peo DETECTION

LUDLUM MEASUREMENTS, INC.

Model 3007 Series

Neutron Dose Survey Meter

with Optional Internal Gamma Detector

Features

- Small & Light 19.5 cm (7.7 in.) REM Ball
- Moderated Neutron Detector
- Range: 0 - 100 mSv/h (0 - 10,000 mrem/hr)
- Gamma Rejection up to 0.1 Sv/h (10 R/hr)
- "i" Versions: Internal Gamma Detector Option for Exposure/Dose Measurements
- Rate, Max, Integrated Dose & Count Modes
- Digital Calibration, Data Logging, Auto-Ranging, USB
- Large, Backlit, Easy-to-Read LCD Screen
- Simple 5-Button Interface

Meter Display and Controls

Introduction

The Model 3007 Series of neutron dose survey meters combines a handheld digital meter with a 19.5 cm (7.7 in.) diameter REM ball containing a 3He detector to measure and monitor neutron radiation. Several versions of these instruments are available. The Model 3007 and Model 3007B use similar detectors that only differ by the boron concentration in the internal borated layer. The Model 3007 has a lower boron concentration and offers a typical sensitivity of 10 cpm per µSv/h (100 cpm per mrem/hr), but tends to overrespond in the 5 keV range. The Model 3007B has a higher boron concentration and a lower sensitivity, typically 4.5 cpm per µSv/h (45 cpm per mrem/hr), but does not have the same overresponse issue. The Model 3007-1 has a higher pressure detector that offers greater sensitivity, typically 17 cpm per µSv/h (170 cpm per mrem/hr), but falls under shipping regulations due to the pressure.* "i" versions include an internal gamma detector in the meter for exposure or dose measurements. See table at right for available versions.

Each instrument features a large, easy-to-read LCD screen and is controlled using a simple five-button interface. The meter body is made of high-impact plastic, and splash resistant construction allows the instruments to be used outdoors.

Four modes of operation are available – RATE, MAX, COUNT, and DOSE – which can be selected by pressing the MODE button. Measurements can be collected in two sets of units (primary and secondary) for RATE and MAX modes in cps, cpm, Bq, dpm, mR/hr, mrem/hr, or µSv/h units. The user can switch between two sets of units by pressing the UNITS button. Audible alarms can be set in all modes of operation. When enabled with the optional Lumic Data Logger Kit (PN: 4498-1019), data can be logged in any of the operational modes using the LOG button on the handle. Up to 1000 data points can be stored internally.

Instrument setup can be done either through the front-panel controls or via the Lumic Calibration Kit (PN: 4519-865). The Model 3007 is shipped ready to use with batteries and a calibration certificate.

* Since the detector in the Model 3007-1 is classified as a pressure vessel, users must be careful to follow shipping regulations regarding any shipment of this device.

Model	Detec tor	Sensitivity (bare 241AmBe)	Part Number
3007	2 atm 3He tube	10 cpm per µSv/h (100 cpm per mrem/hr)	48-4294
3007B	2 atm 3He tube	4.5 cpm per µSv/h (45 cpm per mrem/hr)	48-4294B
3007-1 *	10 atm 3He tube	17 cpm per µSv/h (170 cpm per mrem/hr)	48-4294-1

Internal Detector Options

Model	Detector / Range	Part Number
3007i	Energy compensated GM Background to 50 mSv/h (5 R/hr)	48-4443
3007Bi		48-4443B
3007i/1	CsI scintillator (not energy compensated) Background to 500 µSv/h (50 mR/hr)	48-4443-1
3007Bi/1		48-4443B-1
3007i/4	Energy compensated GM Background to 500 mSv/h (50 R/hr)	48-4443-4
3007Bi/4		48-4443B-4
3007i/6	Energy compensated GM Background to 10 Sv/h (1 kR/hr)	48-4443-6
3007Bi/6		48-4443B-6

Specifications

MEASUREMENT RANGE: 0-100 mSv/h (0-10,000 mrem/hr)
DETECTOR: 3He proportional detector, 1.6 x 2.5 cm (0.6 x 1.0 in.) (D x L), surrounded by 19.6 cm (7.7 in.) diameter high density polyethylene sphere
SENSITIVITY: see table on front
ENERGY RESPONSE: provides an approximate inverse RPG curve for neutrons from thermal to 12 MeV
GAMMA REJECTION: < 10 cpm through 0.1 Sv/h (10 R/hr) (137Cs gamma)
THRESHOLD: -2 mV
HIGH VOLTAGE: adjustable from 300 to 2400 Vdc
OPERATING VOLTAGE: approximately 1200 Vdc
INTERNAL DETECTOR ("i" versions): energy compensated GM or scintillation detector (see table on front)
LINEARITY: reading within 10% of true value
MODES: four operational modes including rate, max, integrated dose, and count
DISPLAY: 3-digit LCD with large 20 mm (0.8 in.) digits. Units: (k)(M)c, (k)cps, (k)(M)cpm, (k)(M)d, (k)(M)Bq, (k)(M)Bq/cm2, (k)(M)dpm, (μ)(m)(k)(M)R, (μ)(m)(k)R/h, (μ)(m)(k)(M)Sv, (μ)(m)Sv/h, (μ)(m)(k)(M)Rem, (μ)(m)(k)Rem/h Indicators: bar graph, radiation type (alpha (α), beta (β), gamma (γ), neutron (n)), mode (MAX, INTG), three alarm levels (ALARM 1,2,3), fault messages (FAULT, OVERLOAD, LOSS OF COUNT, OVERRANGE), USB, wireless, audio, low-battery
DISPLAY RANGE: minimum and maximum display can be set to limit display to calibrated range.

- 0 cps to 999 kcps
- 0 cpm to 99.9 Mcpm
- 0 Bq to 999 MBq
- 0 Bq/cm2 to 999 MBq/cm2
- 0 dpm to 999 Mdpm
- 0 μR to 999 MR
- 0 μR/h to 9.99 kR/h
- 0 μSv to 999 MSv/h
- 0 μSv/h to 999 Sv/h
- 0 μRem to 999 MRem
- 0 μRem/h to 9.99 kRem/h
- 0 c to 999 Mc (counts)
- 0 d to 999 Md (disintegrations)

BACKLIGHT: built-in ambient light sensor automatically activates low-power LED backlight, unless internal dipswitch is set to continuous-on (will reduce battery life)
USER CONTROLS:

- ON/OFF (non-"i" versions) - shortpress to turn ON, short press to acknowledge alarms, long press to reset RATE/MAX, extra-long press plus 3 second to turn OFF
- ON/AUD ("i" versions) - short press to turn ON, short press to adjust audio level, extra-long press plus 3 seconds to turn OFF
- UNITS - short press changes the units between count rate, dose/exposure, or activity
- AUDIO (non-"i" versions) - short press to adjust audio level
- DETECTOR ("i" versions) - short press to change between external and internal detectors
- MODE - short press alternates between modes: RATE (displays count rate), MAX (captures peak rate), COUNT (user-selectable preset count time from 0 to 31.68 years), and DOSE
- LOG - short press to log current display (or initiate count in COUNT mode), extra-long press to change count in scaler mode. Data logging requires Lumic Data Logger Kit.

RESPONSE TIME: user-selectable from 1 to 60 seconds, auto SLOW, auto FAST, fixed SLOW (22 s), or fixed FAST (4 s)
ALARMS: three adjustable alarm setpoints for each unit in all four modes of operation
SELF-DIAGNOSTICS: detects and reports internal instrument issues, indicated by showing FAULT on the display and an audio warning
OVERLOAD PROTECTION: high count rate saturation protection prevents false display of lower count rates. If the instrument detects an overload condition, it will show OVERLOAD on the display and trigger an audio warning.
LOSS OF COUNT PROTECTION: after a user-settable number of seconds with no pulses from the detector, the instrument will trigger the alarm audio, and show LOSS OF COUNTS and the affected unit on the display. Disabled by default.
OVERRANGE: if the reading exceeds the predefined detector range, the instrument will flash a maximum reading, show OVERRANGE on the display, and trigger an audio warning
AUDIO: approximately 4.5 kHz; click audio greater than 65 dB at 0.6 m (2 ft), alarm audio greater than 72 dB
CALIBRATION PROTECTION: internal dipswitch to disable front-panel calibration parameter changes
POWER: four alkaline "AA" batteries
BATTERY LIFE:
Non-"i" versions: approximately 375 hours of operation
"i" versions: approximately 175 hours of operation
16-hour low battery warning
WORKING ENVIRONMENT: splash-proof shields for outdoor use
CONSTRUCTION: high-impact plastic with water-resistant rubber seals and separate battery compartment
TEMPERATURE RANGE: -20 to 50 °C (-5 to 122 °F), may be certified for operation from -40 to 65 °C (-40 to 150 °F)
ENVIRONMENTAL RATING: NEMA rating of 3X, IP rating of 53
SIZE (H x W x L): 37.1 x 19.5 x 24.4 cm (14.6 x 7.7 x 9.6 in.)
WEIGHT: 5.5 kg (12.2 lb), with batteries

Options

- Lumic Calibration Kit (PN: 4519-865)
- Lumic Data Logger Kit (PN: 4498-1019)
- Bluetooth (PN: 4519-564)
- Headphone Jack (PN: 4498-555)
- Carrying Case (PN: 2310377)
- Rolling Case (PN: 2311487)