

Real-time Dosimetry



CONTENT

RaySafe i3 System Configurations	3
RaySafe i3 On-screen Display System	4
RaySafe i3 On-screen Display Packages	5
RaySafe i3 Stand-alone Display System	6
RaySafe i3 Stand-alone Display Packages with RaySafe Dose Manager	8
RaySafe i3 Stand-alone Display Packages	8
RaySafe i3 Accessories	9
RaySafe i3 Accessories	9
Specifications.....	11

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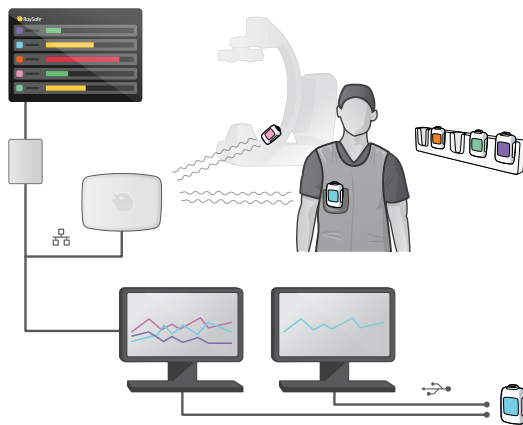
RaySafe i3 System Configurations

The RaySafe i3 is an active dosimetry system that provides real-time insights about radiation exposure, helping medical staff and physicians evaluate and take action to more effectively use all the radiation reduction solutions provided in the room. Especially suitable for interventional staff who have higher radiation exposure than most medical professions, because of scattered radiation.

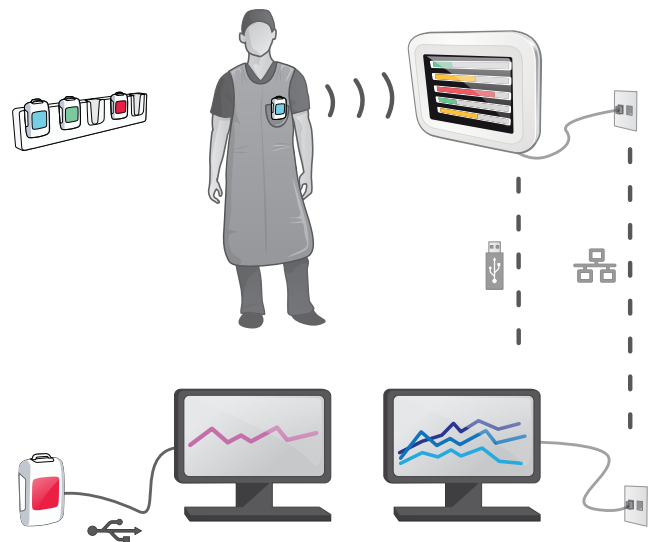
Use the RaySafe i3 to easily observe, minimize, and manage radiation exposure without being distracted from the task at hand.

The RaySafe i3 system comes in two main configurations:

- RaySafe i3 with On-screen Display
- RaySafe i3 with Stand-alone Display







RaySafe i3 with On-screen Display: Real-time dose rate indication, shown on the X-ray System's main monitor.

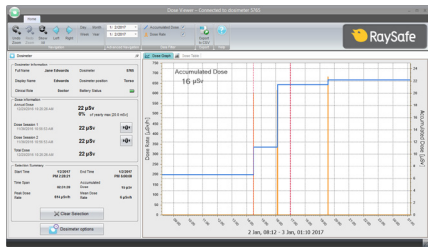
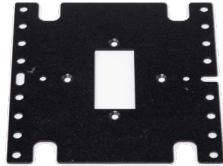



RaySafe i3 with Stand-alone Display: Real-time dose rate indication, shown on dedicated display unit.

RaySafe i3 On-Screen Display System

RaySafe i3 On-Screen Display is targeted for different markets/radio frequencies. A system includes:

<p>RaySafe Real-time Hub</p> <p>Communicates with dosimeters within range. Collects data and makes it available for the RaySafe Video Unit, as well as the RaySafe Dose Manager Software. Can be accessed within the hospital network, via a web browser, to download stored dose data.</p>	
<p>RaySafe Video Unit</p> <p>Uses data from the RaySafe Real-time Hub to render the Real-time View, transmitted as a video signal (HDMI/DVI). The Real-time View is shown on the lab's main screen or on a separate display, and it shows dose rate for connected dosimeters in real time via green, yellow and red bars corresponding to each individual user.</p>	
<p>RaySafe Real-time Reference Dosimeter</p> <p>Provides X-ray start/stop time stamps in order to synchronize measurements from multiple dosimeters. A reference dosimeter is required for displaying the history bars on the right side of the Real-time View.</p>	
<p>RaySafe Reference Dosimeter Holder</p> <p>Can be affixed to an exposed surface, e.g. a C-arm.</p>	




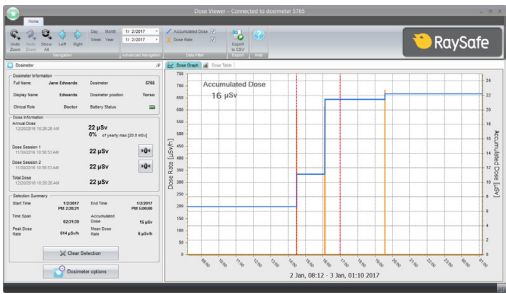
<p>RaySafe Dose Viewer Software*</p> <p>Easy-to-use software for administration of individual RaySafe i3 dosimeters. Shows dose history for the connected dosimeter.</p>	
<p>RaySafe Video Unit Wall Holder</p> <p>VESA 75 holder for wall mounting of video unit.</p>	
<p>Cables & Power Supplies</p> <ul style="list-style-type: none"> • 3 m and 30 m Ethernet cable • 2 m USB to micro-USB cable • HDMI-DVI cable • Power over Ethernet injector (for Real-time Hub) • Video Unit power supply and power plugs <p>Power cable and extension cables according to region:</p> <ul style="list-style-type: none"> • Europe power cable • US/Canada/Japan power cable • Australia power cable • UK power cable 	

* RaySafe Dose Manager software can be purchased separately, see page 10.

Part No / Model	RaySafe i3 On-screen Display Packages
5293302	RaySafe i3 On-screen Display Package, 866.0 MHz
	<i>India</i>
5131252	RaySafe i3 On-screen Display Package, 868.3 MHz
	<i>EU / EEA / CH: See list of countries on page 10.</i>
5131265	RaySafe i3 On-screen Display Package, 918.3 MHz
	<i>Canada & USA</i>
5131276	RaySafe i3 On-screen Display Package, 927.9 MHz
	<i>Japan</i>

RaySafe i3 Stand-alone Display System

The RaySafe i3 with stand-alone display can be ordered in packages with or without the RaySafe Dose Manager software, and targeted for different markets/radio frequencies. A system includes:

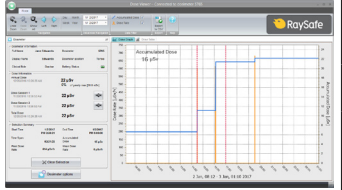
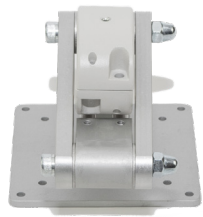

<p>RaySafe Real-time Display</p> <p>Touch screen that shows dose rate in real time for up to 8 dosimeters, and stores dose and dose rate for all dosimeters within range.</p>	 <p>A white, square-shaped device with a large touch screen. The screen displays a list of dosimeters with their names and dose rates. The RaySafe logo is visible at the bottom left of the device.</p>
<p>Four RaySafe Real-time Dosimeters</p> <p>Personal dosimeter for instant wireless transfer of dose data. Measures dose and dose rate for every second. Stores dose rate per second for last hour of exposure and dose per hour for 5 years.</p>	 <p>Four white, rectangular personal dosimeters standing upright. Each has a different colored front panel: purple (Dr. Purple), pink (Dr. Pink), grey (Nurse Grey), and green (Nurse Green). They all feature the RaySafe logo and an Apple logo.</p>
<p>RaySafe Dosimeter Rack for Five Dosimeters</p> <p>For storage of 5 dosimeters when not in use. Can be affixed to a wall.</p>	 <p>A white, rectangular rack designed to hold five dosimeters. It has five slots, each with a small circular indicator light on the front.</p>
<p>RaySafe Dose Viewer Software</p> <p>Easy-to-use software for administration of individual RaySafe i3 dosimeters. Shows dose history for the connected dosimeter.</p>	 <p>A screenshot of the RaySafe Dose Viewer software interface. The window title is 'Dose Viewer - Connected to dosimeter 8393'. The interface includes a sidebar with 'Dosimeters' and 'Dose Manager' sections. The main area shows a 'Dose Rate (µSv/h)' graph with a blue line representing the dose rate over time. The graph shows a step-like increase in dose rate. The accumulated dose is displayed as '16 µSv'. The x-axis is labeled 'Time (h:m:s)' and the y-axis is 'Dose Rate (µSv/h)'. The RaySafe logo is in the top right corner.</p>

Part No / Model	RaySafe i3 Stand-alone Display Packages with RaySafe Dose Manager
5293287	RaySafe i3 Package, including RaySafe Dose Manager Software, 866.0 MHz
	<i>India</i>
5081023	RaySafe i3 Package, including RaySafe Dose Manager Software, 868.3 MHz
	<i>EU / EEA: See list of countries on page 10.</i>
5111956	RaySafe i3 Package, including RaySafe Dose Manager Software, 868.3 MHz
	<i>China</i>
5081038	RaySafe i3 Package, including RaySafe Dose Manager Software, 918.3 MHz
	<i>Canada & USA</i>
5129169	RaySafe i3 Package, including RaySafe Dose Manager Software, 927.9 MHz
	<i>Japan</i>

Part No / Model	RaySafe i3 Stand-alone Display Packages
5293279	RaySafe i3 Package, 866.0 MHz
	<i>India</i>
5081006	RaySafe i3 Package, 868.3 MHz
	<i>EU / EEA: See list of countries on page 10.</i>
5111921	RaySafe i3 Package, 868.3 MHz
	<i>China</i>
5081014	RaySafe i3 Package, 918.3 MHz
	<i>Canada & USA</i>
5129157	RaySafe i3 Package, 927.9 MHz
	<i>Japan</i>

RaySafe i3 Accessories

Part No / Model		RaySafe i3 Accessories	
5293222	RaySafe i3 Real-time Dosimeter, 866.0 MHz		
	See page 6 for a description. <i>India</i>		
4923909	RaySafe i3 Real-time Dosimeter, 868.3 MHz		
	See page 6 for a description. <i>EU / EEA / CH: See list of countries on page 10.</i>		
4923911	RaySafe i3 Real-time Dosimeter, 918.3 MHz		
	See page 6 for a description. <i>Canada & USA</i>		
5132180	RaySafe i3 Real-time Dosimeter, 927.9 MHz		
	See page 6 for a description. <i>Japan</i>		
5304537	RaySafe i3 Real-time Dosimeter Bundle, 866.0 MHz		
	Set of four dosimeters. See page 6 for a description. <i>India</i>		
5274858	4xRaySafe i3 Real-time Dosimeter Bundle, 868.3 MHz		
	Set of four dosimeters. See page 6 for a description. <i>EU / EEA / CH: See list of countries on page 10.</i>		
5274873	RaySafe i3 Real-time Dosimeter Bundle, 918.3 MHz		
	Set of four dosimeters. See page 6 for a description. <i>Canada & USA</i>		
5274886	RaySafe i3 Real-time Dosimeter Bundle, 927.9 MHz		
	Set of four dosimeters. See page 6 for a description. <i>Japan</i>		
4923927	RaySafe Dosimeter Rack		
	For storage of 5 dosimeters when not in use. Can be affixed to a wall.		

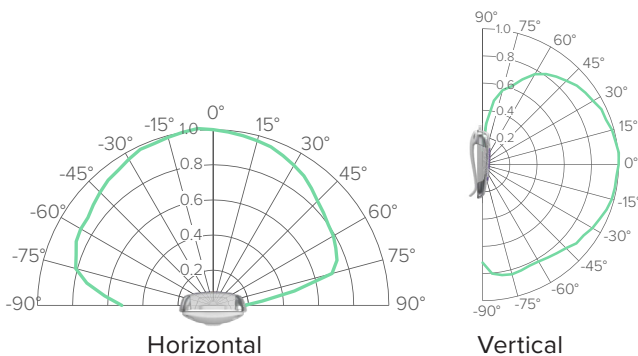
Part No / Model		RaySafe i3 Accessories
4926891	RaySafe Dose Viewer Software	
	<p>Easy-to-use software for administration of individual RaySafe i3 dosimeters. Shows dose history for the connected dosimeter.</p> <p><i>Note: The latest version is required for i3 Real-time Dosimeters.</i></p>	
4926905	RaySafe Dose Manager Software	
	<p>Advanced software for analyzing, reporting and archiving dose information. Collects dose history for all dosimeters. Possibility to retrieve dose information from multiple real-time displays through the hospital network or via a USB memory. Includes tools for data analysis. It is also possible to export data for further analysis, e.g. in Excel.</p>	
4712128	MCS Mounting Bracket	
	<p>One mounting bracket of choice (MCS, Mavig or GCX) is included in a RaySafe Stand-alone System delivery.</p>	
4712414	Mavig Mounting Bracket	
	<p>One mounting bracket of choice (MCS, Mavig or GCX) is included in a RaySafe Stand-alone System delivery.</p>	
4712438	GCX Mounting Bracket	
	<p>One mounting bracket of choice (MCS, Mavig or GCX) is included in a RaySafe Stand-alone System delivery.</p>	

* EU / EEA: Austria, Belgium, Bulgaria, Cyprus, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom.

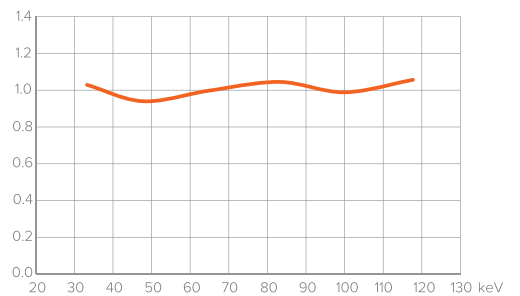
Specifications

Dosimeter	
Dimensions	40 x 58 x 17 mm (1.6 x 2.3 x 0.7 in.)
Weight	34 g (1.20 oz)
Operational quantity	$H_p(10)$
Energy dependence	< 25 % (N-series, 40 – 150 kV)
Temperature dependence	< 5 % (18 – 26 °C) < 25 % (15 – 18 °C, 26 – 35 °C)
Response time	< 1 s, above 100 $\mu\text{Sv/h}$ < 5 s, below 100 $\mu\text{Sv/h}$
Integration interval	1 s
Detection limit	< 30 $\mu\text{Sv/h}$
Dose rate uncertainty (continuous radiation)	10 % or 10 $\mu\text{Sv/h}$ (40 $\mu\text{Sv/h}$ – 150 mSv/h) 20 % (150 mSv/h – 300 mSv/h) 40 % (300 mSv/h – 500 mSv/h) The measured dose rate is monotonically increasing up to 1 Sv/h
Dose reproducibility	10 % or 1 μSv
Maximum lifetime dose	10 Sv
Battery	CR2450 (replaceable, 1 – 2 years lifetime depending on usage)
Communication	See “Radio” section on page 12

Typical angular response (relative to 0°)



Typical energy response



Video Unit	
Dimensions	112 × 84 × 34 mm (4.4 × 3.3 × 1.3 in)
Weight	355 g (12.5 oz)
Dose unit	Sv or rem
Power	External supply
Video output	HDMI 1.4b
Network	1000BASE-T
Real-time Hub	
Dimensions	184 × 134 × 35 mm (7.2 × 5.3 × 1.4 in)
Weight	180 g (6.3 oz)
Power	Power over Ethernet
Network	100BASE-TX
Communication	See “Radio” section below.
Real-time Display	
Dimensions	300 × 250 × 60 mm (11.8 × 9.8 × 2.4 in)
Weight	1240 g (43.74 oz)
Dose unit	Sv or rem
Display	10.4” touch screen
Interfaces	Ethernet connection for Dose Manager. USB connection for synchronizing data to USB memory stick
Power	12 V DC, <1.5 A external power supply included
Communication	See “Radio” section below.
Radio	
Frequency	866.0 MHz, 868.3 MHz, 918.3 MHz or 927.9 MHz, depending on purchased configuration (see label on product)
Transmitter power	Dosimeter output: 3.2 mW Real-time Hub output: 1 mW Real-time Display output: 1 mW
Communication range	Typically 5 – 15 m, depending on the local environment
Software Requirements	
Operating system	Dose Viewer: 32-or 64-bit Windows 7, 8.1 or 10 Dose Manager: 64-bit Windows 7, 8.1 or 10
System memory	At least 2 GB
Storage	At least 15 GB available space (Dose Manager)