

# Pressurized $\mu$ R Ion Chamber Survey Meter

## Inovision Model 451P



- High sensitivity  $\mu$ R measurements of exposure and exposure rate
- Available with dose equivalent energy response (SI units)
- Fast response to measure radiation from leakage, scatter beams and pinholes
- Ergonomic, anti-fatigue handle with replaceable grip and wrist strap
- Excel add-in for Windows® for data logging and selection of instrument operating parameters (optional)
- Low noise chamber bias supply for fast background reading
- Bright, highly visible colors
- Easy touch keys

### Introduction

The Model 451P state-of-the-art ion chamber survey meter is a hand-held battery operated unit designed for use in both rugged and normal environments. The Model 451P features a pressurized ionization chamber, providing enhanced sensitivity and improving energy response to measure gamma and x-ray radiation. The Model 451P employs microprocessor and LCD technology. The ergonomic handle, features a large diameter cushioned grip and is designed to reduce fatigue associated with extended use. The case is constructed of lightweight, high strength materials and is sealed against moisture. The user must specify R or Sv when ordering.

The display features an analog bar graph, 2.5 digit digital readout, low battery and freeze mode indicators. User controls consist of an ON/OFF button and a MODE button. The unit is auto-zeroing and auto-ranging. The display features circuitry that automatically activates the backlight in low ambient light conditions.

The RS-232 interface can be connected directly to a computer for use with the Excel add-in for Windows, enhancing the functionality of the instrument. The software allows for data retrieval, user parameter selection and provides a virtual instrument display with audible (requires sound card) and visual alarm indication. The software may be customized by the user for specific applications.

### Applications

The Model 451P is used in a wide range of medical and health physics applications. The Model 451P was designed to measure leakage and scatter around diagnostic x-ray and radiation therapy suites. Also, the Model 451P is ideal for site surveys and is regularly used by x-ray manufacturers, government agencies, state inspectors, research labs, biomedical technicians, and in airports for baggage inspection equipment maintenance.

### Features

- Ideal for a wide range of applications including NDT, x-ray, and environmental
- Battery operated
- Auto-ranging and auto-zeroing
- RS-232 communications interface
- Measures rate and dose simultaneously
- Tripod mount for stationary, area monitor applications
- Freeze mode indicates peak reading
- Programmable flashing display
- Automatic, ultra-bright LCD display
- Separate integrate mode
- Excel add-in for Windows (optional)

## Specifications

**Radiation detected** Beta above 1 MeV, Gamma and x-rays above 25 keV

### Operating ranges

0 to 500 $\mu$ R/h	or	0 to 5 $\mu$ Sv/h
0 to 5 mR/h	or	0 to 50 $\mu$ Sv/h
0 to 50 mR/h	or	0 to 500 $\mu$ Sv/h
0 to 500 mR/h	or	0 to 5 mSv/h
0 to 5 R/h	or	0 to 50 mSv/h

**Accuracy** Within 10% of reading between 10% and 100% of full scale indication on any range, exclusive of energy response. Calibration source is  $^{137}\text{Cs}$

**Detector Chamber:** 300 cc volume pressurized air ionization chamber to 8 atmospheres or 125 psi

**Controls** ON/OFF and MODE

**Automatic features** Auto-zeroing, auto-ranging, and auto-backlight

**Response time** Analog response time from 10% to 90% of reading for a full scale step increase is dependent on operating range. Response time for a step increase in radiation exposure rate from background:

Step increase, background to	Time to reach 90% of final value
400 $\mu$ R/h	4.8 sec
4 mR/h	3.3 sec
10 mR/h	4.3 sec
40 mR/h	4.5 sec
100 mR/h	2.7 sec
1 R/h	2 sec
4 R/h	2.7 sec

The following table shows time measured from 10% to 90% of final value for a step increase or decrease in exposure rate such that a range change does not occur. These values are the response times for the various ranges:

Range	10% to 90%
0 to 500 $\mu$ R/h (5 $\mu$ Sv/h)	5 sec
0 to 5 mR/h (50 $\mu$ Sv/h)	2 sec
0 to 50 mR/h (500 $\mu$ Sv/h)	1.8 sec
0 to 500 mR/h (5 mSv/h)	1.8 sec
0 to 5 R/h (50 mSv/h)	1.8 sec

**Power requirements** Two 9 V alkaline, 200 hours operation

**Warm-up time** Less than two minutes for initial operation when the instrument is in equilibrium with ambient temperature

**Display** LCD analog/digital with backlight

**Analog** 100 element bar graph 2.5 inch (6.4 cm) long. Bar graph is divided into five major segments, each labeled with the appropriate value for the range of the instrument

**Digital** 2.5 digit display is followed by a significant zero digit depending on the operating range of the instrument. The units of measurement are indicated on the display at all times. Digits are 0.25 inches (6.4 mm) high. Low battery and freeze indicators are also provided on the display

## Modes

**Integrate mode** Operates continuously 30 seconds after the instrument has been turned on. Integration is performed even if the instrument is displaying in mR/h or R/h

**Freeze mode** Will place a tick mark on the bar graph display to hold on the peak displayed value. The unit will continue to read and display current radiation values

## Environmental

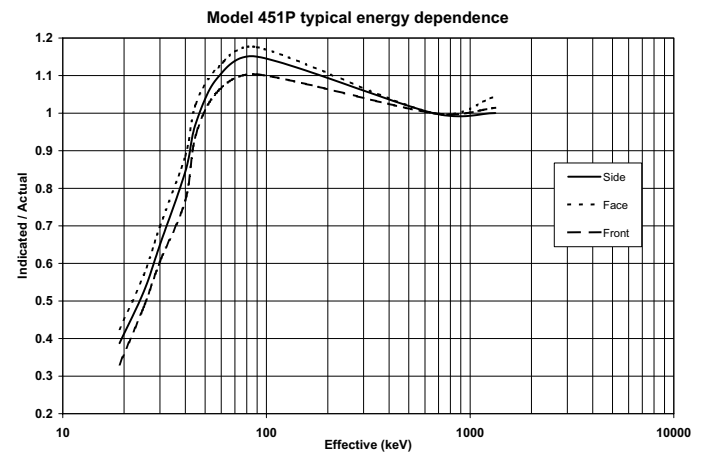
**Temperature range** - 4° to + 122°F (- 20° to + 50°C)

**Relative humidity** 0 to 100%

**Geotropism** Negligible

## Typical energy dependence

$^{16}\text{N}$ itrogen gamma rays are 110% to 120% of indicated readings as determined at the University of Lowell



**Dimensions** 4 (w) x 8 (d) x 6 in (h) (10 x 20 x 15 cm)

**Weight** 2.4 lb (1.07 kg)

## Optional accessories

**451 Assistant for Excel** (Model 451EXL), includes RS-232 interface cable

**Single Unit Carrying Case** (Model 190HPS)

**Multiple Unit Carrying Case** (Model 190HPC)

**Check Source,  $^{137}\text{Cs}$ , 10  $\mu$ Ci. Flat disc, 1 inch diameter** (Model 62-103)

## Available model(s)

**451P-RYR** Pressurized  $\mu$ R Ion Chamber Survey Meter with standard chamber

**451P-DE-SI-RYR** Pressurized  $\mu$ R Ion Chamber Survey Meter with dose equivalent chamber

Suffix designation RYR = red/yellow/red

For additional information, please contact Cardinal Health, Radiation Management Services customer service at 440.248.9300, 800.850.4608, or fax: 440.349.2307; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

## CE Tested. Meets applicable standards.

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