

RaySafe Xi Classic

Specifications



RAYSAFE Xi GENERAL

EMC TESTED	According to EN 61000-6-1:2007 and EN 61000-6-3:2007
EXPOSURE NEEDED	One
RESET	Automatic
TEMP. RANGE	15 – 35 °C (59 – 95 °F)
DETECTOR CABLE LENGTH	2 and 10 m (6.5 and 33 ft)
SOFTWARE	RaySafe Xi view for recording measured data and waveforms. RaySafe Xi view also exports data to Microsoft Excel.
DATA TRANSFER	RS-232 or Bluetooth
DATA FORMAT	XML
PATENT	Germany DE69430268.6-08, UK 0758522, Japan 3449721, Sweden 9302909-8, France 075822, USA 5761270
PTB APPROVAL	<u>23.04</u> <u>08.02</u>

RAYSAFE Xi BASE UNIT, CLASSIC

SIZE	28 x 74 x 142 mm (1.1 x 2.9 x 5.6 in)
WEIGHT	250 g (9 oz)
POWER OFF	Never, or after 5, 20 or 60 min of inactivity
POWER SOURCE	Rechargeable 7.4 V Li-ion battery
BATTERY TIME	20 – 40 hours (depending on detector and if Bluetooth is used)
READ OUT	Three row alphanumerical backlit display with four digits numerical resolution

RAYSAFE Xi mA/mAs DETECTOR

RANGE mA	0.2 – 2000 mA
UNCERTAINTY mA	1 % or ± 0.02 mA
RANGE mAs	0.05 – 9999 mAs
UNCERTAINTY mAs	1 % or ± 0.02 mAs
MAX LOAD	< 200 mA continuously, 500 mA < 1 s, 1000 mA < 0.5 s
REPRODUCIBILITY	< 0.5 %
OVER VOLTAGE PROTECTION	70 V

EXPOSURE TIME

RANGE	1 ms – 999 s
UNCERTAINTY	0.5 % or 0.2 ms

PULSE

RANGE	1 – 9999 pulses
PEAK TRIG LEVEL	> 8 mA

FRAME RATE

RANGE	1/6 – 120 frames/s
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mAs PER FRAME

RANGE	0.001 – 2000 mAs/frame
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WAVEFORM

BANDWIDTH	1 kHz
MEMORY DEPTH	1200 ms

RAYSAFE Xi R/F DETECTOR, CLASSIC

SIZE	12 x 22 x 117 mm (0.5 x 0.9 x 4.6 in)
WEIGHT	50 g (2 oz)
DOSE (R/F LOW)	
RANGE	10 nGy – 9999 Gy (1 µR – 9999 R)
TRIG LEVEL	200 nGy/s (1.4 mR/min)
UNCERTAINTY	5 % (40 – 150 kVp, HVL: 1.5 – 14 mm Al ⁽¹⁾ , Active Compensation) or ± 10 nGy (1 µR)
DOSE (R/F HIGH)	
RANGE	10 µGy – 9999 Gy (1 mR – 9999 R)
TRIG LEVEL	100 µGy/s (0.7 R/min)
UNCERTAINTY	5 % (40 – 150 kVp, HVL: 1.5 – 14 mm Al ⁽¹⁾ , Active Compensation) or ± 10 µGy (1 mR)
DOSE RATE (R/F LOW)	
RANGE	10 nGy/s – 1 mGy/s (70 µR/min – 7 R/min)
MIN. PEAK TRIG LEVEL	200 nGy/s (1.4 mR/min)
UNCERTAINTY	5 % (40 – 150 kVp, HVL: 1.5 – 14 mm Al ⁽¹⁾ , Active Compensation) or ± 10 nGy/s (70 µR/min)
DOSE RATE (R/F HIGH)	
RANGE	20 µGy/s – 1000 mGy/s ⁽²⁾ (140 mR/min – 7000 R/min)
MIN. PEAK TRIG LEVEL	100 µGy/s (0.7 R/min)
UNCERTAINTY	5 % (40 – 150 kVp, HVL: 1.5 – 14 mm Al ⁽¹⁾ , Active Compensation) or ± 10 µGy/s (70 mR/min)
kV/kVp	
RANGE	35 – 160 kV/kVp (for up to 0.5 mm Cu or equivalent)
	60 – 130 kV/kVp (for 0.5 – 1 mm Cu or equivalent)
UNCERTAINTY	2 % (for up to 0.5 mm Cu or equivalent, Active Compensation) 3 % (for 0.5 – 1 mm Cu or equivalent, Active Compensation)

SENSITIVITY (R/F LOW)	0.4 mA, 40 kV, 40 cm (15.7 in), no added filtration
SENSITIVITY (R/F HIGH)	0.8 mA, 70 kV, 50 cm (19.7 in), no added filtration
EXPOSURE TIME	
RANGE	1 ms – 999 s
UNCERTAINTY	0.5 % or 0.2 ms
PULSE	
RANGE	1 – 9999 pulses
PEAK TRIG LEVEL (R/F LOW)	> 3 µGy/s
PEAK TRIG LEVEL (R/F HIGH)	> 1 mGy/s
FRAME RATE	
RANGE	1/6 – 120 frames/s
DOSE PER FRAME	
RANGE	1.0 nGy – 9999 Gy (0.10 µR – 9999 R) per frame
HVL	
RANGE	1.0 – 14.0 mm Al
UNCERTAINTY	10 % (at signal levels above 1/1000 of max dose rate for selected sensor)
TOTAL FILTRATION	
RANGE	1.5 – 35 mm Al (60 – 120 kV)
UNCERTAINTY	10 % or ±0.3 mm Al (at signal levels above 1/1000 of max dose rate for selected sensor)
WAVEFORM	
BANDWIDTH (R/F LOW)	0.1 kHz
BANDWIDTH (R/F HIGH)	2.5 kHz
MEMORY DEPTH	1 200 ms

⁽¹⁾ 45 mm Al added filtration at 145 kVp gives a HVL of ~13 mm Al.

⁽²⁾ 1000 mGy/s up to 70 kVp, 400 mGy/s at 100 kVp, 250 mGy/s at 140 kVp.

RAYSAFE Xi MAM DETECTOR, CLASSIC

SIZE	12 x 22 x 117 mm (0.5 x 0.9 x 4.6 in)
WEIGHT	50 g (2 oz)
DOSE	
BEAM QUALITIES	Basic: Mo/Mo, Mo/Al, Mo/Rh, Rh/Rh, Rh/Al, W/Rh Options: M-Pro: W/Rh, Mo/Rh, W/Ag M-Pro Plus: W/Rh, Mo/Rh, W/Ag, W/Al, Combo Scanning: W/Al
RANGE	5 µGy – 9999 Gy (0.5 mR – 9999 R)
TRIG LEVEL	10 µGy/s (70 mR/min)
UNCERTAINTY	5 % or ± 5 µGy (0.5 mR) (20 – 40 kV: Mo/Mo 22 – 49 kV: Mo/Al, Rh/Rh, Rh/Al 22 – 40 kV: Mo/Rh, W/Rh, W/Ag, 20 – 49 kV: W/Al, Combo 0 – 2.5 mm Al added filtration, Active Compensation Combo: 0-0.1 mm Al added filtration, Active Compensation)
UNCERTAINTY (W/AL SCANNING)	5 % or ± 5 µGy (0.5 mR) (22 – 40 kV, 0.5 mm Al total filtration)
DOSE RATE	
RANGE	10 µGy/s – 100 mGy/s (70 mR/min – 700 R/min)
TRIG LEVEL	10 µGy/s (70 mR/min)
UNCERTAINTY	5 % or ± 5 µGy/s (35 mR/min) (20 – 40 kV: Mo/Mo 22 – 49 kV: Mo/Al, Rh/Rh, Rh/Al 22 – 40 kV: Mo/Rh, W/Rh, W/Ag, 20 – 49 kV: W/Al, Combo 0 – 2.5 mm Al added filtration, Active Compensation Combo: 0–0.1 mm Al added filtration, Active Compensation)
UNCERTAINTY (W/AL SCANNING)	5 % or ± 5 µGy/s (35 mR/min) (22 – 40 kV, 0.5 mm Al total filtration)

kV	
BEAM QUALITIES	Basic: Mo/Mo Options:M-Pro: Mo/Rh, W/Rh M-Pro Plus: Mo/Rh, W/Rh, W/Al Scanning: W/Al
RANGE (MO/MO)	20 – 40 kV
UNCERTAINTY (MO/MO)	2 % or 0.5 kV (no paddle) 2 % or 0.7 kV (paddle) (Active Compensation for inherent Mo filtration of 25 – 35 µm. User selectable paddle compensation.) ⁽³⁾
RANGE (MO/RH)	25 – 40 kV
UNCERTAINTY (MO/RH)	2 % or 0.5 kV (Active Compensation for inherent Rh filtration of 25 – 30 µm.)
RANGE (W/RH)	20 – 40 kV
UNCERTAINTY (W/RH)	2 % or 0.5 kV (no paddle) 2 % or 0.7 kV (paddle) (Active Compensation for inherent Rh filtration of 50 – 60 µm. User selectable paddle compensation.) ⁽³⁾
RANGE (W/AL)	20 – 49 kV (Measuring 40 – 49 kV requires an R/F detector)
UNCERTAINTY (W/AL)	2 % or 0.5 kV (no paddle) 2 % or 0.7 kV (paddle) (Active Compensation for inherent Al filtration of 0.65–0.75 mm. User selectable paddle compensation.) ⁽³⁾
RANGE (W/AL SCANNING)	20 – 40 kV
UNCERTAINTY (W/AL SCANNING)	2 % or 0.7 kV (0.5 mm Al total filtration)
SENSITIVITY	10 mA, 28 kV, 65 cm (25.6 in), no added filtration

⁽³⁾ Definition: Paddle = 0.1 mm Al

Note! Variation in paddle thickness and homogeneity may affect kV results. To achieve the most accurate result, kV measurements without paddle is recommended.

HVL

BEAM QUALITIES	Basic: Mo/Mo, Mo/Al, Mo/Rh, Rh/Rh, Rh/Al, W/Rh Options: M-Pro: W/Rh, Mo/Rh, W/Ag M-Pro Plus: W/Rh, Mo/Rh, W/Ag, W/Al Scanning: W/Al
RANGE	0.2 – 1.2 mm Al, depending on beam quality
UNCERTAINTY	5 % (for up to 2.5 mm Al added filtration to each beam quality)
RANGE (W/AL SCANNING)	0.32 – 0.58 mm Al
UNCERTAINTY (W/AL SCANNING)	5 % (with 0.5 mm Al total filtration)
EXPOSURE TIME	
RANGE	1 ms – 999 s
UNCERTAINTY	0.5 % or 0.2 ms
WAVEFORM	
BANDWIDTH	2.4 kHz
MEMORY DEPTH	1200 ms

RAYSAFE Xi TRANSPARENT DETECTOR

SIZE	200 x 20 x 12 mm (7.9 x 0.8 x 0.5 in)
WEIGHT	40 g (1.5 oz)
DOSE	
RANGE	10 nGy – 9999 Gy (1 µR – 9999 R)
TRIG LEVEL	1 µGy/s (7 mR/min)
UNCERTAINTY	5 % (60 – 150 kVp, HVL: 2 – 10 mm Al ⁽⁴⁾)
DOSE RATE	
RANGE	100 nGy/s – 20 mGy/s (0.7 mR/min – 140 R/min)
MIN. PEAK TRIG LEVEL	1 µGy/s (7 mR/min)
UNCERTAINTY	5 % (60 – 150 kVp, HVL: 2 – 10 mm Al ⁽⁴⁾)
EXPOSURE TIME	
RANGE	1 ms – 999 s
UNCERTAINTY	0.5 % or 0.2 ms
PULSE	
RANGE	1 – 9999 pulses
PEAK TRIG LEVEL	> 3 µGy/s
UNCERTAINTY	1 pulse
FRAME RATE	
RANGE	1/6 – 120 frames/s
DOSE PER FRAME	
RANGE	1.0 nGy – 9999 Gy (0.10 µR – 9999 R) per frame

RAYSAFE Xi CT DETECTOR

SIZE	200 x 20 x 12 mm (7.9 x 0.8 x 0.5 in)
SIZE Ø	7.5 mm (0.30 in)
SIZE Ø PHANTOM ADAPTER	12.5 mm (0.49 in)
EFFECTIVE LENGTH	100 mm (3.94 in)
WEIGHT	50 g (1.75 oz)
RANGE	10 µGy – 9999 Gy (1 mR – 9999 R) 20 µGy/s – 100 mGy/s (140 mR/min – 680 R/min)
UNCERTAINTY	5 % (at reference point RQT9; 120 kV, 3.7 mm Al and 0.25 mm Cu)
ENERGY DEPENDENCE	< 5 % (at 80 kV to 150 kV; RQA, RQR and RQT qualities)
RADIAL UNIFORMITY	± 2 %
AXIAL UNIFORMITY	± 3 %, within rated length
INFLUENCE OF RELATIVE HUMIDITY	< 0.3 % (for RH < 80 %)
UNCERTAINTY IN TEMP. AND PRESSURE CORRECTION	2 %
PRESSURE RANGE	80.0 – 106.0 kPa
INTERNATIONAL STANDARD	Fulfills requirements in IEC 61674

RaySafe Xi CT detector comes with a phantom adapter to fit a standard head and/or body phantom.

⁽⁴⁾ 13 mm Al added filtration at 145 kVp gives a HVL of ~10 mm Al.

RAYSAFE Xi LIGHT DETECTOR

WEIGHT	170 g (6 oz)
RELATIVE AIR HUMIDITY RANGE	< 80 %
UNCERTAINTY ILLUMINANT A	3 %
DETECTOR MEMORY	30 measurements per sensor
CLASSIFICATION	Class B (according to DIN 5032, part 7)
MAX. DEVIATION FROM THE CIE CURVE FOR THE HUMAN EYE (V(λ))	4 % (see figure Photopic Response)

SIZE

LIGHT DETECTOR	30 x 104 x 21 mm (1.2 x 4.1 x 0.83 in)
LUMINANCE TUBE	Ø = 29 mm (1.1 in) L = 84 mm (3.3 in)
SHADOW RING	Ø = 50 mm (2 in)

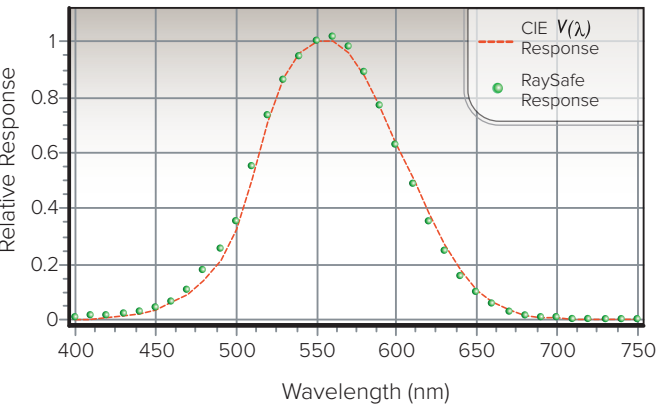
LUMINANCE

RANGE (AUTO)	0.05 – 50 000 cd/m²
RESOLUTION	0.01 cd/m²
LUMINANCE DETECTOR OPTICS	Ø 10 mm (0.4 in) measuring field. Contact measurement focusing lens 1:1.

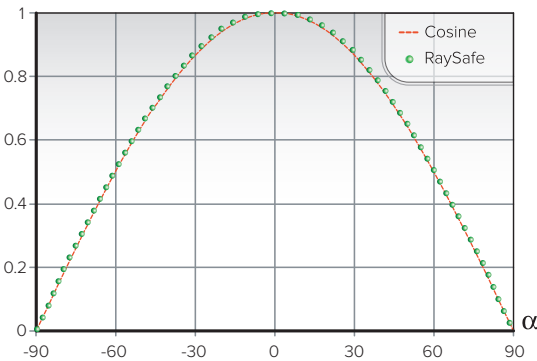
ILLUMINANCE

RANGE (AUTO)	0.05 – 50 000 lux
RESOLUTION	0.01 lux
MAX. DEVIATION FROM COSINE ANGULAR RESPONSE	1.7 % (see figure Cosine Response)

Photopic Response



Cosine Response

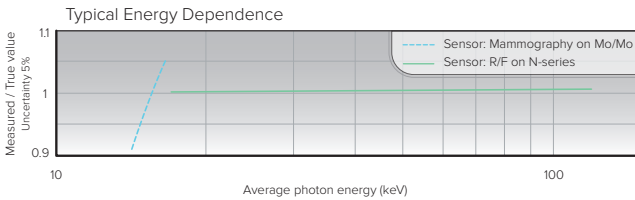


RAYSAFE Xi SURVEY DETECTOR

SIZE	13 x 66 x 175 mm (0.5 x 2.6 x 6.9 in)
DIAMETER	65 mm (2.6 in)
WEIGHT	65 g (2.3 oz)
TRIG	Manual, no threshold
AVERAGE PHOTON ENERGY	13 keV – 1.25 MeV
MINIMUM RESPONSE TIME	0.5 s
SOUND TICKER FREQUENCY	0.5 – 2000 Hz
INTERNATIONAL STANDARD	Fulfills requirements in IEC 60601-1-3
MAX. RESOLUTION	0.001 µSv

DOSE

RANGE	0 µSv – 9999 Sv (0 µGy – 9999 Gy) (0 nR – 9999 R)
UNCERTAINTY (MAMMOGRAPHY)	10 % (< 25 keV)



UNCERTAINTY (R/F)	10 % (25 – 120 keV)
UNCERTAINTY (NUCLEAR MED.)	20 % (> 120 keV)
DOSE RATE	
RANGE	0 µSv/h – 0.15 Sv/h (0 µGy/h – 0.1 Gy/h) (0 nR/h – 11 R/h)
UNCERTAINTY (MAMMOGRAPHY)	10 % or 0,3 µSv/h (> 1 µSv/h, < 25 keV)
UNCERTAINTY (R/F)	10 % or 0,3 µSv/h (> 1 µSv/h, 25 – 120 keV)
UNCERTAINTY (NUCLEAR MED.)	20 % or 0,3 µSv/h (> 1 µSv/h > 120 keV)

RAYSAFE Xi VIEW

COMPATIBLE WITH	Windows 10, Windows 8, Windows 8.1, Windows 7, Windows Vista, Windows XP, Windows 2000
FILE FORMAT	XML
COMMUNICATION	RS-232 (115200/8-N-1) or Bluetooth
BLUETOOTH	
CONNECTOR	9-pin D-SUB, pre-configured for communication with Xi View
OPERATING DISTANCE	100 m nominal (actual performance depends on environment and receiving Bluetooth module)

RAYSAFE UNCERTAINTY DEFINITION

The expanded uncertainty is stated as the combined uncertainty of measurement multiplied by the coverage factor $k=2$, which assuming a normal distribution has a coverage probability of 95 % (complies with GUM by ISO (1995, ISBN 92-67-10188-9)).

Instrument specifications are subject to purchased configuration.
All specifications may change without notice.