

Pressurized μ R Ion Chamber Survey Meter

Victoreen[®] Model 451 P



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 xray 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.

RS

Radiation Safety

- High sensitivity μ 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

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 μ R/h or 0 to 5 μ Sv/h

0 to 5 mR/h or 0 to 50 μ Sv/h

0 to 50 mR/h or 0 to 500 μ 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}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, Time to reach 90% background to	Time to reach 90% of final value
400 μ 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 μ R/h (5 μ Sv/h)	5 sec
0 to 5 mR/h (50 μ Sv/h)	2 sec
0 to 50 mR/h (500 μ 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

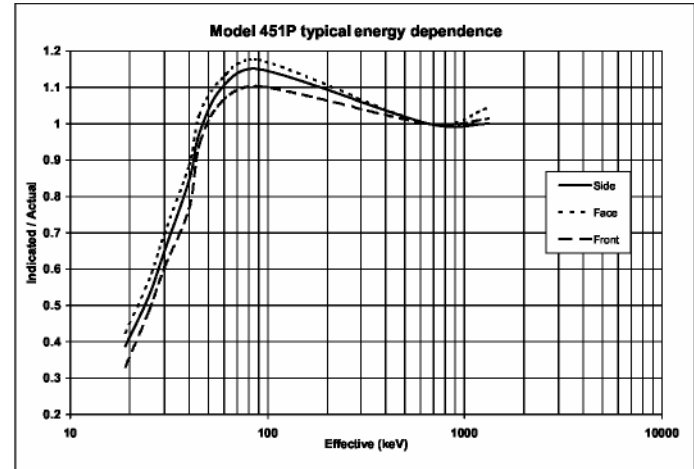
Environmental

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

Relative humidity 0 to 100%

Geotropism Negligible

Typical energy dependence ^{16}N Nitrogen 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)

Check Source, ^{137}Cs , 10 μ Ci. Flat disc, 1 inch diameter (Model 62-103)

Available model(s)

451P-RYR Pressurized μ R Ion Chamber Survey Meter with standard chamber

451P-DE-SI-RYR Pressurized μ R Ion Chamber Survey Meter with dose equivalent chamber

Tested. Meets applicable standards.



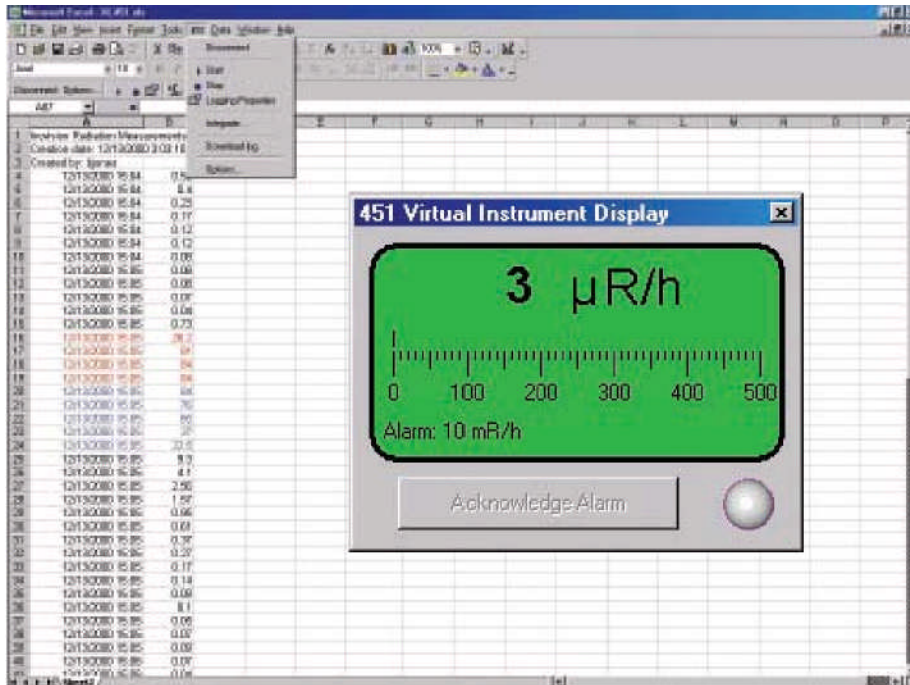
For more information, tsgxray.com

Specifications are subject to change without notice.

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451 Assistant for Excel

Model 451 EXL



- Complete remote radiation information management for Model 451P and 451B Ion Chamber Survey Meters
- Color-coded data provides quick identification for radiation levels and alarm acknowledgment status

Introduction

The 451 Assistant for Excel is an Excel Add-in, a program that adds optional commands and features to Microsoft® Excel. The 451 Assistant provides remote control for many of the 451 functions, real-time data logging with user defined alarm parameters and a real time virtual instrument display. The 451 Assistant automatically loads with Excel once it is installed.

The 451 Assistant data logging function automatically records real time measured data in an active Excel worksheet. Each measurement in the data log is automatically placed in the active worksheet cell, then the active cell moves down to the next row of cells where it will place the next set of measured data. Each recorded measurement is time and date stamped. The 451 Assistant provides user configurable audible and visual alarms for the real time logged data. The picture and data shows radiation levels above the preset alarm in red, the blue data represents the radiation level below the alarm that has not been acknowledged. The black data shows when the alarm was acknowledged. See Control Options for more details.

The 451 Assistant for Excel allows the user to configure the 451's internal data logging and alarm settings. It may also be used to download the 451's internal data log and saves it in an Excel worksheet where it can be easily graphed for quick trend analysis.

The 451 Assistant provides automatic timed integrated dose measurement over a user defined integration period or user controlled integrated dose measurement. After the integration timer has expired or the user has stopped integration, the 451 Assistant retrieves the integrated dose from the 451 and inserts the integrated dose in the active worksheet cell and the average dose rate is placed in the next cell to the right.

Applications

This Model 451EXL information management software program is ideal for the facility Radiation Safety Officer or anyone responsible for maintaining a permanent record of spills and accidents for adherence to state and NRC requirements. The remote control of the 451 series of Ion Chambers may be accessed by any computer on your facility network providing remote information management.

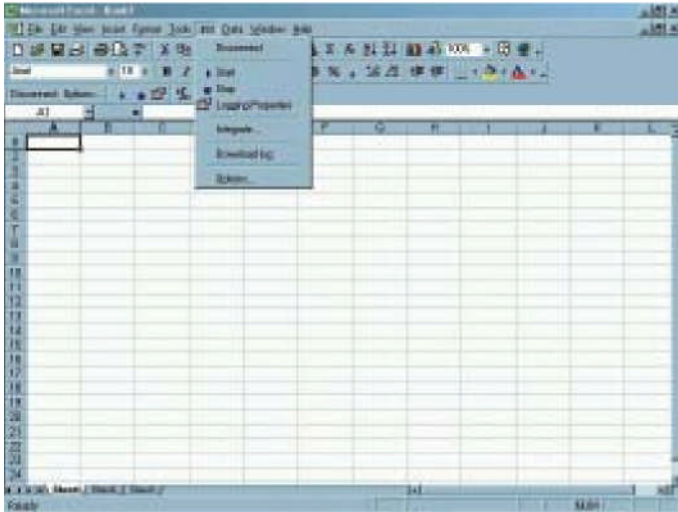
Features

- Real time data logging in protected Excel worksheet
- Virtual instrument display with audible and visual alarm indication
- Remote user definable alarm settings
- Downloads 451's internal data log into Excel worksheet
- Provides remote control and instrument configuration
- Complete on-line help speeds learning
- Compatible with Windows® 95, 98, ME®, NT® 4.0, 2000, XP® and Excel 97, 2000
- Package includes manual, diskette set, and 25 ft RS-232 cable, Model 1020039000

Specifications

Controls

The 451 Assistant menu and toolbar provide an interface for the user to remotely control the 451, configure the 451, download the 451's internal data log and start / stop real time data logging and integrated dose measurements



Connect / Disconnect Connects or disconnects the 451 to the computer's communication port

Start / Stop Starts and stops computer data logging. When data logging is started, logged data is placed in the active Excel worksheet and the worksheet is protected to provide data security

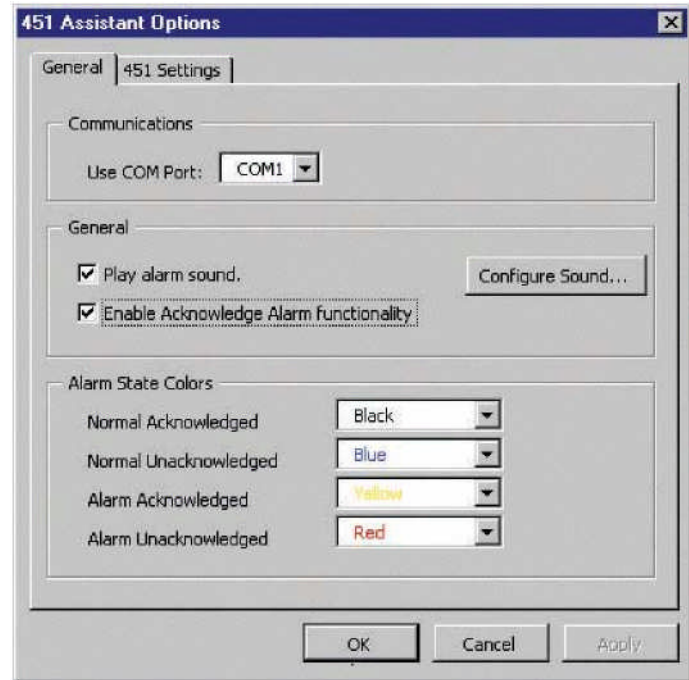
Logging Properties Allows the user specify computer data logging parameters. The data logging sample interval (2 seconds to 999 hours), total data logging period (2 seconds to 49 days) and computer data log alarms may be specified through this menu. These parameters are independent of the 451's internal data logging functions

Integrate... Allows the user to select timed integrated dose measurement or user controlled integrated dose measurement. The user may also specify the integration period for timed integration from 1 minute to 999 hours. When timed integrate mode is selected, the 451 Assistant for Excel stops the integrated dose measurement after the specified integration period has expired

When timed integrate mode is not selected, the user controls the integration period and the integration time is displayed in real time. The integrated dose and average dose rate are recorded in the active Excel worksheet when integration is complete

Download Log The 451 is capable of internally logging data at a user defined interval from 1 to 255 seconds with a total capacity of up to 2700 data points. This feature allows the user to download the 451's internal data log into the active Excel worksheet

Options Allows the user to change many properties of the 451 Assistant for Excel and several of the 451s' properties. The user may configure the various visual and audio alarm features of the 451 Assistant for Excel for each data point that is logged. The 451 Assistant can be configured to use 2 or 4 alarm states. The four alarm states are acknowledged normal (below alarm level), unacknowledged normal, acknowledged alarm and unacknowledged alarm. The user may also select the communication port used by the 451 (default is COM1). The 451's internal data logging parameters and alarm settings may also be changed from the Options menu



System requirements

- Windows 95, 98, ME, NT 4.0, 2000, or XP
- Microsoft Excel 97 or 2000
- One serial port (COM1 through COM4)

Available model(s)

451EXL 451 Assistant for Excel

www.tsgxray.com

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