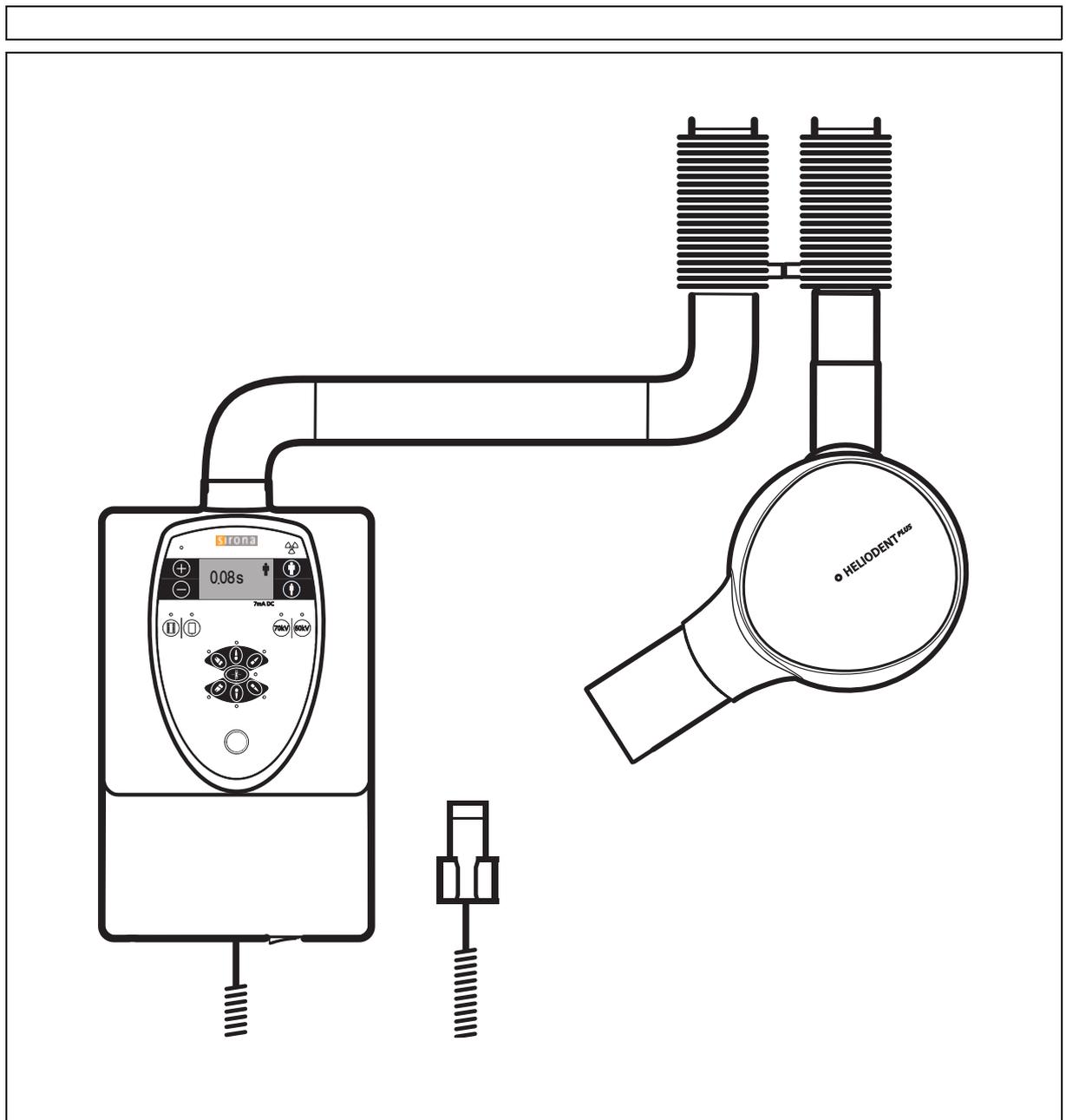


# HELIODENT<sup>PLUS</sup>

## Maintenance Instructions



## ATTENTION!

Adequate lead proofing of room and operator position is essential.

Since these requirements vary from state to state it is the assembler's / installer's responsibility that all local radiation safety requirements are met.

---

**General**

In order to ensure in compliance with the DHHS requirements the **HELIODENT<sup>PLUS</sup>** must be maintained annually following date of installation. It is the responsibility of the user to ensure that the equipment is maintained in accordance with the manufacturer's recommended **Maintenance Instructions** to ensure compliance with the Federal Performance Standard.

The manufacturer and the assembler/installer are not responsible for disturbances in operation when the equipment is not used in accordance with the operating instructions.

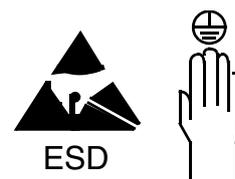
The maintenance inspection and consequent service must be accomplished by a skilled technician. Neither the inspection nor service is part of the equipment warranty.

**Technical instructions required**

Operating Instructions and Service Manual

**Instruments required**

1. Digital multimeter model FLUKE 87 V, or equivalent  
 Accuracy: AC voltage ± 0.5% of reading plus 1 digit  
 DC voltage ± 0.1% of reading plus 2 digits  
 DC current ± 0.3% of reading plus 1 digit
2. Digital Dosimeter,  
 Model PTW Diados, Nomex or Unfors mult-o-meter



**CAUTION RADIATION**

Observe radiation protection guidelines as outlined in the Operating Instructions!

**CAUTION Technician!**

PC-boards are fitted with electronic components sensitive to electrostatic discharge (ESD). Electrostatic discharge is unavoidable due to friction of clothing, carpeting etc.



**ATTENTION**

**To prevent damage of electronic components do not touch same.**  
**Discharge your electrostatic energy by touching a grounded point.**

Always handle circuit boards by the edge of same.

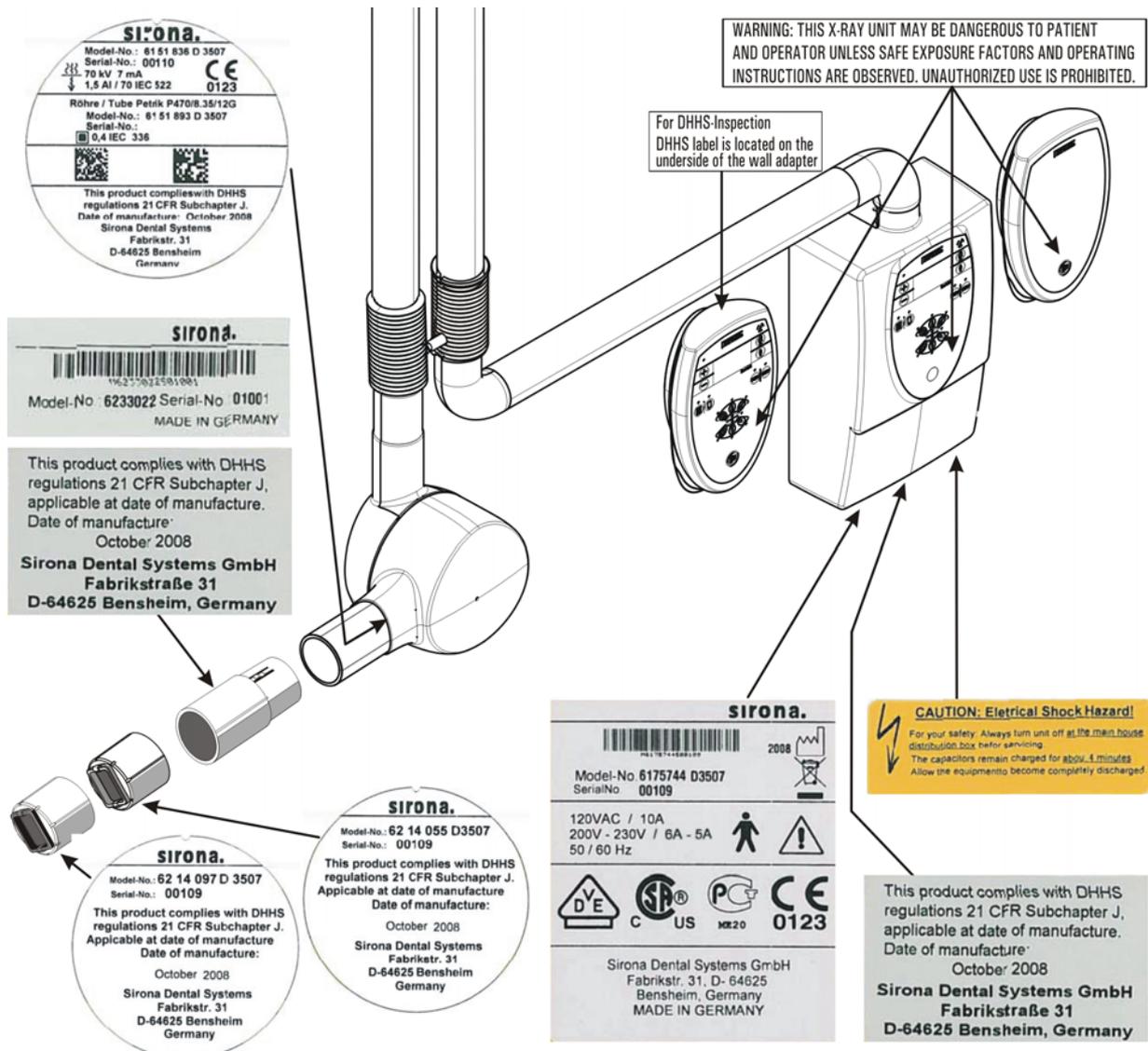


**ATTENTION**

**WARNING: Electrical shock hazard!**

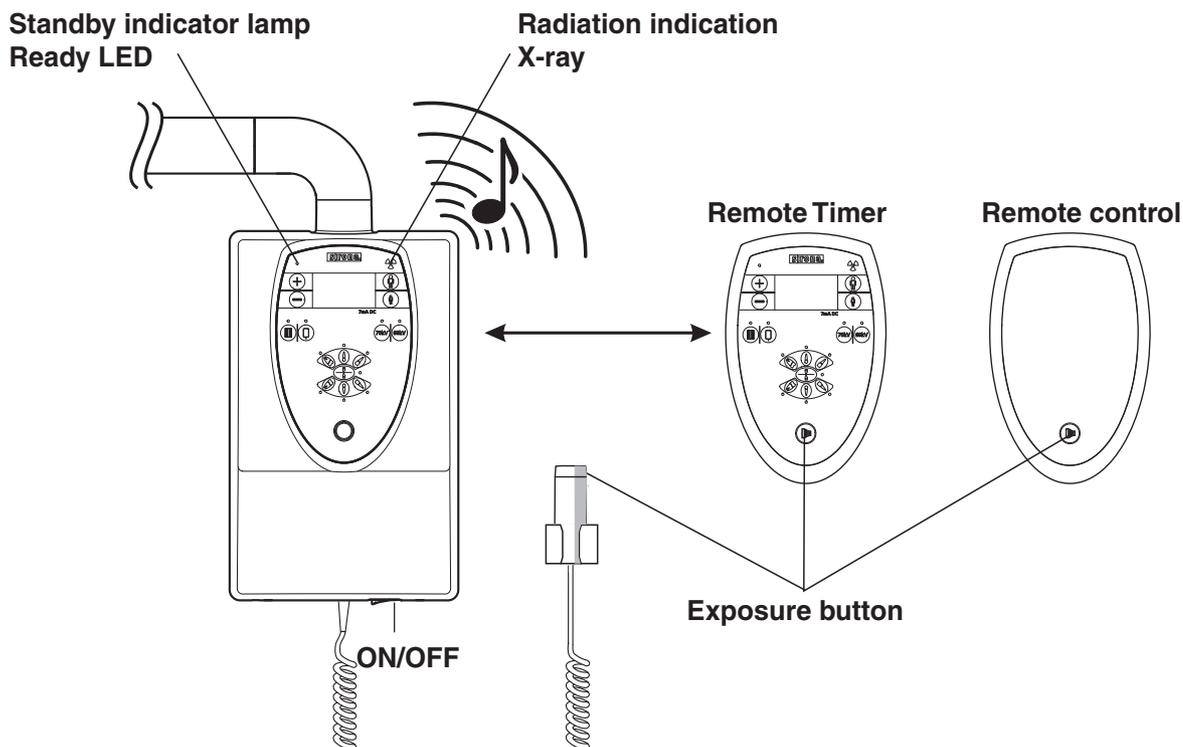
**List of Contents**

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General .....	3
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Light Indicators at the Display, Audible Sound at the Wall Adapter. ....	5
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## Visual Check

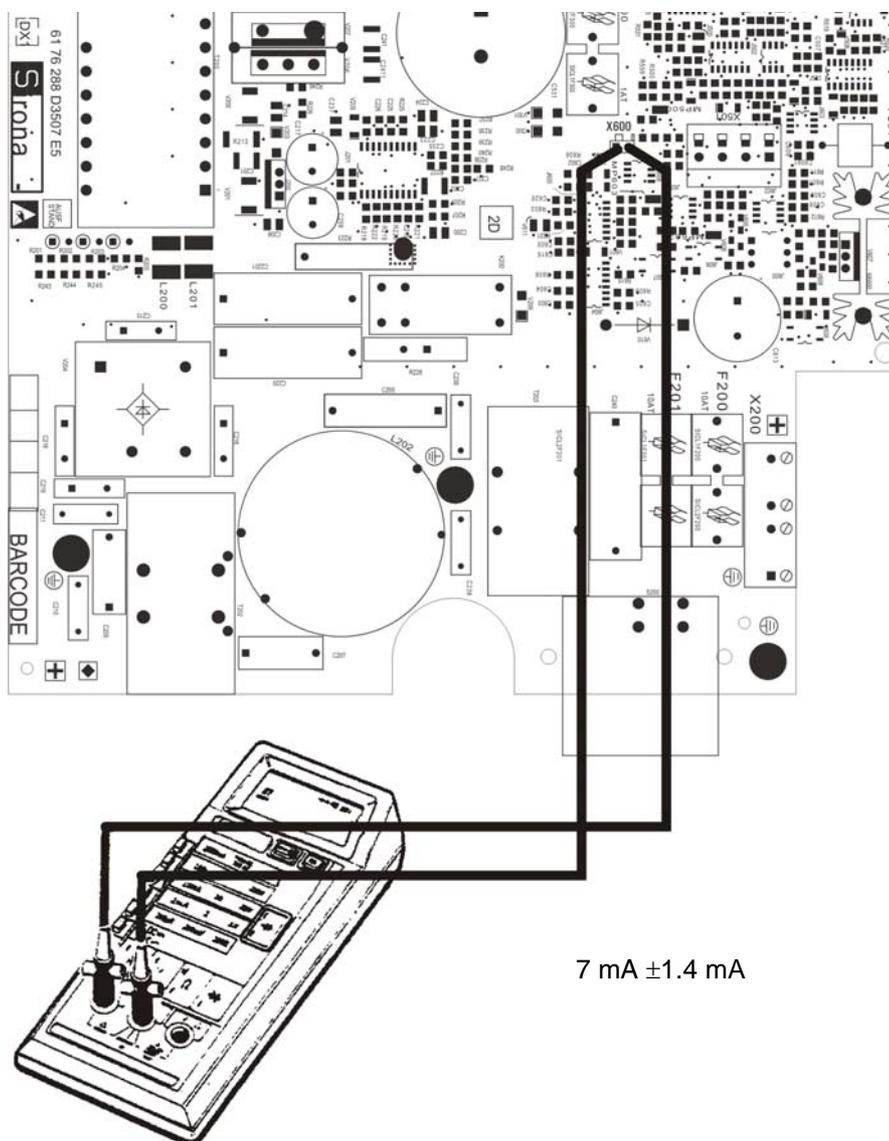
- Look for mechanical damage, possibly affecting radiation safety.
- Inspect cone for possible cracks.
- Check the mechanical functions.  
Test the tubehead in all working positions for possible drift.
- Verify that all labels are affixed and legible.  
Defaced labels must be replaced.  
To order the above, write to Sirona Dental Systems (address, see rear) giving details on:  
Customer Name  
Customer Address  
All Model Numbers with  
Serial Numbers still legible on the unit for identification purposes.  
For serial numbers see also **Installation Report / Warranty Passport.**



**ATTENTION RADIATION**  
**Observe**  
**Radiation Protection Guidelines.**  
 See **Operating Instructions.**

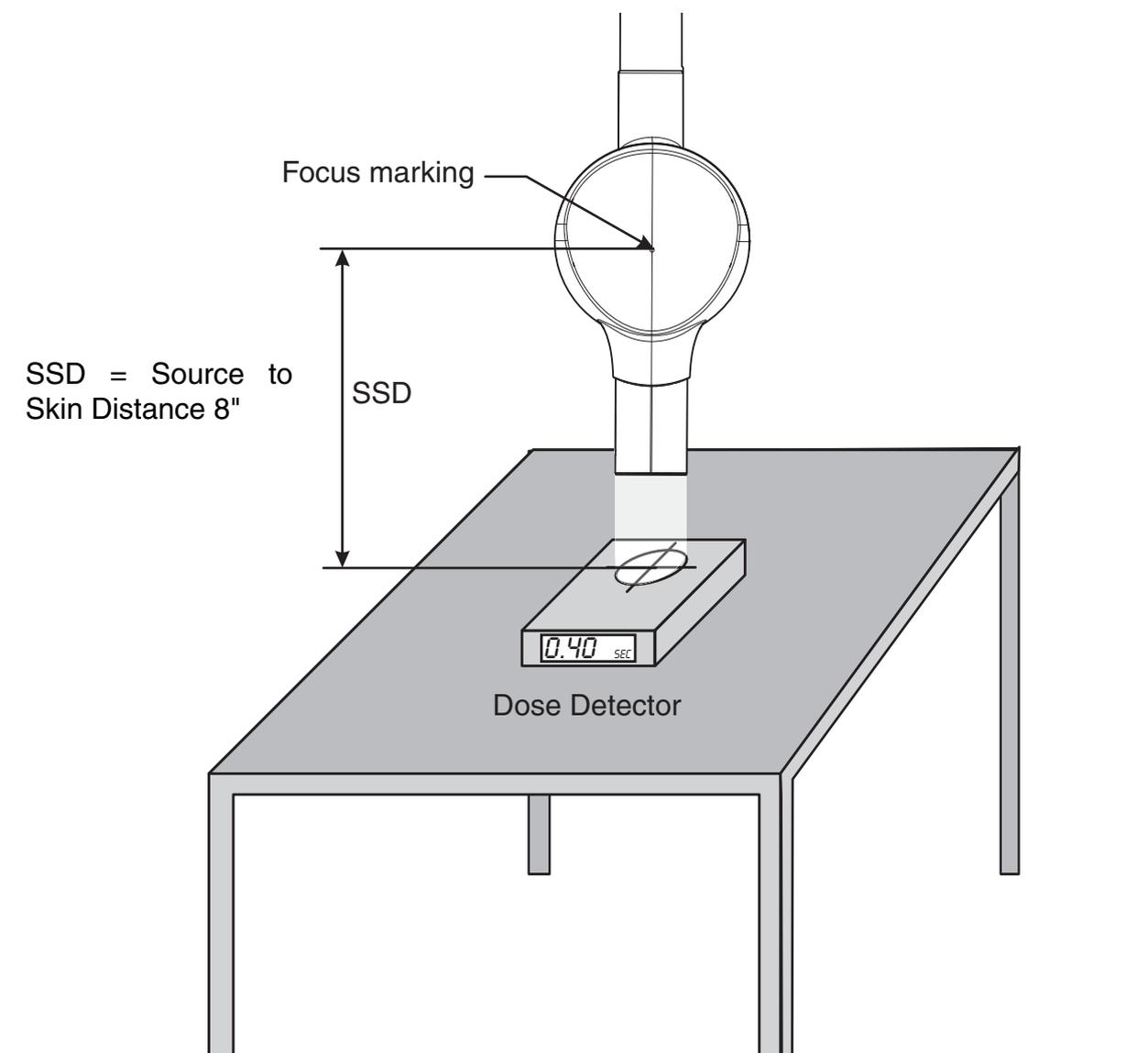
### Light Indicators at the Display, Audible Sound at the Wall Adapter.

- Switch unit **ON** with master power switch. The stored exposure data must light up on the display, see **Operating Instructions** under "**Preparing the exposure**".
- Make an exposure:
  - Set the exposure time to **1.00 s** for conventional radiography technique.
  - **CAUTION RADIATION:** Depress the exposure button and hold until the exposure terminates automatically. The radiation indication X-ray must light up during the exposure period. Also the backlight colour of the display must change into yellow. Simultaneously an **audible beep** must sound at the wall adapter. In operation with remote control, the wall adapter and the remote control must imitate an **audible beep**. The display backlight colour will change automatically from white into blue, when the cooling down time has finished. Also the value of the imitate X-ray dose will vanish from the display.
- Interrupt an exposure – deadman feature:
  - Set the exposure time to 3.2s.
  - **CAUTION RADIATION:** Press the exposure button until **X-ray** lights up and subsequently release – the exposure must terminate immediately. The exposure time which had really happen blinks. It can diversify an depends on the time how long the exposure button was pressed. Press any key on the front panel to return to the automatic cooling down process on the display.
- Defective light indicators constitute a safety hazard to the patient as well as to the operator.  
**CAUTION:** The user is not permitted to use the unit until light indicators have been replaced!



## Tube Current Verification

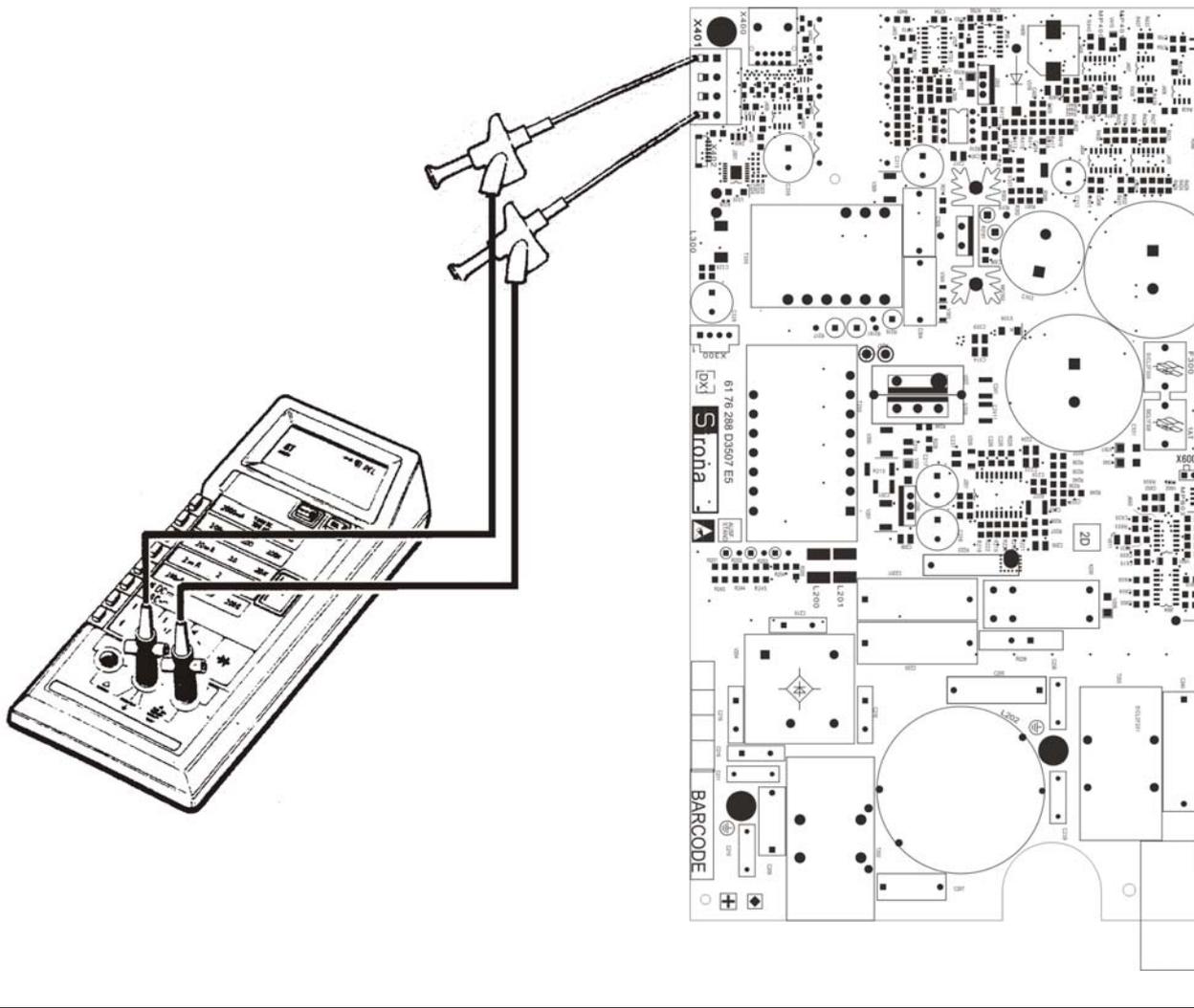
- Turn unit OFF and remove housing (see **Service Manual!**).
- Connect multimeter to X600, range 10mADC.
- Turn unit ON. (**WARNING: Electrical shock hazard!**)
- Set the exposure time on the control panel to 3.2s, using the + or - button (conventional radiography technique).
- CAUTION RADIATION: Make an exposure.
- The reading should be **7mADC ±1.4 mA. Record reading.**
- If specified value is obtained **turn unit OFF.**
- Remove meter leads!
  - If specified value cannot be obtained, see Service Manual, chapter "Tube Current Verification".



## Exposure Time Verification and kV-Verification

(conventional radiography technique)

- For testing the exposure times a Digital Dosimeter is required (PTW Diados).
- Place the Dose Detector in a distance of 8" in front of the Tube Head.
- Switch unit ON.
- **CAUTION RADIATION!** Make an exposure with:  
Voltage: 60 kV  
Exposure time: 0.4 sec
- The reading should be **0.4 sec  $\pm$ 0.04 sec.**  
**kV = 60kV  $\pm$ 6kV.** Record reading
- Switch unit OFF
- If the measured Radiation Time is not within specified tolerance, see Service Manual, chapter "**Exposure Time Verification**".
- If the measured kV Verification is not within specified tolerance, see Service Manual, chapter "**kV Verification**".

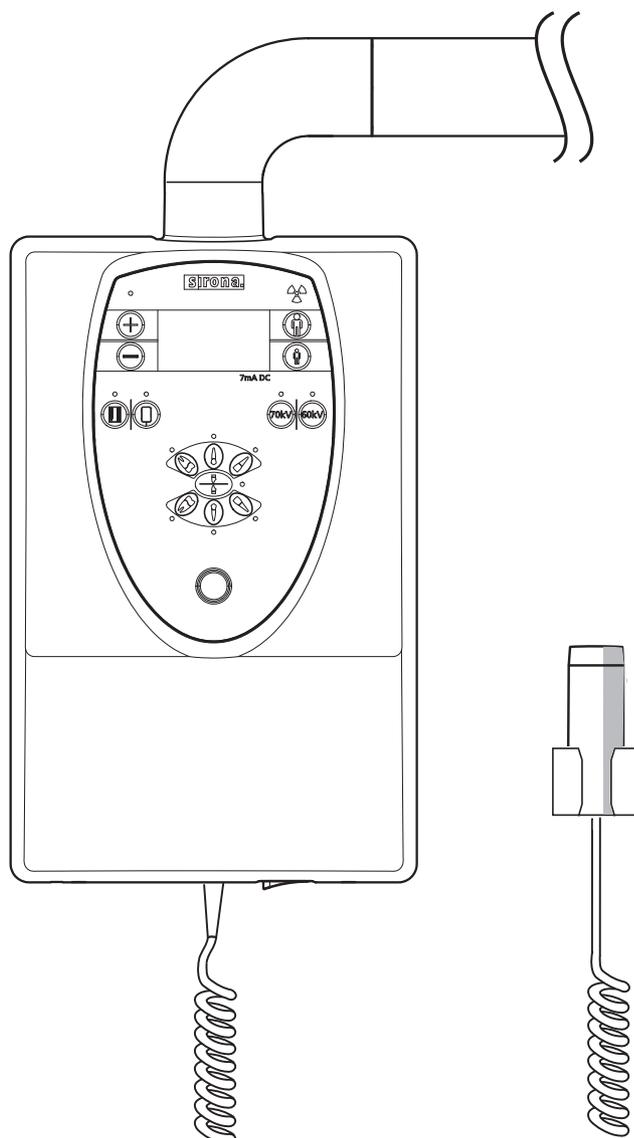


## Verification of the Exposure Button

- If door contacts are installed, close door (close contacts), do not bridge contacts.
- Turn unit OFF (WARNING: Electrical shock hazard!)
- Connect multimeter in range for measuring resistance to:
  - DX1 X401.1 and 4**, when door contacts **are not** used.
  - DX1 X401.1 and 2**, when door contacts **is** used
- Measure resistance:
  - Exposure button not depressed: **R > 10 kOhm**
  - Exposure button depressed: **R < 100 Ohm**

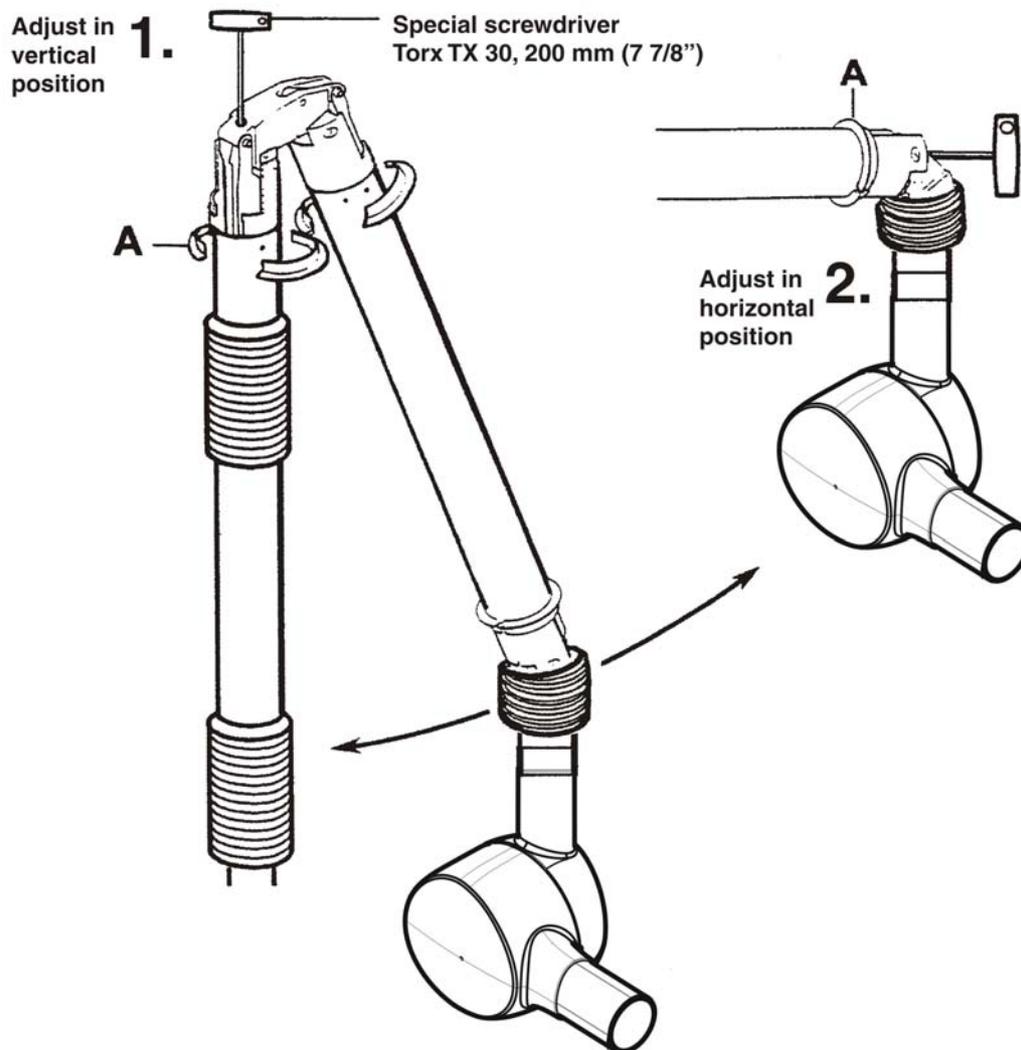
The values must remain constant, even if the coiled cable is moved during the measurement.

  - If the values are not present, check correct function of the door contacts.
- If the values are still not present, exchange exposure button.
- Disconnect multimeter.
- Reattach housing (see Service Manual, chapter "**Removing Housing**")



### Verification of the keys

- Press all the keys one after the other, checking whether the LEDs above the keys go on and off and whether the radiation times change.



## Mechanical Adjustments (if required)

Readjustment is necessary, if the tubehead does not remain stationary after being positioned.

1. Adjust spring on left support arm:
  - Slip bellows on both sides over the half shells **A**. Pull the half shells off.
  - Pull the scissors arm apart and push bellows over the bearing. Set both support arms vertical.
  - Insert torx screwdriver from above into the bore of the bearing and adjust the spring (turn clockwise → tighter).
  - Complete again in reverse order.
2. Adjust spring on right support arm:
  - Slip bellows over the upper half shell **A**. Press the bellows down.
  - Bring support arm into horizontal position.
  - Insert torx screwdriver from the front into the bore of the bearing and adjust the spring (turn clockwise → tighter).
  - Complete again in reverse order.

## Yearly Maintenance Checklist

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Customer: \_\_\_\_\_ Address: \_\_\_\_\_

Dealer: \_\_\_\_\_ Address: \_\_\_\_\_

Date of original installation: \_\_\_\_\_ Date of inspection: \_\_\_\_\_

Report of Assembly FD 2579 # \_\_\_\_\_

SCHEDULE	Yes	No	Remarks
All manuals are present	<input type="checkbox"/>	<input type="checkbox"/>	
Test instruments as required	<input type="checkbox"/>	<input type="checkbox"/>	

	Manufacturer	Model	Accuracy	Last calibrated
Voltmeter				
mA meter				
Exposure Time				

Any mechanical damage noticed	<input type="checkbox"/>	<input type="checkbox"/>	
All labels are present and legible	<input type="checkbox"/>	<input type="checkbox"/>	
All indicator lights are O.K.	<input type="checkbox"/>	<input type="checkbox"/>	
Radiation indicator <b>X-ray</b> lights up, audible buzzer O.K.	<input type="checkbox"/>	<input type="checkbox"/>	
Deadman feature O.K.	<input type="checkbox"/>	<input type="checkbox"/>	
Tube current is within specified limits	<input type="checkbox"/>	<input type="checkbox"/>	Measurement: . . . . mA
Specified exposure time O.K.	<input type="checkbox"/>	<input type="checkbox"/>	Measurement: . . . . sec
Specified kV Value is O.K.	<input type="checkbox"/>	<input type="checkbox"/>	Measurement: . . . . kV
Exposure button O.K. Resistance within specified limits	<input type="checkbox"/>	<input type="checkbox"/>	
All keys O.K.	<input type="checkbox"/>	<input type="checkbox"/>	
Mechanical adjustment of the support arm is O.K.	<input type="checkbox"/>	<input type="checkbox"/>	
The unit is in compliance with MFG specified tests and safety	<input type="checkbox"/>	<input type="checkbox"/>	

Technician: \_\_\_\_\_ Dealer: \_\_\_\_\_

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Technician: \_\_\_\_\_ Dealer: \_\_\_\_\_

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

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USA

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