



37-720

Dual-Diode Dosimeter Patient Dose Monitor

User Manual

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Section 1

General Information

1.1 Introduction

System Description

The Dual-Diode Dosimeter Patient Dose Monitor combines a compact, battery operated, electrometer with a silicon diode detector. The detector can be placed anywhere external to the patient for dose verification and is easily held in position by taping to the skin.

The diode can be taped directly to the patient's skin to obtain data for TLD readout values, eliminating TLD measurements. Irregular field dosimetry is easily performed with this system. No temperature pressure corrections need be applied to values obtained during the measurement process. The system allows accurate and reproducible dose and dose rate data to be obtained without the necessity of temperature equilibration or warm-up time.

Measurements can be read directly on the 3½-digit liquid crystal display (LCD) readout, eliminating complex calculations. The electrometer has two detector inputs on the rear panel labeled DET A and DET B. Each input has a range of 0 through 1999 cGy or cGy/min. A front panel switch enables the selection of the detector input being utilized. Each detector has a clearly marked, screwdriver adjustable set of calibration and zero controls mounted conveniently on the front panel. A quick response reset button, also on the front panel, sets the system up for the next reading.

Patient Dose Monitor Model 37-720 is designed specifically for use with the silicon diode detectors (positive output) recommended by Fluke Biomedical, Radiation Management Services (see Section 1.3). The electrometer must be calibrated for each individual detector and radiation source.

A special feature inherent in the 37-720 is the ability to switch between DET A and DET B, using the front panel switch, so that two detectors can be utilized for monitoring at the same time. This feature is applicable when the measurement is being taken in the dose or rate mode. Measurements can be taken in DOSE or RATE depending on the setting of the function switch. If it is desired to switch from one mode to another, the RESET switch can be pressed to zero the electrometer.

1.2 Specifications

Range	cGy: 0 to 2000 cGy/min: 0 to 2000
Sensitivity	.25 nC/cGy – 2 nC/cGy
Calibration Adjustments	Front panel screwdriver adjustments: CAL A and CAL B used for calibration of detector A and detector B. ZERO A and ZERO B used to set up zero for detector A and detector B. CAL A and CAL B used for calibration of detector A and detector B. ZERO A and ZERO B used to set up zero for detector A and detector B.
Front Panel Controls	Power Switch: ON/OFF Function Switch: DOSE or RATE modes of operation Detector Switch: DET A or DET B selects detector input. Reset Switch: Resets & zeros monitor for dose measurements.
Rear Panel Controls	Two BNC connectors for DET A input and DET B input.
Display	A 3 ½-digit liquid crystal display provides direct reading of the measurement
Accuracy	± 5 % of full scale, current and charge
Rads Holding Drift	Better than 1 % / minute
Batteries Required	One 9 V alkaline cell (Duracell MN1604 or equivalent)
Battery Check	LO BAT appears on display when battery voltage drops below approximately 6 V
Battery Life	Approximately 150 hours
Case	Ivory, high impact plastic
Dimensions (H x W x D)	2.5 in x 6.25 in x 8 in (6.4 cm x 15.9 cm x 20.4 cm)
Weight	1.5 lbs (0.68 kg)
Operating Conditions	10 °C to 45 °C (50 °F to 104 °F) Maximum 90% Relative Humidity non-condensing

Routine Cleaning

CAUTION

Do not immerse the Model 37-720 Dual-Diode Dosimeter Patient Dose Monitor. The unit is not waterproof. Liquid could damage the circuits. The unit should be kept clean and free of dirt and contamination. The unit may be cleaned by wiping with a damp cloth using any commercially available cleaning or decontaminating agent.

NOTE

Refer to the applicable diode manual for specific response characteristics relative to diode performance.

1.3 Accessories

<u>Part Number</u>	<u>Description</u>
30-492	Diode Detector Holder
88-490	Diode Extension Cable 30'
88-490-1000	Diode Extension Cable 10'

VeriDose Diodes

Model	Range	Polarity/Color	Buildup Type	Buildup (g/cm²)	Electrometer
30-471	1-4 MV	Positive/Blue	Cu	0.732	37-720
30-472	5-11 MV	Positive/Yellow	Cu	1.359	37-720
30-473	12-17 MV	Positive/Red	W	2.606	37-720
30-474	18-25 MV	Positive/Green	W	3.574	37-720
30-475	5-25 MeV	Positive/Grey		0.284	37-720

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Section 2

Operation

2.1 Battery Check

Model 37-720 Dual-Diode Dosimeter Patient Dose Monitor is shipped with the battery installed.

Turn power on by placing the ON/OFF switch to the ON position, then look at the upper left hand corner of the display. If the battery is low, a LO BAT message will appear on the display.

NOTE

If a probe has been connected, remove it until the zero adjustments are complete.

2.2 Zeroing the Instrument

Place the function switch in the DOSE position and the detector switch in the DET A position. Press the RESET button. In approximately five to seven seconds, a zero reading will appear on the display. If the zero reading does not appear, adjust the ZERO A control using a small screwdriver until a zero reading is obtained. The RESET switch should be held in while zeroing the instrument.

Once the RESET switch is released, the display will remain at zero and drift less than 1% of full scale in one minute. Repeat this process for DET B, if necessary.

Place the function switch in the RATE position and the detector in the DET A position. The display will show a value, but it should show a zero value in approximately five to seven seconds. Repeat this process for DET B. The monitor will zero automatically when it is used in the RATE position, so it is not necessary to use the RESET switch.

Connect the probe or probes to the rear panel connectors. Before taking readings, each probe should be calibrated as discussed in the following paragraphs.

2.3 Calibration

Calibration is performed by positioning the diode at a point in a phantom where the dose is accurately known. The screwdriver adjustment (CAL A or CAL B), located on the front panel, can now be performed. Adjust CAL A or CAL B (depending on the detector being calibrated), until the indicated dose or dose rate appears on the display.

NOTE

If two detectors are connected, alternate readings can be taken by switching between DET A and DET B. Both detectors should be calibrated concurrently.

The highest degree of calibration can be attained by calibrating at a dose or dose rate near $\frac{1}{2}$ scale (1000 cGy or 1000 cGy/min). This is due to display resolution.

After the battery check, instrument zeroing, and calibration have been performed, measurements can be taken.

2.4 Making a Measurement

Rate: cGy/min

1. Zero the instrument if not previously zeroed. Refer to "Zeroing the Instrument", at the beginning of Section 2.2.
2. Connect the appropriate probe/probes to the DET A, DET B inputs.
3. Select the RATE mode on the front panel.
4. Initiate a radiation exposure.
5. During the exposure, view the reading on the display.

Dose Mode: cGy

1. Zero the instrument if not previously zeroed. Refer to "Zeroing the Instrument", at the beginning of Section 2.2.
2. Connect the appropriate probe/probes to the DET A, DET B inputs.
3. Select the DOSE mode on the front panel.
4. Initiate a radiation exposure.
5. Upon completion of the exposure, view the results on the front panel display.
6. Alternate between DET A and DET B to view both channels.

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