RaySafe ThinX RAD is intended for measurements on radiography, dental intraoral and CBCT machines. The instrument is always on, triggered by radiation. You don’t need any correction tables, since the active compensation feature automatically applies corrections for variation in beam filtration.

BATTERY REPLACEMENT
Replace the battery if the yellow LED is blinking, or if the start-up screen shows after X-ray exposure.

1. Remove the battery cover.
2. Replace the battery (CR2450).
3. Put the cover back. The instrument is ready to use.

CLEANING
Use a damp cloth for cleaning.

INSTRUMENT VERSIONS
This manual is valid for 1302024-A, 1302025-A and 1302026-A.

Position RaySafe ThinX with the sensor area centered in the X-ray field.

Expose.

Read the values on the display.

If the detected waveform is pulsed, the number of pulses will automatically be displayed.
### SPECIFICATIONS

**GENERAL**  
EMC tested according to EN 60000-6-1:2007 and EN 60000-6-3:2007.

- **Dimension:** 108x45x13 mm  
  (4.3x1.8x0.5 in)
- **Weight:** 70 g (2.5 oz)
- **Display:** 128x64 pixels LCD
- **Power on:** auto, radiation triggered
- **Power off:** 150 s after exposure
- **Battery:** 3V, CR2450
- **Trig level:** 0.1 mGy/s (0.7 R/min)

### DOSE

- **Range:** 20 µGy – 999 mGy  
  (2.3 mR – 114 R)
- **Minimum dose at 50 kV:** 100 µGy (1.1 mR)
- **Resolution:** 1 µGy (0.1 mR)
- **Uncertainty:** 5 %

### DOSE RATE

- **Range:** 0.1 mGy/s – 100 mGy/s  
  (0.7 R/min – 685 R/min)
- **Minimum dose rate at 50 kV:** 0.5 mGy/s (3.4 R/min)
- **Resolution:** 0.01 mGy/s (0.1 R/min)
- **Uncertainty:** 5 %

### KVP

- **Range:** 45 – 150 kVp
- **Resolution:** 0.5 kVp
- **Uncertainty:** 3 %

### HVL

- **Range:** 1.0 – 10.0 mm Al
- **Resolution:** 0.1 mm Al
- **Uncertainty:** 10 % or 0.2 mm Al

### EXPOSURE TIME

- **Range:** 10 ms – 10 s
- **Resolution:** 1 ms
- **Uncertainty:** 0.5 %
- **Bandwidth:** 0.5 kHz

### PULSES

- **Number of pulses:** 3–999
- **Resolution:** 1 pulse
- **Uncertainty:** 1 pulse

### ACTIVE COMPENSATION

- **1.5 mm Al – 0.5 mm Cu total filtration** for 45 – 125 kV.
- **2.5 mm Al – 10 mm Al total filtration** for 125 – 150 kV.

1) When measuring on an AMX4 or AMX4+, multiply the displayed kVp value with 1.055 to get the correct kVp.

### Bandwidth: 0.5 kHz

### PULSES

- **Number of pulses:** 3–999
- **Resolution:** 1 pulse
- **Uncertainty:** 1 pulse

### ACTIVE COMPENSATION

- **1.5 mm Al – 0.5 mm Cu total filtration** for 45 – 125 kV.
- **2.5 mm Al – 10 mm Al total filtration** for 125 – 150 kV.

1) When measuring on an AMX4 or AMX4+, multiply the displayed kVp value with 1.055 to get the correct kVp.

### Time

- **Range:** 10 ms – 10 s
- **Resolution:** 1 ms
- **Uncertainty:** 0.5 %

### Number of pulses

- **Dose < 20 µGy (2.3 mR) Increase dose.**
- **Dose > 999 mGy (114 R) Decrease dose.**
- **Dose rate < 0.1 mGy/s (0.7 R/min) Increase the dose rate.**
- **Dose rate > 100 mGy/s (685 R/min) Decrease the dose rate.**
- **Number of pulses < 3 Decrease the number of pulses.**
- **Number of pulses > 999 Decrease the number of pulses.**

### Defining Parameters

- **Exposure time:** measured from start trig until the signal drops below 25% of max (HF/DC), or from the first pulse that has a peak above 25% of max until the last time the signal drops below 25% of max (AC).
- **All recorded samples are used to calculate dose and HVL.**
- **Dose rate is (dose)/(exposure time).**
- **kVp is calculated from 5 ms after trig until the signal drops below 75% of peak (HF/DC), or from pulses with a peak signal level above 75% of maximum (AC).**

### LED Indication

RaySafeThinX RAD has three LED:s. Normal state is an idle blink every fourth second.

- **Green**  
  - Idle blink: The instrument is ready to use.
  - Intense blink: An exposure has been recorded.
- **Yellow**  
  - Idle blink: Replace the battery. No further measurements are allowed.
  - Intense blink: An error has occurred. See details on display.
- **Red**  
  - Idle blink: The instrument is ready to use.
  - Intense blink: An exposure has been recorded.

**Battery low, 100 exposures left.**  
Replace the battery.

**Battery low. Replace battery.**  
Replace the battery immediately. No further measurements allowed.

**Instrument error**  
Please write down the error code and contact support (technicalsupport@raysafe.com).

### Display Messages

<table>
<thead>
<tr>
<th>Exposure error message</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low signal</td>
<td>Increase dose, dose rate or kV.</td>
</tr>
<tr>
<td>High signal</td>
<td>Decrease dose, dose rate or kV.</td>
</tr>
<tr>
<td>Radiation during calculation</td>
<td>Wait longer between exposures or make the time between pulses shorter than 375 ms.</td>
</tr>
<tr>
<td>Total filtration &lt; specification</td>
<td>Decrease the amount of filtration.</td>
</tr>
<tr>
<td>Time &lt; 10 ms</td>
<td>Increase exposure time.</td>
</tr>
<tr>
<td>Time &gt; 10 s</td>
<td>Decrease exposure time.</td>
</tr>
<tr>
<td>Dose &lt; 20 μGy (2.3 mR)</td>
<td>Increase dose.</td>
</tr>
<tr>
<td>Dose &gt; 999 mGy (114 R)</td>
<td>Decrease dose.</td>
</tr>
<tr>
<td>Dose rate &lt; 0.1 mGy/s (0.7 R/min)</td>
<td>Increase the dose rate.</td>
</tr>
<tr>
<td>Dose rate &gt; 100 mGy/s (685 R/min)</td>
<td>Decrease the dose rate.</td>
</tr>
<tr>
<td>Number of pulses &lt; 3 for kVp</td>
<td>Increase the number of pulses to make an AC kVp calculation.</td>
</tr>
<tr>
<td>kVp &lt; 45 kVp</td>
<td>Increase kVp.</td>
</tr>
<tr>
<td>kVp &gt; 150 kVp</td>
<td>Decrease kVp.</td>
</tr>
<tr>
<td>Number of pulses &gt; 999</td>
<td>Decrease the number of pulses.</td>
</tr>
</tbody>
</table>