

RaySafe ThinX

An easy tool for fast results



Elsophilips Service
Jilemnického 2; 911 01 Trenčín
tel: +421 32 6582410
fax: +421 32 6582592
email: elso@elso.sk
web: www.elso.sk





RaySafe ThinX

The RaySafe ThinX has been designed to meet the need for a basic multi-parameter instrument for simultaneous measurement of dose, dose rate, kVp, HVL, time and pulses. All parameters can be continually viewed in the convenient LCD display.

AN EASY-TO-USE INSTRUMENT

The RaySafe ThinX is an easy-to-use instrument thanks to its fully automatic user interface. There is no need to adjust settings, set-up or range selection, as the RaySafe ThinX works all automatically. As soon as radiation is detected the instrument switches itself on by using the automatic on/off function.

With a long battery lifetime of more than 1 year, no maintenance is needed.

ACTIVE COMPENSATION

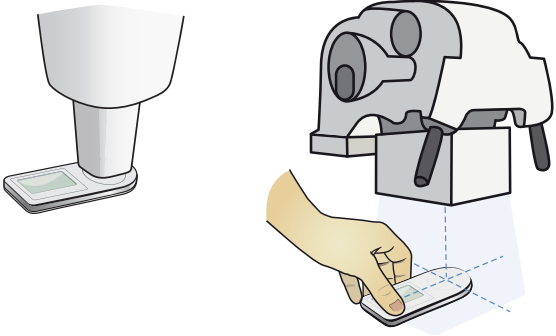
Thanks to the RaySafe Active Compensation technology, no further corrections are required regarding variations in beam filtration to both kVp and dose measurements.

Multiple sensors and advanced calculations automatically determine the beam quality, thereby eliminating the need for further corrections of measured kVp and dose values. The solid state sensor technology enables maximum accuracy whilst making measurements as effortless as possible.

HOW IT WORKS

Simply position the meter under the X-ray beam and make an exposure. The display shows all measured values.

1. POSITION INTRA / POSITION RAD



2. EXPOSE



3. READ OUT

1.84 mGy	4.59 $\frac{\text{mGy}}{\text{s}}$
68.5 kVp	2.7 mmAl
	401 ms
	21 pulses

SPECIFICATIONS

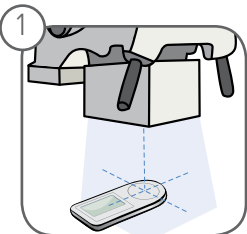
EMC TESTED	According to EN 61000-6-1:2007 and EN 61000-6-3:2007
EXPOSURE NEEDED	One
POWER ON	Auto, radiation triggered
POWER OFF	Automatic after 2.5 min of inactivity
RESET	Automatic
BATTERY	3V, CR 2450
BATTERY LIFE	2 years of typical use
READ OUT	128 x 64 pixel LCD
TRIG LEVEL	0.1 Gy/s (0.7 R/min)
SIZE (H x W x L)	13 x 45 x 108 mm (0.5 x 1.8 x 4.3 in)
WEIGHT	< 70 g (2.5 oz)
kVp	
RANGE (RAD)	45 – 150 kVp
RANGE (INTRA)	45 – 100 kVp
RESOLUTION	0.5 kVp
UNCERTAINTY	3%
DOSE	
RANGE	20 µGy – 999 mGy at >70 kV (2.3 mR–114 R) Minimum dose at 50 kV is 100 µGy (11.4 mR)
RESOLUTION	1 µGy (0.1 mR)
UNCERTAINTY	5%

MODEL	PARAMETERS
RaySafe ThinX Intra	Dose, rate, kVp, HVL, time, pulses
RaySafe ThinX RAD	Dose, rate, kVp, HVL, time, pulses
RaySafe ThinX RAD kVp	kVp, time, pulses
RaySafe ThinX RAD Dose	Dose, rate, HVL, time, pulses

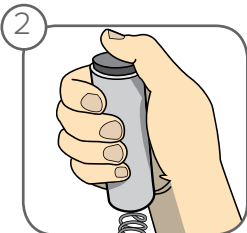
DOSE RATE	
RANGE	0.1 mGy/s – 100 mGy/s at >70 kV (0.7 R/min–685 R/min) Minimum dose rate at 50 kV is 0.5 mGy/s (3.4 R/min)
RESOLUTION	0.01 mGy/s (0.1 R/min)
UNCERTAINTY	5%
HVL	
RANGE	1.0 – 10.0 mm Al
RESOLUTION	0.1 mm Al
UNCERTAINTY	10% or 0.2 mm Al
EXPOSURE TIME	
RANGE	10 ms – 10 s
UNCERTAINTY	0.5%
RESOLUTION	1 ms
BANDWIDTH	0.5 kHz
PULSES ⁽¹⁾	
PULSES	3–999 pulses, max 375 ms dead time between pulses.
UNCERTAINTY	1 pulse
ACTIVE COMPENSATION	
RANGE (RAD)	1.5 mm Al – 0.5 mm Cu total filtration 45-125 kVp 2.5 – 10 mm Al total filtration 125-150 kVp
RANGE (INTRA)	1.5 – 10 mm Al total filtration 45-100 kVp

⁽¹⁾ If the X-ray generator waveform is pulsed the instrument will also automatically display pulses.

RaySafe ThinX measures X-ray radiation. 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.



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



Expose.



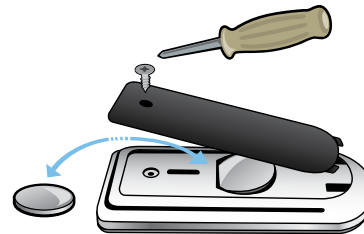
Read the values on the display.

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

BATTERY REPLACEMENT

When the yellow LED is blinking, please replace the battery:

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.

SUPPORT

Do not hesitate to contact Unfors RaySafe for support:

Technical support

+49 731 175 492-20
technicalsupport@raysafe.com

Service

+46 31 719 97 10
customerservice.se@raysafe.com

RaySafe ThinX RAD



SPECIFICATIONS

GENERAL
EMC tested according to EN 61000-6-1:2007 and EN 61000-6-3:2007.
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) at > 70 kV
Minimum dose at 50 kV: 100 µGy (11.4 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) at > 70 kV

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 %

Note! If any parameter is out of range, no measurement results will be shown.

KVP¹⁾
Range: 45 – 150 kVp
Resolution: 0.5 kVp
Uncertainty: 3 %
HVL
Range: 1.0 – 10.0 mm Al
Resolution: 0.1 mmAl
Uncertainty: 10 % or 0.2 mm Al

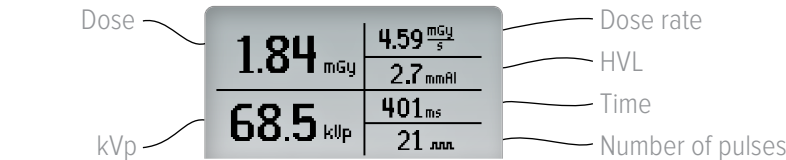
EXPOSURE TIME
Range: 10 ms – 10 s
Resolution: 1 ms
Uncertainty: 0.5 %
Bandwidth: 0.5 kHz

PULSES
Number of pulses: 3–999 (Max 375 ms dead time between pulses.)
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.

PARAMETERS



Instrument model	Dose	kVp	Dose rate	HVL	Time	Pulses
RAD	●	●	●	●	●	●
RAD kVp		●			●	●
RAD Dose	●		●	●	●	●

DEFINITIONS

Exposure time is 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

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

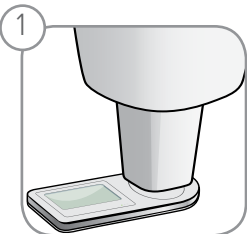
• Green	Idle blink: The instrument is ready to use.
	Intense blink: An exposure has been recorded..
• Yellow	Replace the battery. 100 exposures left.
• Red	Idle blink: Replace the battery. No further measurements are allowed.
	Intense blink: An error has occurred. See details on display.

DISPLAY MESSAGES

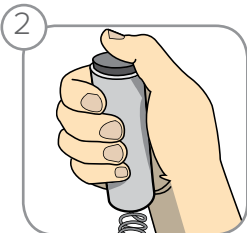
Exposure error message	Action
Low signal	Increase dose, dose rate or kV.
High signal	Decrease dose, dose rate or kV.
Radiation during calculation	Wait longer between exposures or make the time between pulses shorter than 375 ms.
Total filtration > specification	Decrease the amount of filtration.
Time < 10 ms	Increase exposure time.
Time > 10 s	Decrease exposure time.
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 for kVp	Increase the number of pulses to make an AC kVp calculation.
kVp < 45 kVp	Increase kVp.
kVp > 150 kVp	Decrease kVp.
Number of pulses > 999	Decrease the number of pulses.

Information message	Action
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 (contact information on back side of this manual).

RaySafe ThinX measures X-ray radiation. 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.



1 Position RaySafe ThinX on a flat surface. Position the collimator of the X-ray machine close to the sensor area.



2 Expose.



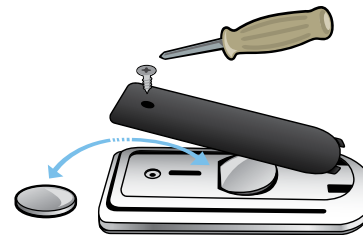
3 Read the values on the display.

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

BATTERY REPLACEMENT

When the yellow LED is blinking, please replace the battery:

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 1302023-A.

SUPPORT

Do not hesitate to contact Unfors RaySafe for support:

Technical support

+49 731 175 492-20
technicalsupport@raysafe.com

Service

+46 31 719 97 10
customerservice.se@raysafe.com

RaySafe ThinX Intra



SPECIFICATIONS

GENERAL
EMC tested according to EN 61000-6-1:2007 and EN 61000-6-3:2007.
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: 0.1m Gy/s (0.7 R/min)

DOSE
Range: 20 µGy – 999 mGy (2.3 mR – 114 R) at > 70 kV

Minimum dose at 50 kV: 100 µGy (11.4 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) at > 70 kV

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 – 100 kVp
Resolution: 0.5 kVp
Uncertainty: 3 %

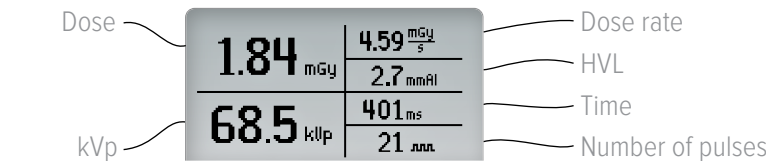
HVL
Range: 1.0 – 10.0 mm Al
Resolution: 0.1 mmAl
Uncertainty: 10% or 0.2 mm Al

EXPOSURE TIME
Range: 10 ms – 10 s
Resolution: 1 ms
Uncertainty: 0.5 %
Bandwidth: 0.5 kHz

PULSES
Number of pulses: 3–999 (Max 375 ms dead time between pulses.)
Uncertainty: 1 pulse

ACTIVE COMPENSATION
1.5 – 10 mm Al total filtration for 45 – 100 kV.

PARAMETERS



DEFINITIONS
Exposure time is 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
Unfors ThinX Intra 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	Replace the battery. 100 exposures left.
• Red	Idle blink: Replace the battery. No further measurements are allowed.
	Intense blink: An error has occurred. See details on display.

DISPLAY MESSAGES

Exposure error message	Action
Low signal	Increase dose, dose rate or kV.
High signal	Decrease dose, dose rate or kV.
Radiation during calculation	Wait longer between exposures or make the time between pulses shorter than 375 ms.
Total filtration > specification	Decrease the amount of filtration.
Time < 10 ms	Increase exposure time.
Time > 10 s	Decrease exposure time.
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 for kVp	Increase the number of pulses to make an AC kVp calculation.
kVp < 45 kVp	Increase kVp.
kVp > 100 kVp	Decrease kVp.
Number of pulses > 999	Decrease the number of pulses.

Information message	Action
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 (contact information on back side of this manual).

Note! If any parameter is out of range, no measurement results will be shown.