**
E6 **11** 03	Operating system/resource error	● Acknowledge error and repeat procedure. If the error occurs again... ● Replace board DX11.	**6-55**
E7 **11** 04	Unplausible data in EEPROM	● Check the device configuration via service routines S017 and S018 and reconfigure if necessary. ● Check adjustment with diaphragm test exposures. If the adjustment is not OK... ● Readjust the unit. If the adjustment is OK... ● perform the individual system settings again (e.g. programming of the patient symbol keys; see operating instructions).	**5-54, 5-61** **7-16** **4-3**
E6 **11** 05	RAM allocation failed	● Replace board DX11.	**6-55**
E6 **11** 07	Unknown or invalid definition of system class **Note:** Occurs during first power-on after replacement of board DX6 or DX11.	● Perform actions required according to Chapter "Replacing circuit boards".	**6-55**
E7 **11** 08	The user interface connected to this unit does is not compliant with the unit's system class configuration	● Install the user interface compliant with the system class configuration of this unit.	**6-21**
E5 **11** 09	Internal error in program flow of board DX11	● Acknowledge error. If the error occurs again... ● Perform a software update (bug fix).	**1-9**
E1 **11** 10	The system is operating with default settings; exposure is possible **Note:** If this error occurs in combination with errors E1 **61** 02, E1 **91** 02 or E1 **11** 04 (see error logging memory), these additional errors provide an indication of the module involved.	● Read out log memory and take the appropriate actions. ● Readjust the unit. If the error occurs again... ● Replace the defective module (DX61, DX91 or DX11).	**4-3** **6-5**

Error code	Description	Actions required	see page
E7 **11** 11	Wrong device configuration	● Check the device configuration via service routine S017.2 and reconfigure if necessary.	**5-54**
E7 **11** 12	Internal error in data management of board DX11	If the error occurs after a module has been replaced...	
		● display "Extended Details" via SIXABCON and coordinate all further action with the dealer tech support.	
		If no module has been replaced...	
		● switch the unit off, wait for 30 seconds, and then switch it back on.	
		● Check software versions via info screen or service routine S008.2,	**5-35**
		perform a software update if necessary.	**1-9**
		If the error occurs again...	
		● Perform a software update (bug fix).	**1-9**
E6 **11** 13	Short circuit in radiation release signal path between board DX42 and board DX11 (cables L117 and L108) The release signal was detected on board DX11, but not on board DX42	● Check cables L118 and L108,	**3-17**
		replace the cables if necessary	**6-65**
		● Check board DX1,	**3-12**
		replace the board if necessary	**6-55**
		● Check board DX42,	**3-12**
		replace the board if necessary	**6-55**
E6 **11** 14	The remote control is not compatible with the unit. ***NOTE*** *This error message disables all unit functions. In order to continue operating the unit, you must disconnect the remote control and then restart the unit.*	● Install the PanElite remote control. Order a new remote control from the manufacturer if necessary.	
E1 **11** 88	The unit is set to the demo mode **Note:** Occurs when the unit is switched on.	If the user mode is expressly required...	
		● Switch the demo mode OFF.	**1-6**
		NOTE *Radiation can be released after the demo mode is switched off!*	

Location 12: CAN bus

Error code	Description	Actions required	see page
E6 **12** 01	CAN controller init error on DX1	● Check CAN bus.	**3-6**
E6 **12** 02	CAN malfunction (cannot be assigned to module)	● Check CAN bus.	**3-6**

Location 13: Stand, peripherals

Error code	Description	Actions required	see page
E4 **13** 01	Actuator 1 has not reached pan home position	● Check the actuator mechanisms manually for smooth and easy running.	
		In case of binding...	
		● manually reset the actuators to the zero position and run a test cycle via P1.	
		If the error occurs again...	
		● Check light barrier V1_1 (X802) with service routine S015.5,	**5-52**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S015.5 (free travel),	**5-52**
		● replace the actuators and/or spindles and	**6-17**
		replace board DX1 if necessary.	**6-55**
E4 **13** 02	Actuator 1 has not left pan home position	● Check the actuator mechanisms manually for smooth and easy running.	
		In case of binding...	
		● manually reset the actuators to the zero position and run a test cycle via P1.	
		If the error occurs again...	
		● Check light barrier V1_1 (X802) with service routine S015.5,	**5-52**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S015.5 (free travel),	**5-52**
		● replace the actuators and/or spindles and	**6-17**
		replace board DX1 if necessary.	**6-55**

Error code	Description	Actions required	see page
E5 **13** 03	Malfunction of actuator 1 during operation	● Check the actuator mechanisms manually for smooth and easy running.	
		In case of binding...	
		● manually reset the actuators to the zero position and run a test cycle via P1.	
		If the error occurs again...	
		● Check light barrier V1_1 (X802) with service routine S015.5,	**5-52**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S015.5 (free travel),	**5-52**
		● replace the actuators and/or spindles and	**6-17**
		replace board DX1 if necessary.	**6-55**
E4 **13** 04	Actuator 1; position counter error	● Check the actuator mechanisms manually for smooth and easy running.	
		In case of binding...	
		● manually reset the actuators to the zero position and run a test cycle via P1.	
		If the error occurs again...	
		● Check light barrier V1_1 (X802) with service routine S015.5,	**5-52**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S015.5 (free travel),	**5-52**
		● replace the actuators and/or spindles and	**6-17**
		replace board DX1 if necessary.	**6-55**
E6 **13** 05	Actuator 1 is not ready for operation	This error is a sequential fault.	
		● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on.	
		● Repeat procedure and observe causal error messages.	
E6 **13** 07	Error when activating actuator 1	● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function.	
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**

Error code	Description	Actions required	see page
E4 **13** 11	Actuator 2 has not reached pan home position	● Check the actuator mechanisms manually for smooth and easy running.	
		In case of binding...	
		● manually reset the actuators to the zero position and run a test cycle via P1.	
		If the error occurs again...	
		● Check light barrier V1_2 (X803) with service routine S015.5,	**5-52**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S015.5 (free travel),	**5-52**
		● replace the actuators and/or spindles and	**6-17**
		replace board DX1 if necessary.	**6-55**
E4 **13** 12	Actuator 2 has not left pan home position	● Check the actuator mechanisms manually for smooth and easy running.	
		In case of binding...	
		● manually reset the actuators to the zero position and run a test cycle via P1.	
		If the error occurs again...	
		● Check light barrier V1_2 (X803) with service routine S015.5,	**5-52**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S015.5 (free travel),	**5-52**
		● replace the actuators and/or spindles and	**6-17**
		replace board DX1 if necessary.	**6-55**
E5 **13** 13	Malfunction of actuator 2 during operation	● Check the actuator mechanisms manually for smooth and easy running.	
		In case of binding...	
		● manually reset the actuators to the zero position and run a test cycle via P1.	
		If the error occurs again...	
		● Check light barrier V1_2 (X803) with service routine S015.5,	**5-52**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S015.5 (free travel),	**5-52**
		● replace the actuators and/or spindles and	**6-17**
		replace board DX1 if necessary.	**6-55**

Error code	Description	Actions required	see page
E4 **13** 14	Actuator 2; position counter error	● Check the actuator mechanisms manually for smooth and easy running. In case of binding... ● manually reset the actuators to the zero position and run a test cycle via P1. If the error occurs again... ● Check light barrier V1_2 (X803) with service routine S015.5, replace light barrier if necessary. ● Check electric drive and jolt-free running with service routine S015.5 (free travel), ● replace the actuators and/or spindles and replace board DX1 if necessary.	**5-52** **6-45** **5-52** **6-17** **6-55**
E6 **13** 15	Actuator 2 is not ready for operation	This error is a sequential fault. ● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on. ● Repeat procedure and observe causal error messages.	
E6 **13** 17	Error when activating actuator 2	● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function. ● Please contact dealer tech support to see if a software update is necessary.	**1-9**
E4 **13** 21	Ring motor has not reached pan home position	● Check the actuator mechanisms manually for smooth and easy running, reset actuators to zero position if necessary. ● Check the ring drive mechanism manually for smooth and easy running, replace the ring motor or mechanism if necessary. ● Check light barrier V1_3 (X804) with service routine S014.4, replace light barrier if necessary. ● Check electric drive and jolt-free running with service routine S014.3, replace board DX1 if necessary.	**6-14** **5-51** **6-45** **5-49** **6-55**

Error code	Description	Actions required	see page
E4 **13** 22	Ring motor has not left pan home position	● Check the actuator mechanisms manually for smooth and easy running, reset actuators to zero position if necessary.	
		● Check the ring drive mechanism manually for smooth and easy running,	
		replace the ring motor or mechanism if necessary.	**6-14**
		● Check light barrier V1_3 (X804) with service routine S014.4,	**5-51**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S014.3,	**5-49**
		replace board DX1 if necessary.	**6-55**
E5 **13** 23	Malfunction of ring motor during operation	● Acknowledge error.	
		If the error occurs again...	
		● Replace board DX1.	**6-55**
E4 **13** 24	Ring motor; position counter error	● Check the actuator mechanisms manually for smooth and easy running, reset actuators to zero position if necessary.	
		● Check the ring drive mechanism manually for smooth and easy running,	
		replace the ring motor or mechanism if necessary.	**6-14**
		● Check light barrier V1_3 (X804) with service routine S014.4,	**5-51**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S014.3,	**5-49**
		replace board DX1 if necessary.	**6-55**
E4 **13** 25	Ring motor has not reached ceph home position	● Check the actuator mechanisms manually for smooth and easy running, reset actuators to zero position if necessary.	
		● Check the ring drive mechanism manually for smooth and easy running,	
		replace the ring motor or mechanism if necessary.	**6-14**
		● Check light barrier V1_3 (X804) with service routine S014.4,	**5-51**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S014.3,	**5-49**
		replace board DX1 if necessary.	**6-55**

Error code	Description	Actions required	see page
E4 **13** 26	Ring motor has not left ceph home position	● Check the actuator mechanisms manually for smooth and easy running, reset actuators to zero position if necessary.	
		● Check the ring drive mechanism manually for smooth and easy running,	
		replace the ring motor or mechanism if necessary.	**6-14**
		● Check light barrier V1_3 (X804) with service routine S014.4,	**5-51**
		replace light barrier if necessary.	**6-45**
		● Check electric drive and jolt-free running with service routine S014.3,	**5-49**
		replace board DX1 if necessary.	**6-55**
E6 **13** 27	Ring motor is not ready for operation	This error is a sequential fault.	
		● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on.	
		● Repeat procedure and observe causal error messages.	
E6 **13** 28	Error when activating ring motor	● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function.	
		● Repeat procedure and observe causal error messages.	
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
E4 **13** 30	No height adjustment motor pulses	● Check cable L16 (X402),	**3-17**
		replace if necessary.	**6-65**
		● Check board DX1,	**3-12**
		replace if necessary.	**6-55**
		● Check filter between HA motor and L16 (acc. to circuit diagram on filter) (ohmic and voltage)	
		replace if necessary.	
		● Check height adjustment motor incl. pulse generator,	**3-14**
		replace if necessary.	**6-6**
		● Replace board DX1.	**6-55**

Error code	Description	Actions required	see page
E5 **13** 31	Unit has traveled to upper limit switch	● Check max. travel height with service routine S018.2, adjust if necessary. ● Run HA motor in the other direction with the UP/DOWN keys and reference (value approx. 1500). ● Check light barriers V1_4 replace if necessary. ● Check HA motor for overtravel, replace DX1 if necessary. If the error occurs again... ● check the limit switch or wiring, correct or replace the limit switch if necessary	**5-61** **3-15** **6-45** **6-55**
E5 **13** 32	Unit has traveled to lower limit switch	● Run HA motor in the other direction with the UP/DOWN keys and reference (value approx. 1500). ● Check light barriers V1_4 replace if necessary. ● Check HA motor for overtravel, replace DX1 if necessary. If the error occurs again... ● check the limit switch or wiring, correct or replace the limit switch if necessary.	**5-61** **3-15** **6-45** **6-55**
E5 **13** 33	Height adjustment motor position counter too small for current position **Note:** Error may occur after replacement of board (DX11)	● Run HA motor in the other direction with the UP/DOWN keys and reference (value approx. 1500). ● Check max. travel height using service routine S018.2, adjust if necessary ● Check light barriers V1_4, replace if necessary.	**5-61** **3-15** **6-45**
E5 **13** 34	Height adjustment motor position counter too large for current position **Note:** Error may occur after replacement of board (DX11)	● Run HA motor in the other direction with the UP/DOWN keys on the Control Pad and reference (value approx. 1500). ● Check light barriers V1_4, replace if necessary. ℹ ***NOTE*** *As an aid, the current switching state can be queried via service routine S018.4.*	**3-15** **6-45** **5-64**
E5 **13** 35	Height adjustment motor; wrong direction of rotation	● Check connector assignment on filter or in front of HA motor, correct if necessary. ● Replace board DX1.	**6-55**

Error code	Description	Actions required	see page
E5 **13** 36	Software signal of key is applied, but hardware signal is not	- Check cables L9 and L10,	**3-17**
		replace if necessary.	**6-65**
		- Check limit switches SE1_1 and SE1_2,	**7-4**
		replace if necessary.	**6-6**
		- Replace Control Pad	**6-21**
E7 **13** 37	Overtravel of HA motor occurs or height adjustment power transistor defective	- Check HA motor for overtravel,	
		replace board DX1 if necessary.	**6-55**
		- System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function.	
		- Replace board DX1.	**6-55**
E6 **13** 38	Height adjustment motor is not ready for operation	This error is a sequential fault.	
		- System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on.	
		- Repeat procedure and observe causal error messages.	
E6 **13** 39	Error when activating height adjustment motor	- System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function.	
		- Please contact dealer tech support to see if a software update is necessary.	**1-9**
		- Replace board DX1.	**6-55**
E3 **13** 40	Release signal applied during power-on	- System restart: Switch the unit OFF. Wait 30 sec. Switch unit ON, making sure that the exposure switch is not actuated during boot-up.	
		If the error occurs again...	
		- Check the X-ray signal path.	**3-19**
E3 **13** 41	Release signal not applied on DX11	- Check signal path for interruption according to wiring diagrams, replace component if necessary.	
		- Check exposure switch.	
		If the exposure switch is functioning...	
		- Check cable L17,	**3-17**
		replace if necessary.	**6-65**
E6 **13** 42	The hardware signal for radiation release is applied on board DX1 during unit operation even when no actuated X-RAY exposure switch is reported via the CAN bus	- Check the X-ray signal path.	**3-19**
E5 13 43	The door was opened during the exposure	- Check the X-ray signal path.	**3-19**

Error code	Description	Actions required	see page
E5 **13** 50	Forehead support; has not left home position despite movement pulses	● Check light barriers V5_1 to V5_4,	**3-15**
		replace headrest or	**6-19**
		light barrier if necessary.	**6-45**
		● Check cable L18,	**3-17**
		replace if necessary.	**6-65**
		● Check board DX5,	**3-12**
		replace if necessary.	**6-55**
E4 **13** 51	Forehead support; has not left home position and no motor movement	● Check motor M5_1,	**3-14**
		replace headrest if necessary.	**6-19**
		● Check light barriers V5_1 to V5_4,	**3-15**
		replace headrest or	**6-19**
		light barrier if necessary.	**6-45**
		● Check cable L18,	**3-17**
		replace if necessary.	**6-65**
		● Check board DX5,	**3-12**
		replace if necessary.	**6-55**
E5 **13** 52	Forehead support; has left home position without detected movement pulses	● Check light barriers V5_1 to V5_4,	**3-15**
		replace headrest or	**6-19**
		light barrier if necessary.	**6-45**
		● Check cable L18,	**3-17**
		replace if necessary.	**6-65**
		● Check board DX5,	**3-12**
		● replace if necessary.	**6-55**
E5 **13** 53	Forehead support; system does not block within setting range	● Check headrest mechanics,	
		replace if necessary.	**6-19**
E6 **13** 54	Forehead support is not ready for operation	This error is a sequential fault.	
		● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on.	
		● Repeat procedure and observe causal error messages.	
E6 **13** 57	Error when activating forehead support motor	● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function.	
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
		● Check headrest mechanics,	
		replace if necessary.	**6-19**
		● Replace board DX1.	**6-55**

Error code	Description	Actions required	see page
E6 **13** 58	Error when activating forehead support motor	● Acknowledge error.	
		If the error occurs again...	
	Timeout of FPGA* module on board DX1.	● Replace board DX1.	**6-55**
		● Replace board DX11.	**6-55**
E4 **13** 59	Forehead support drive defective	● Replace the headrest.	**6-19**
E5 **13** 60	Temple supports; have not left home position despite movement pulses	● Check light barriers V5_1 to V5_4,	**3-15**
		replace headrest or	**6-19**
		light barrier if necessary.	**6-45**
		● Check cable L18,	**3-17**
		replace if necessary.	**6-65**
		● Check board DX5,	**3-12**
		replace if necessary.	**6-55**
E4 **13** 61	Temple supports; have not left home position and no motor movement	● Check motor M5_2,	**3-14**
		replace headrest if necessary.	**6-19**
		● Check light barriers V5_1 to V5_4,	**3-15**
		replace headrest or	**6-19**
		light barrier if necessary.	**6-45**
		● Check cable L18,	**3-17**
		replace if necessary.	**6-65**
		● Check board DX5,	**3-12**
		● replace if necessary.	**6-55**
E5 **13** 62	Temple supports; have left home position without detected movement pulses	● Check light barriers V5_1 to V5_4,	**3-15**
		replace headrest or	**6-19**
		light barrier if necessary.	**6-45**
		● Check cable L18,	**3-17**
		replace if necessary.	**6-65**
		● Check board DX5,	**3-12**
		replace if necessary.	**6-55**
E5 **13** 63	Temple supports; system does not block within setting range	● Check headrest mechanics, replace if necessary.	**6-19**
E6 **13** 64	Temple supports are not ready for operation	This error is a sequential fault.	
		● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on.	
		● Repeat procedure and observe causal error messages.	

Error code	Description	Actions required	see page
E6 **13** 67	Error when activating temple support motor	● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function.	
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
		● Check headrest mechanics, replace if necessary.	**6-19**
		● Replace board DX1.	**6-55**
E6 **13** 68	Error when activating temple support motor Timeout of FPGA* module on board DX1.	● Acknowledge error.	
		If the error occurs again...	
		● Replace board DX1.	**6-55**
		● Replace board DX11.	**6-55**
E4 **13** 69	Forehead support drive defective	● Replace the headrest.	**6-19**
E5 **13** 73	Malfunction of height adjustment during operation	● Acknowledge error.	
		● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function.	
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
		If the error occurs repeatedly...	
		● Replace board DX1.	**6-55**
E5 **13** 83	Error while generating pulse for sensor	● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function.	
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
		If the error occurs repeatedly...	
		● Replace board DX1.	**6-55**
E6 **13** 87	Error when activating pulse generation	● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on and test the function.	
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**

*) *FPGA = Field Programmable Gate Array*

Location 14: Digital extension, CDR PanElite Service program

Error code	Description	Actions required	see page
E5 **14** 01	Cancellation caused by CDR Software	● Check network connection, CDR Software installation and software version.	
E7 **14** 02	Interface version not compatible with CDR Software	● Check software versions of unit (S008.2) and CDR Software and perform software update if necessary.	**5-35** **1-9**
E6 **14** 03	Inappropriate or incorrect data input from CDR Software	● Send in Xab.ini and raw image of last exposure to the dealer tech support (check the binning setting) and coordinate with dealer tech support .	
E5 **14** 04	The network connection was interrupted **Note:** This error often occurs when CDR Software is started and the CDR PanElite unit is not yet ready for selection.	● Acknowledge error and quit service domain from unit and CDR Software end. ● Switch unit OFF and ON again and restart CDR Software. If the error occurs again... ● Perform network diagnosis in coordination with the dealer tech support and check the setting of the network card in coordination with the dealer tech support if necessary. (Checksum offload for patient names with 15 characters for 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 software versions of unit (info screen or service routine S008.2) and of CDR Software and perform a software update if necessary.	**5-35** **1-9**
E6 **14** 05	Service of DHCP server is not available	● Have network configuration of dental practice checked by the administrator in charge. ● Ensure proper functioning of the DHCP server.	
E6 **14** 06	The bootline of board DX11 had to be preassigned with default values	● Reconfiguration of network data via sixabcon.exe required.	

Error code	Description	Actions required	see page
E6 **14** 10	Clock signals for sensor image transfer not received on board DX1/DX11 (...10).	● Acknowledge error and, if possible, check function at another slot (PAN/CEPH) via test image (PAN/CEPH).	**3-21**
E6 **14** 11	Faulty detection of sensor image transfer data signals on board DX1/DX11; nonrecurring (...11)	**If both test images indicate the error...**	**5-71**
E6 **14** 12	Faulty detection of sensor image transfer data signals on board DX1/DX11; recurring (...12)	- Check image signal on board DX1 (does the image LED on DX1 switch on when the ring cycle starts in the test image mode?), replace DX1 if necessary.	**6-55**
		If only the PAN test image is not OK...	
		- Check cable L13 for damage as well as connectors and repair or replace DX11.	**6-65**
		- Check board DX1, replace if necessary.	**6-55**
		- Run service routine S032.2. In this way, it can be determined whether the fault is stationary or permanent; replace sensor or cable if necessary.	**5-69** **6-65**
		If only the CEPH test image is not OK...	
		For E06 14 10 and Ceph exposure:	
		- Check board DX91 and cables (L37, L40), replace if necessary	**3-17** **6-65**
		- Run service routine S033.10. In this way, it can be determined whether the fault is stationary or permanent; replace sensor or cable if necessary	**5-72** **6-65**
		Otherwise:	
		- Check cable L35/L38 for damage as well as plugs, repair or replace if necessary	**3-17** **6-65**
		- Check board DX1, replace if necessary.	**6-55**
		- Run service routine S033.10. In this way, it can be determined whether the fault is stationary or permanent; replace sensor or cable if necessary.	**5-72** **6-65**

Location 15: Configuration, update

Error code	Description	Actions required	see page
E7 **15** 01	Wrong memory modules	If a DRAM memory module is plugged into board DX11... - Replace memory module or DX11. If no DRAM memory module is plugged into board DX11... - Replace DX11.	**6-55** **6-55**
E7 **15** 02	Wrong module configuration for this unit Incompatible modules were used.	- Refer to list of software versions. - Check to make sure the correct modules are installed (e.g. after replacing modules). - Perform a software update. If the error occurs again... - Contact the dealer tech support .	**1-9**
E7 **15** 03	Wrong software configuration of modules	- Check software versions of unit (info screen or service routine S008.2) and of CDR PanElite Software and Perform or repeat software update or downgrade if necessary.	**5-35** **1-9**
E6 **15** 04	not applicable	not applicable	
E6 **15** 05	Unit serial number invalid or not available **Note:** Occurs during first power-on after replacement of board DX6 or DX11. See also chapter "Procedure following replacement of boards" starting on page 6-56.	- Execute service routine S008.3 and confirm or enter the unit serial number at the unit.	**5-36**
E6 **15** 06	Wrong or invalid manufacturer code detected on a module.	- Check board DX1, replace the board if necessary. - Replace the tube assembly.	**3-12** **6-55** **6-36**
E6 **15** 07	The user interface (DX71) or remote control is not compatible with the unit.	- Install the PanElite control pad or - PanElite remote control, Order new modules from the manufacturer if necessary.	**6-23**
E6 **15** 10	Update file for module is corrupt	- Obtain the current update from the CDR PanElite Support CD and update the software to the latest version.	**1-9**

Location 42: Remote control, board DX42

Error code	Description	Actions required	see page
E6 **42** 01	General module initialization error **Note:** Error generated during module self-test	- Please contact dealer tech support to see if a software update is necessary. - Replace board DX42.	**1-9** **6-55**
E6 **42** 02	Invalid system data or uninitialized module storage data	- Please contact dealer tech support to see if a software update is necessary. - Acknowledge error and repeat procedure. If the error occurs again... - Replace board DX42.	**1-9** **6-55**
E6 **42** 03	Invalid response or control data **Note:** 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.	- Check software version of DX42 (in comparison to overall software version) via service routine S008.2, perform a software update if necessary. - Check CAN bus. - Check the signal path from board DX1 to board DX42, replace module DX42 if necessary. - Please contact dealer tech support to see if a software update is necessary.	**5-35** **1-9** **3-6** **1-9**
E6 **42** 04	Data transfer error or dialog error to module (master side)	- Check CAN bus. - Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **42** 05	Data transfer error or dialog error to bootloader of module **Note:** Occurs only in connection with software update	- Repeat software update. - Check CAN bus. - Replace board DX42.	**1-9** **3-6** **6-55**
E6 **42** 06	Module failed in TTP* (detected on master side)	- Check CAN bus. - Check the signal path from board DX1 to board DX42, replace module if necessary - Replace board DX42. - Please contact dealer tech support to see if a software update is necessary.	**3-6** **6-55** **1-9**

Error code	Description	Actions required	see page
E6 **42** 07	TTP* timeout error (detected on slave side) **Note:** The module was temporarily not addressed by the master: - Undervoltage on the master side - Procedure error in the software - Master (DX11) receives no return response from the module **Note:** 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.	● Check CAN bus. ● Check power supply (3.3 V) of 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.	**3-6** **6-55** **6-55**
E6 **42** 08	General fault detected locally on module (slave side). CAN controller being reinitialized **Note:** Occurs if software of boards is incompatible.	● Check software versions via info screen or service routine S008.2, perform a software update if necessary. ● Check CAN bus. ● Replace board DX42. ● Please contact dealer tech support to see if a software update is necessary.	**5-35** **1-9** **3-6** **6-55** **1-9**
E7 **42** 10	Module is stuck in bootloader stage	● Check board DX42 (note LED states). If the board remains in the bootloader stage... ● Repeat software update. ● Replace remote control, see installation instructions.	**3-12** **1-9**
E7 **42** 12	Unit is not ready for operation	This error is a sequential fault. ● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on. ● Repeat procedure and observe causal error messages. ● Check the signal path from board DX1 to board DX42, replace module if necessary.	

Error code	Description	Actions required	see page
E6 **42** 20	Contact to DX11 interrupted during operation	● Check the signal path from board DX1 to board DX42, replace module if necessary.	
		● Check connection of remote control, see installation instructions.	
		● Check CAN bus.	**3-6**
		● Check cable L17,	**3-17**
		replace if necessary.	**6-65**
		● Check board DX42,	**3-12**
		replace if necessary.	**6-55**
		NOTE *If the error cannot be eliminated immediately, the unit can be temporarily reconfigured and operated with a exposure switch located directly on the unit (see installation instructions).*	
E7 **42** 21	No CAN bus connection. DX11 does not start **Note:** Occurs in the start screen after power-on.	● Check the signal path from board DX1 to board DX42,	
		replace module if necessary.	
		● Check CAN bus.	**3-6**
		● Check remote control via service routine 17.6, configure if necessary.	**5-57**
		● Start the detail query via Sixabcon.	
		● If DX11 responds...	
		● Check the signal path to DX42,	
		repair or replace cable/connector if necessary.	**6-65**
		● Replace DX1.	**6-55**
		If DX11 does not respond...	
		● Replace DX11 if this error persists.	**6-55**
E3 **42** 30	R key actuated during power-on	● System restart: Switch the unit OFF. Wait 30 sec. Switch unit ON, making sure that the remote control is not actuated during boot-up.	
		If the error occurs again...	
		● Replace remote control, see installation instructions.	

Error code	Description	Actions required	see page
E3 **42** 31	Exposure switch actuated during power-on The hardware signal for radiation release is applied on board DX42 when the unit is switched on.	● System restart: Switch the unit OFF. Wait 30 sec. Switch unit ON. If the error reoccurs: ● Replace board DX42.	**6-55**

*) *TTP = Time Trigger Protocol*

Location 61: Diaphragm control, board DX61

Error code	Description	Actions required	see page
E6 **61** 01	General error during module initialization	● Please contact dealer tech support to see if a software update is necessary. ● Check board DX61, replace if necessary. Replace board DX61 or Replace diaphragm unit.	**1-9** **3-12** **6-55** **6-33**
E6 **61** 02	Invalid system data or uninitialized module storage data	● Please contact dealer tech support to see if a software update is necessary. ● Acknowledge error and repeat procedure. If the error occurs again... ● Check board DX61, replace if necessary. Replace board DX61 or Replace diaphragm unit.	**1-9** **3-12** **6-55** **6-33**
E6 **61** 03	Invalid response or control data **Note:** 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: ● 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 fitting position of the diaphragm. If the error occurs in the normal mode: ● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	 **4-3** **3-6** **1-9**
E6 **61** 04	Data transfer error or dialog error to module (master side)	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **61** 05	Data transfer error or dialog error to bootloader of module **Note:** Occurs only in connection with software update	● Repeat software update. ● Check CAN bus. ● Check board DX61, replace if necessary. Replace board DX61 or Replace diaphragm unit.	**1-9** **3-6** **3-12** **6-55** **6-33**
E6 **61** 06	Module failed in TTP* (detected on master side)	● Check CAN bus. ● Check board DX61, replace if necessary. Replace board DX61 or Replace diaphragm unit. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **3-12** **6-55** **6-33** **1-9**

Error code	Description	Actions required	see page
E6 **61** 07	TTP* timeout error (detected on slave side) **Note:** The module was temporarily not addressed by the master: - Undervoltage on the master side - Procedure error in the software - Master (DX11) receives no return response from the module **Note:** 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.	● Check CAN bus. ● Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). – If 3.3 V are present, replace board DX11 – If 3.3 V are not present, replace board DX11	**3-6** **6-55** **6-55**
E6 **61** 08	General fault detected locally on module (slave side). CAN controller being reinitialized	● Check CAN bus. ● Check software versions via info screen or service routine S008.2, perform a software update if necessary. ● Check board DX61, replace if necessary. Replace board DX61 or Replace diaphragm unit. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **5-35** **1-9** **3-12** **6-55** **6-33** **1-9**
E7 **61** 10	Module is stuck in bootloader stage	● Check operating status of board (observe LED statuses). If the board remains in the bootloader stage... ● Repeat software update. ● Check board DX61, replace if necessary. Replace board DX61 or Replace diaphragm unit.	**3-12** **1-9** **3-12** **6-55** **6-33**
E7 **61** 12	Unit is not ready for operation	This error is a sequential fault. ● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on. ● Repeat procedure and observe causal error messages. ● Check CAN bus. ● Replace diaphragm unit.	 **3-6** **6-33**
E5 **61** 15	Drive overtemperature **Note:** Can occur after frequent diaphragm travel, e.g. during demo operation at a fair	● Allow unit to cool down. If the error occurs again... ● Check board DX61, replace if necessary. Replace board DX61 or Replace diaphragm unit.	 **3-12** **6-55** **6-33**

Error code	Description	Actions required	see page
E5 **61** 20	Horizontal motor malfunction during operation **Note:** Can occur after frequent diaphragm travel, e.g. during demo operation at a fair	● Allow unit to cool down.	
		If the error occurs again...	**3-12**
		● Check board DX61, replace if necessary.	
		Replace board DX61 or	**6-55**
		Replace diaphragm unit	**6-33**
E5 **61** 21	Horizontal motor limit switch error	● Check light barrier V61_1 and connectors, replace if necessary.	**3-15** **6-45**
		● Perform diaphragm adjustment.	**4-3**
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
		If the error occurs again...	
		● Check board DX61, replace if necessary.	**3-12**
		Replace board DX61 or	**6-55**
		Replace diaphragm unit.	**6-33**
E5 **61** 22	Horizontal motor movement error	● Acknowledge error and repeat procedure.	
		If the error occurs again...	**3-12**
		● Check board DX61, replace if necessary.	
		Replace board DX61 or	**6-55**
		Replace diaphragm unit.	**6-33**
E5 **61** 30	Vertical motor malfunction during operation	● Allow unit to cool down.	
		If the error occurs again...	
		● Check board DX61, replace if necessary.	**3-12**
		Replace board DX61 or	**6-55**
		Replace diaphragm unit.	**6-33**
E5 **61** 31	Vertical motor limit switch error	● Check light barrier V61_2 and connectors, replace if necessary.	**3-15** **6-45**
		● Perform diaphragm adjustment.	**4-3**
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
		If the error occurs again...	
		● Check board DX61, replace if necessary.	**3-12**
		Replace board DX61 or	**6-55**
		Replace diaphragm unit.	**6-33**
E5 **61** 32	Vertical motor movement error	● Acknowledge error and repeat procedure.	
		If the error occurs again...	
		● Check board DX61, replace if necessary.	**3-12**
		Replace board DX61 or	**6-55**
		Replace diaphragm unit.	**6-33**

Error code	Description	Actions required	see page
E5 **61** 40	Filter motor malfunction during operation	● Allow unit to cool down.	
		If the error occurs again...	
		● Check board DX61, replace if necessary.	**3-12**
		Replace board DX61 or	**6-55**
		Replace diaphragm unit.	**6-33**
E5 **61** 41	Filter motor limit switch error	● Check light barrier V61_1 and connectors,	**3-15**
		replace if necessary.	**6-45**
		● Perform diaphragm adjustment.	**4-3**
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
		If the error occurs again...	
		● Check board DX61, replace if necessary.	**3-12**
		Replace board DX61 or	**6-55**
		● Replace diaphragm unit.	**6-33**
E5 **61** 42	Filter motor movement error	● Acknowledge error and repeat procedure.	
		If the error occurs again...	
		● Check board DX61, replace if necessary.	**3-12**
		Replace board DX61 or	**6-55**
		Replace diaphragm unit.	**6-33**
E1 **61** 60	Voltage error on DX61, 40 V or 28 V **Note:** If several drives are operated simultaneously under unfavorable circumstances, this may cause voltages to fall below their minimum tolerances.	● Acknowledge error and repeat procedure.	
		If the error occurs again...	
		● Check height adjustment (soft start),	
		replace DX1 if necessary.	**6-55**
		● Check voltages at X501 on board DX61 according to wiring diagrams,	
		replace diaphragm unit if necessary.	**6-33**
		● Check cable L11,	**3-17**
		replace if necessary.	**6-65**
		● Check voltage path from DX32 to DX1 (X102) according to wiring diagrams, replace component if necessary.	

*) *TTP = Time Trigger Protocol*

Location 71: Control Pad/Board DX71

Error code	Description	Actions required	see page
E6 **71** 01	General error during module initialization	● Please contact dealer tech support to see if a software update is necessary. If the error occurs again... ● Check board DX71 or replace Control Pad.	**1-9** **6-55** **6-21**
E6 **71** 02	Invalid system data or uninitialized module storage data	● Please contact dealer tech support to see if a software update is necessary. ● Acknowledge error and repeat procedure. If the error occurs again... ● Check board DX71 or replace Control Pad.	**1-9** **6-55** **6-21**
E6 **71** 03	Invalid response or control data **Note:** 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.	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **71** 04	Data transfer error or dialog error to module (master side)	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **71** 05	Data transfer error or dialog error to bootloader of module **Note:** Occurs only in connection with software update	● Repeat software update. ● Check CAN bus. ● Check board DX71 or replace Control Pad.	**1-9** **3-6** **6-55** **6-21**
E6 **71** 06	Module failed in TTP* (detected on master side)	● Check CAN bus. ● Replace board DX71. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **6-21** **5-7**
E6 **71** 07	TTP* timeout error (detected on slave side) **Note:** The module was temporarily not addressed by the DX11: - Undervoltage on the master side - Procedure error in the software - Master (DX11) receives no return response from the module **Note:** 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.	● Check CAN bus. ● Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). – If 3.3 V are present, replace board DX11 – If 3.3 V are not present, replace board DX11	**3-6** **6-55** **6-55**

Error code	Description	Actions required	see page
E6 **71** 08	General fault detected locally on module (slave side). CAN controller being reinitialized	● Check CAN bus.	**3-6**
		● Check software versions via info screen or service routine S008.2,	**5-35**
		perform a software update if necessary.	**1-9**
		● Check board DX71 or	**3-55**
		● replace Control Pad.	**6-21**
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
E7 **71** 10	Module is stuck in bootloader stage	● Check board DX71	**3-12**
		If the board remains in the bootloader stage...	
		● Repeat software update.	**1-9**
		● Check board DX71 or	**6-55**
		replace Control Pad.	**6-21**
E7 **71** 12	Unit is not ready for operation	● Check CAN bus.	**3-6**
		This error is a sequential fault.	
		● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on.	
		● Repeat procedure and observe causal error messages.	
E6 **71** 20	Contact to DX11 interrupted during operation	● Note error message on remote control (DX42) and check log memory (via extended details).	
		● Check CAN bus	**3-6**
		● Check cable L9,	**3-17**
		replace if necessary.	**6-65**
E7 **71** 21	No CAN bus connection. DX11 does not start. **Note:** Occurs in the start screen after power-on.	● Start the detail query via Sixabcon.	
		If DX11 responds...	
		● Check signal path to DX71,	
		repair or replace cable/connector if necessary.	**6-65**
		● Replace DX1.	**6-55**
		If DX11 does not respond...	
		● Replace DX11.	**6-55**

Error code	Description	Actions required	see page
E3 **71** 30	Height adjustment keys actuated during power-on	- System restart: Switch the unit OFF. Wait 30 sec. Switch unit ON, making sure that the Control Pad is not actuated during boot-up. If the error occurs again... - Check board DX71 or replace Control Pad.	 **6-55** **6-21**
E3 **71** 31	Forehead support key pressed during power-on		
E3 **71** 32	Temple support keys actuated during power-on		
E3 **71** 33	Light localizer key actuated during power-on		
E3 **71** 34	Test key actuated during power-on		
E3 **71** 35	Return key actuated during power-on		
E3 **71** 36	Service key actuated during power-on		
E3 **71** 37	Memory key actuated during power-on		
E3 **71** 38	Program selection key actuated during power-on		
E3 **71** 39	Radiation time key actuated during power-on		
E3 **71** 40	kV/mA key actuated during power-on		
E3 **71** 41	Patient symbol key actuated during power-on		

**) TTP = Time Trigger Protocol*

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

Error code	Description	Actions required	see page
E6 **81** 01	**PAN** General error during module initialization	● Please contact dealer tech support to see if a software update is necessary. ● Check pan sensor, replace if necessary.	**1-9**
E6 **81** 02	**PAN** Invalid system data or uninitialized module storage data	● Please contact dealer tech support to see if a software update is necessary. ● Acknowledge error and repeat procedure. If the error occurs again... ● Check pan sensor, replace if necessary.	**1-9**
E6 **81** 03	**PAN** Invalid response or control data **Note:** 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.	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **81** 04	**PAN** Data transfer error or dialog error to module (master side)	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary..	**3-6** **1-9**
E6 **81** 05	**PAN** Data transfer error or dialog error to bootloader of module **Note:** Occurs only in connection with software update.	● Repeat software update. ● Check CAN bus. ● Check pan sensor, replace if necessary.	**1-9** **3-6**
E6 **81** 06	**PAN** Module failed in TTP* (detected on master side)	● Check CAN bus. ● Check pan sensor, replace if necessary. ● Please contact dealer tech support to see if a software update is necessary..	**3-6** **1-9**

Error code	Description	Actions required	see page
E6 **81** 07	**PAN** TTP* timeout error (detected on slave side) **Note:** The module was temporarily not addressed by the master: - Undervoltage on the master side - Procedure error in the software - Master (DX11) receives no return response from the module **Note:** 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.	● Check 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). – If 3.3 V are present, replace board DX11 – If 3.3 V are not present, replace board DX11	**3-6** **3-17** **6-65** **6-55** **6-55**
E6 **81** 08	**PAN** General fault detected locally on module (slave side). CAN controller being reinitialized	● Check CAN bus. ● Check software versions via info screen or service routine S008.2, perform a software update if necessary. ● Check pan sensor, replace if necessary. ● Please contact dealer tech support to see if a software update is necessary..	**3-6** **5-35** **1-9** **1-9**
E7 **81** 10	**PAN** Module is stuck in bootloader stage	● Check sensor or board DX81 (replacement sensor), replace sensor if necessary. If the board remains in the bootloader stage... ● Repeat software update. ● Check pan sensor, replace if necessary.	**1-9**
E7 **81** 12	**PAN** Unit is not ready for operation	This error is a sequential fault. ● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on. ● Repeat procedure and observe causal error messages.	
E5 **81** 13	**PAN** Error when writing to EEPROM **Note:** Stored data may be lost	● Acknowledge error and repeat procedure. ● Perform a software update. If the error occurs again... ● Check log memory (via extended details). ● Check pan sensor, replace if necessary.	**1-9**
E6 **81** 20	**PAN** The sensor type on the panoramic unit is not compatible with CDR Software specifications	● Check with the dealer tech support for CDR Software specifications. ● Check version compatibility of CDR Software and CDR PanElite Drivers perform a software update if necessary. ● Pull sensor out of slot and plug it back in, repeat procedure.	**1-9** **1-9**

Error code	Description	Actions required	see page
E7 **81** 21	**PAN** File system error on DX81P	● Perform a software update.	**1-9**
		● Check sensor or board DX81 (replacement sensor), replace sensor if necessary.	
E6 **81** 23	**PAN** Sensor in pan slot active on CAN bus, but no hardware detection	● Check cable L13, replace if necessary.	**3-17** **6-65**
		● Check Pan LED (V500) on DX1 (hardware detection of sensor).	**3-12**
		● Check sensor or board DX81 (replacement sensor), replace sensor if necessary.	
		● Check plug X500 on DX1, board DX1 or DX11 if necessary.	**6-55**
		● Replace board DX1 or DX11.	**6-55**
E5 **81** 24	**PAN** Sensor in PAN slot not detected	● Check cable L13, replace if necessary.	**3-17** **6-65**
		● Check Pan LED (V500) on DX1 (hardware detection of sensor).	**3-12**
		● Check sensor or board DX81 (replacement sensor), replace sensor if necessary.	
		● Check plug X500 on DX1, replace DX1 if necessary.	**6-55**
		● Check CAN bus.	**3-6**
E5 **81** 25	**PAN** Error while synchronizing image data	● Perform a software update.	**6-55**
		If the error occurs again...	
		● Check pan sensor, replace if necessary.	
E5 **81** 27	**PAN** Voltage error detected on sensor. (CCD voltages on board DX81P) **Note:** If this error occurs in connection with other causal error messages (e.g. E6 6160, E6 9150), take appropriate action	● Check cable L13, replace if necessary.	**3-17** **6-65**
		● Check plug X500 on DX1, replace DX1 if necessary.	**6-55**
		● Check pan sensor, replace if necessary.	

Error code	Description	Actions required	see page
E5 **81** 28	**PAN** Invalid data at start of exposure.	- Acknowledge error and repeat procedure. If the error occurs again... - Perform a software update. - Check version compatibility of CDR software and CDR PanElite Drivers, perform a software update if necessary. - Contact the dealer tech support for the settings/ sensor information in the Xab.ini file.	 **1-9** **1-9** **1-9**

*) *TTP = Time Trigger Protocol*

Location 81, zz = 51-73: DX 81, ceph slot

Error code	Description	Actions required	see page
E6 **81** 51	**Ceph** General error during module initialization	● Please contact dealer tech support to see if a software update is necessary. ● Check ceph sensor, replace if necessary.	**1-9**
E6 **81** 52	**Ceph** Invalid system data or uninitialized module storage data	● Please contact dealer tech support to see if a software update is necessary. ● Acknowledge error and repeat procedure. If the error occurs again... ● Check ceph sensor, replace if necessary.	**1-9**
E6 **81** 53	**Ceph** Invalid response or control data **Note:** 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.	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **81** 54	**Ceph** Data transfer error or dialog error to module (master side)	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **81** 55	**Ceph** Data transfer error or dialog error to bootloader of module **Note:** Occurs only in connection with software update	● Repeat software update. ● Check CAN bus. ● Check ceph sensor, replace if necessary.	**1-9** **3-6**
E6 **81** 56	**Ceph** Module failed in TTP* (detected on master side)	● Check CAN bus. ● Check ceph sensor, replace if necessary. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**

Error code	Description	Actions required	see page
E6 **81** 57	**Ceph** TTP* timeout error (detected on slave side) **Note:** The module was temporarily not addressed by DX11: - Undervoltage on the master side - Procedure error in the software - Master (DX11) receives no return response from the module **Note:** 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.	● Check CAN bus. ● Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). – If 3.3 V are present, replace board DX11 – If 3.3 V are not present, replace board DX11	**3-6** **6-55** **6-55**
E6 **81** 58	**Ceph** General fault detected locally on module (slave side). CAN controller being reinitialized	● Check CAN bus. ● Check software versions via info screen or service routine S008.2, perform a software update if necessary. ● Check ceph sensor, replace if necessary. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **5-35** **1-9** **1-9**
E7 **81** 60	**Ceph** Module is stuck in bootloader stage	● Check sensor or board DX81 (replacement sensor). If the board remains in the bootloader stage... ● Repeat software update. ● Check ceph sensor, replace if necessary.	**3-12** **1-9**
E7 **81** 62	**Ceph** Unit is not ready for operation	This error is a sequential fault. ● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on. ● Repeat procedure and observe causal error messages.	
E5 **81** 63	**Ceph** Error when writing to EEPROM **Note:** Stored data may be lost.	● Acknowledge error and repeat procedure. If the error occurs again... ● Check ceph sensor, replace if necessary.	
E7 **81** 71	**Ceph** File system error on DX81C	● Perform a software update.	**1-9**

Error code	Description	Actions required	see page
E6 **81** 73	**Ceph** Sensor in ceph slot active on CAN bus, but no hardware detection	● Check cable L35/L38, replace if necessary.	**3-17** **6-65**
		● Check plug X500 on board DX1, replace board DX1 if necessary.	**6-55**
		● Check Ceph sensor holder, replace if necessary.	**6-43**
E5 **81** 74	**Ceph** Sensor in ceph slot not detected	● Check cables L35 and L38, replace if necessary.	**3-17** **6-65**
		● Check CAN bus.	**3-6**
		● Check plug X503 on board DX1, replace board DX1 if necessary.	**6-55**
		● Check ceph sensor holder, replace if necessary.	**6-43**
E5 **81** 75	**Ceph** Error while synchronizing image data	● Perform a software update.	**1-9**
		If the error occurs again...	
		● Check ceph sensor, replace if necessary.	
E5 **81** 77	**Ceph** Voltage error detected on sensor. (CCD voltages on board DX81C) **Note:** If this error occurs in connection with other causal error messages (e.g. E6 6160, E6 9150), take appropriate action	● Check cable L35/L38, replace if necessary.	**3-17** **6-65**
		● Check plug X503 on board DX1, replace board DX1 if necessary.	**6-55**
		● Check ceph sensor holder, replace if necessary.	**6-43**
		● Perform a software update.	**1-9**
		● Check ceph sensor, replace if necessary.	
E5 **81** 78	**Ceph** Invalid data at start of exposure.	● Acknowledge error and repeat procedure.	
		If the error occurs again...	
		● Perform a software update.	**1-9**
		● Check version compatibility of CDR software and CDR PanElite Drivers, perform a software update if necessary.	**1-9** **1-9**
		● Contact the dealer tech support for the settings/ sensor information in the Xab.ini file	

*) *TTP = Time Trigger Protocol*

Location 91: Cephalometer, board DX91

Error code	Description	Actions required	see page
E6 **91** 01	General error during module initialization	● Please contact dealer tech support to see if a software update is necessary. ● Replace board DX91.	**1-9** **6-55**
E6 **91** 02	Invalid system data or uninitialized module storage data	● Please contact dealer tech support to see if a software update is necessary. ● Acknowledge error and repeat procedure. If the error occurs again... ● Replace board DX91.	**1-9** **6-55**
E6 **91** 03	Invalid response or control data **Note:** 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.	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **91** 04	Data transfer error or dialog error to module (master side)	● Check CAN bus. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **1-9**
E6 **91** 05	Data transfer error or dialog error to bootloader of module **Note:** Occurs only in connection with software update	● Repeat software update. ● Check CAN bus. ● Replace board DX91.	**1-9** **3-6** **6-55**
E6 **91** 06	Module failed in TTP* (detected on master side)	● Check CAN bus. ● Replace board DX91. ● Please contact dealer tech support to see if a software update is necessary.	**3-6** **6-55** **1-9**
E6 **91** 07	TTP* timeout error (detected on slave side) **Note:** The module was temporarily not addressed by the master: - Undervoltage on the master side - Procedure error in the software - Master (DX11) receives no return response from the module **Note:** 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.	● Check CAN bus. ● Check power supply of board DX11; measuring point 3.3 V on board DX1 (see wiring diagrams). – If 3.3 V are present, replace board DX11 – If 3.3 V are not present, replace board DX11	**3-6** **6-55** **6-55**

Error code	Description	Actions required	see page
E6 **91** 08	General fault detected locally on module (slave side). CAN controller being reinitialized	● Check CAN bus.	**3-6**
		● Check software versions via info screen or service routine S008.2,	**5-31**
		perform a software update if necessary.	**1-9**
		● Replace board DX91.	**6-55**
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
E7 **91** 10	Module is stuck in bootloader stage	● Check operating status of board (observe LED statuses).	**3-12**
		If the board remains in the bootloader stage...	
		● Repeat software update.	**1-9**
		● Check DX91,	**3-12**
		replace if necessary.	**6-55**
E7 **91** 12	Unit is not ready for operation	This error is a sequential fault.	
		● System restart: Switch the unit OFF. Wait 30 sec. Switch the unit on.	
		● Repeat procedure and observe causal error messages.	
E3 **91** 13	Error when writing to EEPROM	● Complete unit adjustment	**4-3**
	Note: Stored data may be lost	incl. check of center position of Ceph scan via service routines S034.4 and S034.5, readjust if necessary.	**5-74,** **5-78**
		● Acknowledge error and repeat procedure.	
		If the error occurs again...	
		● Check board DX91,	**3-12**
		replace if necessary.	**6-55**

Error code	Description	Actions required	see page
E5 **91** 15	Drive overtemperature	● Allow unit to cool down.	
		If the error occurs again...	
		● Check complete mechanics/spindle of motor M91_3 for smooth and easy running, replace if necessary	
		● Replace board DX91.	**6-33**
E5 **91** 16	Motor control timeout (M91_2/3)	● Replace board DX91.	**6-55**
E5 **91** 20	Sensor drive malfunction during operation	● Allow unit to cool down.	
		If the error occurs again...	
		● Check complete mechanics/spindle of motor M91_3 for smooth and easy running, replace if necessary.	
E5 **91** 21	Sensor drive, opposite light barrier reached prematurely	● Check light barrier V91_2,	**3-15**
		replace if necessary.	**6-45**
		● Check cable to light barrier (L21/L24), replace if necessary.	**6-45**
		● Check board DX91,	**3-12**
		replace if necessary.	**6-55**
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
E5 **91** 22	Sensor drive timeout	● Check motor M91_3 incl. cable and connector, replace if necessary.	
		● Check cable to light barrier (L21/L24), replace if necessary.	**6-45**
E5 **91** 30	Secondary diaphragm drive malfunction during operation	● Allow unit to cool down.	
		If the error occurs again...	
		● Check motor M91_2 incl. cable and connector, replace if necessary.	
		● Check cable to light barrier (L21/L24), replace if necessary.	**6-45**

Error code	Description	Actions required	see page
E5 **91** 31	Secondary diaphragm drive, opposite light barrier reached prematurely	● Check light barrier V91_2, replace if necessary.	**3-15** **6-45**
		● Check cable to light barrier (L21/L24), replace if necessary.	**6-45**
		● Check board DX91, replace if necessary.	**3-12** **6-55**
		● Please contact dealer tech support to see if a software update is necessary.	**1-9**
E5 **91** 32	Secondary diaphragm drive timeout	● Check motor M91_2, replace if necessary.	
		● Check cable to light barrier (L21/L24), replace if necessary.	**6-45**
E1 **91** 50	Voltage error on DX91, 40 V or 28 V **Note:** If several drives are operated simultaneously under unfavorable circumstances, this may cause voltages to fall below their minimum tolerances.	● Check height adjustment (soft start), replace DX1 if necessary.	**6-55**
		● Check cables L36, L39 and adapter, replace if necessary.	**3-17** **6-65**
		● Check voltages at X103 on board DX91 according to wiring diagrams, replace DX91 if necessary.	**6-55**
		● Check boards DX1 and DX91, replace if necessary.	**3-12** **6-55**
		If multiple boards report errors...	
		● Check DX32, replace if necessary.	**3-12** **6-55**

*) *TTP = Time Trigger Protocol*

2.5 List of available service routines

Routine	Description	Required...	see page
S001	Radiation without rotary movement: Fixed radiation time of 14.0 s	- for tube assembly test and testing kV/mA levels ℹ ***NOTE*** *This routine enables the service engineer to release radiation without having to attain exposure readiness for the entire system.*	**5-14**
S002	Radiation without rotary movement: Max. radiation time selectable **Test step 1:** Radiation from any position; last primary diaphragm setting **Test step 3:** Radiation from any position; Primary diaphragm opened fully **Test step 4:** Radiation from any position; Step filter in beam path; Primary diaphragm opened symmetrical to PAN setting	- for system test, final testing, tube voltage measurement, reproducibility measurement, equivalent dose measurement	**5-16**
S005	General X-ray tube assembly service **Test step 2:** Automatic alignment of preheating (board DX6) with display of setpoint values **Test step 4:** Fan test (board DX6) **Test step 5:** Temperature sensor test (board DX6)	- after error messages or component replacement	**5-20**
	Test step 6: Disabling the pulse/pause monitoring	- only if expressly requested by the customer! ⚠ ***CAUTION*** ***The execution of this service routine is irreversible.*** *The system is operated beyond its specifications afterwards. This may result in an X-ray tube assembly failure.* ***The warranty for the X-ray tube assembly will become void!*** *Performance of this service function can be proven by the manufacturer following a system failure.*	**5-25**
	Test step 7: Switching tube assembly fan to continuous operation	- only if expressly requested by the customer! ⚠ ***CAUTION*** ***The execution of this service routine is irreversibly documented on the tube assembly!***	**5-27**

Routine	Description	Required...	see page
S007	Error logging **Test step 1:** Displaying error logging memory **Test step 2:** Clearing error logging memory **Test step 5:** Enabling CAN bus logging in the Miniweb	● after error messages ● only after consulting with the dealer tech support!	**5-29**
S008	Update service **Test step 2:** Display of module software version statuses **Test step 3:** Input/confirmation of unit Serial number **Test step 4:** Initialize the function activation	● for checking the configuration ● after error messages	**5-35**
S009	Flash file system **Test step 4:** Formatting flash file system	● after error messages	**5-41**
S012	CAN bus service **Test step 2:** Query of CAN status register of modules **Test step 3:** Reset of CAN status register of modules **Test step 4:** Display of CAN bus cycle on LEDs of modules	● on suspicion of unstable CAN bus ● in case of accumulated error messages EX yy 12; Ex yy 06, Ex yy 07, Ex yy 03 ● not suitable as an accompanying measure e.g. "check connector of CAN bus" or "check bus terminations" ● to be executed prior to service routine S012.2 if required ● in case of sporadic failures of modules on CAN bus (after Ex yy 06, Ex yy 07, Ex yy 08, Ex yy 12) ● as accompanying measure during check of plugs for firm seating	**5-43**
S014	Rotation motor service **Test step 1:** Travel of rotational drive to the Pan home position **Test step 2**: Travel of rotational drive to the Ceph position **Test step 3:** Free travel of rotational drive **Test step 4:** Display of light barrier signals of rotational drive	● for electromechanical problems with the ring motor or the ring rotation system	**5-47**

Routine	Description	Required...	see page
S015	Actuator service **Test step 5:** Functional test of actuators 1 + 2	- for electromechanical problems with the actuators or the actuator movement	**5-52**
S017	Configuration service Unit ID **Test step 2:** Configuration of hardware version **Test step 3:** Selecting the country group code	- for changing the configuration	**5-54**
	Test step 6: Activating the remote control	- for installation and removal of remote control	
	Test step 8: Selecting the kV/mA level ID	- for changing the configuration	
	Test step 11: Selecting the ceph image format	- for changing the configuration	
	Test step 15: Activating/deactivating the acoustic signal for the end of exposure	- At the customer's request: Switch the acoustic signal for the end of exposure ON or OFF.	
S018	Set travel height **Test step 2:** Setting maximum travel height **Test step 3:** Undoing maximum travel height setting	- if the room height is lower than 2.27 m (2.3 m with floor stand)	**5-61**
	Test step 4: Check of the height adjustment sensor system	- Check of the sensor system for the height adjustment (upper and lower limit switches, correction switch, pulse counter)	
	Test step 5: Setting minimum travel height **Test step 6:** Undoing minimum travel height setting	- if the minimum travel height must be limited	
S021	Diaphragm service: motor-driven diaphragm **Test step 1:** Initialization of diaphragm axis	- following replacement of diaphragm unit	**5-67**
S032	Test function for sensor in PAN slot **Test step 10:** Test function for sensor in PAN slot	- for troubleshooting HSI problems (E6 14 10, E6 14 11, E6 14 12)	**5-69**
S033	Test of CEPH image path without CDR Software **Test step 10:** Test of CEPH image path without CDR Software	- for troubleshooting HSI problems (E6 14 10, E6 14 11, E6 14 12)	**5-72**

Routine	Description	Required...	see page
S034	Service for the digital cephalometer **Test step 4:** Calibrating center position of ceph scan (sensor side) **Test step 5:** Calibrating center position of ceph scan (diaphragm side) **Test step 6:** Moving cephalometer to packing position	● after replacing ceph module ● for adjustment problems (only after consulting the dealer tech support) ● to repack the cephalometer	**5-74**
S037	Network service, PC service **Test step 1:** Display of network data **Test step 2:** Resetting the IP address **Test step 3:** Toggling between DHCP and UDP boot mode **Test step 4:** Manual input of IP address, default gateway address and subnet mask	● for problems with exposure readiness ● for changing the network configuration	**5-82**

3 Troubleshooting

Contents

3

Troubleshooting

DANGER

Shock hazard! It is essential that you switch the X-ray unit OFF before replacing any components!

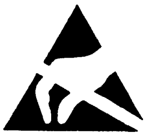
CAUTION

- *Switch the X-ray unit OFF before connecting a measuring instrument.*
- *Select the correct current/voltage type and adjust the measuring range to match the expected readings.*
- *Perform continuity tests only on units which are switched off.*
- *Observe the prescribed cool-down intervals if several exposures must be taken to check a measurement.*

CAUTION

Please observe the usual precautionary measures for handling printed circuit boards (ESD).

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

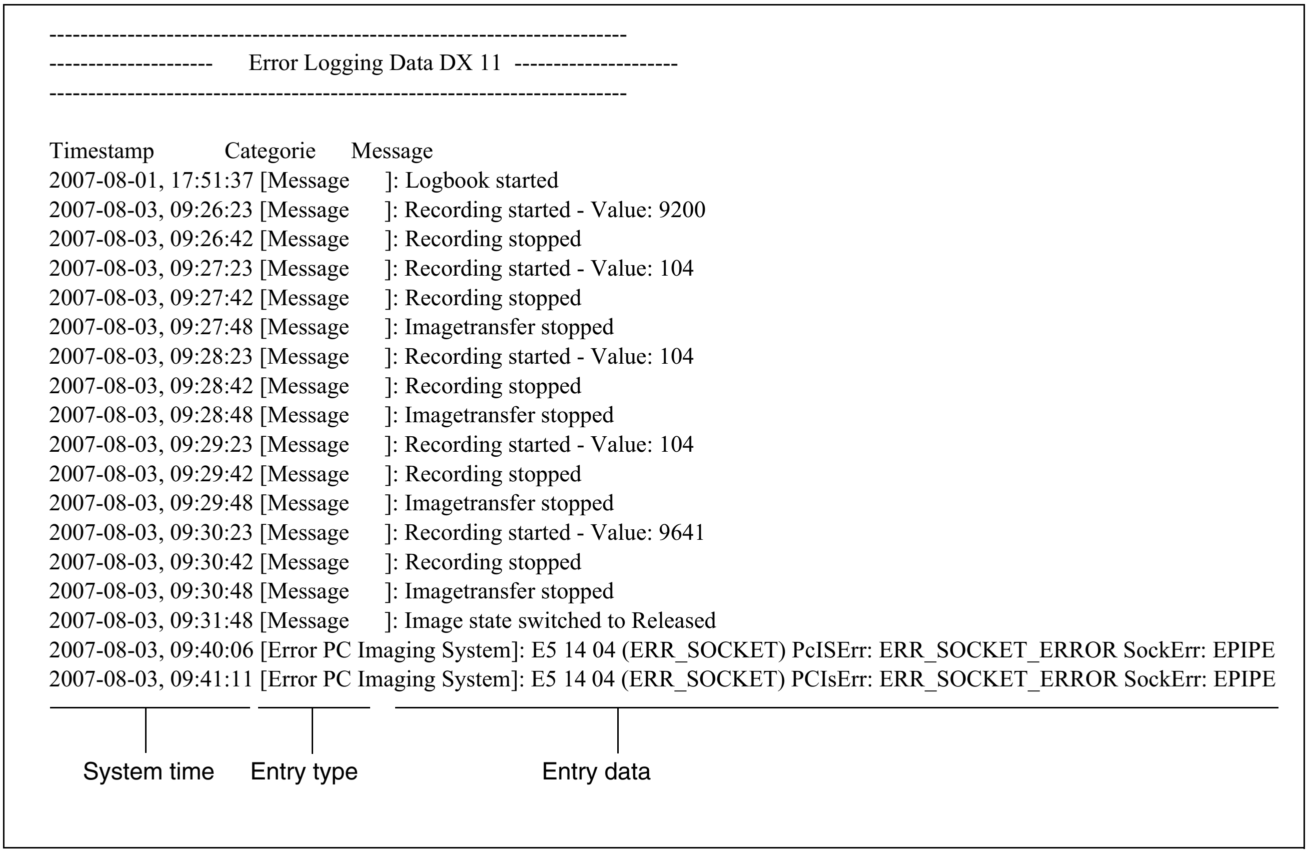


CAUTION

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

3.1 Error logging memory

The error logging memory is a component of the **EXTENDED DETAILS** (see section 1.7 on page 3-4).



```
-----------------------------------------------------------------------------
---------------------     Error Logging Data DX 11  ---------------------
-----------------------------------------------------------------------------

Timestamp          Categorie     Message
2007-08-01, 17:51:37 [Message     ]: Logbook started
2007-08-03, 09:26:23 [Message     ]: Recording started - Value: 9200
2007-08-03, 09:26:42 [Message     ]: Recording stopped
2007-08-03, 09:27:23 [Message     ]: Recording started - Value: 104
2007-08-03, 09:27:42 [Message     ]: Recording stopped
2007-08-03, 09:27:48 [Message     ]: Imagetransfer stopped
2007-08-03, 09:28:23 [Message     ]: Recording started - Value: 104
2007-08-03, 09:28:42 [Message     ]: Recording stopped
2007-08-03, 09:28:48 [Message     ]: Imagetransfer stopped
2007-08-03, 09:29:23 [Message     ]: Recording started - Value: 104
2007-08-03, 09:29:42 [Message     ]: Recording stopped
2007-08-03, 09:29:48 [Message     ]: Imagetransfer stopped
2007-08-03, 09:30:23 [Message     ]: Recording started - Value: 9641
2007-08-03, 09:30:42 [Message     ]: Recording stopped
2007-08-03, 09:30:48 [Message     ]: Imagetransfer stopped
2007-08-03, 09:31:48 [Message     ]: Image state switched to Released
2007-08-03, 09:40:06 [Error PC Imaging System]: E5 14 04 (ERR_SOCKET) PcISErr: ERR_SOCKET_ERROR SockErr: EPIPE
2007-08-03, 09:41:11 [Error PC Imaging System]: E5 14 04 (ERR_SOCKET) PCIsErr: ERR_SOCKET_ERROR SockErr: EPIPE
```

Data which might be expected to occur in the logging memory are explained below to help you interpret them better:

3.3.1 Example of error logging data

System time	2006-03-06, 20:13:02	:	System time (clock on DX11)
Entry type	[Message]	:	General system event
	[Error]	:	Error event
	[Error CDR Software]	:	Network error event
	[Stringname]	:	Free status texts
	[Stringsegment]	:	Additional data (string names)
Entry data [Message]	Recording started	:	Beginning of a recording
	Value: 9000	:	Sequence ID of recording
	Recording stopped	:	End of a recording
	Recording cancelled	:	Recording cancellation
	Logbook started	:	Corresponds to power-on of unit
	Image state switched to Released	:	Recording has been delivered to and confirmed by CDR PanElite Service Program

Other entry data which document the occurrence of a rescue event include:

- Image state switched to CDR PanElite Rescue
- Rescue request CDR PanElite Service program Error
- Rescue request CDR PanElite Service programTrackEpilogue
- Rescue request CDR PanElite Service program Timeout

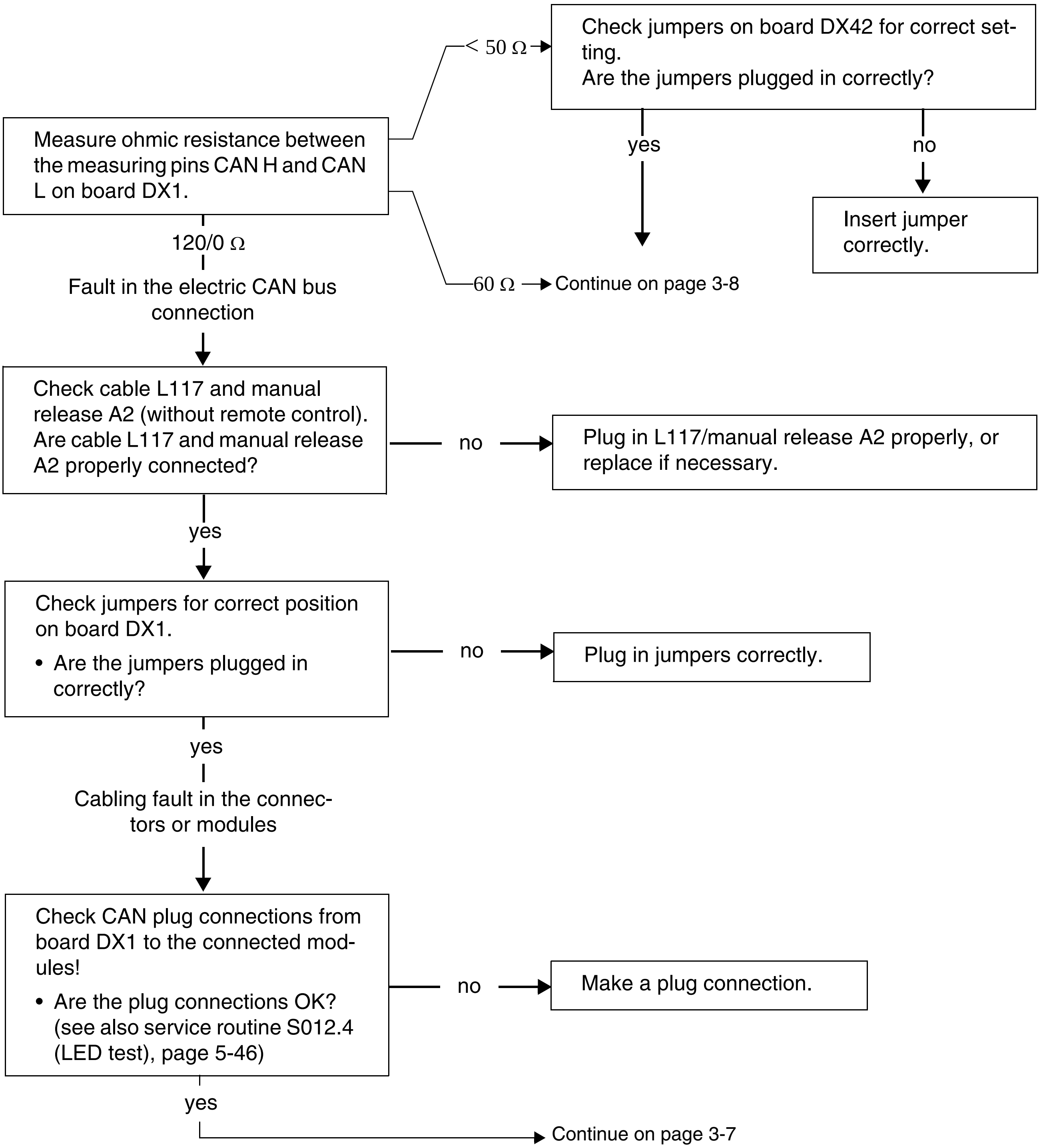
These entry data may also occur after "Recording stopped" or "Cancel" and indicate an exceptional circumstance. You can supply important information for error diagnosis in coordination with the dealer tech support.

Entry data [Error]	E6 07 06	:	Error code
	ERR_DX7_TTP_LOST	:	Cleartext display of error
Entry data [Error Sidexis]	SidErr: ERR_SOCKET_ERROR	:	Details on network error
	SockErr:	:	Details on network error
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)

3.4 Check the CAN bus

CAUTION

When unplugging CAN bus cables, it is essential that the voltage supply is applied at the module!



Measure ohmic resistance between the measuring pins CAN H and CAN L on board DX1.

Check jumpers on board DX42 for correct setting. Are the jumpers plugged in correctly?

Insert jumper correctly.

Fault in the electric CAN bus connection

Check cable L117 and manual release A2 (without remote control). Are cable L117 and manual release A2 properly connected?

Plug in L117/manual release A2 properly, or replace if necessary.

Check jumpers for correct position on board DX1.

- Are the jumpers plugged in correctly?

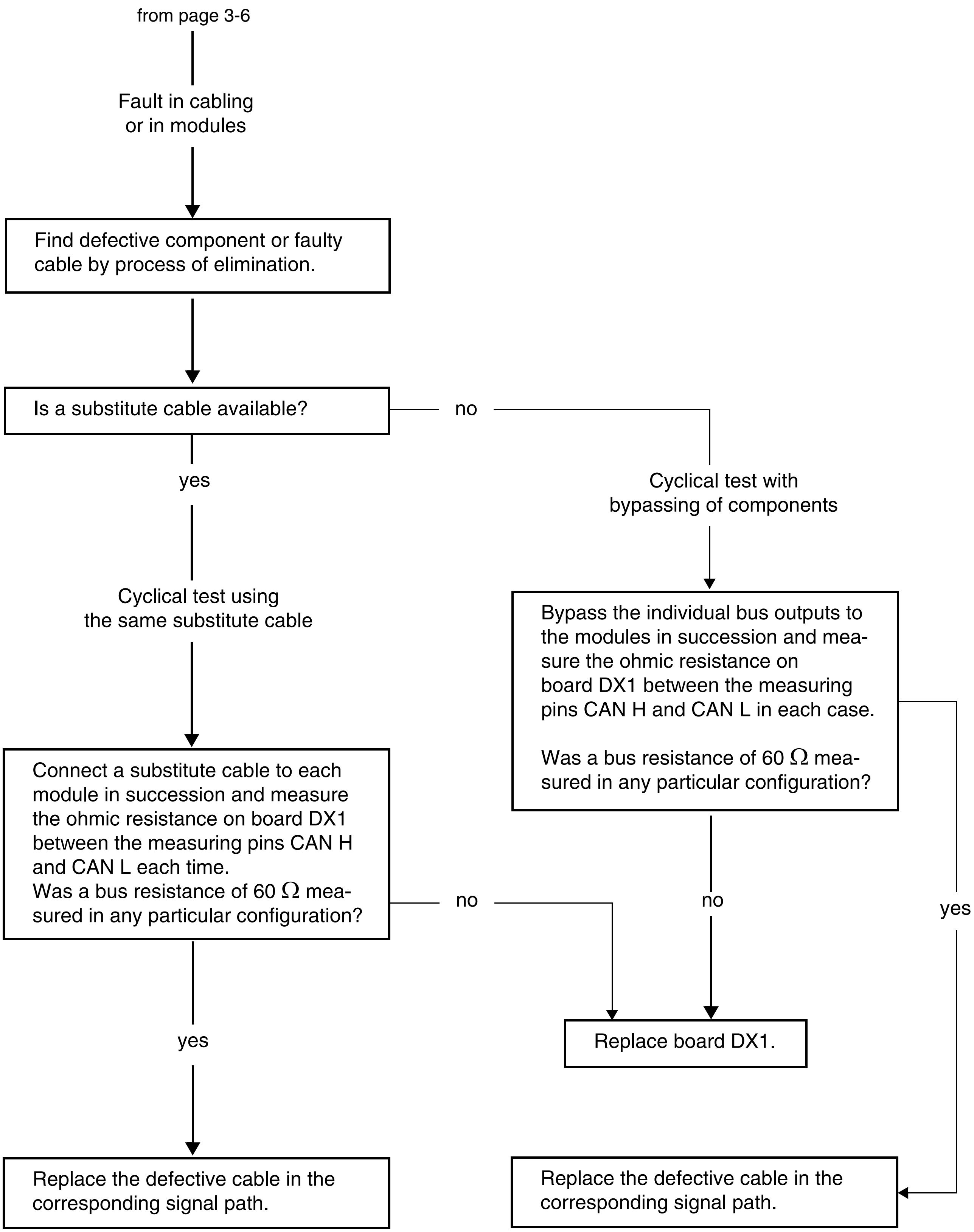
Plug in jumpers correctly.

Cabling fault in the connectors or modules

Check CAN plug connections from board DX1 to the connected modules!

- Are the plug connections OK? (see also service routine S012.4 (LED test), page 5-46)

Make a plug connection.



Fault in cabling
or in modules

Find defective component or faulty cable by process of elimination.

Is a substitute cable available?

Cyclical test using
the same substitute cable

Connect a substitute cable to each module in succession and measure the ohmic resistance on board DX1 between the measuring pins CAN H and CAN L each time.
Was a bus resistance of 60 Ω measured in any particular configuration?

Replace the defective cable in the corresponding signal path.

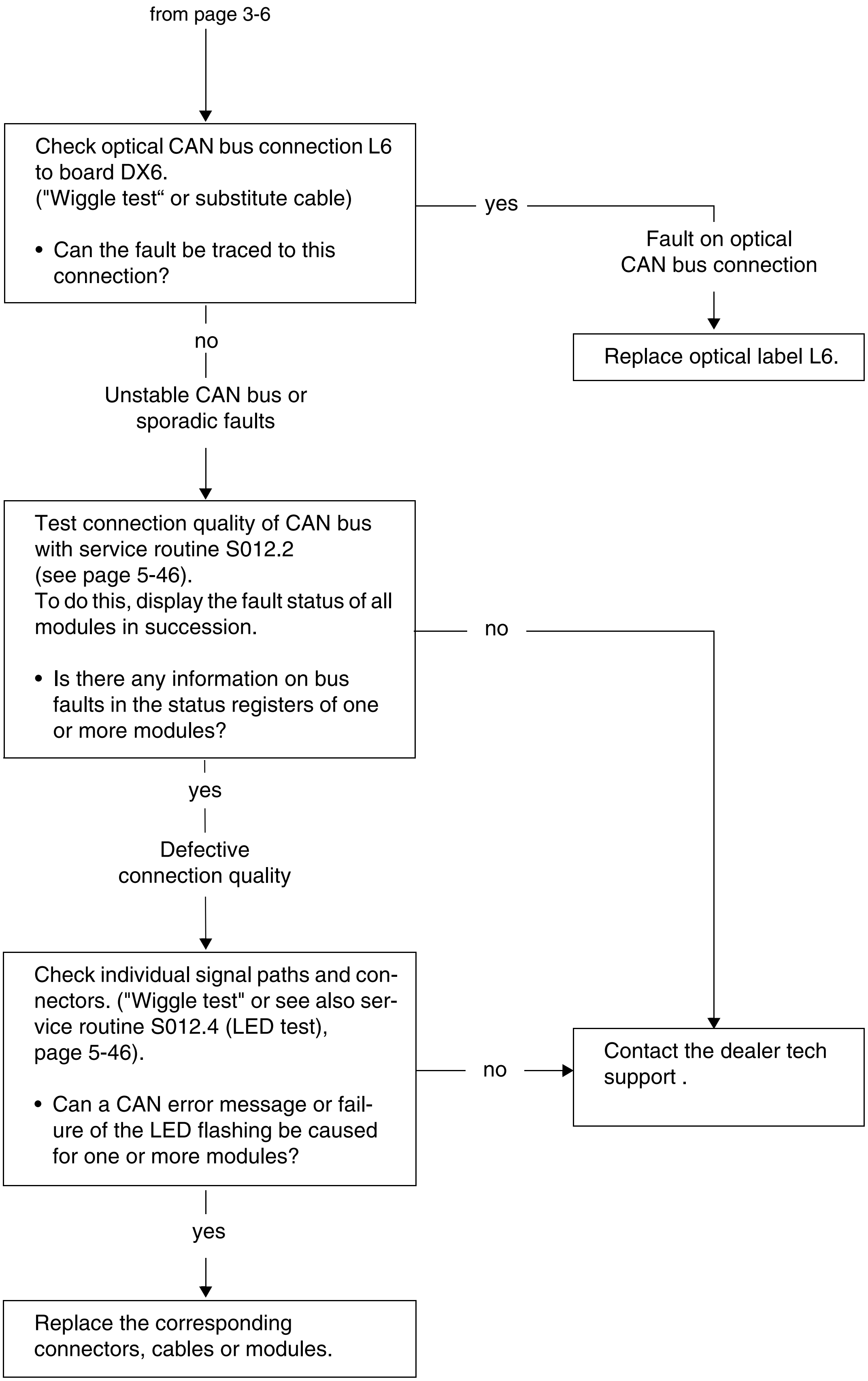
Cyclical test with
bypassing of components

Bypass the individual bus outputs to the modules in succession and measure the ohmic resistance on board DX1 between the measuring pins CAN H and CAN L in each case.

Was a bus resistance of 60 Ω measured in any particular configuration?

Replace board DX1.

Replace the defective cable in the corresponding signal path.



from page 3-6

Check optical CAN bus connection L6 to board DX6.
("Wiggle test“ or substitute cable)

- Can the fault be traced to this connection?

yes

Fault on optical
CAN bus connection

Replace optical label L6.

no

Unstable CAN bus or
sporadic faults

Test connection quality of CAN bus with service routine S012.2 (see page 5-46).
To do this, display the fault status of all modules in succession.

- Is there any information on bus faults in the status registers of one or more modules?

no

yes

Defective
connection quality

Check individual signal paths and connectors. ("Wiggle test" or see also service routine S012.4 (LED test), page 5-46).

- Can a CAN error message or failure of the LED flashing be caused for one or more modules?

no

Contact the dealer tech support .

yes

Replace the corresponding connectors, cables or modules.

3.3.1 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	Operating status of CAN bus	Error correction measures
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	● Check cabling ● Check CAN jumper (see section 3.3.2)
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	● Disconnect CAN cables successively (set jumper to inner position!) until the CAN bus functions again (V700 and V701 flash slowly) ● Replace defective module
Off	Fast flashing	CAN error, CAN bus TTP* disturbed by defective, constantly transmitting board (bus-heavy)	● Disconnect CAN cables successively (set jumper to inner position!) until the CAN bus functions again (V700 and V701 flash slowly) ● Replace defective module
Off	Off	System did not power up (DX11)	● Switch unit OFF and ON again and wait until end of power-up time

*) *TTP = Time Trigger Protocol*

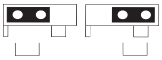
3.3.2 Jumper positions in the CAN bus

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 plugged into 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 not set to the inner position with 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.

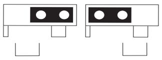
Socket,
e.g. X500



Jumper outside

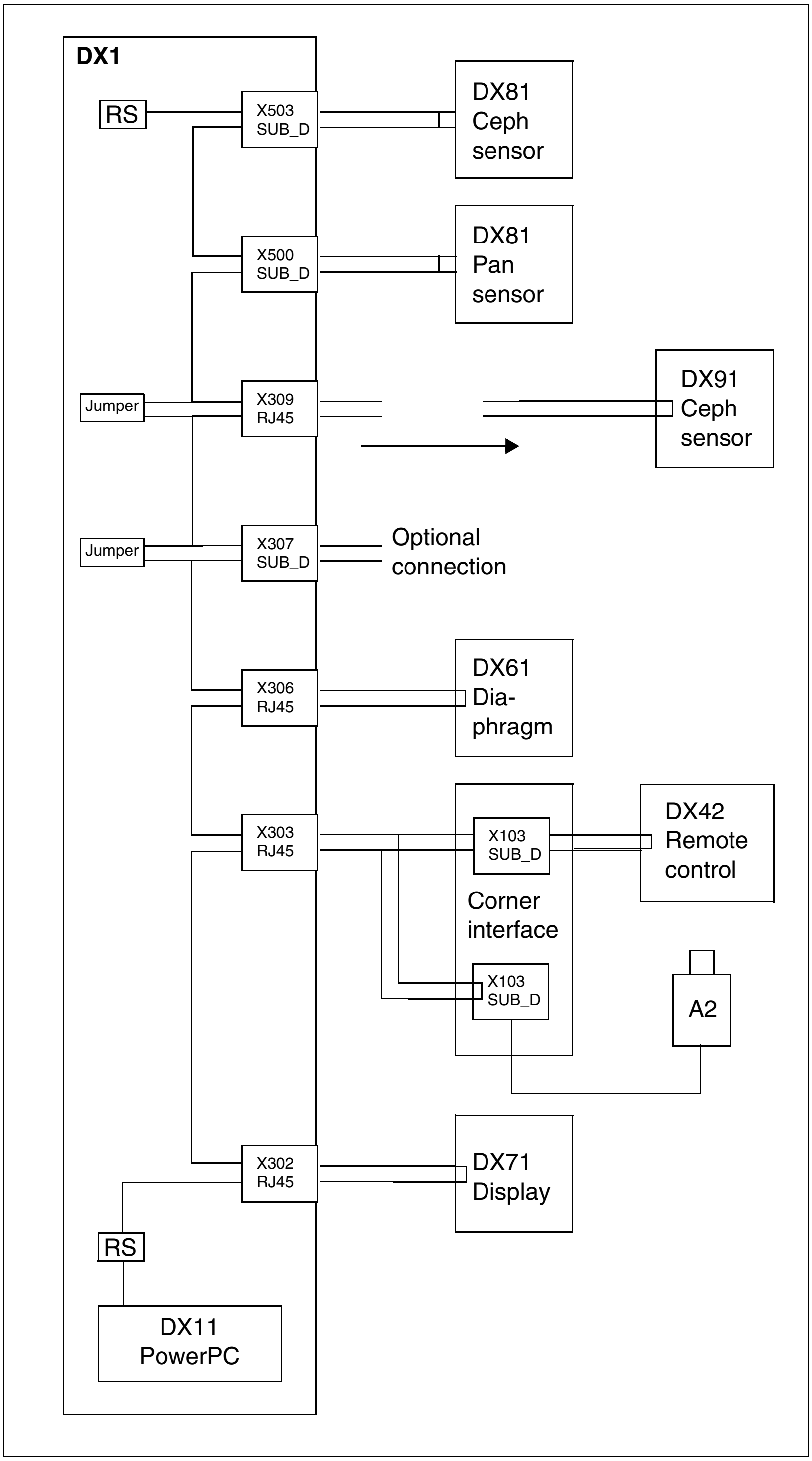
Module connected, i.e. connector plugged in

Socket,
e.g. X309

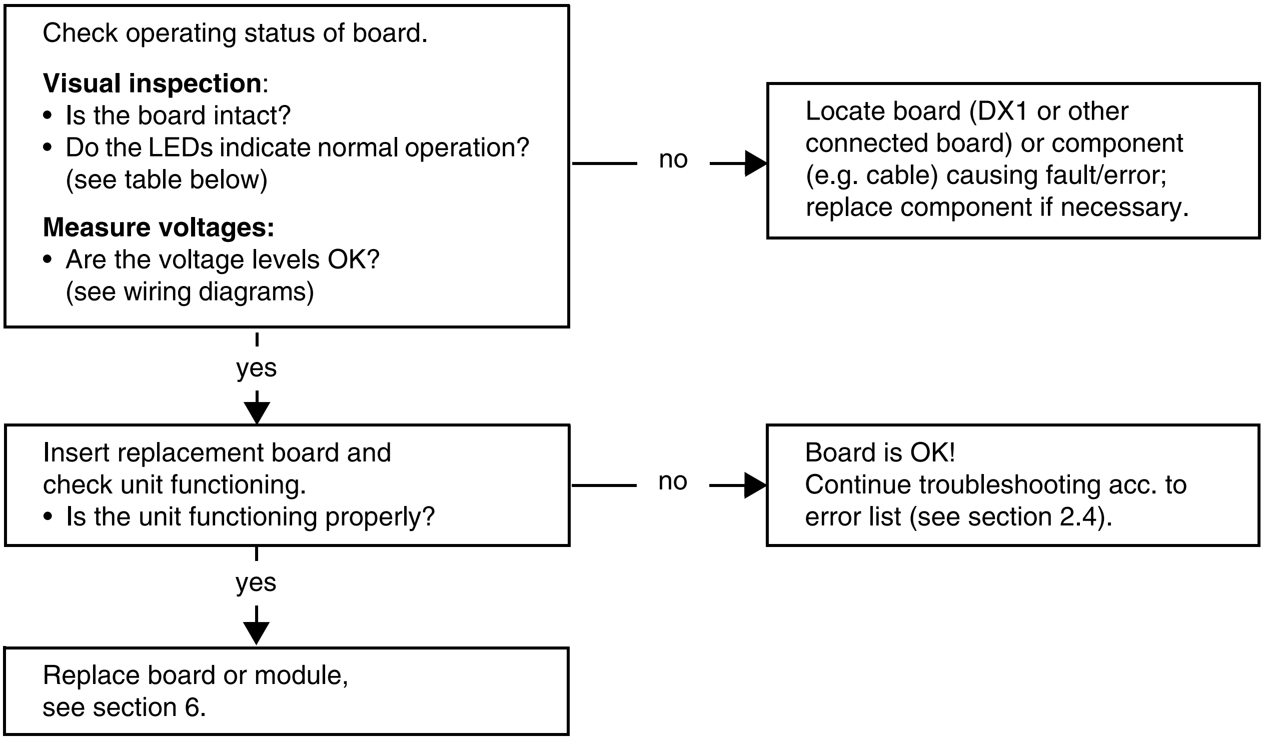


Jumper inside

Module not connected, i.e. connector not plugged in



3.4 Checking the boards



Check operating status of board.

Visual inspection:
- Is the board intact?
- Do the LEDs indicate normal operation? (see table below)

Measure voltages:
- Are the voltage levels OK? (see wiring diagrams)

Locate board (DX1 or other connected board) or component (e.g. cable) causing fault/error; replace component if necessary.

Insert replacement board and check unit functioning.
- Is the unit functioning properly?

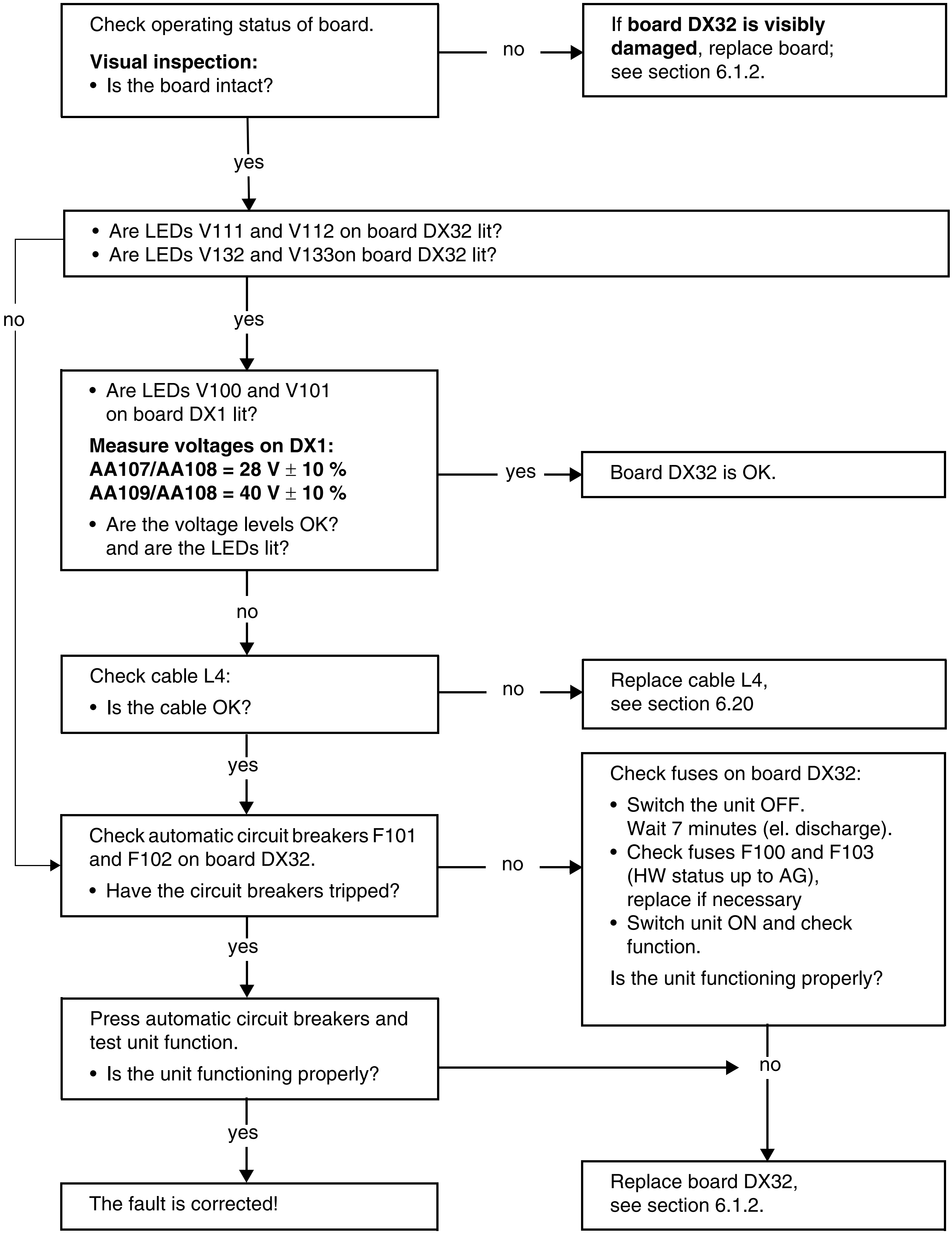
Board is OK!
Continue troubleshooting acc. to error list (see section 2.4).

Replace board or module, see section 6.

Important LEDs on the boards (see also wiring diagrams)

Board	LEDs	Normal operation	Malfunction	Bootloader
DX1	**V100**	**lit**	**not lit**	
	V101	**lit**	**not lit**	
	V109	**lit**	**not lit**	
	V110	**lit**	**not lit**	
	V610	**lit**	**not lit**	
DX6	**V1**	**flashing at 1 Hz**	**not lit**	**flashing at 2 Hz**
	V203	**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**	
DX71	**V101**	**lit**	**not lit**	
	V103	**lit**	**not lit**	
	V107	**flashing at 1 Hz**	**not lit**	**flashing at 2 Hz**
DX42	**V101**	**lit**	**not lit**	
	V103	**lit**	**not lit**	
DX91	**V101**	**flashing at 1 Hz**	**not lit**	**flashing at 2 Hz**
	V501	**lit**	**not lit**	

3.3.1 Checking board DX32



Check operating status of board.

Visual inspection:
- Is the board intact?

If **board DX32 is visibly damaged**, replace board; see section 6.1.2.

- Are LEDs V111 and V112 on board DX32 lit?
- Are LEDs V132 and V133on board DX32 lit?

- Are LEDs V100 and V101 on board DX1 lit?

Measure voltages on DX1:
AA107/AA108 = 28 V ± 10 %
AA109/AA108 = 40 V ± 10 %

- Are the voltage levels OK? and are the LEDs lit?

Board DX32 is OK.

Check cable L4:
- Is the cable OK?

Replace cable L4, see section 6.20

Check automatic circuit breakers F101 and F102 on board DX32.
- Have the circuit breakers tripped?

Check fuses on board DX32:
- Switch the unit OFF. Wait 7 minutes (el. discharge).
- Check fuses F100 and F103 (HW status up to AG), replace if necessary
- Switch unit ON and check function.

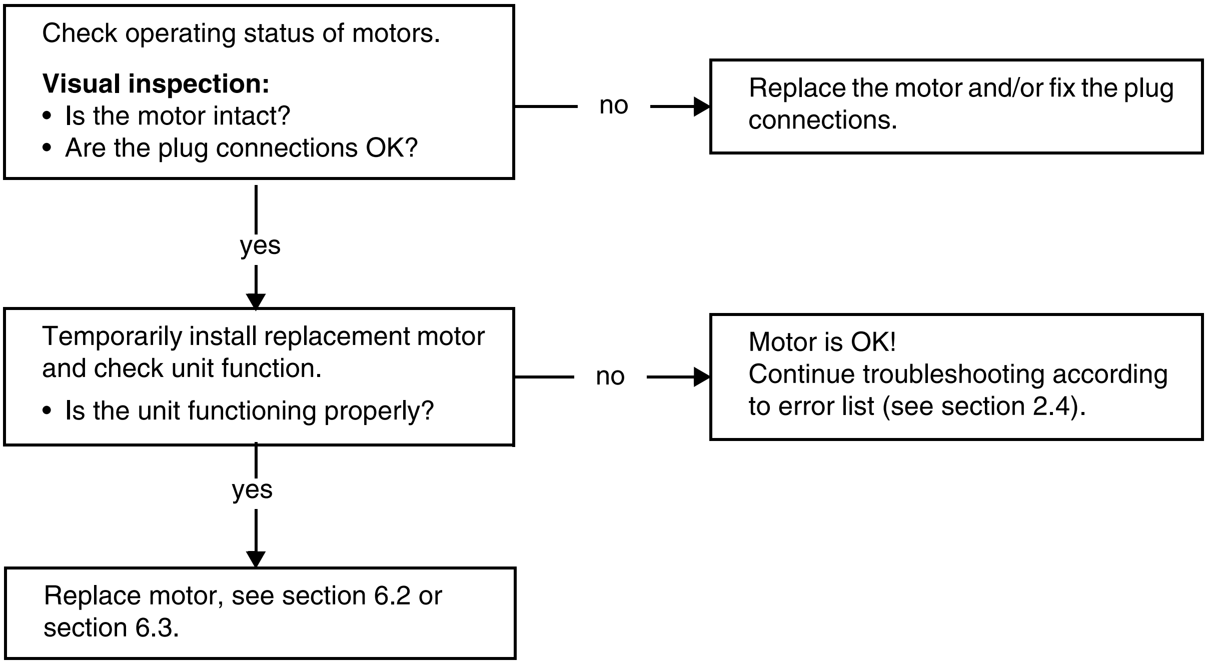
Is the unit functioning properly?

Press automatic circuit breakers and test unit function.
- Is the unit functioning properly?

The fault is corrected!

Replace board DX32, see section 6.1.2.

3.4 Checking the motors



Check operating status of motors.

Visual inspection:
- Is the motor intact?
- Are the plug connections OK?

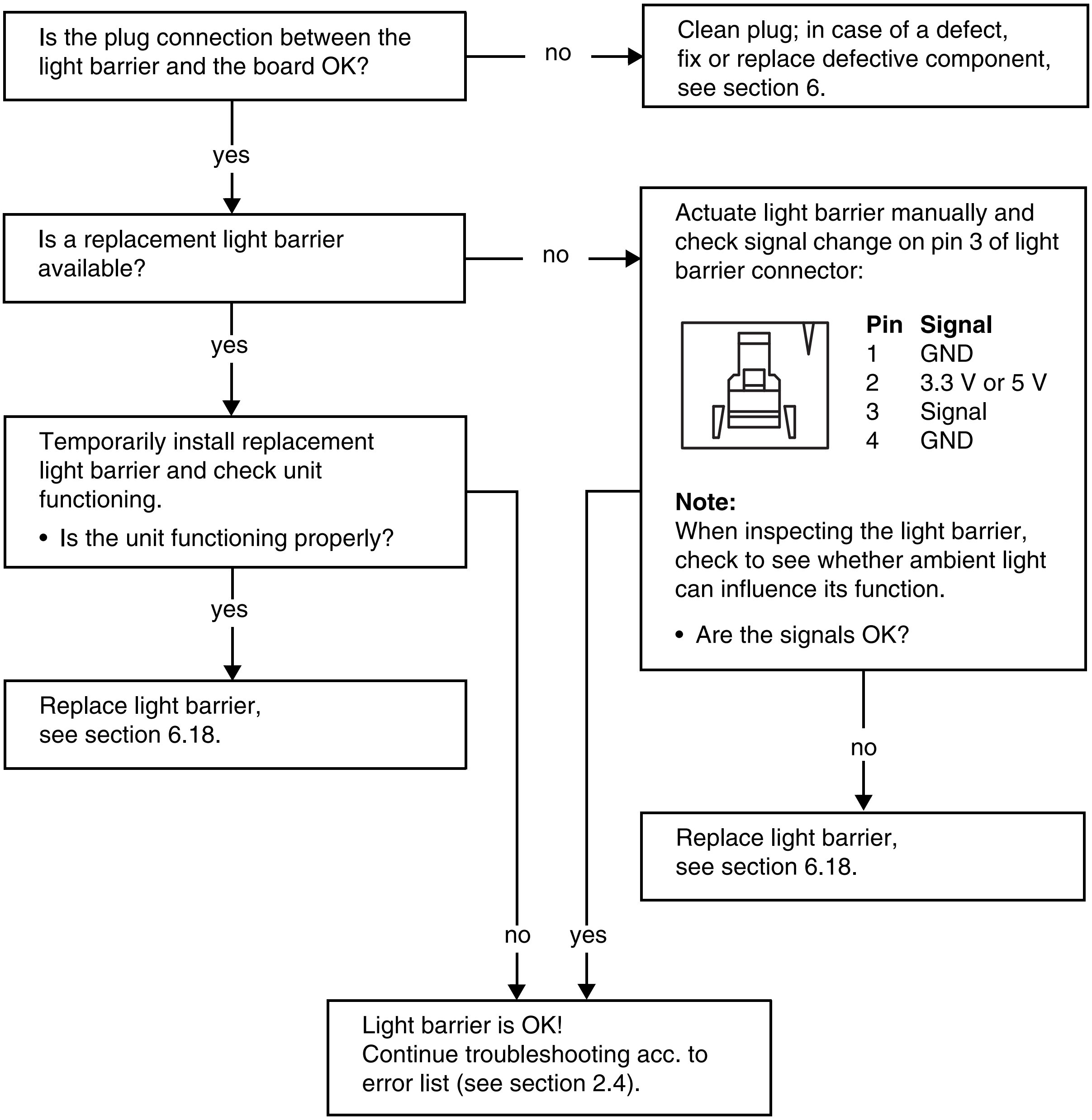
Replace the motor and/or fix the plug connections.

Temporarily install replacement motor and check unit function.
- Is the unit functioning properly?

Motor is OK!
Continue troubleshooting according to error list (see section 2.4).

Replace motor, see section 6.2 or section 6.3.

3.5 Checking the light barriers



Is the plug connection between the light barrier and the board OK?

Clean plug; in case of a defect, fix or replace defective component, see section 6.

Is a replacement light barrier available?

Actuate light barrier manually and check signal change on pin 3 of light barrier connector:

Pin	Signal
1	GND
2	3.3 V or 5 V
3	Signal
4	GND

Note:
When inspecting the light barrier, check to see whether ambient light can influence its function.

- Are the signals OK?

Temporarily install replacement light barrier and check unit functioning.

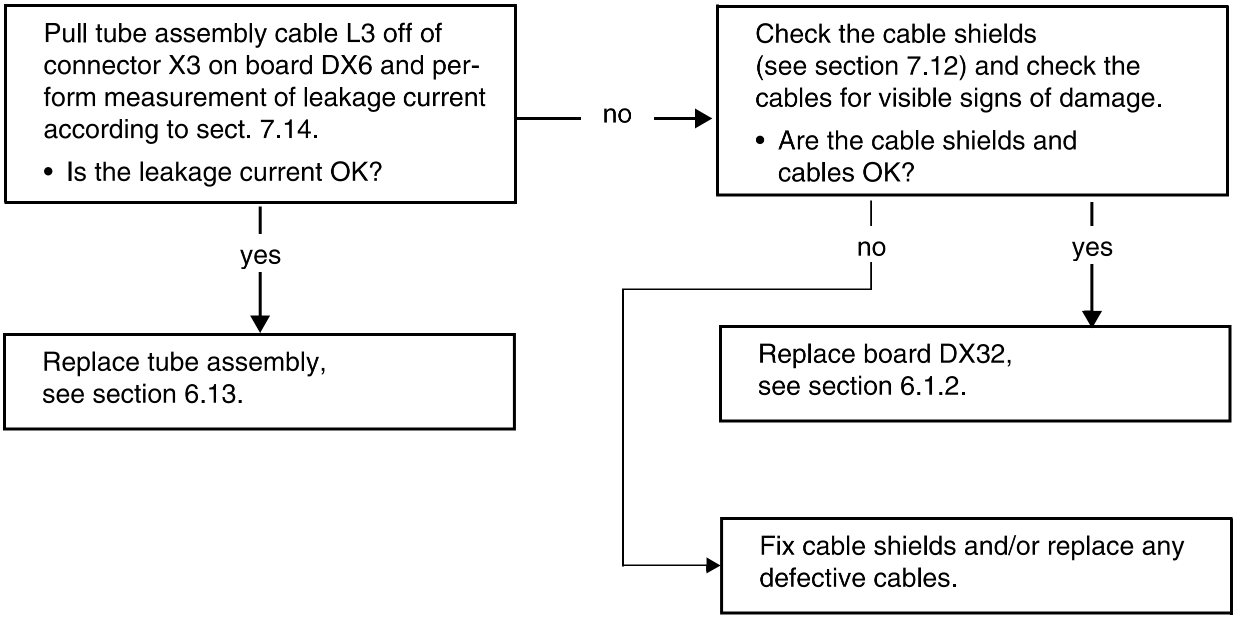
- Is the unit functioning properly?

Replace light barrier, see section 6.18.

Replace light barrier, see section 6.18.

Light barrier is OK!
Continue troubleshooting acc. to error list (see section 2.4).

3.6 Device leakage current too high


Pull tube assembly cable L3 off of connector X3 on board DX6 and perform measurement of leakage current according to sect. 7.14.
• Is the leakage current OK?
no
Check the cable shields (see section 7.12) and check the cables for visible signs of damage.
• Are the cable shields and cables OK?
yes
Replace tube assembly, see section 6.13.
no
yes
Replace board DX32, see section 6.1.2.
Fix cable shields and/or replace any defective cables.

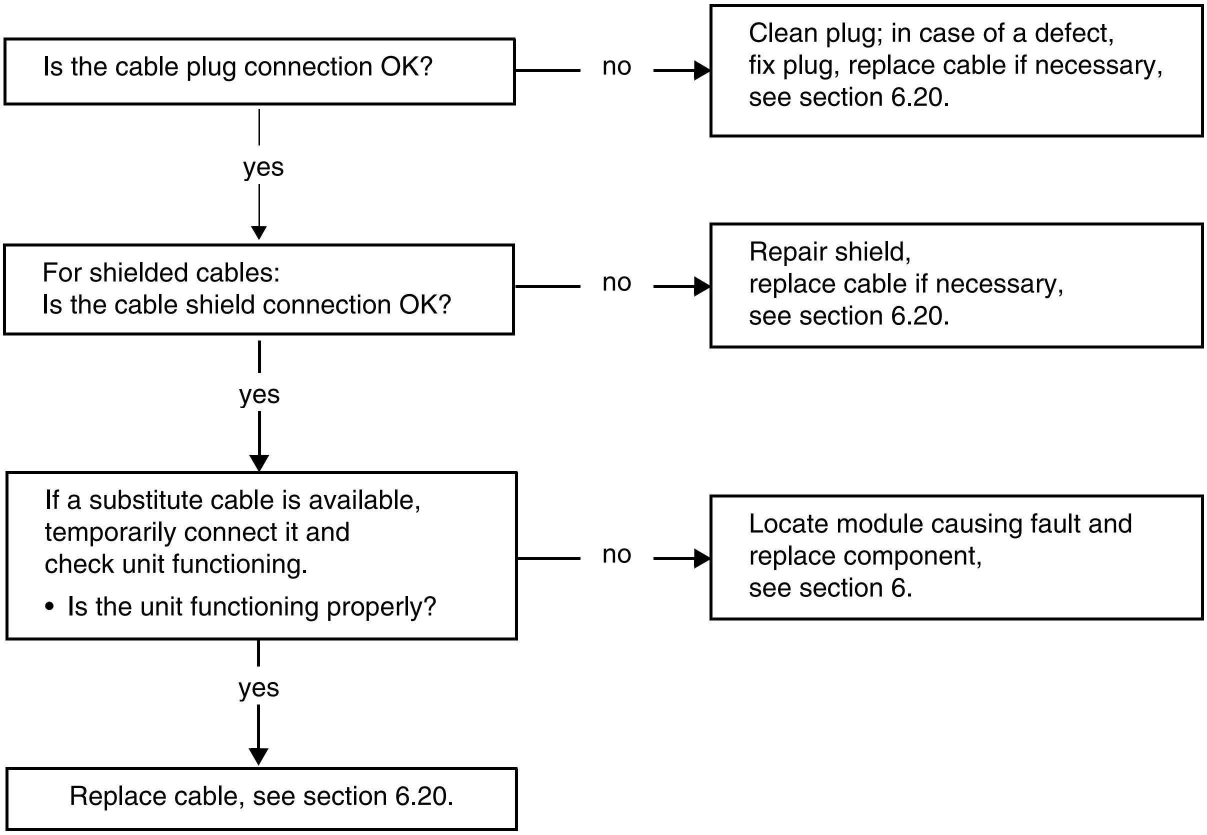
3.7 Checking the cables

NOTE

You can use a standard Cat5 cable as a test cable for L108, L10, L12, L40 and L37. Caution! This cable must not be permanently installed.

NOTE

Most cables have the same plug at both ends and are connected 1:1 (see also section "1.9 Cabling overview').


Is the cable plug connection OK?
no
Clean plug; in case of a defect, fix plug, replace cable if necessary, see section 6.20.
yes
For shielded cables: Is the cable shield connection OK?
no
Repair shield, replace cable if necessary, see section 6.20.
yes
If a substitute cable is available, temporarily connect it and check unit functioning.
• Is the unit functioning properly?
no
Locate module causing fault and replace component, see section 6.
yes
Replace cable, see section 6.20.

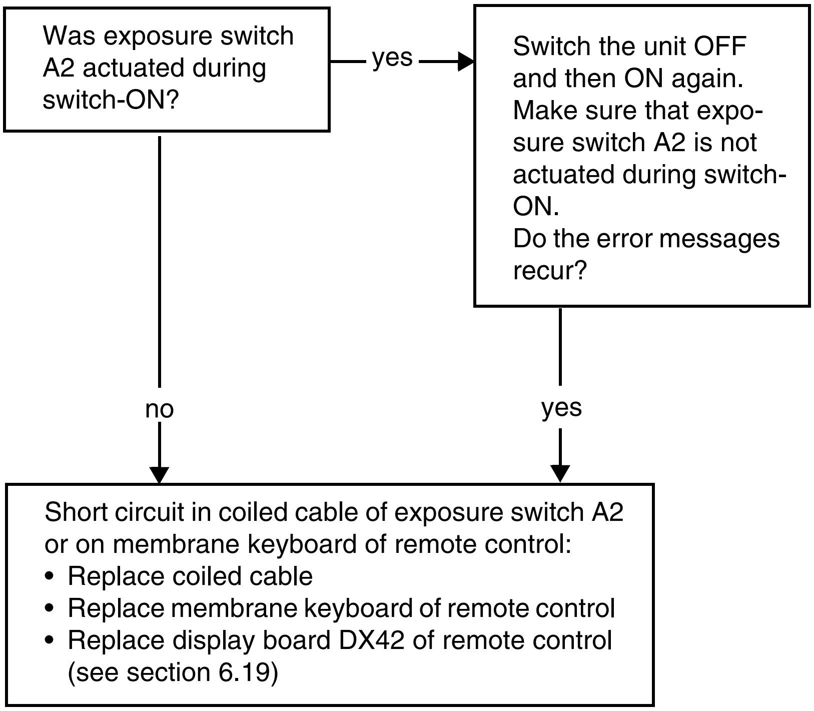
3.3.1 Error messages *with and without installed remote control*

Error code	Description	Actions required	see page
E3 **13** 40	Short circuit in signal path between exposure switch A2 and board DX11 during switch-ON.	● Replace cable L117 or L108 ● Replace board DX1 ● Replace board DX11	**6-68** **6-55**
E6 **13** 41	Release signal missing on board DX11 at start of exposure.	● Replace cable L117 or L108 ● Replace board DX1 ● Replace board DX11	**6-68** **6-55**
E3 **13** 42	Short circuit in signal path between exposure switch A2 and board DX11 during unit operation.	● Replace cable L117 or L108 ● Replace board DX1 ● Replace board DX11	**6-68** **6-55**

3.4 Error analysis of X-RAY control signal path

3.3.1 Error and help messages *with remote control installed*

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



Was exposure switch A2 actuated during switch-ON?

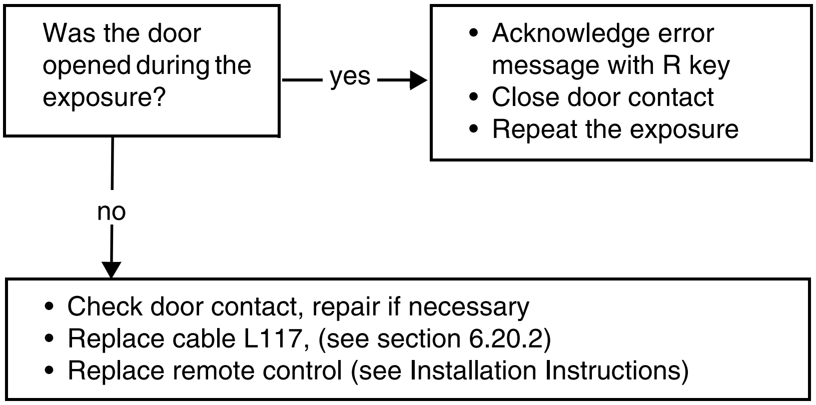
Switch the unit OFF and then ON again. Make sure that exposure switch A2 is not actuated during switch-ON. Do the error messages recur?

Short circuit in coiled cable of exposure switch A2 or on membrane keyboard of remote control:
- Replace coiled cable
- Replace membrane keyboard of remote control
- Replace display board DX42 of remote control (see section 6.19)

E3 42 31
occurs individually after the unit is switched ON.

Hardware fault on display board DX42 or short circuit in coiled cable of exposure switch A2 or on membrane keyboard of remote control:
- Replace exposure switch A2
- Replace remote control (see Installation Instructions)

E6 13 43
occurs individually during operation of unit.

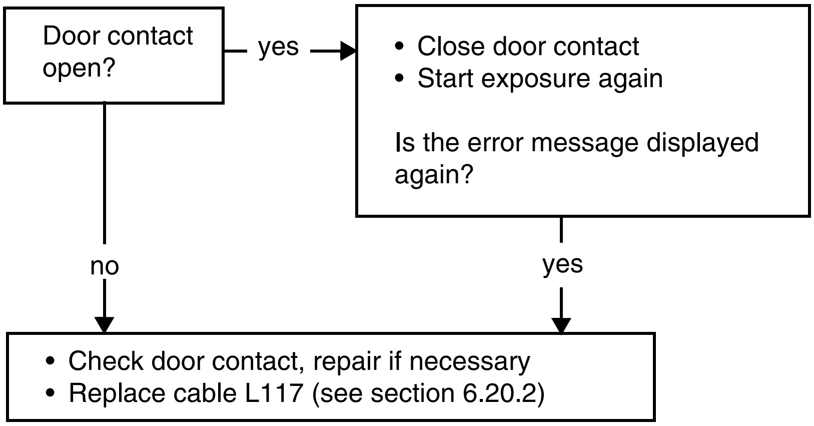


Was the door opened during the exposure?

- Acknowledge error message with R key
- Close door contact
- Repeat the exposure

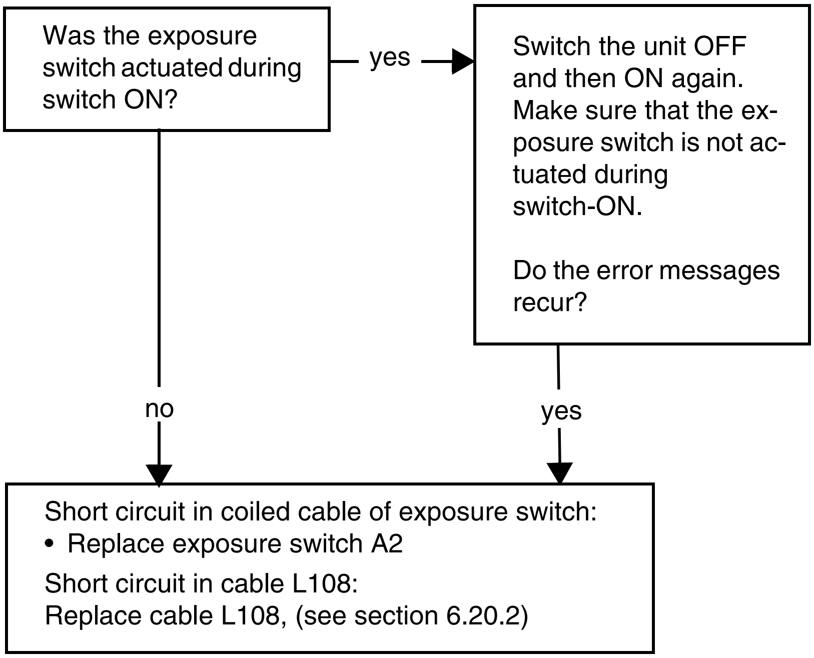
- Check door contact, repair if necessary
- Replace cable L117, (see section 6.20.2)
- Replace remote control (see Installation Instructions)

H321
is triggered at start of exposure.


Door contact open?
yes
• Close door contact
• Start exposure again
Is the error message displayed again?
no
yes
• Check door contact, repair if necessary
• Replace cable L117 (see section 6.20.2)

3.3.2 Error messages *without installed remote control*

E3 13 40
occurs individually after unit is switched ON.


Was the exposure switch actuated during switch ON?
yes
Switch the unit OFF and then ON again. Make sure that the exposure switch is not actuated during switch-ON.
Do the error messages recur?
no
yes
Short circuit in coiled cable of exposure switch:
• Replace exposure switch A2
Short circuit in cable L108:
Replace cable L108, (see section 6.20.2)

3.4 Check data paths/Generate test images

CAUTION

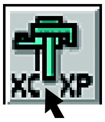
CDR Software must be installed and configured before you begin checking the data paths.

NOTE

For a panoramic test image, the panoramic mode must be activated on the unit; for a ceph test image, the cephalometric mode must be activated (see operating instructions). Generate the test images for the different operating modes in succession.

1. Launch the CDR PanElite Service program via the path:

   Program files\Schick Technologies\CDR PanElite\CDR PanElite Service Program.exe

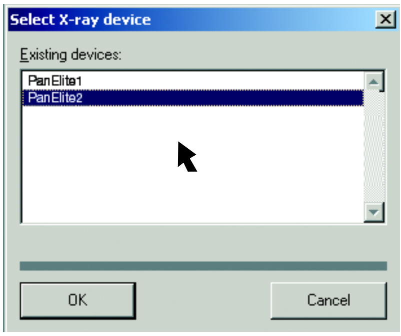


2. Starting the exposure mode:
   Click **XCXP**

   The dialog box for selecting the X-ray device opens.

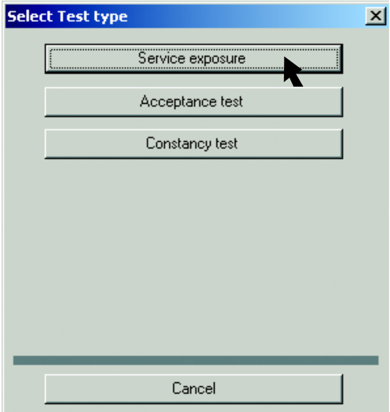
NOTE

If no X-ray device has been configured yet in the CDR PanElite Service program, the password input dialog box will appear instead of the dialog box for selecting the X-ray device.



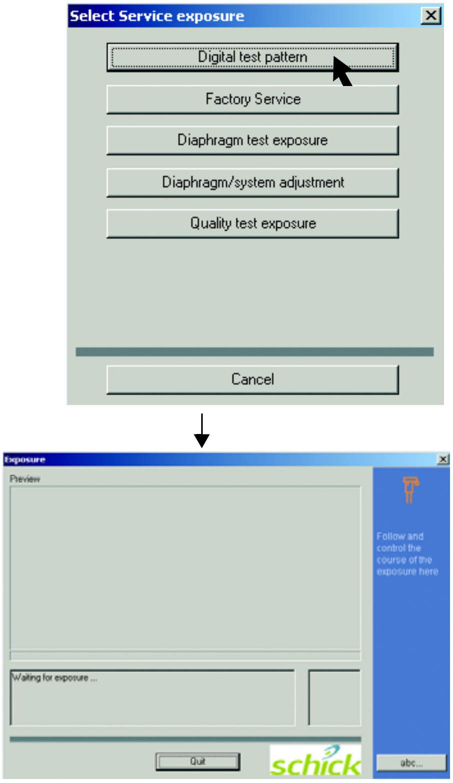
3. Select/confirm the X-ray device:
   Select e.g. **PANELITE2** and click **OK**

   The dialog box for selecting the test type appears on the screen.



4. Select/confirm the test type:
   Click **SERVICE EXPOSURE**

   The dialog box for selecting the service exposure appears on the screen.



Follow and control the course of the exposure here

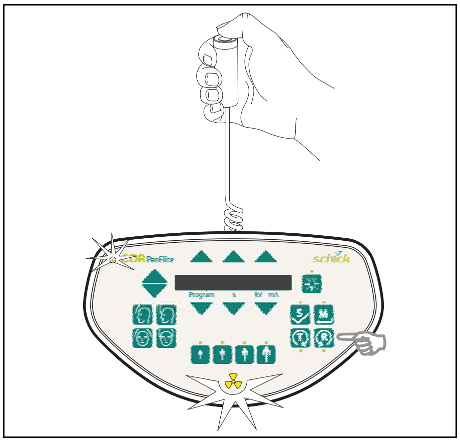
Waiting for exposure ...

5. Select/confirm the service exposure:
   Click **DIGITAL TEST PATTERN**
   - If several different X-ray components are available, a dialog box for selecting the X-ray component appears on the screen. In this case, select/confirm the required component.
   - If only one X-ray component is available, the exposure readiness dialog box appears on the screen and shows the status of the exposure.

NOTE

During operation in the service mode, the unit switches from the user mode to the PC service mode logged by the PC.

Once the exposure is completed, the unit switches back to the user mode.

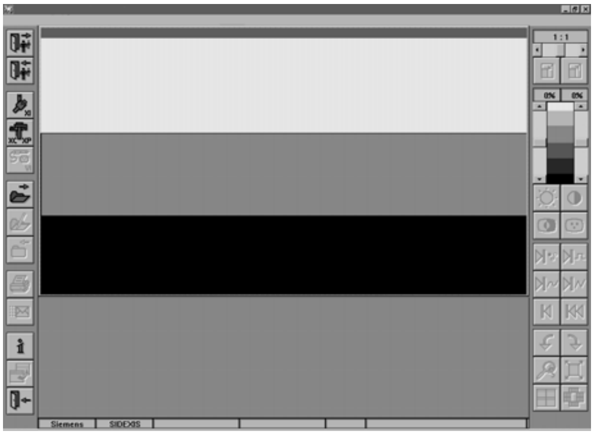


6. Take an exposure:
   - Press the **R key** on the Control Pad to move the unit back to its starting position.
   - Press and hold the exposure switch until the exposure has been completed.

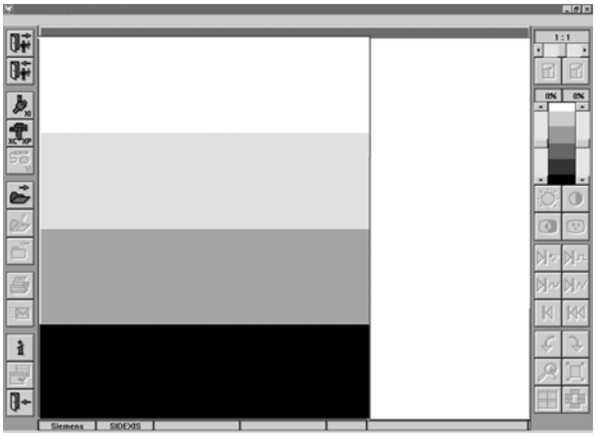
NOTE

*A service message box indicates whether the generated test image is correct. Acknowledge this message with **OK**. The test image is displayed on the screen.*

PAN test image



CEPH test image



7. Check the images according to the following criteria:
   - Tile structure of the existing segments

i NOTE

To facilitate checking, you may adjust the image contrast and brightness in CDR PanElite Service program.

   - Linear grayscale gradient
   - Intensity steps clearly recognizable
   - No image artifacts detectable

4 Adjustment

Contents

4

Adjustment

4.1 Important information concerning adjustment

⚠ ***WARNING***

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

⚠ ***CAUTION***

Prior to starting a service routine ensure that all system movement has ceased.

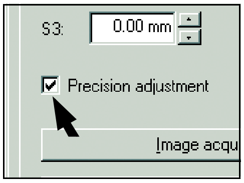
NOTE

“Radiation” is signaled acoustically and with the X-ray LED active.

NOTE

Be sure to take screenshots of the ***PAN - RESET ADJUSTMENT*** *and* ***CEPH - RESET ADJUSTMENT*** *menus before and after the adjustment (see section 4.5) and save them along with the time and date!*

Coarse and precision adjustment using the Diaphragm/system adjustment menu in the CDR PanElite Service Program



S3: 0.00 mm

☑ Precision adjustment

NOTE

The Pan - Sensor adjustment, Pan - Diaphragm and Ceph - Fixed point of rotation submenus provide a coarse adjustment and a precision adjustment (precision adjustment is preset).
Use precision adjustment first when adjusting the unit. In most cases, coarse adjustment is not necessary.

A message window indicates whether a coarse adjustment is required on completion of the precision exposure.

If you cannot achieve your goal with precision adjustment, e.g. if the exposed area is completely outside the image field, should you perform a coarse and then a precision adjustment.

If a coarse adjustment proves necessary, deactivate the ***PRECISION ADJUSTMENT*** *check box and follow the adjustment steps described in the present chapter to perform a coarse adjustment.*

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

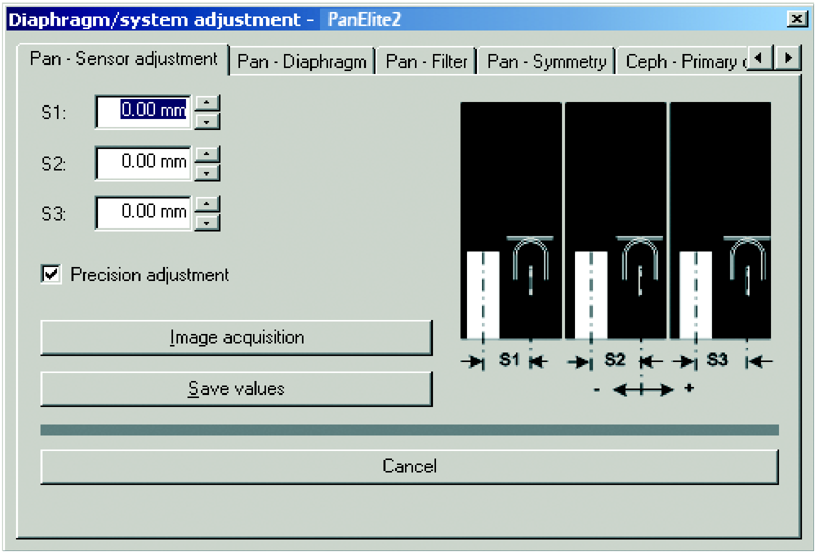
Default values in the Diaphragm/system adjustment menu in the CDR PanElite Service Program

During the adjustment, the default adjustment values are displayed in the text boxes of the Diaphragm/system adjustment menu.

First perform the adjustment with these default values. If you do not attain the desired result via this automatic adjustment, you should determine the adjustment values manually by measuring the exposure with the the CDR PanElite Service Program the measuring tool and then overwrite the default values in the menu.

This procedure is described in the following sections.

4.2 Diaphragm/system adjustment menu



Diaphragm/system adjustment - PanElite2

S1: 0.00 mm

S2: 0.00 mm

S3: 0.00 mm

☑ Precision adjustment

Menu: Diaphragm/system adjustment

The **DIAPHRAGM/SYSTEM ADJUSTMENT** menu guides you through the adjustment of the panoramic unit and the cephalometer. This service routine is started from the CDR PanElite Service Program.

- Launch the CDR PanElite Service Program via the path:

  Program files/Schick Technologies/CDR PanElite/CDR PanElite Service/ CDR PanElite Service.exe

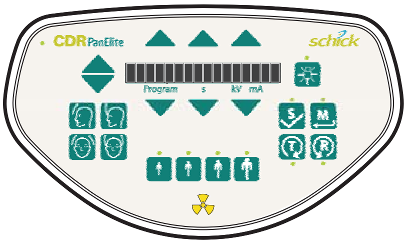
- Open the **DIAPHRAGM/SYSTEM ADJUSTMENT** menu:

  XCXP ‡ SELECT X-RAY DEVICE ‡ SERVICE EXPOSURE ‡ DIAPHRAGM/ SYSTEM ADJUSTMENT

NOTE

*The **DIAPHRAGM/SYSTEM ADJUSTMENT** menu is password-protected. As password, enter the first four digits of the current system date (PC) in reverse order.*

*Example: On 05/30/2004, the service password is **5003***



NOTE

*When you open the **DIAPHRAGM/SYSTEM ADJUSTMENT** menu, the unit switches from the user mode to the PC service mode controlled by the PC.*

*This mode is indicated by the **SERVICE** reading on the Control Pad.*
In the PC service mode, the Control Pad control options are determined by the CDR PanElite Service Program and the currently selected service routine. General control of the unit by means of the Control Pad (as in the user mode) is not possible in this mode.

The **DIAPHRAGM/SYSTEM ADJUSTMENT** menu has 10 submenus:

- Pan - Sensor adjustment
- Pan - Diaphragm
- Pan - Filter
- Pan - Symmetry
- Ceph - Primary diaphragm
- Ceph - Fixed point of rotation
- Ceph - Main X-ray beam direction
- Pan - Reset adjustment
- Ceph - Reset adjustment
- Service Sheet (for internal use only)

You can change between the individual submenus by clicking the **menu tabs** with the mouse. To quit the **DIAPHRAGM/SYSTEM ADJUSTMENT** menu, click **CANCEL**.

The following submenus are required for pan adjustment:

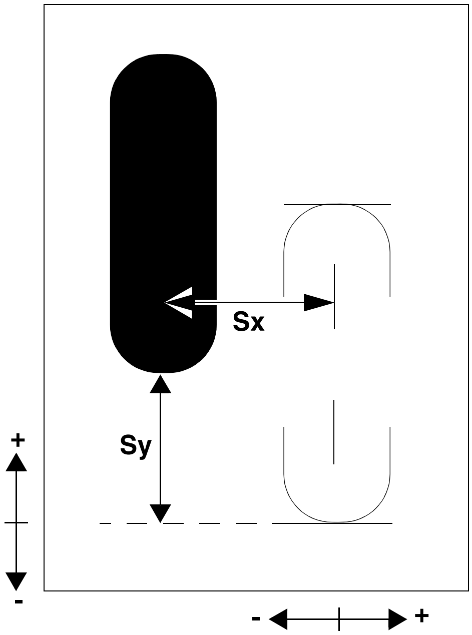
- Pan - Sensor adjustment: see page 4-10
- Pan - Diaphragm: see page 4-20
- Pan - Filter: see page 4-29
- Pan - Symmetry: see page 4-36

For the ceph adjustment you require the following submenu:

- Ceph - Primary diaphragm (see page 4-46)
- Ceph - Fixed point of rotation (see page 4-55)
- Ceph - Main X-ray beam direction (see page 4-67)

Direction of displacement of the exposed image area/
Information on the pictographs in the system adjustment menu

The Pan - Sensor adjustment, Pan - Filter and Pan - Symmetry submenus each contain a pictographic representation of the expected adjustment image to help you perform the adjustment. The shifting directions indicated by the plus and minus signs located below and next to the pictograph refer to shifting of the exposed image area in the direction of the stationary auxiliary lines (see the following example):



In the example the exposed image area is offset to the left by the value **Sx** and upward by the value **Sy**. In order to shift the image area 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 of the submenu.

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**

Displays during the adjustment procedure

During the adjustment procedure, different service routines are started from the CDR PanElite Service Program; they are displayed one after the other on the the Control Pad display.

In addition to the relevant parameters of the Control Pad shows different help messages (see section 2.1).

Help messages during the adjustment procedure

The most frequent help displays during adjustment are the following:

H301: Move panoramic unit into starting position ‡ Press the **R key** Ⓡ

H401: Plug the sensor into the PAN slot

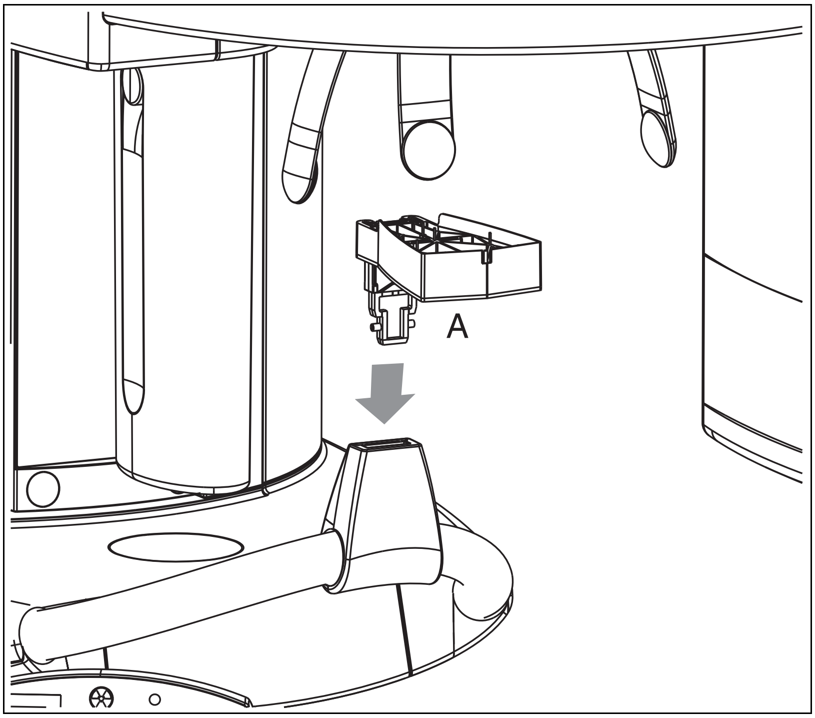
H402: Plug the sensor into the CEPH slot

H406: Move cephalometer into starting position ‡ Press the **R key** Ⓡ

NOTE
If any other help or error messages are displayed during adjustment, please follow the instructions provided in chapter 2.

4.3 Adjusting the panoramic X-ray unit

4.3.1 Pan needle phantom



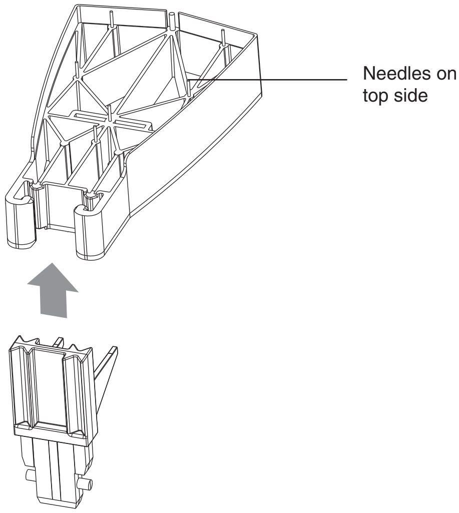
Pan needle phantom

In order to perform the **pan sensor adjustment** and the **symmetry adjustment** you must insert the needle phantom **(A)** in the bite block holder of the panoramic X-ray unit.

The needle phantom must be removed from the bite block holder for the **PAN diaphragm**.

⚠ ***CAUTION***

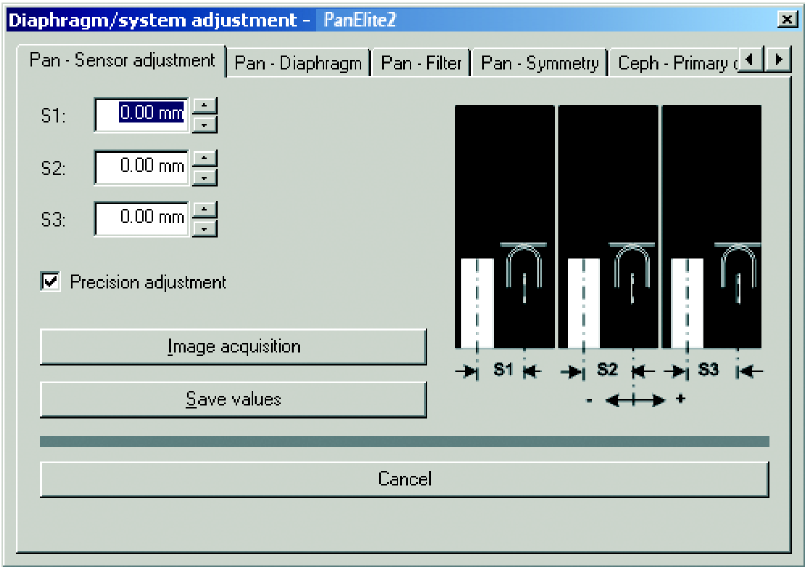
It is essential that the needle phantom be removed from the bite block holder of the panoramic X-ray unit again before a Ceph exposure is taken; otherwise the phantom may collide with the sensor.



i ***NOTE***

*When fitting the needle phantom, make sure that it is **correctly oriented**. For the adjustment of the X-ray unit, the phantom must be fitted in such a way that the **needles point upward**.*

4.3.2 Adjusting the pan sensor



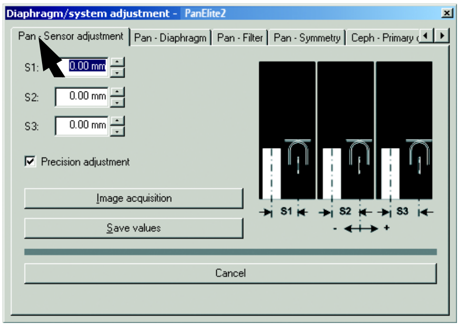
S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm
☑ Precision adjustment

Menu: Diaphragm/system adjustment ‡ Pan - Sensor adjustment

Preparations

- Plug the sensor into the sensor slot on the panoramic X-ray unit.
- Insert the needle phantom in the bite block holder of the panoramic X-ray unit (see page 4-9).

Opening PAN - SENSOR ADJUSTMENT



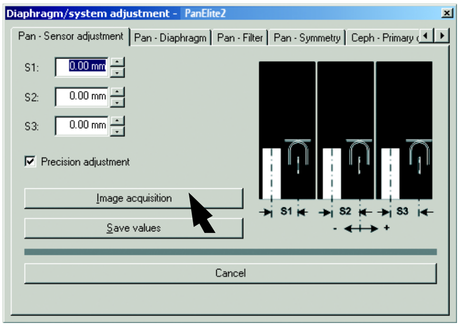
S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm
☑ Precision adjustment

1. Open the **PAN - SENSOR ADJUSTMENT** submenu (see section 4.2).

NOTE

The menu provides a precision adjustment and a coarse adjustment (precision adjustment is preset). Perform a precision adjustment first. In most cases, previous coarse adjustment is not necessary.

Making the unit ready for exposure:

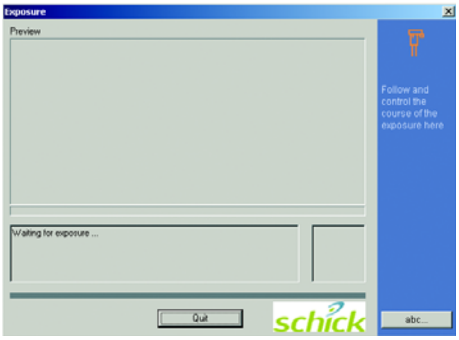


S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm
☑ Precision adjustment

2. Make the CDR PanElite Service Program ready for exposure:

   Click **IMAGE ACQUISITION**

CDR PanElite Service Program

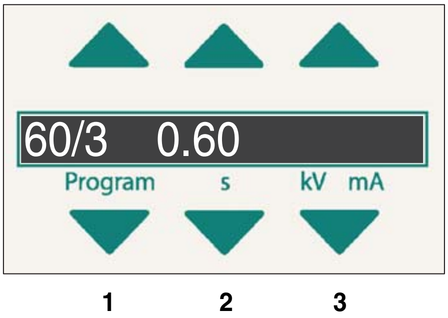


Follow and control the course of the exposure here

Waiting for exposure ...

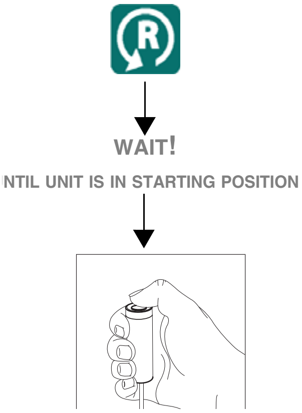
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



3. Take an exposure (60kV/3mA; 0.60 s):

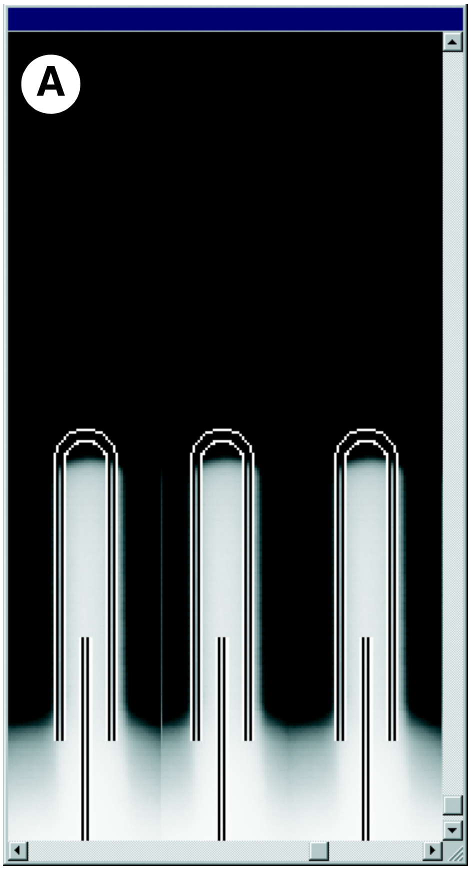
– Press the **R key** to move the unit back to the starting position.

The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

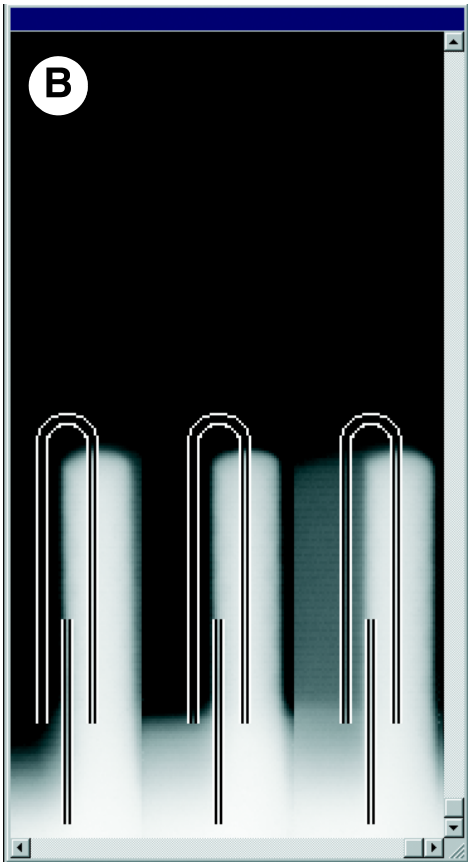
– Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok



Adjustment: not ok

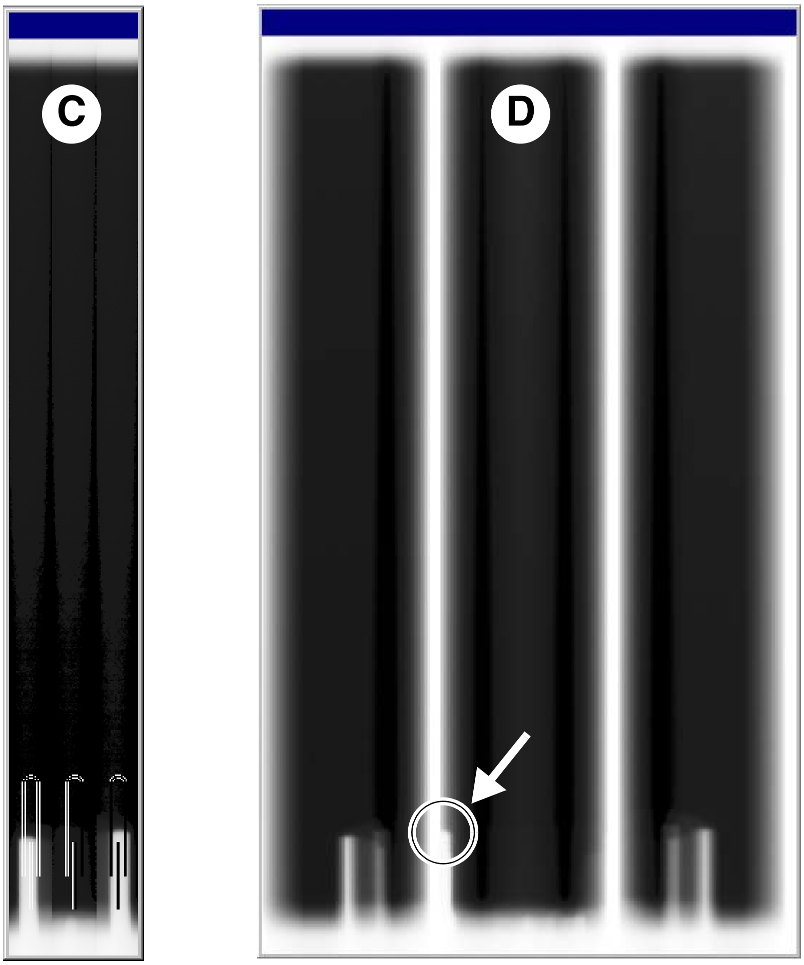
– **The three needle images must lie in the center of the exposed areas and inside the auxiliary lines (A).**

NOTE

If these criteria are not fulfilled ***(B)****, the pan sensor must be adjusted.*

Coarse or precision 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 field **C** in an image acquired with the **PRECISION ADJUSTMENT** presetting, is it necessary to perform a coarse adjustment prior to precision adjustment **D**. To do this, deactivate the **PRECISION ADJUSTMENT** check box (see page 4-3) and then perform a coarse adjustment proceeding in the same way as for precision adjustment. The only difference between coarse and precision adjustment is the size of the image area considered. Furthermore, there are fewer auxiliary lines in the coarse adjustment mode.



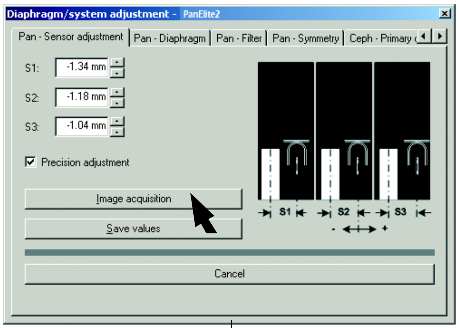
X-ray image with unadjusted pan sensor:
Alternatively with precision adjustment setting (C) and coarse adjustment setting (D)

On the X-ray image with coarse adjustment (D), the center pin is just barely visible on the left margin of the image field in the middle. Even in this extreme case, an adjustment would still be possible.

i ***NOTE***

A message window indicates whether a coarse adjustment is required on completion of the precision exposure.

Making the unit ready for exposure

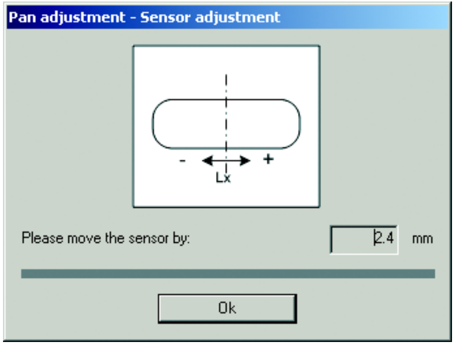

Diaphragm/system adjustment - PanElite2

S1: -1.34 mm

S2: -1.18 mm

S3: -1.04 mm

☑ Precision adjustment


Pan adjustment - Sensor adjustment

Please move the sensor by: 2.4 mm

NOTE

The default values for S1, S2 and S3 were automatically determined by the CDR PanElite Service Program based on the exposure and entered in the text boxes of the menu.

For manual adjustment, the values displayed at this position in the text boxes of the menu can be overwritten (see page 4-19).

First continue with the automatic adjustment. Manual determination of the adjustment values is required only if you fail to reach your goal via automatic adjustment (see page 4-18).

5. Make the CDR PanElite Service Program ready for exposure:

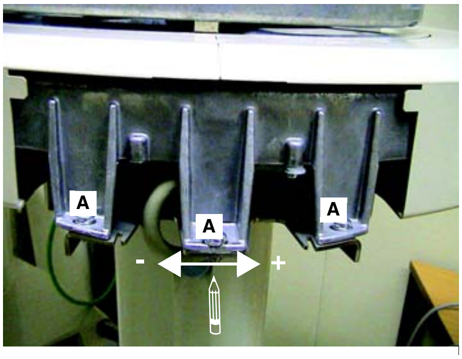
Click **IMAGE ACQUISITION**

The **PAN - SENSOR ADJUSTMENT** dialog box appears in the CDR PanElite Service Program.

The dialog box suggests a value **Lx** for the mechanical adjustment of the sensor.

If the suggested value is greater than ±0.5 mm, then perform a mechanical adjustment of the sensor.

Moving the sensor



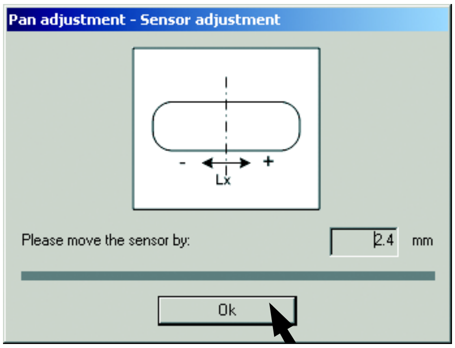
6. Adjust the sensor:

NOTE

Positive sign *= moves the sensor to the right*
Negative sign *= moves the sensor to the left*

- Mark the position of the sensor.
- Loosen the three screws **A** (approx. 2 turns, do not unscrew fully)
- Move the sensor to the left or right by the displayed value **Lx**.
- Tighten screws **A** again.

Making the unit ready for exposure

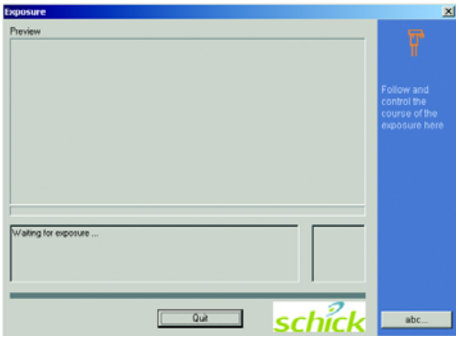

Pan adjustment - Sensor adjustment

Please move the sensor by: 2.4 mm

7. Confirm the sensor adjustment and make the CDR PanElite Service Program ready for exposure:

Click **OK**

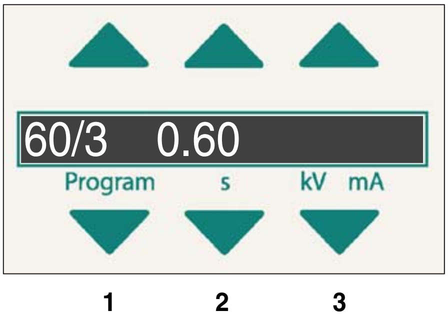
CDR PanElite Service Program



Waiting for exposure ...

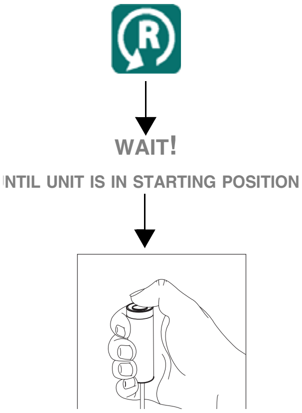
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



8. Take an exposure (60kV/3mA; 0.60 s):

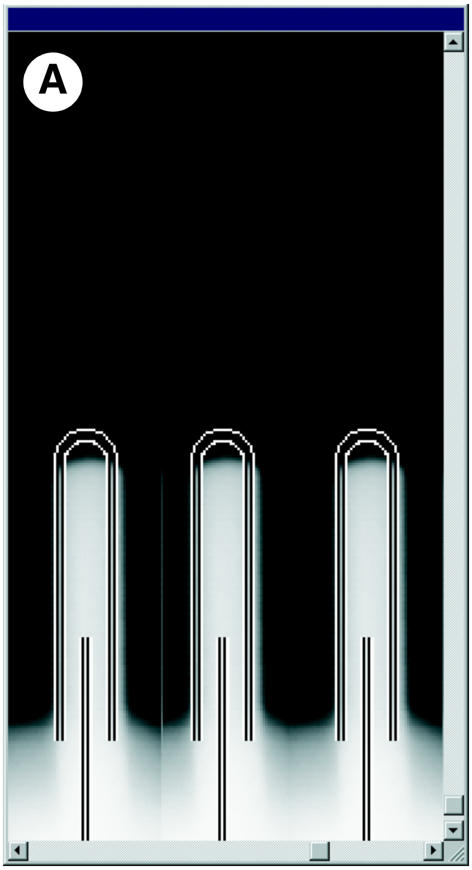
– Press the **R key** to move the unit back to the starting position.

The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

– Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

9. Evaluate the X-ray image:



Adjustment: ok

- **The three needle images must lie in the center of the exposed areas and inside the auxiliary lines (A).**

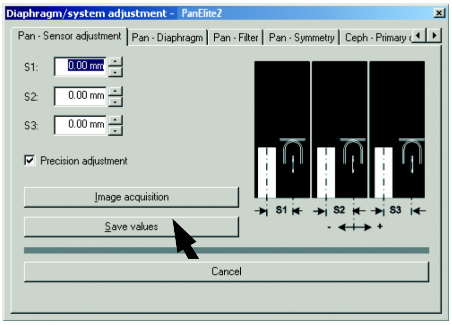
NOTE

If these criteria are not yet fulfilled, repeat the adjustment procedure starting with step 5.

NOTE

If you do not reach your goal via automatic adjustment, repeat the adjustment procedure with manually determined adjustment values (see page 4-18).

Saving the values


Diaphragm/system adjustment - PanElite2

S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm

☑ Precision adjustment

10. If the image is identical to the ideal image **(A)**, save the values:

Click **SAVE VALUES**

NOTE

*The values for **S1 - S3** in the **PAN - SENSOR ADJUSTMENT** submenu are **setequal to zero** with a correct adjustment, i.e. if they are within the permissible tolerance.*

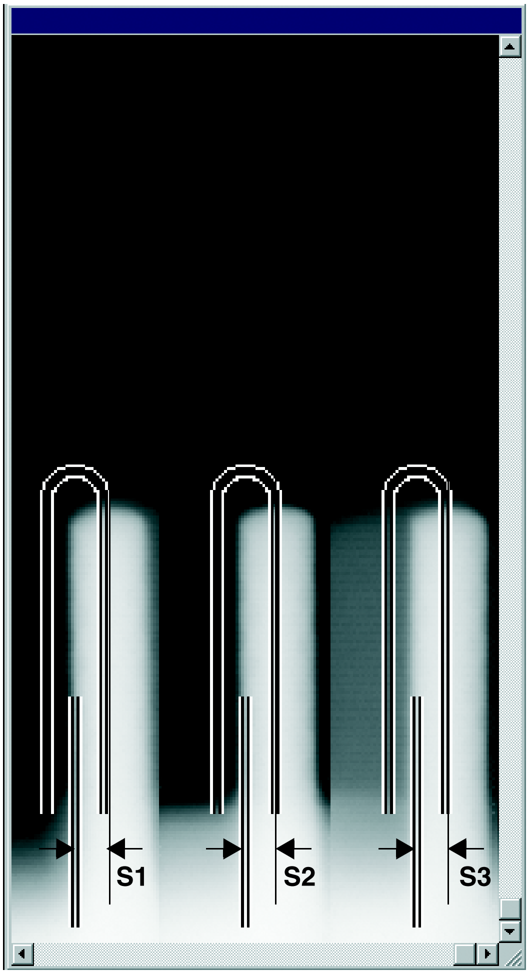
- Remove the needle phantom from the bite block holder of the unit.
- Go on to the next adjustment step.

Manual adjustment of the PAN sensor

The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment values automatically determined by CDR PanElite Service Program are overwritten by manually determined adjustment values in the **PAN - SENSOR ADJUSTMENT** submenu.

Determining the adjustment values for S1, S2 and S3 manually

- Measure distances **S1**, **S2** and **S3** with the CDR PanElite Service Program measuring tool.

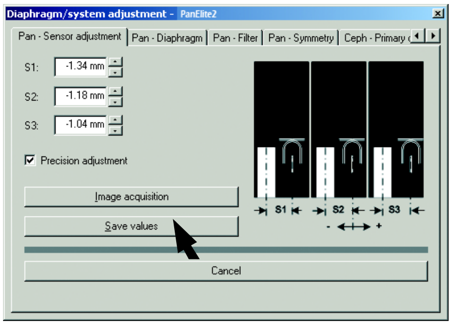


NOTE

To measure S1, S2 and S3, estimate the horizontal center position of the displayed needles. Measure in the lower area of the needles if possible, since they may have been bent slightly after repeated use.

Tip: *To facilitate the measuring procedure, you can color the image in the CDR PanElite Service Program .*

Overwriting default values for S1, S2 and S3



S1: -1.34 mm
S2: -1.18 mm
S3: -1.04 mm
☑ Precision adjustment

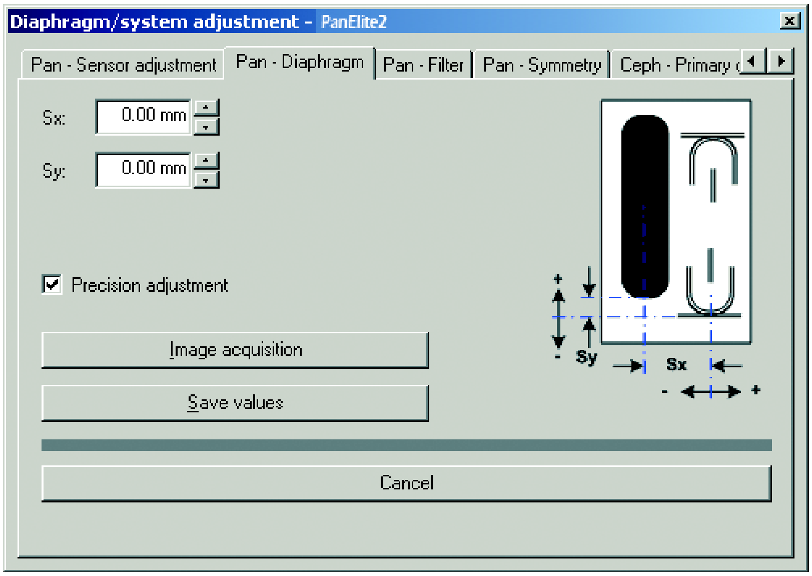
- Overwrite the default values for **S1, S2** and **S3** with the measured values in the text boxes of the **PAN - SENSOR ADJUSTMENT** submenu.

NOTE

For information on the direction of displacement (input of +/- sign in the menu) see page 4-7. Use points as decimal separators!

- Proceed with step 5 of the adjustment procedure.

4.3.3 Adjusting the motorized pan diaphragm



Sx: 0.00 mm

Sy: 0.00 mm

☑ Precision adjustment

Menu: Diaphragm/system adjustment ‡ Pan - Diaphragm

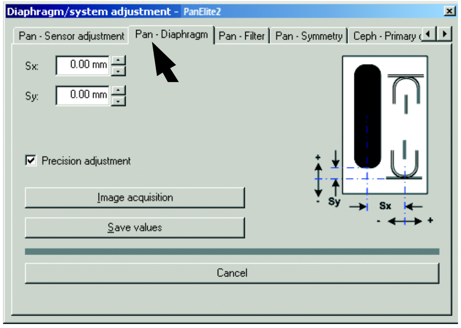
Preparations

- Remove the needle phantom from the bite block holder of the panoramic X-ray unit (see page 4-9).

NOTE

If a message window indicating that the diaphragm is tilted appears during the pan diaphragm adjustment, this means that the primary diaphragm is mechanically maladjusted in the vertical axis. In this case, contact the dealer tech support.

Opening PAN - DIAPHRAGM



Sx: 0.00 mm

Sy: 0.00 mm

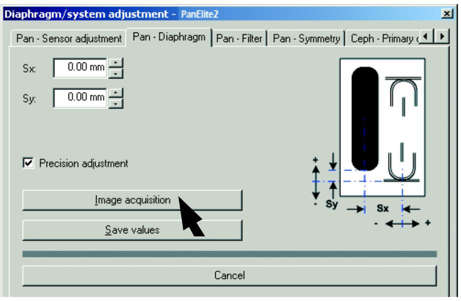
☑ Precision adjustment

1. Go to the **PAN - DIAPHRAGM** submenu.

NOTE

The menu provides a precision adjustment and a coarse adjustment (precision adjustment is preset). Perform a precision adjustment first. In most cases, previous coarse adjustment is not necessary.

Making the unit ready for exposure

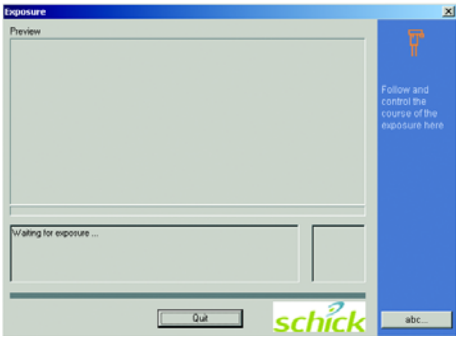


Sx: 0.00 mm
Sy: 0.00 mm
☑ Precision adjustment

2. Make CDR PanElite Service Program ready for exposure:
   Click **IMAGE ACQUISITION**

CDR PanElite Service Program

The exposure dialog box showing the exposure status appears in CDR PanElite Service Program.

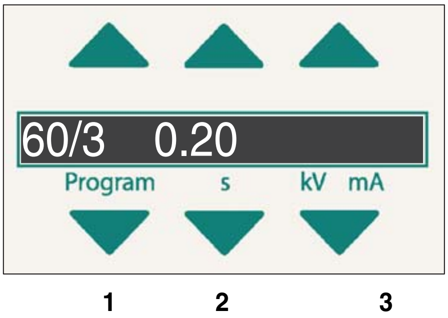


Follow and control the course of the exposure here

Waiting for exposure ...

Display on the Control Pad

The single-line display of the Control Pad shows the exposure parameters.

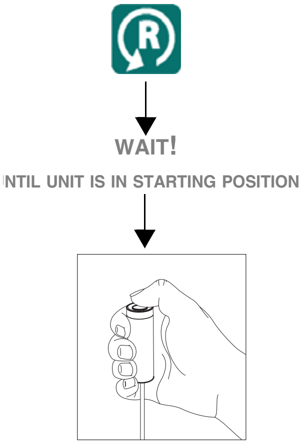


Starting the exposure

3. Take an exposure (60 kV/3 mA; 0.20 s):
   – Press the **R key** to move the unit back to the starting position.

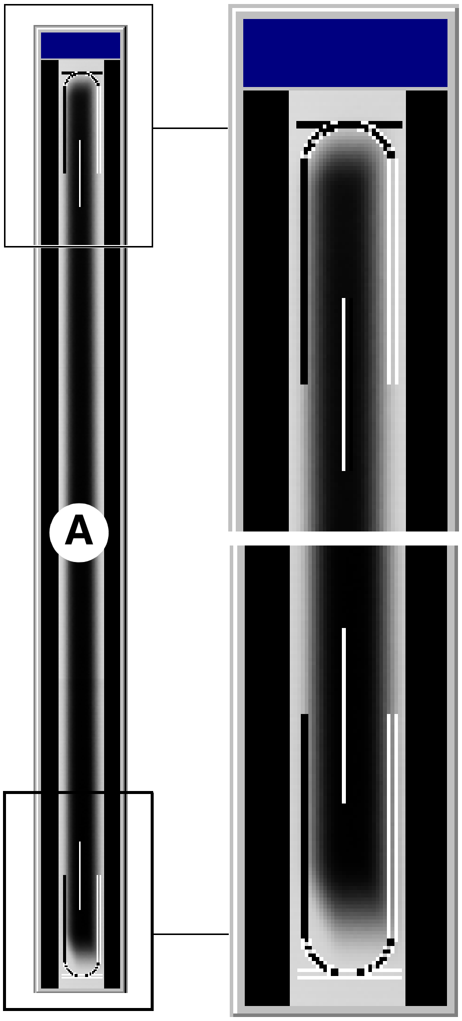
   The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

   – Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

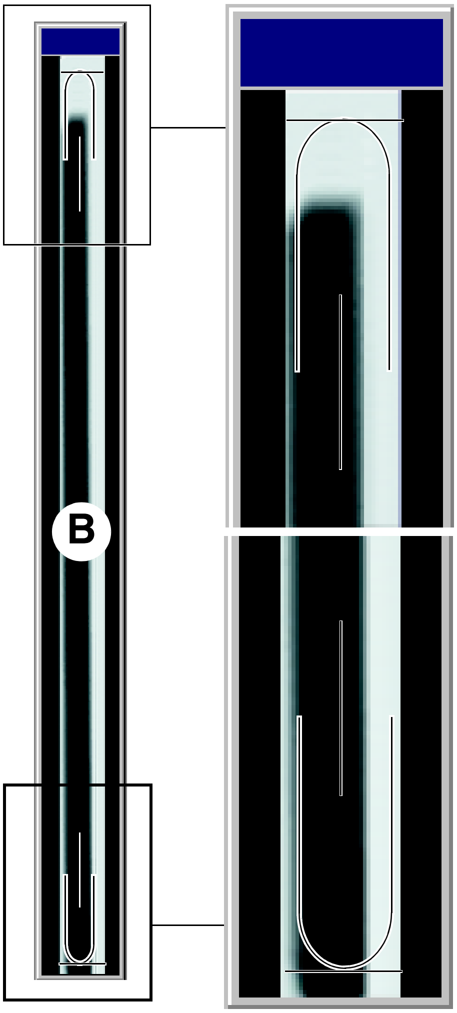


Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok



Adjustment: not ok

- **The exposed diaphragm area must lie horizontally centered in the image field as well as inside the superimposed auxiliary lines (A).**
- **A white border surrounding the image on all sides must be visible. The maximum density must lie in the center of the diaphragm area (A).**

NOTE

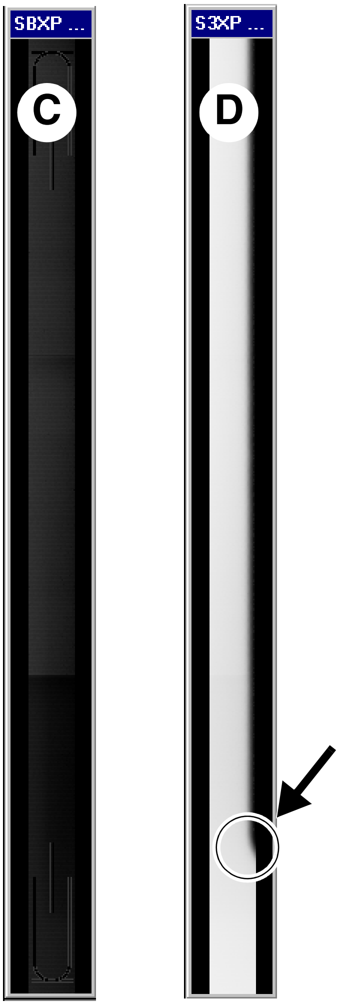
If these criteria are not fulfilled ***(B)****, the pan diaphragm must be adjusted.*

Coarse or precision adjustment?

In most cases, the diaphragm can be adjusted using precision adjustment from the start (see step 5 onward). Only in exceptional cases, e.g. if the exposed image area is completely outside the image field **C** in an image acquired with **PRECISION ADJUSTMENT** setting, is it necessary to perform a coarse adjustment prior to precision adjustment **D**. To do this, deactivate the **PRECISION ADJUSTMENT** check box (see page 4-3) and then perform a coarse adjustment proceeding in the same way as for precision adjustment. The only difference between coarse and precision adjustment is the size of the image area considered. Furthermore, there are fewer auxiliary lines in the coarse adjustment mode.

NOTE

*When the **diaphragm is correctly adjusted**, a course adjustment does not produce a meaningful image, since no surrounding border can be seen in this case (similar to image C).*



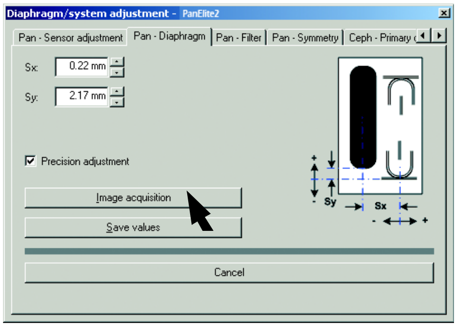
X-ray image with unadjusted pan diaphragm:
Alternatively with precision adjustment setting (C) and coarse adjustment setting (D)

On the X-ray image 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.

NOTE

A message window indicates whether a coarse adjustment is required on completion of the precision exposure.

Making the unit ready for exposure



Sx: 0.22 mm

Sy: 2.17 mm

☑ Precision adjustment

NOTE

The default values for Sx and Sy were automatically determined by the CDR PanElite Service Program based on the exposure and entered in the text boxes of the menu.

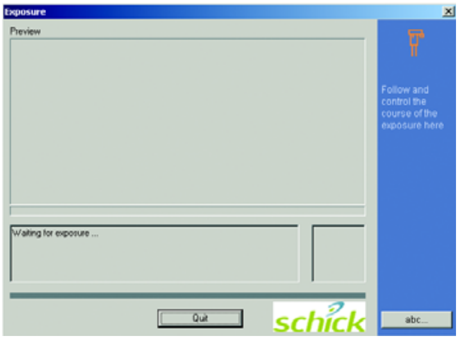
For manual adjustment, the values displayed at this position in the text boxes of the menu can be overwritten (see page 4-28).

First continue with the automatic adjustment. Manual determination of the adjustment values is required only if you fail to reach your goal via automatic adjustment (see page 4-27).

5. Make the CDR PanElite Service Program ready for exposure:

Click **IMAGE ACQUISITION**

CDR PanElite Service Program

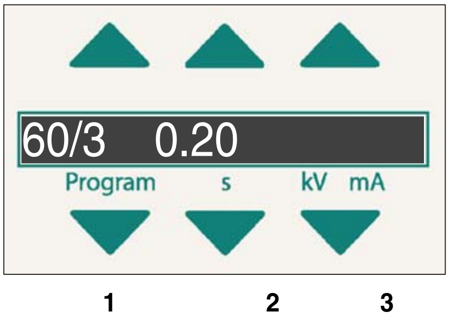


Waiting for exposure ...

Follow and control the course of the exposure here

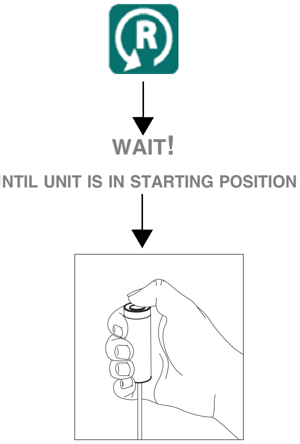
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



6. Take an exposure (60 kV/3 mA; 0.20 s):

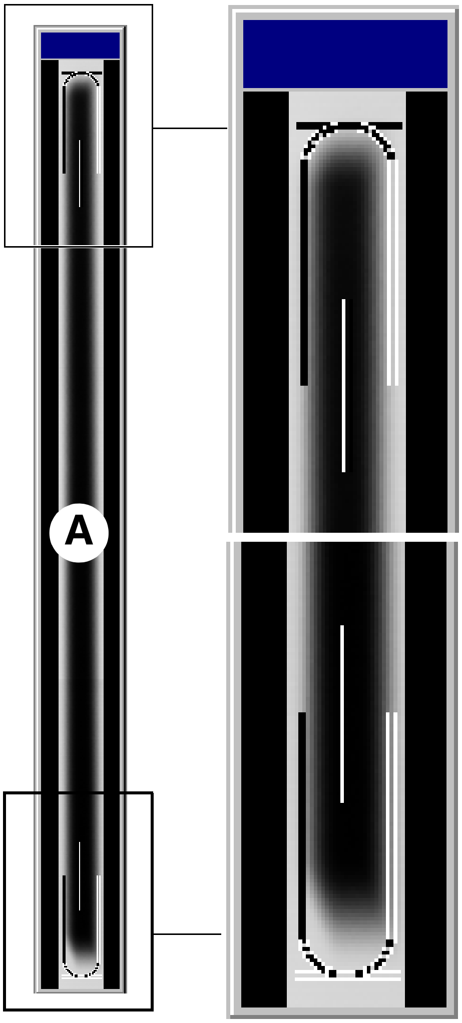
– Press the **R key** to move the unit back to the starting position.

The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

– Press and hold down the exposure switch until image acquisition is completed and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

7. Evaluate the X-ray image:



Adjustment: ok

- **The exposed diaphragm area must lie horizontally centered in the image field as well as inside the superimposed auxiliary lines (A).**
- **A white border surrounding the image on all sides must be visible. The maximum density must lie in the center of the diaphragm area (A).**

NOTE

If these criteria are not yet fulfilled, repeat the adjustment procedure starting with step 5.

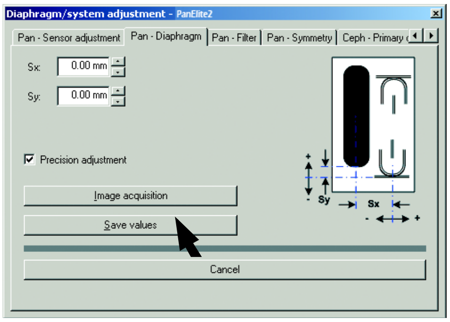
NOTE

If you do not reach your goal via automatic adjustment, repeat the adjustment procedure with manually determined adjustment values (see page 4-27).

NOTE

If a message window indicating the need to take an additional X-ray exposure opens at this point, repeat the adjustment procedure starting with item 5. This is necessary even if the X-ray exposure which has been taken is already within the tolerance limits. This additional exposure ensures that the new diaphragm gap width offset is also correctly adjusted.

Saving the values



Diaphragm/system adjustment - PanElite2

Sx: 0.00 mm

Sy: 0.00 mm

☑ Precision adjustment

8. If the image is identical to the ideal image **(A)**, save the values:

Click **SAVE VALUES**

NOTE

*The values for **Sx** and **Sy** in the **PAN - DIAPHRAGM** submenu are **setequal to zero** with a correct adjustment, i.e. if they are within the permissible tolerance.*

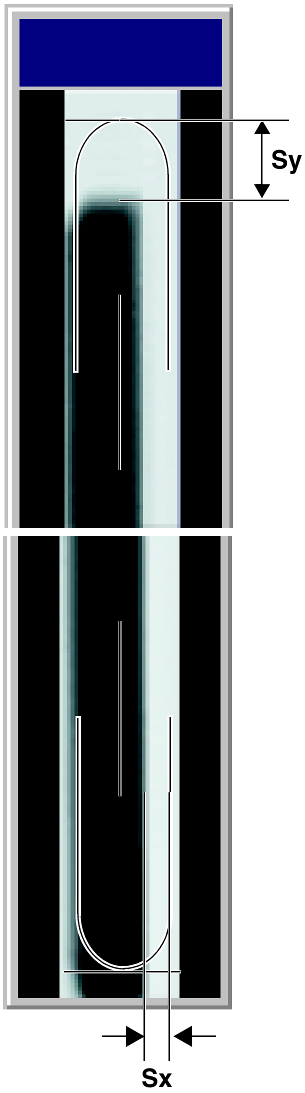
- Go on to the next adjustment step.

Manual adjustment of the PAN diaphragm

The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment values automatically determined by the CDR PanElite Service Program are overwritten by manually determined adjustment values in the **PAN - DIAPHRAGM** submenu.

Determining adjustment values for Sx and Sy manually

- Measure distances **Sx** and **Sy** with the the CDR PanElite Service Program measuring tool.

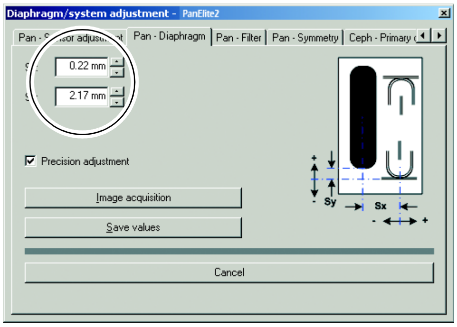


NOTE

Tip: *To facilitate the measuring procedure, you can color the image in the CDR PanElite Service Program.*

Overwriting the default values for Sx and Sy

- Overwrite the default values for **Sx** and **Sy** with the measured values in the text boxes of the **PAN - DIAPHRAGM** submenu.



0.22 mm

2.17 mm

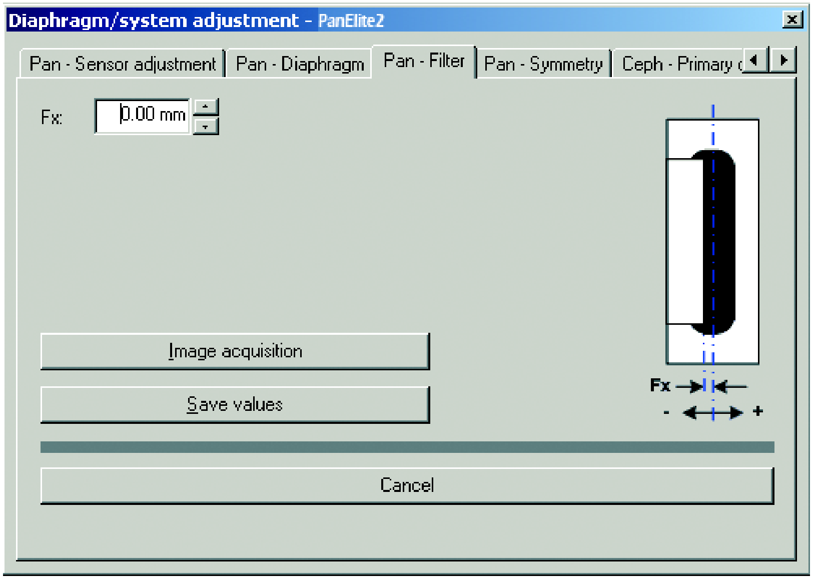
☑ Precision adjustment

NOTE

For information on the direction of displacement (input of +/- sign in the menu) see page 4-7. Use points as decimal separators!

- Proceed with step 5 of the adjustment procedure.

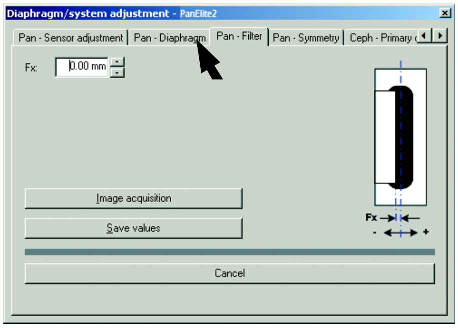
4.3.4 Adjusting the pan filter



Fx: 0.00 mm

Menu: Diaphragm/system adjustment ‡ Pan - Filter

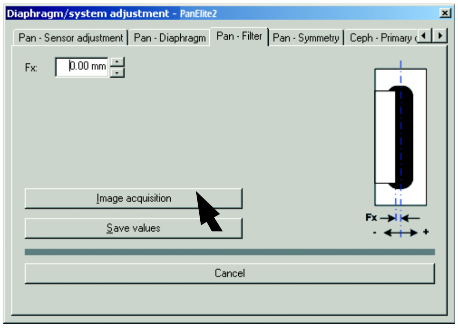
Opening PAN - FILTER



Fx: 0.00 mm

1. Go to the **PAN - FILTER** submenu.

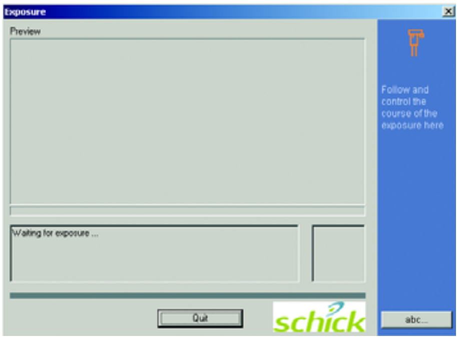
Making the unit ready for exposure



Fx: 0.00 mm

2. Make the CDR PanElite Service Program ready for exposure:
   Click **IMAGE ACQUISITION**

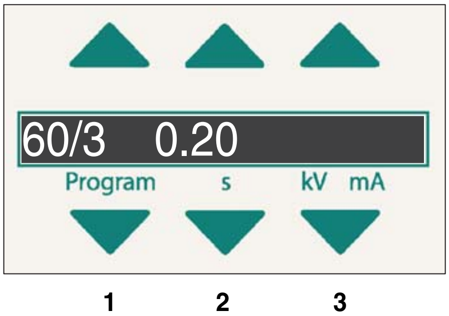
CDR PanElite Service Program



Waiting for exposure ...

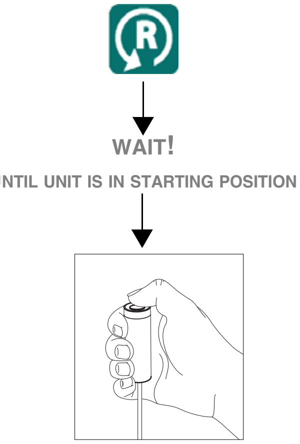
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



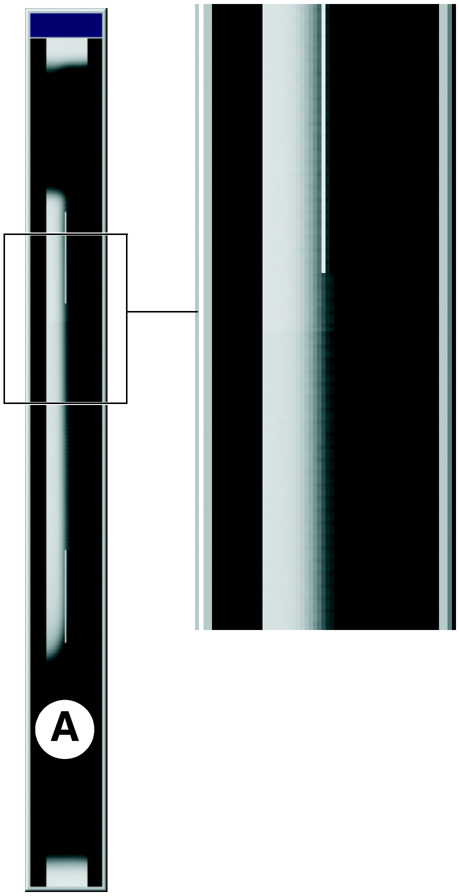
3. Take an exposure (60 kV/3 mA; 0.20 s):
   - Press the **R key** to move the unit back to the starting position.

   The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

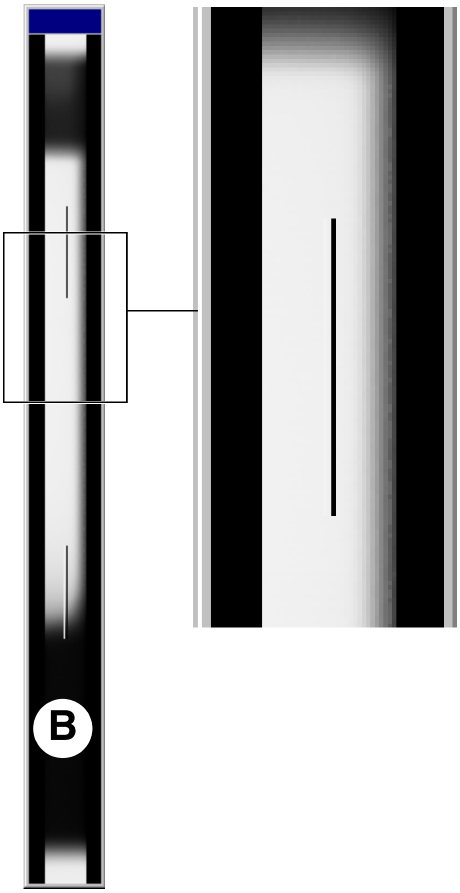
   - Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok



Adjustment: not ok

- **The superimposed filter must cover one half of the diaphragm (A).**

NOTE

*If these criteria are not fulfilled **(B)**, the pan filter must be adjusted.*

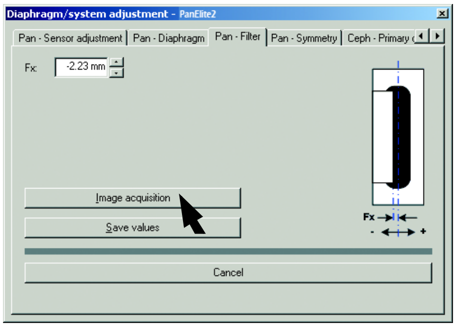
NOTE

The default value for Fx was automatically determined by the CDR PanElite Service Program based on the exposure and entered in the text box of the menu.

For manual adjustment, the value displayed at this position in the text box of the menu can be overwritten (see page 4-35).

First continue with the automatic adjustment. Manual determination of the adjustment value is required only if you fail to reach your goal via automatic adjustment (see page 4-34).

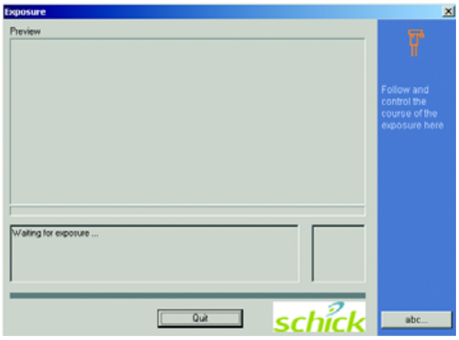
Making the unit ready for exposure



5. Make the CDR PanElite Service Program ready for exposure:

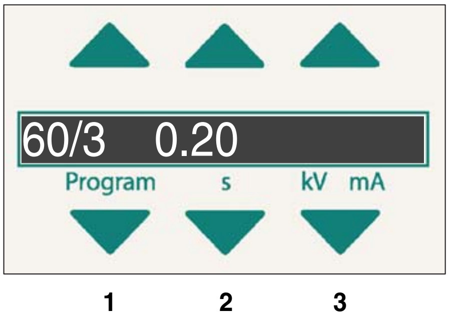
Click **IMAGE ACQUISITION**

CDR PanElite Service Program



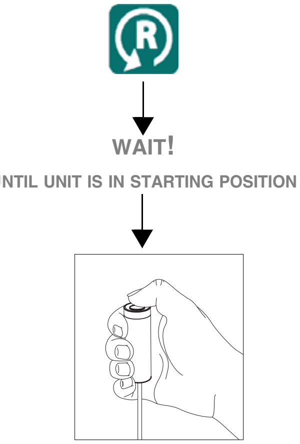
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



6. Take an exposure (60 kV/3 mA; 0.20 s):

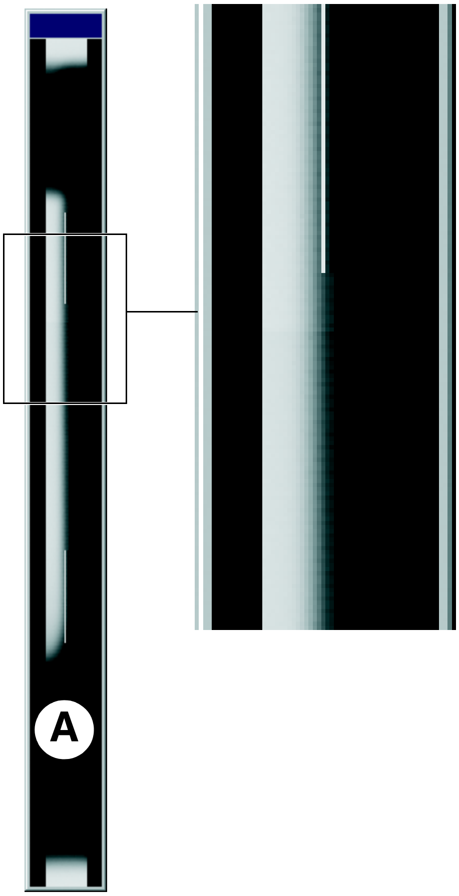
– Press the **R key** to move the unit back to the starting position.

The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

– Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

7. Evaluate the X-ray image:



Adjustment: ok

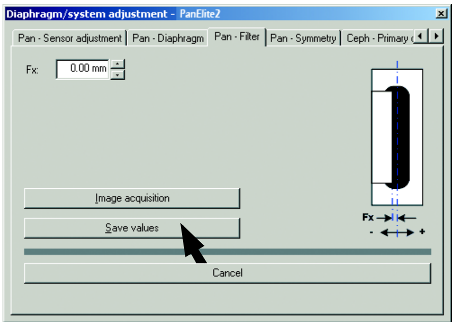
– **The superimposed filter must cover one half of the diaphragm (A).**

NOTE

*If this criterion is not yet fulfilled **(B)**, repeat the adjustment procedure starting with step 5.*

If you do not reach your goal via automatic adjustment, repeat the adjustment procedure with a manually determined adjustment value (see page 4-34).

Saving a value



Fx: 0.00 mm

8. If the image is identical to the ideal image **(A)**, save the value:

Click **SAVE VALUES**

NOTE

*The value for **Fx** in the **PAN - FILTER** submenu is set**equal to zero** with a correct adjustment, i.e. if it is within the permissible tolerance.*

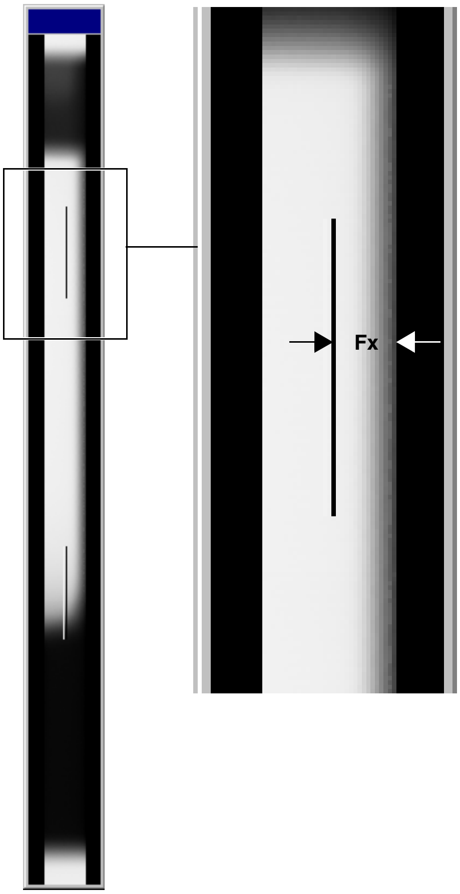
- Go on to the next adjustment step.

Manual adjustment of the PAN filter

The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment value automatically determined by the CDR PanElite Service Program is overwritten by a manually determined adjustment value in the **PAN - FILTER** submenu.

Determining the adjustment value for Fx manually

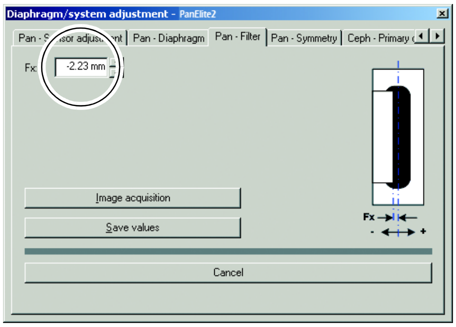
- Measure distance **Fx** with the the CDR PanElite Service Program measuring tool.



NOTE

Tip: *To facilitate the measuring procedure, you can color the image in the CDR PanElite Service Program .*

Overwriting the default value for Fx



Fx: -2.23 mm

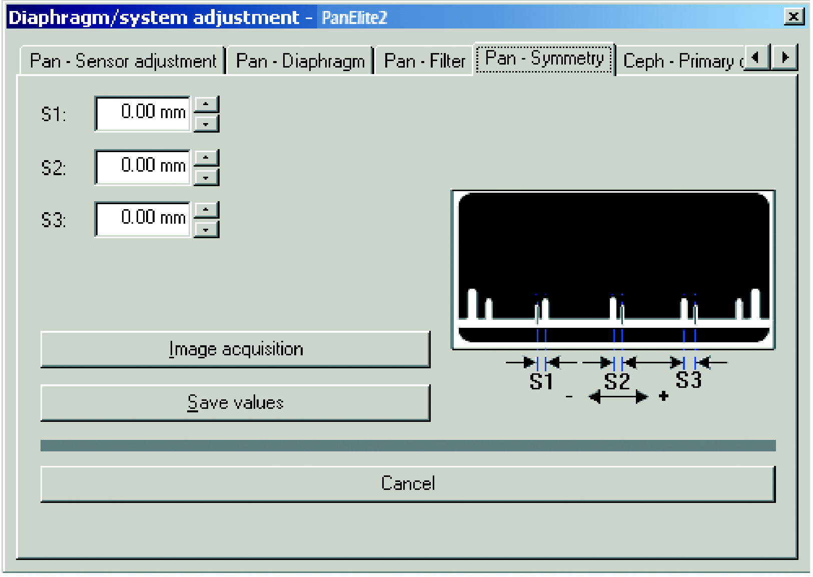
- Replace the default value for **Fx** by entering the measured value in the text box of the **PAN - FILTER** submenu.

NOTE

For information on the direction of displacement (input of +/- sign in the menu) see page 4-7. Use points as decimal separators!

- Proceed with step 5 of the adjustment procedure.

4.3.5 Adjusting the pan symmetry



S1: 0.00 mm

S2: 0.00 mm

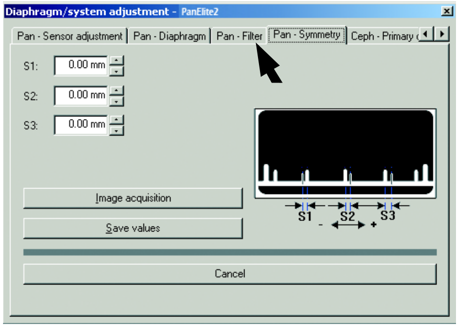
S3: 0.00 mm

Menu: Diaphragm/system adjustment ‡ Pan - Symmetry

Preparations

- Insert the needle phantom in the bite block holder of the panoramic X-ray unit (see page 4-9).

Opening PAN - SYMMETRY



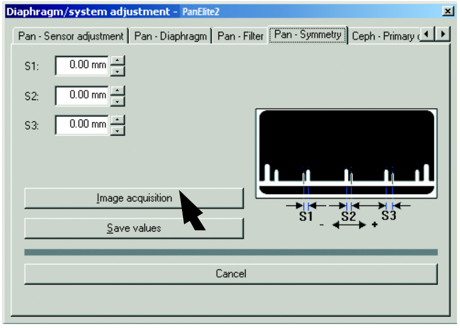
S1: 0.00 mm

S2: 0.00 mm

S3: 0.00 mm

1. Go to the **PAN - SYMMETRY** submenu.

Making the unit ready for exposure



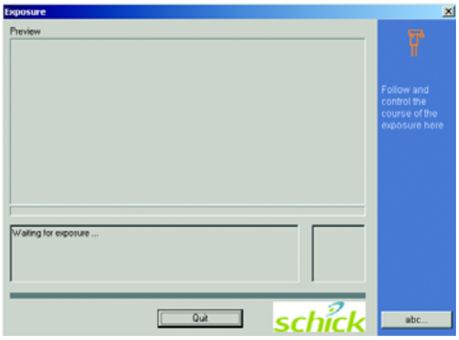
S1: 0.00 mm

S2: 0.00 mm

S3: 0.00 mm

2. Make the CDR PanElite Service Program ready for exposure:
   Click **IMAGE ACQUISITION**

CDR PanElite Service Program

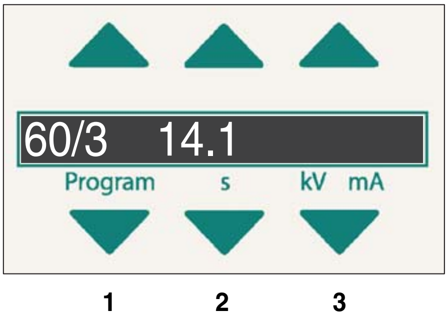


Follow and control the course of the exposure here

Waiting for exposure ...

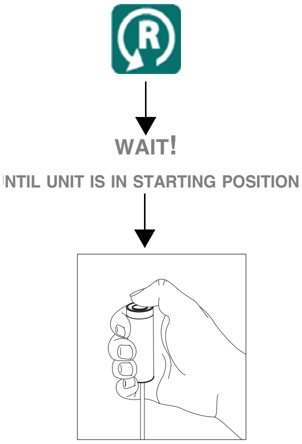
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



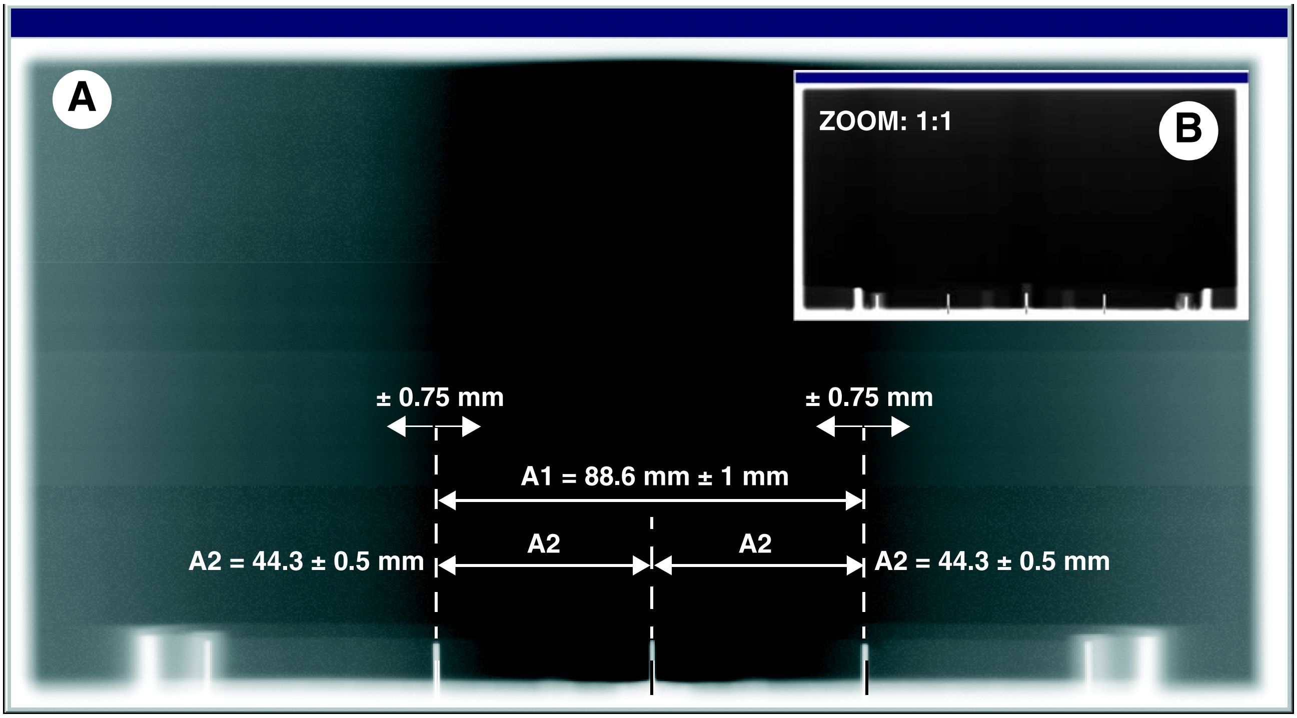
3. Take an exposure (60kV/3mA; 14.1 s):
   – Press the **R key** to move the unit back to the starting position.

   The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

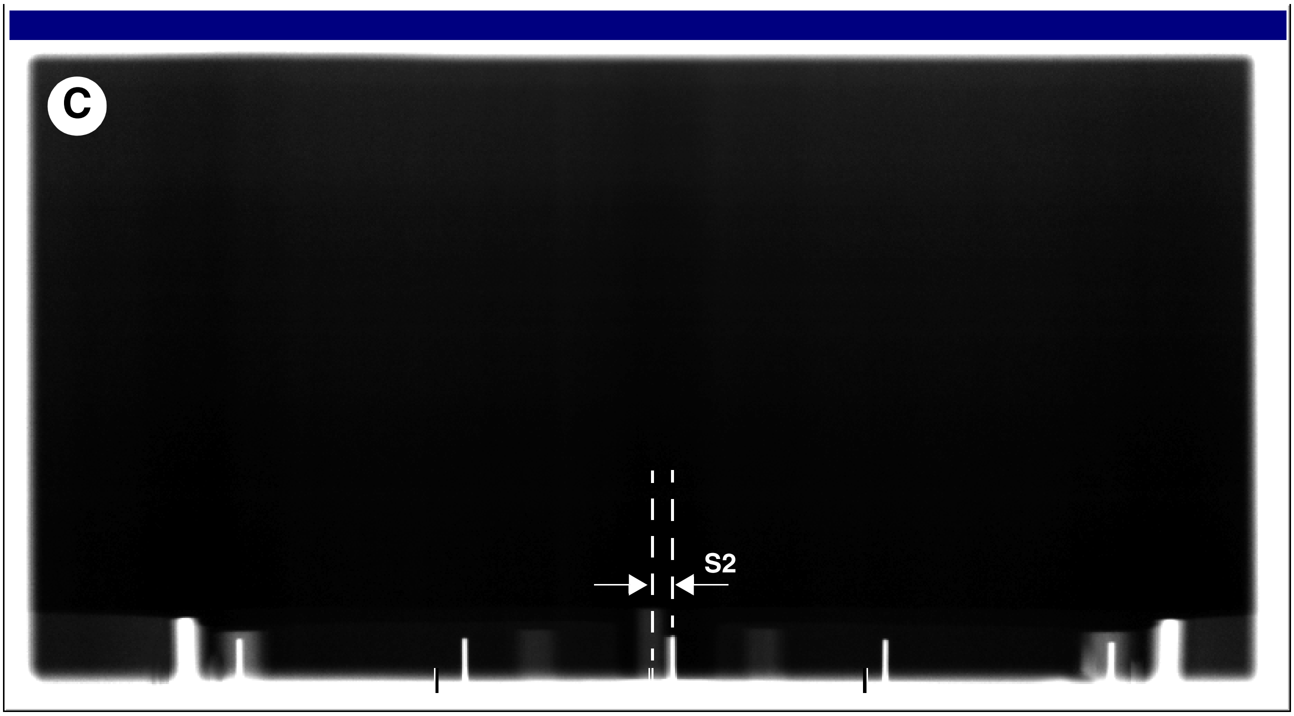
   – Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok (length measurement with the CDR PanElite Service Program)



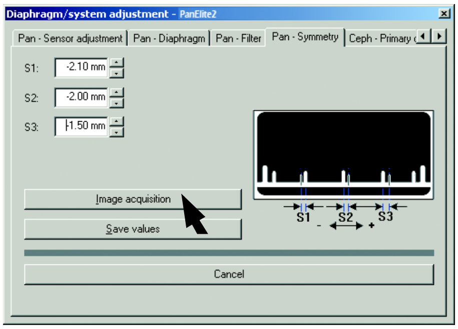
Adjustment: not ok (length measurement with the CDR PanElite Service Program)

- **The shadow of the center needle, the needle image and the auxiliary line must be coincident and located behind each other.
A tolerance (offset of needle from the central auxiliary line) of ± 0.75 mm is admissible (A).**
- **Distance A1 must be 88.6 ± 1 mm (A).**
- **Distances A2 must be identical, each being 44.3 ± 0.5 mm (A).**
- **A white border surrounding the image on all sides must be visible (B).**

NOTE

*If one of these criteria is not fulfilled **(C)**, the pan symmetry must be adjusted.*

Making the unit ready for exposure



S1: -2.10 mm
S2: -2.00 mm
S3: 1.50 mm

NOTE

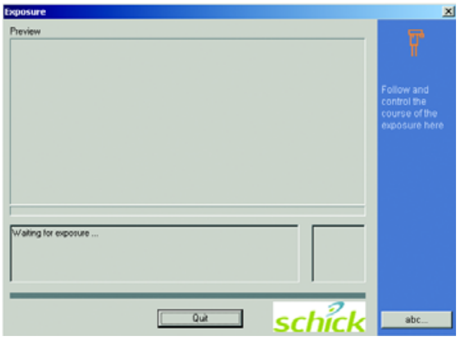
The default values for S1, S2 and S3 were automatically determined by the CDR PanElite Service Program based on the exposure and entered in the text boxes of the menu.

For manual adjustment, the values displayed at this position in the text boxes of the menu can be overwritten (see page 4-19).

First continue with the automatic adjustment. Manual determination of the adjustment values is required only if you fail to reach your goal via automatic adjustment (see page 4-18).

5. Make the CDR PanElite Service Program ready for exposure:
Click **IMAGE ACQUISITION**

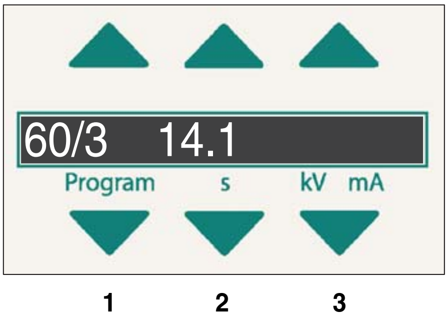
CDR PanElite Service Program



Waiting for exposure ...

The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad

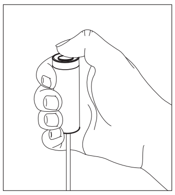


The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure

WAIT!

NTIL UNIT IS IN STARTING POSITION



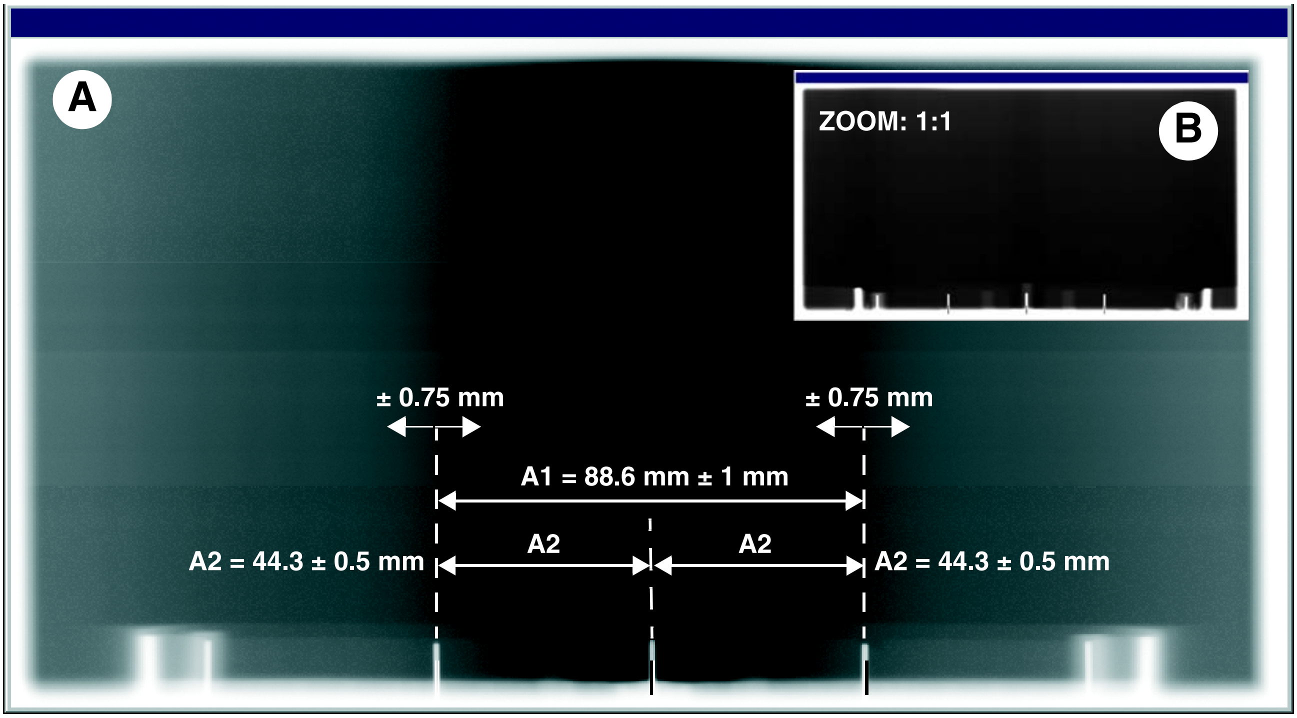
6. Take an exposure (60kV/3mA; 14.1 s):
   - Press the **R key** to move the unit back to the starting position.

   The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

   - Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

7. Evaluate the X-ray image:



Adjustment: ok (length measurement with the CDR PanElite Service Program)

- **The shadow of the center needle, the needle image and the auxiliary line must be coincident and located behind each other. A tolerance (offset of needle from the central auxiliary line) of ± 0.75 mm is admissible (A).**
- **Distance A1 must be 88.6 ± 1 mm (A).**
- **Distances A2 must be identical, each being 44.3 ± 0.5 mm (A).**
- **A white border surrounding the image on all sides must be visible (B).**

NOTE

Always measure exactly from pin center to pin center.

NOTE

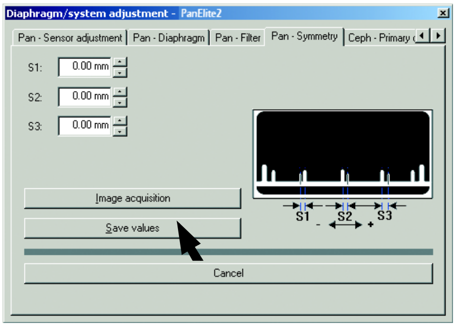
If the X-ray image still does not correspond to the ideal image, it is possible that one or more criteria have not yet been fulfilled:

Case 1: Center needle not coincident with auxiliary line
If the shadow of the center needle, the needle image and the auxiliary line do not yet coincide, then repeat the adjustment procedure starting with step 5.

Case 2: Symmetry not OK
If the shadow of the center needle, the needle image and the auxiliary line coincide, but the symmetry or the distance between the two outer needles is not yet correct, then repeat the adjustment procedure starting with step 5.

NOTE
If you do not reach your goal via automatic adjustment, repeat the adjustment procedure with manually determined adjustment values (see page 4-43).

Saving the values



Diaphragm/system adjustment - PanElite2

S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm

8. If all criteria are fulfilled and the current image is identical to the ideal image **A + B**, then save the values:

Click **SAVE VALUES**

NOTE
*The values for **S1**, **S2** and **S3** in the **PAN - SYMMETRY** submenu are set **equal to zero** with a correct adjustment, i.e. if they are within the permissible tolerance.*

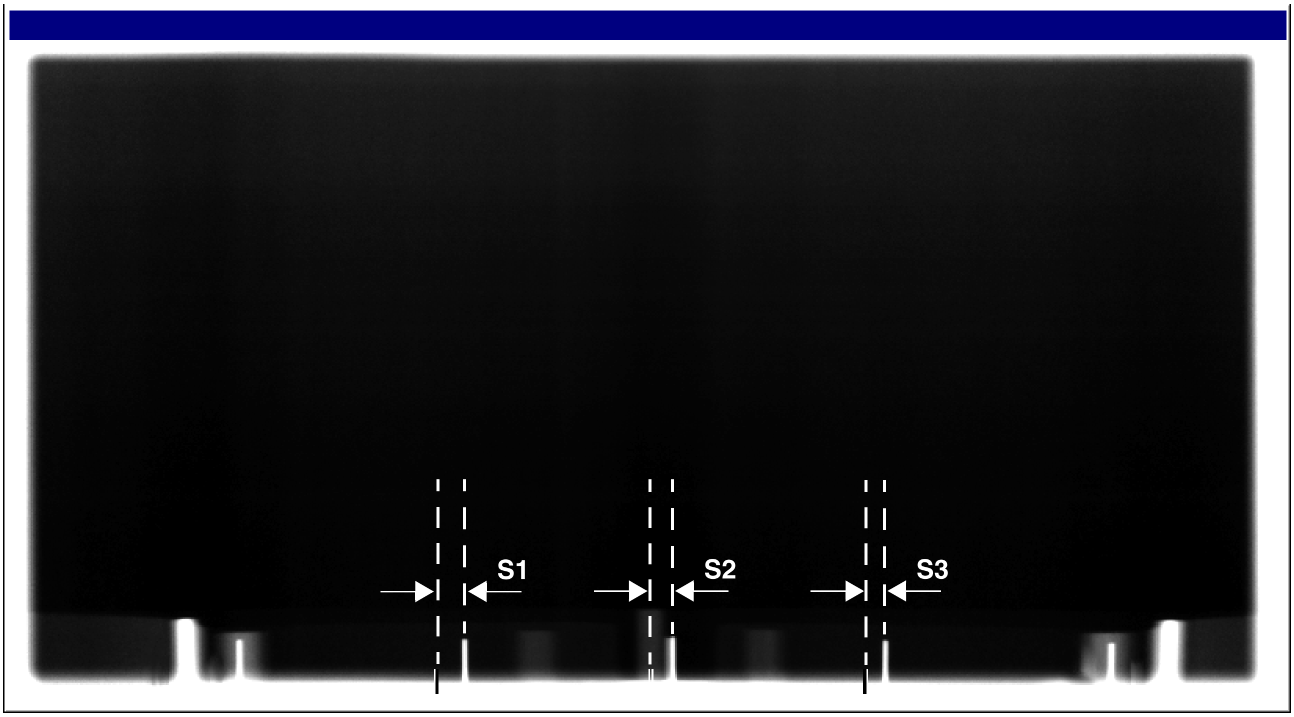
- Go on to the next adjustment step.

Manual adjustment of the PAN symmetry

The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment values automatically determined by the CDR PanElite Service Program are overwritten by manually determined adjustment values in the **PAN - SYMMETRY** submenu.

Determining the adjustment values for S1, S2 and S3 manually

- Measure distances **S1, S2** and **S3** with the the CDR PanElite Service Program measuring tool.



NOTE

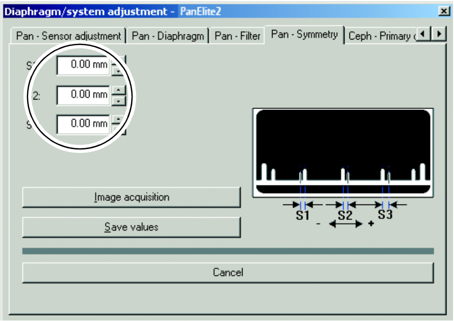
Measure in the lower area of the needles if possible, since they may have been bent slightly after repeated use.

Always measure exactly from pin center to pin center.

NOTE

***Tip:** To facilitate the measuring procedure, you can color the image in the CDR PanElite Service Program.*

Overwriting default values for S1, S2 and S3



- Overwrite the default values for **S1, S2** and **S3** with the measured values in the text boxes of the **PAN - SYMMETRY** submenu.

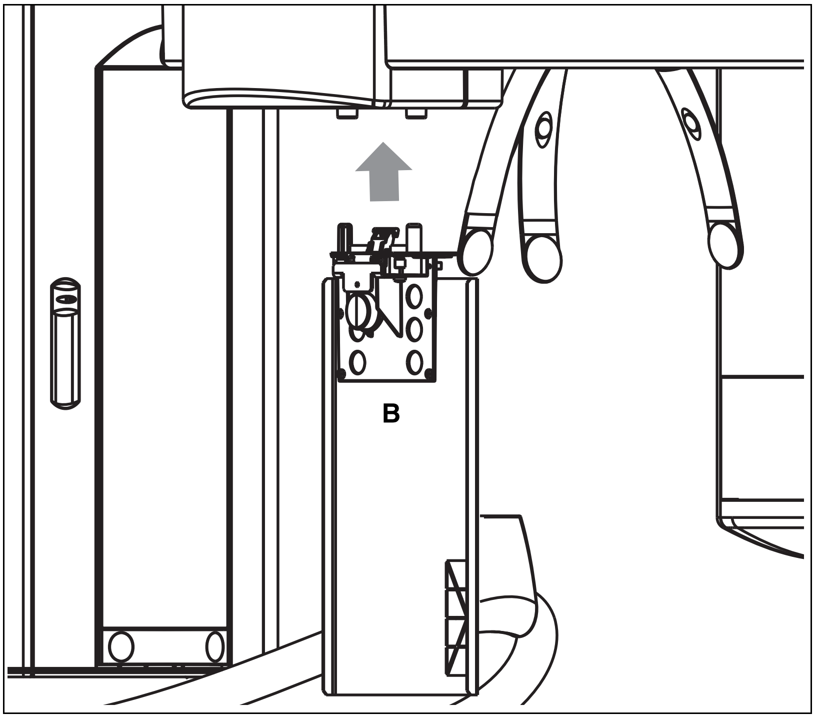
NOTE

For information on the direction of displacement (input of +/- sign in the menu) see page 4-7. Use points as decimal separators!

- Proceed with step 5 of the adjustment procedure.

4.4 Adjusting the cephalometer (if ceph is installed)

4.4.1 Ceph test phantom

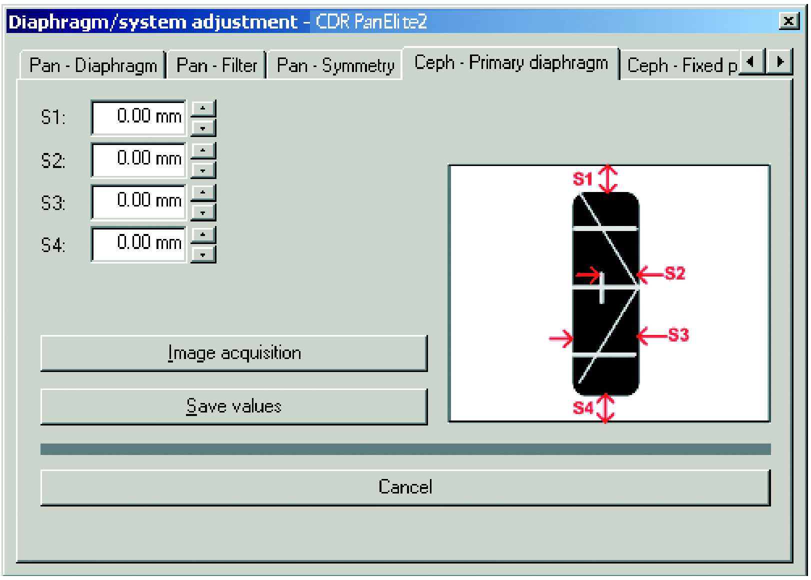


Accessory: Ceph test phantom

For the adjustment of the **ceph primary diaphragm** and the **ceph main X-ray beam direction**, you must insert test phantom **B** in the **sensor slot on the panoramic X-ray unit**.

For the adjustment of the **ceph fixed point of rotation**, you must remove the test phantom from the sensor slot on the panoramic X-ray unit.

4.4.2 Adjusting the ceph primary diaphragm



S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm
S4: 0.00 mm

Menu: Diaphragm/system adjustment ‡ Ceph - Primary diaphragm

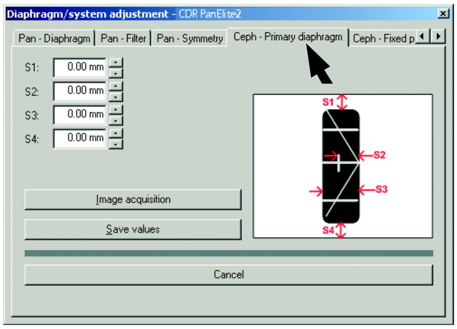
CAUTION

It is essential that the PAN needle phantom be removed from the bite block holder of the panoramic X-ray unit before a Ceph exposure is taken; otherwise the phantom may interfere with the sensor.

Preparations

- Move the ear plug holders on the cephalometer completely apart and swing them out of the beam direction (ap).
- Insert the test phantom in the **sensor slot on the panoramic X-ray unit** (see page 4-45).
- Plug the sensor into the sensor slot on the cephalometer.
- Open the **DIAPHRAGM/SYSTEM ADJUSTMENT** menu (see page 4-5).

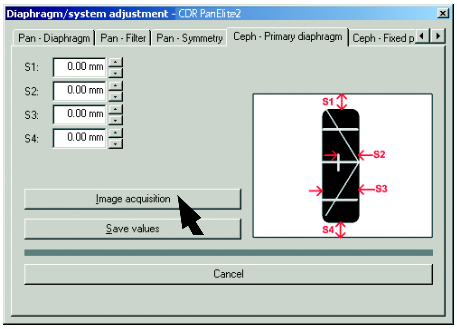
Call up CEPH - PRIMARY DIAPHRAGM



S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm
S4: 0.00 mm

1. Go to the **CEPH - PRIMARY DIAPHRAGM** submenu.

Making the unit ready for exposure



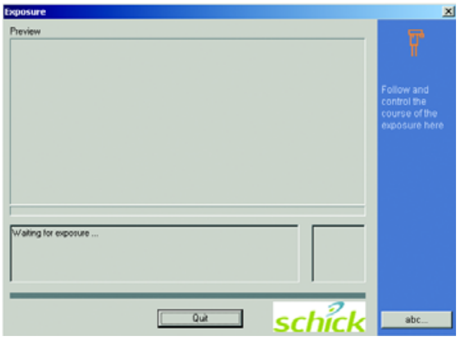
Diaphragm/system adjustment - CDR PanElite2

S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm
S4: 0.00 mm

2. Make the CDR PanElite Service Program ready for exposure:

Click **IMAGE ACQUISITION**

CDR PanElite Service Program



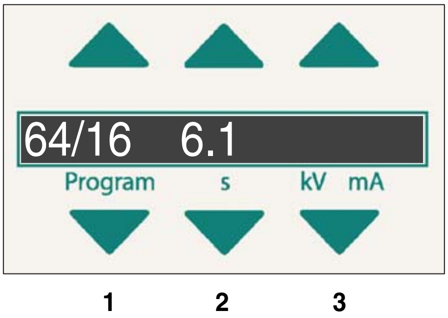
Exposure

Waiting for exposure ...

Follow and control the course of the exposure here

The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

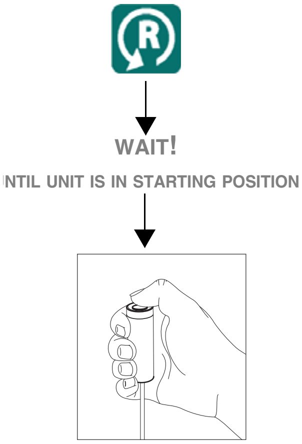
Display on the Control Pad



64/16 6.1

The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



3. Take an exposure (64 kV/16 mA; 6.1 s):

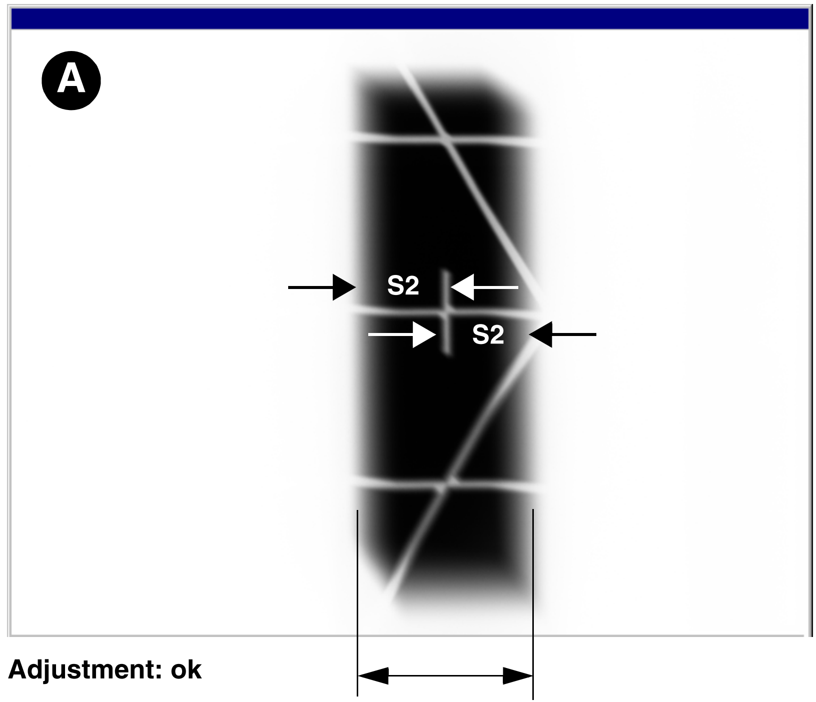
– Press the **R key** to move the unit back to the starting position.

The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

– Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

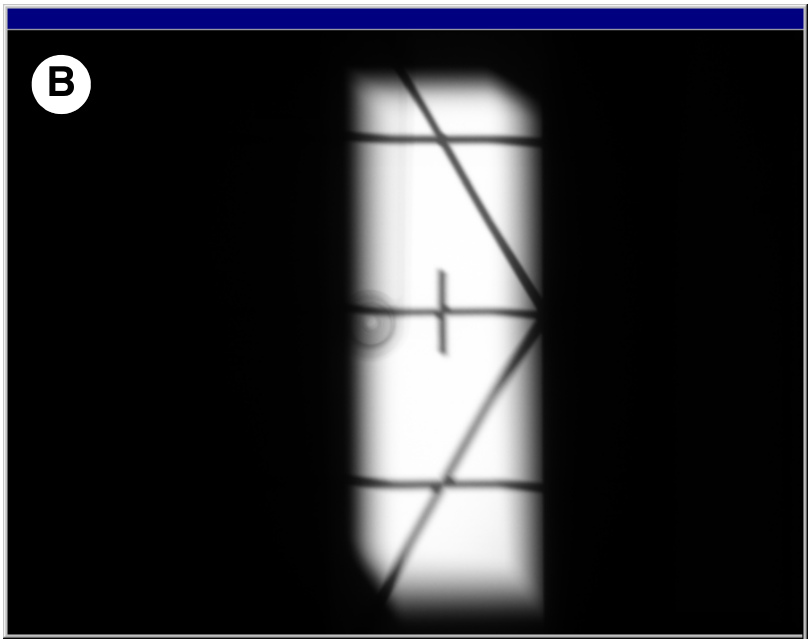
Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok

Length measurement with the CDR PanElite Service Program



Adjustment: not ok

Length measurement with the CDR PanElite Service Program

- **The vertical pin must be horizontally centered in the exposed image area A. A slight vertical offset of the grid is permissible.**
- **A uniform white border surrounding the image on all sides must be visible A.**
- **Distance S3 must be approx. 60mm.**

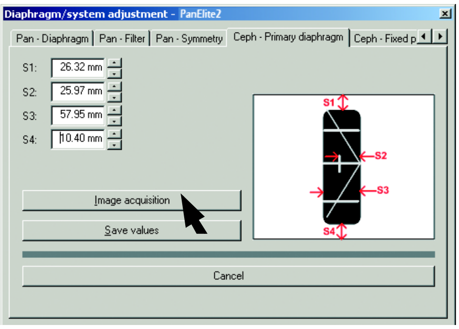
NOTE

If these criteria are not fulfilled ***(B)****, the ceph primary diaphragm must be adjusted.*

NOTE

If S3 is > 70 mm, then contact the dealer tech support.

Making the unit ready for exposure



Diaphragm/system adjustment - PanElite2

S1: 26.32 mm
S2: 25.97 mm
S3: 57.95 mm
S4: 10.40 mm

NOTE

The default values for S1, S2, S3 and S4 were automatically determined by the CDR PanElite Service Program based on the exposure and entered in the text boxes of the menu.

For manual adjustment, the values displayed at this position in the text boxes of the menu can be overwritten (see page 4-54).

First continue with the automatic adjustment. Manual determination of the adjustment values is required only if you fail to reach your goal via automatic adjustment (see page 4-53).

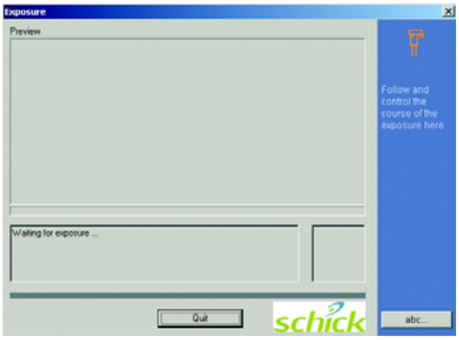
---

5. Make the CDR PanElite Service Program ready for exposure:

   Click **IMAGE ACQUISITION**

   The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

CDR PanElite Service Program



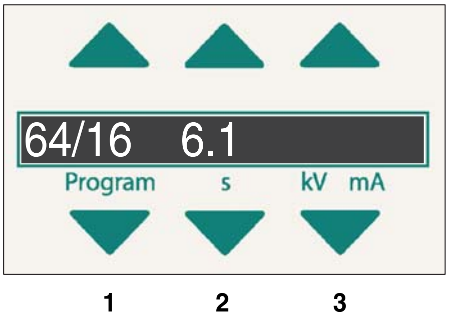
Exposure

Waiting for exposure ...

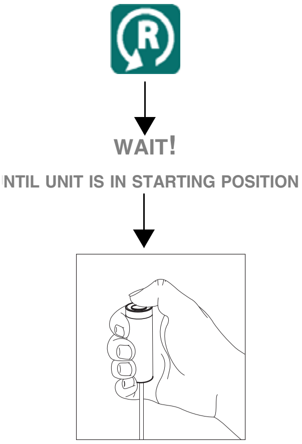
Follow and control the course of the exposure here

Display on the Control Pad

The single-line display of the Control Pad shows the exposure parameters.



Starting the exposure



6. Take an exposure (64 kV/16 mA; 6.1 s):

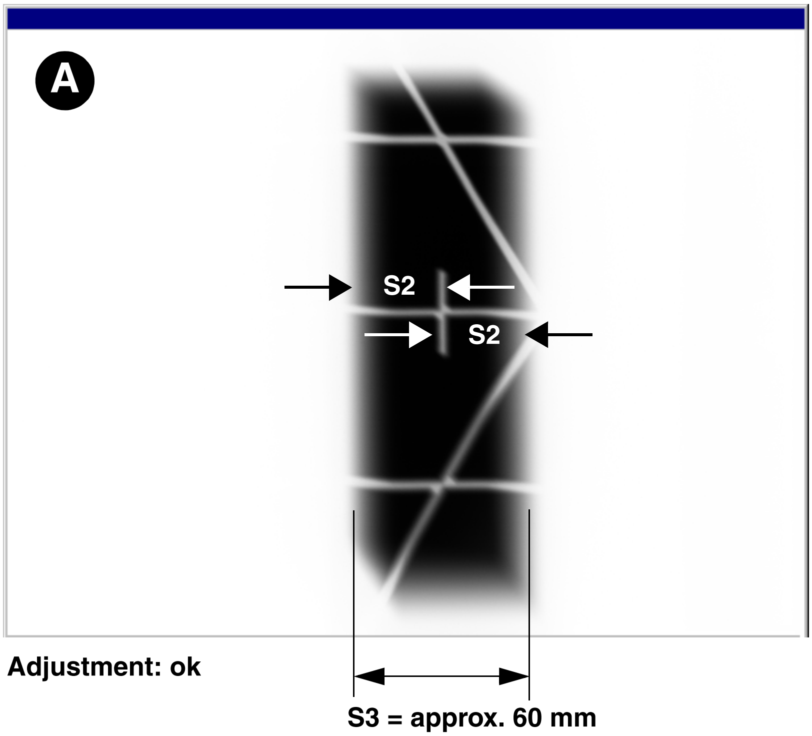
– Press the **R key** to move the unit back to the starting position.

The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

– Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

7. Evaluate the X-ray image:



Adjustment: ok

- **The vertical pin must be horizontally centered in the exposed image area A.** ***A slight vertical offset of the grid is permissible.***
- **A uniform white border surrounding the image on all sides must be visible A.**
- **Distance S3 must be approx. 60mm.**

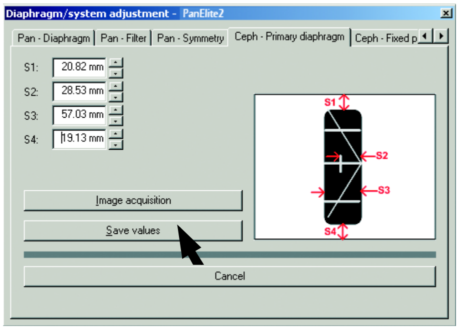
NOTE

If these criteria are not yet fulfilled, repeat the adjustment procedure starting with step 5.

NOTE

If you do not reach your goal via automatic adjustment, repeat the adjustment procedure with manually determined adjustment values (see page 4-53).

Saving the values



S1: 20.82 mm
S2: 28.53 mm
S3: 57.03 mm
S4: 19.13 mm

8. If the image is identical to the ideal image **(A)**, save the values:
Click **SAVE VALUES**

- Go on to the next adjustment step.

Manual adjustment of the ceph primary diaphragm

The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment values automatically determined by the CDR PanElite Service Program are overwritten by manually determined adjustment values in the **CEPH - PRIMARY DIAPHRAGM** submenu.

Determining the adjustment values for S1, S2, S3 and S4 manually

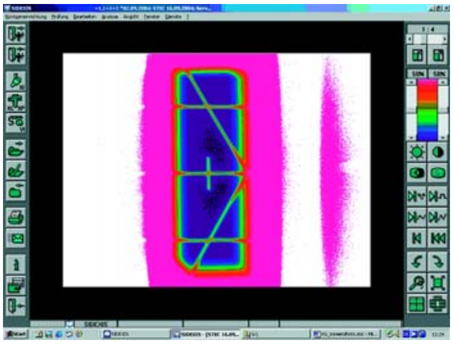
- Measure distances **S1 - S4** with the the CDR PanElite Service Program measuring tool:

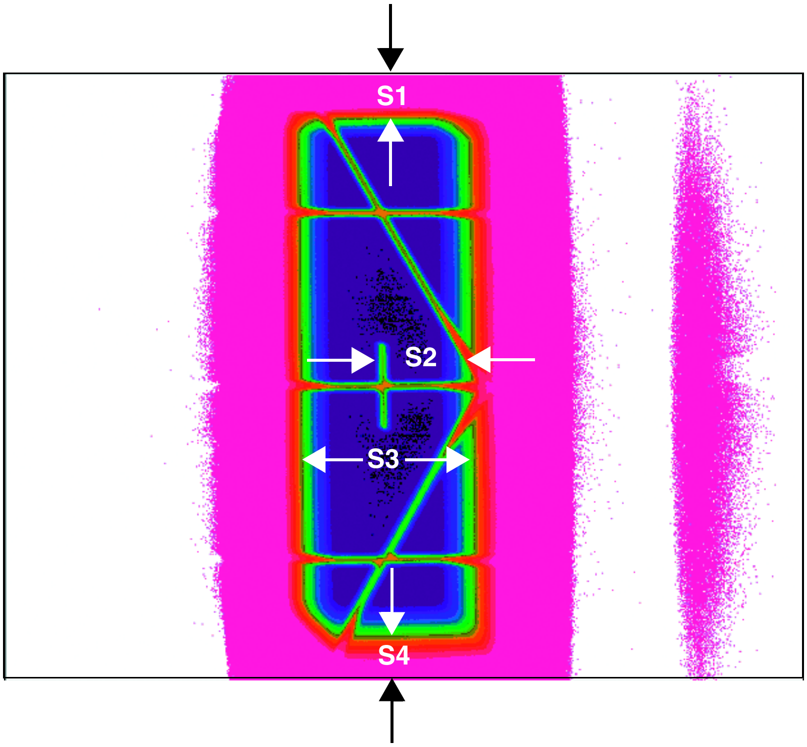
  S1: Distance from the top edge of the image

  S2: Distance from the right edge of the exposed area to the middle of the center pin

  S3: Width of the exposed area

  S4: Distance from the bottom edge of the image



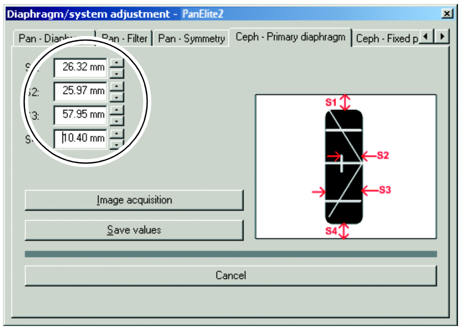


NOTE

Tip: *To facilitate the measuring procedure, you can invert or color the image in the CDR PanElite Service Program.*

4.4

Overwriting default values for S1, S2, S3 and S4



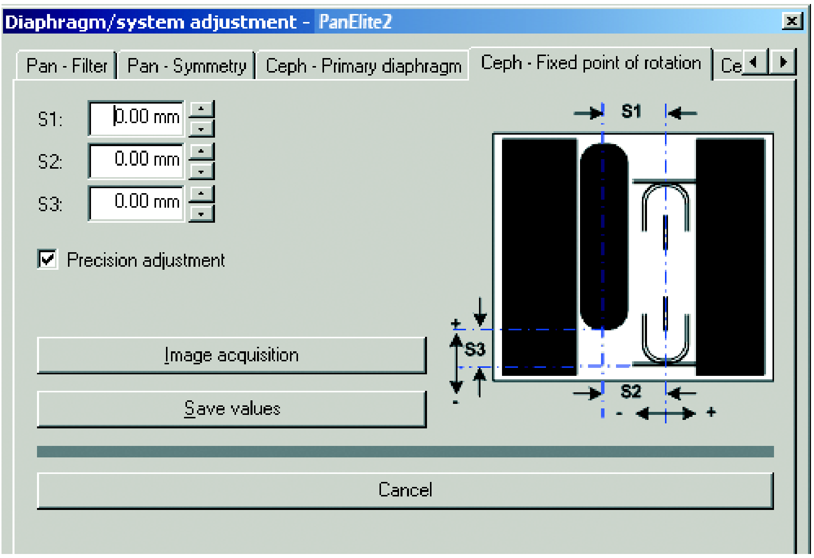
26.32 mm
25.97 mm
57.95 mm
10.40 mm

- Overwrite the default values for **S1, S2, S3** and **S4** with the measured values in the text boxes of the **CEPH - PRIMARY DIAPHRAGM** submenu.

NOTE
For information on the direction of displacement (input of +/- sign in the menu) see page 4-7. Use points as decimal separators!

- Proceed with step 5 of the adjustment procedure.

4.4.3 Adjusting the ceph fixed point of rotation



S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm
☑ Precision adjustment

Menu: Diaphragm/system adjustment ‡ Ceph - Fixed point of rotation

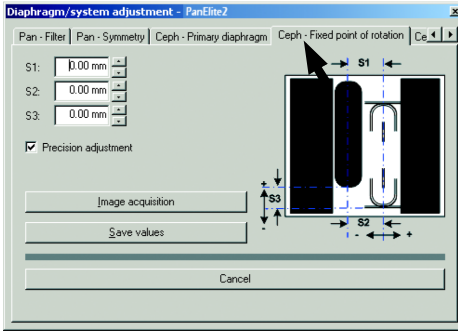
CAUTION

It is essential that the PAN needle phantom be removed from the bite block holder of the panoramic X-ray unit before a Ceph exposure is taken; otherwise the phantom may collide with the sensor.

Preparations

- Remove the ceph test phantom from the sensor slot of the panoramic X-ray unit (see page 4-45).

Opening CEPH - FIXED POINT OF ROTATION

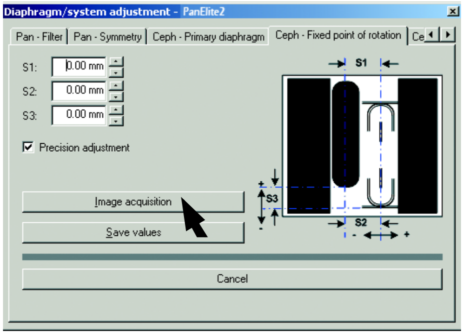


1. Go to the **CEPH - FIXED POINT OF ROTATION** submenu.

NOTE

The menu provides a precision adjustment and a coarse adjustment (precision adjustment is preset). Perform a precision adjustment first. In most cases, previous coarse adjustment is not necessary.

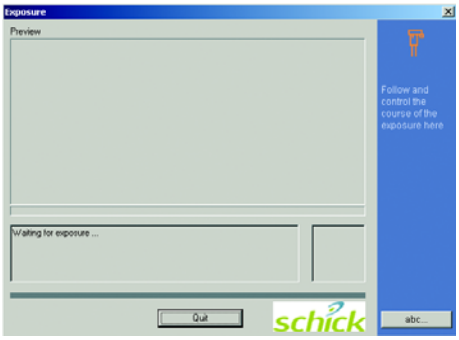
Making the unit ready for exposure



S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm
☑ Precision adjustment

2. Make the CDR PanElite Service Program ready for exposure:
   Click **IMAGE ACQUISITION**

CDR PanElite Service Program

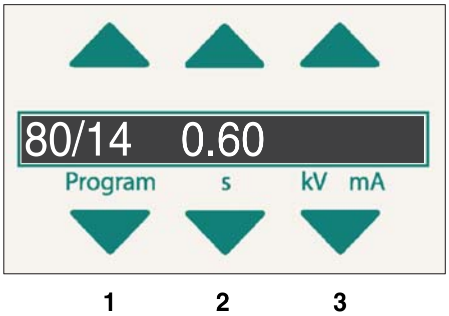


Waiting for exposure ...

Follow and control the course of the exposure here

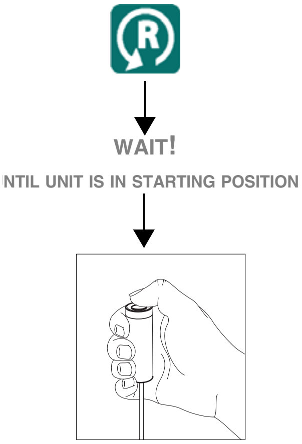
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



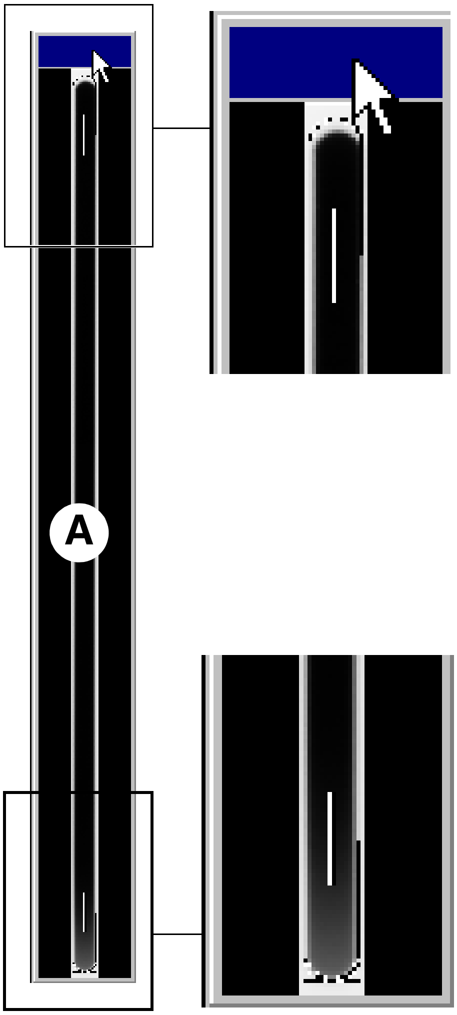
3. Take an exposure (80 kV/14 mA; 0.60 s):
   - Press the **R key** to move the unit back to the starting position.

   The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

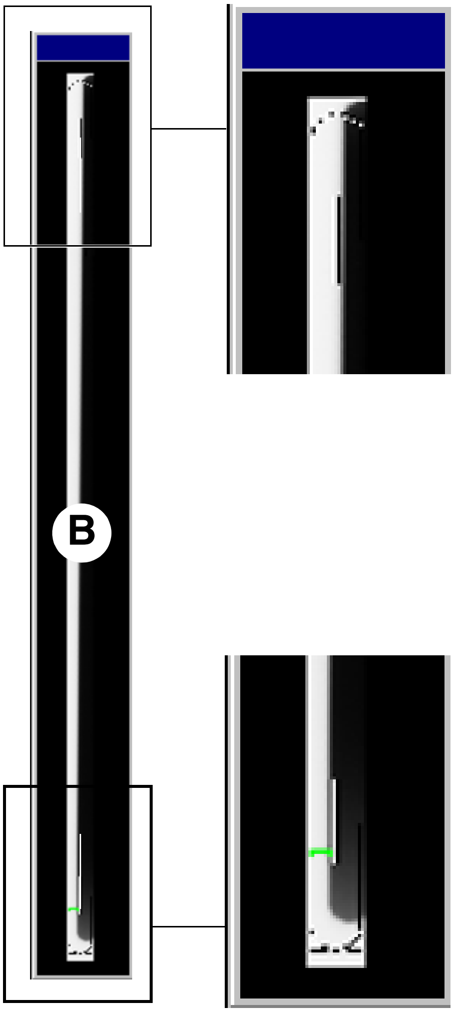
   - Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok



Adjustment: not ok

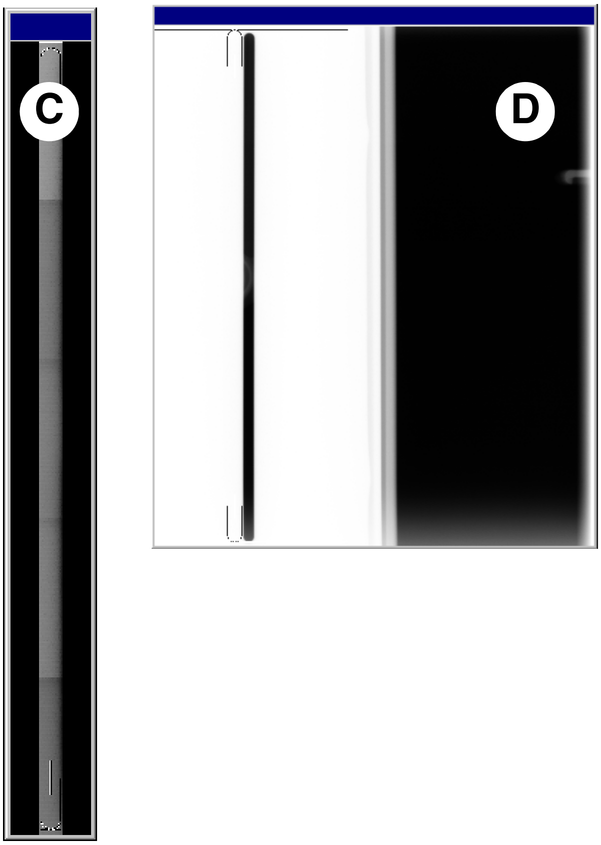
- **The exposed diaphragm area must lie centered and straight in the image field as well as inside the superimposed auxiliary lines (A).**
- **A white border surrounding the image on all sides must be visible. The maximum density must lie in the center of the diaphragm area (A).**

NOTE

*If these criteria are not fulfilled **(B)**, the ceph fixed point of rotation must be adjusted.*

Coarse or precision adjustment?

In most cases, the fixed point of rotation can be adjusted using precision adjustment from the start (see steps 5 ff.). Only in exceptional cases, e.g. if the exposed image area is completely outside the image field **C** in an image acquired with **PRECISION ADJUSTMENT** setting, is it necessary to perform a coarse adjustment prior to precision adjustment **D**. To do this, deactivate the **PRECISION ADJUSTMENT** check box (see page 4-3) and then perform a coarse adjustment proceeding in the same way as for precision adjustment. The only difference between coarse and precision adjustment is the size of the image area considered. Furthermore, there are fewer auxiliary lines in the coarse adjustment mode.

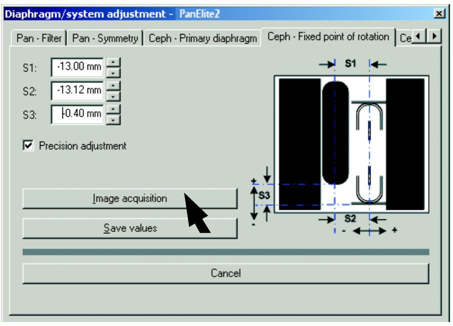


X-ray image with unadjusted ceph fixed point of rotation:
Alternatively with precision adjustment setting (C) and coarse adjustment setting (D)

On the X-ray image with coarse adjustment D, the exposed area is still visible in the image field. Even in this extreme case, an adjustment would still be possible.

NOTE
A message window indicates whether a coarse adjustment is required on completion of the precision exposure.

Making the unit ready for exposure



S1: -13.00 mm

S2: -13.12 mm

S3: -0.40 mm

☑ Precision adjustment

CDR PanElite Service Program

NOTE

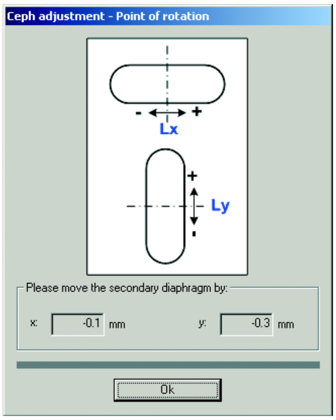
The default values for S1, S2 and S3 were automatically determined by the CDR PanElite Service Program based on the exposure and entered in the text boxes of the menu.

For manual adjustment, the values displayed at this position in the text boxes of the menu can be overwritten (see page 4-66).

First continue with the automatic adjustment. Manual determination of the adjustment values is required only if you fail to reach your goal via automatic adjustment (see page 4-65).

5. Make the CDR PanElite Service Program ready for exposure:

   Click **IMAGE ACQUISITION**



Please move the secondary diaphragm by:

x: -0.1 mm y: -0.3 mm

The **CEPH ADJUSTMENT - FIXED POINT OF ROTATION** dialog box appears in the CDR PanElite Service Program.

The dialog box suggests two values, **Lx** and **Ly**, for the mechanical adjustment of the ceph secondary diaphragm.

If the suggested values are greater than ±0.5 mm, you must perform a mechanical adjustment of the diaphragm.

NOTE

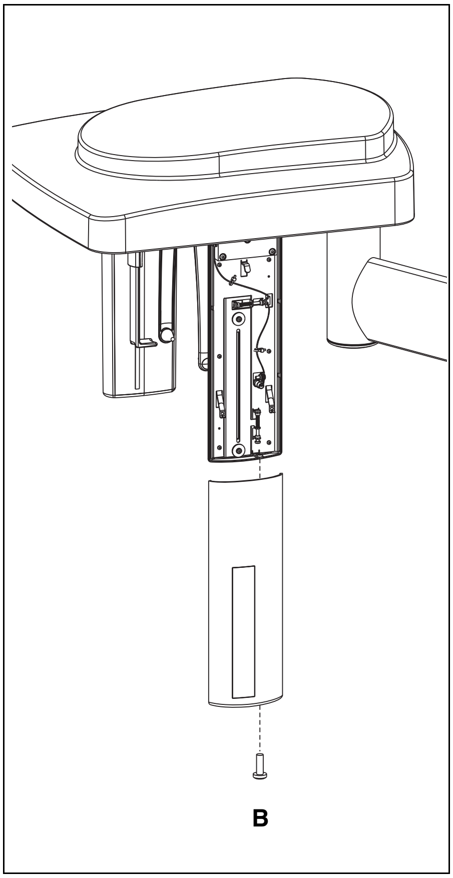
Positive sign *= Moves the diaphragm* ***to the right or upward***
Negative sign *= Moves the diaphragm* ***to the left or downward***

Adjusting the diaphragm

6. Adjust the diaphragm on the cephalometer mechanically.
To do this, proceed as follows:

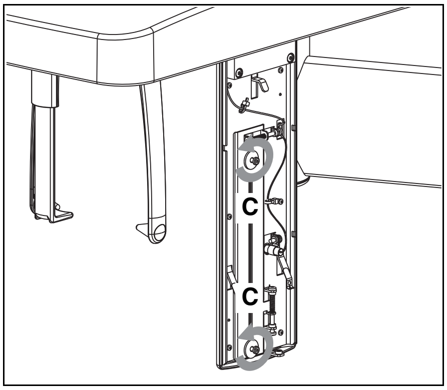
Removing the cover

7. Loosen screw **B** and remove the cover of the secondary diaphragm by pulling it downward.

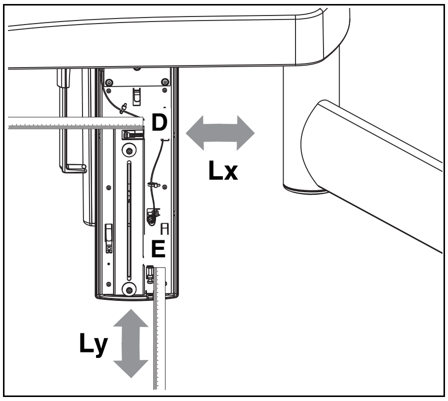


Detaching the diaphragm

8. Loosen screws **C** slightly (approx. 2-3 turns).



Adjusting the inclination



9. Adjust the inclination of the diaphragm with screw **D (Lx mm)** and the height of the diaphragm with screw **E (Ly mm)**.

NOTE

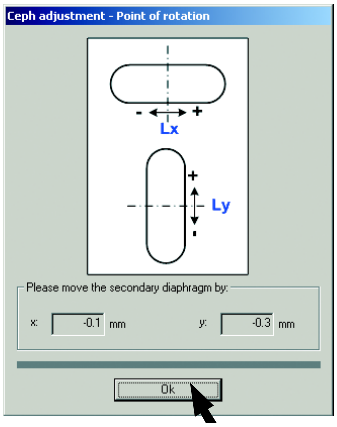
Screw D: *CCW rotation = Correction of diaphragm to the right*
CW rotation = Correction of diaphragm to the left
Screw E: *CCW rotation = downward correction of diaphragm*
CW rotation = upward correction of diaphragm

Use a ruler to measure the displacement.

The directions of rotation specified for the screws above apply equally to both versions (with the ceph arm on the left and on the right).

- Tighten screws **C** again.

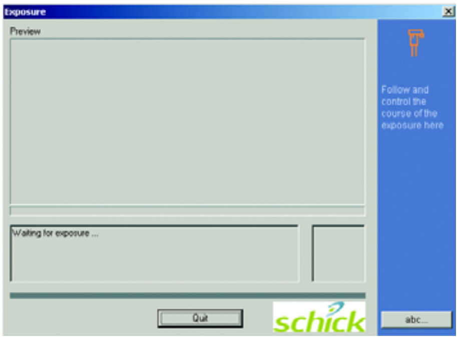
Confirming the diaphragm adjustment



Please move the secondary diaphragm by:
x: -0.1 mm y: -0.3 mm

10. Confirm the mechanical correction of the ceph secondary diaphragm:
Click **OK**

CDR PanElite Service Program

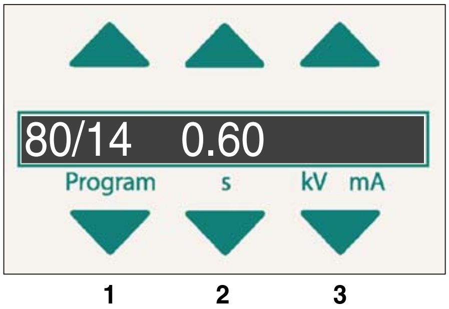


Follow and control the course of the exposure here

Waiting for exposure ...

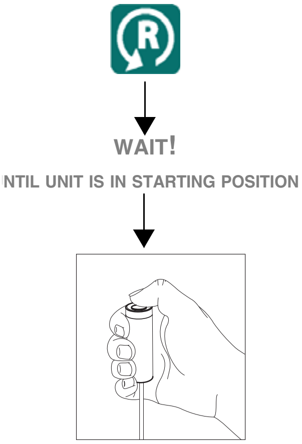
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



11. Take an exposure (80 kV/14 mA; 0.60 s):

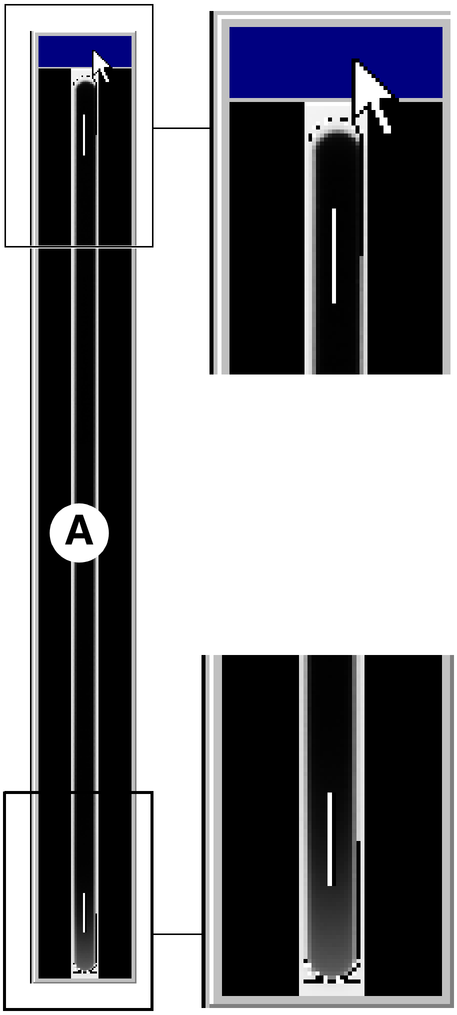
- Press the **R key** to move the unit back to the starting position.

The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

- Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

12. Evaluate the X-ray image:



Adjustment: ok

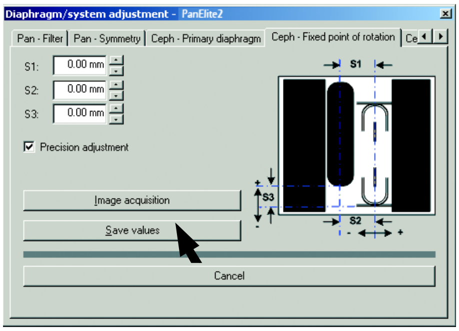
- **The exposed diaphragm area must lie centered and straight in the image field as well as inside the superimposed auxiliary lines (A).**
- **A white border surrounding the image on all sides must be visible. The maximum density must lie in the center of the diaphragm area (A).**

NOTE

If this criterion is not yet fulfilled, repeat the adjustment procedure starting with step 5.

If you do not reach your goal via automatic adjustment, repeat the adjustment procedure with manually determined adjustment values (see page 4-65).

Saving the values



S1: 0.00 mm
S2: 0.00 mm
S3: 0.00 mm

☑ Precision adjustment

13. If the image is identical to the ideal image **(A)**, save the values:

Click **SAVE VALUES**

NOTE

*The values for **S1**, **S2** and **S3** in the **CEPH - FIXED POINT OF ROTATION** submenu are set**equal to zero** with a correct adjustment, i.e. if they are within the permissible tolerance.*

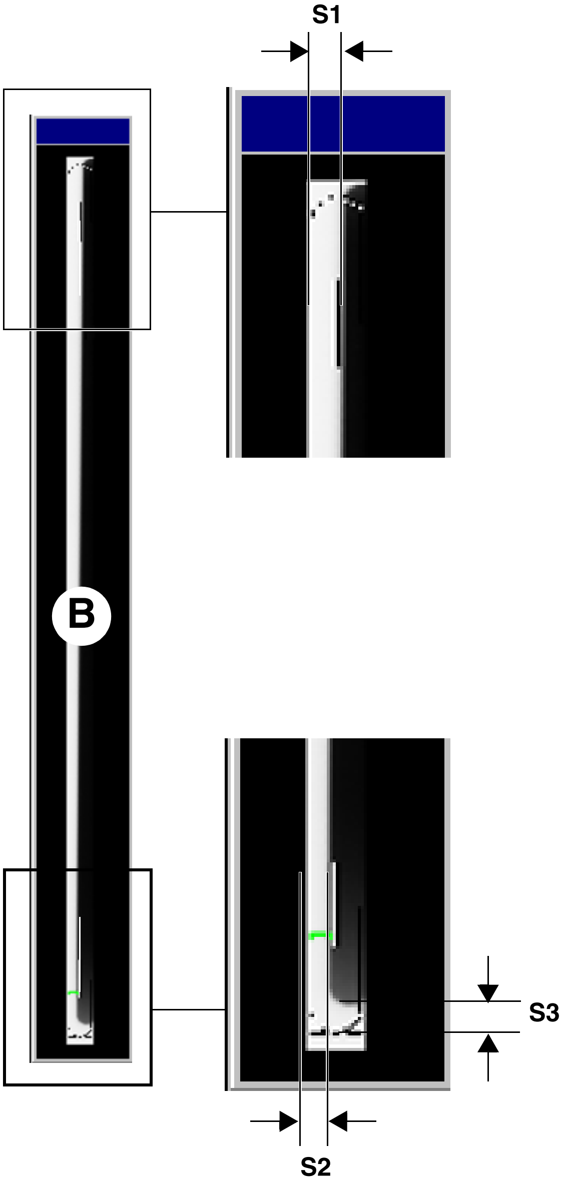
- Go on to the next adjustment step.

Adjusting the ceph fixed point of rotation manually

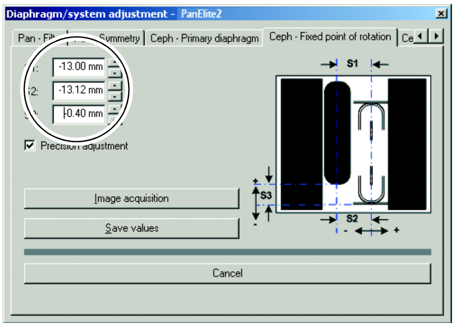
The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment values automatically determined by the CDR PanElite Service Program are overwritten by manually determined adjustment values in the **CEPH - FIXED POINT OF ROTATION** submenu.

Determining the adjustment values for S1, S2 and S3 manually

- Measure distances **S1, S2** and **S3** with the the CDR PanElite Service Program measuring tool.



Overwriting default values for S1, S2 and S3



-13.00 mm
-13.12 mm
0.40 mm

☑ Precision adjustment

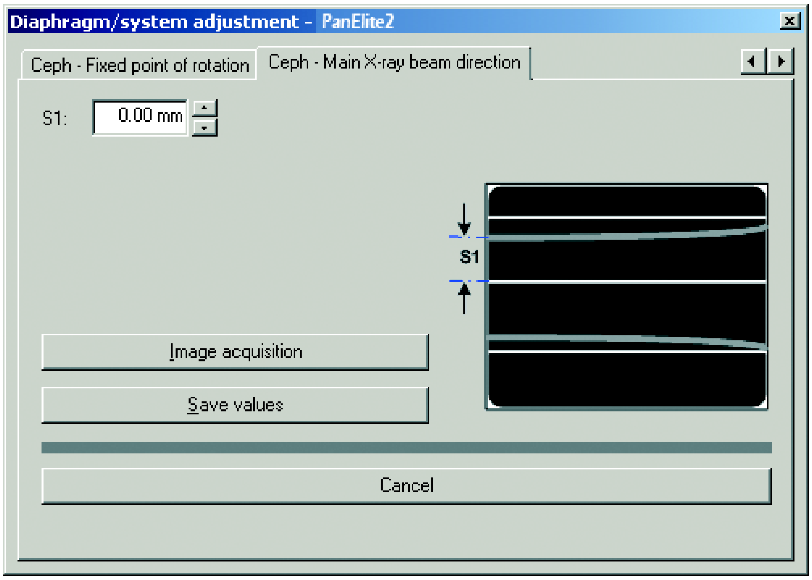
- Overwrite the default values for **S1, S2** and **S3** with the measured values in the text boxes of the **CEPH - FIXED POINT OF ROTATION** submenu.

NOTE

For information on the direction of displacement (input of +/- sign in the menu) see page 4-7. Use points as decimal separators!

- Proceed with step 5 of the adjustment procedure.

4.4.4 Adjusting the ceph main X-ray beam direction


Diaphragm/system adjustment - PanElite2
Ceph - Fixed point of rotation
Ceph - Main X-ray beam direction
S1
Image acquisition
Save values
Cancel

S1: 0.00 mm

Menu: Diaphragm/system adjustment ‡ Ceph - Main X-ray beam direction

CAUTION

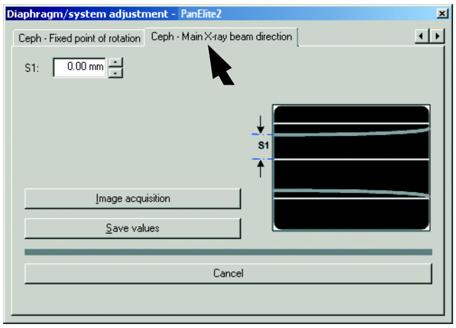
It is essential that the PAN needle phantom be removed from the bite block holder of the panoramic X-ray unit before a Ceph exposure is taken; otherwise the phantom may interfere with the sensor.

Preparations

- Insert the test phantom in the **sensor slot on the panoramic X-ray unit** (see page 4-45).
- Swing the ear plug holders out of the beam direction.

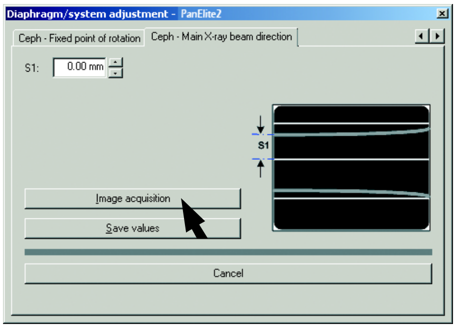
Opening CEPH - MAIN X-RAY BEAM DIRECTION

1. Go to the **CEPH - MAIN X-RAY BEAM DIRECTION** submenu.


Diaphragm/system adjustment - PanElite2
Ceph - Fixed point of rotation
Ceph - Main X-ray beam direction
S1
Image acquisition
Save values
Cancel

S1: 0.00 mm

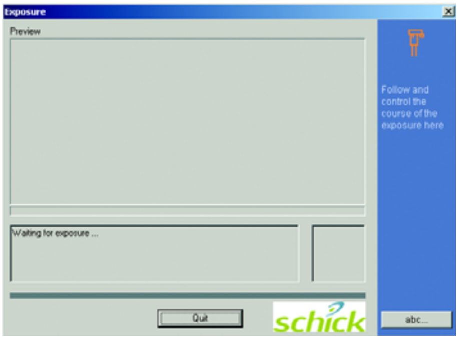
Making the unit ready for exposure


Diaphragm/system adjustment - PanElite2
Ceph - Fixed point of rotation
Ceph - Main X-ray beam direction
S1:
0.00 mm
S1
Image acquisition
Save values
Cancel

2. Make the CDR PanElite Service Program ready for exposure:

   Click **IMAGE ACQUISITION**

CDR PanElite Service Program

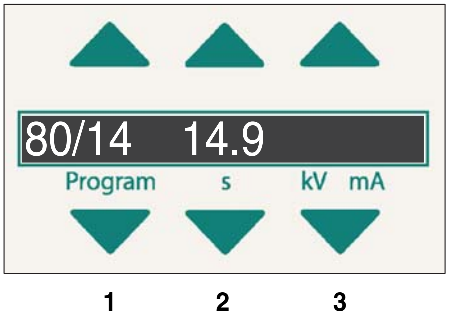


Waiting for exposure ...

Follow and control the course of the exposure here

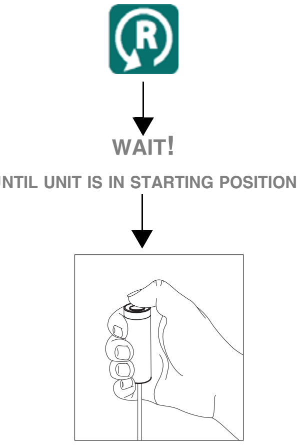
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



3. Take an exposure (80 kV/14 mA; 14.9 s):

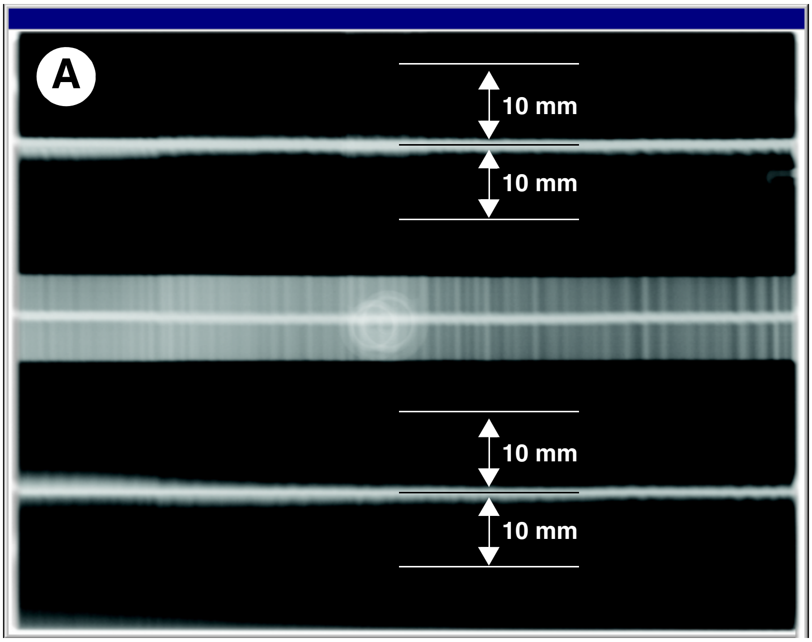
   – Press the **R key** to move the unit back to the starting position.

   The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

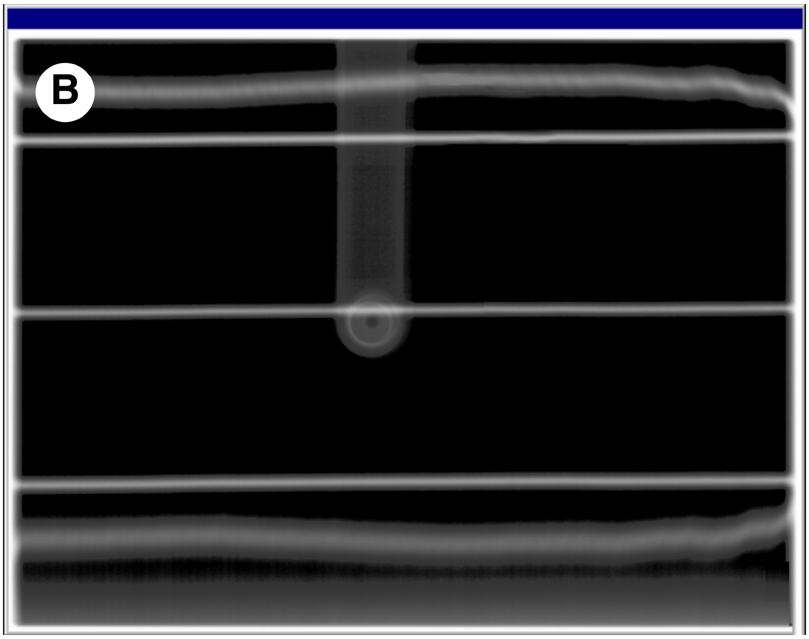
   – Press tand hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok



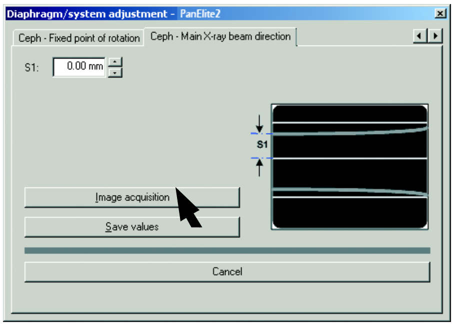
Adjustment: not ok

- **A horizontal bar must be visible in the center of the image (A). If this bar is visible, the exposure is OK and ...**
- **the two beams imaged are within the tolerance band of ± 10 mm (A).**

NOTE

*If the above criteria are not fulfilled **(B)**, the ceph main X-ray beam direction must be adjusted.*

Making the unit ready for exposure


Diaphragm/system adjustment - PanElite2

S1: 0.00 mm
Ceph - Fixed point of rotation
Ceph - Main X-ray beam direction
S1
Image acquisition
Save values
Cancel

NOTE

The default value for S1 was automatically determined by the CDR PanElite Service Program based on the exposure and entered in the text box of the menu.

For manual adjustment, the value displayed at this position in the text box of the menu can be overwritten (see page 4-74).

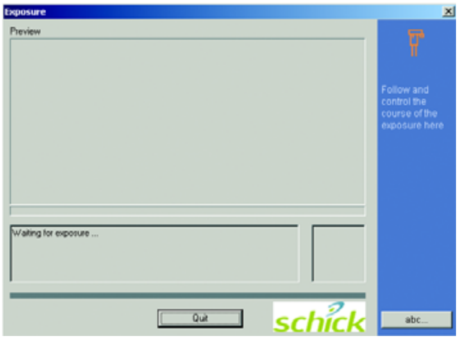
First continue with the automatic adjustment. Manual determination of the adjustment value is required only if you fail to reach your goal via automatic adjustment (see page 4-73).

---

5. Make the CDR PanElite Service Program ready for exposure:

Click **IMAGE ACQUISITION**

CDR PanElite Service Program

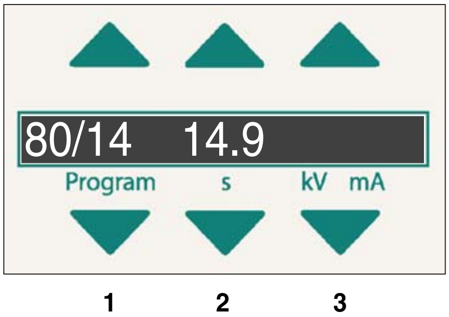

Exposure

Waiting for exposure ...

Follow and control the course of the exposure here

The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad

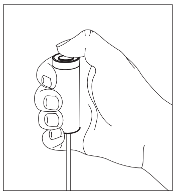


The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure

WAIT!

NTIL UNIT IS IN STARTING POSITION



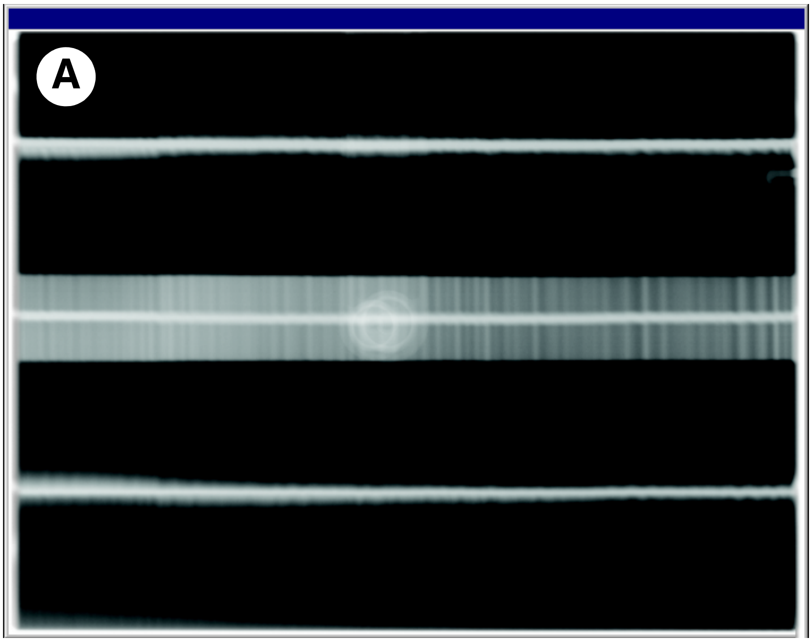
6. Take an exposure (80 kV/14 mA; 14.9 s):
   - Press the **R key** to move the unit back to the starting position.

   The procedure is complete when the exposure parameters are displayed and the progress indicator disappears.

   - Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

7. Evaluate the X-ray image:



Adjustment: ok

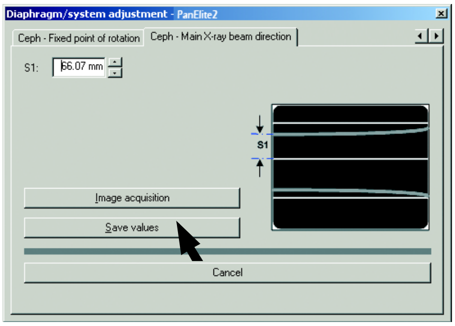
- **A horizontal bar must be visible in the center of the image (A). If this bar is visible, the exposure is OK and ...**
- **the two beams imaged are within the tolerance band of ± 10 mm (A).**

NOTE

If this criterion is not yet fulfilled, repeat the adjustment procedure starting with step 5.

If you do not reach your goal via automatic adjustment, repeat the adjustment procedure with a manually determined adjustment value (see page 4-73).

Saving a value


Diaphragm/system adjustment - PanElite2
Ceph - Fixed point of rotation
Ceph - Main X-ray beam direction
S1
Image acquisition
Save values
Cancel

S1: 66.07 mm

8. If the image is identical to the ideal image **(A)**, save the value:

   Click **SAVE VALUES**

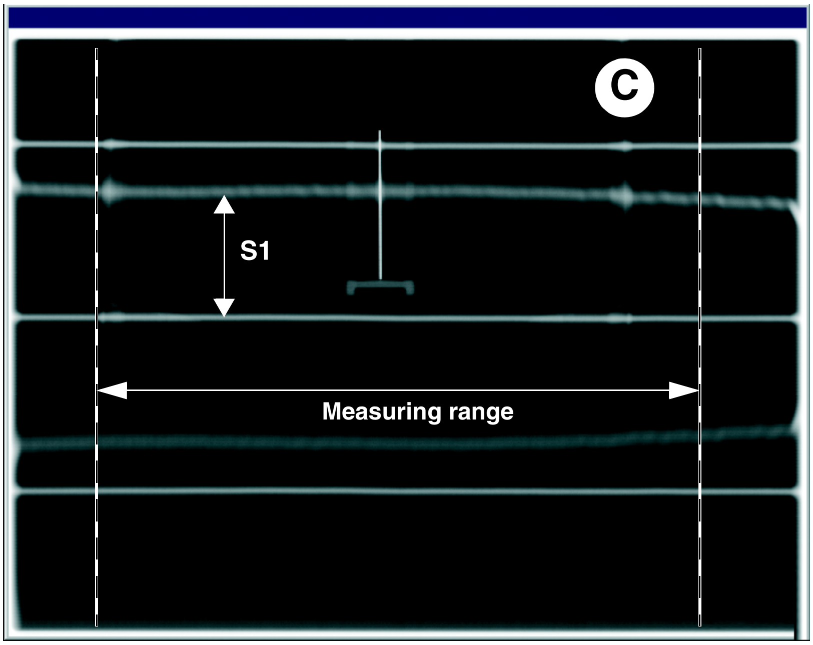
- Go on to the next adjustment step.

Manual adjustment of the ceph main X-ray beam direction

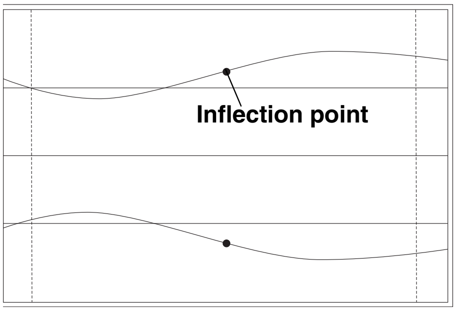
The manual adjustment procedure is similar to the one for automatic adjustment. The only difference is that the default adjustment value automatically determined by the CDR PanElite Service Program is overwritten by a manually determined adjustment value in the **CEPH - MAIN X-RAY BEAM DIRECTION** submenu.

Determining the adjustment value for S1 manually

- Measure distance **S1** with the the CDR PanElite Service Program measuring tool.



Measuring range

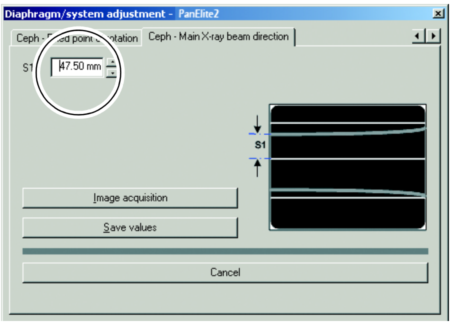


NOTE

Measure within the measuring range shown in ***C****.*

Measure 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, but always within the measuring range shown.

Overwriting the default value for S1


Diaphragm/system adjustment - PanElite2
Ceph - Main X-ray beam direction
S1
Image acquisition
Save values
Cancel

S1 47.50 mm

- Replace the default value for **S1** displayed in the text box of the **CEPH MAIN X-RAY BEAM DIRECTION** submenu with the measured value if necessary.

NOTE

Use points as decimal separators!

- Proceed with step 5 of the adjustment procedure.

4.4.5 Checking and adjusting the alignment of the ear plugs

Checking the ear plug alignment

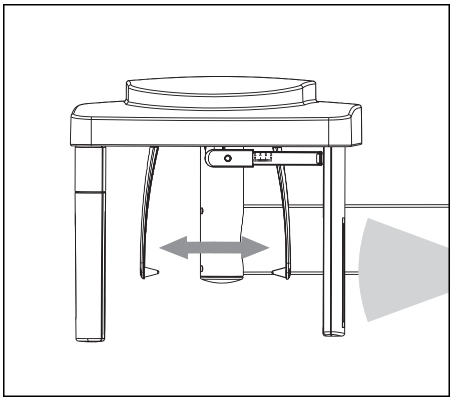
NOTE

The sensor must be plugged into the sensor slot on the cephalometer.
The sensor must not be plugged into the sensor slot on the panoramic X-ray unit.

Preparations

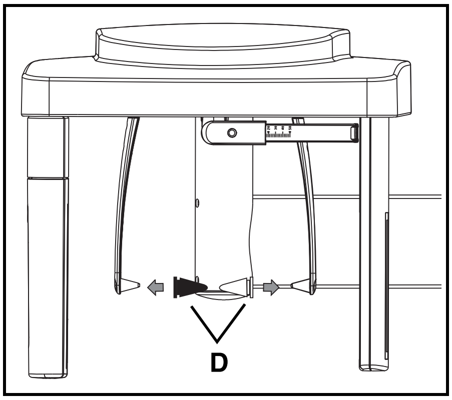
- Select one of the ceph programs on the Control Pad.

Position of the ear plug holders



1. Move the **ear plug holders** completely apart and rotate them **into the beam path**.

Fitting the adjusting caps

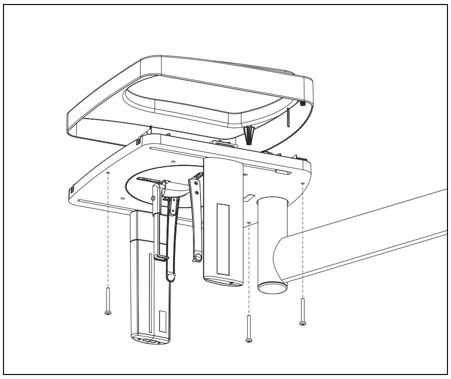


2. Fit adjusting caps **D** onto the ear plugs and secure them with adhesive tape.

- **Fit the black adjusting cap on the outside (sensor side)**
- **Fit the transparent adjusting cap on the inside (tube assembly side).**

Removing the cover

3. Unscrew and remove the cover from the cephalometer.

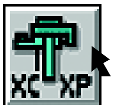


Opening the CDR PanElite Service Program

- Launch the CDR PanElite Service Program via the path:

  Program files\Schick Technologies\CDR PanElite\CDR PanElite Service Program.exe

Starting the exposure mode



- Start the exposure mode:

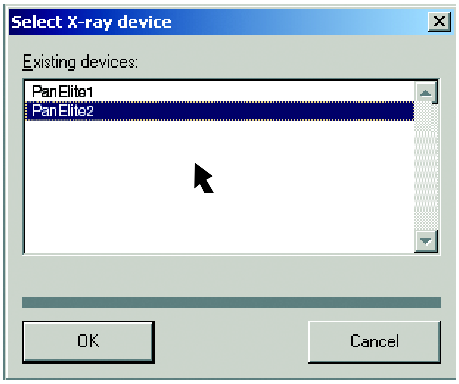
  Click **XCXP**

  The dialog box for selecting the X-ray device appears on the screen.

NOTE

If no X-ray device has been configured yet in the CDR PanElite Service Program, the password input dialog box will appear instead of the dialog box for selecting the X-ray device.

Selecting/confirming the X-ray device

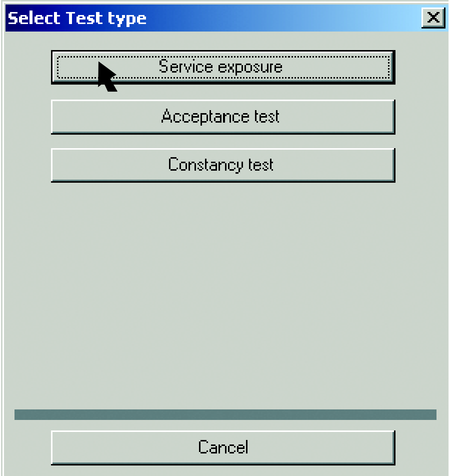


- Select/confirm the desired X-ray device:

  Select e.g. **PANELITE2** and click **OK**

  The dialog box for selecting the test type appears on the screen.

Selecting/confirming the test type

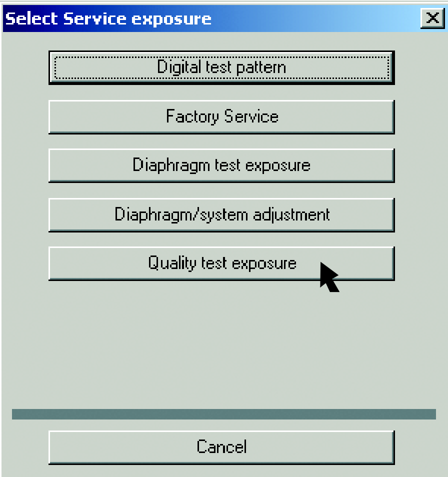


- Select/confirm the test type:

  Click **SERVICE EXPOSURE**

  The dialog box for selecting the service exposure appears on the screen.

Selecting/confirming the service exposure



- Select/confirm the service exposure:

  Click **QUALITY TEST EXPOSURE**

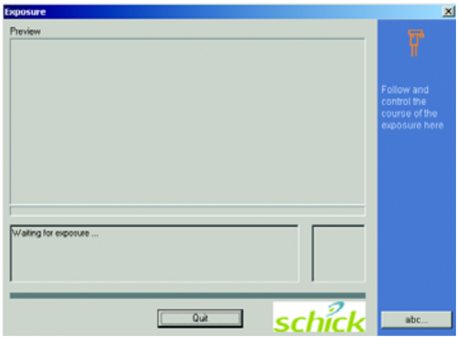
NOTE

The ceph mode must be activated for the ceph quality test exposure (see page 4-75).

NOTE

If necessary, select the X-ray component.

CDR PanElite Service Program

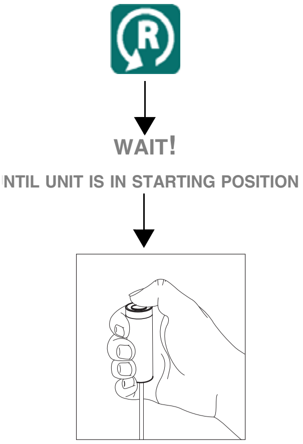


Follow and control the course of the exposure here

Waiting for exposure ...

The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Starting the exposure

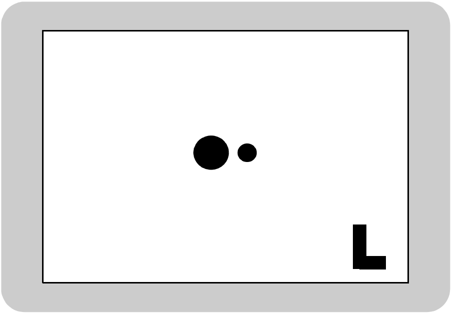


4. Take an exposure:
   - Press the **R key** to move the unit back to the starting position.

   The procedure is complete when the progess indicator disappears.

   - Press and hold down the exposure switch until image acquisition is completed and the preview image appears in the exposure dialog box.

Image

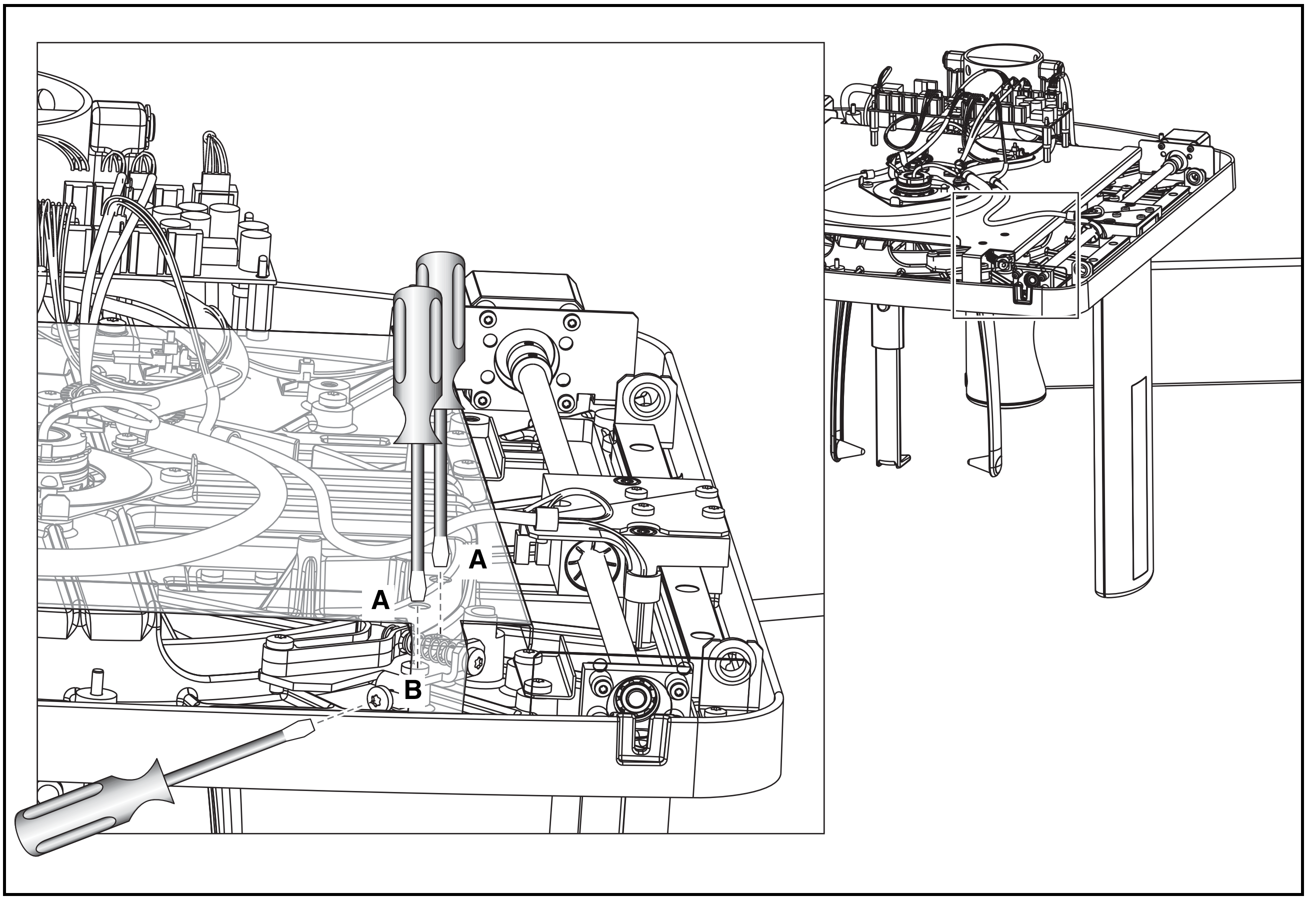


The lead balls in the adjusting caps appear as dots on the image. The two dots must be coincident.

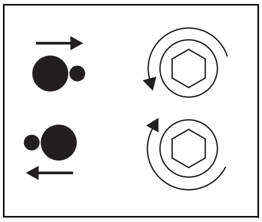
NOTE

If the two dots are not coincident, the ear plugs must be adjusted.

Adjusting the ear plug alignment



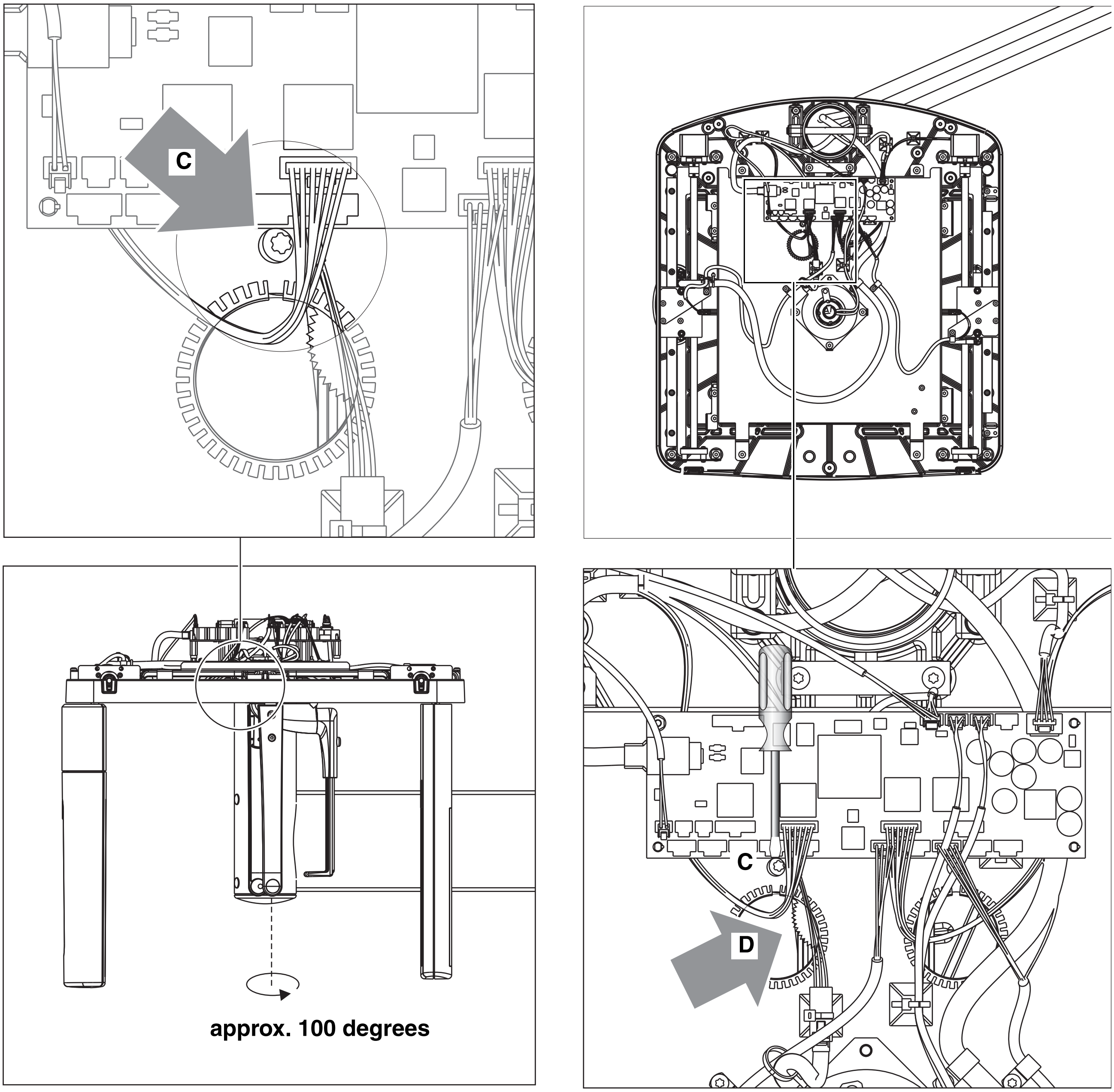
Horizontal correction



5. Loosen screws **A** slightly. **Do not unscrew them completely!**

6. Adjust the ear plugs in the **horizontal direction** by turning screw **B** counterclockwise or clockwise.

- Tighten screws **A** again.

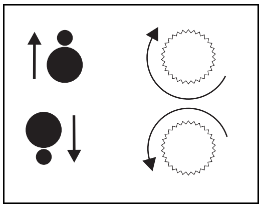


Vertical correction

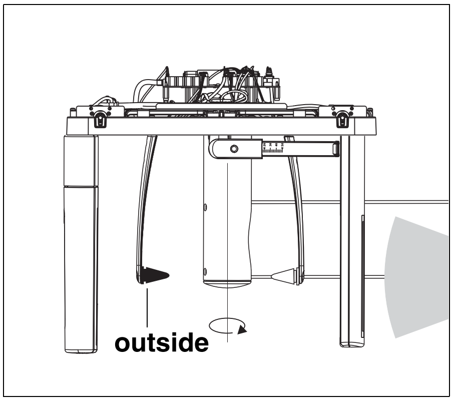
7. Turn the rotary table counterclockwise approx. 100 degrees until you can see screw **C** through the opening in the cover plate.

8. Loosen screw **C** slightly (**do not unscrew it completely!**) and adjust the ear plugs in the **vertical direction** with knurled nut **D**.

- Tighten screw **C** again.



Position of the ear plug holders



9. Turn the ear plug holders back into the beam direction. Make sure that the black adjusting cap is located on the outside again.

- Release radiation again to check the adjustment (see page 4-76).
  - If the two dots displayed on the screen are coincident, reattach the cover (see page 4-76).
  - If the two dots displayed on the screen are not yet coincident, repeat the adjustment procedure.

- **The adjustment of the unit is now complete.**

4.5 Resetting the adjustment

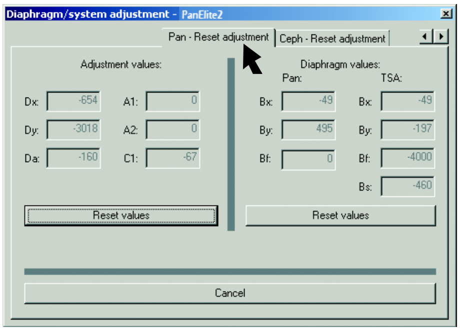
NOTE

Important: Make sure to note down the values displayed in the text boxes before modifying them. This will enable you to reset the adjustment values to the factory settings if necessary.

Contact the dealer tech support for more information (or to enable the menu).

The **DIAPHRAGM/SYSTEM ADJUSTMENT** menu offers you the possibility of resetting or manually modifying any or all of the pan or ceph adjustment settings you have made **in very exceptional cases**.

Resetting the pan adjustment



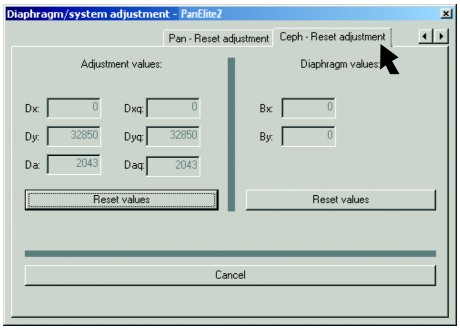
Adjustment values:
Dx: -654
Dy: -3018
Da: -160
A1: 0
A2: 0
C1: -67

Diaphragm values:
Pan:
Bx: -49
By: 495
Bf: 0

TSA:
Bx: -49
By: -197
Bf: -4000
Bs: -460

- To reset the pan settings, open the **PAN - RESET ADJUSTMENT** menu.

Ceph - Reset adjustment



Adjustment values:
Dx: 0
Dy: 32850
Da: 2043
Dxq: 0
Dyq: 32850
Daq: 2043

Diaphragm values:
Bx: 0
By: 0

- To reset the ceph settings, open the **CEPH - RESET ADJUSTMENT** menu.

NOTE

If the adjustment values have been reset, the unit must be readjusted.

5 Service routines

Contents

Directory of all available service routines

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Service routine	Function	Page
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5

Service routines

Using the service routines, you can check certain components and modules of the unit for proper functioning.

This chapter describes all of the service routines which can be selected and started via the service menu on the Control Pad.

NOTE
Service routines S010 and S030 are not manually selectable and therefore are not described here. They are used only for system adjustment (see chapter 4).

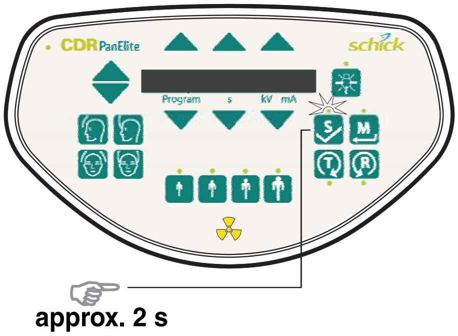
Important for ceph units

NOTE
The Y axis can be displayed laterally reversed (e.g. for C3 the nose tip of the exposure then points to the left instead of to the right as in the normal configuration).

This configuration is effective for all ceph images created (C1-C4).

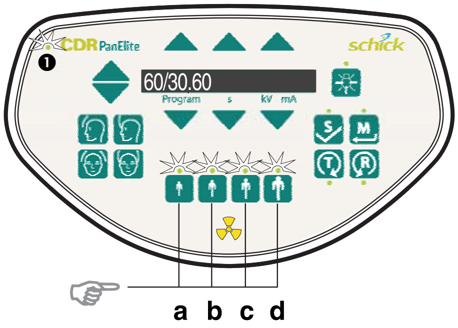
To activate the lateral image reversal, please contact the dealer tech support. They will be glad to give you all the information you need on this subject.

5.1 Selecting the Service menu



1. Press the Service key until the LED above the Service key lights up.

   After the Service key is released, the LEDs above the patient symbol keys light up.



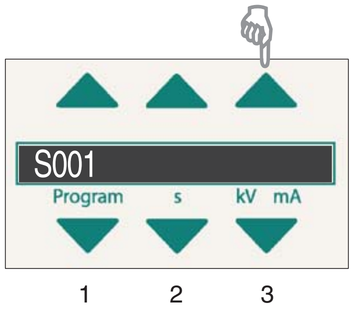
2. Then press the patient symbol keys in the following order within 4 s: **b** – **d** – **a**.

   After you have entered the key combination correctly, the Service menu appears.

NOTE

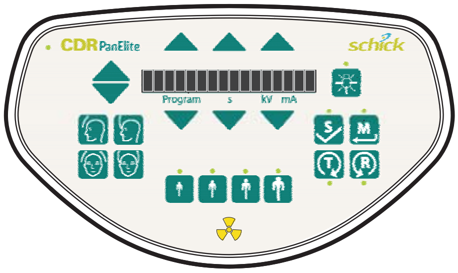
The service mode is signaled by a slow flashing of the Power LED å.

Service menu



To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

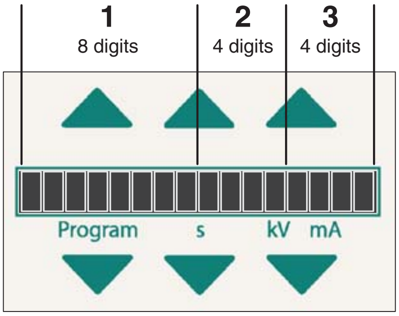
Displays and keys on the Control Pad (for service only)



From the Service menu, you can run all available service routines and perform important system settings, tests and compensations.

Depending on the procedure step, different hints, error messages and parameters are displayed in a context-sensitive way on the Control Pad:

Display



Selection fields 1 - 3: Display fields for service routines, test steps, values, IDs, etc.

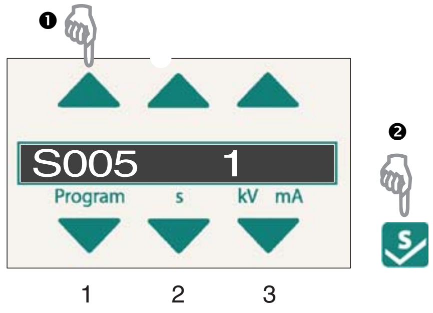
Keys

Patient symbol keys a - d:	a b c d	different functions, depending on the service routine
Memory key:	M	For saving an input
Service key:	S	different functions dep. on service routine; however typically used for confirming a selection or jumping to the next test step
Test key:	T	For starting a test
Return key:	R	For moving the unit to the starting position or confirming a save operation
Double arrow key:	⬍	Return to the Main menu

5.2 Selecting a service routine

- Select the Service menu (see section 5.1).

Selecting a service routine

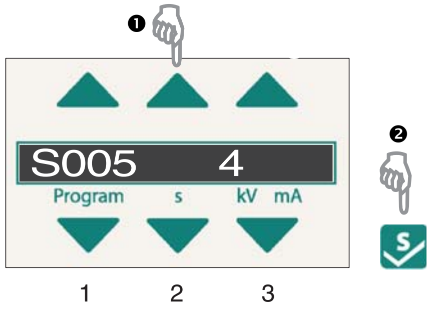


1. Select the desired system version using the **arrow keys** of selection field 1 and confirm this selection with the **Service key**.

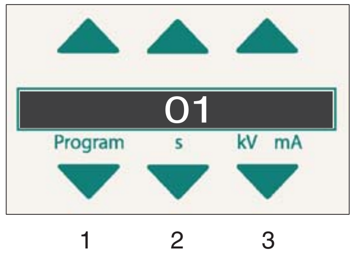
NOTE

If the selected service routine comprises several test steps, the first selectable test step is displayed in selection field 2.

Selecting a test step



2. Select the desired test step using the **arrow keys** of selection field 2 and confirm your selection by pressing the **Service key**.



The parameters or IDs of the selected service routine are displayed on the Control Pad. The Control Pad does not show which service routine or test step is currently active.

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.2.1 Service routines with security access

NOTE

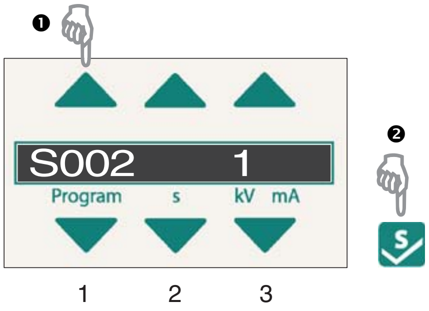
A security code is required for accessing service routines involving functions such as radiation release or editing of configuration data or stored values. This procedure prevents the inadvertent selection or activation of these service routines.

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

WARNING

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

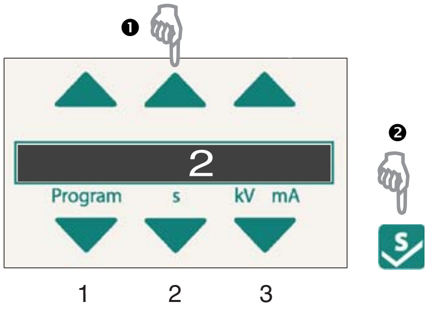
Selecting the service routine/test step



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.

Confirming the security access



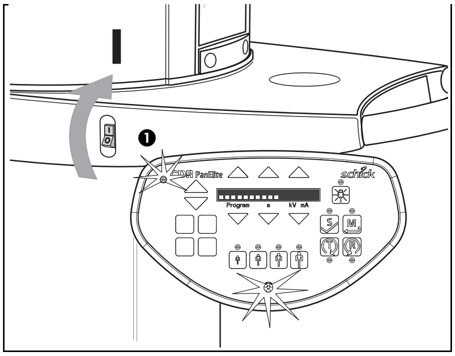
2. Confirm the security access by once again selecting the number of the main routine (in our example 2) with the **arrow keys** of selection field 2 and then pressing the Service key.

   Following this double selection and confirmation, the service routine is activated.

5.3 Service routines with the CDR PanElite Service Program

WARNING

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



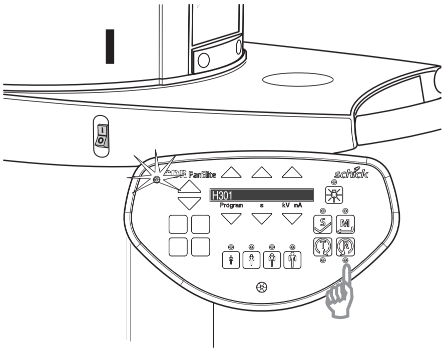
1. Switch the unit **ON**.

   All LEDs and the LED display on the Control Pad light up briefly.

   The green LED in the upper left corner of the Control Pad å remains permanently lit as long as the unit is ON.

   The initialization status is visualized by a progress indicator while the unit performs a self-adjustment routine (approx. 1 min.). At the same time, the rotating element rotates briefly clockwise and counterclockwise and the diaphragm is positioned. The forehead and temple supports on the panoramic unit open and close and then stop moving in fully opened position.

   Once the self-adjustment routine is completed, help message H301 prompts you to move the unit to the starting position.

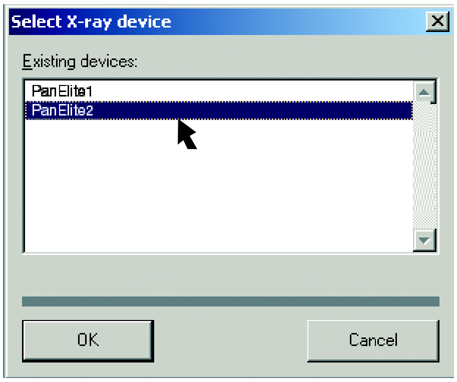


2. Press the **R key** to move the unit back to the starting position.

- Switch the PC **ON** and start the CDR PanElite Service Program (see page 4-5).

3. Start the exposure mode:
   Click **XCXP**.

   The dialog box for selecting the X-ray device appears on the screen.

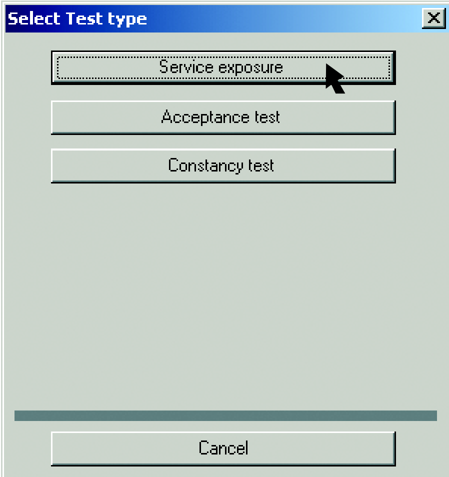


4. Select/confirm the X-ray device:
   Select the desired **X-RAY DEVICE** and click **OK**.

   The dialog box for selecting the test type appears on the screen.

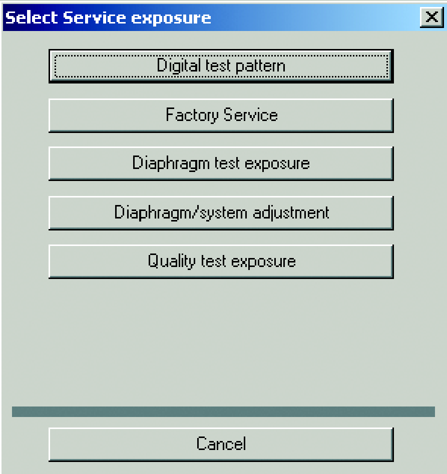
NOTE

Under certain circumstances, the dialog box for selecting the X-ray device may be skipped by the software and the dialog box for selecting the test type appears immediately.



5. Select/confirm the test type:
   Click **SERVICE EXPOSURE**.

   The dialog box for selecting the service exposure appears on the screen.



6. Select/confirm the **SERVICE EXPOSURE**.

   The following service exposures are available for selection:

DIGITAL TEST PATTERN:	Checks the data transmission path between PC and sensor
FACTORY SERVICE:	Sets interlock signal for service programs (without function)
DIAPHRAGM TEST EXPOSURE:	Check of pan and ceph adjustments
DIAPHRAGM/SYSTEM ADJUSTMENT:	Adjustment
QUALITY TEST EXPOSURE:	Test exposure not stored in the PDATA/P2K_Config folder

If several different X-ray components are available, a dialog box for selecting the X-ray device appears on the screen. In this case, select/confirm the required component.

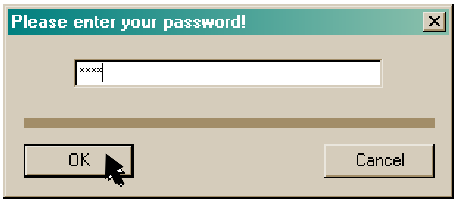
If only one X-ray component is available, the exposure readiness dialog box appears on the screen and shows the status of the exposure.

ℹ ***NOTE***

During operation in the service mode, the unit switches from the user mode to the PC service mode logged by the PC (see section 4.2).

When you select the DIAPHRAGM/SYSTEM ADJUSTMENT menu...

the dialog box for entering the service password appears on the screen.



- Enter the service password and confirm your input by clicking **OK**.

ℹ ***NOTE***

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

5.4 Service routine S001

Radiation without rotary movement, fixed radiation time

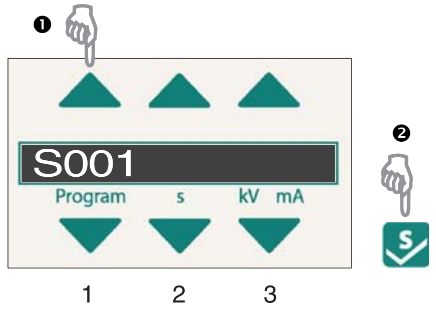
⚠ ***WARNING***

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

Function S001:	Test of X-ray beam and kV/mA levels	
	Radiation with selected kV/mA level Radiation time cannot be selected, max. 14.0 sec. Primary diaphragm remains in last position selected	Security access

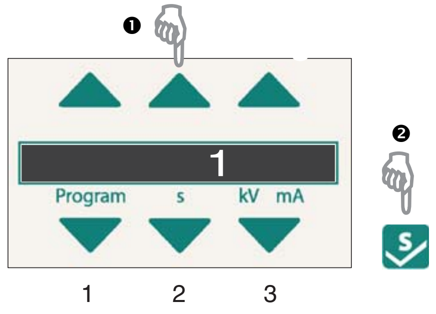
- Select the Service menu (see page 5-8).

Selecting service routine S001



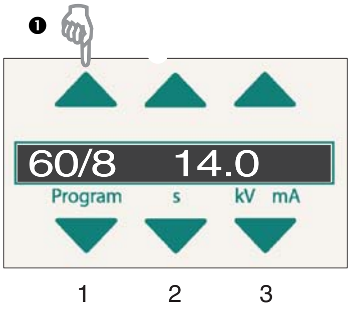
1. Use the **arrow keys** in selection field 1 to select service routine **S001** and confirm this selection with the **Service key** .

Confirming the security access



2. Confirm the security access by once again selecting the number of the main routine (1) with the arrow keys of selection field 2 and then pressing the **Service key** .

Selecting the kV/mA level



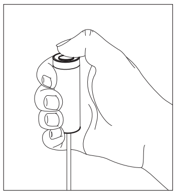
3. Use the **arrow keys** in selection field 1 to select the desired kV/mA level.

NOTE

The maximum radiation time is displayed in selection field 2. The maximum radiation time cannot be changed in this service routine and equals 14.0 seconds.

Radiation is emitted as long as the exposure switch remains pressed until the maximum time of 14.0 seconds is reached.

Releasing radiation



4. Release radiation by pressing the exposure switch.

- ✓ **Radiation from any tube assembly position, no rotary movement**
- ✓ **The primary diaphragm remains in the last position set**
- ✓ **The radiation time is 14.0 seconds**

NOTE

*If you let go of the exposure switch 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 selection field 2 on the Control Pad (automatic exposure blocking).

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.5 Service routine S002

Radiation without rotary movement, maximum radiation time can be selected

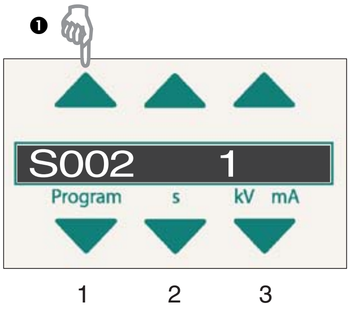
WARNING

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

Function S002	X-ray beam test	
	Radiation with selected kV/mA level Maximum radiation time selectable Radiation from any position	
Test step 1	Primary diaphragm remains in last position selected	Security access
Test step 3	Primary diaphragm opened fully	Security access
Test step 4	Filter element for 0.8 Cu step filter The primary diaphragm is set to a widened opening symmetrical to the PAN setting so that the step filter still remains covered.	Security access

- Select the Service menu (see page 5-8).

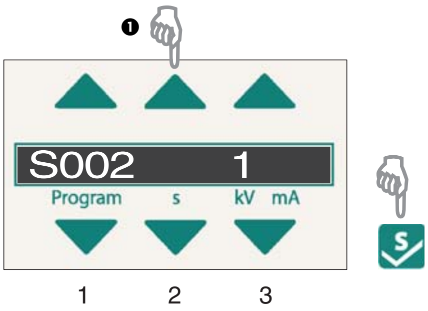
Selecting service routine S002



1. Select service routine **S002** using the **arrow keys** of selection field 1.

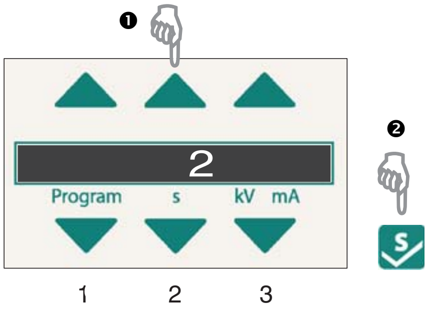
5.5.1 S002: Test step 1

Selecting test step 1



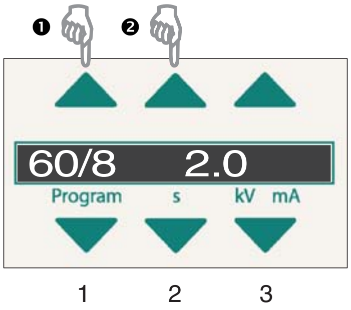
1. Select test step 1 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.

Confirming the security access



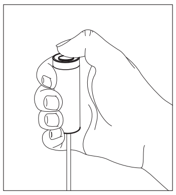
2. Confirm the security access by once again selecting the number of the main routine (2) with the **arrow keys** of selection field 2 and then pressing the **Service key** S.

Selecting the kV/mA level and radiation time



3. Use the **arrow keys** of
   - selection field 1 to select the desired kV/mA level and
   - selection field 2 to select the desired radiation time.

Releasing radiation



4. Release radiation by pressing the exposure switch.

- ✓ **Radiation from any tube assembly position, no rotary movement**
- ✓ **The primary diaphragm remains in the last position set**
- ✓ **The maximum radiation time corresponds to the selected radiation time**

NOTE

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

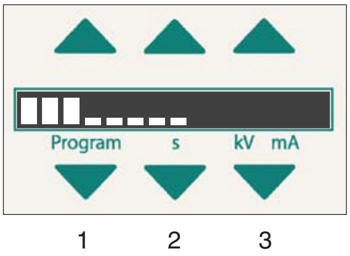
When you release radiation during the cool-down interval, a countdown of the remaining waiting time is displayed in selection field 2 on the Control Pad (automatic exposure blocking).

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.5.2 S002: Test step 3



Difference from S002, test step 1:

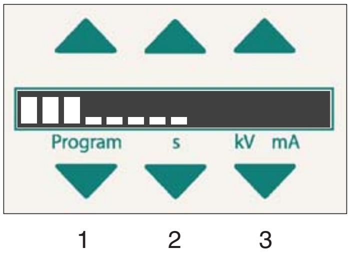
- ✓ **Primary diaphragm is opened fully**

NOTE

For selection and operating sequence, see S002, test step 1.

After you have selected test step 3, the primary diaphragm is moved to the new position (opened fully).
During this time, a progress indicator is displayed in selection field 1.

5.5.3 S002: Test step 4



Difference from S002, test step 1:

- ✓ **A filter element for a 0.8 Cu step filter is inserted in the beam path**
- ✓ **The primary diaphragm is widened symmetrically to the pan position so that the step filter still remains covered**

NOTE

For selection and operating sequence, see S002, test step 1.

After you have selected test step 4, the primary diaphragm is moved to the new position (opened fully and symmetrical to PAN position).
During this time, a progress indicator is displayed in selection field 1.

5.6 Service routine S005

General X-ray tube assembly service

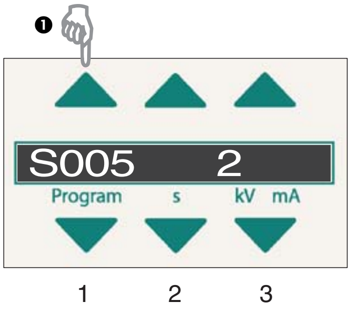
WARNING
Be sure to observe the radiation protection regulations applicable in your country.

Function S005	General X-ray tube assembly service	
Test step 2	Automatic compensation of preheating	Security access
Test step 4	Fan test	
Test step 5	Temperature sensor test	
Test step 6	Switch off cool-down interval of the single tank	Security access
Test step 7	Configuring continuous operation of the tube assembly fan	Security access

- Select the Service menu (see page 5-8).

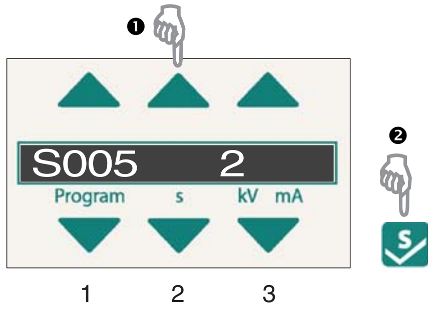
Selecting service routine S005

1. Use the **arrow keys** to select service routine **S005**.



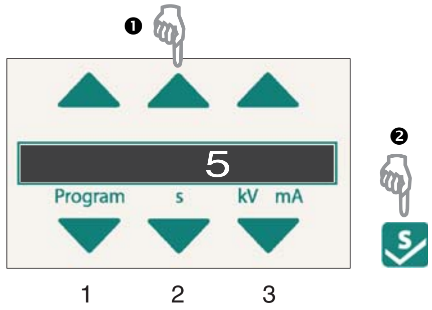
5.6.1 S005: Test step 2

Selecting test step 2

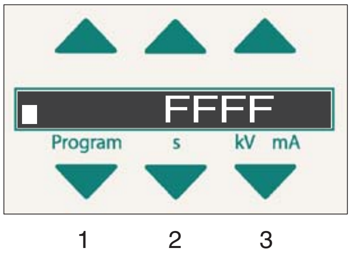


1. Select test step 2 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .

Confirming the security access

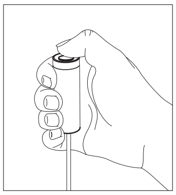


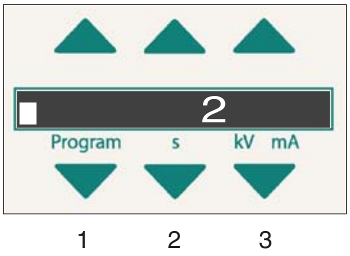
2. Confirm the security access by once again selecting the number of the main routine (5) with the **arrow keys** of selection field 2 and then pressing the **Service key** .



An inactive progress indicator in selection field 1 and the message FFFF in selection field 2 signal that the system is ready for compensation.

Performing the compensation





3. Start the automatic compensation by pressing the exposure switch.

⚠ **CAUTION**

The tube assembly must be at operating temperature before the compensation. To do this, release radiation once for 14.0 s at kV/mA level 60/9 via service routine S001 (see page 5-14).

ℹ **NOTE**

Keep pressing the exposure switch until compensation is completed and the new offset value for preheating is displayed. During the compensation procedure, a progress indicator is displayed in selection field 1.

ℹ **NOTE**

If you interrupt the compensation procedure prematurely by letting go of the exposure switch, the message EEEE appears in selection field 2. This message must be acknowledged with the ***R key****.*

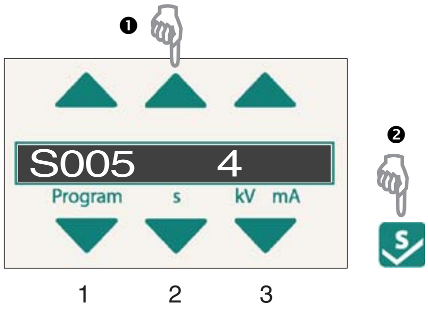
Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

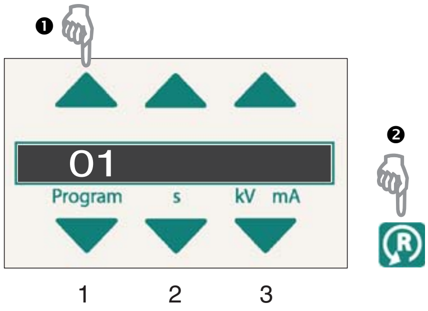
5.6.2 S005: Test step 4

Selecting test step 4



1. Select test step 4 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S .

Testing the fan



2. Switch the fan **ON** by selecting code **01** with the **arrow keys** and confirming with the **R key** R .

Code: **00 = Fan OFF**
01 = Fan ON

- Check the fan for running noise.

Quitting the service routine

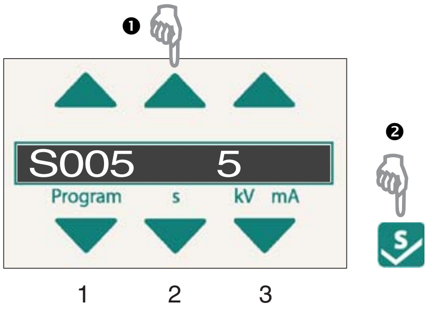
To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

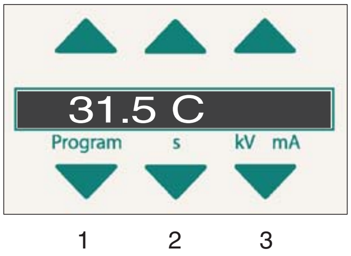
NOTE
When you quit the service routine the fan is automatically switched OFF again.

5.6.3 S005: Test step 5

Selecting test step 5



1. Select test step 5 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .



After test step 5 is selected, selection field 1 displays the single tank temperature in °C. The display is updated once per second.

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

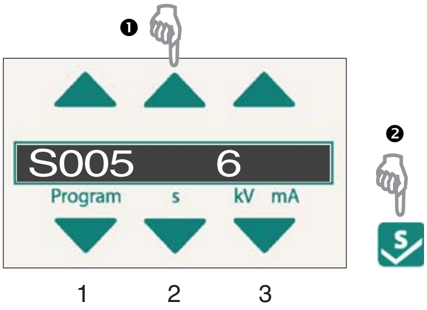
5.6.4 S005: Test step 6

Upon explicit customer request, the monitored pulse/pause ratio can be disabled in exceptional cases. This can be done one time via service routine S005, test step 6. 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".

CAUTION

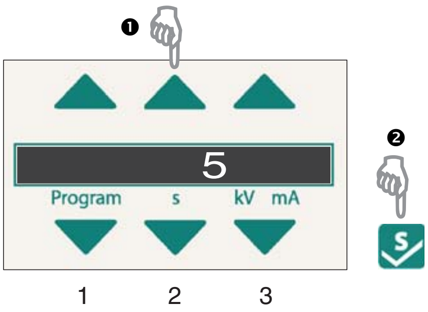
The execution of this service routine is irreversible. The system is operated beyond its specifications afterwards. This may result in an X-ray tube assembly failure. As a result, the system warranty expires. The dealer tech support is able to prove this system setting after a system failure.

Selecting test step 6

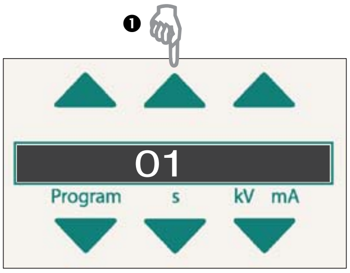


1. Select test step 6 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .

Confirming the security access



2. Confirm the security access by once again selecting the number of the main routine (5) with the **arrow keys** of selection field 2 and then pressing the **Service key** .



The status of the pulse/pause treatment is displayed in the selection field 1:

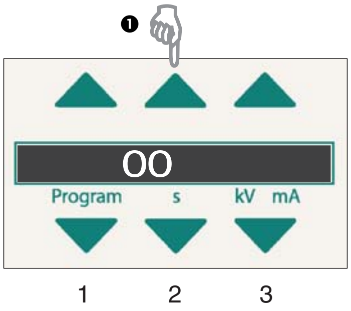
01 = Pulse/pause monitoring enabled

00 = Pulse/pause monitoring disabled

Disabling the pulse/pause monitoring

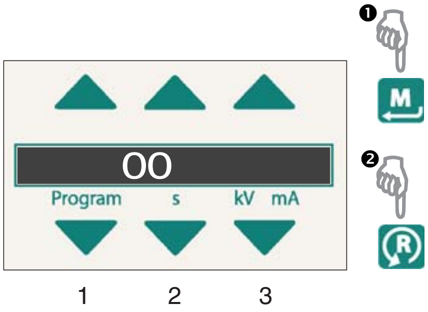
⚠ *CAUTION*

The execution of this service routine is irreversible. The system is operated beyond its specifications afterwards. This may result in an X-ray tube assembly failure. As a result, the system warranty expires. The dealer tech support is able to prove this system setting after a system failure.



3. To distable the pulse/pause monitoring, select code 00 in selection field 1 with the arrow keys.

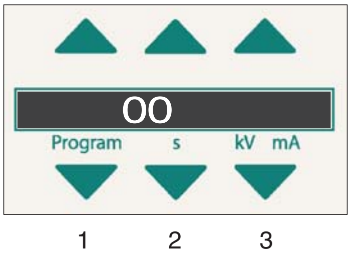
The LED above the **Memory key** M lights up.



4. To save the selection, first press the **Memory key** M (LED below R key lights up) and then the **R key** R .

i *NOTE*

If pulse/pause monitoring has been disabled before already, this service routine serves as a mere status display. These keys are then disabled.



Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

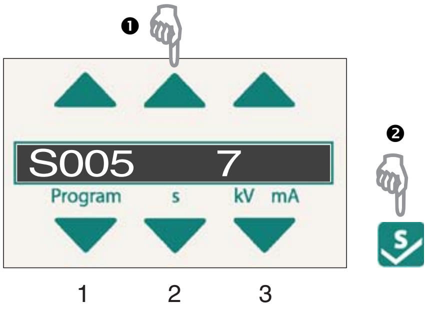
5.6.5 S005: Test step 7

The tube assembly fan can be configured for continuous operation at the express wish of the customer This can be done via service routine S005, test step 7. The customer should be informed in advance about the increased noise to be expected. A demonstration of the fan noise can be made with service routine S005.4.

CAUTION

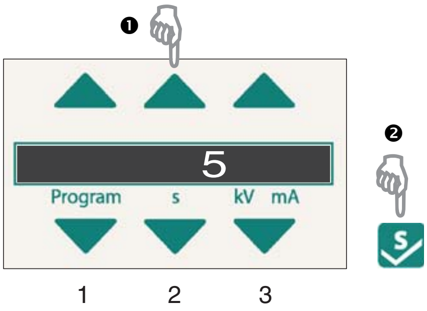
Because of the expected greater contamination of the fan and of the single tank housing, the configuration of continuous operation is documented irreversibly on the tube assembly in order to obtain additional information in the case of returned goods.

Selecting test step 6

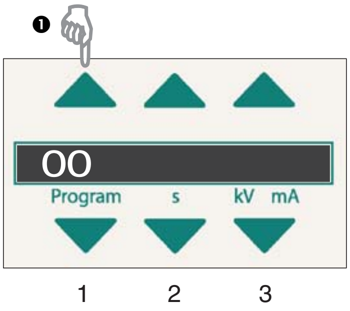


1. Select test step 7 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .

Confirming the security access



2. Confirm the security access by once again selecting the number of the main routine (5) with the **arrow keys** of selection field 2 and then pressing the **Service key** .

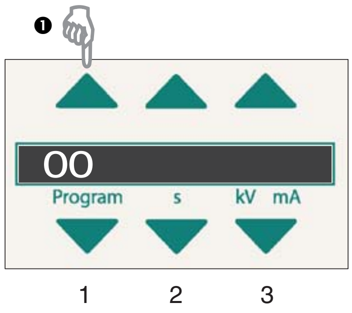


The operating mode of the fan is displayed in selection field 1:

01 = continuous operation of the fan

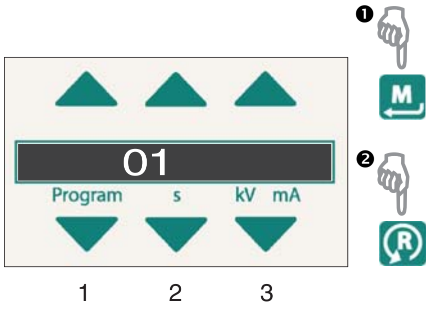
00 = controlled operation of the fan

Switching on continuous fan operation



3. To switch the fan to continuous operation, select code 01 in selection field 1 with the arrow keys.

   The LED above the **Memory key** M lights up.



4. To save the selection, first press the **Memory key** M (LED below R key lights up) and then the **R key** Ⓡ.

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.7 Service routine S007

Error logging memory

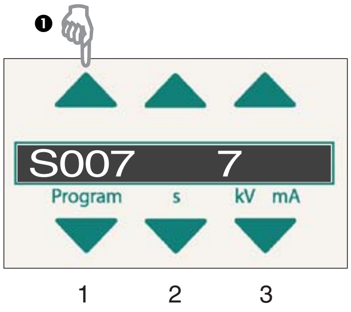
Function S007	Error logging memory	
Test step 1	Display error logging memory	
Test step 2	Clear error logging memory	Security access
Test step 5	Enabling the CAN bus logging in the Miniweb	

NOTE

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

- Select the Service menu (see page 5-8).

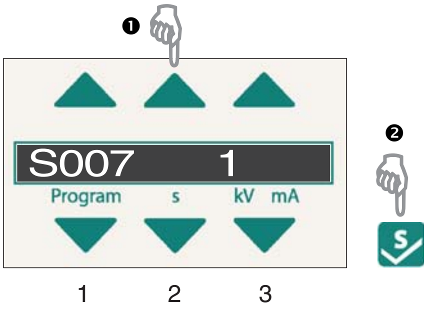
Selecting service routine S007



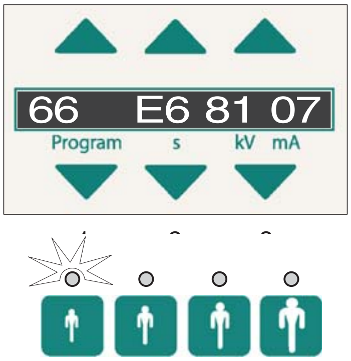
1. Use the **arrow keys** to select service routine **S007**.

5.7.1 S007: Test step 1

Selecting test step 1

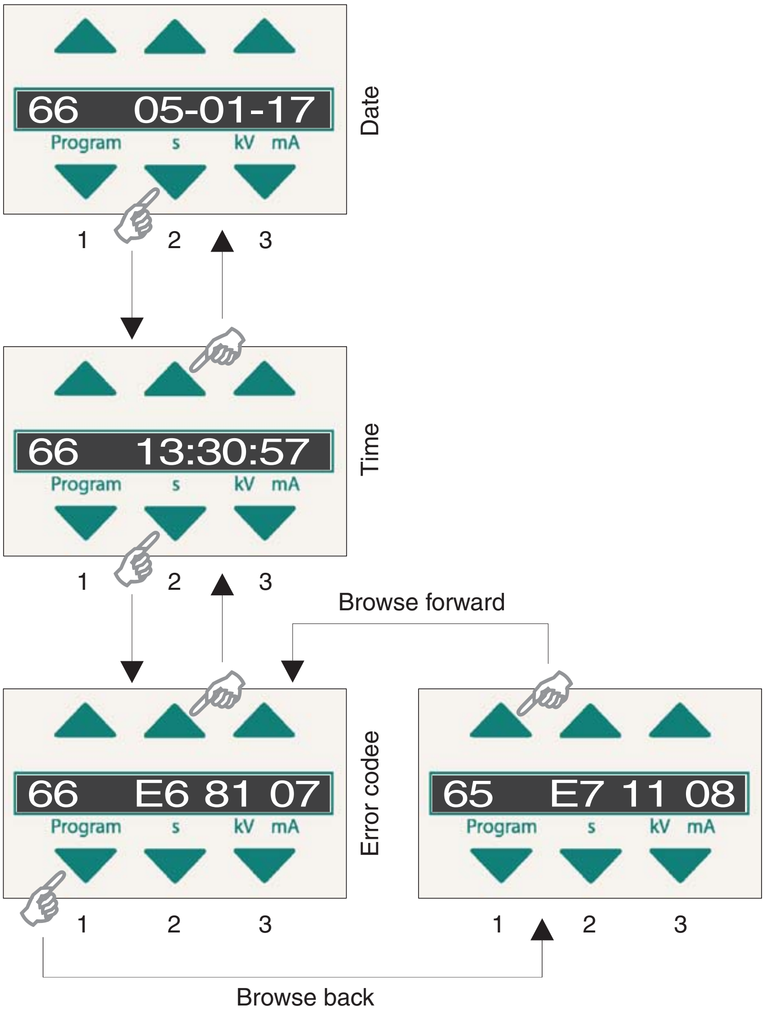


1. Select test step 1 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .

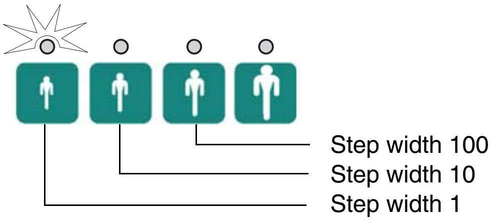


2. Select the desired error event (in example 66).

You can browse between the different occurred error numbers with the arrow keys in selection field 1. You can display the error code, time or date of the error event with the arrow keys in selection field 2.



You can set the step width for browsing between the error numbers with the first three patient symbol keys (starting from the left).



The LED above the selected patient symbol key is lit. A step width of 1 is preset (the LED above the left patient symbol key is lit).

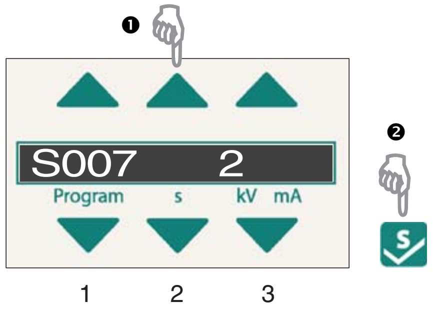
Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

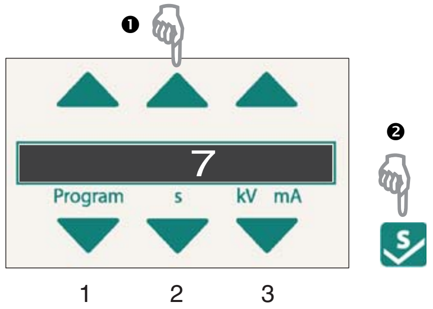
5.7.2 S007: Test step 2

Selecting test step 2

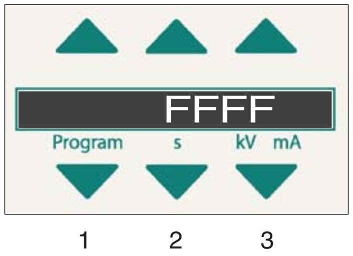


1. Select test step 2 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.

Confirming the security access



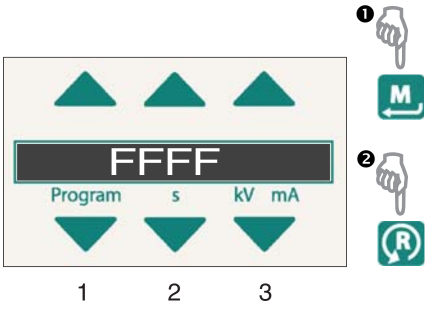
2. Confirm the security access by once again selecting the number of the main routine (7) with the **arrow keys** of selection field 2 and then pressing the **Service key** S.

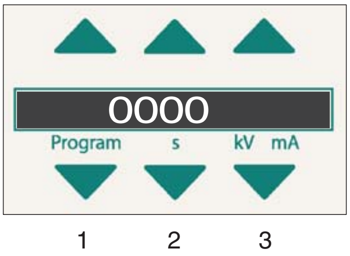


The system's readiness to clear the memory is indicated by the display message FFFF in selection field 1. If the error logging memory does not contain any data, 0000 is displayed.

Clear error logging memory

3. To clear the memory, first press the **Memory key** M (LED below R key lights up) and then the **R key** Ⓡ .





Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

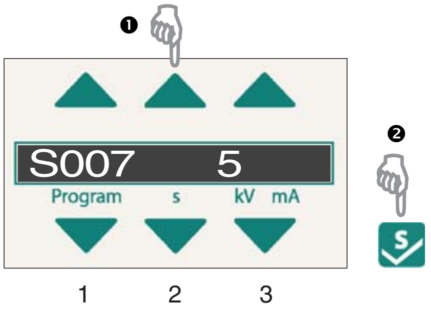
To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.7.3 S007: Test step 5

CAUTION

This service routine should be executed only in consultation with the dealer tech support!

Selecting test step 5



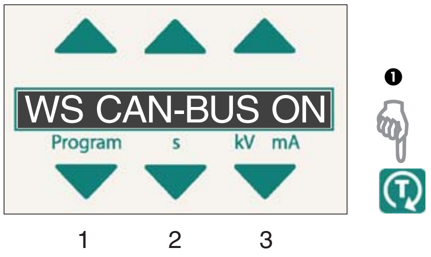
1. Select test step 5 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .

Activation of logging

2. Select the desired setting using the arrow keys of selection field 1:

   – **WS CAN bus off (factory setting):** Logging switched off
   – **WS CAN bus on:** Logging switched on
   – **WS CAN bus Ex. on:** Extended logging switched on

   After the test step has been selected the LED below the **Test key** lights up.



3. To activate the logging function, press the **Test key** .
   All CAN bus events occurring from now on during operation of the system will be logged and can be displayed with a web browser (e.g. Internet Explorer). This log will help you when consulting the dealer tech support for error diagnosis.

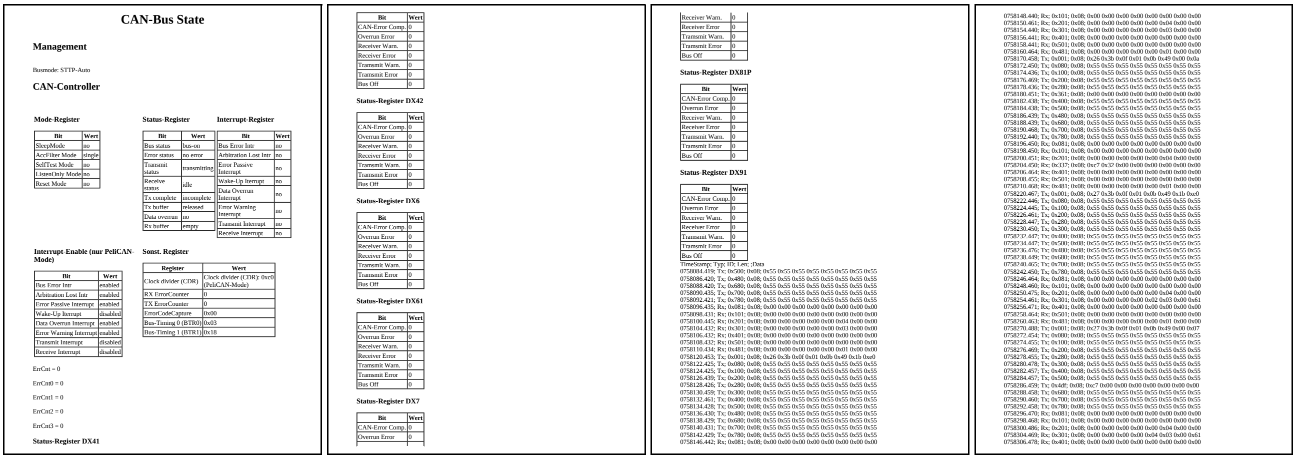
Displaying the log with a web browser

Enter the following web address on a PC (with internet access) integrated in a system network:

http://XXX.XXX.XXX.XXX:8051/CAN
IP address of the unit

The CAN bus protocol is displayed in the browser and can be saved as HTML page, printed out of sent to the dealer tech support.

Example for the first 4 pages of an extended log (WS CAN bus Ex. on)



CAN-Bus State

Management

Busmode: STTP-Auto

CAN-Controller

Mode-Register

Bit	Wert
SleepMode	no
AccFilter Mode	single
SelfTest Mode	no
ListenOnly Mode	no
Reset Mode	no

Status-Register

Bit	Wert
Bus status	bus-on
Error status	no error
Transmit status	transmitting
Receive status	idle
Tx complete	incomplete
Tx buffer	released
Data overrun	no
Rx buffer	empty

Interrupt-Register

Bit	Wert
Bus Error Intr	no
Arbitration Lost Intr	no
Error Passive Interrupt	no
Wake-Up Iterrupt	no
Data Overrun Interrupt	no
Error Warning Interrupt	no
Transmit Interrupt	no
Receive Interrupt	no

Interrupt-Enable (nur PeliCAN-Mode)

Bit	Wert
Bus Error Intr	enabled
Arbitration Lost Intr	enabled
Error Passive Interrupt	enabled
Wake-Up Iterrupt	disabled
Data Overrun Interrupt	enabled
Error Warning Interrupt	enabled
Transmit Interrupt	disabled
Receive Interrupt	disabled

Sonst. Register

Register	Wert
Clock divider (CDR)	Clock divider (CDR): 0xc0 (PeliCAN-Mode)
RX ErrorCounter	0
TX ErrorCounter	0
ErrorCodeCapture	0x00
Bus-Timing 0 (BTR0)	0x03
Bus-Timing 1 (BTR1)	0x18

ErrCnt = 0

ErrCnt0 = 0

ErrCnt1 = 0

ErrCnt2 = 0

ErrCnt3 = 0

Status-Register DX41

Bit	Wert
CAN-Error Comp.	0
Overrun Error	0
Receiver Warn.	0
Receiver Error	0
Tramsmit Warn.	0
Tramsmit Error	0
Bus Off	0

Status-Register DX42

Bit	Wert
CAN-Error Comp.	0
Overrun Error	0
Receiver Warn.	0
Receiver Error	0
Tramsmit Warn.	0
Tramsmit Error	0
Bus Off	0

Status-Register DX6

Bit	Wert
CAN-Error Comp.	0
Overrun Error	0
Receiver Warn.	0
Receiver Error	0
Tramsmit Warn.	0
Tramsmit Error	0
Bus Off	0

Status-Register DX61

Bit	Wert
CAN-Error Comp.	0
Overrun Error	0
Receiver Warn.	0
Receiver Error	0
Tramsmit Warn.	0
Tramsmit Error	0
Bus Off	0

Status-Register DX7

Bit	Wert
CAN-Error Comp.	0
Overrun Error	0
Receiver Warn.	0
Receiver Error	0
Tramsmit Warn.	0
Tramsmit Error	0
Bus Off	0

Status-Register DX81P

Bit	Wert
CAN-Error Comp.	0
Overrun Error	0
Receiver Warn.	0
Receiver Error	0
Tramsmit Warn.	0
Tramsmit Error	0
Bus Off	0

Status-Register DX91

Bit	Wert
CAN-Error Comp.	0
Overrun Error	0
Receiver Warn.	0
Receiver Error	0
Tramsmit Warn.	0
Tramsmit Error	0
Bus Off	0

```
TimeStamp; Typ; ID; Len; ;Data
0758084.419; Tx; 0x500; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758086.420; Tx; 0x480; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758088.420; Tx; 0x680; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758090.435; Tx; 0x700; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758092.421; Tx; 0x780; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758096.435; Rx; 0x081; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758098.431; Rx; 0x101; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758100.445; Rx; 0x201; 0x08; 0x00 0x00 0x00 0x00 0x00 0x04 0x00 0x00
0758104.432; Rx; 0x301; 0x08; 0x00 0x00 0x00 0x00 0x00 0x03 0x00 0x00
0758106.432; Rx; 0x401; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758108.432; Rx; 0x501; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758110.434; Rx; 0x481; 0x08; 0x00 0x00 0x00 0x00 0x00 0x01 0x00 0x00
0758120.453; Tx; 0x001; 0x08; 0x26 0x3b 0x0f 0x01 0x0b 0x49 0x1b 0xe0
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0758132.461; Tx; 0x400; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758134.428; Tx; 0x500; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758136.430; Tx; 0x480; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758138.429; Tx; 0x680; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758140.431; Tx; 0x700; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758142.429; Tx; 0x780; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758146.442; Rx; 0x081; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758148.440; Rx; 0x101; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758150.461; Rx; 0x201; 0x08; 0x00 0x00 0x00 0x00 0x00 0x04 0x00 0x00
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0758200.451; Rx; 0x201; 0x08; 0x00 0x00 0x00 0x00 0x00 0x04 0x00 0x00
0758204.450; Rx; 0x337; 0x08; 0xc7 0x32 0x00 0x00 0x00 0x00 0x00 0x00
0758206.464; Rx; 0x401; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758208.455; Rx; 0x501; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758210.468; Rx; 0x481; 0x08; 0x00 0x00 0x00 0x00 0x00 0x01 0x00 0x00
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0758234.447; Tx; 0x500; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
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0758254.461; Rx; 0x301; 0x08; 0x00 0x00 0x00 0x00 0x02 0x03 0x00 0x61
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0758258.464; Rx; 0x501; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758260.463; Rx; 0x481; 0x08; 0x00 0x00 0x00 0x00 0x00 0x01 0x00 0x00
0758270.488; Tx; 0x001; 0x08; 0x27 0x3b 0x0f 0x01 0x0b 0x49 0x00 0x07
0758272.454; Tx; 0x080; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758274.455; Tx; 0x100; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758276.469; Tx; 0x200; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758278.455; Tx; 0x280; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758280.478; Tx; 0x300; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758282.457; Tx; 0x400; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758284.457; Tx; 0x500; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758286.459; Tx; 0x4df; 0x08; 0xc7 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758288.458; Tx; 0x680; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758290.460; Tx; 0x700; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758292.458; Tx; 0x780; 0x08; 0x55 0x55 0x55 0x55 0x55 0x55 0x55 0x55
0758296.470; Rx; 0x081; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758298.468; Rx; 0x101; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0758300.486; Rx; 0x201; 0x08; 0x00 0x00 0x00 0x00 0x00 0x04 0x00 0x00
0758304.469; Rx; 0x301; 0x08; 0x00 0x00 0x00 0x00 0x04 0x03 0x00 0x61
0758306.478; Rx; 0x401; 0x08; 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
```

etc.

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

NOTE

After the unit is switched off, the logging function will be deactivated again automatically.

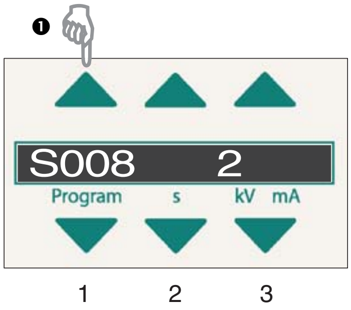
5.8 Service routine S008

Update service

Function S008	Checking the software versions
Test step 2	Overview of the module software versions
Test step 3	Entry of a unit serial number
Test step 4	Initialize the function activation

- Select the Service menu (see page 5-8).

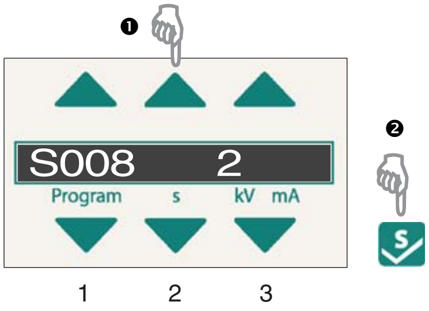
Selecting service routine S008



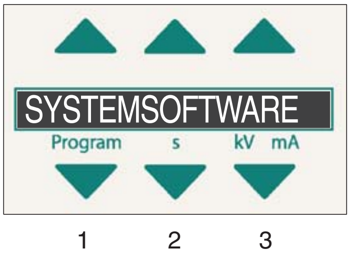
1. Use the **arrow keys** to select service routine **S008**.

5.8.1 S008: Test step 2

Selecting test step 2



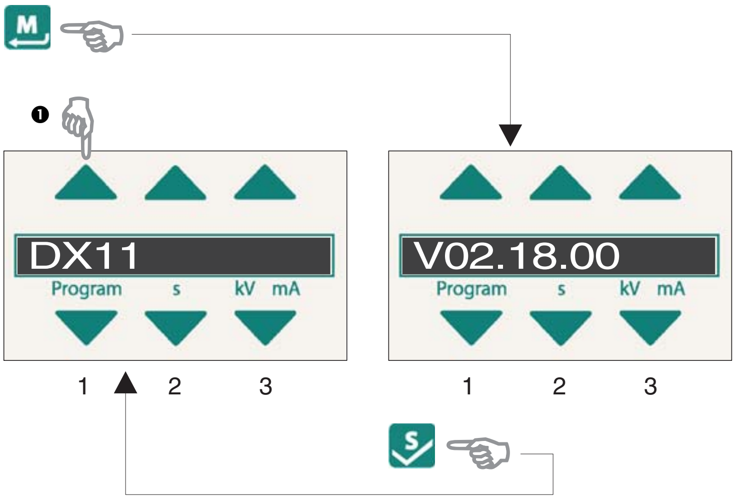
1. Select test step 2 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** ✓.



The single-line display of the Control Pad shows the message **SYSTEMSOFTWARE**.

Select the desired module using the **arrow keys** of selection field 1 and confirm your selection by pressing the **Memory key** M.

The software version of the selected module is displayed in selection field 1.



To return to the module selection menu, press the **Service key** S.

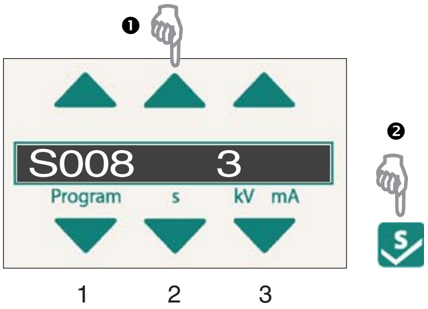
Quitting the service routine

To return to the module selection menu, press the **up arrow key** ▲ above selection field 3.

To return to the service routine selection menu and then to the Main menu, press the **up arrow key** ▲ above selection field 3 repeatedly.

5.8.2 S008: Test step 3

Selecting test step 3



1. Select test step 3 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.

This test step is required...

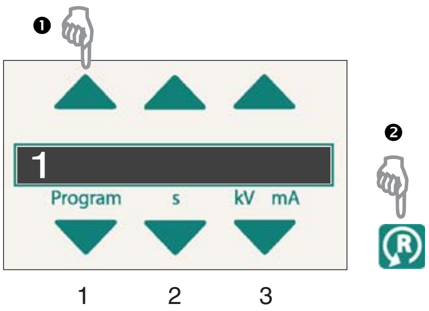
- if a software update is performed.
  The value X is then displayed in selection field 1 of service routine S008.3. When opened, the routine is initially in the editing mode for entry of the unit serial number (case A).
- if modules have been replaced. In this case, the backup copy of the unit serial number still stored in the unit must be reconfirmed (case B).

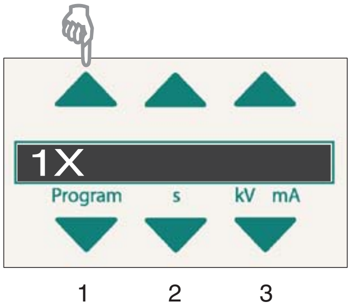
If this service routine is called up with a valid unit serial number, the possibility of entering or confirming the serial number will be deactivated. The valid serial number is displayed in selection field 1.

Case A:
Entry of a unit serial number

1. Get the unit serial number from the rating plate of the unit (e.g. 00123).

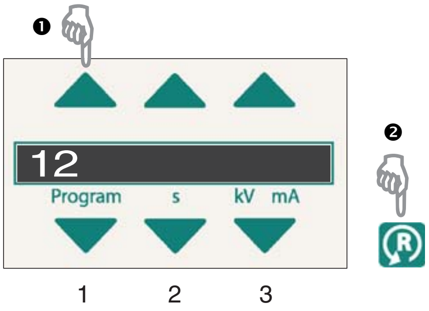
2. Select the first digit of the serial number with the **arrow keys** in selection field 1 (from the left in example 1) and accept this value with the **R key** Ⓡ.

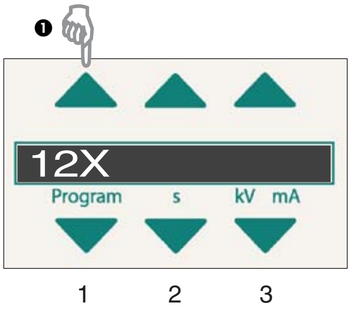




1X is now displayed in selection field 1 and the second digit of the serial number can be selected.

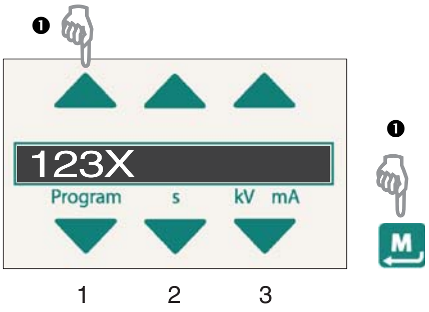
3. Select the second digit of the serial number with the **arrow keys** in selection field 1 (from the left in example 2) and accept this value with the **R key** Ⓡ.



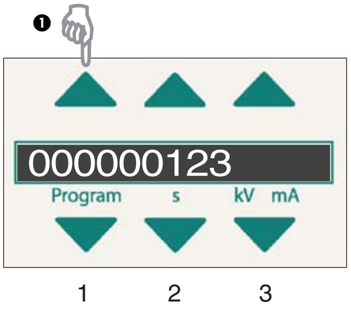


12X is now displayed in selection field 1 and the third digit of the serial number can be selected.

4. Repeat this procedure until the complete unit serial number has been entered.



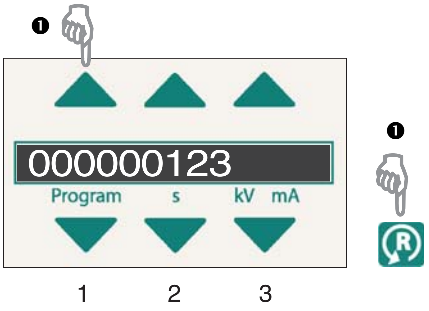
5. Save the unit serial number with the **Memory key** M.



The complete serial number is displayed for review. The system automatically changes the entry to a 9-digit number by adding leading zeroes at the left.

NOTE

At this point you have the possibility of discarding an incorrectly entered serial number. This is done by quitting the service routine without finally confirming the serial number via the R key.

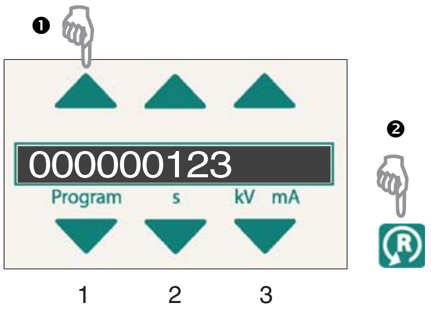


6. Check the correctness of the unit serial number you have entered and, if it is OK, confirm this by pressing the **R key** R.

CAUTION

Make sure that you do not accidentally press the R key and/or the Memory key before all digits of the serial number have been entered. Otherwise an incorrect serial number will be irreversibly entered.

Case B:
Confirming the unit serial number



1. To confirm the displayed serial number, press the **R key** Ⓡ.

You can interrupt this procedure with the **Service key** Ⓢ.
The unit serial number will then not be confirmed.

Quitting the service routine

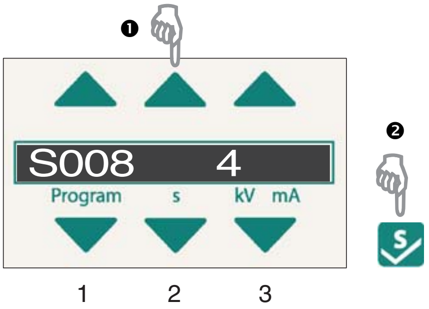
Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.8

5.8.3 S008: Test step 4

Selecting test step 4

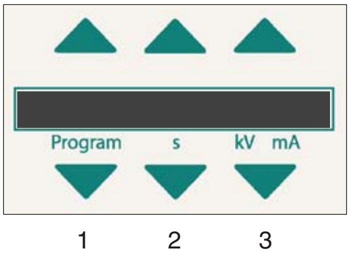


1. Select test step 4 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S .

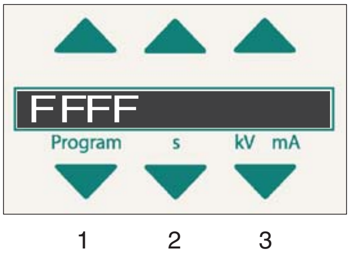
After the test step has been selected, there are two possibilities:

- It is possible to initialize the function activation (case A)
- It is not possible to initialize the function activation (case B)

***Case A:* Initialization of function activation is possible**



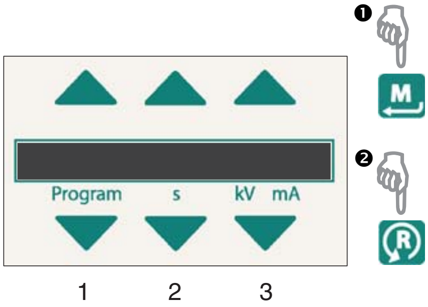
***Case B:* Initialization of function activation is not possible**



NOTE

*If it is possible to initialize the function activation, then theLED above the **Memory key** M will light up at this point.*

Performing initialization



2. To initialize the function activation, first press the **Memory key** M (LED below the R key lights up) and then the **R key** R **.**

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.9 Service routine S009

Flash file system

Function S009	Flash file system	
Test step 4	Initializing the flash file system	Security access

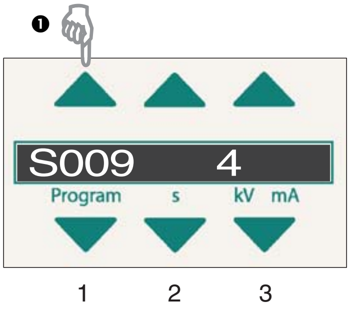
NOTE

If the flash file system is initialized, the contents of the Error logging memory are also lost.

- Select the Service menu (see page 5-8).

Selecting service routine S009

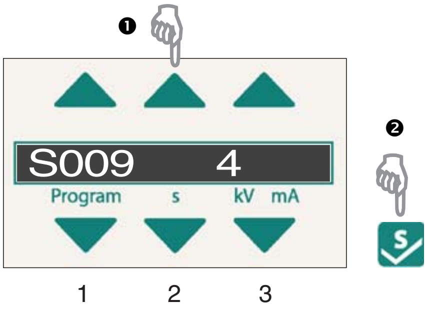
1. Use the **arrow keys** to select service routine **S009**.



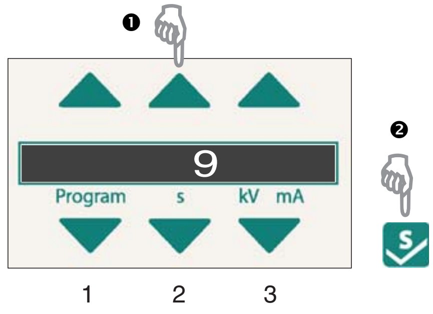
5.9.1 S009: Test step 4

Selecting test step 4

1. Select test step 4 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.



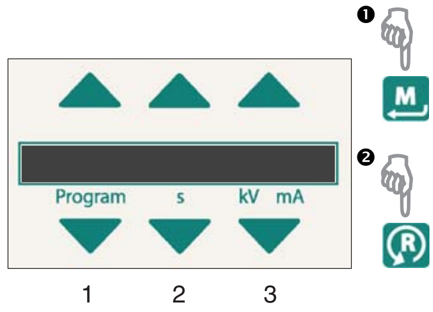
Confirming the security access



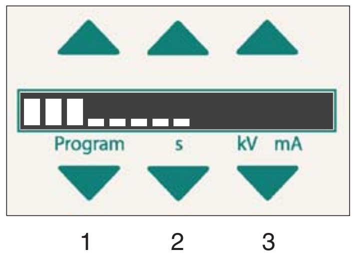
2. Confirm the security access by once again selecting the number of the main routine (9) with the **arrow keys** of selection field 2 and then pressing the **Service key** S.

   After the test step has been selected the LED above the **Memory key** M lights up.

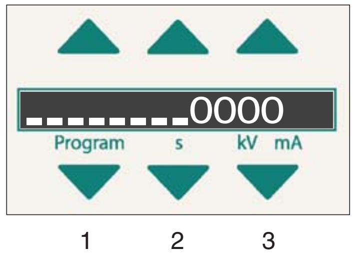
Initializing the flash file system



3. To initialize the flash file system, first press the **Memory key** M (LED above the R key lights up) and then the **R key** R.



Flash file system formatting in progress. This process takes approx. 5 - 6 min. and is visualized by a progress indicator. The end of this process is indicated by the message 0000 in selection field 2. The LED above the **Memory key** M lights up.



When the initialization has been completed, *0000* is displayed in the selection field.

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.10 Service routine S012

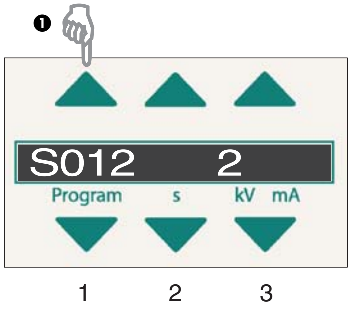
CAN bus service

Function S012	CAN bus service
Test step 2	Inquiry of the CAN status register of the modules
Test step 3	Resetting the CAN status register of the modules
Test step 4	Display of CAN bus cycle on LEDs of modules

NOTE
The CAN bus service is not yet implemented for module DX11.

- Select the Service menu (see page 5-8).

Selecting service routine S012

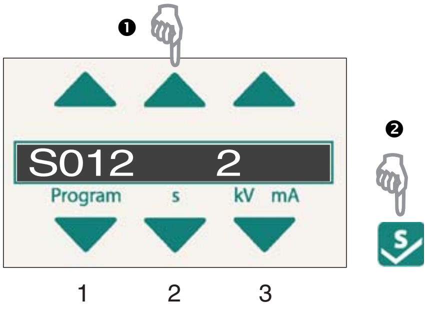


1. Use the **arrow keys** to select service routine **S012**.

5.10.1 S012: Test step 2

NOTE
Before querying the CAN status register for the modules, you should first reset the registers via service routine S012.3 (see page 5-45).

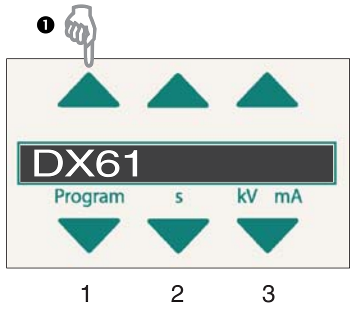
Selecting test step 2



1. Select test step 2 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.

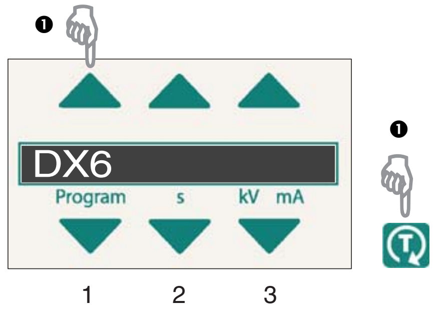
The selected module is displayed in the selection field 1.

Selecting a module

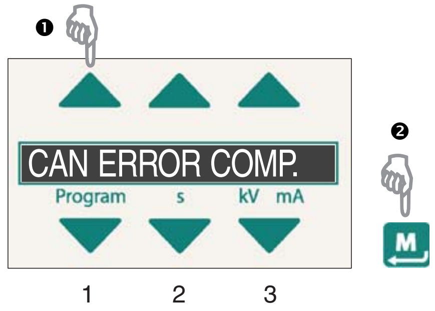


2. Select the desired module using the **arrow keys** of selection field 1. After the module has been selected the LED below the **Test key** Ⓣ lights up.

Selecting the register

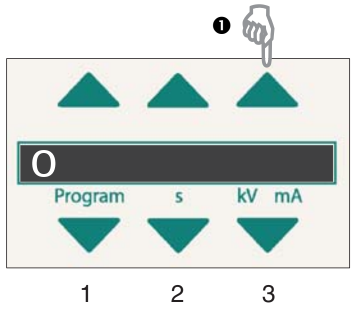


3. Press the **Test key** Ⓣ.



The first CAN status registers of the currently selected module, e.g. "CAN-State DX6" are displayed.

Select the desired CAN status register using the **arrow keys** in selection field 1 and confirm your selection with the **Memory key** Ⓜ.



The value of the selected CAN status register is displayed.

You can return to the CAN status register selection menu using the **up arrow key** ▲ or the **Service key** Ⓢ.

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

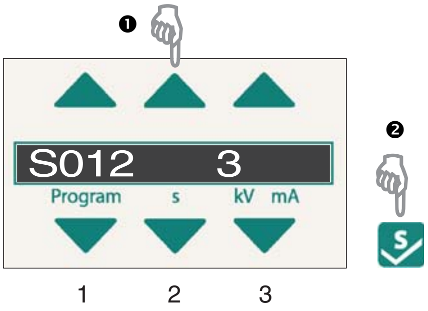
To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.10.2 S012: Test step 3

NOTE

Perform this service routine as required prior to service routine S012.2.

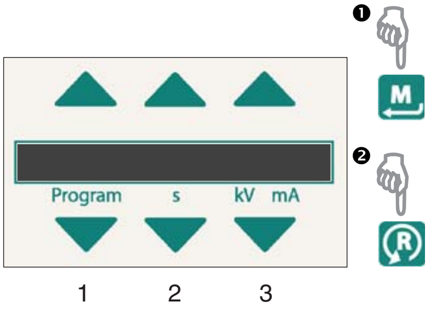
Selecting test step 3



1. Select test step 3 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.

After the test step is selected, the the LED above the **Memory key** M and below the **R key** R light up.

Clearing the CAN bus registers



2. To clear the CAN bus registers, first press the **Memory key** M (LED below **R key** lights up) and then the **R key** R.

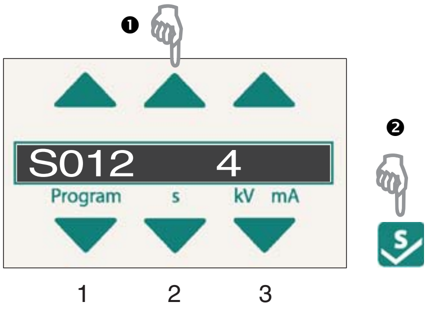
Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.10.3 S012: Test step 4

Selecting test step 4



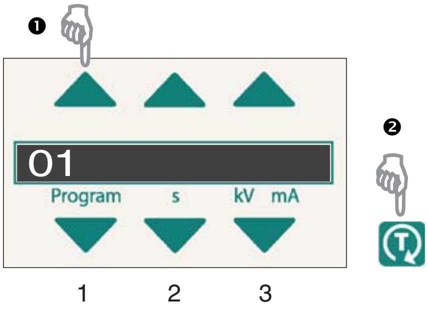
1. Select test step 4 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .

After the test step is selected, the code for the current setting of the display appears in selection field 1:

00 = LED display on the modules switched OFF

01 = LED display on the modules switched ON

Switching LED display on/off



2. Select the desired code using the **arrow keys** of selection field 1 and confirm your selection by pressing the **Test key** .

NOTE

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). Cable contact integrity may be checked by observing the LEDs while moving the cable. The activation or deactivation of this function simultaneously acts on all modules.

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.11 Service routine S014

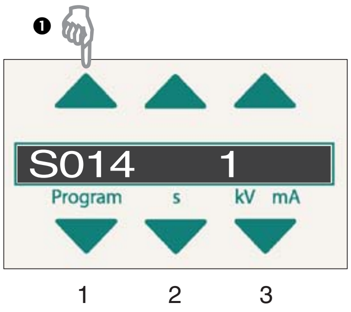
Rotation motor service

Function S014	Rotation motor service
Test step 1	Travel of rotational drive to the Pan home position
Test step 2	Travel of rotational drive to the ceph home position
Test step 3	Free travel of rotational drive
Test step 4	Display of light barrier signals of rotational drive

- Select the Service menu (see page 5-8).

Selecting service routine S014

1. Use the **arrow keys** to select service routine **S0014**.

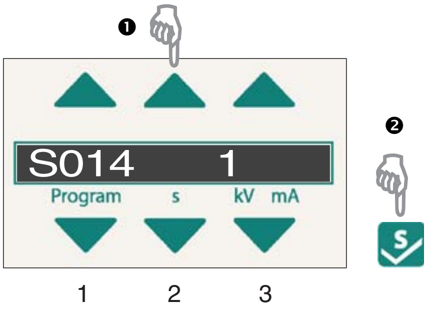


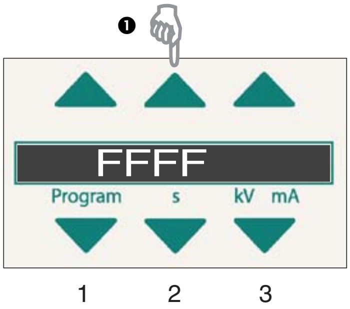
5.11.1 S014: Test step 1

This test step realizes "isolated" travel of the rotation motor to the pan home position Actuators 1 and 2 remain in their current positions.

Selecting test step 1

1. Select test step 1 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S .

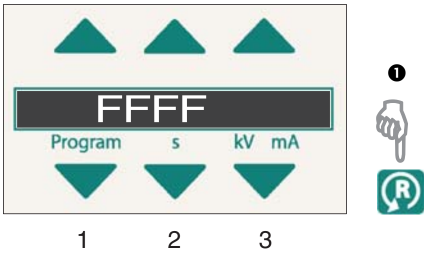




After the test step is selected, selection field 1 displays the current status:

FFFF = **Position of rotation undefined (following activation of service routine)**

Moving the ring



2. Press the **R key** Ⓡ to move the ring to the pan home position.

After the test step is selected, selection field 1 displays the current status:

FFFF = **Position of rotation undefined (following activation of service routine)**

0000 = **Pan home position reached**

EEEE = **Pan home position not reached due to an error state**

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

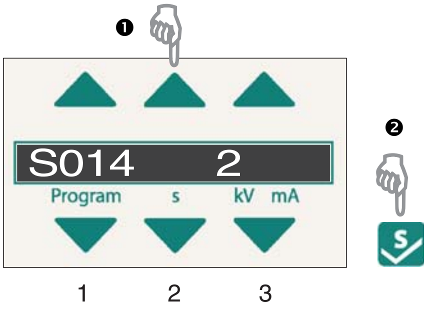
5.11.2 S014: Test step 2

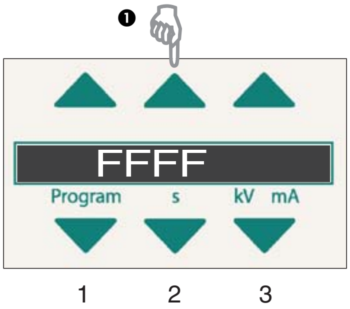
This test step realizes "isolated" travel of the rotation motor to the ceph home position (with the arm in the right or the left position, depending on the configuration). Actuators 1 and 2 remain in their current positions.

Travel to the ceph home position is also possible without configuring the system version for the cephalometer mode.

Selecting test step 2

1. Select test step 2 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .



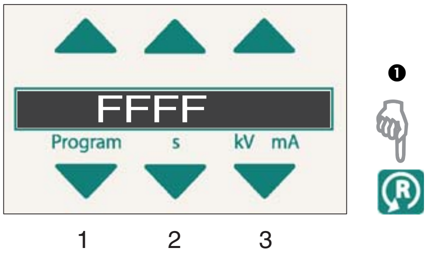


After the test step is selected, selection field 1 displays the current status:

FFFF = **Position of rotation undefined (following activation of service routine)**

Moving the ring

2. Press the **R key** Ⓡ to move the ring to the ceph home position.



After the test step is selected, selection field 1 displays the current status:

FFFF = **Position of rotation undefined (following activation of service routine)**

0000 = **Ceph home position reached**

EEEE = **Ceph home position not reached due to an error state**

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

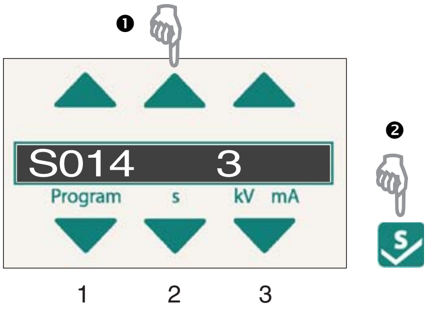
5.11.3 S014: Test step 3

This test step realizes "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.

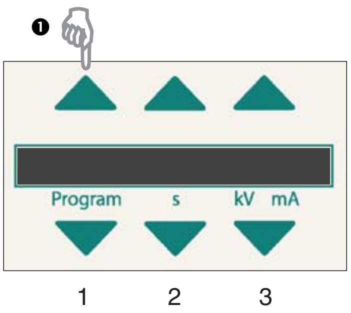
Travel to the ceph home position is also possible without configuring the system version for the cephalometer mode.

Selecting test step 3

1. Select test step 3 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** Ⓢ .



Moving the ring



2. Press the arrow keys to move the ring to the right (+) or to the left (-). The ring keeps moving as long as the key remains pressed.

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

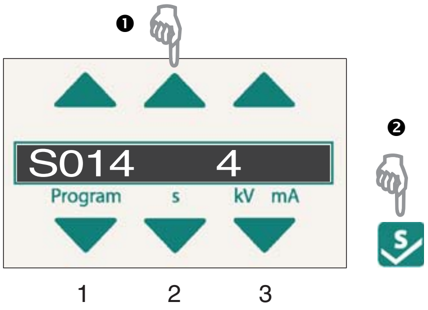
To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.11.4 S014: Test step 4

This test step realizes display of the switching state of rotation motor light barrier V1_3.

Selecting test step 4

1. Select test step 3 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.



Checking the light barrier

2. Move the ring manually. Tripping of the light barrier is indicated by illumination of the LED above patient symbol key 1.

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

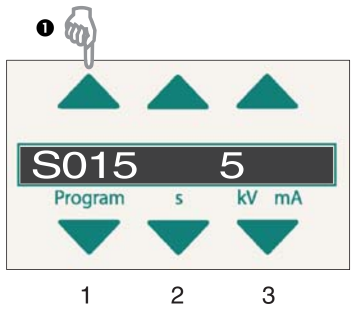
5.12 Service routine S015

Actuator service

Function S015	Actuator service
Test step 5	Testing of actuators 1 and 2

- Select the Service menu (see page 5-8).

Selecting service routine S015

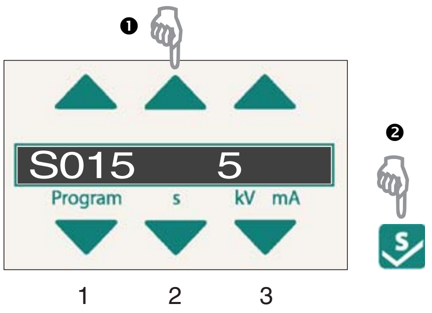


1. Use the **arrow keys** to selec service routine **S015**.

5.12.1 S015: Test step 5

The use of this service routine is suitable for troubleshooting of 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 binding of the individual adjusting axes.

Selecting test step 5



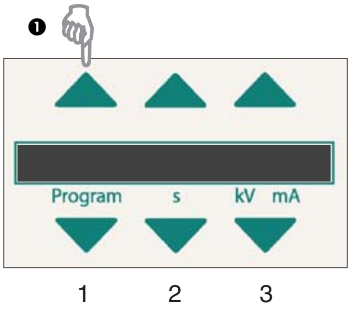
1. Select test step 5 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.

Patient symbol key 1 indicates the switching state of the light barrier for actuator 1; patient symbol key 2 indicates the switching state of the light barrier for actuator 2:

LED above patient symbol key lit = **Light barrier located in switching plate**

LED above patient symbol key not lit = **Light barrier not located in switching plate**

Moving the actuators



2. Press the arrow keys in selection field 1 (for actuator 1) or selection field 2 (for actuator 2) to move the actuator to the right (+) or to the left (-). The actuor keeps moving as long as the key remains pressed.

Using the **R key** Ⓡ, the system (actuators 1 and 2) can be moved back to the pan home position. In this position the LEDs above patient symbol keys 1 and 2 light up.

Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.13 Service routine S017

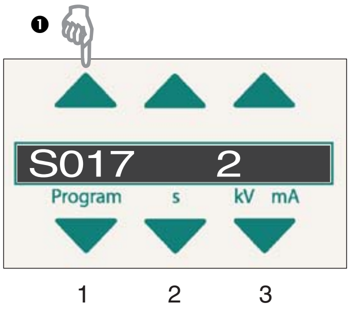
Configuration service

Function S017	System configuration	
Test step 2	Configuring the hardware version	Security access
Test step 3	Reserved; always leave set to "0"!	Security access
Test step 6	Activating the remote control display	Security access
Test step 8	Selecting the kVmA level series	Security access
Test step 11	Selecting the image format	Security access
Test step 15	Activating/deactivating the acoustic signal for end of exposure	Security access

- Select the Service menu (see page 5-8).

Selecting service routine S017

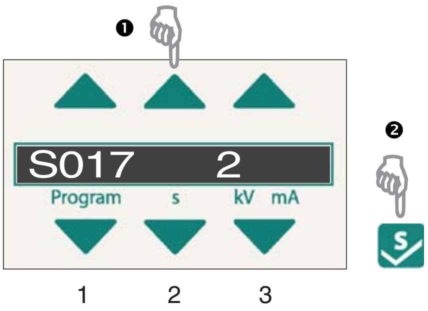
1. Use the **arrow keys** to select service routine **S017**.



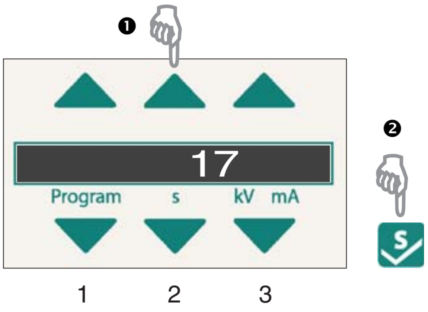
5.13.1 S017: Test step 2

Selecting test step 2

1. Select test step 2 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .

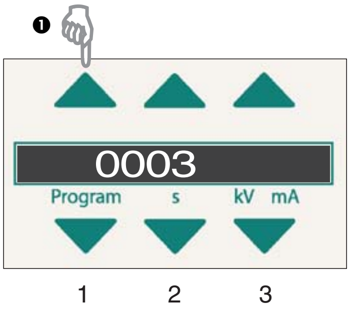


Confirming the security access



2. Confirm the security access by once again selecting the number of the main routine (17) with the **arrow keys** of selection field 2 and then pressing the **Service key** S .

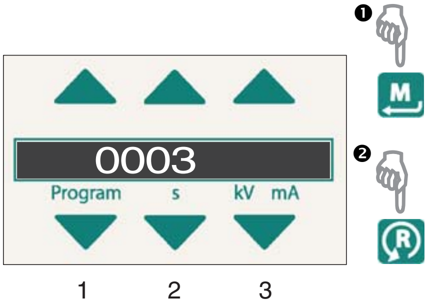
Selecting the system version



3. Select the desired system version using the **arrow keys** of selection field 1.

0001 = panoramic digital
0003 = panoramic digital/ceph left digital

After the system version has been selected the LED above the **Memory key** M lights up.

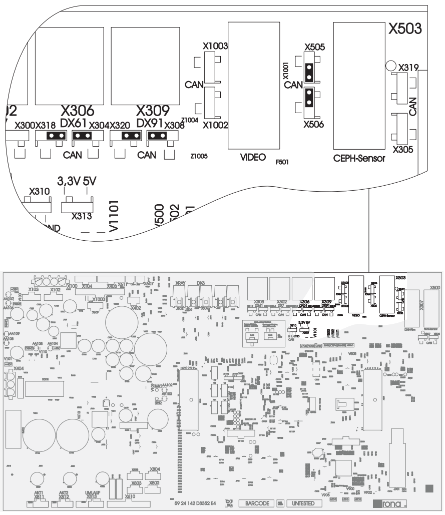


4. To save the selected system version, first press the **Memory key** M (LED below R key lights up) and then the **R key** R .

NOTE

The set value is permanently saved as the relevant system version.

Checking/setting the jumper position



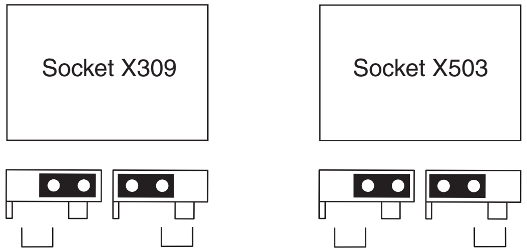
DX1

5. Check the jumper settings of sockets

   309 (DX91, ceph sensor) and
   503 (DX81, ceph sensor)

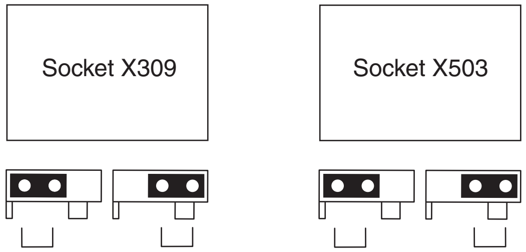
   on board DX1.

00011



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

0003



Jumper outside
Cephalometer connected
i.e. connector plugged in

NOTE
For more information on the correct jumper positions and CAN bus wiring, refer to section 3.3.2.

Quitting the service routine

To go on to the next test step, press the Service key S.

To return to the Service menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

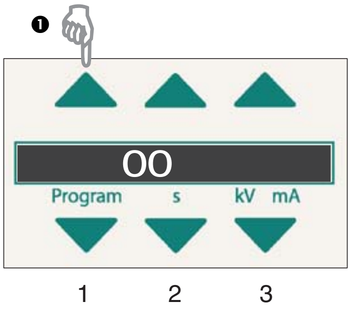
5.13.2 S017: Test step 6

- Start test step 6 in the same way as described on page 5-54 or by pressing the **Service key** in test step 5.

NOTE

If you go to test step 6 from test step 5 by pressing the Service key, the security access confirmation will be skipped.

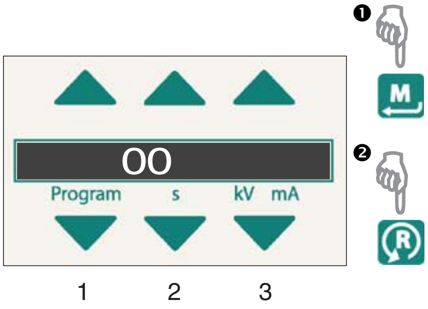
Selecting the device status



1. Select the desired device status using the **arrow keys** of selection field 1.

   00 = Remote control inactive
   01 = Remote control active

   After the device status is selected, the LED above the **Memory key** M lights up.



2. To save the selected device status, first press the **Memory key** M (LED below R key lights up) and then the **R key** R.

NOTE

The setting is permanently saved.

Quitting the service routine

To go on to the next test step, press the Service key S.

To return to the Service menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

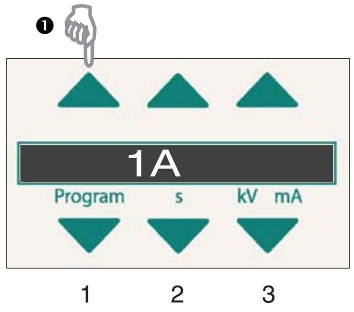
5.13.3 S017: Test step 8

- Start test step 8 in the same way as described on page 5-54 or by pressing the **Service key** ◎ S in test step 6.

NOTE

If you go to test step 8 from test step 6 by pressing the Service key, the security access confirmation will be skipped.

Selecting the kV/mA level series



1. Select the desired kV/mA level series using the **arrow keys** of selection field 1.

1A = 16 mA series for PAN
6 mA series for Ceph

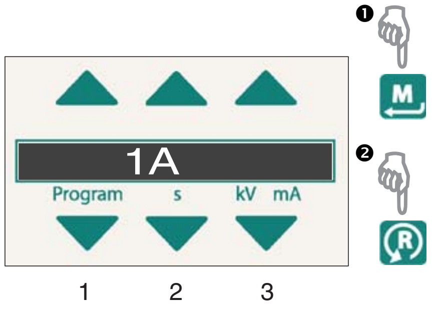
2A = 8 mA series for PAN
16 mA series for Ceph

4A = 8/16 mA series for PAN
16 mA series for Ceph

NOTE

Series 4A is the default for CDR PanElite.

After the kV/mA level series are selected, the LED above the **Memory key** M lights up.



2. To save the selected kV/mA level series, first press the **Memory key** M (LED below R key lights up) and then the **R key** R.

Quitting the service routine

To go on to the next test step, press the Service key S.

To return to the Service menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

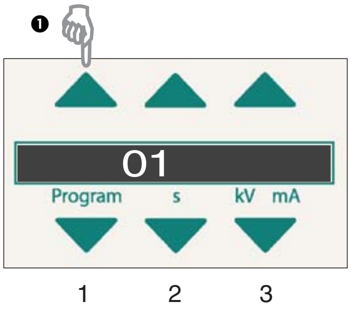
5.13.4 S017: Test step 11

- Start test step 11 in the same way as described on page 5-54 or by pressing the **Service key** S in test step 8.

NOTE

If you go to test step 11 from test step 8 by pressing the Service key, the security access confirmation will be skipped.

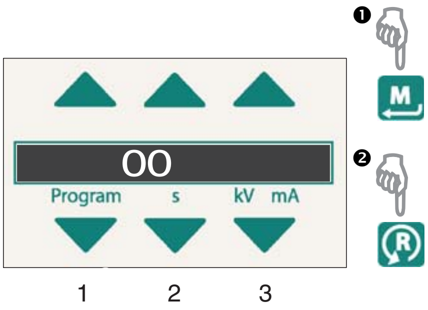
Selecting the image format



1. Select the desired image format using the **arrow keys** of selection field 1.

   00 = C3 = 18 x 23 cm
   01 = C3F = 30 x 23 cm

   After the image format is selected, the LED above the **Memory key** M lights up.



2. To save the selected image format, first press the **Memory key** M (LED below the R key lights up) and then the **R key** R.

Quitting the service routine

To go on to the next test step, press the Service key S.

To return to the Service menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

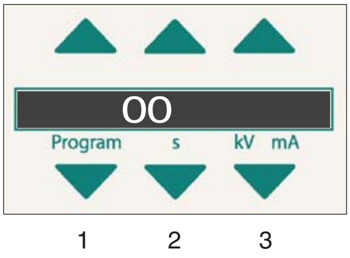
5.13.5 S017: Test step 15

- Start test step 15 in the same way as described on page 5-54 or by pressing the **Service key** S in test step 14.

NOTE

If you go to test step 15 from test step 14 by pressing the Service key, the security access confirmation will be skipped.

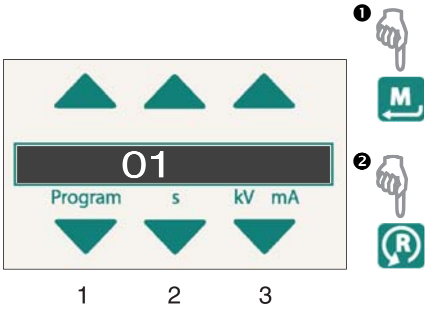
Activating/deactivating the acoustic signal for end of exposure



1. Select the code for activating or deactivating the acoustic signal using the **arrow keys** of selection field 1.

   00 = acoustic signal for end of exposure = OFF

   01 = acoustic signal for end of exposure = ON



2. After the code is selected the **Memory key** M lights up. To save the changes, first press the **Memory key** M (R key lights up) and then press the **R key** R.

Quitting the service routine

To return to the Service menu, press the **double arrow key** △ .

To quit the Service menu and return to the main menu, press the **double arrow key** △ .

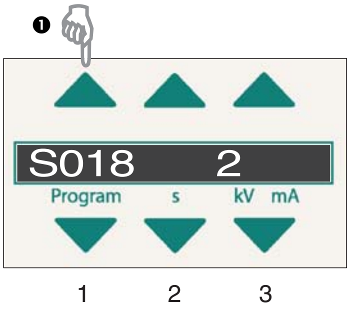
5.14 Service routine S018

Service for height adjustment

Function S018	Service for height adjustment
Test step 2	Limitation of the maximum travel height
Test step 3	Undoing the maximum travel height setting
Test step 4	Check of the height adjustment sensor system
Test step 5	Setting of the minimum travel height
Test step 6	Undoing the minimum travel height setting

- Select the Service menu (see page 5-8).

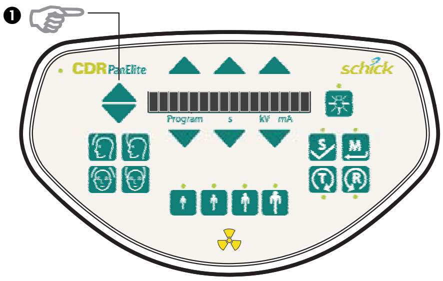
Selecting service routine S018



1. Use the**arrow keys** to select service routine **S0018**.

5.14.1 S018: Test step 2

Moving the unit

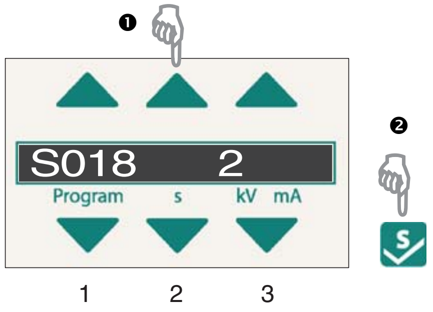


1. Move the unit to the required maximum travel height by pressing the **Up/Down keys** in the user mode.

NOTE

Programming the maximum travel height is possible only for a system height above the upper correction switch level (> position value of 1500)!

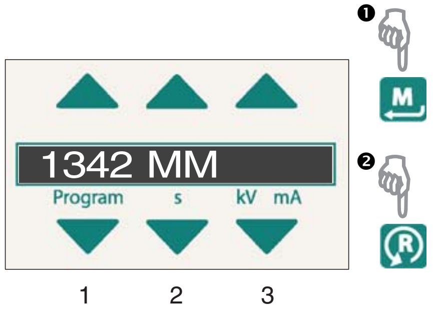
Selecting test step 2



2. Select test step 2 using the **arrow keys** in selection field 2 and then confirm your selection with the **Service key** S.

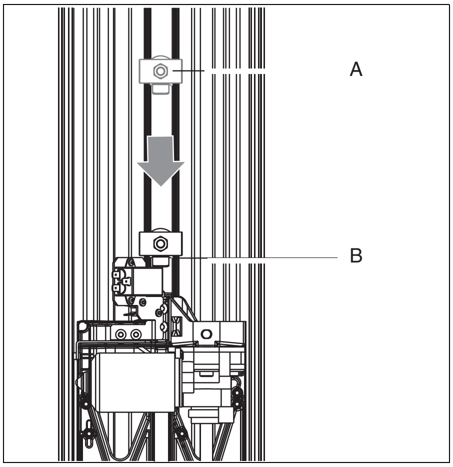
The current height position is displayed in selection field 1. The LED above the **Memory key** M lights up.

Saving the maximum travel height



3. To save the maximum travel height, first press the **Memory key** M (LED below R key lights up) and then the **R key** R.

Setting the mechanical limit stop on the unit



4. Loosen nut **A** and slide mechanical limit stop **B** for the limit switch toward the limit switch until it switches. Retighten nut **A**.

NOTE

The next time the Up key is pressed, the unit will stop 10 mm below the limit switch.

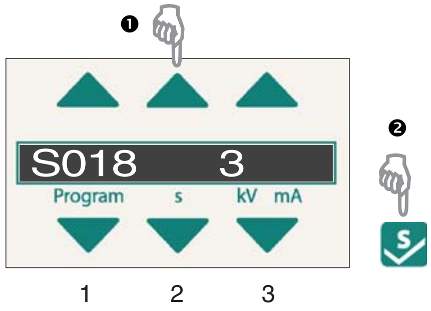
Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.14.2 S018: Test step 3

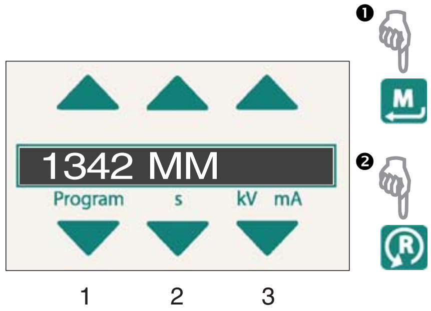
Selecting test step 3



1. Select test step 3 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.

   The current height position is displayed in selection field 1. The LED above the **Memory key** M lights up.

Undoing the maximum travel height setting



2. To undo the maximum travel height setting, first press the **Memory key** M (LED below R key lights up) and then the **R key** R.

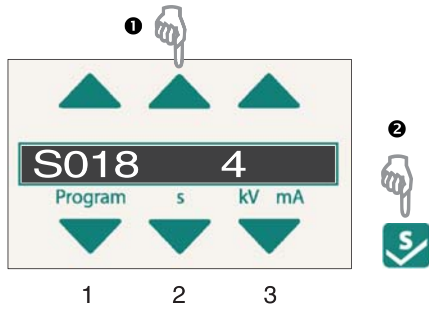
Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

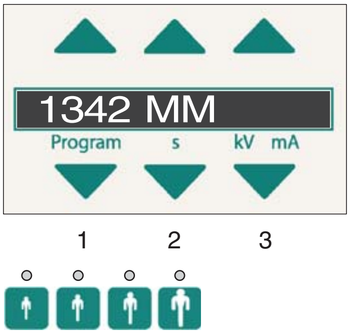
To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.14.3 S018: Test step 4

Selecting test step 4



1. Select test step 4 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .



The current height position is displayed in selection field 1.

NOTE

Following the selection of the service routine, the stand can be moved up or down up to the limit switches using the UP/DOWN keys on the control console. The "soft limit positions" set by the software are ignored in this case.

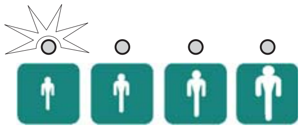
The first three patient symbol keys (from the left) indicate the switching state of the limit switches:

First patient symbol key = State of correction switch

Second patient symbol key = State of bottom limit switch

Third patient symbol key = State of top limit switch

If the LED above the key lights up, the switch is actuated, i.e. the unit is located above the position value 1500.



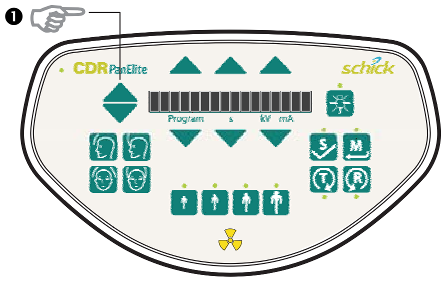
Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.14.4 S018: Test step 5

Moving the unit

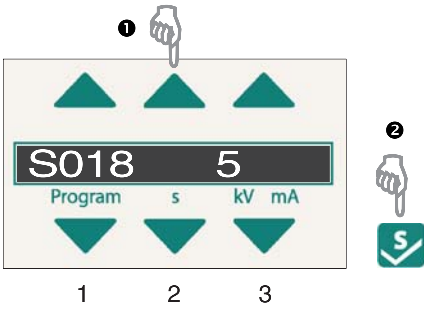


1. Move the unit to the required minimum travel height by pressing the **Up/Down keys** in the user mode.

NOTE

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

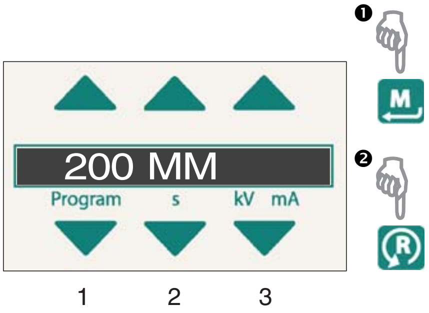
Selecting test step 5



2. Select test step 2 using the **arrow keys** in selection field 5 and then confirm your selection with the **Service key** .

   The current height position is displayed in selection field 1. The LED above the **Memory key** lights up.

Saving the minimum travel height



3. To save the minimum travel height, first press the **Memory key** (LED below R key lights up) and then the **R key** .

NOTE

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

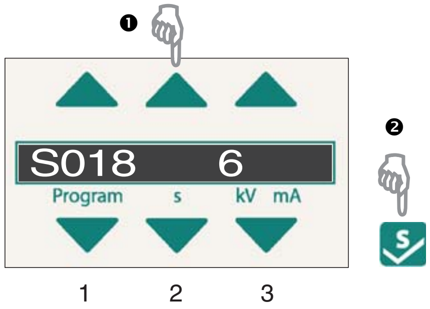
Quitting the service routine

Pressing the **up arrow key** ▲ above selection field 3 returns you to the service routine selection menu.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.14.5 S018: Test step 6

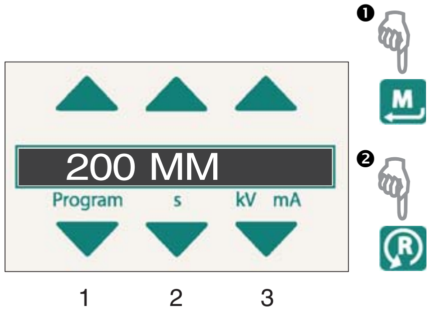
Selecting test step 6



1. Select test step 6 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.

   The current height position is displayed in selection field 1. The LED above the **Memory key** M lights up.

Undoing the minimum travel height setting



2. To undo the minimum travel height setting, first press the **Memory key** M (LED below R key lights up) and then the **R key** Ⓡ.

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

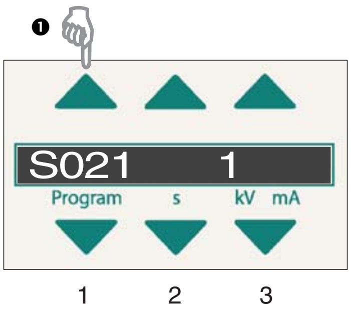
5.15 Service routine S021

Service for motor-driven diaphragm

Function S021	Service for motor-driven diaphragm
Test step 1	Initialization of diaphragm axis

- Select the Service menu (see page 5-8).

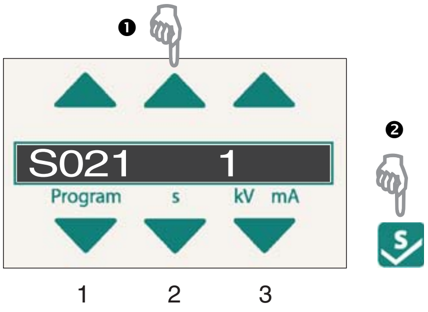
Selecting service routine S021



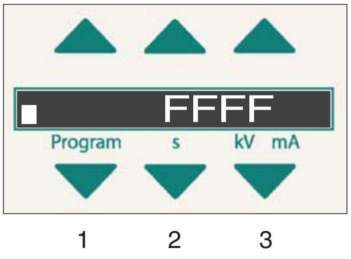
1. Use the **arrow keys** to select service routine **S021**.

5.15.1 S021: Test step 1

Selecting test step 1

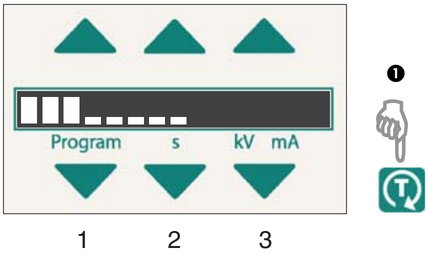


1. Select test step 1 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .



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.

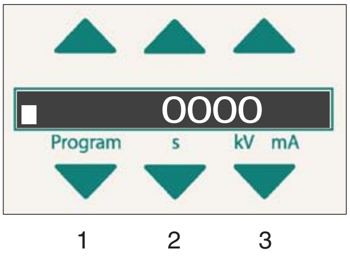
Performing the initialization of the diaphragm axis



2. Start the automatic initialization of the diaphragm axis by pressing the **T key** .

   When the axis initialization is complete, the result is displayed in selection field 2:

   0000 = Initializiation OK
   EEEE = Initialization error



The initialization can be restarted at any time by pressing the **T key** **.**

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

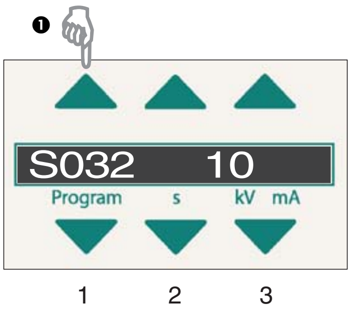
5.16 Service routine S032

Test function for sensor in PAN slot

Function S032	Test function for sensor in the PAN slot
Test step 10	Test function for sensor in the PAN slot

- Select the Service menu (see page 5-8).

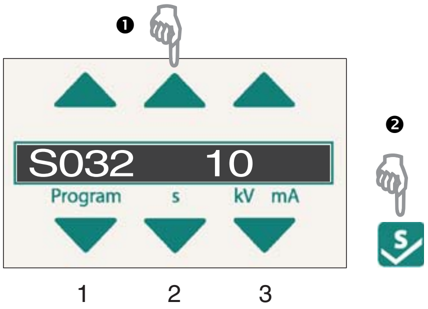
Selecting service routine S032



1. Use the **arrow keys** to select service routine **S032**.

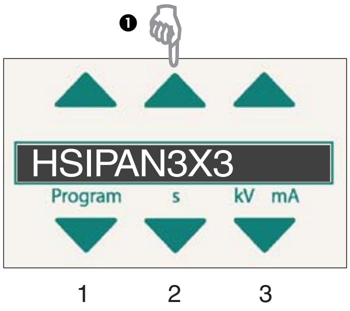
5.16.1 S032: Test step 10

Selecting test step 10



1. Select test step 10 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.
   After test step 10 is selected, selection field 1 displays the current selection for synchronized readout sequence.

Selecting the synchronized readout sequence



2. Select the mode of the desired synchronized readout sequence using the **arrow keys** of selection field 1.

HSIPan3x3 = sensor in the PAN mode with synchronized readout sequence 3x3 clocked out

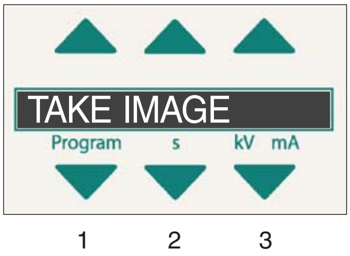
HSIPan4x4 = sensor in the PAN mode with synchronized readout sequence 4x4 clocked out

After the mode for the synchronized readout sequence has been selected the LED below the **Test key** Ⓣ lights up.

NOTE

If the LED below the R key initially lights up, the sensor holder must be moved to the corresponding position first. To do this, press the ***R key*** Ⓡ *.*

Starting synchronized readout sequence



NOTE

The sensor must be plugged in for at least 15 seconds before starting the synchronized readout sequence.

3. Start the synchronized readout sequence with the **Test key** Ⓣ.

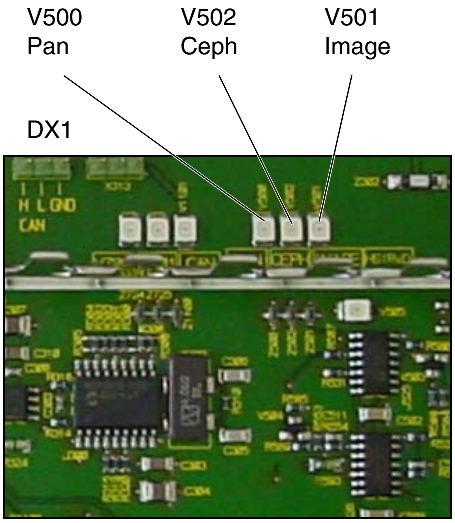
CAUTION

The sensor must not be removed while the synchronized readout sequence is active! Otherwise the electronics may be damaged.

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:

Stand By mode = LED dark

Active synchronized readout sequence = LED lights up

CEPH-LED V502:

Sensor in the Ceph slot/Stand By mode = LED lights up

No sensor in the Ceph slot/Stand By mode = LED dark

Sensor in the Ceph slot/active synchronized readout sequence = LED dark

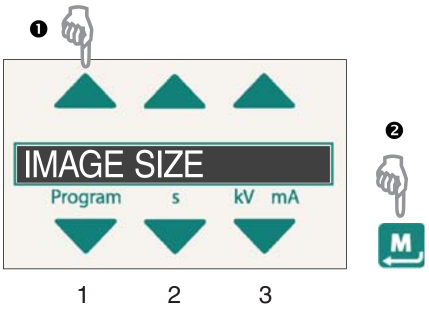
PAN-LED V500:

Sensor in the Pan slot/Stand By mode = LED lights up

No sensor in the Pan slot/Stand By mode = LED dark

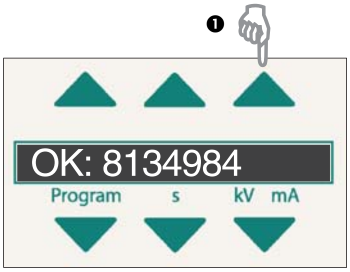
Sensor in the Pan slot/active synchronized readout sequence = LED dark

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



The single-line display of the Control Pad initially shows the **HSI-STATE**.

Use the **arrow keys** in selection field 1 to select the desired parameters, e.g. **IMAGE SIZE** and confirm your selection by pressing the **Memory key** M.



The result of the synchronized readout sequence for the selected parameters is displayed.

Using the **up arrow key** ▲ in selection field 3 or the **Service key** S, you can return to the parameter selection menu.

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

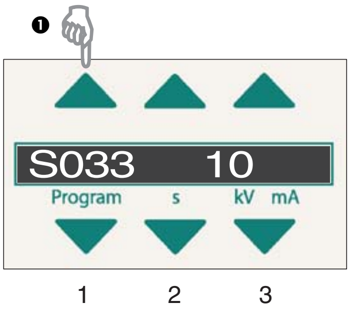
5.17 Service routine S033

Test of CEPH image path without CDR Software or CDR PanElite Service program

Function S033	Test of CEPH image path without CDR Software or CDR PanElite Service program
Test step 10	Test of the CEPH image path without CDR Software or CDR PanElite Service program

- Select the Service menu (see page 5-8).

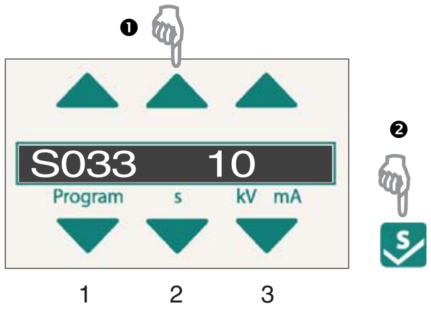
Selecting service routine S033



1. Use the **arrow keys** to select service routine **S033**.

5.17.1 S033: Test step 10

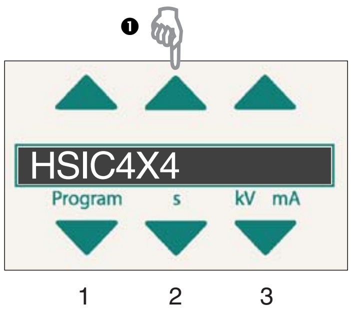
Selecting test step 10



1. Select test step 10 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .

   After test step 10 is selected, selection field 1 displays the current selection for the synchronized readout sequence.

Selecting the synchronized readout sequence



2. Select the mode of the desired synchronized readout sequence using the **arrow keys** of selection field 1.

HSIC4x4 = Sensor in CEPH mode with synchronized readout sequence 4x4 clocked out without CEPH scan

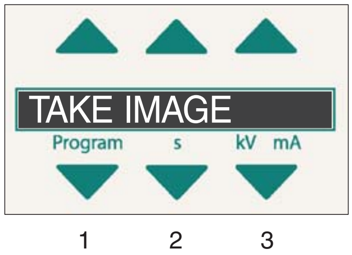
HSIC4x4M = Sensor in CEPH mode with synchronized readout sequence 4x4 clocked out with CEPH scan

After the mode for the synchronized readout sequence has been selected, the LED below the **Test key** Ⓣ lights up.

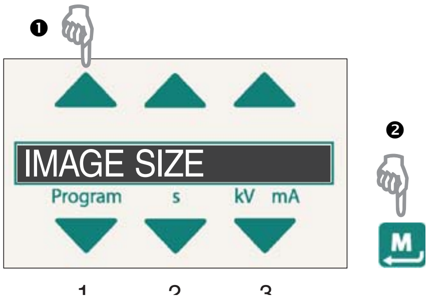
NOTE

If the LED below the R key initially lights up, the sensor holder must be moved to the corresponding position first. To do this, press the ***R key*** Ⓡ.

Starting the synchronized readout sequence

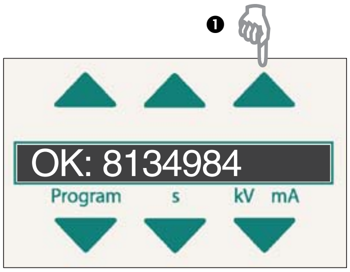


3. Start the synchronized readout sequence with the **Test key** Ⓣ.



The single-line display of the Control Pad initially shows the **HSI-STATE**.

Use the **arrow keys** in selection field 1 to select the desired parameters, e.g. **IMAGE SIZE** and confirm your selection by pressing the **Memory key** Ⓜ.



The result of the synchronized readout sequence for the selected parameters is displayed.

Using the **up arrow key** ▲ in selection field 3 or the **Service key** Ⓢ, you can return to the parameter selection menu.

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.18 Service routine S034

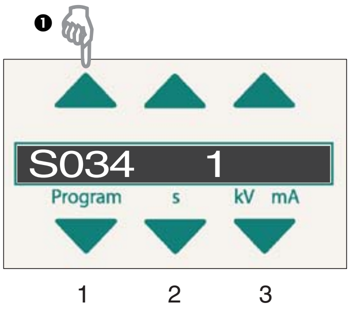
Service for the digital cephalometer

Function S034	Service for the digital cephalometer
Test step 4	Display/calibrate center position of ceph scan sensor axis
Test step 5	Display/calibrate center position of ceph scan secondary diaphragm axis
Test step 6	Moving to the ceph packing position

- Select the Service menu (see page 5-8).

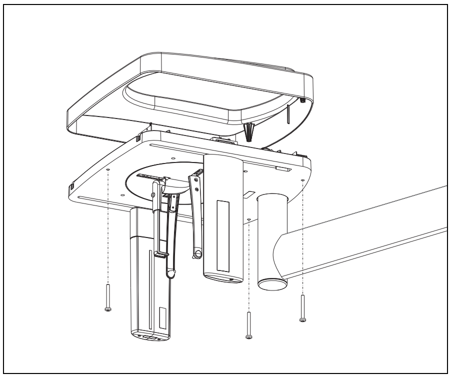
Selecting service routine S034

1. Use the **arrow keys** to select service routine **S034**.

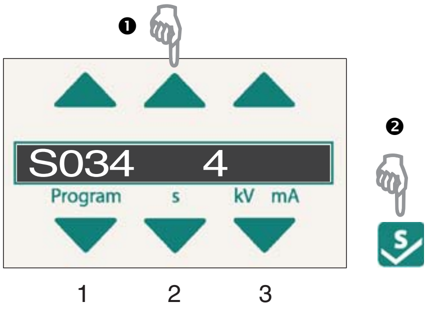


5.18.1 S034: Test step 4

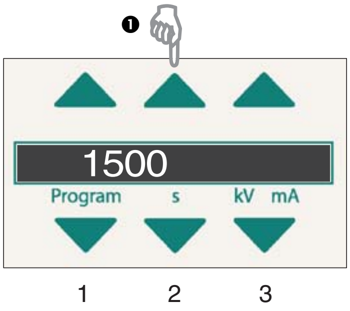
- Remove the cover from the cephalometer (see also section 1.11).



Selecting test step 4



1. Select test step 4 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .



After test step 4 is selected, the current offset value for the center position of the ceph scan *sensor axis* is displayed in selection field 1.

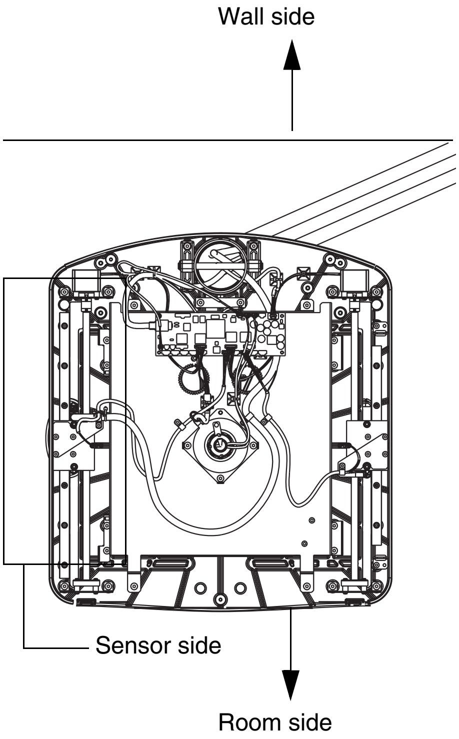
Switching the test mode ON

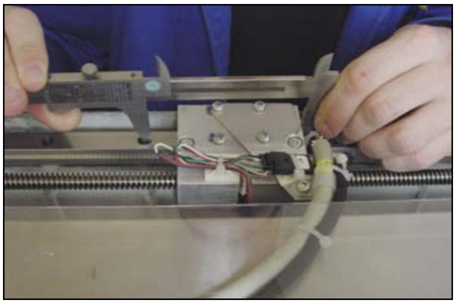
2. Press the **T key** to switch the test mode on.

NOTE

In the test mode, travel to the center position of the ceph scan sensor axis is initially performed without offsets. The LED below the T key lights up and displays the test mode.

Determining the offset values



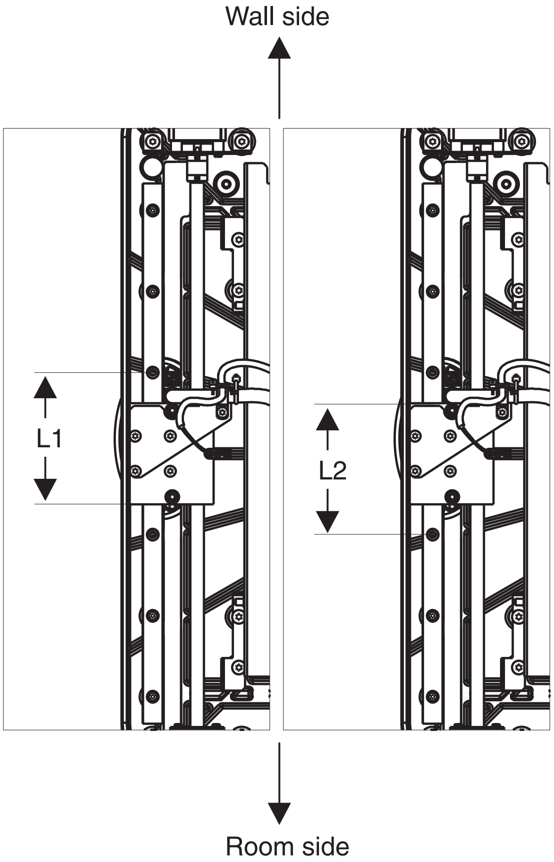


3. Move the sensor to its front position by pressing the **R key** Ⓡ.

i ***NOTE***

The sensor can always be moved back and forth between its front and center positions with the R key.

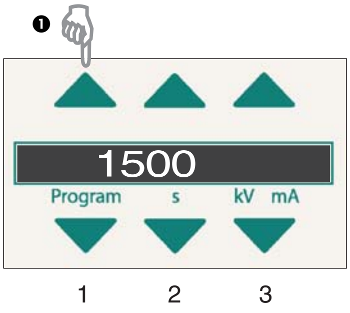
4. Move the sensor to its center position by pressing the **R key** Ⓡ.
5. Measure distances **L2** and **L1** with a slide gage.



6. Calculate the offset value according to the following formula:

$$(L2 - L1) \div 2 = \text{offset value}$$

Entering the offset value



7. Select an offset value using the **arrow keys** of selection field 1.

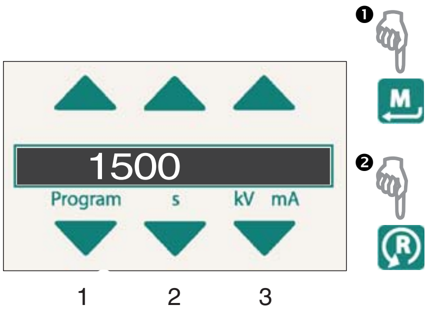
NOTE

The offset value can have a positive or a negative sign.

Ceph arm on left side:
– A positive offset value shifts the sensor toward the room center.
– A negative offset value shifts the sensor toward the wall.

Ceph arm mounted on right side:
– A positive offset value shifts the sensor toward the wall.
– A negative offset value shifts the sensor toward the room center.

Since the offset value can be set only in large steps of 500 (500 = 0.5 mm), you should set a value which comes as close as possible to the one you calculated.



8. To save the offset value, first press the **Memory key** M (the LED below the R key lights up) and then the **R key** Ⓡ.

Checking the new center position of the ceph scan (sensor axis)

9. Quit the test mode by pressing the **T key** Ⓣ.

NOTE

The offset settings are taken into account in normal operation.

10. Move the sensor to its referenz position by pressing the **R key** Ⓡ.

NOTE

The sensor can always be moved back and forth between its front and center positions with the R key.

11. Move the sensor to its center position by pressing the **R key** Ⓡ.
12. Measure distances **L1** and **L2** with a slide gage and calculate the remaining offset as described on page 5-76.
    - If the offset is still > ± 0.5 mm, the offset value must be corrected again. Repeat the service routine from item 2.
    - If the offset is < ± 0.5 mm, the calibration is OK.

- Continue with service routine S034.5.

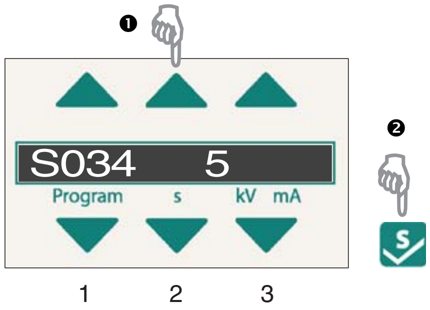
Quitting the service routine

To return to the Service menu, press the **up arrow key** ▲ above selection field 3.

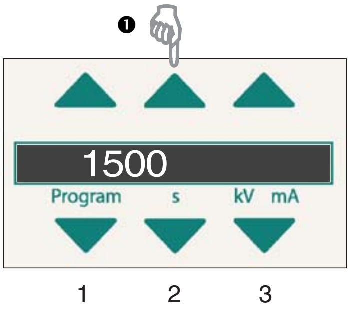
To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.18.2 S034: Test step 5

Selecting test step 5



1. Select test step 5 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .



After test step 5 is selected, the current offset value for the center position of the ceph scan *secondary diaphragm axis* is displayed in selection field 1.

Switching the test mode on

2. Press the **T key** to switch the test mode on.

NOTE

In the test mode, travel to the center position of the ceph scan secondary diaphragm axis is initially performed without offsets. The LED below the T key lights up and displays the test mode.

Determining the offset values

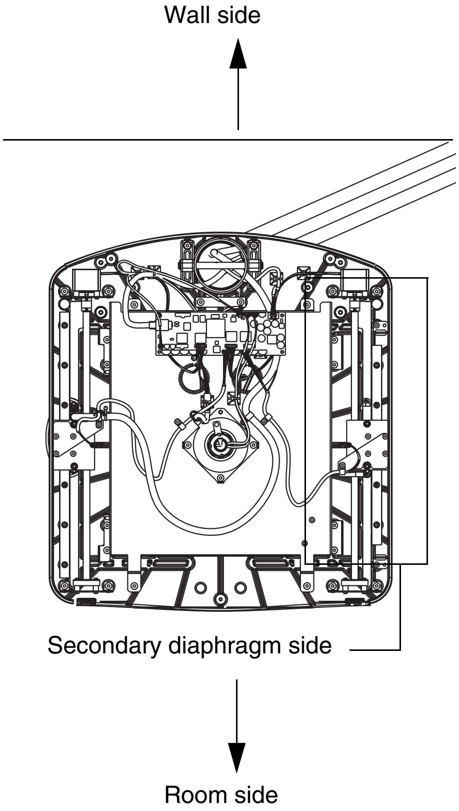
3. Move the secondary diaphragm to its front position by pressing the **R key** Ⓡ.

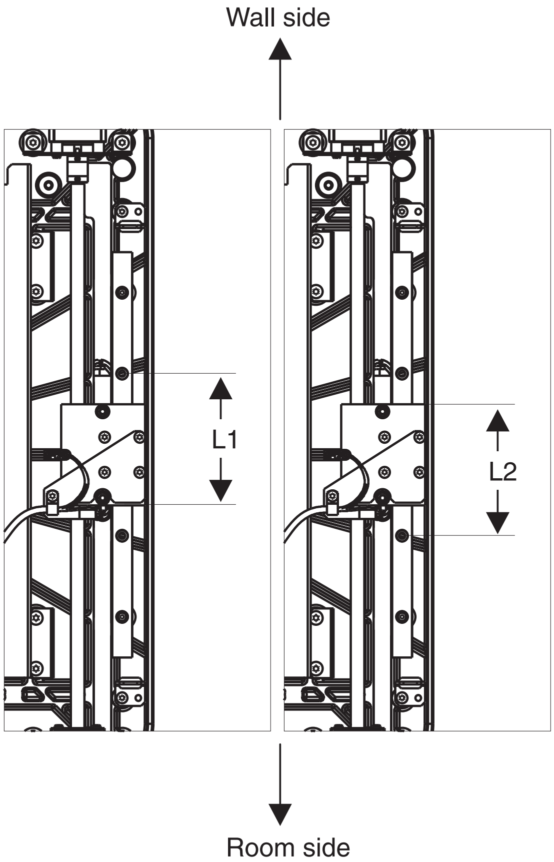
NOTE

The secondary diaphragm can always be moved back and forth between its front and center positions with the R key.

4. Move the secondary diaphragm to its center position by pressing the **R key** Ⓡ.

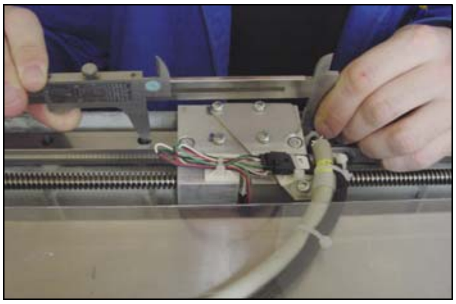
5. Measure distances **L2** and **L1** with a slide gage.



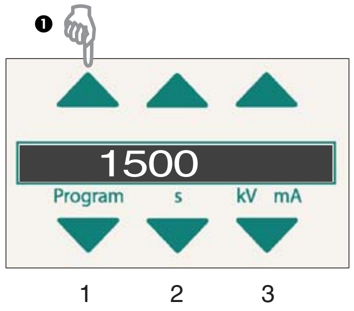


6. Calculate the offset value according to the following formula:

$$(L2 - L1) \div 2 = \text{offset value}$$



Entering the offset value



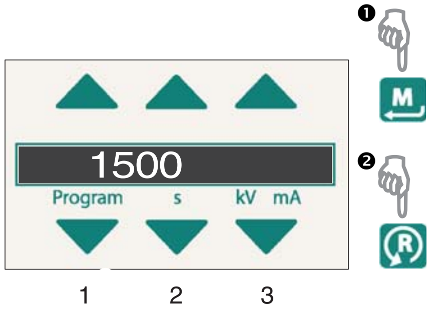
7. Select an offset value using the **arrow keys** of selection field 1.

NOTE

The offset value can have a positive or a negative sign.

Ceph arm on left side:
– A positive offset value shifts the secondary diaphragm toward the room center.
– A negative offset value shifts the secondary diaphragm toward the wall.

Ceph arm mounted on right side:
– A positive offset value shifts the secondary diaphragm toward the wall.
– A negative offset value shifts the secondary diaphragm toward the room center.
Since the offset value can be set only in large steps of 500 (500 = 0.5 mm), you should set a value which comes as close as possible to the one you calculated.



8. To save the offset value, first press the **Memory key** M (the LED below the R key lights up) and then the **R key** Ⓡ.

Checking the new center position of the ceph scan (secondary diaphragm axis)

9. Quit the test mode by pressing the **T key** Ⓣ.

NOTE

The offset settings are taken into account in normal operation.

10. Move the secondary diaphragm to its referenz position by pressing the **R key** Ⓡ.

NOTE

The secondary diaphragm can always be moved back and forth between its front and center positions with the R key.

11. Move the secondary diaphragm to its center position by pressing the **R key** Ⓡ.
12. Measure distances **L1** and **L2** with a slide gage and calculate the remaining offset as described on page 5-79.
    - If the offset is still > ± 0.5 mm, the offset value must be corrected again. Repeat the service routine from item 2.
    - If the offset is < ± 0.5 mm, the calibration is OK.

- Reattach the ceph cover.

Quitting the service routine

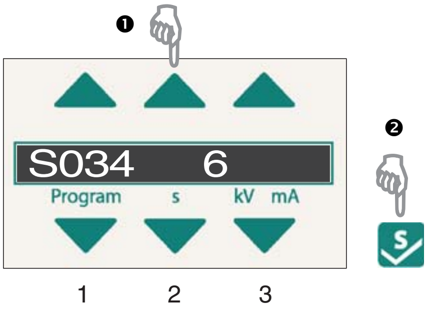
To return to the Service menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

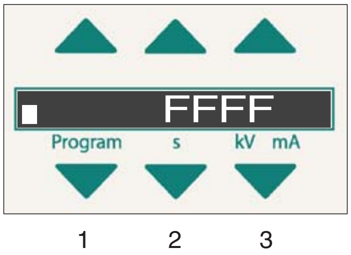
5.18.3 S034: Test step 6

Selecting test step 6

1. Select test step 6 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key**.



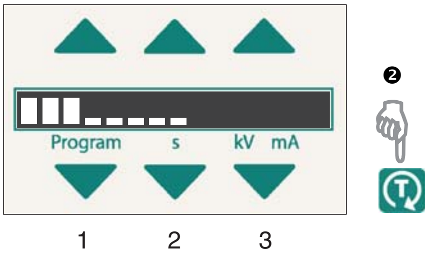
After the test step is started, an inactive progress indicator is displayed in selection field 1. Selection field 2 shows the characters FFFF.



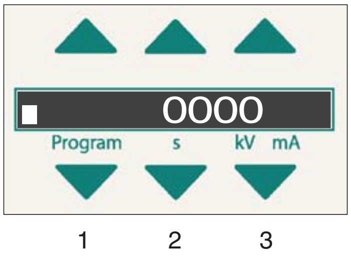
Moving to the ceph packing position

2. Press the **T key**.

   The cephalometer moves to the packing position. The procedure is visualized by an active progress indicator in selection field 1. Once the procedure is complete, the characters **0000** appear in selection field 2.



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



Quitting the service routine

To return to the Service menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.19 Service routine S037

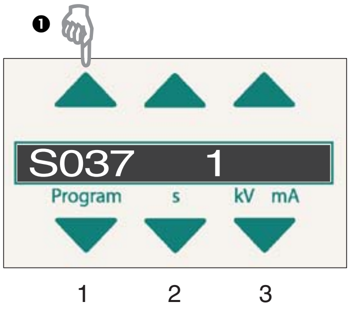
Network service

Function S037	Network service	
Test step 1	Showing the network data	
Test step 2	Setting the default IP address, default gateway address and default subnet mask	Security access
Test step 3	Toggling the DHCP and fixed address boot mode (DEFAULT/STATIC)	Security access
Test step 4	Manual input of IP address, default gateway address and subnet mask	Security access

- Select the Service menu (see page 5-8).

Selecting service routine S037

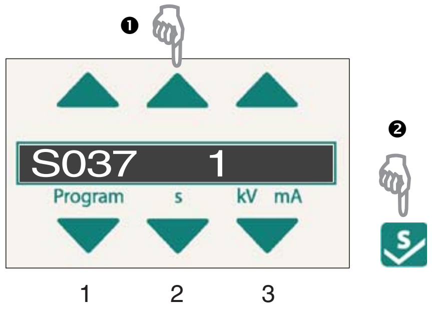
- Use the **arrow keys** to select service routine **S037**.

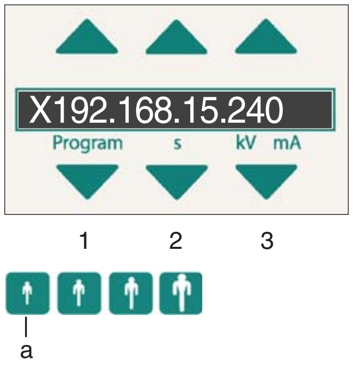


5.19.1 S037: Test step 1

Selecting test step 1

1. Select test step 1 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .





The IP address of the unit is displayed.

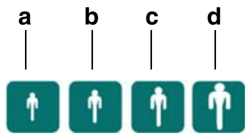
The first digit in the single-line display of the Control Pad denotes **DEFAULT** or **STATIC**.

X = **DEFAULT**= fixed address, factory setting
S = **STATIC** = fixed address, changed setting
D = **DHCP** = automatic address allocation

The LED above **patient symbol key a** lights up.

Displaying the network data

2. You can display different network data in selection field 1 by pressing **patient symbol keys a**, **b** and **c**.



a : Display of the IP address
b : Display of the standard gateway
c : Display of the subnet mask

The currently selected LED above the selected **patient symbol key** is lit.

The first digit in the single-line display of the Control Pad denotes **DEFAULT** or **STATIC**.

X = **DEFAULT** = fixed address, factory setting
S = **STATIC** = fixed address, changed setting
D = **DHCP** = automatic address allocation

NOTE

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

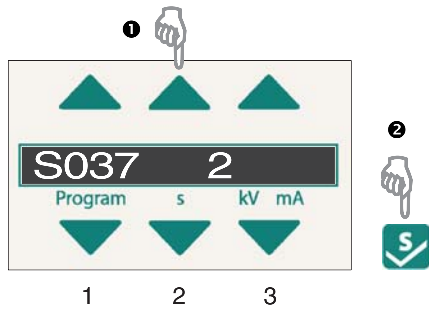
Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

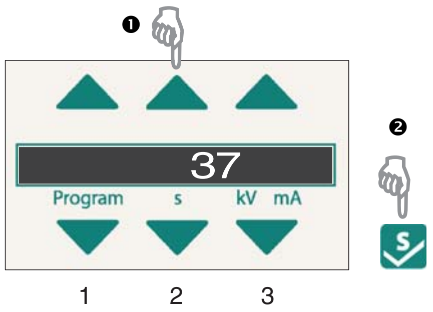
5.19.2 S037: Test step 2

Selecting test step 2

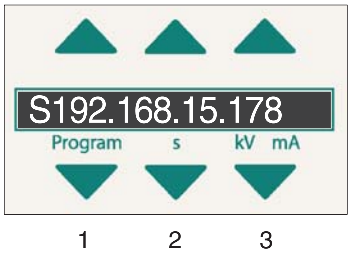


1. Select test step 2 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.

Confirming the security access

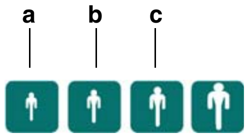


2. Confirm the security access by once again selecting the number of the main routine (37) with the **arrow keys** of selection field 2 and then pressing the **Service key** S.



After test step 2 is selected, the network data display appears as in test step 1. The LED above the **Memory key** M is lit.

Checking the network data

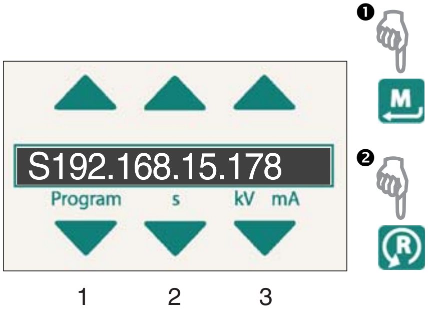


3. Check the network data still in the system before resetting.

a : Display of the IP address
b : Display of the standard gateway
c : Display of the subnet mask

The currently selected e LED above the selected **patient symbol key** is lit.

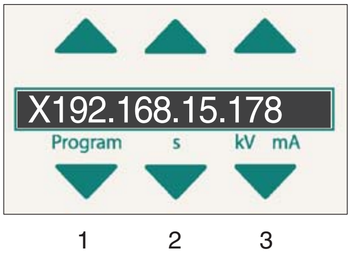
Resetting the network data



4. To reset the network data, first press the **Memory key** M (LED below R key lights up) and then the **R key** Ⓡ.

NOTE

The network data cannot be reset selectively. All network data are reset.



The default network data is displayed. To switch between the display of the different network data, proceed as in test step 1.

NOTE

It is possible to reset the network address to the default value only in the fixed address boot mode (no DHCP).

5. Switch the unit off and then on again.

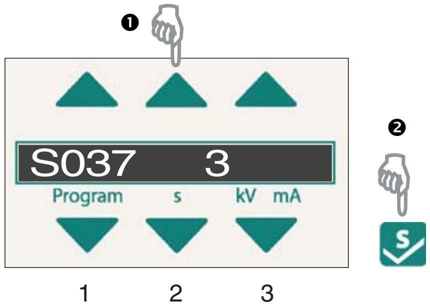
Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

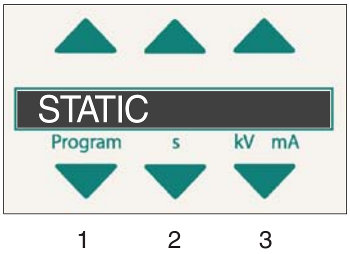
To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.19.3 S037: Test step 3

Selecting test step 3



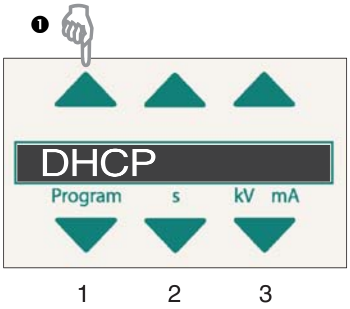
1. Select test step 3 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** S.



The current boot mode of the unit is displayed in selection field 1.

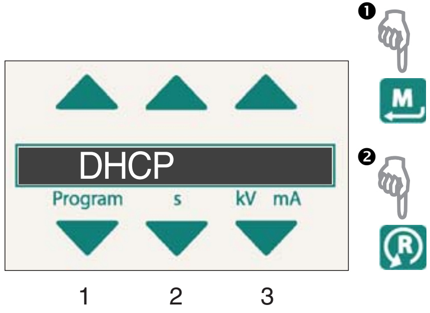
Selecting the boot mode

2. Using the **arrow keys** in selection field 1, select the desired boot mode **DHCP** or **fixed address** (STATIC).



Saving the boot mode

3. To save the boot mode, first press the **Memory key** M (LED below R key lights up) and then the **R key** R.



NOTE

If the system is reset to the STATIC mode, the network addresses will be reset to the factory setting. Switch the unit off and then on again.

4. Switch the unit off and then on again.

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

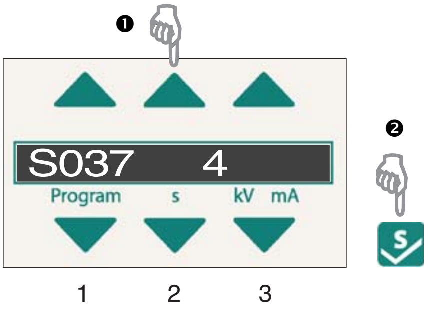
To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

5.19.4 S037: Test step 4

NOTE

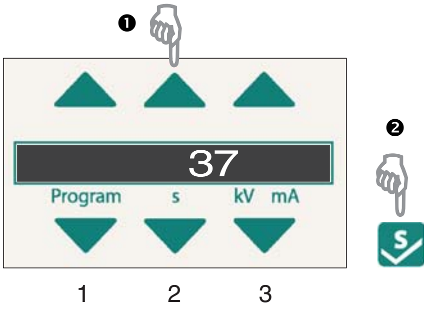
*Performance of this service routine is not possible in the **DHCP mode** (**T key** is blocked).*

Selecting test step 4

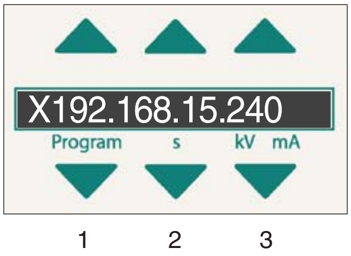


1. Select test step 4 in selection field 2 with the **arrow keys** and confirm your selection by pressing the **Service key** .

Confirming the security access

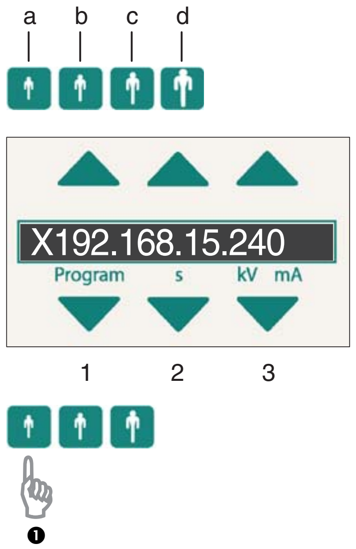


2. Confirm the security access by once again selecting the number of the main routine (37) with the **arrow keys** of selection field 2 and then pressing the **Service key** .



The IP address of the unit is displayed in selection field 1.

Selecting/displaying the network data

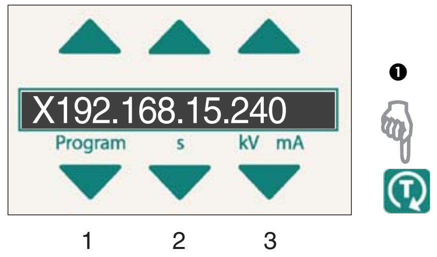


3. To select the network data you would like to edit, press patient symbol key a, b or c:

a : Display of the IP address
b : Display of the standard gateway
c : Display of the subnet mask

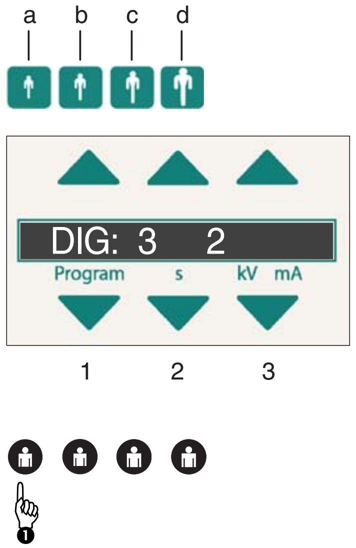
The currently selected LED above the selected **patient symbol key** is lit.

Selecting the network data



4. To change the selected parameter, first press the **T key** .

Selecting the octet



5. Select the desired octet 1-4 with **patient symbol keys a-d**:

a : Octet B1
b : Octet B2
c : Octet B3
d : Octet B4

Example:

1 2 3 (Digit 1 - 3 of octet)
192.168.015.178
B1 B2 B3 B4 (Octets 1 - 4)

The currently selected **patient symbol key** is lit.

Selecting the digit

192.168.015.178

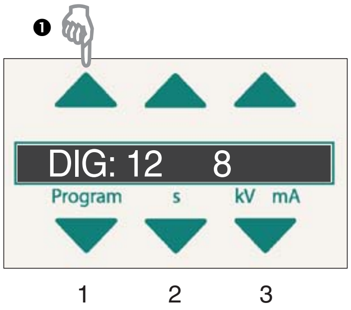
Octet 3, digit 12, with the value 8

6. Use the arrow keys in selection field 1 to select the desired digit within the octet (see step 5).

NOTE

The digits always refer to the selected octet only. Reprogramming the last digit is shown here as an example.

Selection field 2 shows the value of the selected digit.

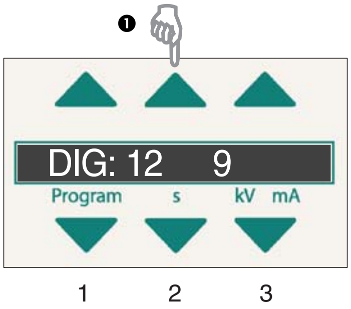


Changing the value under the digit

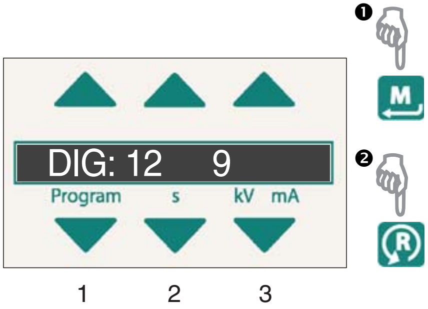
7. To change the value under the digit, use the arrow keys of selection field 2.

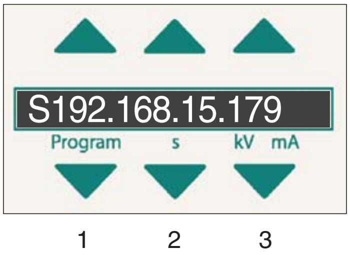
192.168.015.179

Octet 3, digit 12, with the value 9



Saving the changes





8. To save the changes, first press the **Memory key** M (LED below R key lights up) and then the **R key** R.
9. Switch the unit off and then on again.

Quitting the service routine

To return to the service routine selection menu, press the **up arrow key** ▲ above selection field 3.

To quit the Service menu and return to the Main menu, press the **up arrow key** ▲ above selection field 3.

6 Repair

Contents

6

Repair

DANGER

Shock hazard! It is essential that you switch the X-ray unit OFF before replacing any components!

The unit must be disconnected from the junction box of the building installation before replacing any parts near the power supply, power switch, board DX 32 or the X-ray tube assembly!

CAUTION

Please observe the usual precautionary measures for handling printed circuit boards (ESD).

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

NOTE

Open the ***PAN*** *and* ***CEPH RESET ADJUSTMENT*** *menus in CDR PanElite Service Program and note the old adjustment values before you begin replacing boards or modules (which contain boards).*

NOTE

After replacing boards or modules containing boards, check to make sure that the programming of the module corresponds to the current software status of the system. The software version for the modules can be accessed through service routine S008.2 or the extended detail query in SIXABCON.

Perform a software update in case of software incompatibilities (see Section 1.6).

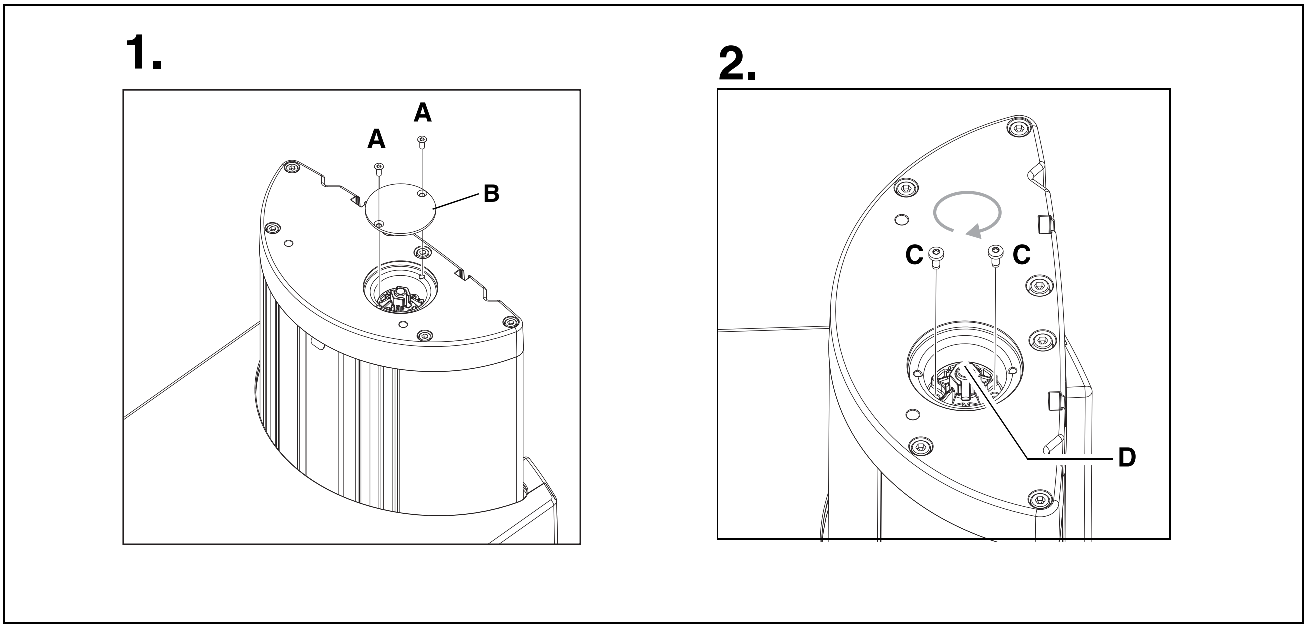
CAUTION

When replacing modules, be sure to note which ones contain boards and follow the instructions in section "Procedure following replacement of boards" starting on page 6-56. Also check whether the current CDR PanElite Support CD contains any additional, up-to-date information on module replacement.

CAUTION

Be sure to observe the information on action required following module replacement. You will find this information at the end of each set of repair instructions.

6.1 Replacing the height adjustment motor (M1_4)/spindle



6.1.1 Preparing for motor replacement

- Remove the sensor and store it in a safe place.
- Switch the unit ON.

Moving the unit up and removing the profile covers

- Use the UP/DOWN keys on the Control Pad to move the slide upward and remove the cover parts (see section 1.11):
  - Intermediate piece
  - Profile covers, top and bottom

NOTE

__Tip:__ When unscrewing the profile cover, press it toward the top of the unit and let it slide down after detaching it.

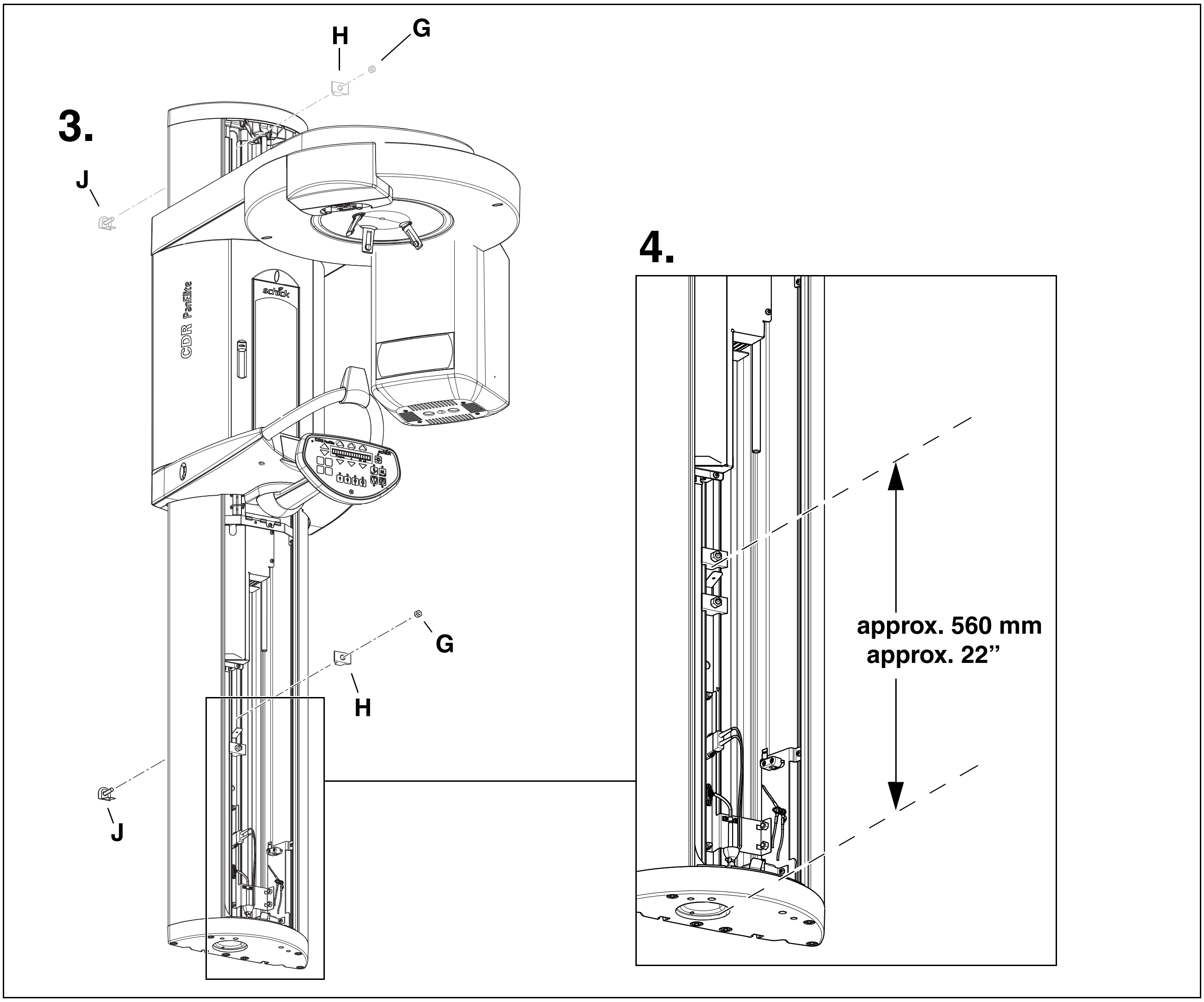
NOTE

If the height adjustment motor is inoperative, you can also move the slide manually.

Moving the slide manually

1. Loosen the two screws **A** and remove cover **B**.
2. Loosen screws **C** on spindle holder **D** and turn the spindle holder with a socket wrench (18 mm A/F):
   - **CW rotation of spindle = slide moves upward**
   - **CCW rotation of spindle = slide moves downward**

   The spindle and slide can thus be manually moved in the vertical axis.



Securing the slide position

- Make a mark at the position of the upper limit stop.

3. Loosen nut **G** on upper profile clamp **H** and remove upper limit stop **J** from the stand.
4. Install limit stop **J** above the lower limit stop so that there is a distance of approx. **560 mm (22”)** between the lower edge of the unit and the lower edge of the limit stop.

- Use the UP/DOWN keys on the Control Pad to move the slide downward.

ℹ ***NOTE***

If the height adjustment motor is inoperative, you can also move the slide manually (see page 6-6).

- Switch the unit **OFF** and **de-energize** it.

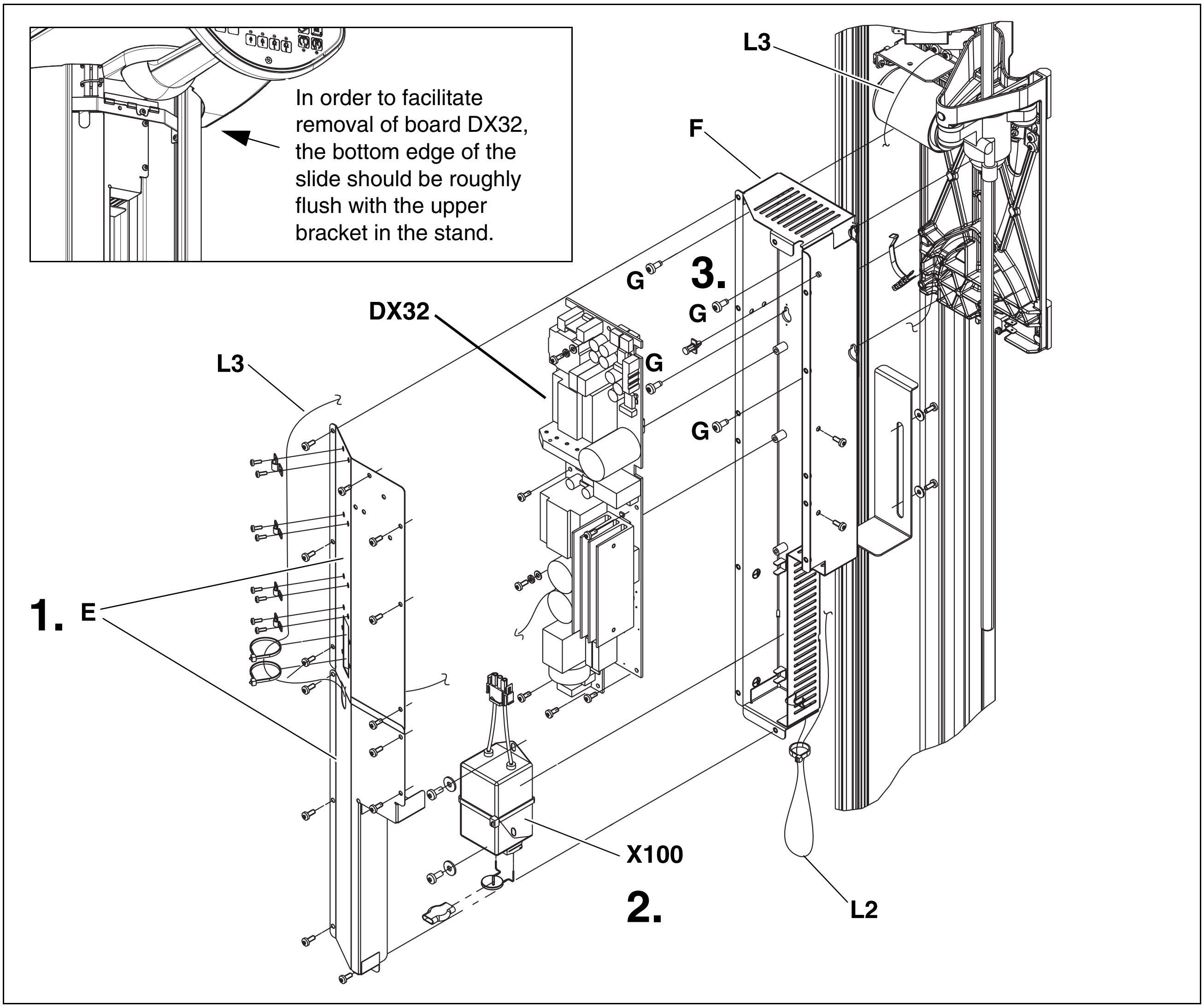
Removing the remaining covers

- Remove the top cover and pull connector X607 off of board DX1.
- Now remove the following cover parts:
  - Arm cover, top
  - Slide cover, top rear
  - Slide cover, bottom rear
  - Slide cover, front
    Attention: FH laser cable (PAN)!

NOTE

To prevent scratches, also remove the covers of the slide table and the drawer.

6.1.2 Removing board DX32


In order to facilitate removal of board DX32, the bottom edge of the slide should be roughly flush with the upper bracket in the stand.

1. Unscrew cover plates **E** (bottom and top) from connection box **F** of board **DX32**.

NOTE

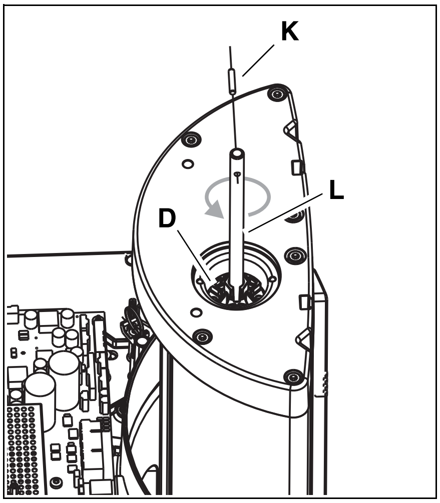
*Cable **L3** can remain on the top cover plate (remove the shield terminal if necessary). The cover plate can simply be folded to the side and stored laterally in the stand.*

- Pull connector **X2** off of board **DX32** and detach the protective ground wire.

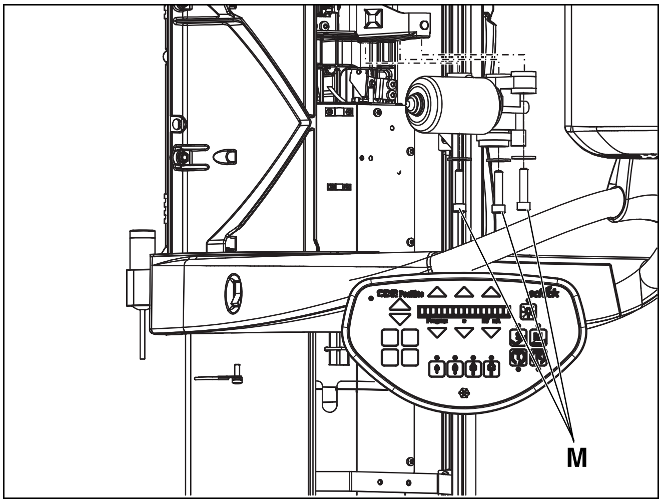
2. Detach cable **L2** from the cable tie and from terminal **X100** and pull it out of connection box **F** toward the bottom.
3. Loosen the four screws **(G)** and remove the connection box including board DX32.

6.1.3 Replacing the height adjustment motor/spindle

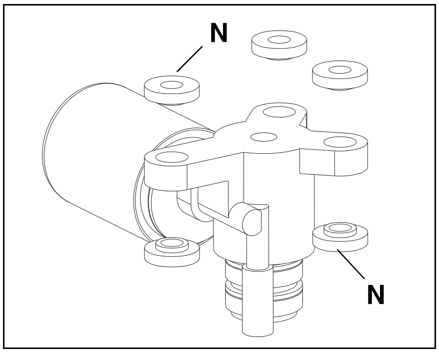
1.



2.



3.



Removing the spindle

1. Turn spindle holder **D** (with an 18 mm A/F socket wrench) CCW until the motor comes to rest on the limit stop and spindle **L** has been turned all the way out of the motor. Remove the straight pin**(K).**

   Remove the spindle **(L)**.

NOTE

Tip: First pull spindle ***L*** downward along the motor, and then diagonally upward and out of the unit.

Removing the defective motor

- Unplug connector **X402** of the motor cable from board DX1, detach the motor cable from the cable harness and carefully pull it out of the stand.

2. Loosen the three screws **(M)**. Remove the motor while carefully pulling the motor cable out of the stand.

Inserting the dampers

3. Attach the new rubber pads to the new motor.
   They are included in the scope of supply of the HA motor.

Installing the new motor

- Install the height adjustment motor in the reverse order of removal. Please observe the following:

NOTE
When fastening the motor, make sure that all three screws are tightened uniformly and protrude approx. 3 mm out of the nut.

NOTE
Don't forget to plug all connectors and cables back in again in their original positions and to reattach all cable ties and clamps (see section "Laying cables when replacing the height adjustment motor" on page 6-12).

Make sure that none of the cables are crushed by the cover plates of the DX32 connection box.

NOTE
Don't forget to install the upper limit stop in the marked position after replacing the height adjustment motor.

⚠ ***ATTENTION: What should I do after replacement?***

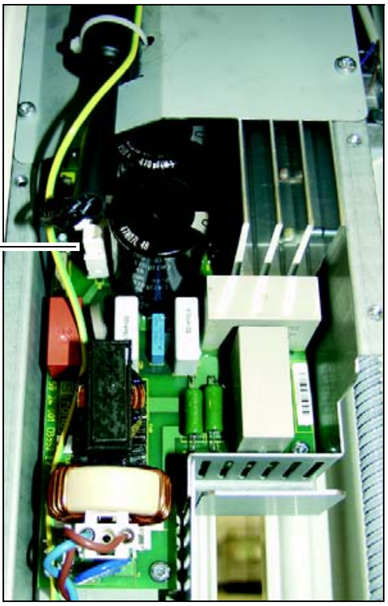
– After inserting the new spindle above and below the HA motor, grease it generously with Chesterton 622 food grade H1 lubricant.

– Check the function of the height adjustment motor with the UP/DOWN keys on the user interface.

– Readjust the travel height (see "Service routine S018" on page 5-61).

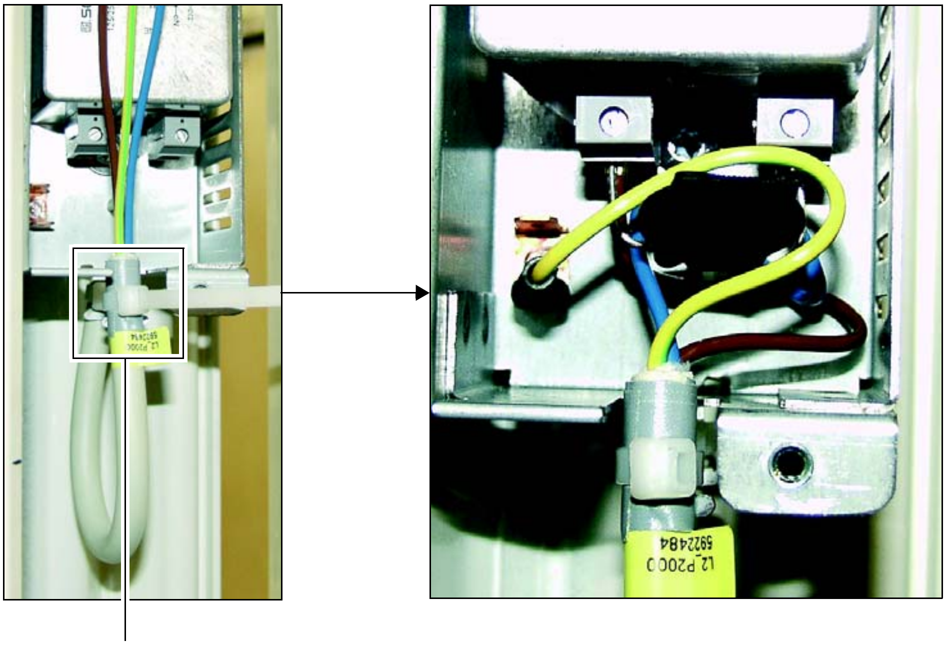
6.1.4 Laying cables when replacing the height adjustment motor

Plugging connector X2 (cable L3) into DX 32



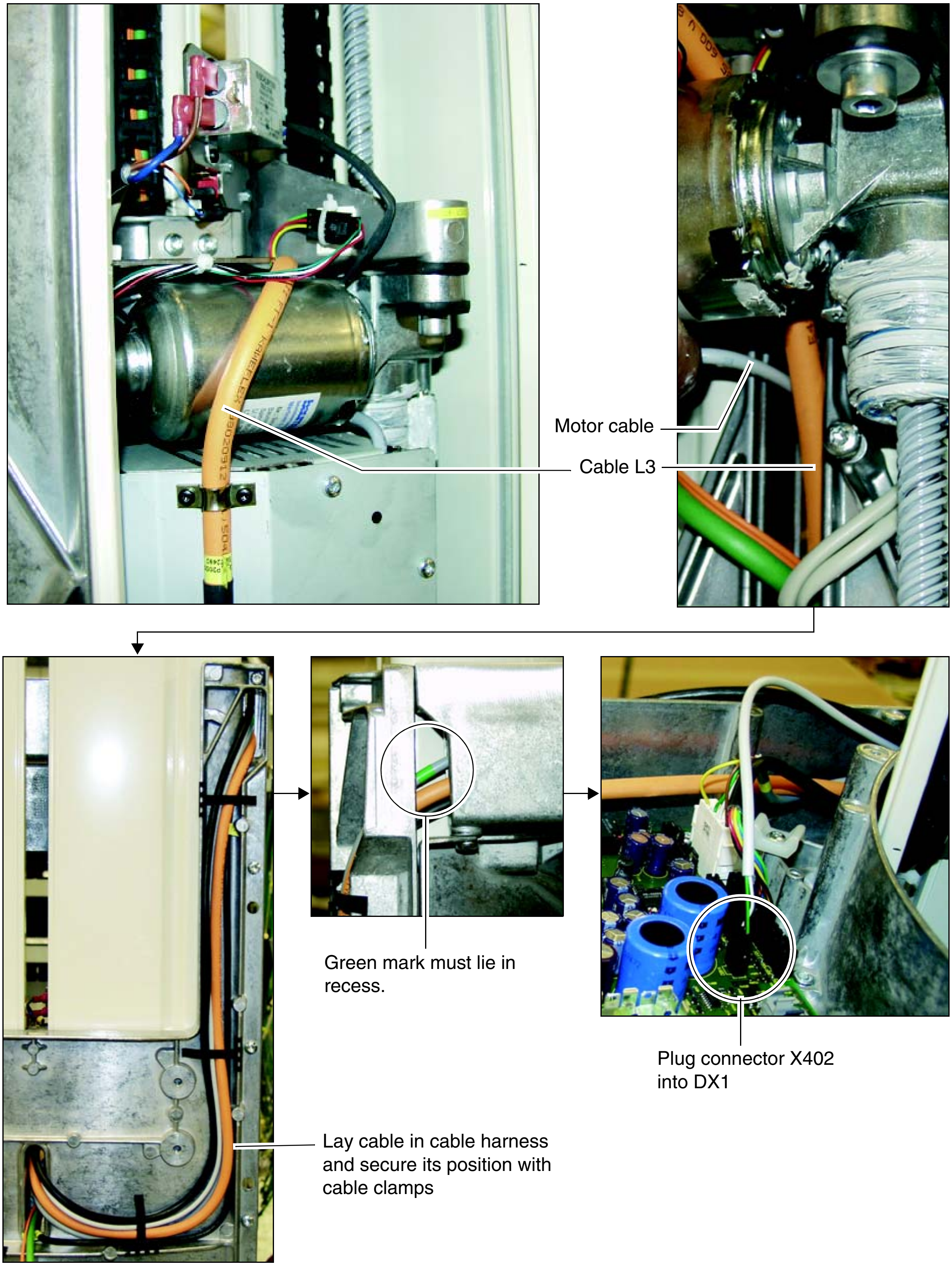
Plug connector X2 (L3) into DX32.

Connecting cable L2 to terminal X100 (DX32)



Fasten cable L2 to bottom strain relief with cable tie (on plate DX32).
Cable L2 must be run behind the EMC plate of DX32 without any loops.

Motor cable and cable L3



Motor cable

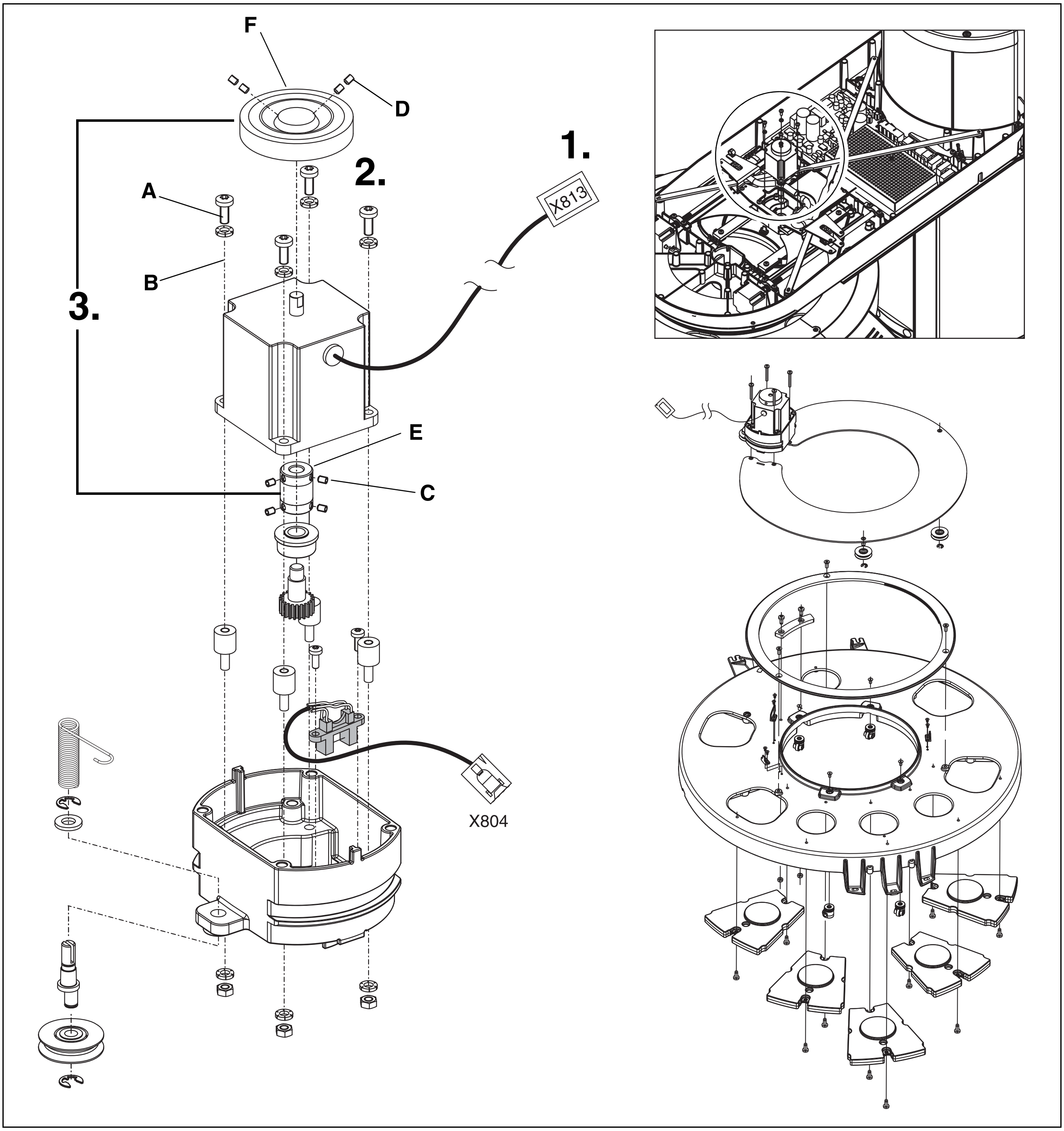
Cable L3

Green mark must lie in recess.

Plug connector X402 into DX1

Lay cable in cable harness and secure its position with cable clamps

6.2 Replacing the ring motor (M1_3)



Removing the covers

- Remove the covers (see section 1.11):
  – Top arm cover

Removing the defective 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**.

Reusing the coupling and flywheel

3. Loosen set screws **C** and **D** and remove coupling **E** and absorber **F** from the defective motor.

- Attach the coupling and absorber to the new motor and retighten the set screws.

NOTE

Seal set screws ***C** and **D** with Loctite 242 before tightening them.*

Installing the new motor

- Insert the new motor including coupling and absorber in the ring.

NOTE

While inserting the motor, turn it back and forth slightly until the pinion engages in the ring gear.

- Use the screws and serrated washers **B** to screw the new motor onto the ring securely.

4. Run the motor cable along its original path and plug it back into connector **X813** on board **DX1** (see "Laying cables when replacing the ring motor" on page 6-16).

NOTE

Don't forget to reattach all cable ties and clamps.

Attaching the covers

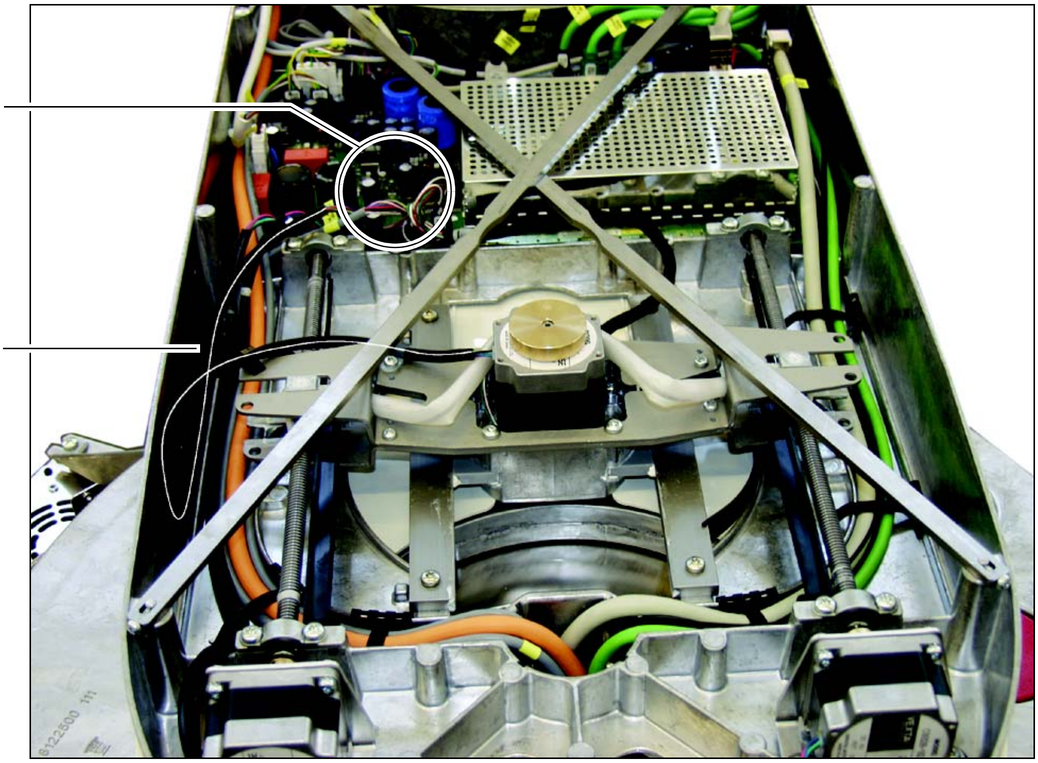
- Reattach the covers.

ATTENTION: What should I do after replacement?

– Check the function of the ring motor.

– Perform the complete unit adjustment (see chapter 4).

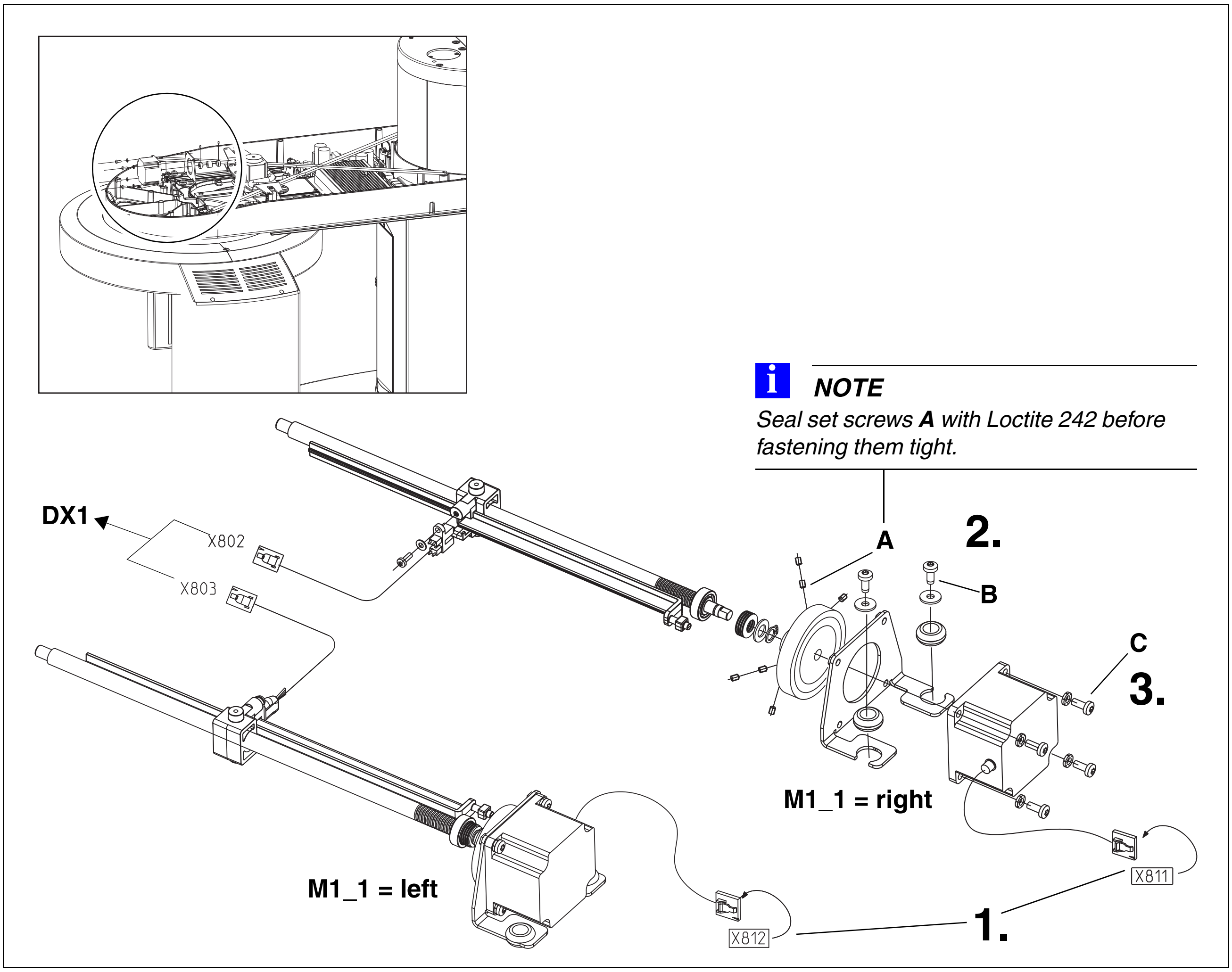
6.2.1 Laying cables when replacing the ring motor



Plug in connector X813 on DX1.

Lay motor cable in a single loop (from top to bottom).

6.3 Replacing the PAN actuators (M1_1/2)



NOTE

*Seal set screws **A** with Loctite 242 before fastening them tight.*

Removing the covers

- Remove the covers (see section 1.11):
  – Top arm cover

Removing the defective actuator

1. Loosen the actuator cable from the cable holders and pull it off of connectors **X811** (AK1; M1_1) and **X812** (AK2; M1_2) 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.

Reusing the motor holder (if required)

3. Loosen the four screws **(C)** and remove the actuator holder from the defective motor.

- Place the new actuator in the holder and fasten it with the four screws **C**.

Installing the new actuator

- Install the actuator in the reverse order of removal.

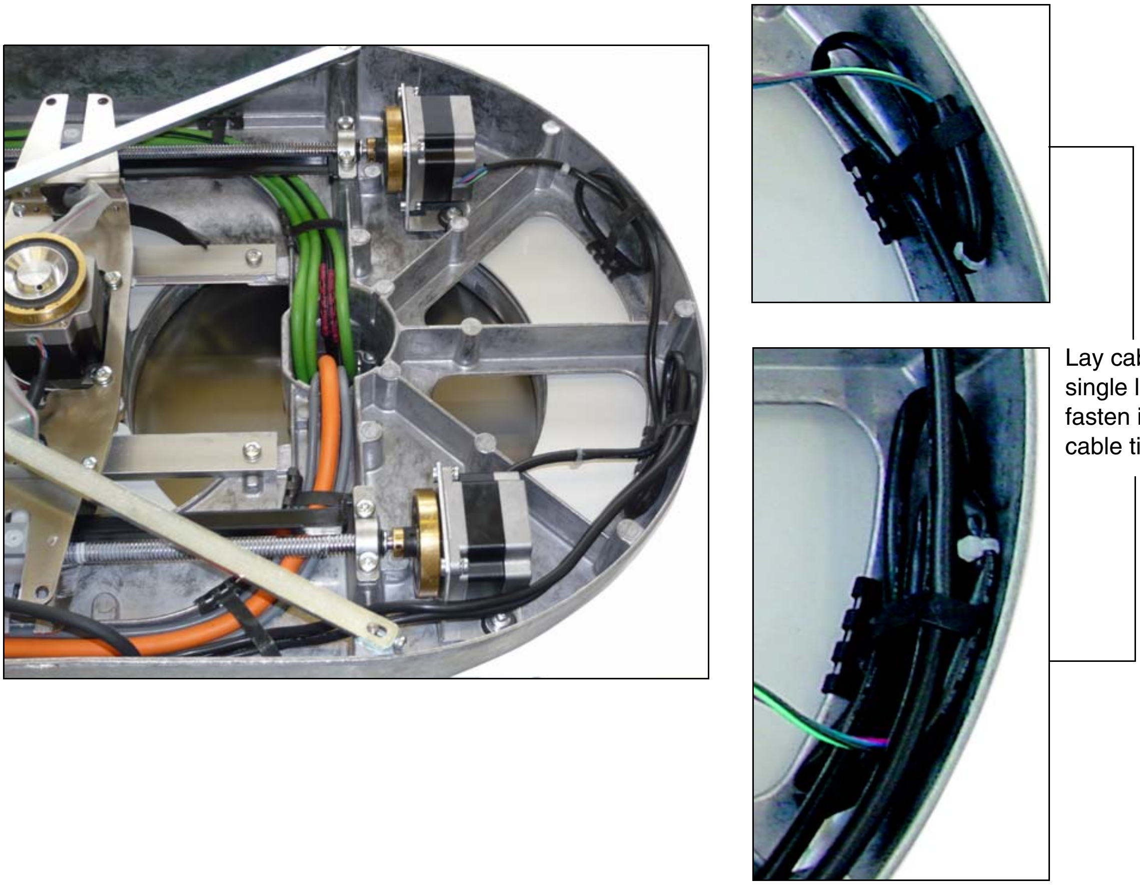
NOTE
Don't forget to plug connectors X811 and X812 back in, lay the cables in their original positions and reattach all cable ties and clamps (see section "Laying cables when replacing actuators (M1_1/2)" on page 6-18).

ATTENTION: What should I do after replacement?

– Check the function of the actuators.

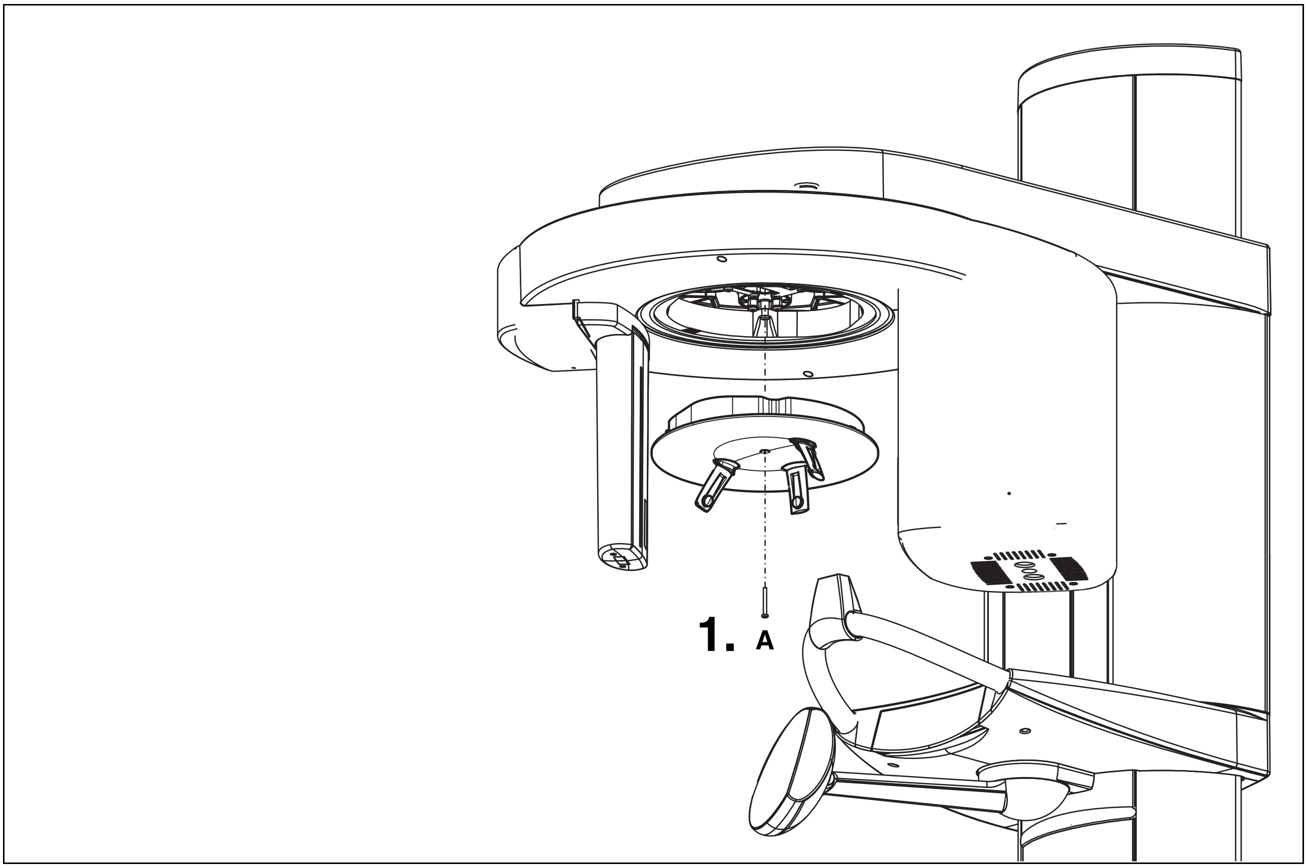
– Perform the complete unit adjustment (see chapter 4).

6.3.1 Laying cables when replacing actuators (M1_1/2)



Lay cable in a single loop and fasten it with a cable tie.

6.4 Replacing the headrest



Removing the defective headrest

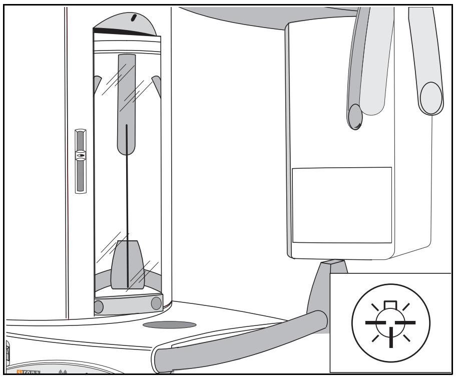
1. While holding the headrest firmly from below, loosen screw **A** and remove the defective headrest.

- Pull cable **L18** off of connector **X1** on board **DX5** (see "Laying cables when replacing the headrests" on page 6-20).

Installing the new headrest

- Plug cable **L18** into connector **X1** on board **DX5** of the new headrest.
- Position the new headrest in the unit and screw it on loosely with screw **A** until a slight stop is perceptible.

Aligning the new headrest



- Switch the unit **ON**.
- Switch the light localizers **ON** and align the headrest so that the MS light beam strikes the center of the forehead support.
- Tighten screw **A** securely.

NOTE

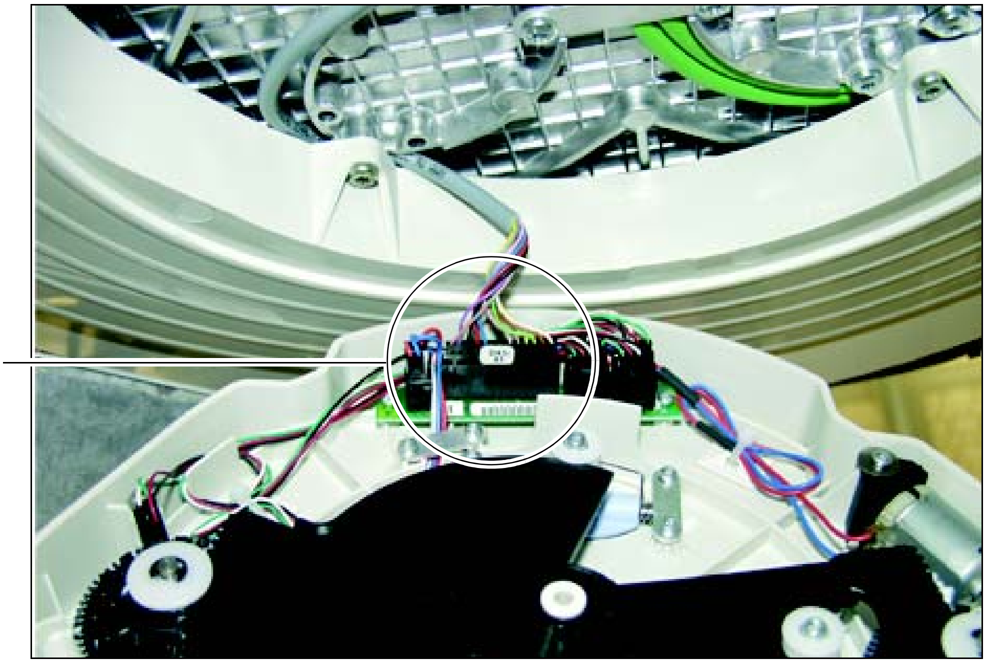
Make sure that the headrest does not turn when you tighten the screw.

ATTENTION: What should I do after replacement?

– Check the function of the headrest using the forehead and temple support keys on the user interface.

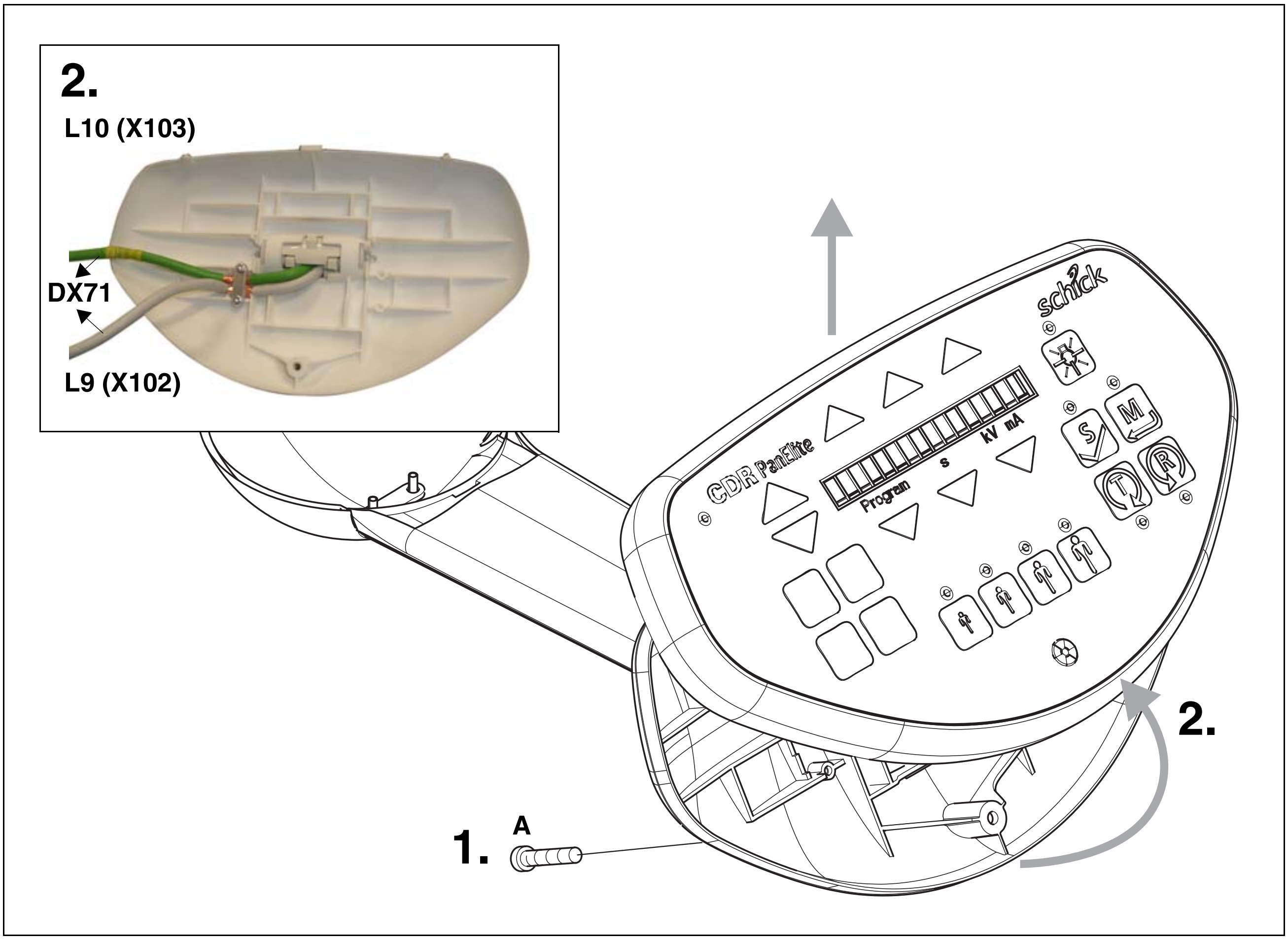
– No further action is required.

6.4.1 Laying cables when replacing the headrests



Plug cable L13 into connector X1 (DX5).

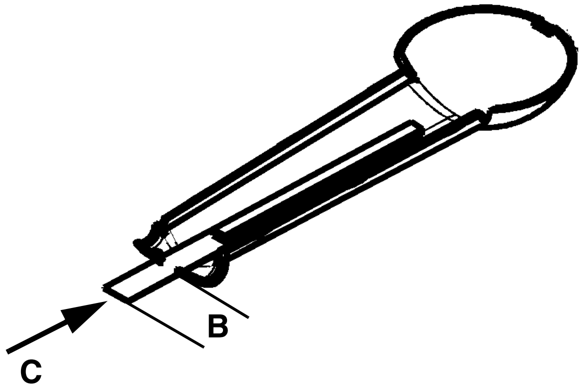
6.5 Replacing the Control Pad



Removing the defective user interface

1. Loosen screw **A**.
2. Carefully open the front cover of the control pad and pull upward to remove it.
3. Pull cables **L9** and **L10** off of connectors **X102** (L9) and **X103** (L10) on board **DX71**.

4.



Installing the new user interface

4. Cut off the projekting length **B** of the gounding strap **C** from the new cover.

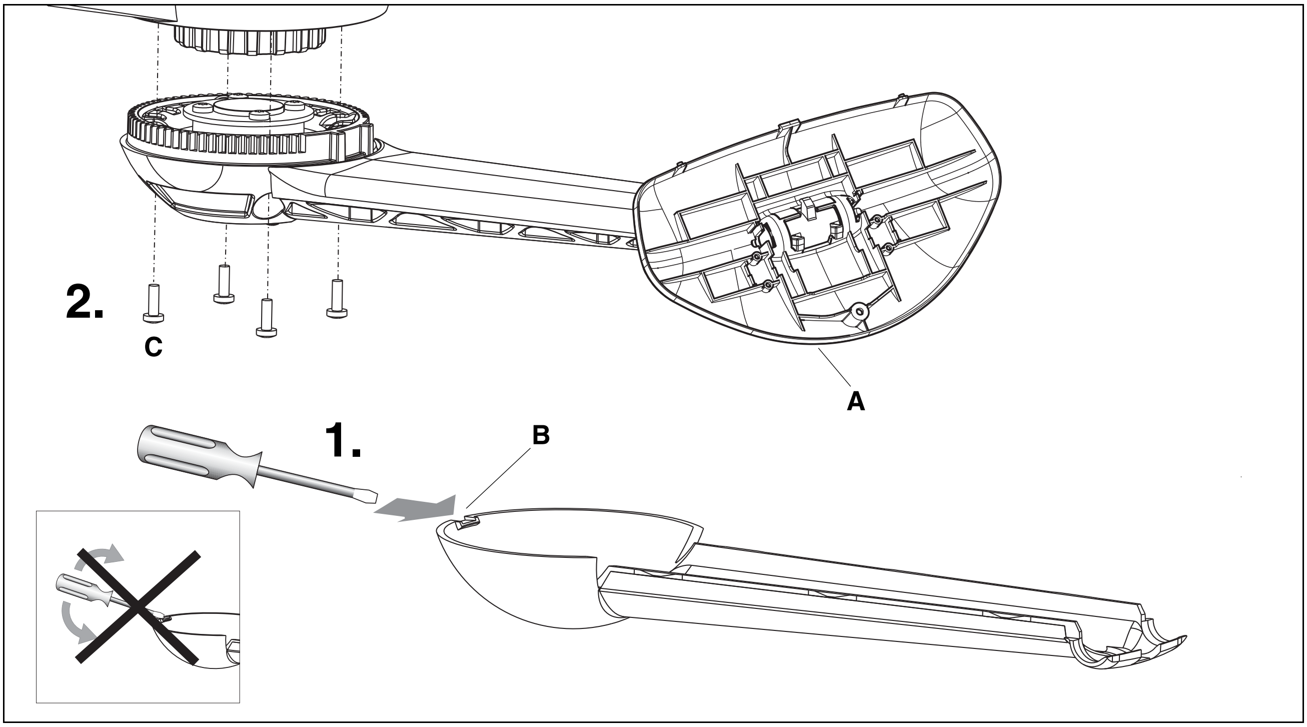
- Plug the cables of the new user interface into connectors **X102**(L9) and **X103** (L10) on board **DX71** and clip the new user interface onto the control panel.

⚠ ***ATTENTION: What should I do after replacement?***

– Since board DX71 is always replaced along with the user interface, ***be sure to also observe the “Procedure following replacement of boards“*** *(see section 6.19.1)*

– Check the user interface for correct functioning as well as the function of the display elements. (After the unit is switched ON all of the display elements must light up briefly!)

6.6 Replacing the control panel



Removing the user interface

- Remove the user interface (see page 6-21).

Removing the defective control panel

- Swing folding mechanism **A** for the user interface all the way up. This makes it easier to remove the cover.

1. Press into slit **B** of the housing cover with a screwdriver **(do not pry!)** and remove the cover.

- Detach cables **L9** and **L10** from the strain reliefs.

2. Rotate the control panel to the center position and loosen the four screws **C**.

- Pull the cables out of the control panel and remove the panel.

Installing the new control panel

- To install the control panel and the user interface, follow the procedure for removing them in reverse order.

ℹ ***NOTE***

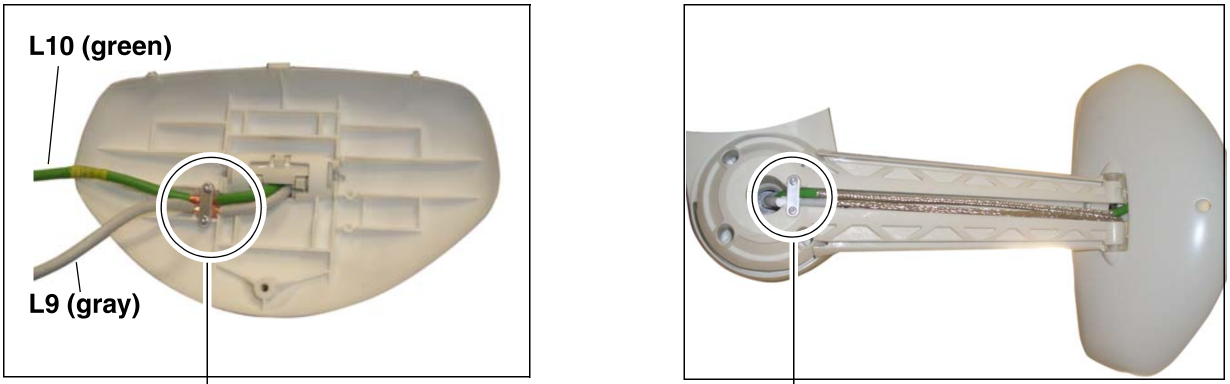
Don't forget to plug connectors X102 and X103 back into board DX71, lay the cables in their original positions and reattach the strain reliefs (see "Laying cables when replacing the control panel" on page 6-24).

⚠ ***ATTENTION: What should I do after replacement?***

– Check the user interface for correct functioning as well as the function of the display elements. (After the unit is switched ON all of the display elements must light up briefly!)

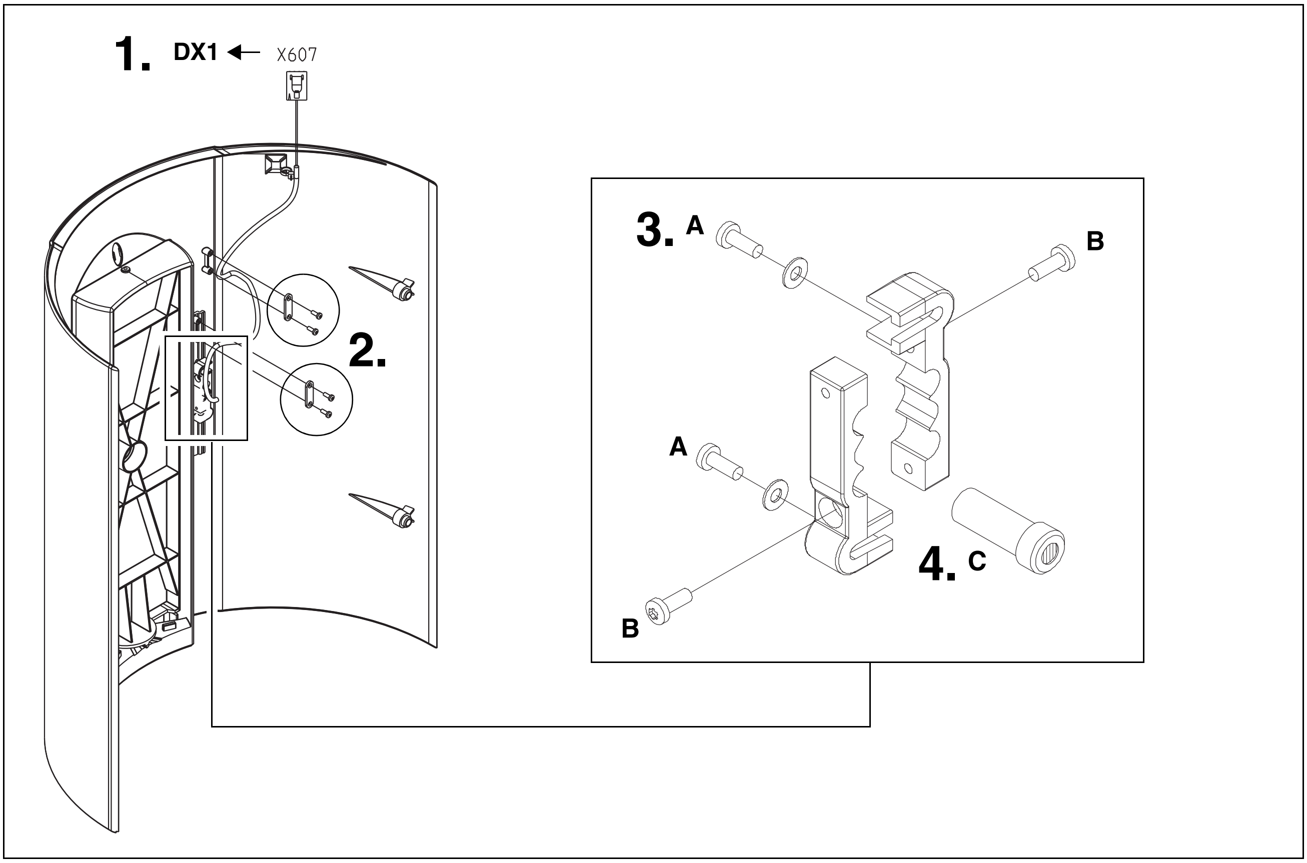
– No further action is required.

6.6.1 Laying cables when replacing the control panel



Reattach the strain reliefs.

6.7 Replacing/adjusting the FH light localizer (PAN)



Removing the covers

- Remove the covers (see also section 1.11):
  - – Top arm cover

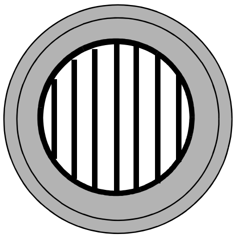
1. Pull the cable of the FH laser module off of connector **X807** on board **DX1**.

- Detach the cover (see also section 1.11):
  - – Front slide cover, carefully pulling it together with the FH light localizer off toward the front.

Removing the defective laser module

2. Detach the cable from the strain reliefs.
3. Loosen the two screws **(A)** and remove the holder including the laser module (FH).
4. Loosen the two screws **(B)** and carefully pull laser module **C** out of the holder toward the front.

Installing the new laser module



- Insert the new laser module (FH) in the holder and retighten screws **B**.

NOTE

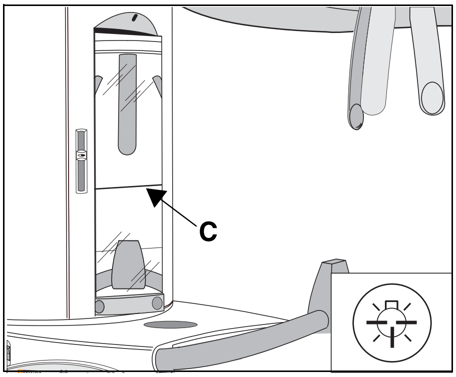
Make sure that the lines in the laser module run vertically.

- Screw the holder securely back onto the cover with screws **A** and reattach the strain reliefs.
- Set the front slide cover down on the top support cover and plug the cable of the new FH laser module into connector **X807** on board **DX1**.

NOTE

Before reattaching the front slide cover, you must adjust the FH light localizer.

Adjusting the FH light localizer (PAN)



- Switch the unit ON.
- Switch the light localizers ON.
- Loosen screws A slightly and align the laser module (FH) including the holder so that the FH light beam runs parallel to the edge of the tube assembly light localizer **C** (visible here in the mirror).
- Tighten screws **A** securely.

NOTE

Make sure that the holder does not turn when you tighten the screws.

- Check the light localizer again and perform a correction if necessary.

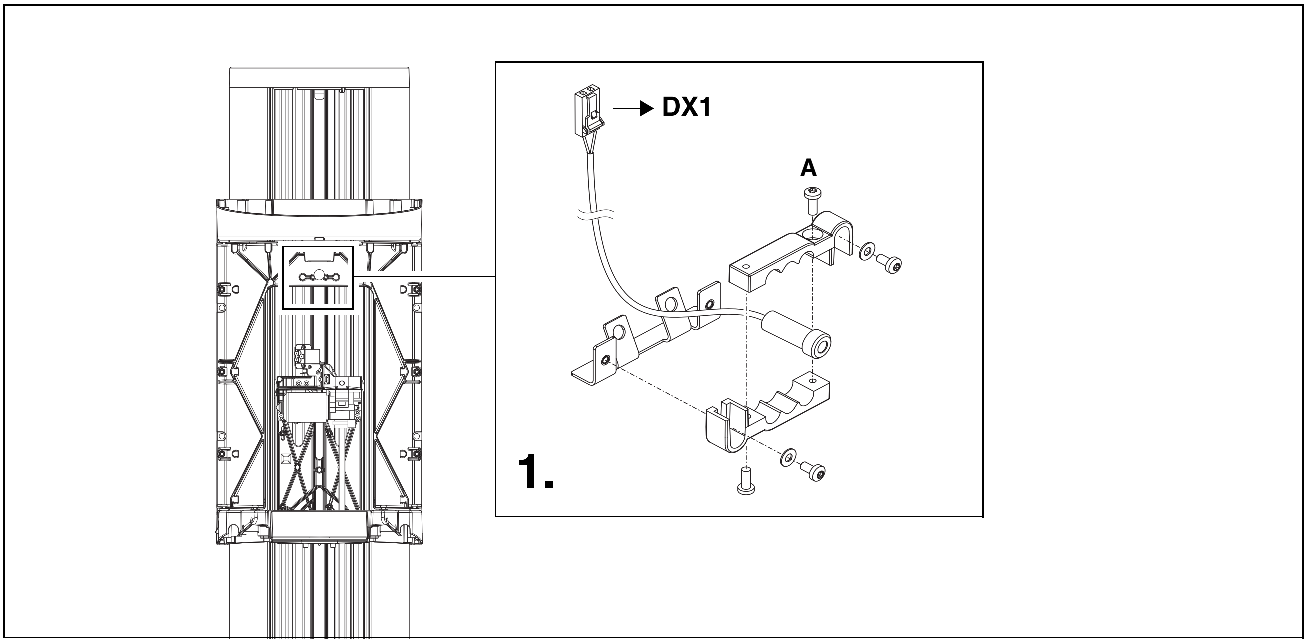
Attaching the covers

- Reattach the top arm and front slide covers.

ATTENTION: What should I do after replacement?

– No further action is required.

6.8 Replacing/adjusting the MS light localizer laser module (PAN)



Removing the covers

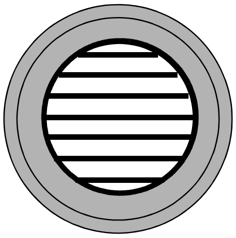
- Remove the covers (see also section 1.11):
  – Top arm cover
- Pull the cables of the laser modules (FH+MS) off of connectors **X807** (FH) and **X811** (MS) on board **DX1**.
- Detach the cover (see also section 1.11):
  – Front slide cover, carefully pulling it together with the FH light localizer off toward the front.

Removing the defective laser module

- Detach the cable from the cable holder.

1. Loosen the two screws **A** and carefully remove the laser module (MS) toward the front.

Installing the new laser module



- Insert the new laser module (MS) in the holder and tighten the screws **A** loosely.

NOTE

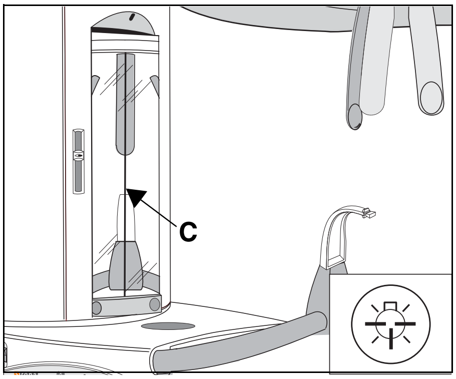
Make sure that the lines in the laser module run horizontally.

- Plug the cable of the new MS laser module into connector **X811** on board **DX1** and run the cable in the cable holder.

NOTE

Before reattaching the front slide cover, you must adjust the MS light localizer.

Adjusting the MS light localizer (PAN)



- **Insert** a bite block in the support piece.
- Switch the unit **ON**.
- Switch the light localizers **ON** and align the laser module (MS) so that the MS light beam **(C)** strikes the center of the bite block or support piece.
- Tighten screws **A** securely.

NOTE

Be careful not to turn the laser module any more when tightening the screws.

- Check the light localizer again and perform a correction if necessary.

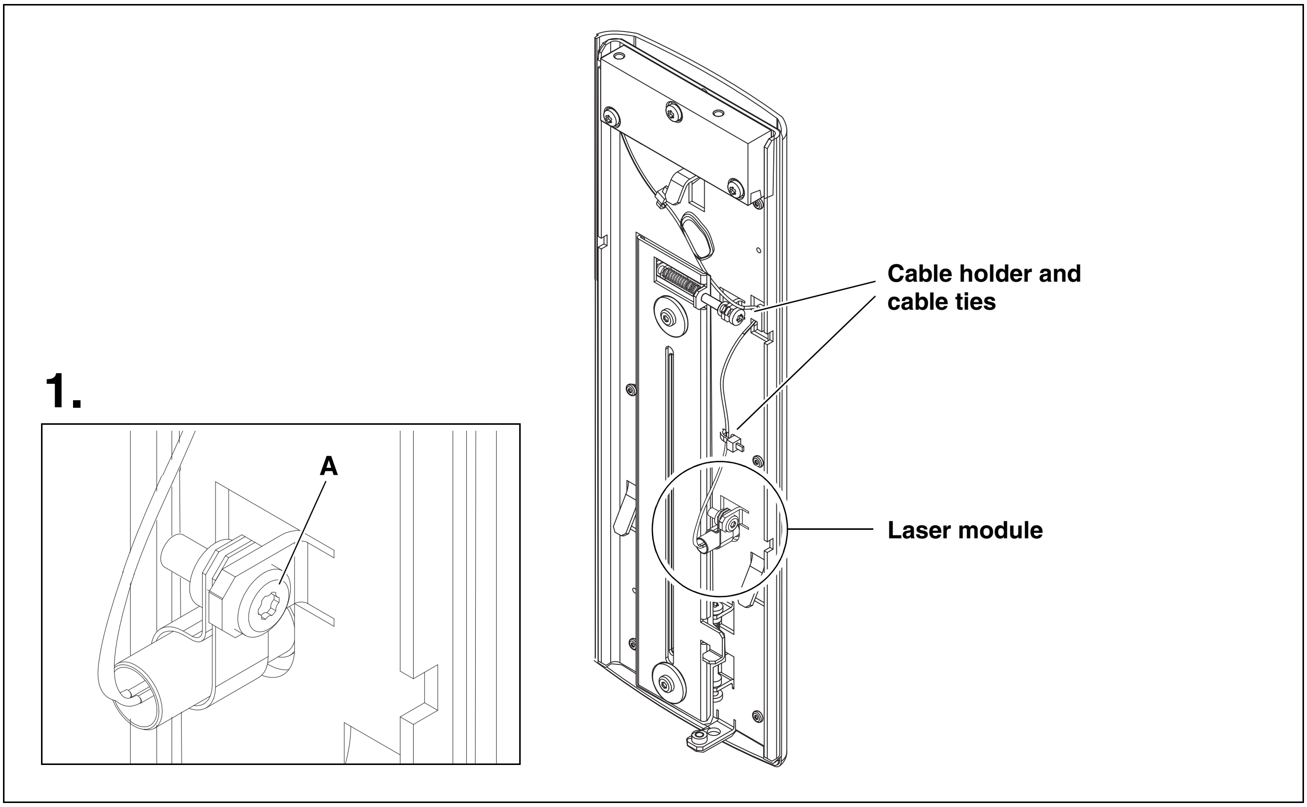
Attaching the covers

- Set the front slide cover down on the top support cover.
- Plug the cable of the FH laser module back into connector **X807** on board **DX1**.
- Reattach the top arm and front slide covers.

ATTENTION: What should I do after replacement?

– No further action is required.

6.9 Replacing/adjusting the FH light localizer (Ceph)



Removing the covers

- Remove the covers (see also section 1.11):
  - – Cover of cephalometer
  - – Outer cover of secondary diaphragm

⚠ ***CAUTION***

Do not under any circumstances remove or move the secondary diaphragm! *Otherwise the system will require readjustment.*

Removing the defective laser module

- Pull the cable of the Ceph laser module off of connector **X407** on board **DX91** and detach the cable from the cable ties and holder.

1. Loosen screw **A** and remove the FH laser module (Ceph).

Installing the new laser module

- Insert the new laser module (FH) and tighten screw **A** loosely.

---

i ***NOTE***

Make sure that the lines in the laser module run vertically.

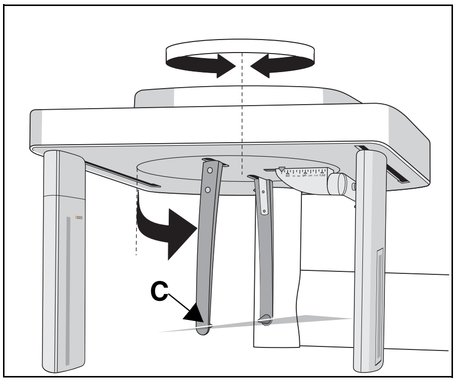
- Plug the cable of the FH laser module back into connector **X407** on board **DX91**.
- Lay the cable in its original position and secure it there with cable ties.

---

i ***NOTE***

Before reattaching the cover of the secondary diaphragm, you must adjust the Ceph light localizer.

Adjusting the Ceph light localizer (FH)



- Switch the unit **ON**.
- Switch the light localizers **ON**.
- Align the Ceph (FH) laser module so that FH light beam **C** runs horizontal between the ear plugs (tolerance: ± 1.5 mm).
- Tighten screw **A** securely.

NOTE

Be careful not to turn the laser module when you tighten the screws.

- Check the light localizer again and perform a correction if necessary.

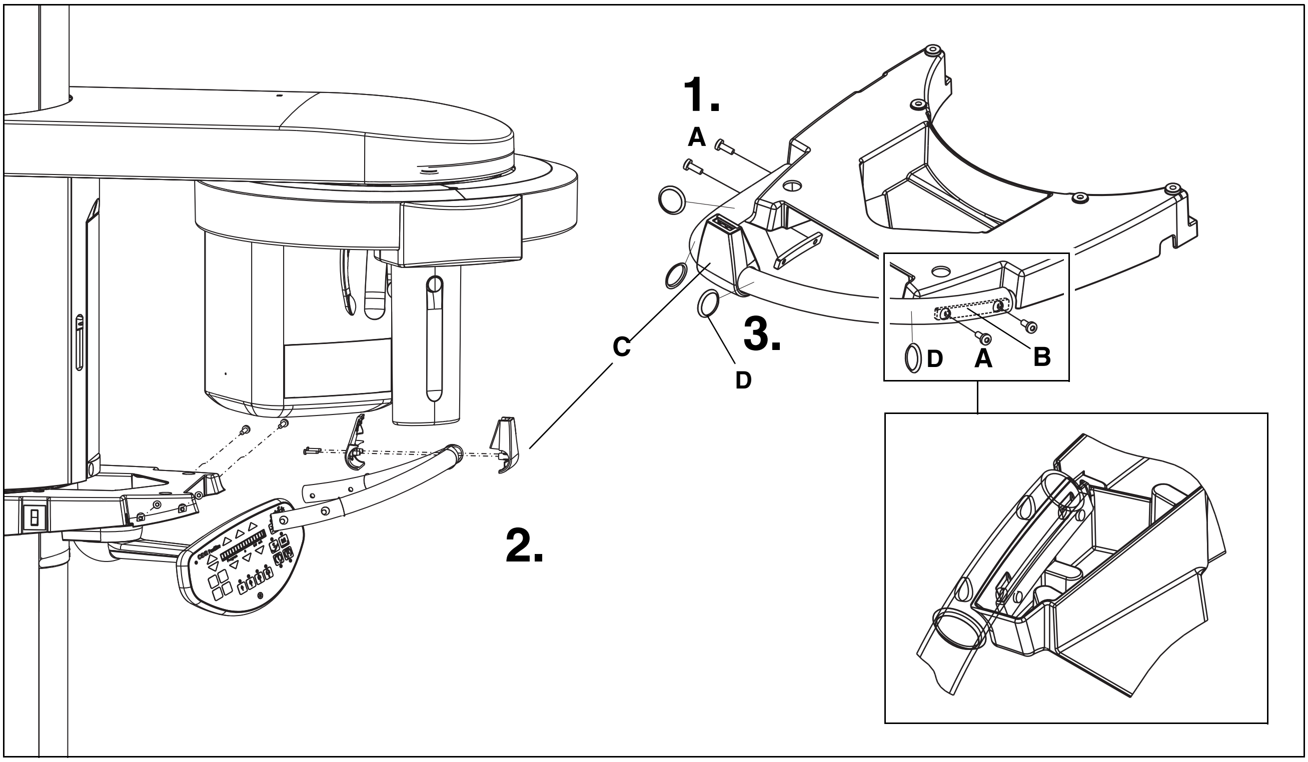
Attaching the covers

- Reattach the cover of the secondary diaphragm.
- Reattach the cover to the cephalometer.

ATTENTION: What should I do after replacement?

– No further action is required.

6.10 **Replacing the tube bend** (bite block holder)



Removing the covers

- Remove the covers (see also section 1.11):
  - Top support
  - Bottom support

  and remove the drawer.

Removing the defective tube bend

1. Loosen the four screws **(A)** and remove the tube bend.

NOTE

*Observe the position of the flat bars **(B)**.*

Reusing the support piece and silicone rings

2. Remove support piece **C** from the defective tube bend and attach it to the new tube bend (see section 6.11).
3. Remove silicone rings **D** from the defective tube bend and place them on the new tube bend.

Installing the new tube bend

- Install the tube bend in the reverse order of removal.

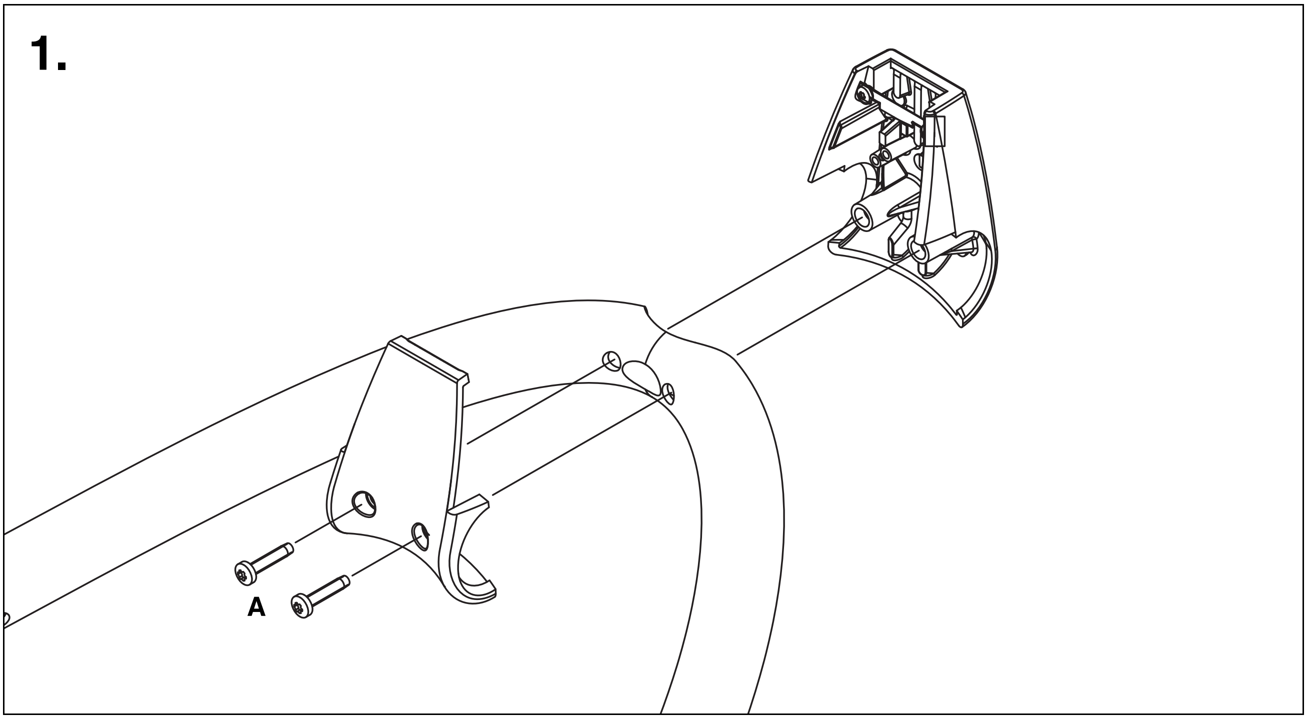
ATTENTION: What should I do after replacement?

– Perform system adjustment (PAN and CEPH) (see chapter 4).

6.10

6.11 **Replacing the support piece** (bite block holder)

1.



Removing the defective support piece

1. Loosen the two screws **(A)** and remove the support piece.

Installing the support piece

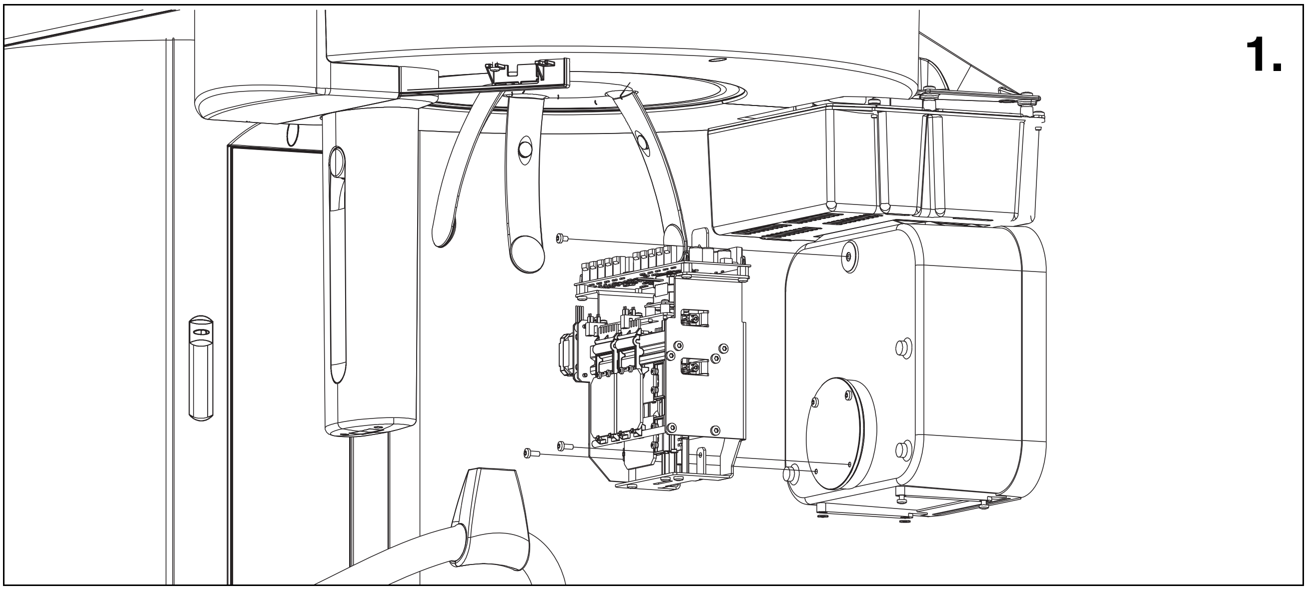
- Place the support piece on the tube bend and fasten it with the two screws **(A)**.

⚠ ***ATTENTION: What should I do after replacement?***

– Check the system adjustment via a diaphragm test exposure PAN - Symmetry (see page 7-20).

– Perform a complete PAN unit adjustment(see chapter 4).

6.12 Replacing the motor-driven diaphragm



Removing the covers

- Remove the covers (see also section 1.11):
  - Tube assembly, front
  - Tube assembly, rear

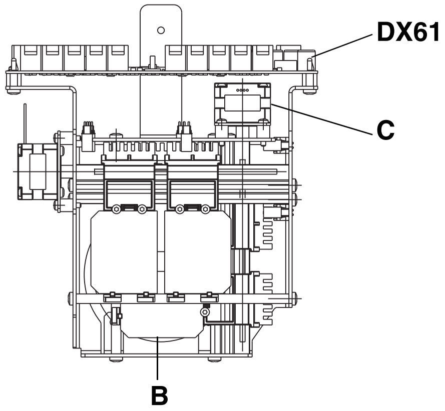
Removing the defective diaphragm unit

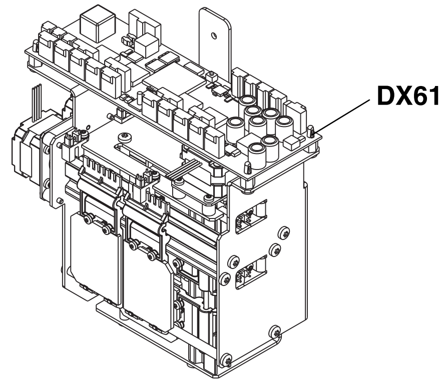
- Pull cables **L11** and **L12** off of connectors **X501** (L11) and **X101** (L12) on board **DX61** (see page 6-35).

1. Loosen the upper screw **(A)** and the two lower screws **(B)** and remove the diaphragm unit.

NOTE

*If the two lower screws are not accessible, push the lower slider **(B)** upward manually. If the slider is in such an unfavorable position that it cannot be pushed upward, then:*
*– Remove board **DX61**,*
*– Loosen the 4 screws on motor **C** and raise it together with the spindle.*





Installing the new diaphragm unit

- Start by fastening the new diaphragm unit to the unit with screw **A**.
- Then screw in the two lower screws **(B)** and carefully tighten them **securely** (to a torque of 80 Ncm);
  Caution! Aluminum housing.
- Plug cables **L11** and **L12** onto connectors **X501** (L11) and **X101** (L12) on board **DX61** (see "Cables and connectors for replacement of the motor-driven diaphragm unit" on page 6-35).

Attaching the covers

- Reattach the covers.

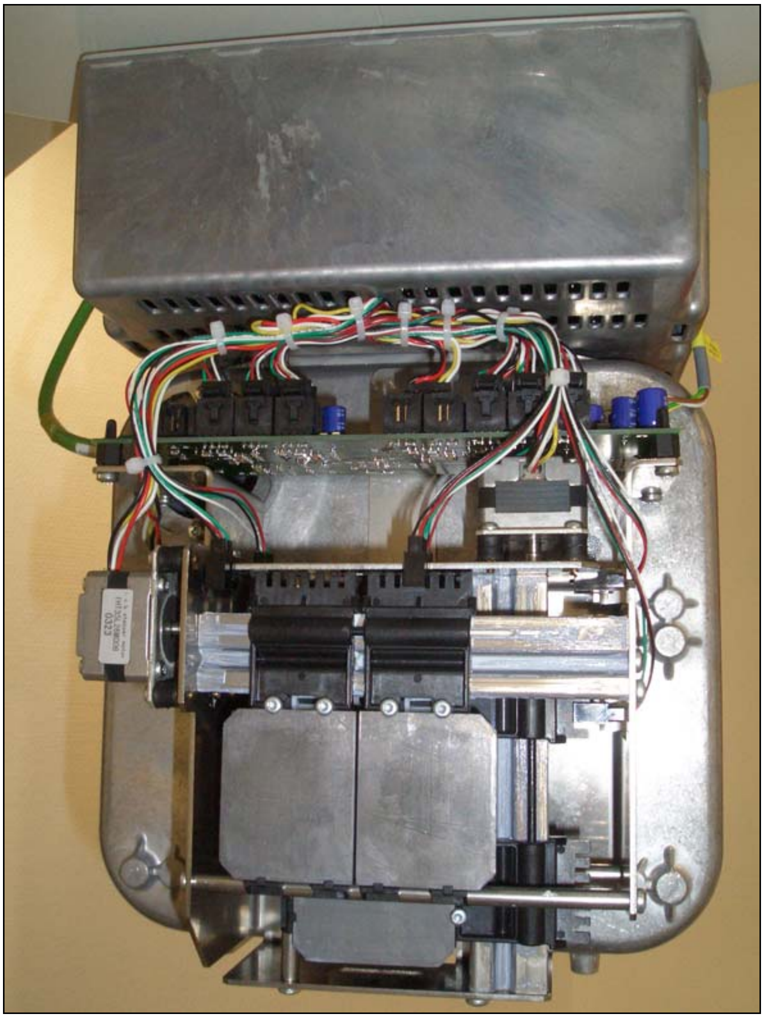
⚠ ***ATTENTION: What should I do after replacement?***

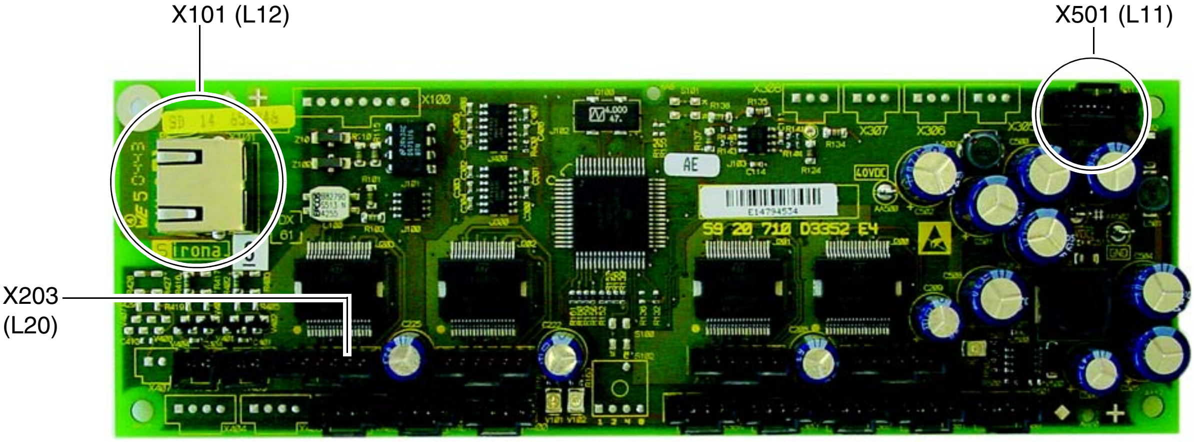
*– Since board DX61 is always replaced along with the diaphragm unit, **also be sure to observe the “Procedure following replacement of boards“** (see section 6.19.1).*

– Perform a complete unit adjustment (see chapter 4).

– Take diaphragm test exposures for possible later evaluation by an expert.

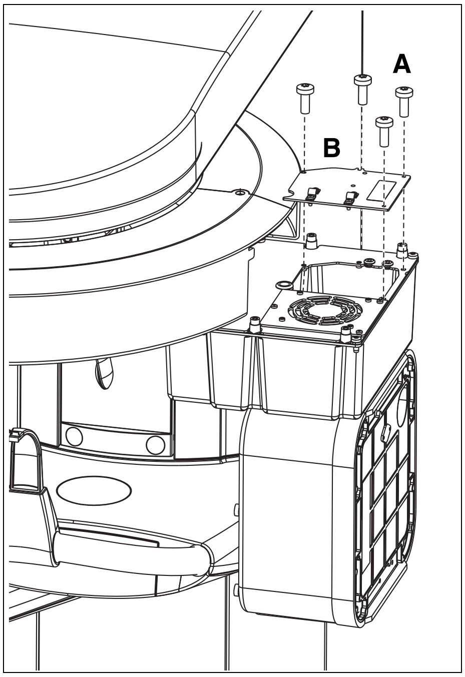
6.12.1 Cables and connectors for replacement of the motor-driven diaphragm unit



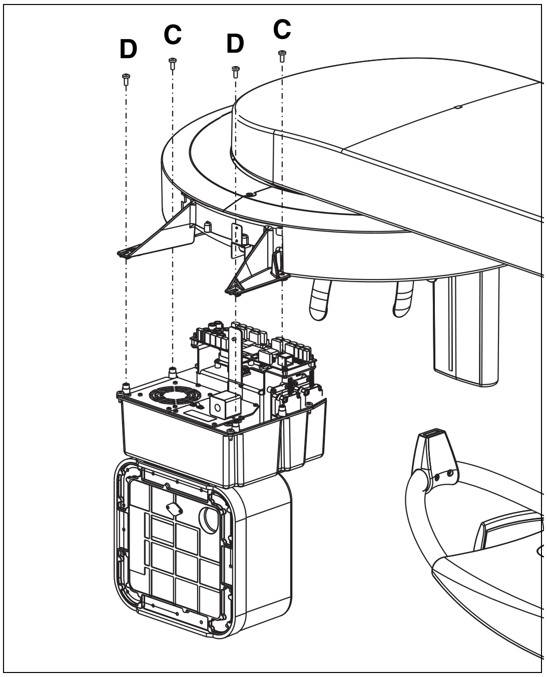


6.13 Replacing the X-ray tube assembly

1.



2.



Removing the covers

- Remove the covers (see also section 1.11):
  - Tube assembly, front
  - Tube assembly, rear

Removing the diaphragm unit

- Remove the diaphragm unit (see section 6.12).

Removing the defective tube assembly

1. Loosen the four screws **A** and remove cover plate **B** incl. the cable shielding (L3). **Caution! Also pull cable L3 off of connector X3 and the ground cable off of connector X304 on board DX6**. (see page 6-38)

NOTE

The ferrite core and cable shielding can remain on the cover plate.

- Detach cables **L5** and **L6** from the strain reliefs and pull the cables off of sockets **J6** (L5) and **J2-J3** (L6) on board **DX6** (see page 6-38).

2. Loosen the two rear screws **(C)** on the tube assembly.

   Hold the tube assembly firmly in place **(caution: heavy!)**, loosen the two front screws **(D)** and remove the tube assembly toward the front.

NOTE

Tip: *If you leave the two front screws on the rotating element, you can immediately hang the tube assembly on them when reinstalling it.*

Installing the new tube assembly

- Hang the new tube assembly on the two front screws of the rotating element and tighten them securely.

⚠ ***CAUTION***

Make sure that the cables of the diaphragm unit once again lie in their original position (see section 6.20 page 6-65), as they could otherwise get in the way while you're attaching the covers later on.

- Insert the two rear screws and tighten them firmly.
- Plug cables **L3**, **L5** and **L6** as well as the ground cable back onto board **DX6** and reattach the cables to the strain reliefs.
- Attach the cover plate.

Installing the diaphragm unit

- Install the diaphragm unit (see section 6.12).

Attaching the covers

- Reattach the covers.

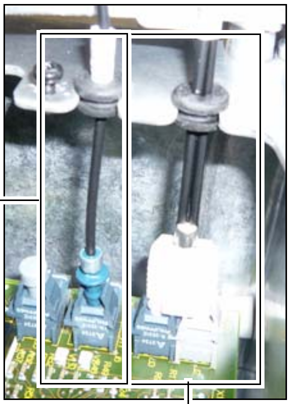
⚠ ***ATTENTION: What should I do after replacement?***

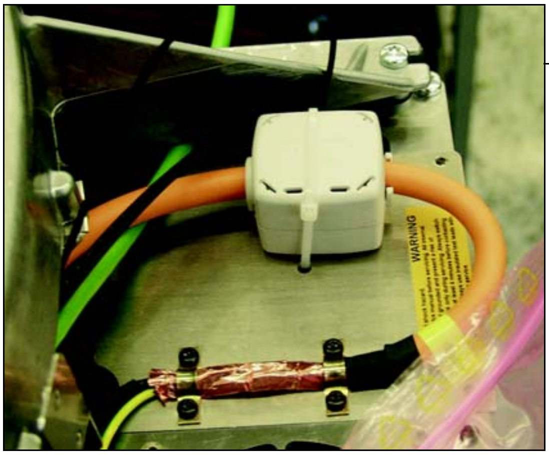
*– Since board DX6 is always replaced along with the tube assembly, **also be sure to observe the “Procedure following replacement of boards“** (see section 6.19.1)*

– Perform a complete unit adjustment (see chapter 4).

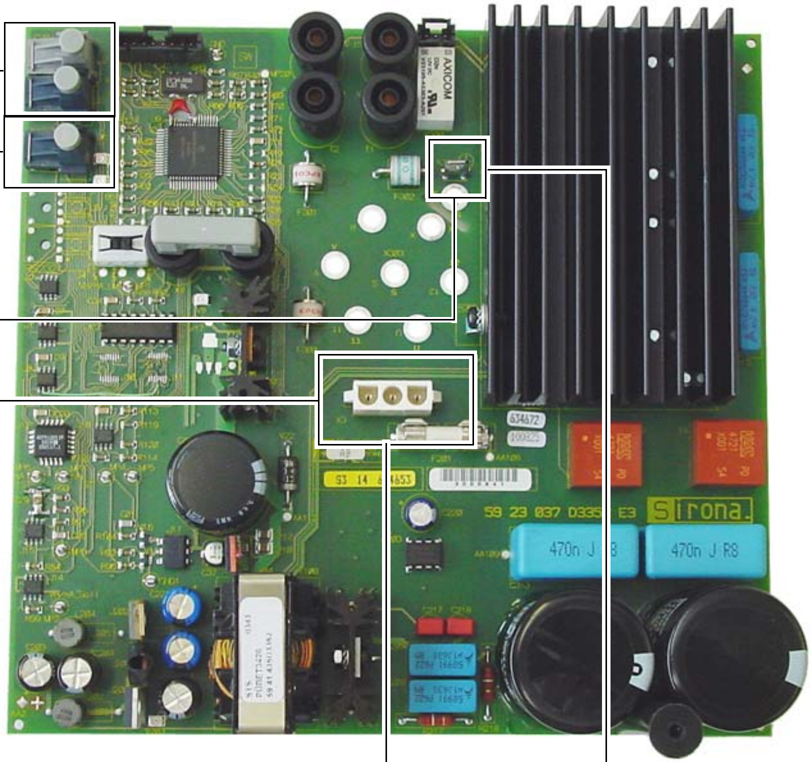
– Take diaphragm test exposures for possible later evaluation by an expert.

6.13.1 Cables and connectors for replacement of the tube assembly





Laying cables correctly on the cover plate

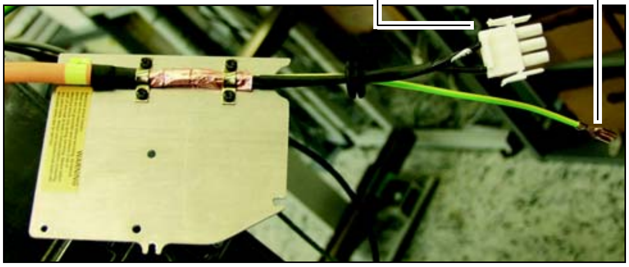


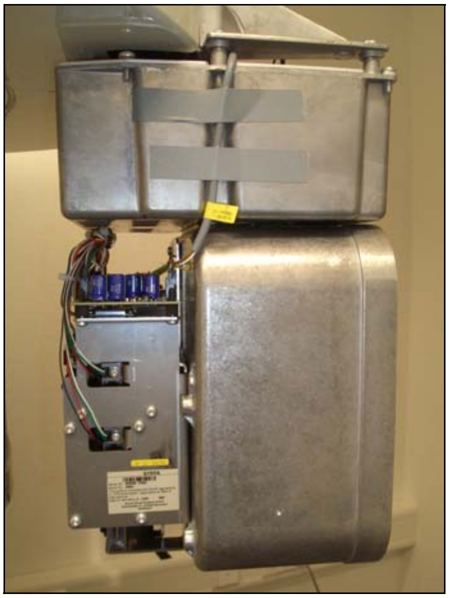
Unplug/plug in cable L6 (socket J2-J3 on board DX6)

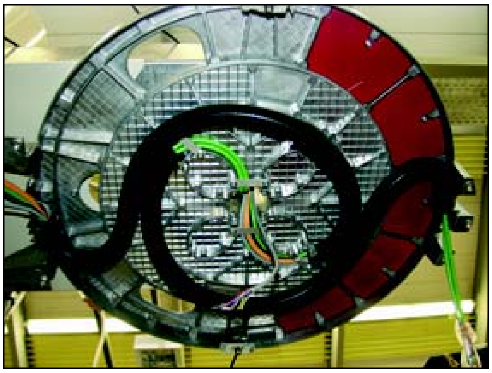
Unplug/plug in cable L5 (socket J6 on board DX6)

Unplug/plug in ground cable (connector X304 on board DX6)

Unplug/plug in cable L3 (connector X3 on board DX6)

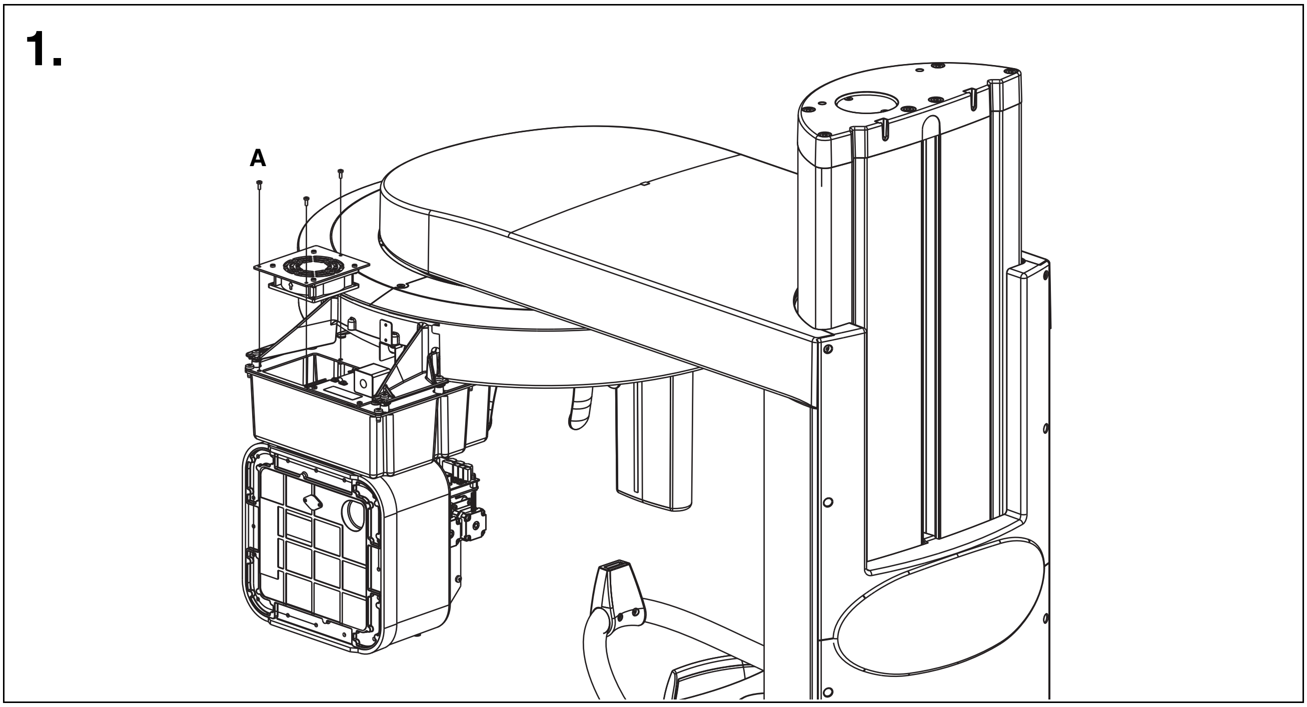






Cable L11routed on **left side** of tube assembly.

6.14 Replacing the fan (tube assembly)



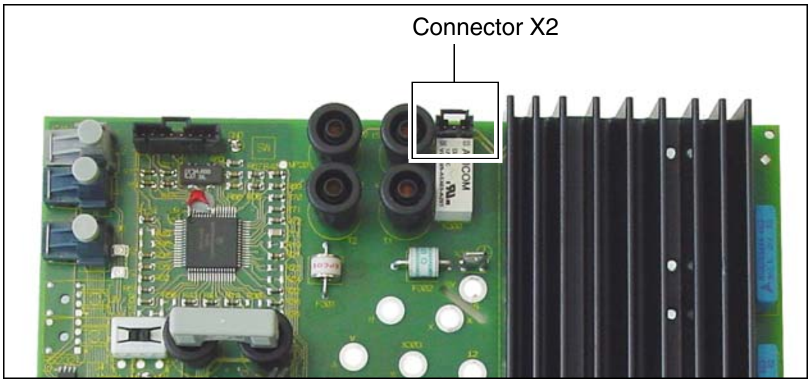
Removing the covers

- Remove the covers (see section 1.11):
  - Tube assembly, front

Replacing the fan

1. Loosen the four screws **A** and carefully remove the cover plate including the fan. **Caution: Exercise care when removing the cover plate as the fan cable is connected to a board in the Tube assembly!**

- Pull the fan cable off of connector **X2** on board **DX6**.



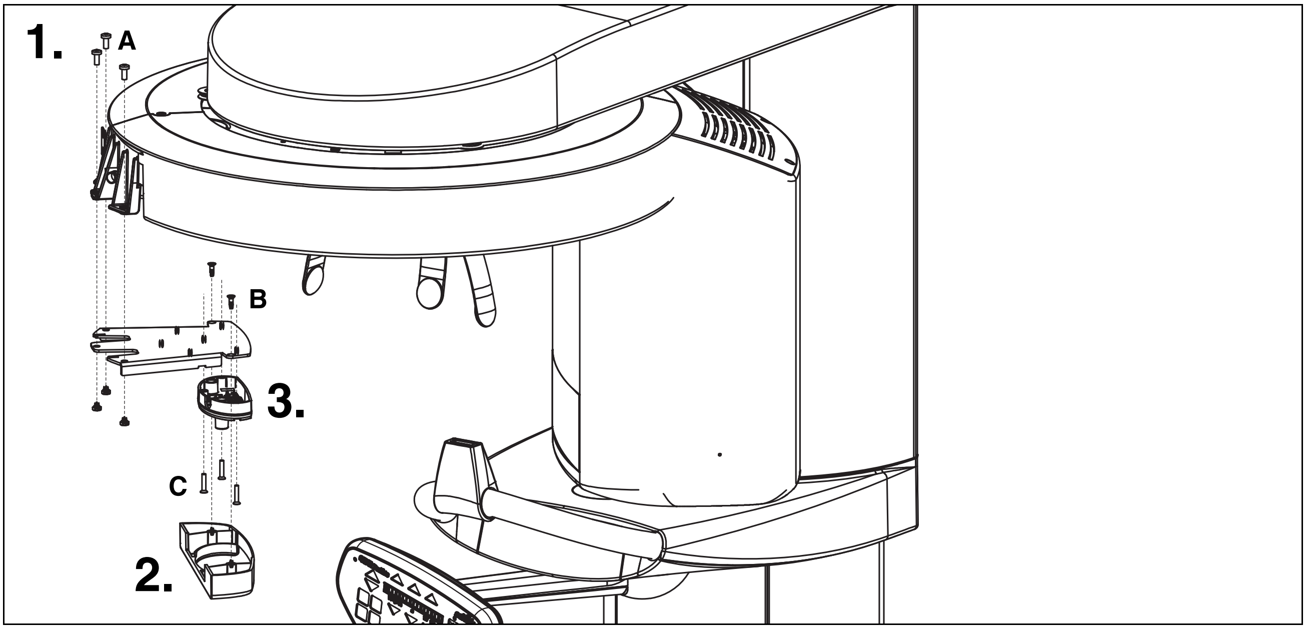
- Install the new fan in the reverse order of removal.

⚠ ATTENTION: What should I do after replacement?

– Check the function of the fan using service routine S005.4 (see section 5.6.2).

– No further action is required.

6.15 Replacing the PAN sensor holder

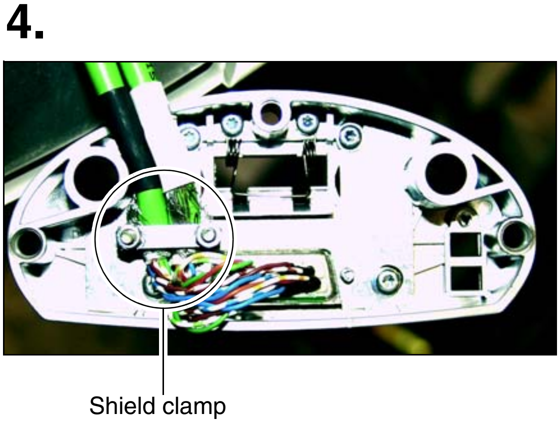


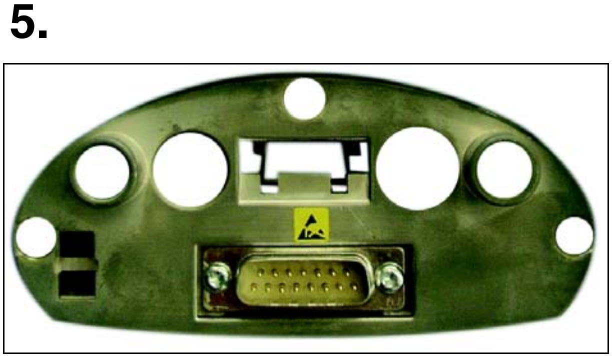
Removing the covers

- Remove the covers (see section 1.11):
  – Sensor holder cover, large
- Remove the sensor.

Removing the defective sensor holder

1. Loosen the three screws **A** and remove the sensor holder.
   Caution: Exercise care when removing the cover plate as the fan cable is connected to a board in the Tube assembly!
2. Loosen the two screws **(B)** and remove the small sensor holder cover.
3. Loosen the three screws **(C)** and remove the connection socket.





4. Detach the shield clamp (L13) on the rear side of the connection socket.
5. Loosen the connector screw connection on the front side of the connection socket and thread the connector to the rear through the connection socket and the sensor holder.

Installing the new sensor holder

- Install the new sensor holder in the reverse order of removal.

NOTE

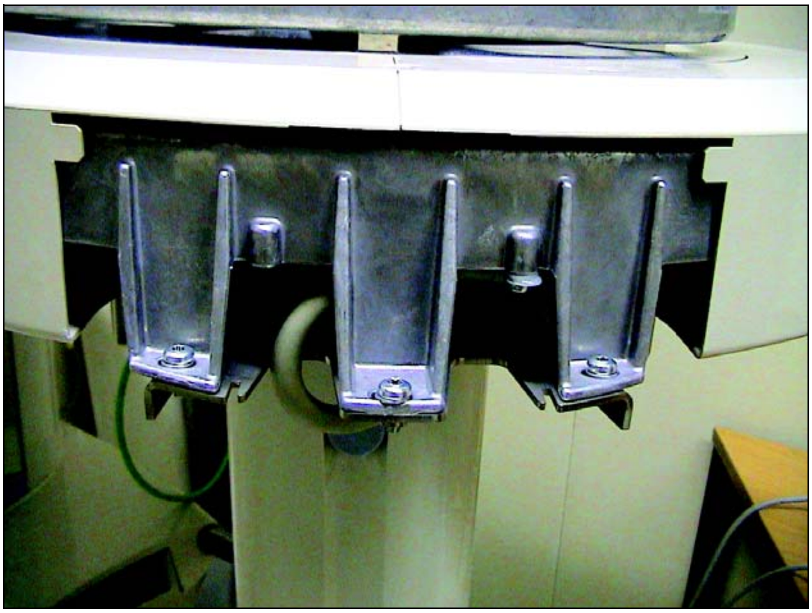
Don't forget to plug all connectors and cables back in again in their original position and reattach the cable shields as well as all cable ties and strain reliefs (see section "Laying cables when replacing the PAN sensor holder" on page 6-42).

ATTENTION: What should I do after replacement?

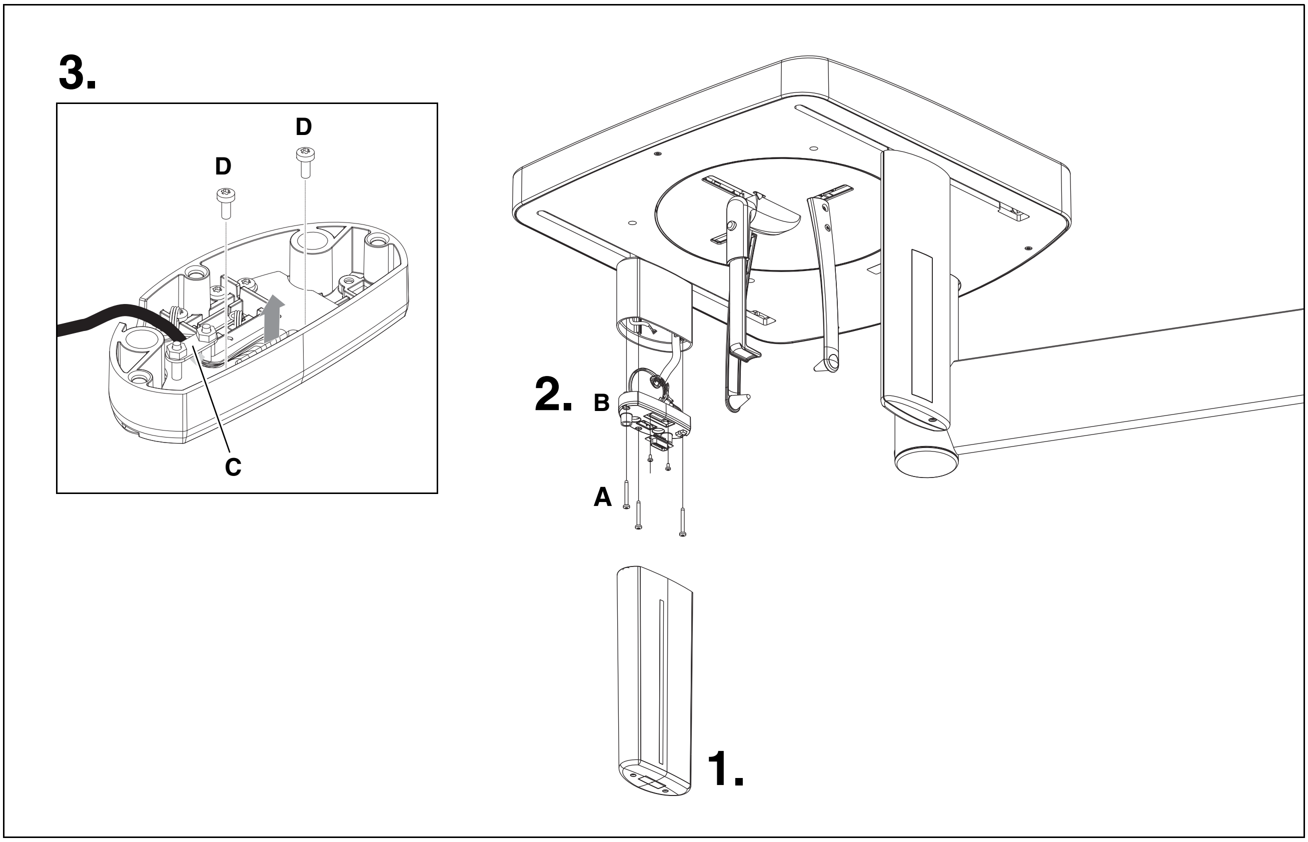
– Perform the PAN system adjustment (see section 4.3).

– Take diaphragm test exposures for possible later evaluation by an expert.

6.15.1 Laying cables when replacing the PAN sensor holder



6.16 Replacing the ceph sensor holder



1. Remove the sensor.

Removing the defective sensor holder

2. Loosen the three screws **A** and remove the connection socket **B**. **Caution: Exercise care when removing the cover plate as the fan cable is connected to a board in the Tube assembly!**
3. Detach the cable shield from terminal **C** and the connector screw connection (loosen the two screws **D** from the rear) and thread the connector to the rear through the connection socket.

Installing the new sensor holder

- Install the new sensor holder in the reverse order of removal.

NOTE

Don't forget to reattach the cable shields.

ATTENTION: What should I do after replacement?

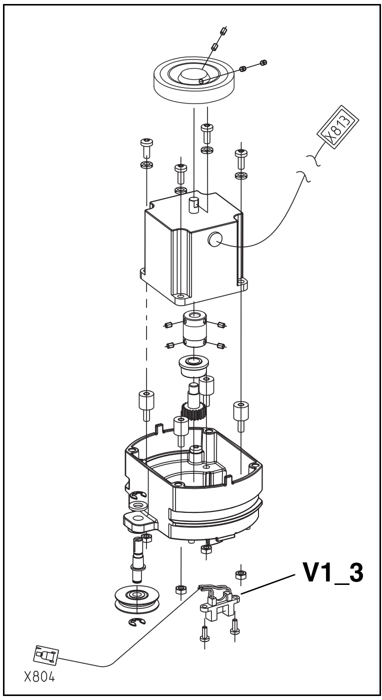
– Perform the CEPH system adjustment (see section 4.4).

6.17 Replacing the sensor

⚠ ***ATTENTION: What should I do after replacement?***

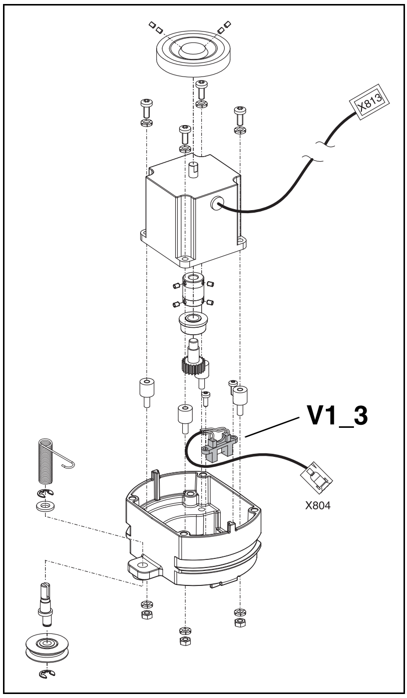
– *Since board DX81 is always replaced along with the sensor,* ***also be sure to observe the "Procedure following replacement of boards"*** *(see section 6.19.1)*

6.18 Replacing the light barriers



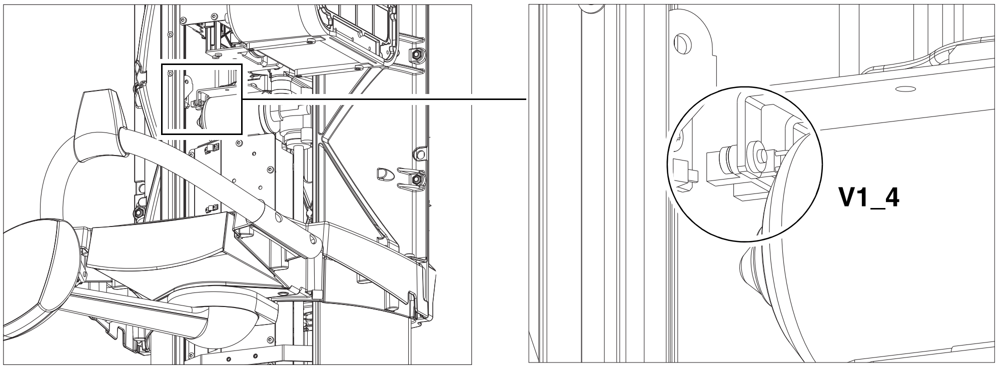
PAN:
serial number
< 200046

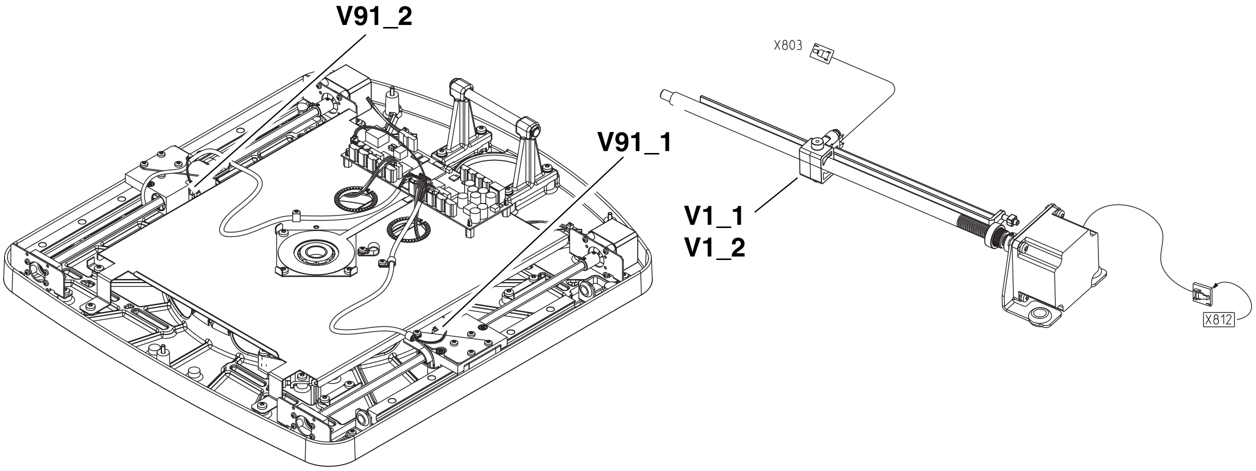
CEPH:
serial number
< 220011



PAN:
serial number
≥ 200046

CEPH:
serial number
≥ 220011





6.18 Replacing the light barriers

The following light barriers can be replaced:

In the panoramic X-ray unit

- Light barrier at actuator 1, ON position: **V1_1**
- Light barrier at actuator 2, ON position: **V1_2**
- Light barrier at ring motor, starting position of rotation: **V1_3**
- Light barrier at HA motor, height adjustment: **V1_4**

In the cephalometer

- Light barrier for patient diaphragm position detection, ceph: **V91_1**
- Light barrier for sensor position detection, ceph: **V91_2**

⚠ ***ATTENTION: What should I do after replacement?***

After replacing V1_1, 2 and 3:
– Perform a complete unit adjustment (see chapter 4).

After replacing V1_4:
– Perform a function check.

After replacing V91_1 and 2:
– Execute S034.4 and S034.5 (see pages 5.18.1 ff.)
– Check the CEPH adjustment by taking diaphragm test exposures: Fixed point of rotation
– Perform a CEPH unit adjustment if necessary (see chapter 4).

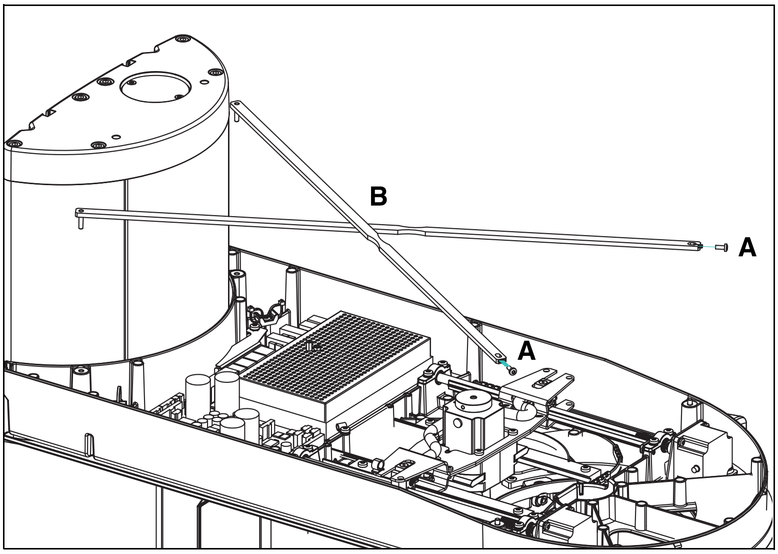
6.18.1 Replacing light barrier V1_3: PAN: serial number < 200046 CEPH: serial number < 220011

Removing light barrier V1_3

- Remove the covers (see also section 1.11):
  - – Top arm cover

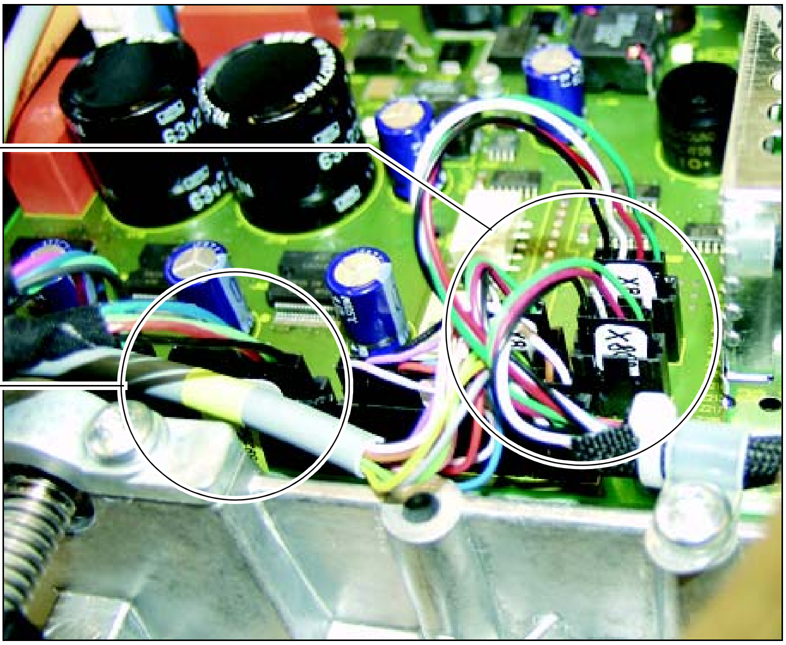
1. Loosen the two clamping screws **A** on the tie rods and remove the tie rods by pulling them **B** upward.

1.



2. Pull the light barrier cables (V1_1, V1_2 and V1_3) off of connectors **X802**, **X803** and **X804** and the ring motor cable off of connector **X813** on board **DX1**.

2.



Pull light barrier cables off of connectors X802, X803 and X804 on board DX1

Pull ring motor cable off of connector X813 on board DX1

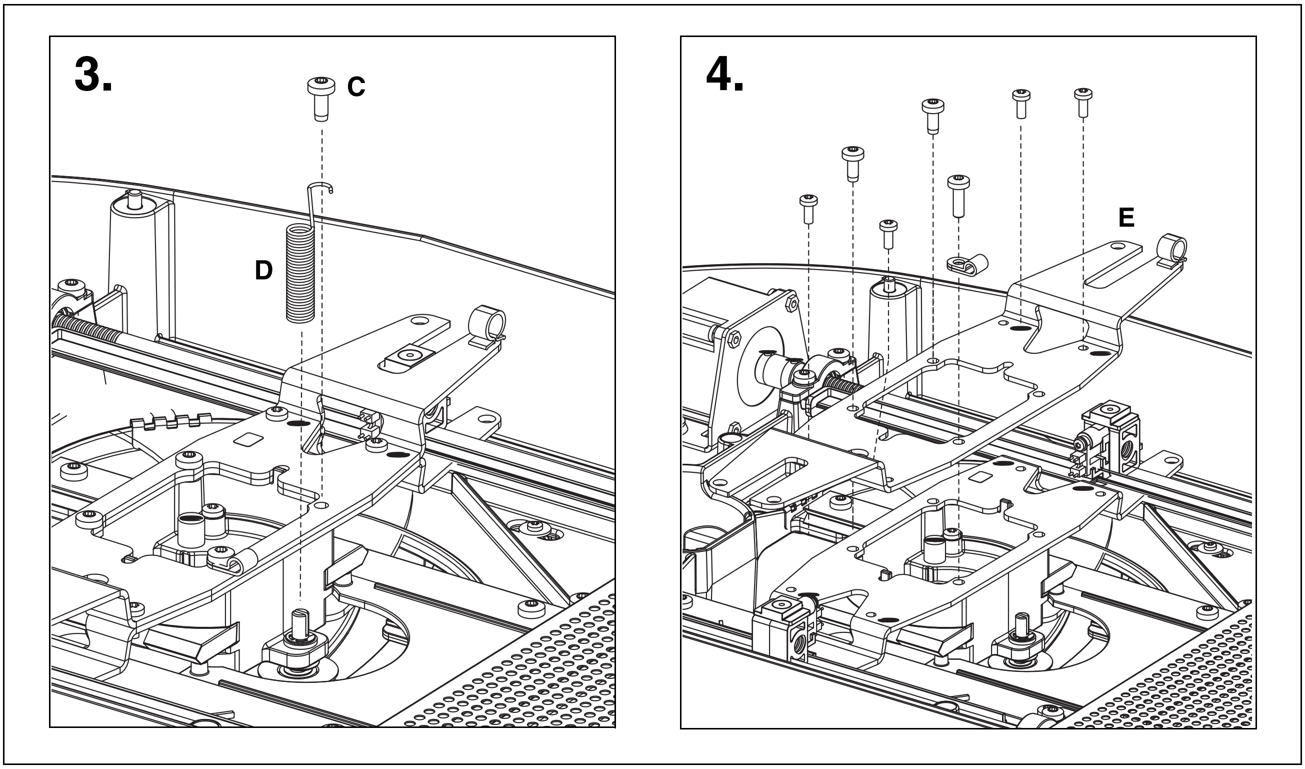
NOTE

The three light barrier cables are bundled with a flexible tube and fastened to the basic unit next to board DX1 or on the upper wing plate with two cable clamps.

- Detach the cable harness (flexible tube) from the cable clamps and remove the flexible tube.
- Remove the ring motor (see page 6-14).

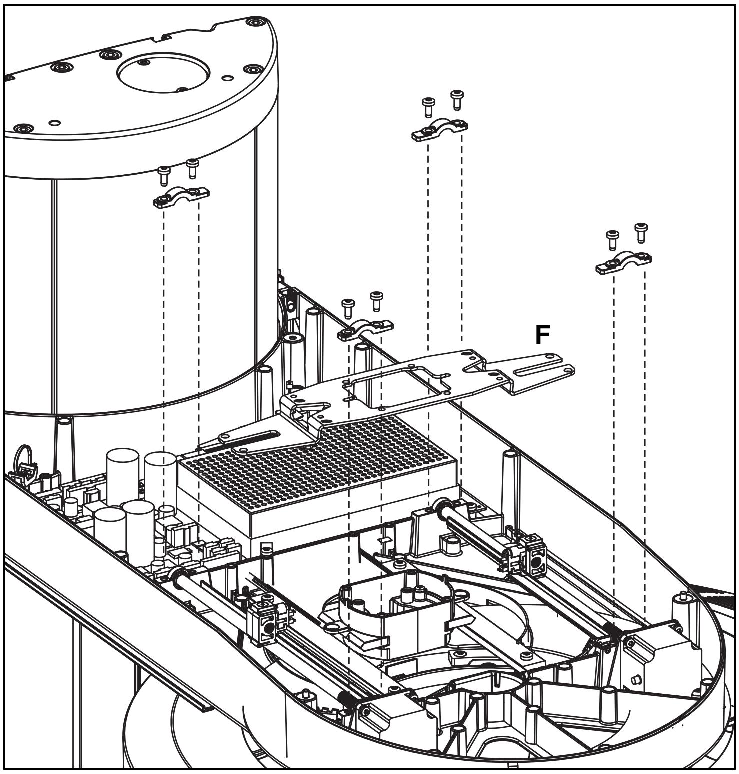
3. Loosen the screw **(C)** on the wing plate **(Caution: The eccentric spring is prestressed!)**. Unhook the spring and release it carefully. Remove the eccentric spring **D**.

4. Detach the remaining screws from the wing plates and initially remove the upper wing **E**.



5. Loosen the screws from the bearing covers of the actuator spindles and detach the spindles. Now you can remove the lower wing plate **(F)**.

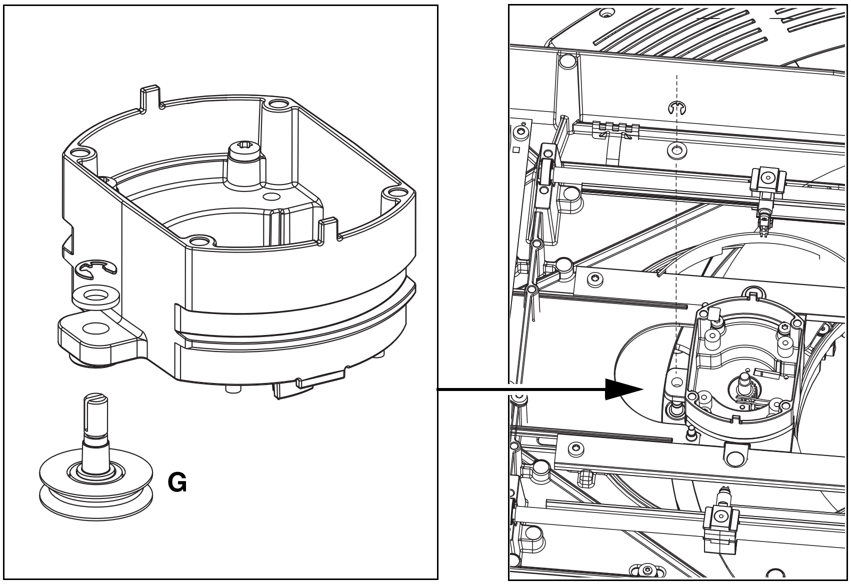
5.



- Position the motor mount ring so that the tensioning roller is positioned above a recess (so that the roller can be removed from below).

6. Detach the retaining ring and the washer. Remove tensioning roller **G** incl. eccentric bolt (downward).

6.



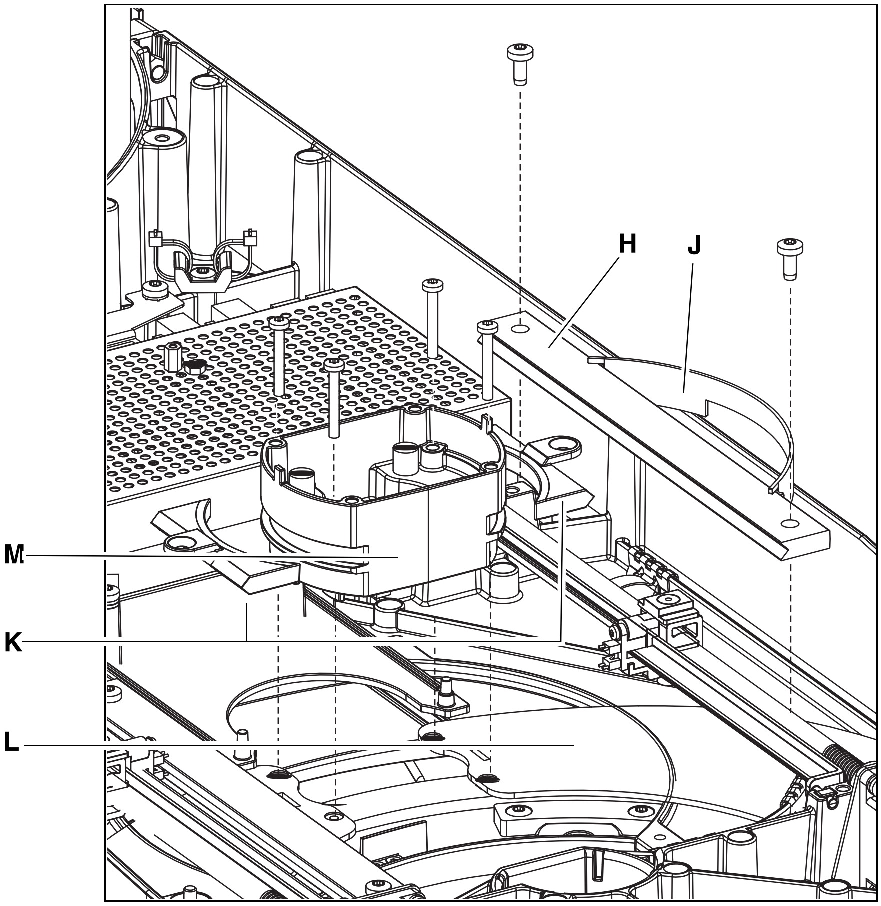
7. Loosen the screws on the right guide profile (on spring side) **H** and remove the profile including tension spring **J**.

⚠ ***CAUTION***

*Look out for bearing shells **K**. They may fall out after the profile is removed.*

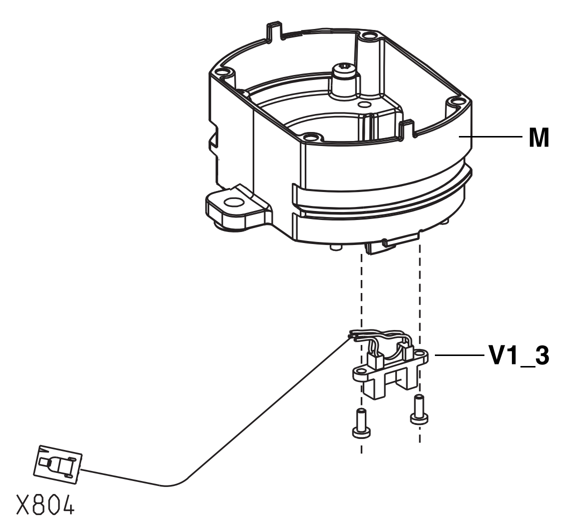
8. Remove bearing shells **K**.
9. Loosen the screws on motor mount ring **L** and remove motor housing **M**.

7. - 9.



10. Loosen the two screws on light barrier **V1_3** and remove it.

10.



Installing light barrier V1_3

- Screw new light barrier **V1_3** onto motor housing **M** securely.
- Reattach motor housing **M** to motor mount ring **L** and screw them together again with the four screws.

⚠ ***CAUTION***

Seal the screws with Loctite 242.

- Reinsert the left part of the bearing shell and bring the motor mount ring along with the motor mount back into position.
- Reinsert the right part of the bearing shell **K** with the guide profile **H** and the tension spring **J** and tighten the profile screws loosely.
- Reattach tensioning roller **G** to the motor housing with the eccentric bolt from below and fasten the eccentric bolt from above using a washer and a retaining ring.
- Pull the rotary ring (with motor mount ring) into the frontmost position and fasten the front screw of guide profile **H** securely.
- Now push the rotary ring (with motor mount ring) into the rearmost position (from the column) and fasten the rear screw of guide profile **H** securely.
- Slide the rotary ring back and forth another 1 to 2 times to make sure that it glides smoothly in the guide.

ℹ ***NOTE***

Check to make sure that the guide profile is still sufficiently greased following assembly. Grease the profile with Chesterton 622 food grade H1 lubricant if necessary.

- Reinsert the lower wing plate **F**.
- Insert both spindles with spindle nuts and screw the bearing cover back on tight.
- Reinsert upper wing plate **E** and refasten the wing plates with the eight screws (**Note Tighten screw C for fastening the eccentric spring only loosely!**).
- Attach eccentric spring **D** to the eccentric bolt of the tensioning roller and reattach it to screw **C** on the upper wing plate with a prestress of 2½ turns. Tighten screw **C** securely.
- Reinstall the ring motor (see page 6-15).

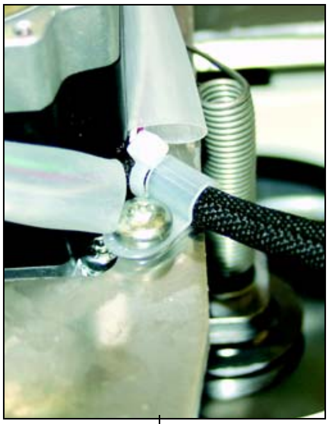
⚠ ***CAUTION***

Note the correct procedure for laying the cables of the ring motor.

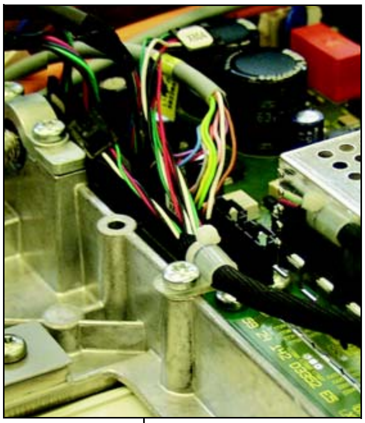
- Now perform the cabling (see page 6-53).

Cabling V1_1, V1_2 and V1_3

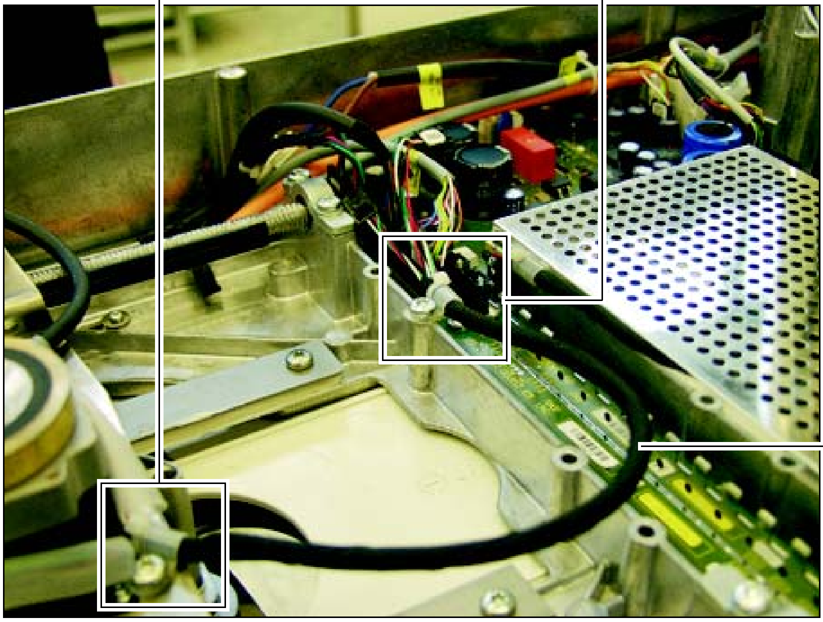
11.



12.



13.



Properly run cable harness

- Run the light barrier cables together next to the ring motor and pull the flexible tube over them.

11. Secure the flexible tube at the motor end with a cable tie and fasten it to the wing plate with the cable clamp.

12. Twist the flexible tube (only the tube, not the cables!) clockwise at the connector end, secure it with a cable tie and fasten it to the basic unit next to board DX1 with the cable clamp.

13.

⚠ ***CAUTION***

In its installed state, the cable harness (flexible tube) must exhibit a tendency to move upward and form a loop during travel of the rotary ring. It must dip into the unit!

Also make sure that the cable harness is refastened to the cable clamps in its original position.

- Plug the ring motor cable and the light barrier cables back into connectors **X813**, **X802**, **X803** and **X804** on board **DX1**.
- Reattach the covers.

6.19 Replacing circuit boards

CAUTION

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

CAUTION

Replacement of printed circuit boards DX6 and DX11:

Never replace both boards at the same time. After replacing one of these boards, first proceed as specified in section 6.19.1 and then restart the unit. Only then may you begin replacement of the other module.

CAUTION

Prior to circuit board replacement:

*Open the **PAN** and **CEPH RESET ADJUSTMENT** menus in CDR PanElite Service Program and write down the adjustment values before you start replacing the boards.*

CAUTION

Replacement of circuit board DX11:

The replacement of circuit board DX11 also causes the loss of user preference settings (patient symbols, etc.).

Point this out to the user or set the original values up again after the replacement of the circuit board, provided they could still be queried prior to the replacement.

CAUTION

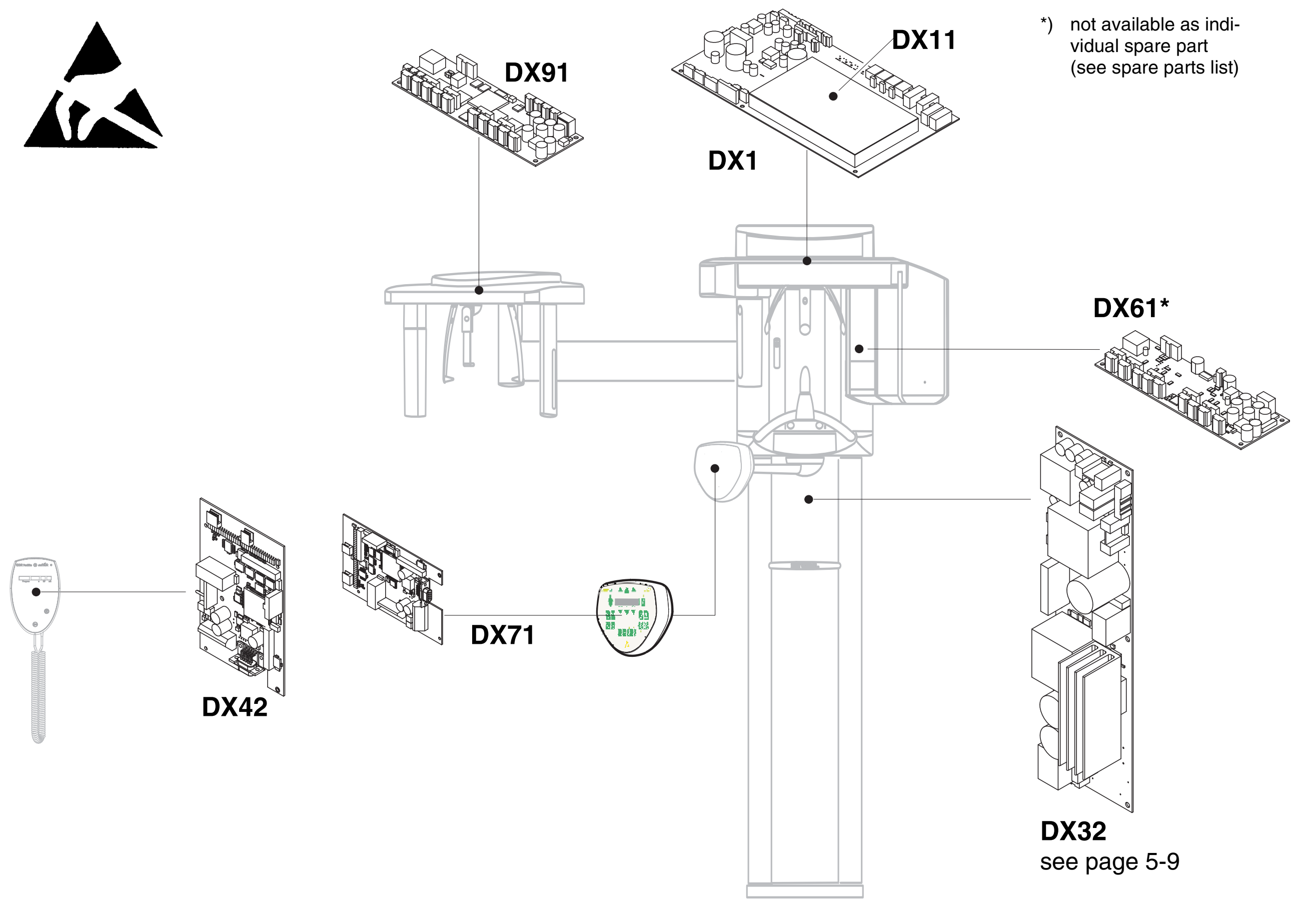
Please be sure to read the notes in Section "Procedure following replacement of boards" (see page 6-56)!

This Service Manual describes all measures required after the replacement of modules or circuit boards, provided they were known at the time of publication. You will find more up-to-date information and supplements concerning this subject on the latest CDR PanElite Support CD. 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.

NOTE

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.*


*) not available as individual spare part (see spare parts list)
DX91
DX11
DX1
DX61*
DX71
DX42
DX32
see page 5-9

6.19.1 Procedure following replacement of boards

CAUTION

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 version for the modules can be accessed through service routine S008.2 or the extended detail query in SIXABCON.

Perform a software update or downgrade (see Section 1.6) in case of software incompatibilities.

Always perform the procedures described below in the given sequence and do not carry out any other actions between the steps.

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	Configuration	Measures	Page
DX1	● **Inserting a new DX1**	● Switch the unit ON.	
DX11	● **Replacing a DX11**		
	● Inserting a **new DX11**	● Please proceed as described in section 6.19.2, **Case A**.	**6-58**
	● Inserting a **DX11 from another unit** (DX11 must come from a CDR PanElite)	● Please proceed as described in section 6.19.2, **Case B**.	**6-60**
DX6 (Tube assembly)	● **Replacing an X-ray tube assembly incl. DX6**		
	● Inserting a **new X-ray tube assembly**	● Please proceed as described in section 6.19.3, **Case C**.	**6-62**
	● Inserting an **X-ray tube assembly from another unit** (DX6 must come from a CDR PanElite)	● Please proceed as described in section 6.19.3, **Case D**.	**6-62**
DX61 (Diaphragm unit)	● **Inserting a new DX61**	● Check the compatibility between the software status of the modules and that of the overall system. Perform an update or a downgrade if necessary.	**1-9**
DX71 (Control Pad)	● **Inserting a new Control Pad incl. DX71**	● Check the compatibility between the software status of the modules and that of the overall system. Perform an update or a downgrade if necessary.	**1-9**
DX32 (Stand)	● **Inserting a new DX32**	● No further action is required.	
DX42 (Remote control)	● **Inserting a new Remote Control incl. DX42**	● Check the compatibility between the software status of the modules and that of the overall system. Perform an update or a downgrade if necessary.	**1-9**
DX81 (Sensor)	● **Using a new sensor incl. DX81**	● No further action is required.	
DX91 (Ceph)	● **Inserting a new DX91**	● Check the compatibility between the software status of the module and that of the overall system. Perform an update or a downgrade if necessary. ● Perform service routine S034, test steps 4 and 5. ● Perform the ceph adjustment.	**1-9** **5-74** **4-45**

6.19.2 Replacing a DX11

Case A: New DX11
System software status V02.30 or higher

⚠ ***CAUTION***

After a new DX11 is inserted, the IP address is initially reset to the factory setting. Make sure that no second system is running on the same IP address before switching the system to a new IP address.

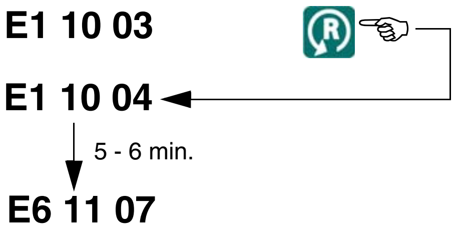
1. Switch the unit ON.

⚠ ***CAUTION***

Do not acknowledge any error messages displayed at this point!

Wait approximately 1 minute.

The error message **E1 10 03** (format flash file system) is displayed.

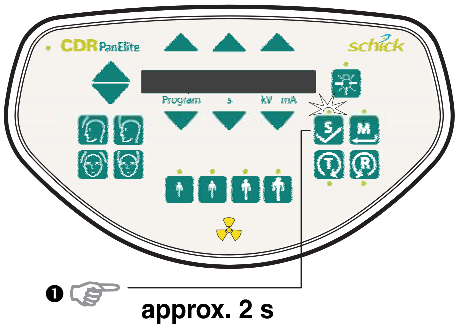


2. Acknowledge the error message with the **R key** Ⓡ.
   The formatting of the flash file system is started automatically. Error message **E1 10 04** is displayed during the entire process (approx. 5 - 6 min.). When the formatting is finished, the error message is automatically acknowledged by the system and error message **E6 11 07** (undefined system class) is displayed.

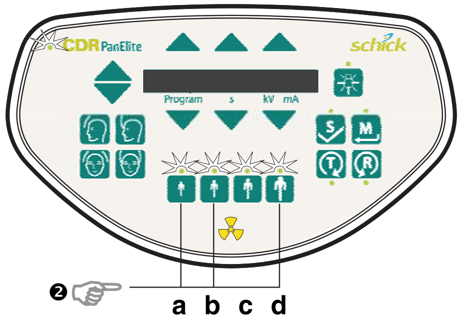
3. Acknowledge the error message with the **R key** Ⓡ.
   The access level for the service menu (level 4) is automatically started.

ℹ ***NOTE***

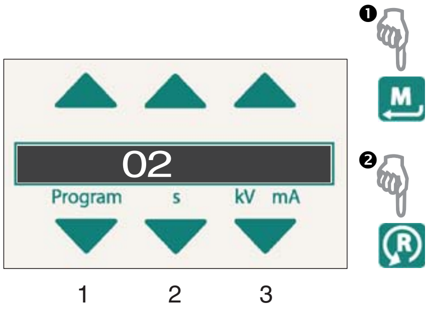
Acknowledge any additional error messages with the ***R key*** Ⓡ.



4. Press and hold down the Service key until the LEDs above the patient symbol keys light up (approx. 2 s).



5. Then press the patient symbol keys in the following order within 4 s: **b** – **d** – **a**.
   Once the key combination has been entered correctly, a service routine (select/confirm system class) is started automatically.
   automatically. The LED above the **Memory key** Ⓜ lights up.



6. Confirm the system class (02):

   To do this, first press the **Memory button** M (LED below the R key lights up) and then the **R key** Ⓡ.

7. Quit the service routine via the **Top arrow key** ▲ above selection field 3.

8. Switch the unit OFF.
   Wait approximately 1 minute. Then switch the unit ON again.

   Error message **E6 15 05** (undefined system serial number) is displayed.

E6 15 05 Ⓡ ☞

9. Acknowledge the error message with the **R key** Ⓡ.

10. Start service routine **S008.3** and confirm the system serial number (see page 5-36).

⚠ ***CAUTION***

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.

11. Quit the service routine via the **up arrow key** ▲ above selection field 3.

12. Switch the unit OFF.
    Wait approximately 1 minute. Then switch the unit ON again.

⚠ ***CAUTION***

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.

ℹ ***NOTE***

Please check that there is a XML file in the PDATA/P2K_Config folder with the network name of the system (see also page 1-15). This file contains up-to-date information about the previous system configuration! See also section 1.7, on page 1-15).

13. Start service routine **S017** and perform the system configuration (test step 2, 6, 8 and 15) (see page 5-54).

14. If the minimum travel height of the system must be limited:
    Set the travel height with service routine **S018.2**. (see page 5-61).

15. Perform another software update to the current system software version as described in section 1.6. This updates all modules in accordance with the configuration.

16. Perform the complete system adjustment (see chapter 4):
    - PAN adjustment
    - CEPH adjustment, if installed
17. Open the "Extended Details“ via SIXABCON.

    This generates an XML file (with the system parameters) which is saved under the network name of the unit in the PDATA/P2K_Config folder (see also page 1-15).

- **The process is complete.**

Case B: DX11 from another CDR PanElite

⚠ ***CAUTION***

DX11 must come from a Schick Technologies CDR PanElite unit.

⚠ ***CAUTION***

After inserting the board, you must reconfigure the IP address to match the IP address of the existing X-ray component. Before you set the unit to the correct IP address, make sure that this address has not been assigned to any other device.

1. Switch the unit ON.

⚠ ***CAUTION***

Do not acknowledge any error messages displayed at this point!

Wait approximately 1 minute.

Error message **E6 15 05** (undefined system serial number) is displayed.

E6 15 05 Ⓡ ☜

2. Acknowledge the error message with the **R key** Ⓡ.
3. Open the Service menu (see page 5-8).
4. Start service routine **S008.3** (see page 5-36).
5. Get the unit serial number from the rating plate of the unit and enter it.

ℹ ***NOTE***

Any serial number which is unknown to the unit will not be accepted by the unit. The serial number entered must be identical with the one on the rating plate of the unit. If an inadmissible serial number is entered, the input will not be accepted and the serial number can be entered again.

6. Switch the unit OFF.
   Wait approximately 1 minute. Then switch the unit ON again.

ℹ ***NOTE***

Please check that there is a XML file in the PDATA/P2KConfig folder with the network name of the unit (see also page 1-15). This file contains up-to-date information about the previous system configuration! See also section 1.7, on page 1-15).

7. Start service routine **S017** and check the system configuration or perform the system configuration (test step 2-6) (see page 5-54).
8. If the minimum travel height of the system must be limited:
   Set the travel height with service routine **S018.2**. (see page 5-61).
9. Perform the complete system adjustment (see chapter 4):
   - PAN adjustment
   - CEPH adjustment, if installed
10. Perform software update to the current system software version as described in section 1.6. This updates all modules in accordance with the configuration.
11. Open the "Extended Details“ via SIXABCON.

    This generates an XML file (with the system parameters) which is saved under the network name of the unit in the PDATA/P2K_Config folder (see also page 1-15).

- **The process is complete.**

6.19.3 Replacing an X-ray tube assembly incl. DX6

Case C: New X-ray tube assembly

1. Switch the unit ON.

CAUTION

At this place do not perform any software update to a higher version! (Important for the configuration!) The tube assembly must first be brought to the existing system software status.

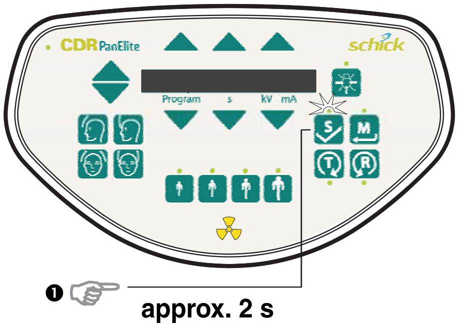
2. Perform a software update to the overall system software status (automatic update) as described in section 1.6 in order to bring the tube assembly to the existing system software status.
3. Switch the unit OFF.
   Wait approximately 1 minute. Then switch the unit ON again.
   Error message **E6 11 07** (undefined system class) is displayed.

E6 11 07 Ⓡ

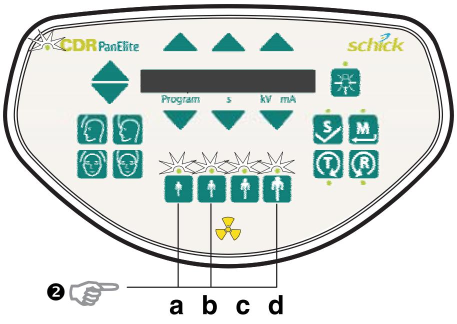
4. Acknowledge the error message with the **R key** Ⓡ.
   The access level for the service menu is automatically started.

NOTE

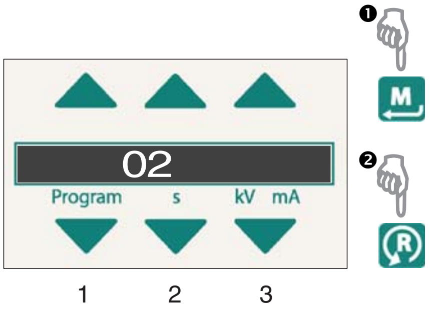
Acknowledge any additional error messages with the ***R key*** Ⓡ.



5. Press and hold down the Service key until the LEDs above the patient symbol keys light up (approx. 2 s).



6. Then press the patient symbol keys in the following order within 4 s: **b** – **d** – **a**.
   Once the key combination has been entered correctly, a service routine (select/confirm system class) is started automatically.
   The LED above the **Memory key** M lights up.



7. Confirm the system class (02):

   To do this, first press the **Memory button** M (LED below the R key lights up) and then the **R key** Ⓡ.

8. Quit the service routine via the **up arrow key** ▲ above selection field 3.

9. Switch the unit OFF.
   Wait approximately 1 minute. Then switch the unit ON again.

   Error message **E6 15 05** (undefined system serial number) is displayed.

E6 15 05 Ⓡ ☜

10. Acknowledge the error message with the **R key** Ⓡ.

11. Open the Service menu (see page 5-8).

12. Start service routine **S008.3** and confirm the system serial number (see page 5-36).

13. Quit the service routine via the **up arrow key** ▲ above selection field 3.

14. Switch the unit OFF.
    Wait approximately 1 minute. Then switch the unit ON again.

15. Perform the complete system adjustment (see chapter 4):

    – PAN adjustment

    – CEPH adjustment, if installed

16. Open the "Extended Details“ via SIXABCON.

    This generates an XML file (with the system parameters) which is saved under the network name of the unit in the PDATA/P2K_Config folder (see also page 1-15).

- **The process is complete.**

Case D: X-ray tube assembly from external system

⚠ ***CAUTION***

The tube assembly come from a must come from a Schick Technologies CDR PanElite unit.

1. Switch the unit ON.

⚠ ***CAUTION***

Do not acknowledge any error messages displayed at this point!

Wait approximately 1 minute.

Error message **E6 15 05** (undefined system serial number) is displayed.

E6 15 05 Ⓡ ☜

2. Acknowledge the error message with the **R key** Ⓡ.

3. Open the Service menu (see page 5-8).

4. Start service routine **S008.3** (see page 5-36).

5. Get the unit serial number from the rating plate of the unit and enter it.

ℹ ***NOTE***

Any serial number which is unknown to the unit will not be accepted by the unit. The serial number entered must be identical with the one on the rating plate of the unit. If an inadmissible serial number is entered, the input will not be accepted and the serial number can be entered again.

6. Switch the unit OFF.
Wait approximately 1 minute. Then switch the unit ON again.

- **The process is complete.**

6.20 Replacing cables

⚠ **_CAUTION_**

Switch the unit OFF before you start replacing cables or removing connectors.

⚠ **_CAUTION_**

Be careful not to twist the cables or kink the fiber-optic light guides when installing them.

NOTE

An overview of all cables can be found in section 1.9.

Always check the cables before replacing them (see section 3-17).

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 designations of the cables when pulling them off.

Some of the cables are marked with 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.

6.20.1 Laying the cable conduit on the rotating element

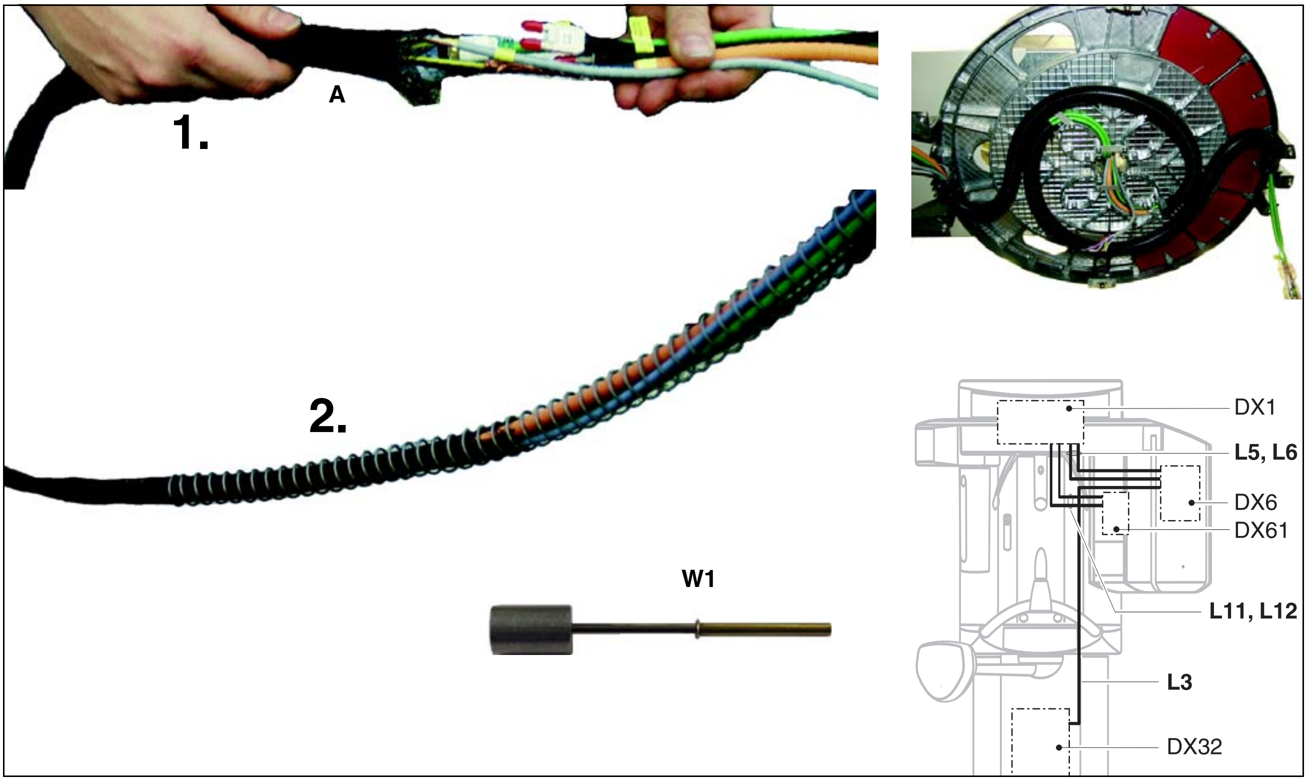
(applicable to cables L3, L5, L6, L11 and L12)

⚠ ***CAUTION***

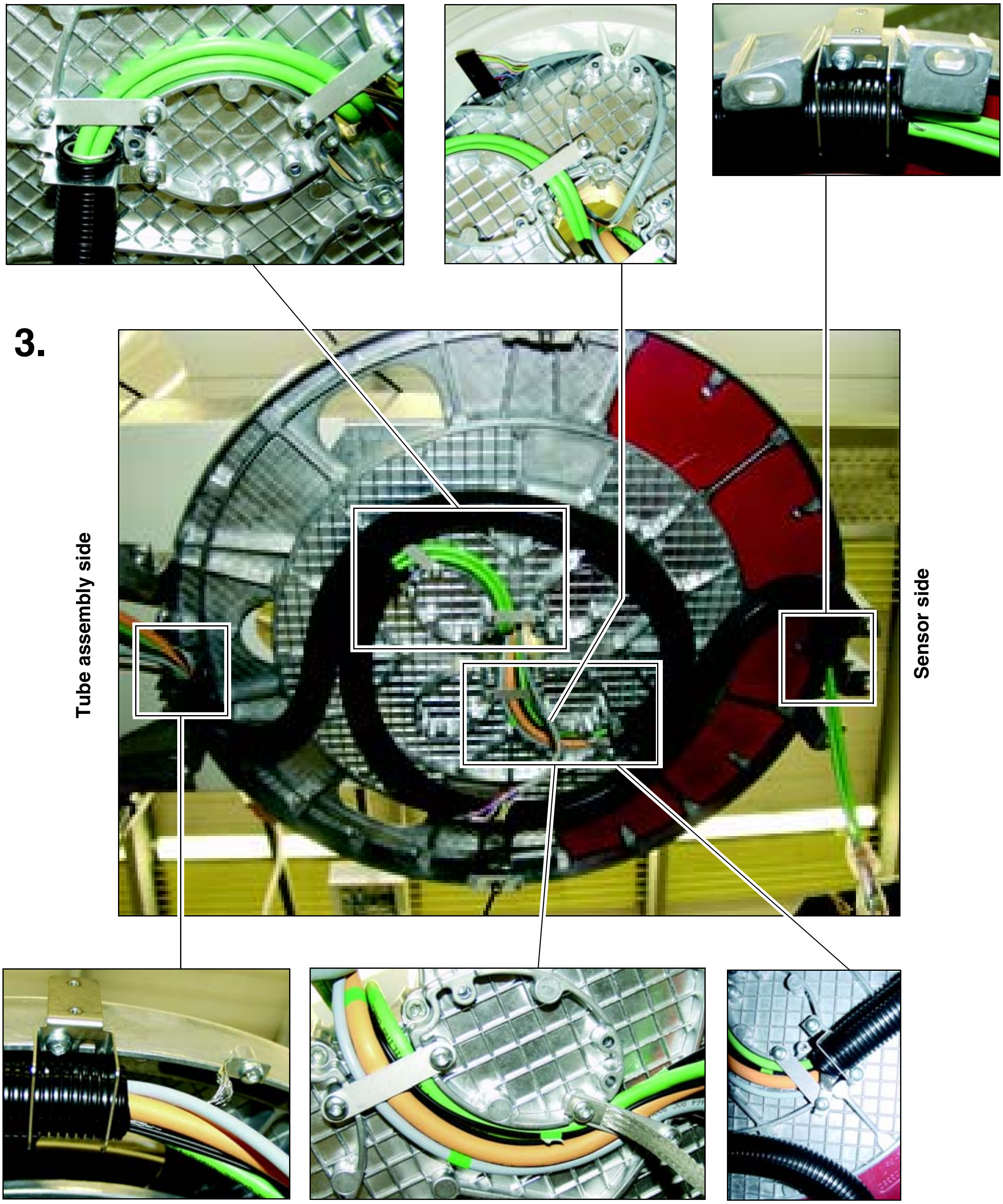
The connectors and cables must be protected by inserting them in the fabric tube supplied with the cables.

Preparations

- Remove the covers.
- Pull the connectors off of board DX6.
- For L12: Protect the tongue of connector RJ45 by wrapping it with insulating tape. Make sure that the contacts don't get sticky or stuck together!
- For L3: Remove the connector of the cable with tool **W1**.
- Pull off the flexible tube and the spiral spring.
- Remove the defective cable and run the new cable up to the rotary ring in the original position.
- Use insulating tape to fasten the end of the grounding strap to cable L12.



1. Bunch the cables together to form a loom. Fasten the defective cable to the loom and use it as a pull wire to pull the loom through the fabric tube **(A)**. Pull the fabric tube over the connector and as far over the cable look as possible.
2. Use the pull wire to pull the fabric tube into the spiral spring.



3. Slide the flexible tube over the spiral spring. Remove the fabric tube and the pull wire. Fasten the cable loom or flexible tube, reattach the connectors and refit the covers.

6.20.2 Replacing cable L7 and L108 (in cable track 2)

Removing cables L7 and L108 from board DX1

- Switch the unit ON.
- Move the slide downward to a pleasant working position using the UP/DOWN keys on the Control Pad.
- Switch the unit OFF again.
- Remove the covers (see section 1.11):
  - Arm
- Remove the two cross braces and the cover plate of board DX1.
- Pull fiber optic cable L7 and cable L108 off of board DX1.

CAUTION

Immediately after pulling off the cables, wrap the detent of connector X303 (cable L108) with adhesive tape to protect it against breaking off.

Moving the unit up and removing the profile covers

- Switch the unit ON.
- Move the slide upward using the UP/DOWN keys on the Control Pad.
- Switch the unit OFF again.
- Remove the covers (see section 1.11):
  - Intermediate piece
  - Profile covers (top and bottom)

NOTE

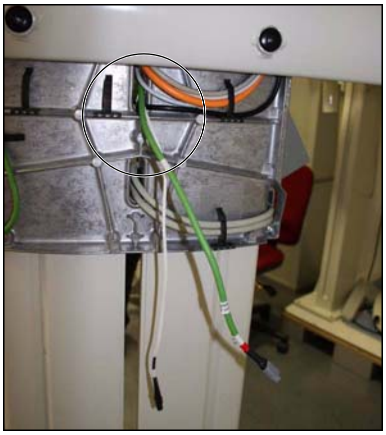
Tip: *When unscrewing the upper profile cover, press it against the unit and let it slide down after detaching it.*

If the height adjustment motor is inoperative, you can also move the slide manually.

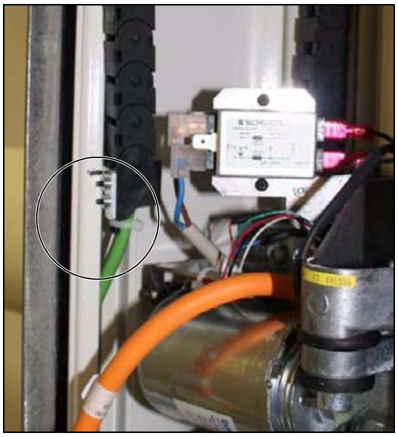
Removing board DX32

- Remove board DX32 (see section 6.1.2).

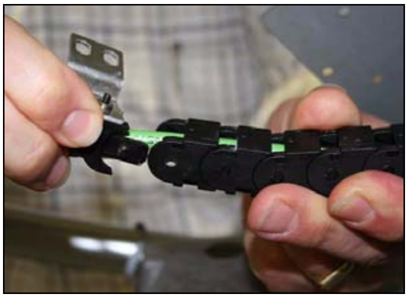
1.



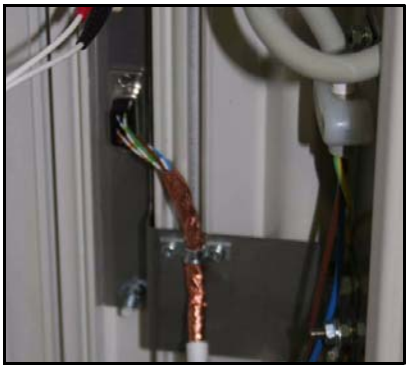
2.



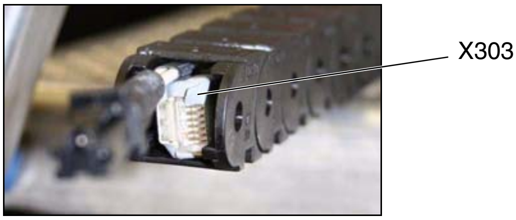
3.



4.



5.



Removing the cable track

1. Detach fiber optic cable L7 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.
2. Unscrew the angle brackets on both sides of the cable track.
3. Remove the motor-side end piece from the cable track.

- Remove both cable covers (on the right and on the left in the stand) and pull the cable track (behind the motor) down and out of the stand.

Detaching old cables from the cable track

4. If cable L7 is defective:
Unscrew cable L7 from the interface board and remove the shielding.

NOTE

This step is not required if cable L7 is intact and therefore will be reused. Unless it is not possible to lay down the cable track flat near the stand (see next step)

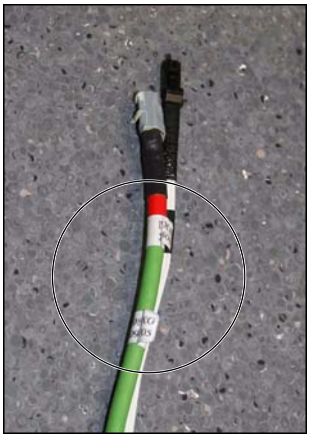
- Remove the cable ties from the cable track and lay the cable track down on a flat surface stretched out.

5. Carefully pull both cables (together) out of the cable track and out of the fabric tube.

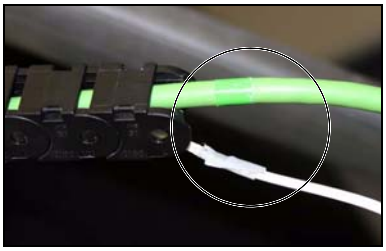
CAUTION

At the same time, be sure to check the position of connector X303 on cable L108 (see photo above).

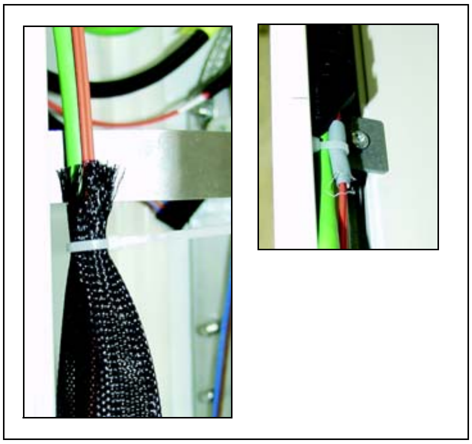
6.



7.



8.



Drawing new cables into the cable track

- If cable L108 is defective:
  Wrap the detent of connector X303 on new cable L108 with adhesive tape to protect it against breaking off.
- Lay the cable track down on a flat surface stretched out.

6. Fasten the two (new) cables together with adhesive tape above the flag labels.

7. Push both cables (together) into the cable track up to the cable markings.

CAUTION

While pushing the green cable, the white cable will also be routed into the cable track. In this way, you can prevent the sensitive fiber optic cable from being damaged.

NOTE

New cables have no 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, mark the new cable.

Reinstalling the cable track in the unit

8. Before installing the cable track in the stand, fasten the cables to both ends of the cable track using cable ties.

CAUTION

The cable ties should only fix the position of the cables. They must not be fastened too tightly, as overtightening them could damage fiber optic cable L7.

- The actual installation of the cable track is performed in the reverse order of its removal.

6.20.3 Laying cable L1 and the 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 6.20.2.

schick

7 Maintenance

Contents

7

Maintenance

DANGER

Shock hazard! It is essential that you switch the X-ray unit OFF before replacing any components!

The unit must be disconnected from the junction box of the building installation before replacing any parts near the power supply, power switch, board DX 32 or the X-ray tube assembly!

CAUTION

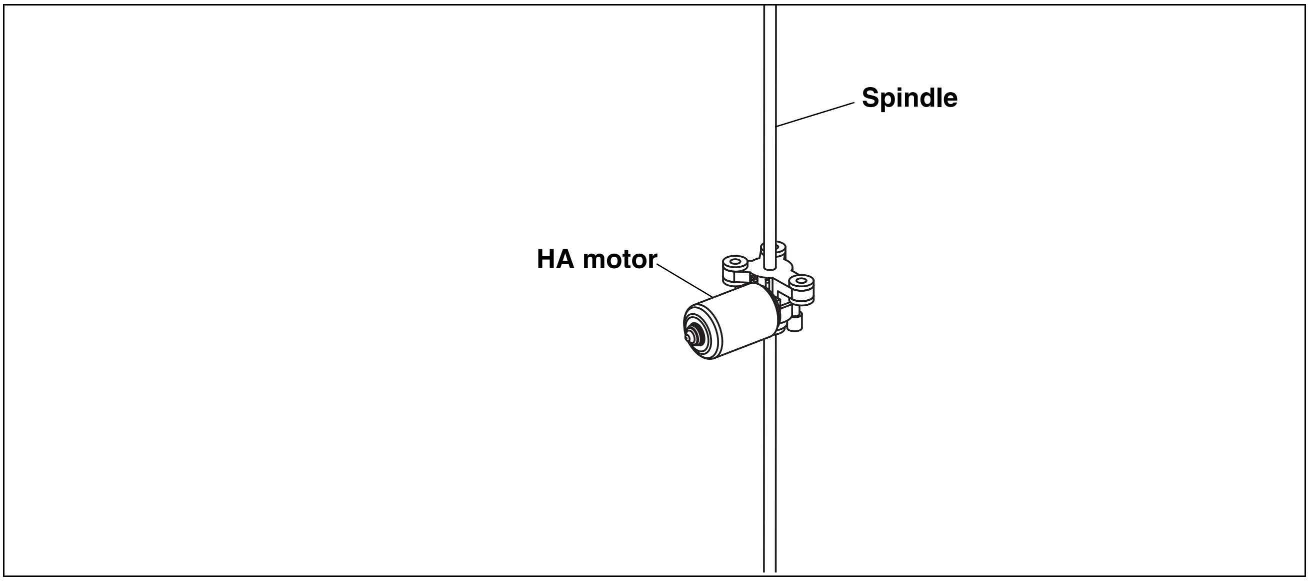
- *Switch the X-ray unit OFF before connecting a measuring instrument.*
- *Select the correct current/voltage type and adjust the measuring range to match the expected readings.*
- *Perform continuity tests only on units which are switched off.*
- *Observe the prescribed cool-down intervals if several exposures must be taken to check a measurement.*

CAUTION

Please observe the usual precautionary measures for handling boards (ESD).

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

7.1 Checking the height adjustment



Check the threaded rod and motor for abrasion

- Perform a visual inspection of the motor and the threaded rod for abrasion.

  If abrasion clearly has occurred:
  → Replace the height adjustment motor including spindle (see Page 6-6)

Check whether the height adjustment produces atypical running noises

▲▼

- Use the UP/DOWN keys on the Control Pad to move the unit up and down throughout its entire travel range.

  If the height adjustment is mechanically defective, atypical running noises may occur:

  Speed-dependent hammering noises:
  Bearing on the height adjustment motor is damaged
  → Replace the height adjustment motor including spindle (see Page 6-6)

Check whether precise, jolt-free height adjustment is possible

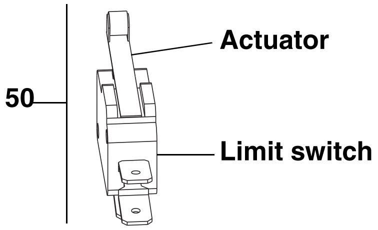
▲▼

- Use the UP/DOWN keys on the Control Pad to move the unit up and down and watch the movement of the slide: The slide must begin moving with a soft start and then speed up its movement.

  If precise height positioning with a soft start is not possible:
  → Lubricate the spindle with a light coat of **Chesterton 622** food grade H1 lubricant.

NOTE
If the X-ray 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.

Check whether the height adjustment limit switches are functioning properly



- Manually actuate both limit switches one after the other while the height adjustment motor is running: The motor must stop.

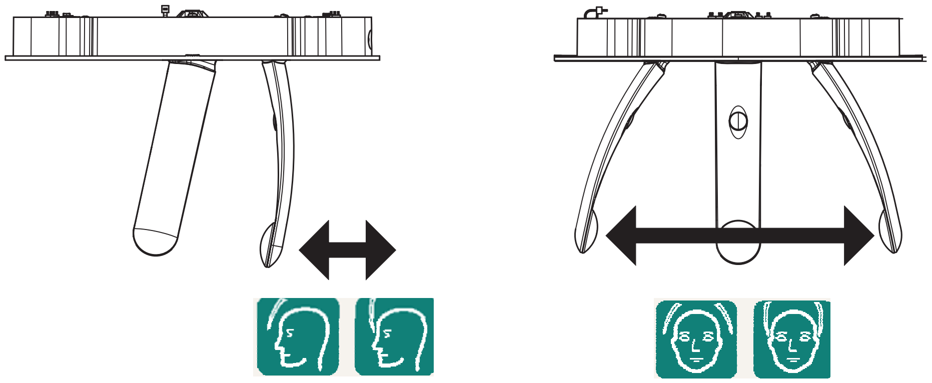
  If the limit switches are not functioning:
  → Check the corresponding microswitch and replace if necessary
  → Check cable L19, replace if necessary

Check whether an audible signal can be heard during height adjustment

- Run the unit up and down: An audible signal must sound.

  If no audible signal sounds:
  → Replace board DX1 (see Page 6-55)

7.2 Checking the forehead and temple supports



Check whether the forehead support moves easily and without jolting throughout its travel range

- Move the forehead support and observe its position.

  If the forehead support cannot be positioned easily and without jolting:
  → Replace the headrest (see section 6.4)

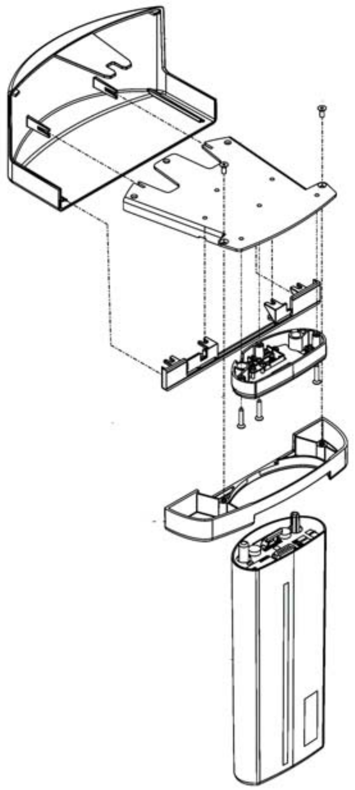
Check whether the temple supports move easily and symmetrically

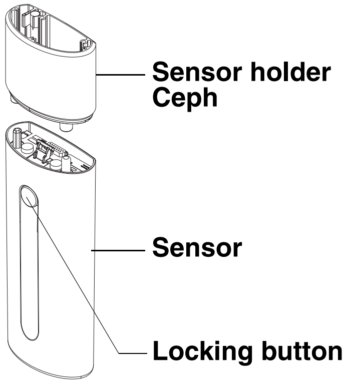
- Move the temple supports and observe their position.

  If the temple supports cannot be positioned symmetrically and without jolting:
  → Replace the headrest (see section 6.4).

7.3 Checking the sensor holder (pan and ceph)

PAN sensor holder, rigid





Check whether the sensor locks and unlocks easily and is firmly seated in the holder

- Carefully insert the sensor upward into the holder:
  The sensor must snap in place audibly.
- Check the sensor for firm seating.
- Press the locking button and carefully pull the sensor downward out of the holder: The sensor must be easy to remove.

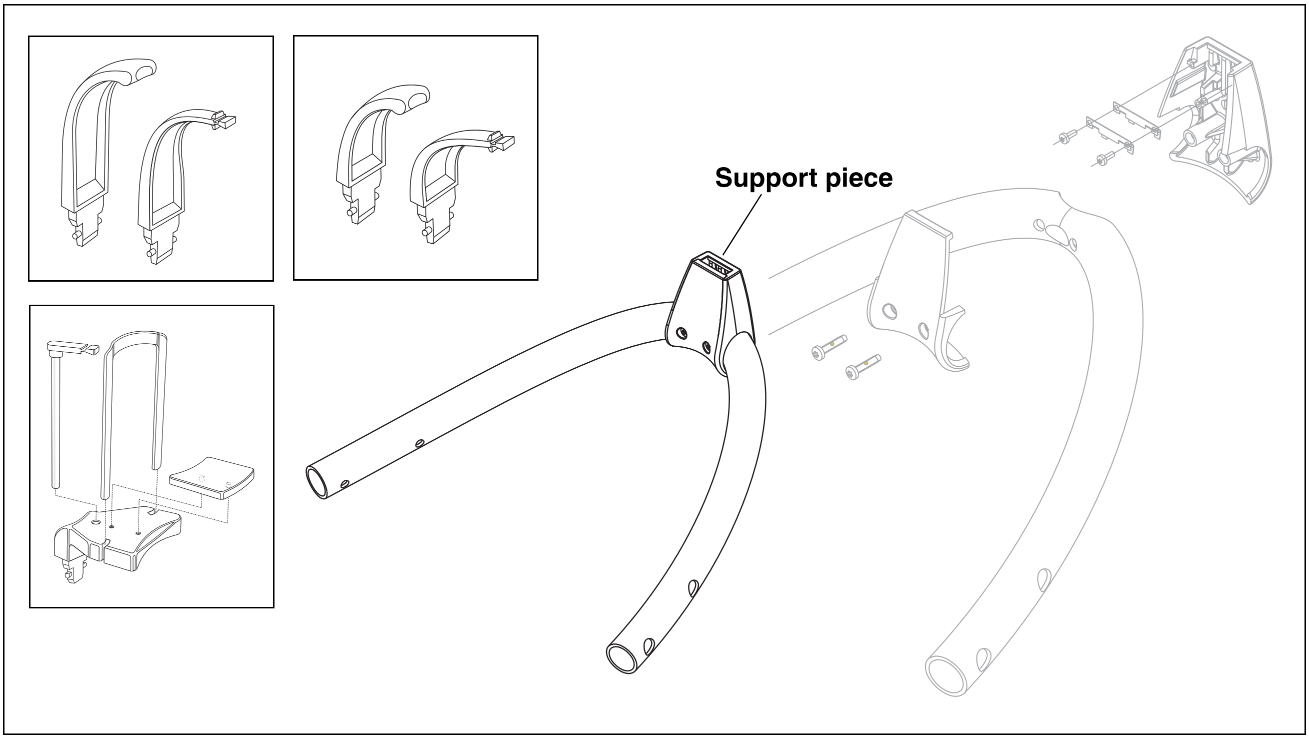
If the sensor cannot easily be inserted in or removed from the holder, or is seated too loosely in the holder:

→ 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 (see Page 6-41)

→ Replace the sensor

7.4 Checking the support piece (bite block holder)



Check whether the bite block, contact segment and chin rest can be fitted securely in the bite block holder

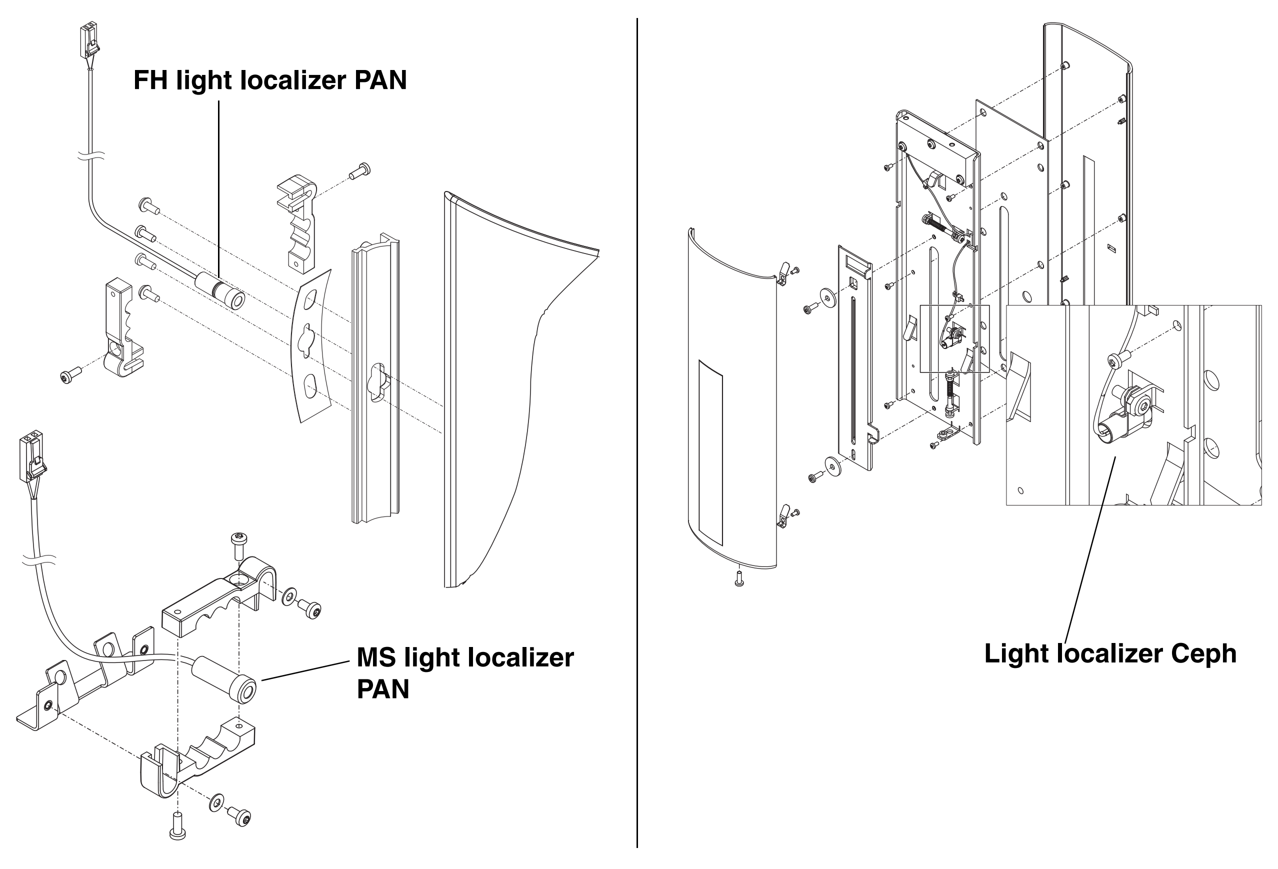
- Insert the bite block, contact segment and chin rest one after the other in the bite block holder and check them to make sure they are firmly seated.

  If loosely seated:

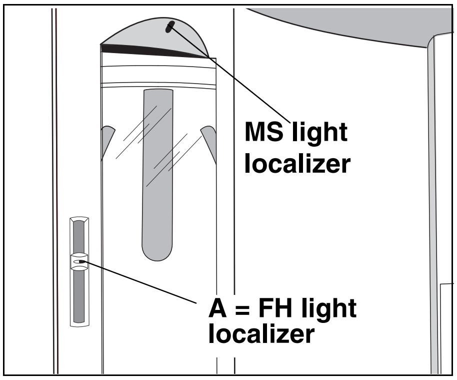
  → Check the bite block, contact segment and/or chin rest for damage; replace with new parts if necessary

  → Replace the support piece (see Page 6-32)

7.5 Checking the light localizers



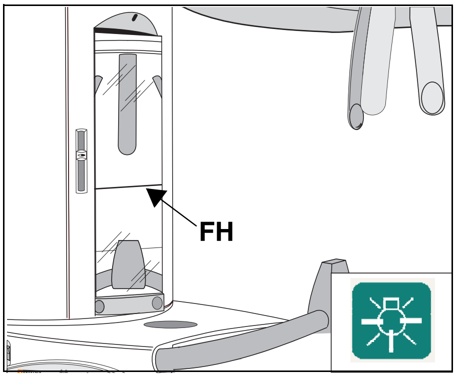
Check whether the FH light localizer (PAN) can be adjusted easily

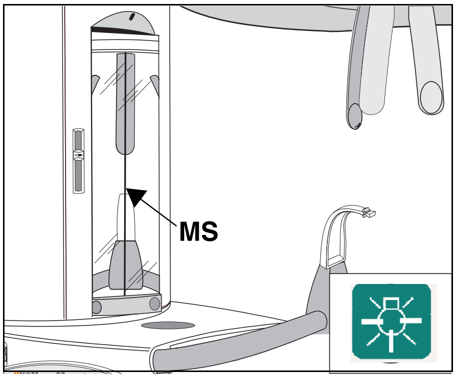


- Adjust the FH light localizer on the PAN with slider **A**.

  If the light localizer cannot be moved easily:
  → Lubricate the slider (rail) with a light coat of Vaseline

Checking the position of the light lines (FH and MS) on the PAN





- Switch the light localizers on and check the positions of the light lines:
  - The **horizontal light line (FH)** must be running horizontally
  - The **vertical light line (MS)** must be running vertically through the center of the forehead support down to the center of the support piece

i ***NOTE***

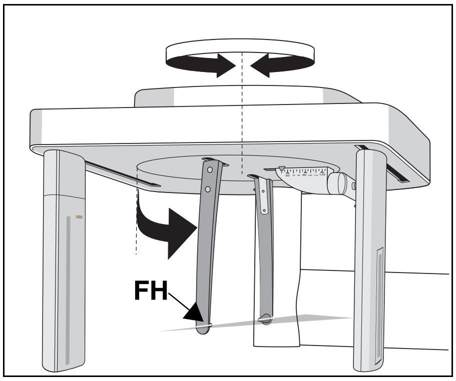
Tip: *When checking and adjusting the light localizers use the following as reference lines:*

For the FH light localizer:	*Edge of the tube assembly light localizer*
For the MS light localizer:	*Support piece, inserted bite block or Forehead support*

If the light beam alignment is not correct:

→ Adjust the light localizers (see chapter 6)

Checking the position of the light lines (FH) on the Ceph



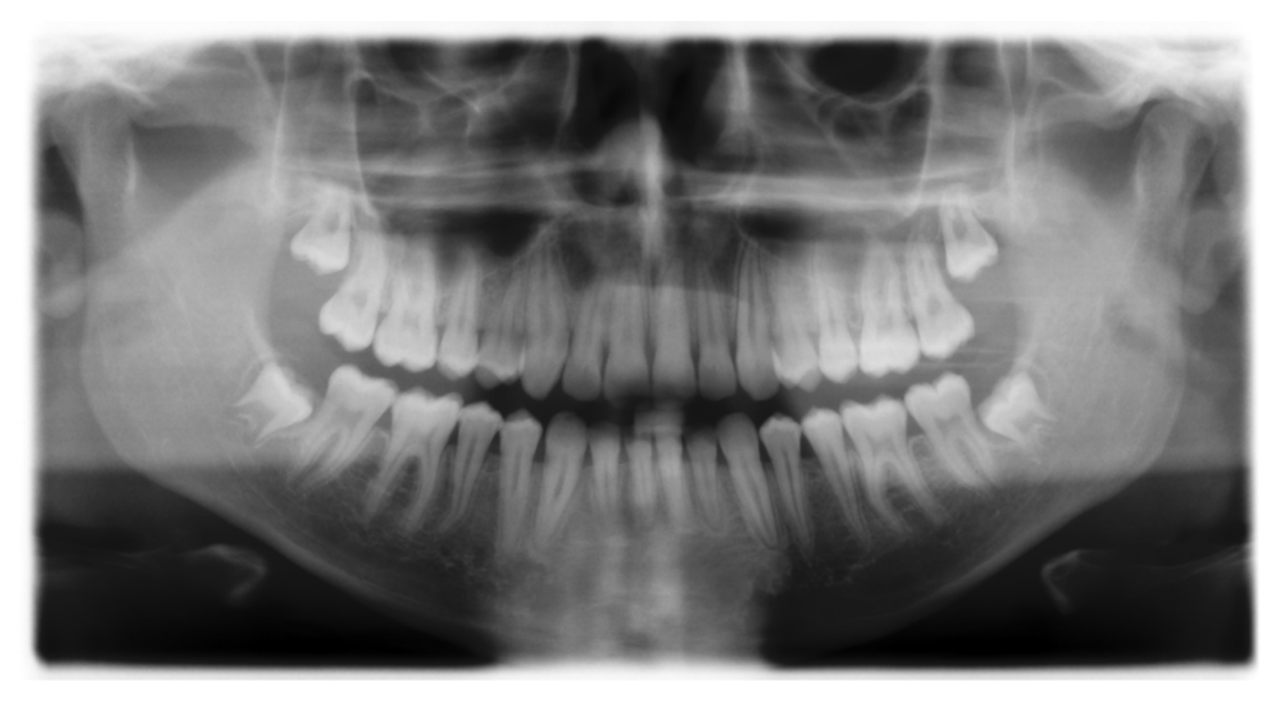
- Switch the light localizers on and check the positions of the light lines:

  → The **horizontal light line (FH)** must be running horizontally between the temple supports at the height of the ear plugs

i ***NOTE***

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.*

7.6 Checking the X-ray images



Check whether the X-ray images taken by the dentist are OK

- Check to see whether the X-ray images taken by the dentist exhibit an unexposed border on all 4 sides.
- Check whether the X-ray images show normal definition.
- Check whether the density of the X-ray images is OK.

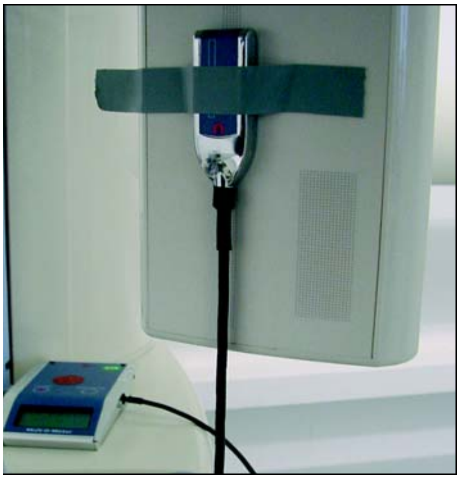
If the quality of the X-ray images is unsatisfactory in some way:

→ Check the adjustment and readjust the system if necessary (see section 4)

7.7 Checking the tube data

7.7.1 kV actual value and radiation time

- Select service routine S002.3 for the exposure (radiation without rotary movement, radiation time selectable, see page 5-19) and set the following parameters:
  - Radiation time: 1 s
  - kV value: 66 kV



- Release radiation and check the kV actual value and radiation time spectrometrically, e.g. using a Mult-O-Meter.

  If the measured values deviate from the values set above (1 s, 66 kV) by more than ± 10 %:

  ‡ Replace the tube assembly (see Page 6-36)

7.7.2 Tube current verification

⚠ *WARNING*

The electronics of the X-ray tube assembly are always connected to line voltage.

Always switch the X-ray unit off and wait until V203 is no longer illuminated before contacting the test leads.

⚠ *WARNING*

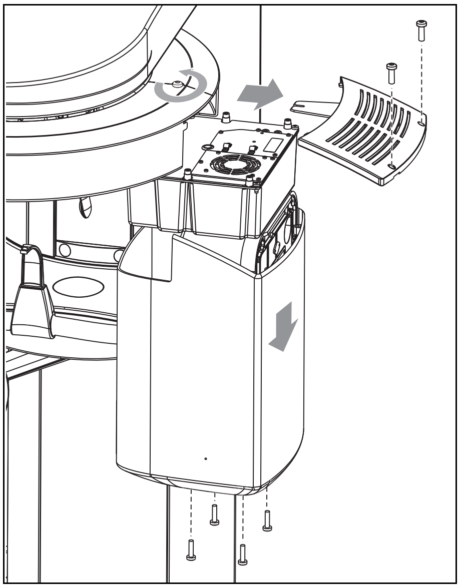
The test leads and measuring instruments used must have a dielectric strength of at least 1000V!

Be sure to use a battery-powered measuring instrument with shock-hazard-protected sockets.

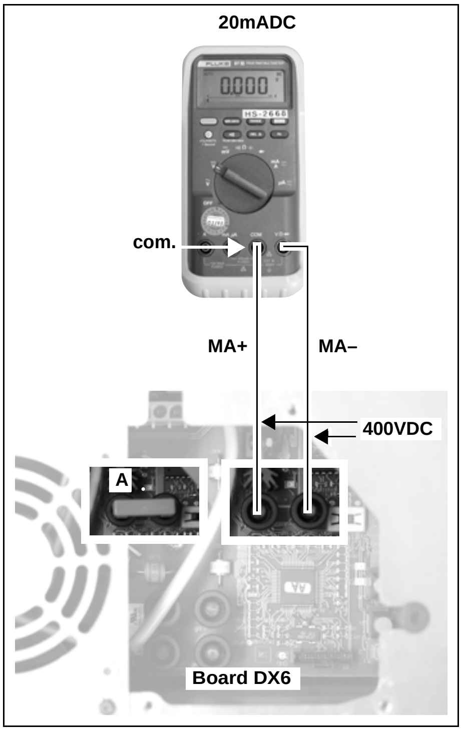
Use only test leads with shock protection.

⚠ *WARNING*

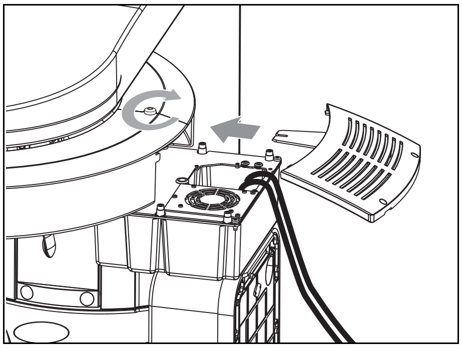
Be sure to switch the X-ray unit off before removing the jumper for the mA measuring jack.



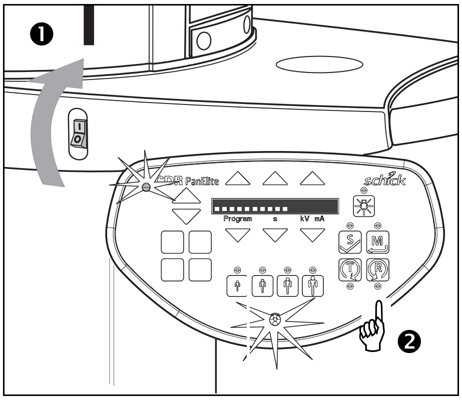
1. Remove the covers of the tube assembly.



2. Remove jumper **A** from the MA+/MA– measuring points on board DX6. Connect a digital ammeter to MA+ and MA– and select range 20mADC.



3. Reattach the cover and tighten the screw securely.



4. Switch the unit ON å.
   Wait 1 min. for self-adjustment of the unit.
   Press the **R key** ❷ to return the X-ray tube head into the initial position.

- Select **66 kV/8 mA**. Make CDR PanElite Service Program ready for exposure.
- As soon as program **P1** and **66 kV/8 mA** have been selected, the unit is ready for exposure.

Measurement

5. Press and hold down the exposure key until a meter reading is obtained.

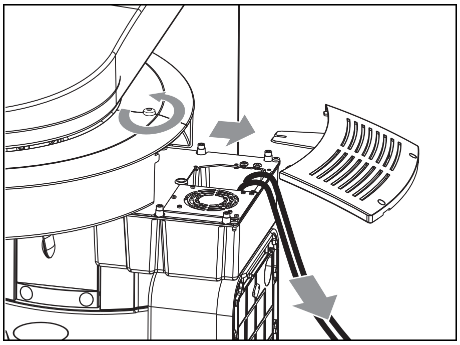
   The ammeter should indicate 8 mA ± 1.6 mA.
   Record the display reading.

NOTE

Display: 1mA corresponds to a tube current of 1mA, permissable tolerance +/-20%.

If the measured value deviates from the permissible value (1 mA) by more than ± 20 %:

‡ Replace the tube assembly (see 6-36)



- If the specified value is obtained, switch the unit OFF.

6. Remove the upper cover and the meter leads.

- Replace jumper!
- Reattach the covers of the tube assembly.

7.7.3 Fan and temperature

Check whether the fan is functioning

- Check the function of the fan using service routine S005.4 (see Page 5-23)

  If the fan is defective:

  ‡ Replace the fan (see Page 6-40)

Check whether the temperature sensor is supplying plausible values

- Read the temperature in the single tank via service routine S005.5 (see page 5-24)

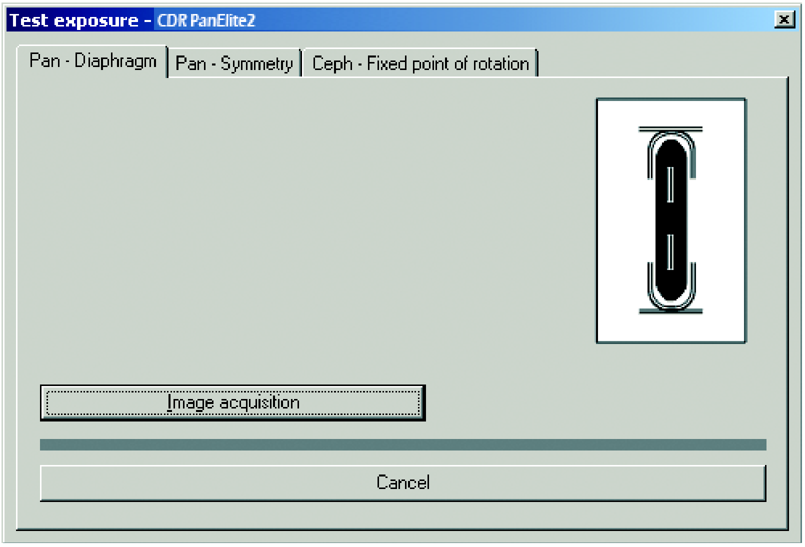
  If the displayed temperature reading is not plausible:

  ‡ Replace the tube assembly (see Page 6-36)

7.8 Checking the diaphragm.

7.8.1 Diaphragm test exposures

The diaphragm test exposures are used for a quick check of the system adjustment. The **TEST EXPOSURE** menu is started without a service password. Diaphragm test exposures can thus be performed by the user as well.



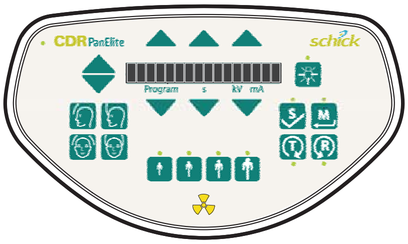
Menu: Test exposure

The **TEST EXPOSURE** menu is started from the CDR Service Program:

- Launch the CDR PanElite Service Program via the path:

  Program files\Schick Technologies\CDR PanElite\CDR PanElite Service Program.exe
- Open the **TEST EXPOSURE** menu:

  XCXP ‡ SELECT X-RAY DEVICE ‡ SERVICE EXPOSURE ‡ DIAPHRAGM TEST EXPOSURE



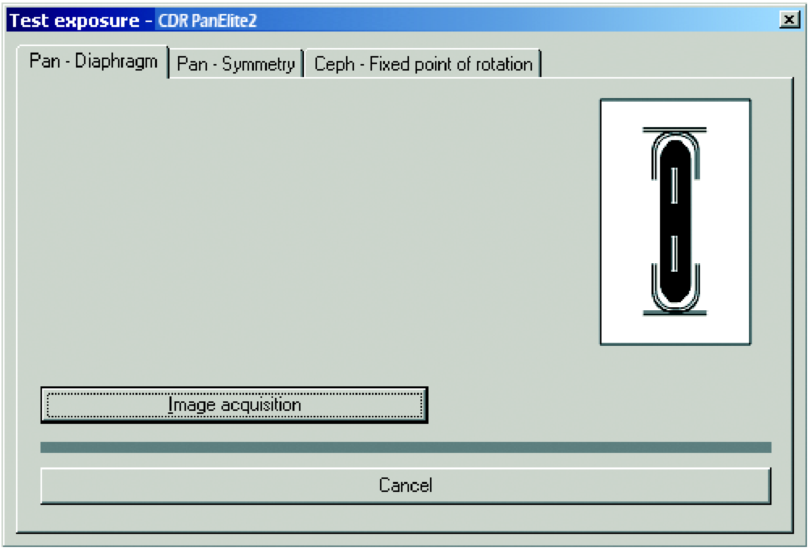
NOTE

*When you open the **DIAPHRAGM TEST EXPOSURE** menu, the unit switches from the user mode to the PC service mode logged by the PC.*

*This mode is indicated by the **SERVICE** reading on the Control Pad.*
In the PC service mode, the Control Pad control options are determined by the CDR PanElite Service Program and the currently selected service routine. General control of the unit by means of the Control Pad (as in the user mode) is not possible in this mode.

You can switch between the **PAN - DIAPHRAGM**, **PAN - SYMMETRY** and **CEPH - FIXED POINT OF ROTATION** menus by clicking the corresponding **tab** with the mouse. To quit the **TEST EXPOSURE** menu, click **CANCEL**.

7.8.2 Pan diaphragm test exposure

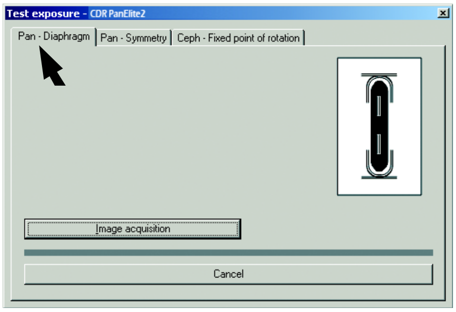


Menu: Test exposure ‡ Pan diaphragm

NOTE

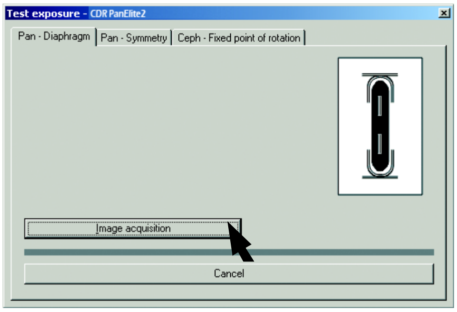
The exposure is performed without a needle phantom.

Opening PAN - DIAPHRAGM



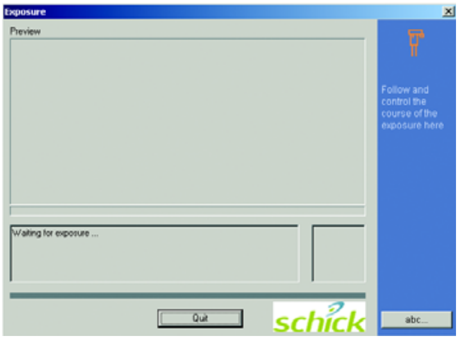
1. Select the **PAN - DIAPHRAGM** submenu.

Making the unit ready for exposure



2. Make the CDR PanElite Service Program ready for exposure:
   Click **IMAGE ACQUISITION**

CDR PanElite Service Program

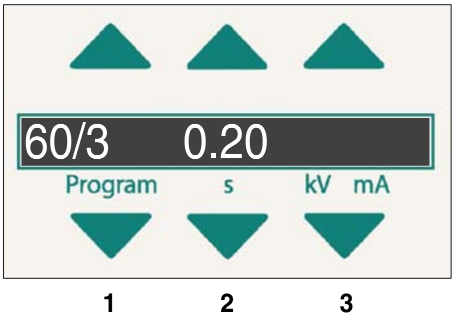


Follow and control the course of the exposure here

Waiting for exposure ...

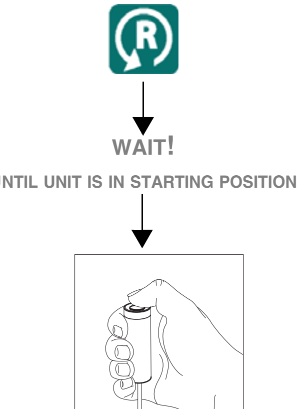
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



3. Take an exposure (60 kV/3 mA; 0.20 s):

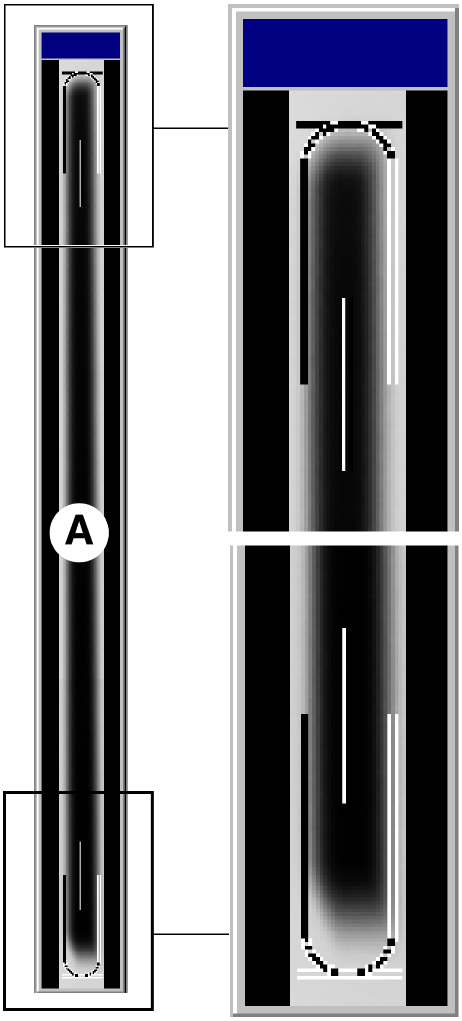
– Press the **R key** to move the unit back to the starting position.

The procedure is completed when the exposure parameters are displayed and the progress indicator disappears.

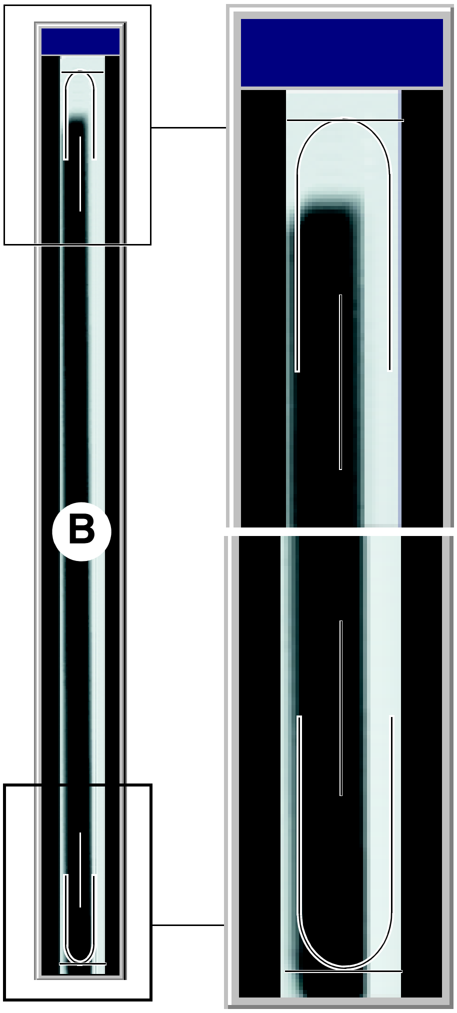
– Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok



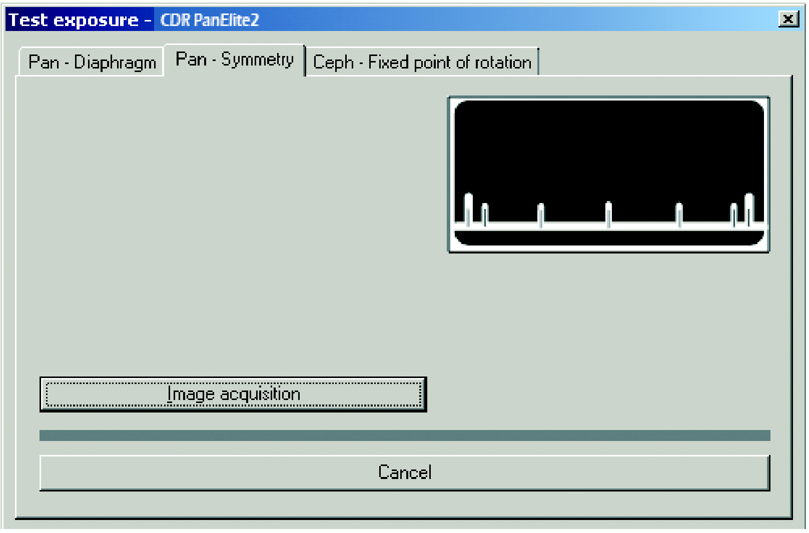
Adjustment: not ok

- **The exposed diaphragm area must lie horizontally centered in the image field as well as inside the superimposed auxiliary lines (A).**
- **A white border surrounding the image on all sides must be visible. The maximum density must lie in the center of the diaphragm area (A).**

NOTE

*If these criteria are not fulfilled **(B)**, the pan diaphragm must be adjusted. (see chapter 4)*

7.8.3 Pan symmetry test exposure



Menu: Test exposure ‡ Pan diaphragm

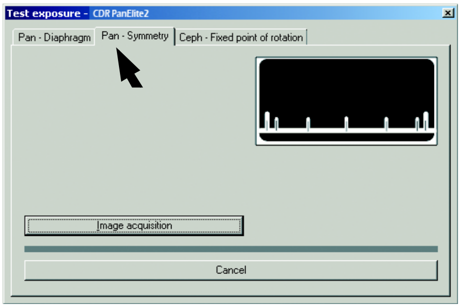
Preparations

- Insert the needle phantom in the bite block holder of the panoramic X-ray unit (see page 4-9).

CAUTION

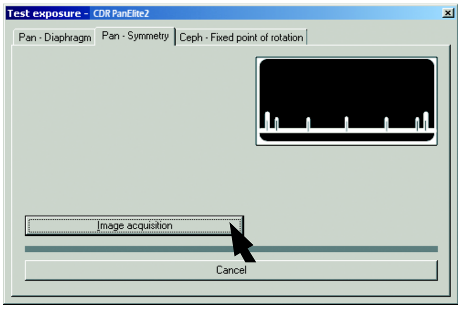
It is essential that the needle phantom be removed from the bite block holder of the panoramic X-ray unit again before a Ceph exposure is taken; otherwise the phantom may collide with the sensor.

Opening PAN - SYMMETRY



1. Select the **PAN - SYMMETRY** submenu.

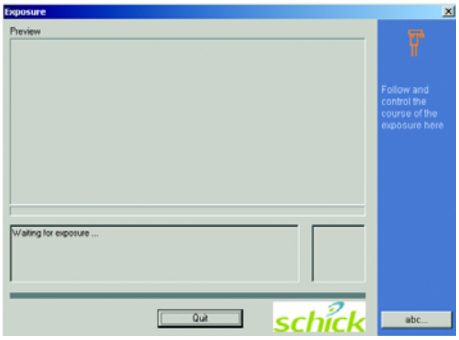
Making the unit ready for exposure



2. Make the CDR PanElite Service Program ready for exposure:

   Click **IMAGE ACQUISITION**

CDR PanElite Service Program

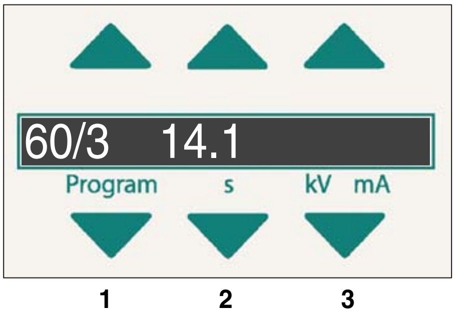


Waiting for exposure ...

Follow and control the course of the exposure here

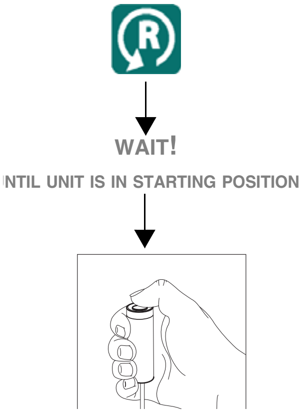
The exposure dialog box showing the exposure status appears in the CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



3. Take an exposure (60kV/3mA; 14.1 s):

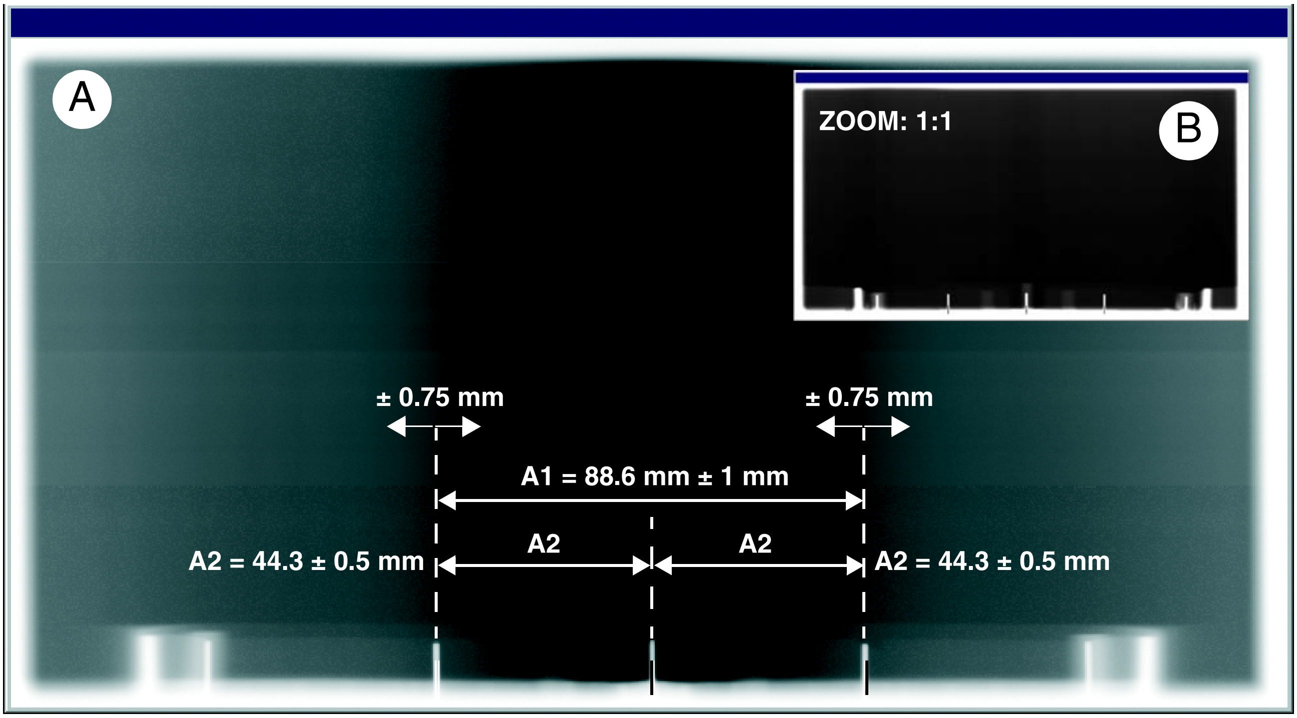
– Press the **R key** to move the unit back to the starting position.

The procedure is completed when the exposure parameters are displayed and the progress indicator disappears.

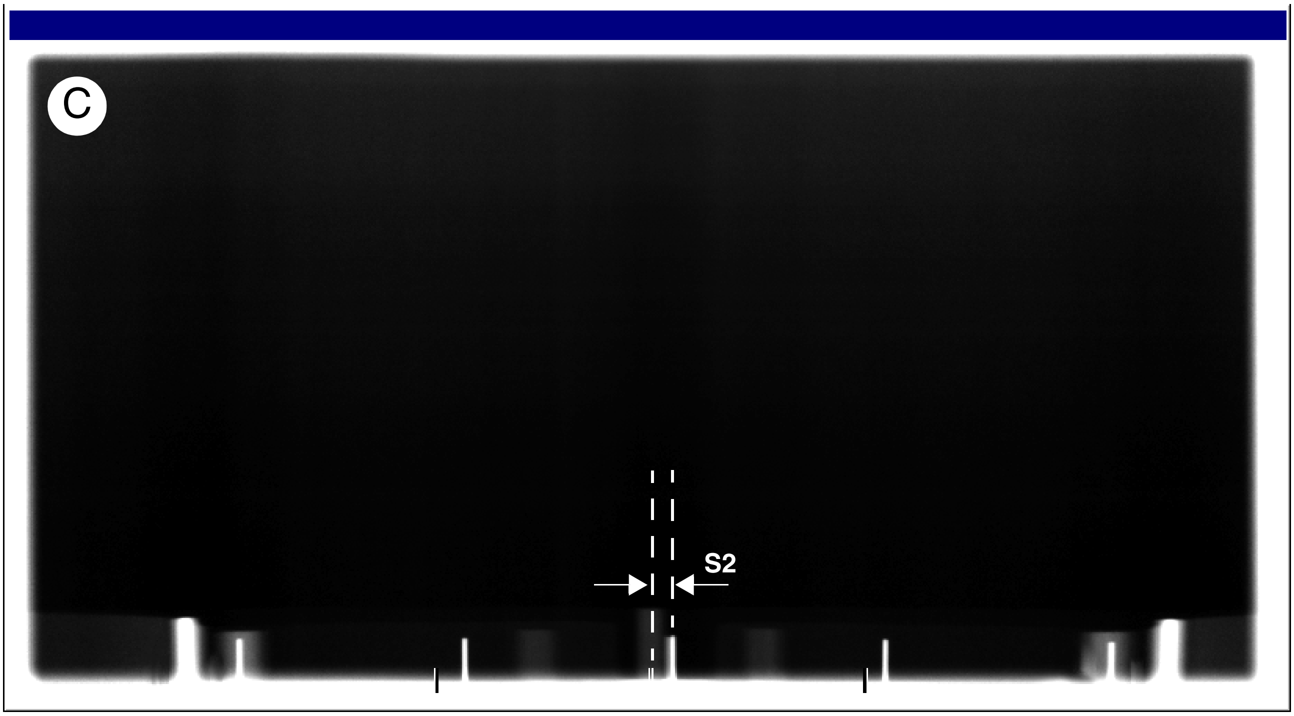
– Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok (length measurement with CDR PanElite Service Program)



Adjustment: not ok (length measurement with CDR PanElite Service Program)

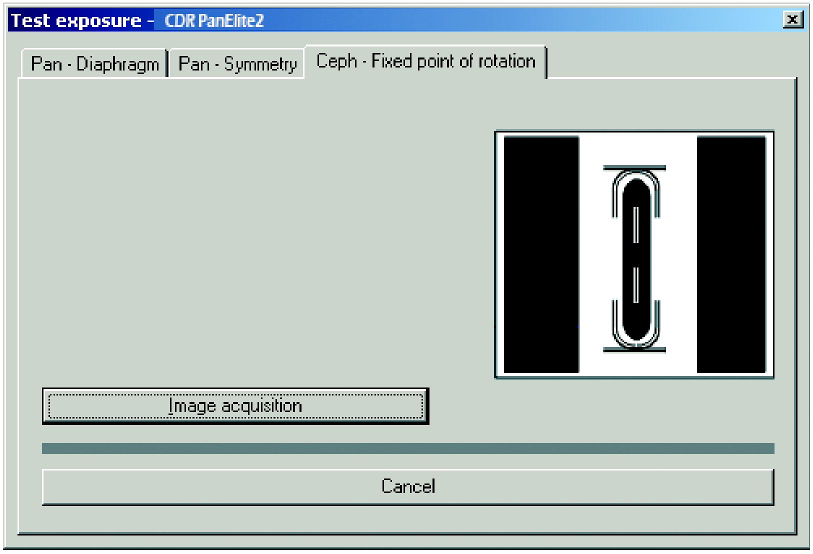
- **The shadow of the center needle, the needle image and the auxiliary line must be coincident and located behind each other.**
  A tolerance (offset of needle from the central auxiliary line) of ± 0.75 mm is permissible (A).
- **Distance A1 must be 88.6 ± 1 mm (A).**
- **Distances A2 must be identical, each being 44.3 ± 0.5 mm.**
- **A white border surrounding the image on all sides must be visible (B).**

i ***NOTE***

If one of these criteria is not fulfilled ***(C)****, the pan symmetry must be adjusted. (see chapter 4)*

- Remove the needle phantom from the bite block holder of the unit.

7.8.4 Ceph – Fixed point of rotation

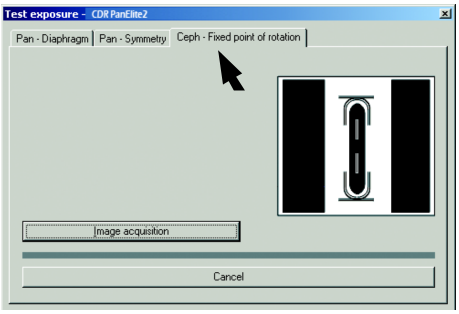


Menu: Test exposure ‡ Ceph - Fixed point of rotation

CAUTION

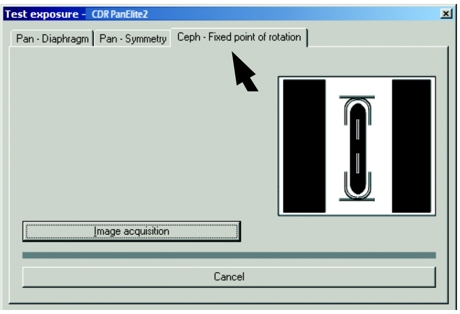
It is essential that the PAN needle phantom be removed from the bite block holder of the panoramic X-ray unit before a Ceph exposure is taken; otherwise the phantom may collide with the sensor.

Opening CEPH - FIXED POINT OF ROTATION



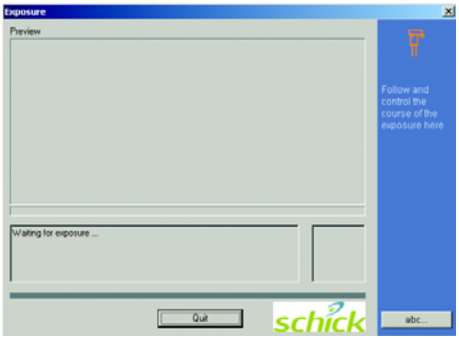
1. Select the **CEPH - FIXED POINT OF ROTATION** submenu.

Making the unit ready for exposure



2. Make the CDR PanElite Service Program ready for exposure:
   Click **IMAGE ACQUISITION**

CDR PanElite Service Program

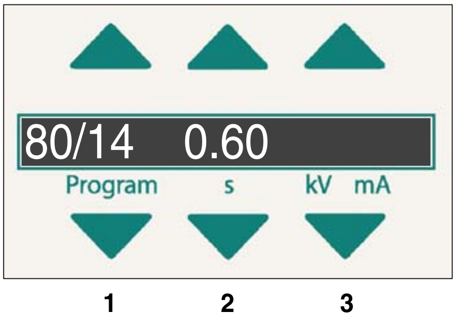


Follow and control the course of the exposure here

Waiting for exposure ...

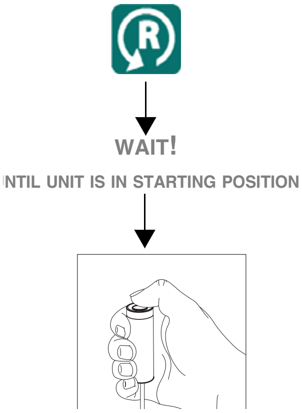
The exposure dialog box showing the exposure status appears in CDR PanElite Service Program.

Display on the Control Pad



The single-line display of the Control Pad shows the exposure parameters.

Starting the exposure



3. Take an exposure (80 kV/14 mA; 0.60 s):

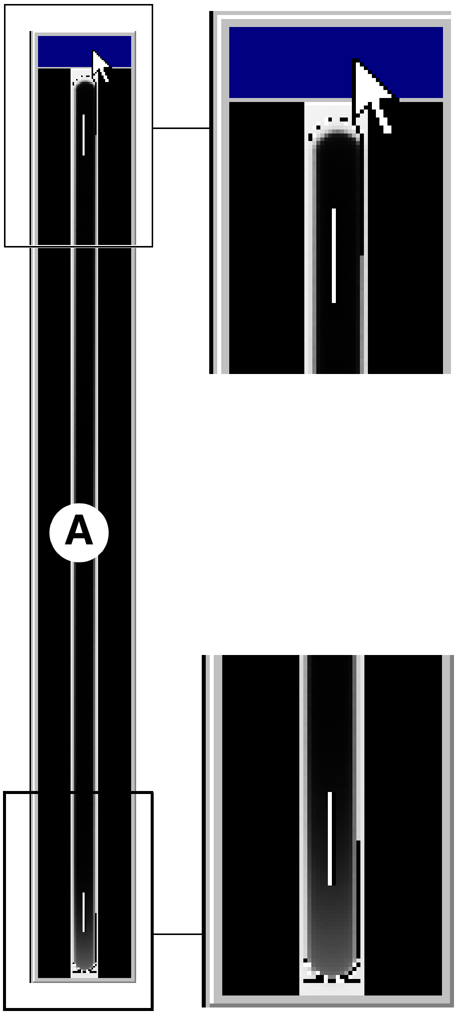
– Press the **R key** to move the unit back to the starting position.

The procedure is completed when the exposure parameters are displayed and the progress indicator disappears.

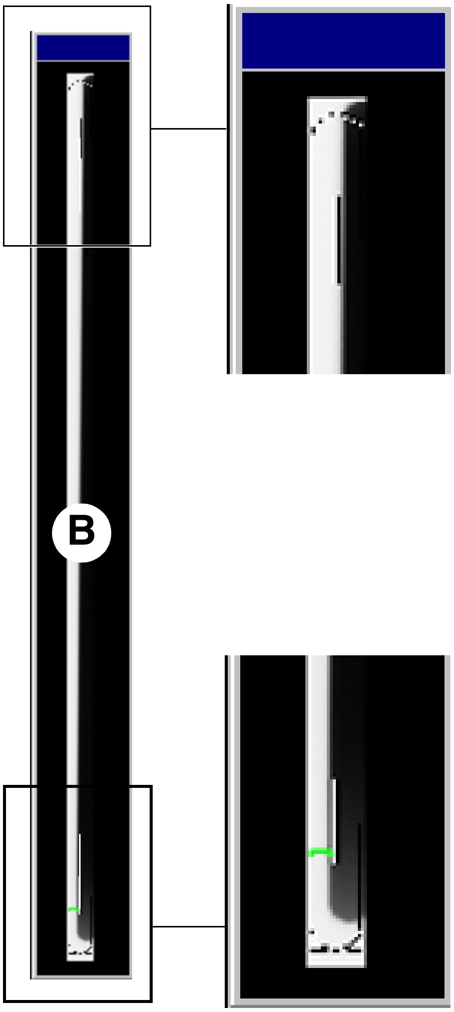
– Press and hold down the exposure switch until image acquisition is complete and the preview image appears in the exposure dialog box.

Evaluating the X-ray image

4. Evaluate the X-ray image:



Adjustment: ok



Adjustment: not ok

- **The exposed diaphragm area must lie centered and straight in the image field as well as inside the superimposed auxiliary lines (A).**
- **A white border surrounding the image on all sides must be visible. The maximum density must lie in the center of the diaphragm area (A).**

NOTE

If these criteria are not fulfilled ***(B)****, the ceph fixed point of rotation must be adjusted (see chapter 4).*

7.9 Checking the cables for damage

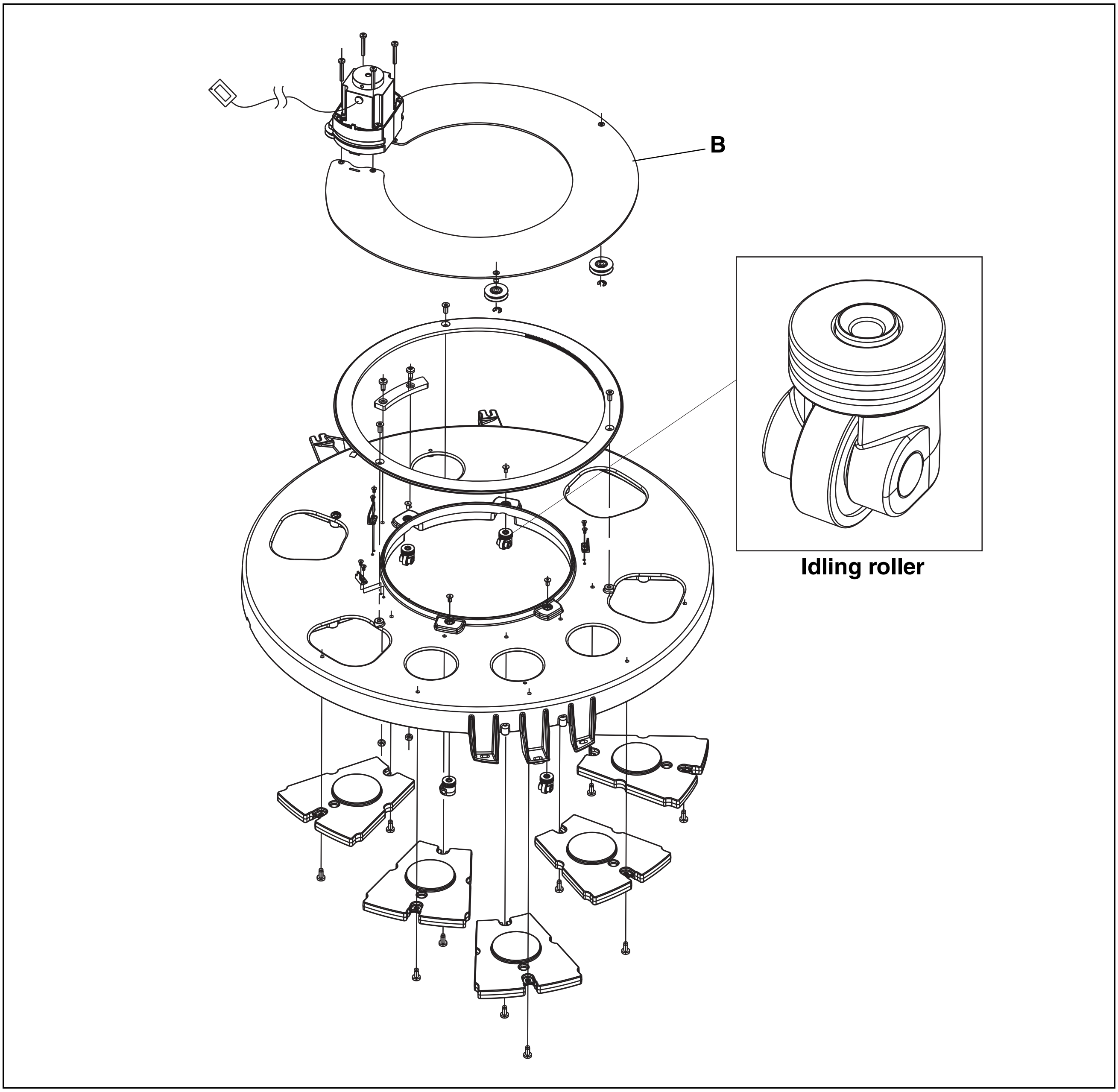
Check whether the cables feeding the unit are OK

- Perform a visual check of the power cable, protective ground wire, control cables and data cables.

  If cables are externally damaged:

  ‡ Replace the respective cables (see Page 6-65)

7.10 Checking the idling rollers



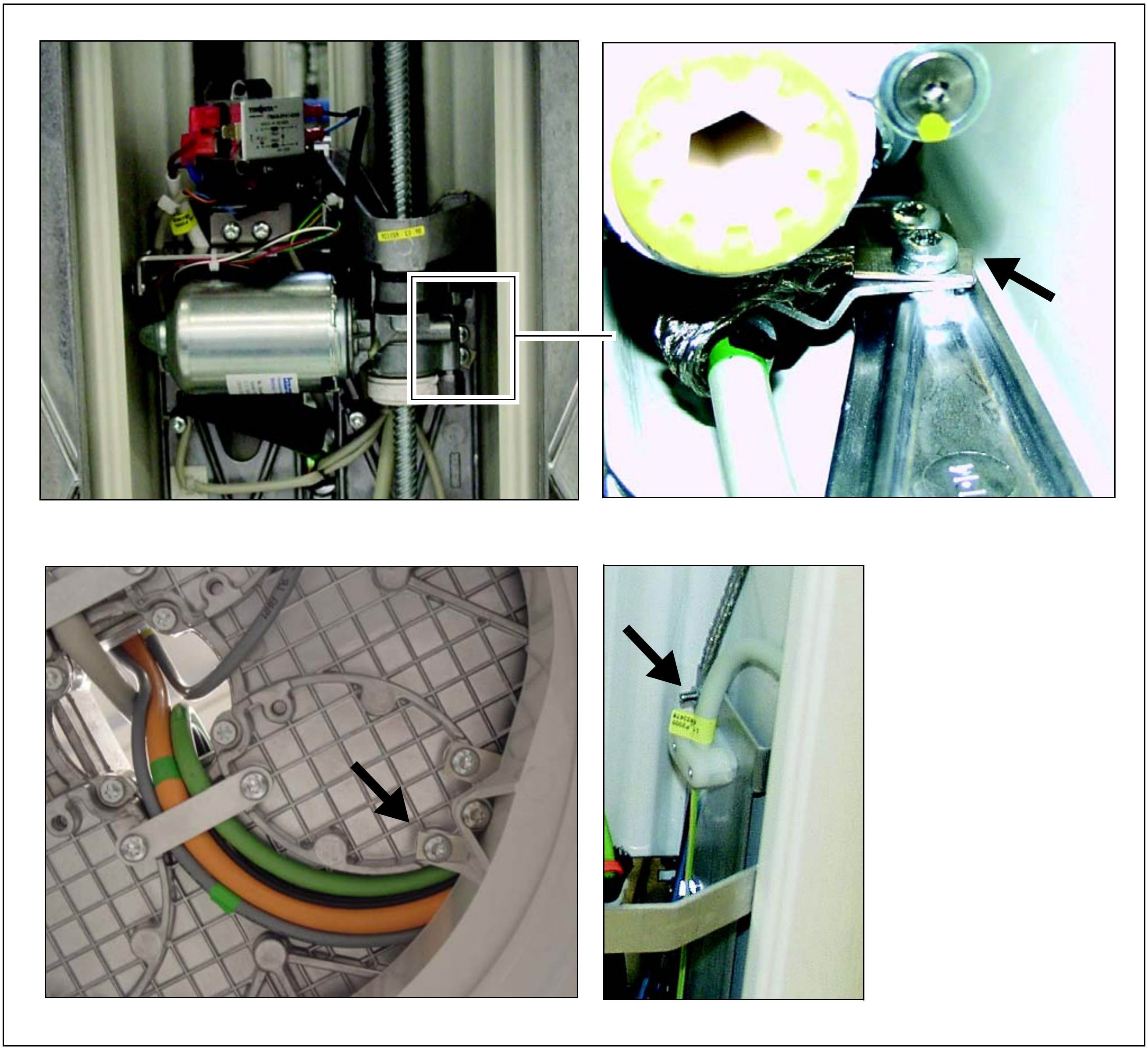
Check whether the idling rollers are OK

- Rotate ring **B** by hand and check it for smooth and easy running.

If the ring does not run smoothly and easily:

→ Remove the housing covers and check the idle rollers for dirt and foreign particles. Clean and remove foreign particles if necessary.

7.11 Checking the grounding straps



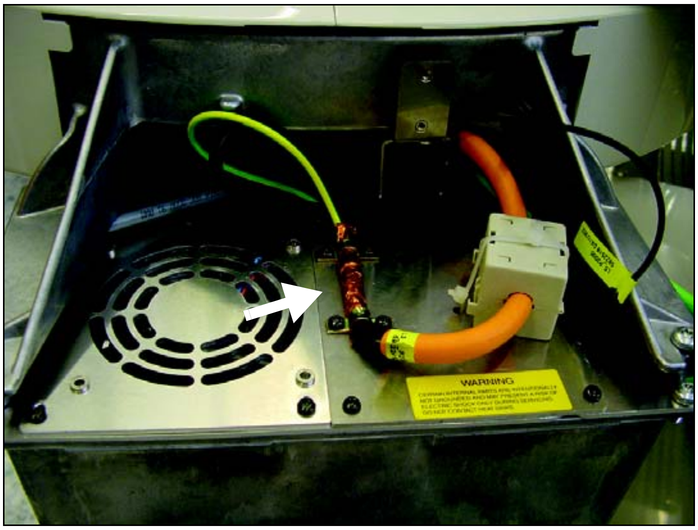
Check whether the grounding straps have complete and firm contact

- Perform a visual and “hands-on” inspection of the ground straps to ensure that they have complete and firm contact at the positions marked.

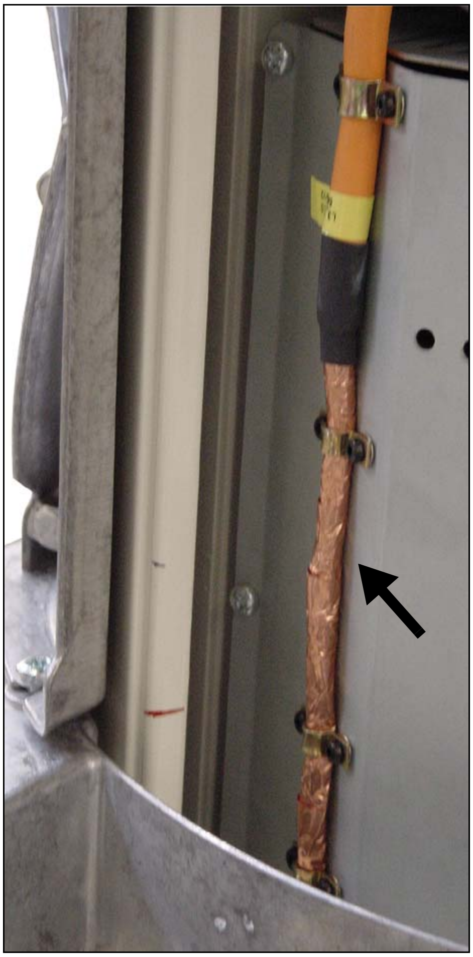
  If the grounding straps do not have proper contact:
  ‡ Fasten them properly

  If the grounding straps are damaged:
  ‡ Replace the grounding straps

7.12 Checking the cable shields



Shield on the tube assembly



Shield on housing DX32

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 proper contact:

  ‡ Fasten them properly

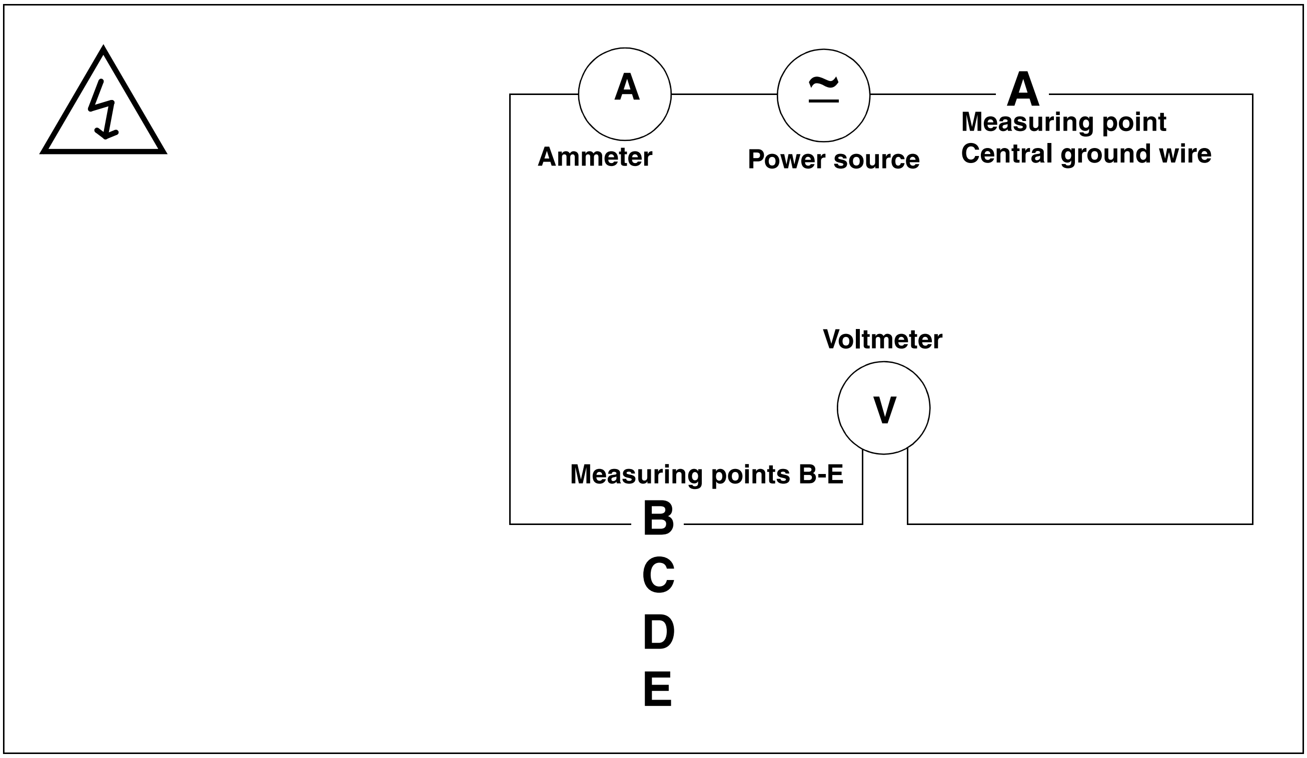
7.13 Checking the protective ground wires

DANGER

Shock hazard! It is essential that you switch the X-ray unit OFF before replacing any components!

- Switch **OFF** the line voltage at the main switch of the building installation.
- Disconnect the power cable and the second protective ground wire from the building installation.
- Remove the following cover parts (see section 1.11):
  - – Profile cover (10)
  - – Tube assembly cover, front (65)
  - – Tube assembly cover, rear (70)

Measuring setup for protective ground wire test



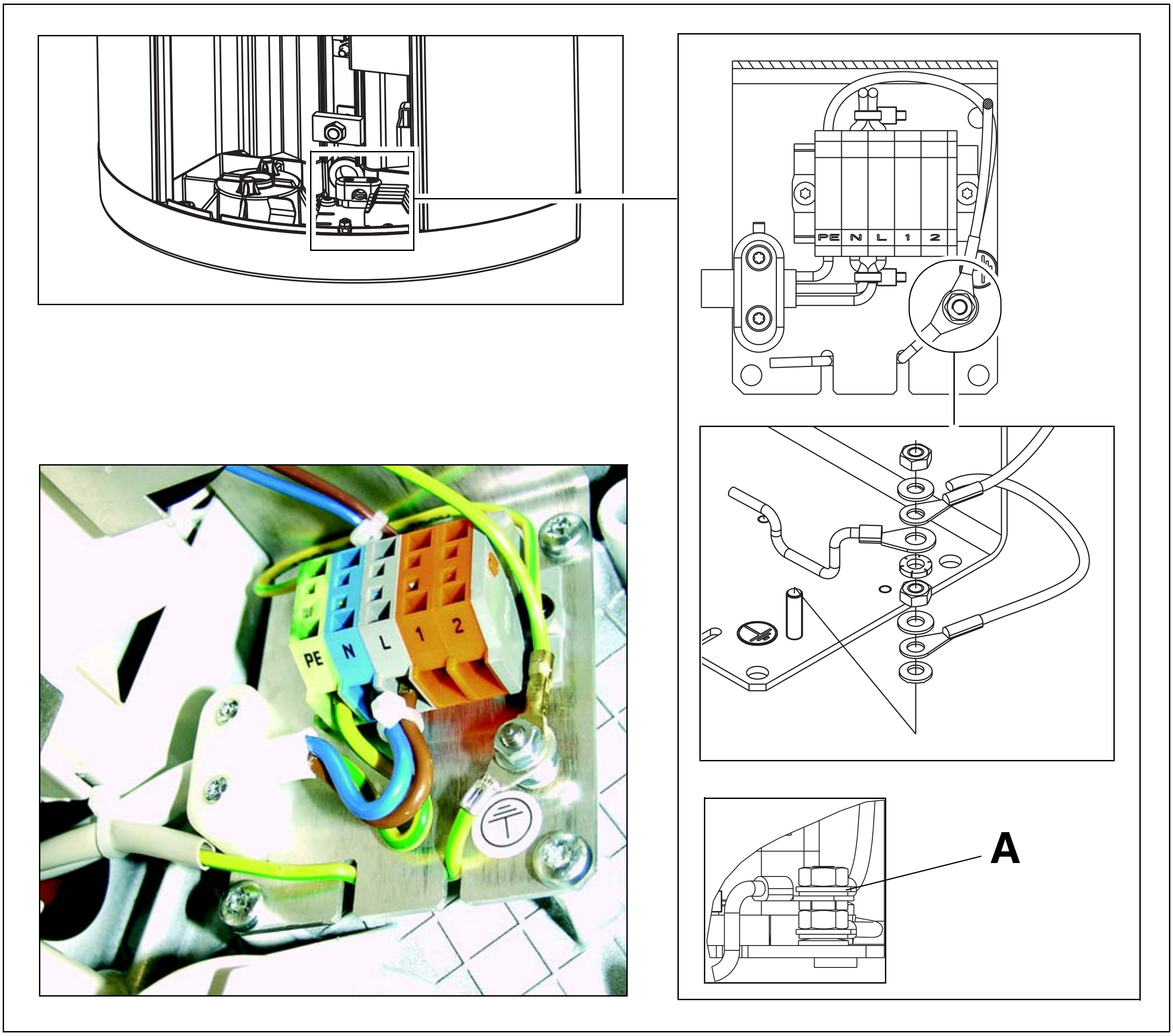
7.13 Checking the protective ground wires

Check whether the ground wire resistance complies with the specifications

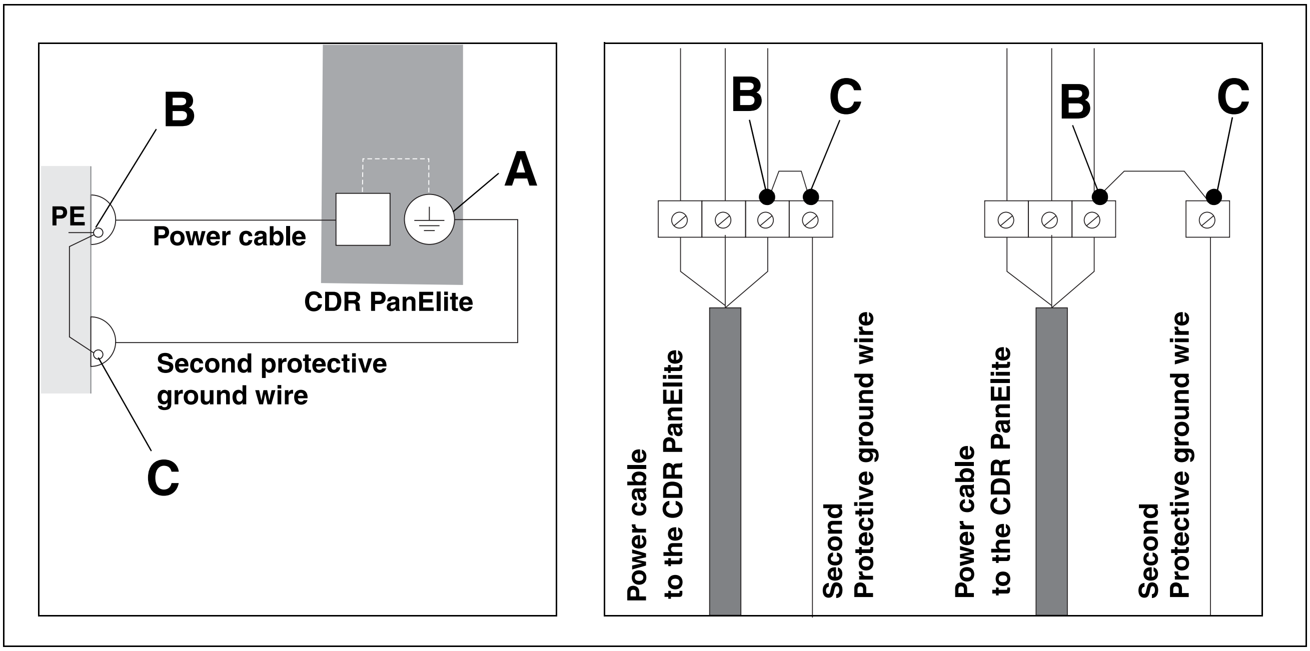
Protective ground wire test between...			
A and	B	GNYE wire	0,1Ω
A and	C	2. Protective ground wire	0,1Ω
A and	D	Housing DX32	0,2Ω

- A power source with a current of at least 0.2 A and a no-load voltage of 24 V max. and 4 V min. is required.
- Connect the power source between the measuring points specified in the table for at least 5 s and measure:
  - the voltage drop with the voltmeter
  - the current with the ammeter and
  - calculate the resistance using the formula **R = U/I**

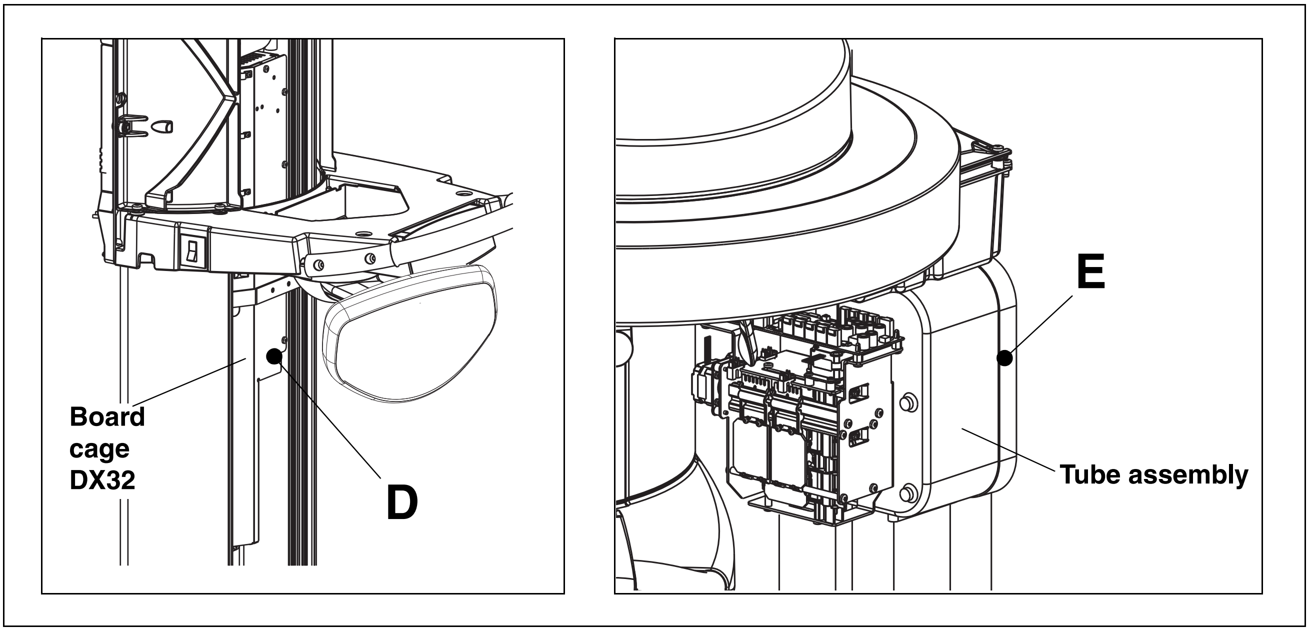
Measuring point A: Central ground wire



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


B
PE
Power cable
A
CDR PanElite
Second protective ground wire
C
B
C
B
C
Power cable to the CDR PanElite
Second Protective ground wire
Power cable to the CDR PanElite
Second Protective ground wire

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



NOTE

If the resistance exceeds the value specified in the adjacent table, check whether the protective ground wire is fastened according to specifications:

- *Check whether the flat washer, toothed lock washer and cable lug are fitted on the protective ground wire in the right order (see page 7-32) and whether the nuts of the ground wire connections are tightened securely.*

If the ground wire is not fastened according to specifications, fasten the ground wire properly.(see page 7-32).

Do not connect the power cable and the second ground wire to the building installation yet, but perform a measurement of the device leakage current first (see section 7.14).

7.14 Checking the device leakage current

DANGER

Shock hazard! It is essential that you switch the X-ray unit OFF before replacing any components!

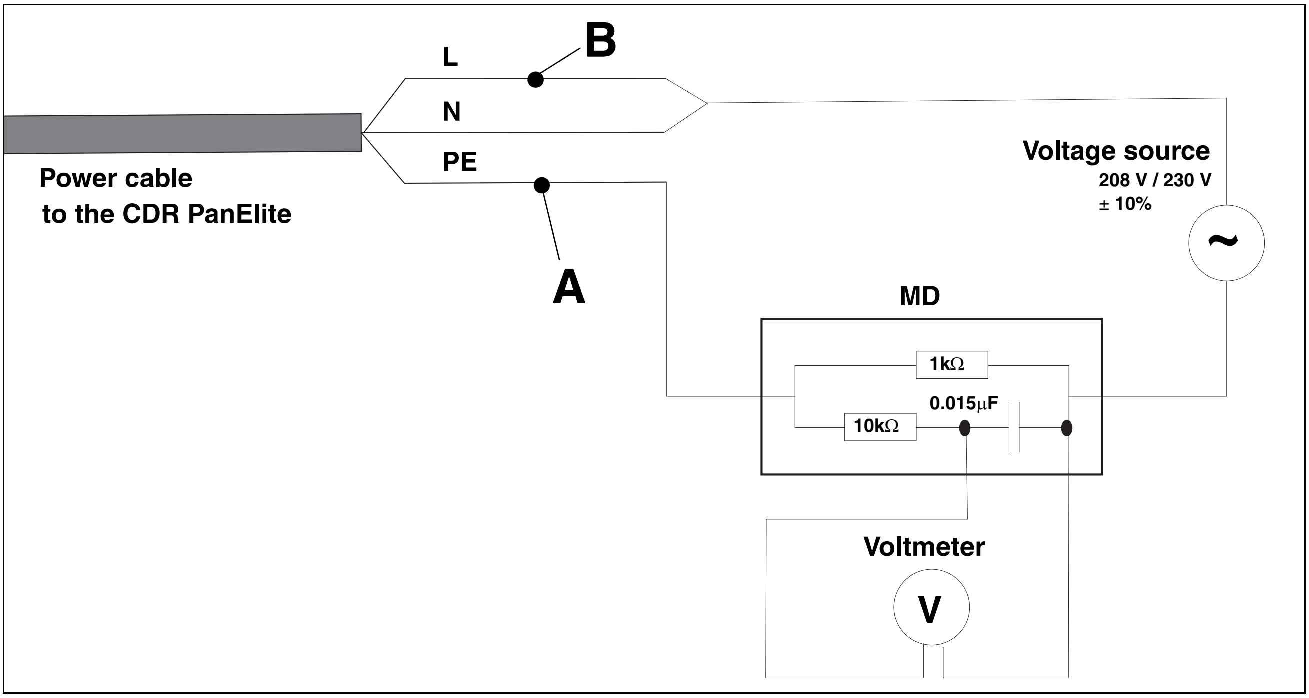
NOTE

A high resistance measuring voltage source at line frequency and a measuring circuit compliant with the requirements of IEC 601 are required.
Complete test units, e.g. the "Bender tester", fulfill these requirements.

If you have not done it already...

- Switch **OFF** the line voltage at the main switch of the building installation.
- Disconnect the power cable and the second protective ground wire from the building installation.
- Remove the following cover parts (see section 1.11):
  - Profile cover (10)

Measuring setup for testing the device leakage current



- Check whether the power switch of the unit is turned **ON**.
- Connect a high-resistance measuring voltage source between the short-circuited power cable **(B)** and ground wire **A**.
- Measure the voltage drop across **MD**.

NOTE

*The measured value must not exceed **5 mA**.*

If the leakage current is not OK, perform troubleshooting according to section 3.6.

- Reconnect the unit to the building installation (see the Installation Instructions for the CDR PanElite).

Service Manual History D 3352

Version 1:	Software version V02.30
Version 2:	Software version V02.31
Version 3:	In Chapter 6, "Repair", sections "Replacing the light barriers" and "Replacing cables in cable tracks" were changed and corrections were made in Chapter 3, "Troubleshooting"
Version 4:	Software version V02.32

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