

DOSE-X Quick Start Guide



How to setup your new DOSE-X.
Additional information can be found in the *DOSE-X Instructions for Use* and *DOSE-X Reference Guide*

Standard DOSE-X package:

1. DOSE-X Electrometer
2. Power cord set
3. Instructions for Use

An optional carrying case is available



Buttons, Switches, and Connectors

- **Power button (1):** Short-press to turn **ON/OFF** the device.
LED ring (around the **Power** button)

- **Red:** Device is powered on but not ready
- **Green:** Device is done booting and ready for use



Note: After the device is ready, if the **LED ring turns Red**, this indicates that there is an error.

- **Power switch (2):** turn **ON/OFF** the power supply
- Main power supply input (3)
- Ethernet port (4)
- Bias Voltage Output (5)

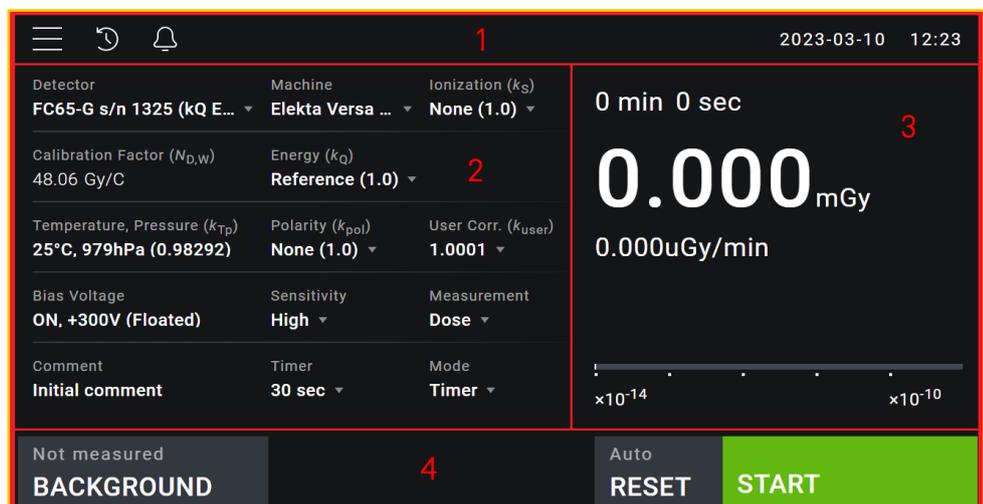


- Triaxial Connector (6): connects a compatible measurement device (e.g., ion chamber) to the channel
- The USB port (7) allows the user to:
 - Export Measurements, Libraries, and Configuration data
 - Import Libraries and Configuration data
 - Install FW upgrades



Main Display

- **Navigation bar (1):**
 - Access the system settings, admin login, and detector / machine libraries via the **Main Menu** icon.
 - See Measurement History , Notifications , and current date and time.
 - A green figure indicates that the user is logged in as an Admin
- **Detector and measurement parameters (2)**
- **Measurement results (3)**
- **At the bottom of the screen (4) the user can:**
 - Check the Background
 - Reset to take a new measurement or background
 - Start / Stop a measurement



Entering Information

The DOSE-X is controlled via the LCD touch screen. To enter information, an on-screen keyboard and number pad are available for easy text and value entry.

- Tap on a field and the keyboard / number pad will open. Tap **ENTER** when you have finished.

Some fields have dropdown options.

- Simply tap on the field to open the dropdown menu and select the correct value.



Setup the Device

- Take the DOSE-X out of storage and connect network cable, mains power cable, and detector cable.
- Turn on the DOSE-X and wait for warm-up of the device. Warm-up time can vary (see *Section 4.2 Device Warm-up* in the *DOSE-X Instructions for Use*):
 - **10 minutes** if the device has been powered on from storage, but is acclimated to the environment.
 - **1 minute** if the device had been previously powered off for no more than 5 minutes.
- During warm-up, the device will automatically run the **Power-on Selftests**. A pop-up will appear informing the user that the tests have finished. Tap **OK**.

Note: Completion of the tests do not indicate that the warm-up is complete.
- Select or enter the correct factors for the following. Please note, if performing a charge measurement, certain detector settings cannot be selected / edited and will be greyed out.
 - Select a **Detector** from the dropdown list. If no detectors are available, an **Admin** will need to add a detector. Ensure that the detector selected from the library is identical to the one which is physically connected to the DOSE-X. Double-check detector type and serial number.
 - Select a **Machine** from the dropdown list.
 - If **Ionization** (k_S correction factors) has been configured, and should be applied, select the applicable Dose rate (k_S) factor from the Ionization (k_S) menu.
 - If **Energy** (k_Q) correction factors have been configured, and should be applied, select the applicable k_Q factor from the k_Q menu.
 - To apply k_{Tp} correction, configure temperature and pressure in the **Temperature, Pressure** (k_{Tp}) menu. The correction factor can be turned **ON/OFF**.

Note: To confirm turning the correction factor ON/OFF, tap the Enter button.
 - **Polarity Correction** (k_{pol}) and **User Correction** (k_{user}):
 - Activate (or deactivate) application of a **Polarity correction** (k_{pol}) in the **Polarity** (k_{pol}) menu, the default is configured in the detector settings.
 - Activate (or deactivate) application of a user-specific additional correction (k_{user}) in the **User Corr** (k_{user}) menu, the default is configured in the detector settings.
 - Tap the **Bias Voltage** field to turn **ON/OFF** the High Voltage, change the **Bias** value, and select Floated or Grounded.

Note: When turning the Bias Voltage ON/OFF or selecting Floated/Grounded, tap the Enter button to confirm.
 - For **Sensitivity**, select **High** (400fA – 600pA), **Medium** (6pA – 60nA), **Low** (2.4nA – 24μA), or **Auto** from the dropdown list.

Note: For best performance, select the lowest range possible for the intended measurement while avoiding the saturation of the electrometer. Please see the respective detector manuals to determine the appropriate ranges and sensitivities.

If **Auto** is selected, the Automatic Range Detection dialog will open to determine the best sensitivity range for the selected detector and parameters.

- Select **Dose** or **Charge** for the **Measurement Type**.

To perform a purely electrical measurement (charge and current), select **Charge** from the menu. In this measurement mode, dose calibration and correction factors will be applied, and the display will be in electrical units.

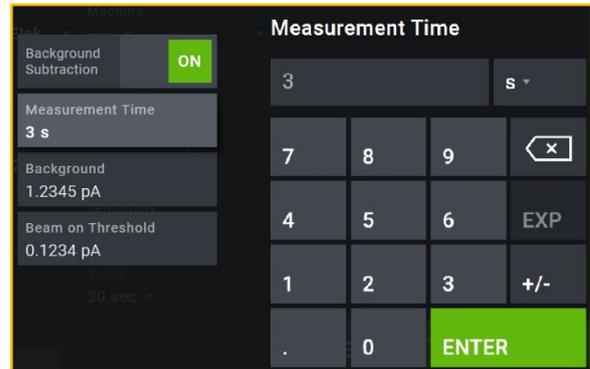
- **Manual, Trigger, or Timer** for the **Measurement Mode**.

- **Manual:** the measurement can be started / stopped by pressing the **START/STOP** button.
- **Trigger:** the measurement is activated / deactivated by pressing the **START/STOP** button.
- **Timer:** the measurement will run for the selected amount of time.

- Connect and pre-irradiate the detector (no user-interaction with the device).
- Before performing a measurement, it is recommended to take a background measurement by tapping the **Background** button on the main screen.

Press and hold the **Background** button to open the background settings. Here the user can:

- Turn **ON/OFF** the **Background Subtraction**.
- Set the default measurement value.
- View the **Background** and **Beam on Threshold** values.



Start a Measurement

- **Manual mode:**

- Tap the **START** button.
- The DOSE-X begins the measurement.
- Tap the **STOP** button when the measurement is complete.

- **Trigger mode:**

- Check that the **Trigger Mode** parameters are correct. (see System Settings menu).
- Tap the **START** button. This activates **Trigger** mode.
- When the input signal is above the **Beam On Threshold** for longer than **Beam On Time** duration, the DOSE-X will recognize the beam on point and start the integration of charge/dose measurement.
- The DOSE-X will continue to take measurements in the defined beam ON/OFF interval.
- Tap the **STOP** button when the measurement is complete.

- **Timer mode:**

- Select the measurement time via the dropdown menu on the **Main** screen.
- Tap the **START** button.
- The DOSE-X begins the measurement.
- The measurement will run for the selected time.

- When the measurement is complete it will appear in the **Measurement History**.

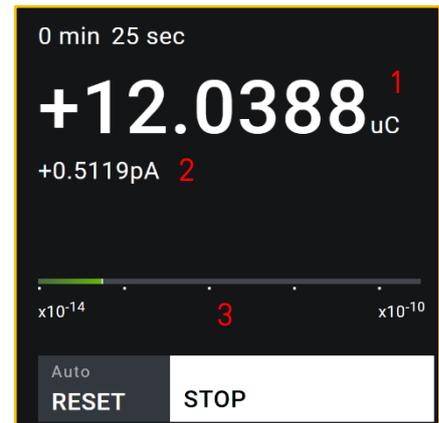
The display on the main screen provides two elements showing the measurement value:

- The large number (1) shows the absolute charge or dose value (depending on the measurement type).
- The small number (2) shows the average electric current or dose (depending on the measurement type).

Please note, the current displayed after a measurement is finished, is integrated charge to total measurement time.

For information on the Range bar (3), see the *Instructions for Use*.

- Turn off the device, remove cables, bring the DOSE-X back into storage.



Technical Specifications of the DOSE-X

Dimensions (mm)	123.4 (D) × 201.9 (H) × 249.7 (W)
Weight	4.6 kg
Display	10" HD Touchscreen
Power supply	100-240V, 50/60Hz
Fuses	T2A, 250V
Mains Voltage	Input voltage range: 90 - 264V
Insulation of External Circuits	50 Ohm
Measurement Modes	Manual, Trigger (beam triggered), and Timed
Measurement Types	Dose and Charge
Correction Factors	$k_{user}, k_{pol}, k_Q, k_{Tp}, k_S$
Bias Voltage	$\pm 50 \text{ V} \dots \pm 500 \text{ V}, \pm 2 \%$
Range (current)	High Sensitivity: 400 fA to 600 pA Medium Sensitivity: 6 pA to 60 nA Low Sensitivity: 2.4 nA to 24 μA
Range (charge)	$500 \pm 10 \text{ V}$
Absorber material on top	4 pC. The maximum charge per pulse is limited to 65nC at a pulse repetition frequency $\leq 400\text{Hz}$. The total charge is not limited.
Display Resolution	5-digits, 0.1 fA (current) and 0.1 fC (charge) in high sensitivity range
Repeatability, Non-linearity, and Zero Drift	$< \pm 0.25 \%$ ($\leq \pm 0.25 \%$ IEC 60731)
Long-term Stability	$\leq \pm 0.2 \%$ ($\leq \pm 0.5 \%$ over one year, IEC 60731)
Response Time	$< 1.5 \text{ s}$
Zeroing	60 s (default)
Beam on Threshold	$\pm 1.5 \times (I_{max} - I_{min})$ where I_{max}, I_{min} are the maximum and minimum current value during the background measurement
Configurations	TNC Triax, BNC Triax
Use	Reference class 60731

Cyber Security Tips

Though the DOSE-X does not require an internet connection to function, it can be connected via the local network (wired or wireless), and therefore will be part of an environment that is vulnerable to a cybersecurity attack. This presents a possible security risk to your patients and their personal data. To minimize the chance of an attack IBA recommends the following:

- Immediately change the default username and password
- Keep your Operating System updated with security patches
- Restrict access by only allowing authorized users to access your network
- Keep patient data on an encrypted storage
- Ensure you have a firewall installed and running
- Maintain up-to-date antivirus software
- Use file sharing with caution and avoid sharing over public networks
- Ensure your access point software is patched and up-to-date
- Connect to your network using a Virtual Private Network (VPN)

Please contact your IT Department to ensure that all necessary and recommended security measures are being taken.

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Please contact IBA Dosimetry Help Center (helpcenter.iba-dosimetry.com) with any further questions:

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