



Unfors Xi General

EMC tested	According to EN 61000-6-1:2001 and EN 61000-6-3:2001
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	Unfors Xi View for recording measured data and waveforms. Unfors 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	23.04 08.02

Unfors Xi Base Unit

Size	28 x 74 x 142 mm (1.1 x 2.9 x 5.6 in)
Weight	250 g (9 oz)
Power off	Automatic after 5, 20 or 60 min of inactivity
Power source	Rechargeable 7.2 V Li-ion battery
Battery time	20 – 40 hours (depending on detector and if Bluetooth is used)
Read out	Three row alphanumeric backlit display with four digits numerical resolution

Unfors Xi R/F Detector

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	100 nGy/s (0.7 mR/min)
Uncertainty	5 % (40 – 150 kVp, HVL: 1.5 – 14 mm Al ⁽¹⁾ , Active Compensation) or ± 10 nGy (1 µR)
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	100 nGy/s (0.7 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
Uncertainty	2 % (for total filtrations from 2.5 mm Al up to 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
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Dose per frame

Range	1.0 nGy – 9999 Gy (0.10 µR – 9999 R) per frame
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HVL

Range	1.0 – 14.0 mm Al
Uncertainty	10 % or ± 0.2 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.

Unfors Xi Mammography Detector

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 μ Gy – 9999 Gy (0.5 mR – 9999 R)
Trig level	10 μ Gy/s (70 mR/min)
Uncertainty	5 % or \pm 5 μ Gy (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 \pm 5 μ Gy (0.5 mR) (22 – 40 kV, 0.5 mm Al total filtration)
Dose rate	
Range	10 μ Gy/s – 100 mGy/s (70 mR/min – 700 R/min)
Trig level	10 μ Gy/s (70 mR/min)
Uncertainty	5 % or \pm 5 μ Gy/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 \pm 5 μ Gy/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 μ m. User selectable paddle compensation.) ⁽¹⁾

Range (Mo/Rh)	25 – 40 kV
Uncertainty (Mo/Rh)	2 % or 0.5 kV (Active Compensation for inherent Rh filtration of 25 – 30 μ m.)
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 55 – 60 μ m. User selectable paddle compensation.) ⁽¹⁾
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.) ⁽¹⁾
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

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
Bandwidth	2.4 kHz
Memory depth	1200 ms

⁽¹⁾ 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.

Unfors Xi CT Detector

Unfors Xi Base Unit firmware	4.0 or higher
Size detector	200 × 20 × 12 mm (7.9 × 0.8 × 0.5 in)
Size Ø detector	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

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

Unfors Xi Light Detector

Unfors Xi Base Unit firmware	4.05 or higher
Weight	170 g (6 oz)
Relative air humidity range	< 80 %
Calibration uncertainty	2 % (Illuminant A)
Calibration traceability	Unfors Light detector is calibrated to international traceable standards (NIST, PTB).
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)

Unfors 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)).

Size

Light detector	30 × 104 × 21 mm (1.2 × 4.1 × 0.83 in)
Luminance tube	Ø = 29 mm (1.1 in) L = 84 mm (3.3 in)
Shadow ring	Ø = 50 mm (2 in)

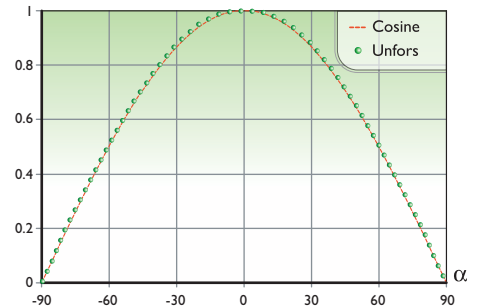
Luminance

Range (auto)	0.05 – 50 000 cd/m ²
Resolution	0.01 cd/m ²
Luminance detector optics	Ø 10 mm (0.4 in) measuring field. Contact measurement focusing lens 1:1.

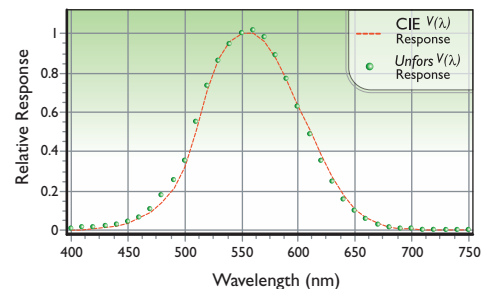
Illuminance

Range (auto)	0.05 – 50 000 lux
Resolution	0.01 lux
Max. deviation from cosine angular response	1.7 % (see figure Cosine Response)

Cosine Response



Photopic Response



Unfors Xi Survey Detector

Unfors Xi Base Unit firmware	5.0 or higher
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
Sound ticker frequency	0.5 – 2000 Hz
International standard	Fulfills requirements in IEC 60601-1-3
Max. resolution	0.001 μ Sv

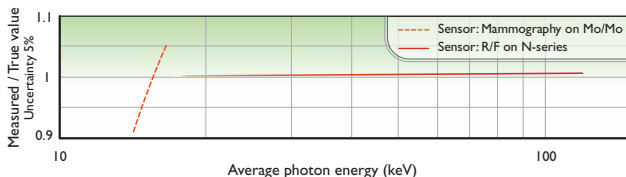
Dose

Range	0.000 μ Sv – 9999 Sv (0.000 μ Gy – 9999 Gy) (0.000 nR – 9999 R)
Uncertainty (Mammography)	10 % (< 25 keV)
Uncertainty (R/F)	10 % (25 – 120 keV)
Uncertainty (Nuclear Med.)	20 % (> 120 keV)

Dose Rate

Range	0.000 μ Sv/h – 0.15 Sv/h (0.000 μ Gy/h – 0.1 Gy/h) (0.000 nR/h – 11 R/h)
Uncertainty (Mammography)	10 % or 0,3 μ Sv/h (> 1 μ Sv/h, < 25 keV)
Uncertainty (R/F)	10 % or 0,3 μ Sv/h (> 1 μ Sv/h, 25 – 120 keV)
Uncertainty (Nuclear Med.)	20 % or 0,3 μ Sv/h (> 1 μ Sv/h > 120 keV)

Typical Energy Dependence



Unfors Xi mA/mAs Detector

Range mA	0.2 – 2000 mA
Uncertainty mA	1 % or \pm 0.02 mA
Range mAs	0.05 – 9999 mAs
Uncertainty mAs	1 % or \pm 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
mAs per frame	

Range	0.001 – 2000 mAs/frame
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Waveform

Bandwidth	1 kHz
Memory depth	1200 ms

Unfors Xi View

Compatible with	Windows 7, Windows Vista, Windows XP, Windows 2000, Windows 98 (Second Edition, OSR2)
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)

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

The Unfors Concept



Accurate result 10 s to learn Pocket sized

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