

# ED3

## Active Extremity Dosimeter



Start here

# Description

The ED3 Active Extremity Dosimetry system can help an operator understand, in real-time, the radiation dose received to the extremity (fingertip). It is a battery operated instrument and should be worn on a belt, in a pocket or in the provided carry pouch to allow the detectors to be attached to the finger tips.

The ED3 Electronic Dosimeter has been designed to operate, display and collect measurement readings from 2 detector types<sup>1</sup>:

- D1 - Suitable for most Hp(0.07) extremity dose equivalent requirements in Medical Physics & Glove Boxes
- D4 - Suitable for beta and photon Hp(0.07) extremity dose equivalent requirements in Medical Physics & Glove Boxes where the photon energy is between 33 keV & 60 keV or high energy betas, such as <sup>90</sup>Sr / <sup>90</sup>Y.

Included with the ED3 is the PC Data Manager Application Software (min. PC requirements: Windows XP SP2 & later).

<sup>1</sup> - the ED3 is NOT capable of operating a D1 and D4 detector at the same time – an error message will display as “Probe Mismatch – Turn off and Retry”.

# In the box

Calibration / Test Certificate

Software CD:

- PC Application
- User manual pdf

Finger cot packs x2  
(2 sizes - 10 in each pack)



Detectors  
(Specified at time of order)

USB cable

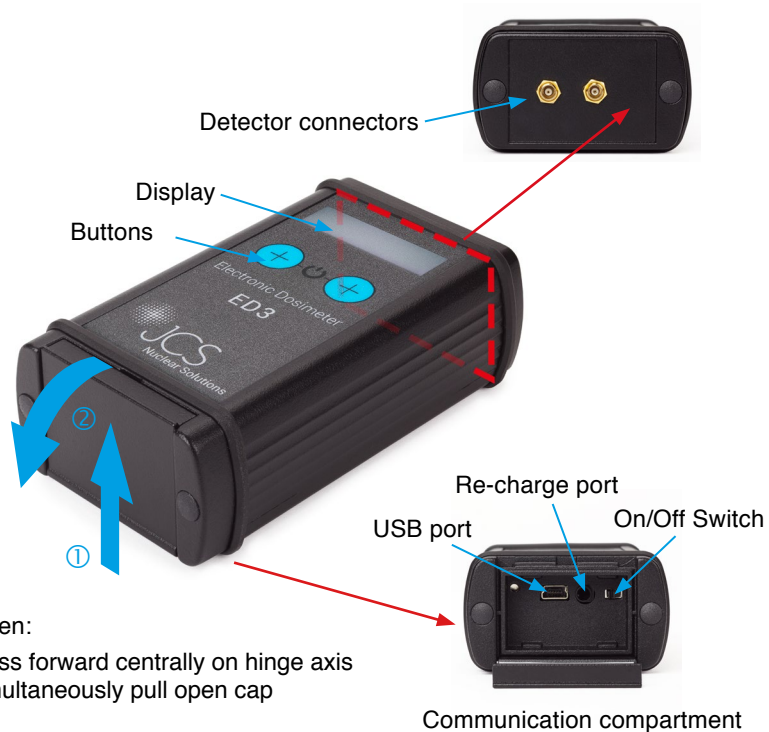
ED3 Dosimeter Electronics

Power supply  
(Re-charging pack)

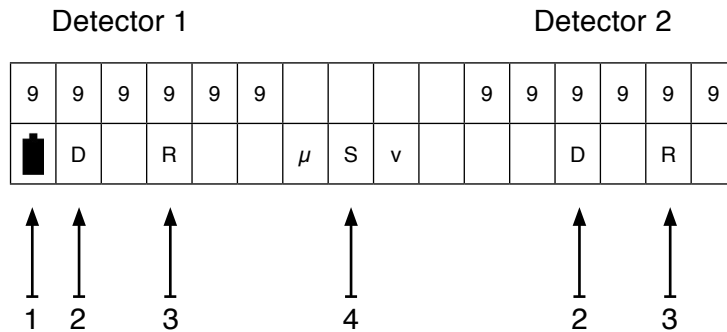
**Extras included:**

- Carry pouch
- International power adaptors on request

# ED3 Features



# ED3 Display



1	<b>Battery Status</b>	
2	<b>Flashing</b>	Dose Alarm
	<b>Solid</b>	Dose Overload
3	<b>Flashing</b>	Rate Alarm
	<b>Solid</b>	Rate Overload
4	<b>Units:</b>	
	<b>Dose Display Mode</b>	$\mu$ Sv or mrem
	<b>Dose Rate Display</b>	$\mu$ Sv/h or mrem/h

# Before First Use

Before the ED3 can be used, the instrument must first be configured using the Data & Configuration Wizard software.

The Data & Configuration Wizard allows the user to:

- Set up the instrument, by setting the logging sample rate, alarm levels and other options
- Uploading logged data from the instrument (that needs to be kept) to the PC applications database
- Clearing any previous logged data from internal memory
- Reset the displayed accumulated dose (calibrator action)

On running the Data & Configuration Wizard, the application will analyse the internal ED3 memory and advise the user if data is present that hasn't be uploaded, so that data is not overwritten or deleted without warning the user first.

***See Section 6. The Data & Configuration Wizard on page 15***

# First Use

***Please ensure the battery is fully charged before use.***

Connect the provided detector(s) and turn the instrument on, the display will ask you to set the date and time (this feature can then be controlled from the Data Manager PC Application).

The instrument is turned on by the on/off switch which is located inside the communications compartment on the ED3 base.

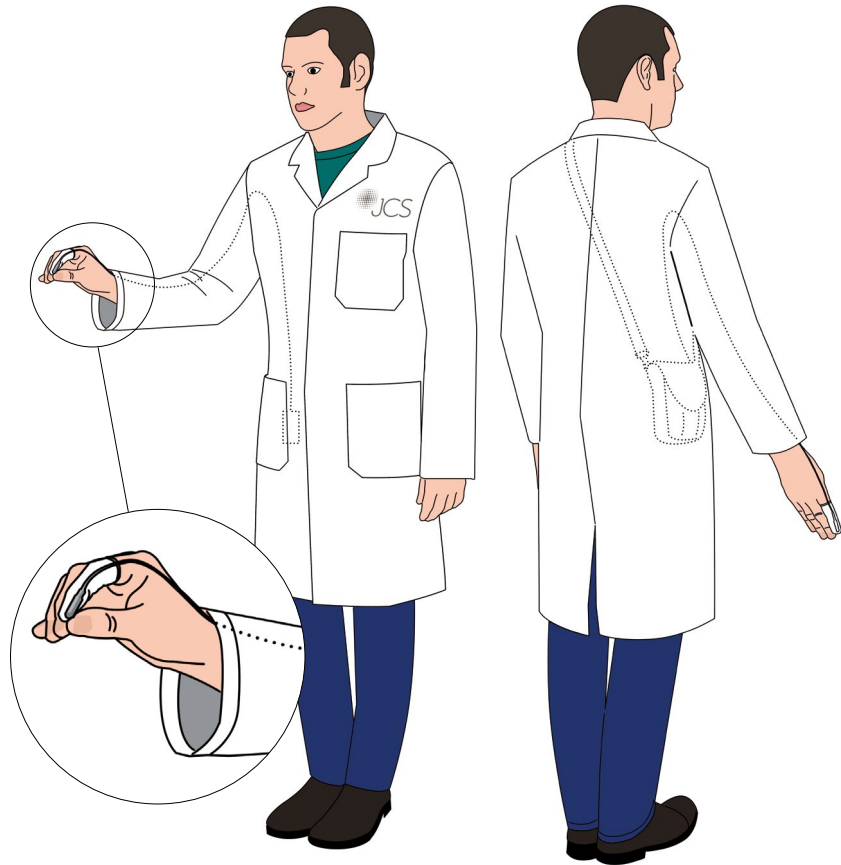
**Once turned on, the instrument is measuring.**

The buttons on the ED3 control panel are used to:

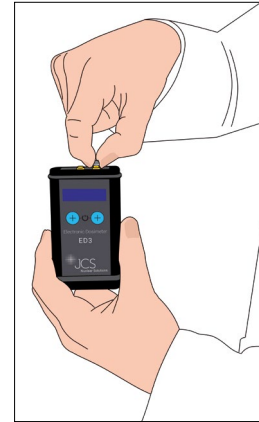
- Put the ED3 into Standby
- Switch between dose & dose rate display
- Switch between Sieverts & rem units
- Operate the back light
- Set the Time & Date

Please refer to the User Guide (included on CD) for further details.

# Best Practice



- Always add & remove a detector by holding the metal connector. *Pulling the lead to remove a detector may cause damage.*
- When taking measurements with the ED3, the user should avoid making or receiving calls while holding a phone, which should preferably be switched to “airplane” mode or not carried. WIFI signals work at much lower power levels and should not be a problem
- Wear the ED3 under your lab coat, in a convenient pocket (this may differ for a single or dual detector set up) or in the supplied pouch.
- Run the detector lead under the sleeve of the coat and secure the detector to the preferred area on the finger with a finger cot.
- Do not use any attachment mechanisms or tape that will add radiation attenuation to the detectors or cause damage to the detectors when removed from the extremity.
- Put the ED3 into standby for everyday on/off functions by long-pressing both buttons on the front panel until “Standby” is displayed on screen. This does not affect its battery life and is ergonomically preferable for the user. Long-press both buttons to bring the ED3 out of standby.



# Audio Alarms

The following audio alerts are available on the ED3. All alerts are configurable (through the Data & Configuration Wizard), apart from the low battery & hardware alarms.

Alarm	Description	Tone	Clearing Alarm
Standard Chirp	Set to high value a 'chirp' will be emitted every time the count measured changes by 2.	Pulse Width. 5 milliseconds.	See <b>Chirp Frequency</b> in <i>"Change Settings Screen" on page 20</i>
Dose Alarm	When a dose alarm is reached the display will indicate a flashing 'D' under the relevant detector dose/dose rate reading. An intermittent audible alarm will also sound.	Intermittent tone: 0.5 seconds on 0.5 seconds off	This can only be cleared by a Supervisor. <b>See Section 6.22 on page 25</b>
Dose Rate Alarm.	When a dose rate alarm is reached the display will indicate a flashing 'R' under the relevant detector dose/dose rate reading. An intermittent audible alarm will also sound.	Intermittent tone: 0.5 seconds on 0.5 seconds off	The alarm can't be silenced but will deactivate after the amount of time specified in the setup file when the rate subsides below the alarm level. <b>See Section 6.17 on page 20</b>
Dose Rate Overload	When the dose rate overload is reached, the display will indicate an 'R' under the relevant detector dose/dose rate reading. If the dose rate display is selected then the display will indicate 99999. An intermittent audible alarm will sound.	Intermittent tone: 0.25 seconds on 0.25 seconds off	Move away from the radioactive source.
Dose Over Range	When the dose over range is reached, the displayed dose rate will remain at 999999 and will flash intermittently with 'Overload' at the same location on the display. An intermittent audible alarm will also sound. A 'D' will also be indicated under the relevant detector dose/dose rate reading.	Intermittent tone: 0.25 seconds on 0.25 seconds off	This can only be cleared by a Supervisor. <b>See Section 6.22 on page 25</b>
Missing Detector	If the ED3 be switched on without a detector fitted an alarm will sound, producing an intermittent beep. The display will indicate 'No Detectors Found Switch off & Retry'. The instrument must be switched off and a detector fitted. Should a detector be removed during use again an alarm is raised, but if the detector is refitted while switched on the alarm condition will remain. The ED3 will need to be switched off.	Intermittent tone: 1 second on 1 second off	Switch the instrument off. Connect a detector and switch on again. <b>See Section 2.3 on page 5</b>
Low Battery	When a low battery condition is reached low battery symbol is indicated accompanied by an audible alarm. The audible alarm is a short beep once every two seconds. <b>The ED3 will continue to operate for a further 8 hours.</b>	Intermittent tone: 0.25 seconds on 1.75 seconds off	Charge the battery. <b>See Section 3.4 on page 8</b>
Memory Full	The ED3 display will read "Data File Full".	No Alarm	Transfer data from ED3 to PC. <b>See Section 6.21 on page 24</b>

# Detectors

## D1 Specification



Black wrapping denotes D1 detector

Radiation Measured	Standard HP(0.07) photon measurements 60keV-1.25MeV
Uses	Suitable for most Hp(0.07) photon extremity dose equivalent requirements
Dose Range	0.0 $\mu\text{Sv}$ to 1 Sv Hp(0.07) [0.00 mrem to 100 rem]
Dose Accuracy	$\pm 20\%$ $^{137}\text{Cs}$
Dose Rate Range	0.0 $\mu\text{Svh}^{-1}$ to 100 $\text{mSvh}^{-1}$ Hp(0.07) [0.00 mrem $\text{h}^{-1}$ to 10 rem $\text{h}^{-1}$ ]
Dose Rate Accuracy	$\pm 20\%$ $^{137}\text{Cs}$
Energy Response	typical $\pm 30\%$ 60 keV to 1.25 MeV
Response Time	16 seconds < 735 $\mu\text{Svh}^{-1}$ and 2 seconds > 735 $\mu\text{Svh}^{-1}$ Hp(0.07)
Linearity	$\pm 20\%$
Angular Response	$\pm 30\%$
Active area of detectors	7.0 $\text{mm}^2$
Dose Temperature Stability	$\pm 20\%$ from 0°C to 40°C
Maintenance	Annual calibration & physical checks
Lead length	1.4m

For further specification & details please see the ED3 User Guide

## D4 Specification



Red wrapping denotes D4 detector

Radiation Measured	Photons (Gamma & X-ray) and beta
Uses	Suitable for low energy photons & high energy beta Hp(0.07) extremity dose equivalent requirements
Dose Range	0.0 $\mu\text{Sv}$ to 1Sv Hp(0.07) [0.00 mrem to 100 rem]
Dose Rate Range	0.3 $\mu\text{Svh}^{-1}$ to 100 $\text{mSvh}^{-1}$ Hp(0.07) [0.0 mrem $\text{h}^{-1}$ to 10 rem $\text{h}^{-1}$ ]
Energy Response	X-rays - 33keV to 248keV
Response Time	16 seconds < 346 $\mu\text{Svh}^{-1}$ & 2 seconds > 346 $\mu\text{Svh}^{-1}$ Hp(0.07)
Linearity	$\pm 20\%$
Angular Response	$\pm 30\%$
90Sr + 90Y Beta response	0.31 of true beta dose Hp(0.07)
Active area of detectors	7.0 $\text{mm}^2$
Dose Temperature Stability	$\pm 20\%$ from 0°C to 40°C
Maintenance	Annual calibration & physical checks
Lead length	1.4m

For further specification & details please see the ED3 User Guide

# Calibration

The ED3 is a highly sensitive electronic instrument that requires individual calibration of the detector against known radiation sources.

The calibration of the ED3 is initially performed when the unit is manufactured and should be re-calibrated every year.

The date of calibration and date of next calibration is briefly displayed on the ED3 upon switching the instrument on.

**Note:** *This item is configurable and may be disabled in the settings.*

Due to the complex nature of the calibration and the need for known radiation sources, the instrument should be returned to a qualified calibration facility for the calibration.

# Download Page

To download the latest version of the ED3 documentation, software or firmware please visit:

<https://johncaunt.com/downloads/ed3/>

**Password:** JC^S-eD3^@yrh&66tfq

# Compliance

This product conforms to:

European EMC Directive 2004/108/EC for radiated emissions and susceptibility. EN55022 Class B emissions, EN61000-4-2 electrostatic discharge, EN61000-4-3 radiation immunity.



Manufactured in the UK by **John Caunt Scientific Ltd**

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# Distributed by

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# JCS

Nuclear Solutions

ED3 Quick Start Guide Issue 1.2.1 2020

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To download the latest version of the ED3 documentation, software or firmware please visit:

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**Password:** JC^S-eD3^@yrh&66tfq