

FLUKE®**Biomedical**

ASM-990 Series Advanced Survey Meter

Technical Data



The ASM-990 Series Advanced Survey Meter can detect alpha, beta, gamma, or x-ray radiation within an operating range of 1 μ R/hr to 1 R/hr (1 to 5,000,000 CPM), depending on the selected probe (Geiger-Mueller, neutron, proportional counter, scintillation). With the proper probe combination, this meter can be used as a general survey meter, an area monitor, a wipe-test counter, and a contamination monitor.

Designed to meet the high-technology requirements of health physics, medical physics, and nondestructive testing applications, the ASM-990 Series is well-suited for a wide range of end users, including: Radiation safety officers, nuclear medicine laboratories, diagnostic x-ray and hospital emergency-room technicians, environmental-health physicists, and emergency responders.

The unit, with purchased probe, is shipped calibrated and ready-to-use and includes an MHV connector to ensure compatibility with all Fluke Biomedical probes. The 992 includes a fully calibrated internal energy-compensated 1 R/hr GM detector. The 993 features a fully calibrated internal pancake detector, as well as an internal energy-compensated 1 R/hr GM detector.

Key features

- Simultaneous auto-scaling measurement of rate and dose, with the capability to record peak rate
- Up to five different probes can be calibrated with one unit
- Data-logging survey mode feature allows user to store up to five separate survey sequences
- Saved data can be uploaded to a PC via included Infrared Data (IrDA) transmitter
- Easy-to-use multifunction keypad for intuitive menu navigation
- Backlit analog/digital LCD display with full-range audio output capability
- Barcode scanner (optional)
- Auto power-down feature extends battery life



Data logging modes

The ASM-990 Series' Log Data feature can easily be accessed via the setup sub-menu. The unit can log/save a maximum of 500 data points in any of three separate modes (manual and survey modes can utilize the optional barcode scanner).

Manual: Individual rate data points can be saved by pressing the Start/Stop/Rst/Save button.

Timed: A data point will automatically be saved at user-selectable time intervals in the range of 1 second to 255 seconds.

Survey: Programmed sequences can be accessed via the menu system. Pressing the Start/Stop/Rst/Save button saves the current reading and displays the next survey location.

Programming of survey sequences, as well as retrieval of logged data, is accomplished via the built-in IrDA port.

Label names up to 20 characters can be programmed into the unit to identify the individual survey locations.

Probe connector: The unit is available with an MHV connector. The unit can be used with multiple probes (5 total) by selecting the appropriate probe from the main menu. All calibration data for each probe is stored in the unit's EEPROM.

Specifications

ASM-990 and ASM-992

Operating modes: Rate, timed-peak hold, integrate, data logging, and scaler (dual option: "based on measurement" or "based on time")

Operating rate ranges (dependent on selected probe): Complementary units in the integrate mode with the integrated time value in seconds

$\mu\text{R/hr}$	mR/hr	R/hr
$\mu\text{rem/hr}$	mrem/hr	rem/hr
$\mu\text{Sv/hr}$	mSv/hr	Sv/hr
CPM	CPS	
DPM 99mTc	DPS 131I	
Bq ^{125}I	kBq ^{123}I	MBq ^{201}Tl
$\mu\text{Ci } ^{67}\text{Ga}$	mCi ^{18}F	Ci ^{57}Co
μR	mR	R
μrem	mrem	rem
μSv	mSv	Sv
C (counts)	kC	MC
D (distintegrations)	kD 99mTc	MC 131I

Accuracy (dependent on selected probe): Within 10 % of reading between 10 % to 100 % of full scale indication on any range, exclusive of typical energy dependence

Detector: Accepts GM detectors and scintillation probes operating at high voltages between 500 volts and 1300 volts

Temperature range:
-10 °C to 50 °C (14 °F to 122 °F)

Relative humidity:
0 % to 95 %, non-condensing

Warm up time: 5 second diagnostic check

Check source: Natural uranium, mounted on the case

Power requirements: Two "D" cells, 150 hours operation, automatically indicates when battery is low

Housing material: Proprietary polycarbonate, splash-proof case

Display: Liquid crystal display, 5.6 cm x 5.6 cm (2.2 in x 2.2 in)

Dimensions (LxWxH):
10.5 cm x 27.7 cm x 6.4 cm
(4.1 in x 10.9 in x 2.5 in)

Weight (without probe):
0.95 kg (2.1 lb)

ASM-992 and ASM-993

Range: 0.1 mR/hr to 1 R/hr

Radiation detected: Gamma above 60 keV

Accuracy: ± 10 % of reading between 10 % and 100 % of full scale on any range, exclusive of energy dependence

ASM-993

Range: Background to 80 mR/hr

Radiation detected: Alpha above 3.5 MeV, beta above 35 keV and gamma above 6 keV

Window: 15 cm² (1.75 in Ø) mica, 1.4 mg/cm² to 2.0 mg/cm²

Typical background: 30 CPM

Protective screen: Stainless steel, hexagonal pattern providing 86 % open area

Accuracy: ± 10 % of reading between 10 % and 100 % of full scale on any range, exclusive of energy dependence (protective cover open)

Efficiency: The internal pancake detector efficiency is shown below. In a recent performance check, the numbers shown represent typical results obtained:

Isotope		% Efficiency	
¹⁴ C	²⁴¹ Am	5 %	8 %
⁹⁹ Tc	¹²⁹ I	12 %	2 %
¹³⁷ Cs	²³⁰ Th	24 %	15 %
⁹⁰ Sr	²³⁹ Pu	59 %	12 %
³⁶ Cl		26 %	

Note: The efficiency formula used to calculate the % Efficiency is: Eff. % = (CPM x 100)/DPM

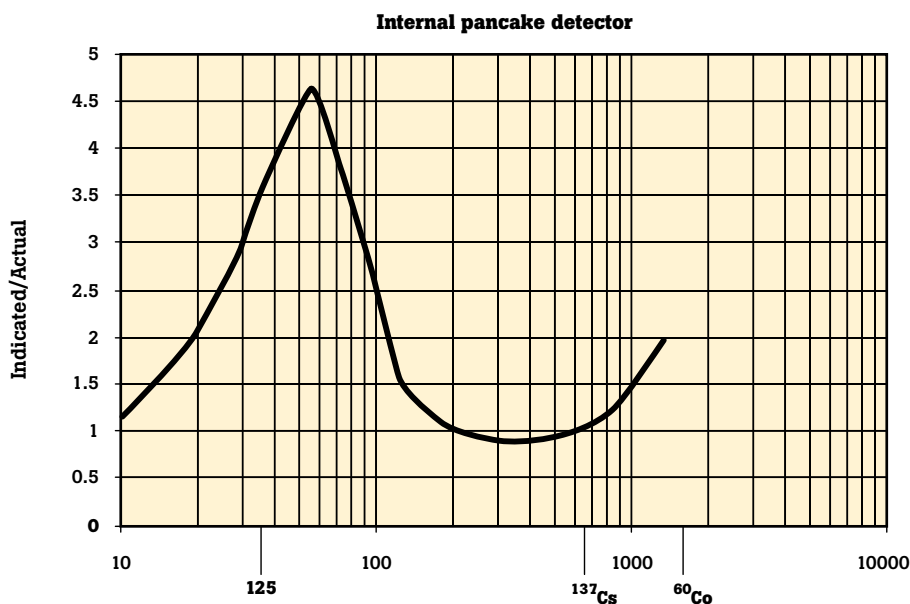
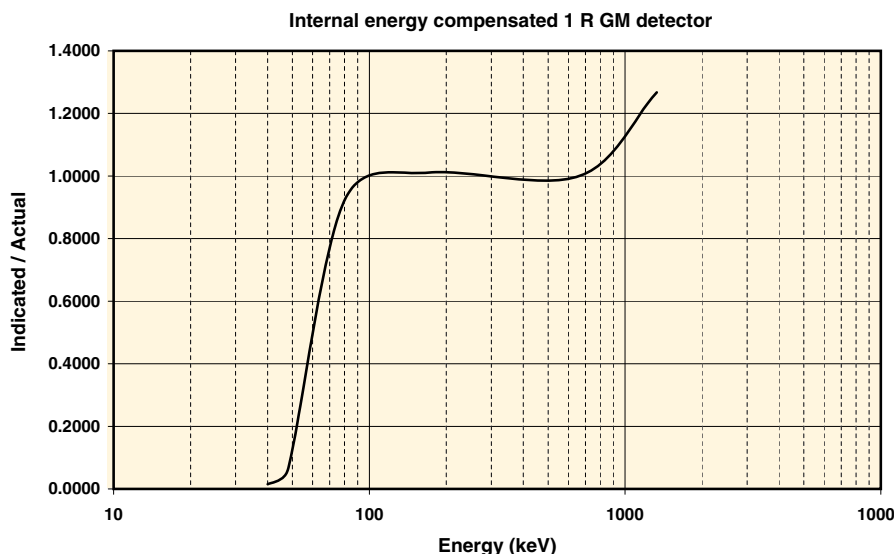
Dimensions (LxWxH):

10.5 cm x 27.7 cm x 6.4 cm
(4.1 in x 10.9 in x 2.5 in)

Weight (without probe):

1.09 kg (2.4 lb)

Typical energy dependence



Model Comparison

Model	Advanced survey meter	Barcode reader	Internal energy compensated 1 R/hr GM detector	Internal pancake detector
990	•			
990BC	•	•		
992	•		•	
992BC	•	•	•	
993	•		•	•
993BC	•	•	•	•

Geiger-Mueller and Scintillation Probe Selection Guide

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Pancake GM Probe

Model 489-110D

- Alpha above 3.5 MeV
- Beta above 35 keV
- Gamma and x-ray > 6 keV
- To 80 mR/hr (800 µSv/hr)



Energy Compensated GM Probe Model 90-12

- Beta above 200 keV
- Gamma and x-ray > 12 keV
- Up to 1 R/hr (10 mSv/hr)



Thin End Window GM Probe

Model 489-35

- Alpha above 4 MeV
- Beta above 70 keV
- Gamma and x-ray > 6 keV
- Up to 80 mR/hr (800 µSv/hr)



Gamma Scintillation Probe

Model 489-50

- Gamma and x-ray > 60 keV
- 1 x 1 in, 1.5 x 1.5 in and 2 x 2 in NaI (Tl) detectors available



Alpha Scintillation Probe

Model 489-60

- Alpha above 4 MeV
- 1.5 in Ø ZnS (Ag)



Utility 1 R/hr GM Probe

Model 491-40

- Beta above 200 keV
- Gamma and x-ray > 12 keV
- Up to 1 R/hr (10 mSv/hr)



Alpha/Beta Scintillation Probe Model 425-200

- Alpha above 350 keV
- Beta above 14 keV
- Plastic scintillator



Scintillation Pancake Probe

Model 489-200

- Beta above 100 keV
- Gamma and x-ray > 25 keV
- NaI (Tl) rectangular



Low Energy Gamma Scintillation Probe

Model 425-110

- Gamma and x-ray > 10 keV
- NaI (Tl) 1 mm thick



100 cm² Beta/Gamma Scintillation Probe

Model 190-100BGS

- Beta ⁹⁰Sr efficiency 65 %
- 126 cm² active area
- Plastic scintillator



Ordering Information

990 Advanced Survey Meter

990BC Advanced Survey Meter with barcode reader

992 Advanced Survey Meter with an internal 1 R GM detector

992BC Advanced Survey Meter with an internal 1 R GM detector and barcode reader

993 Advanced Survey Meter with an internal 1 R GM detector and internal pancake detector

993BC Advanced Survey Meter with an internal 1 R GM detector, internal pancake

Optional accessories

990-IR-USB USB Port IrDA Adapter

990CC Carrying Case

990WM Wall Mounting Bracket

990PH Probe Holder for 489-110D

990UPH Universal Probe Holder

990SH Soft-Sided Holster

990SA Shoulder Strap Assembly

Note: The shoulder strap assembly is only available for the ASM-993 and must be ordered with the instrument and factory installed.

Note: The ASM-990 series, with the customer selected probe is calibrated to NIST standards. The ASM-990 series with GM probe standard calibration is in R, Sv, and rems. Scintillation detectors are calibrated in counts. Radionuclide specific efficiency calibrations are available upon request. For probe selection and calibration services, see next page.

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The accuracy you need
from a company you can trust.

About Fluke Biomedical

Fluke Biomedical is the world's leading manufacturer of quality biomedical test and simulation products. In addition, Fluke Biomedical provides the latest medical imaging and oncology quality-assurance solutions for regulatory compliance.

Today, biomedical personnel must meet the increasing regulatory pressures, higher quality standards, and rapid technological growth, while performing their work faster and more efficiently than ever. Fluke Biomedical provides a diverse range of software and hardware tools to meet today's challenges.

Fluke Biomedical Regulatory Commitment

As a medical device manufacturer, we recognize and follow certain quality standards and certifications when developing our products. We are ISO 9001 certified and our products are:

- FDA Compliant
- CE Certified, where required
- NIST Traceable and Calibrated
- UL, CSA, ETL Certified, where required
- NRC Compliant, where required

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10/2007 3129643 D-EN Rev A