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 µR/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

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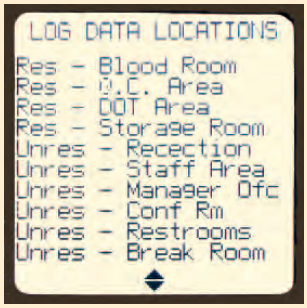
Data logging modes

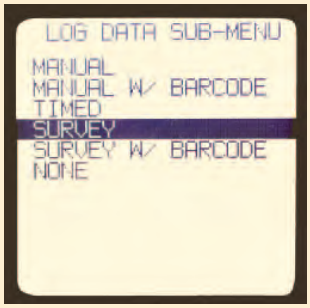
The ASM-990 Series' Log Data feature can easily be accessed via the setup sub-menu. The unit can log/save a maximum of 500 data points in any of three separate modes (manual and survey modes can utilize the optional barcode scanner).

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

<table>
<tr><th colspan="2">ASM-990 and ASM-992</th></tr>
<tr><td>Operating modes</td><td>Rate, timed-peak hold, integrate, data logging, and scaler (dual option: "based on measurement" or "based on time")</td></tr>
<tr><td>Operating rate ranges (dependent on selected probe):</td><td>Complementary units in the integrate mode with the integrated time value in seconds
<table>
<tr><th>µR/hr</th><th>mR/hr</th><th>R/hr</th></tr>
<tr><td>µrem/hr</td><td>mrem/hr</td><td>rem/hr</td></tr>
<tr><td>µSv/hr</td><td>mSv/hr</td><td>Sv/hr</td></tr>
<tr><td>CPM</td><td>CPS</td><td></td></tr>
<tr><td>DPM ^{99m}Tc</td><td>DPS ^{131}I</td><td></td></tr>
<tr><td>Bq ^{125}I</td><td>kBq^{123}I</td><td>MBq ^{201}Tl</td></tr>
<tr><td>µCi ^{67}Ga</td><td>mCi ^{18}F</td><td>Ci ^{57}Co</td></tr>
<tr><th>µR</th><th>mR</th><th>R</th></tr>
<tr><td>µrem</td><td>mrem</td><td>rem</td></tr>
<tr><td>µSv</td><td>mSv</td><td>Sv</td></tr>
<tr><td>C (counts)</td><td>kC</td><td>MC</td></tr>
<tr><td>D (distintigrations)</td><td>kD ^{99m}Tc</td><td>MC ^{131}I</td></tr>
</table></td></tr>
<tr><td>Accuracy (dependent on selected probe)</td><td>Within 10 % of reading between 10 % to 100 % of full scale indication on any range, exclusive of typical energy dependence</td></tr>
<tr><td>Detector</td><td>Accepts GM detectors and scintillation probes operating at high voltages between 500 volts and 1300 volts</td></tr>
<tr><td>Temperature range</td><td>-10 °C to 50 °C (14 °F to 122 °F)</td></tr>
<tr><td>Relative humidity</td><td>0 % to 95 %, non-condensing</td></tr>
</table>

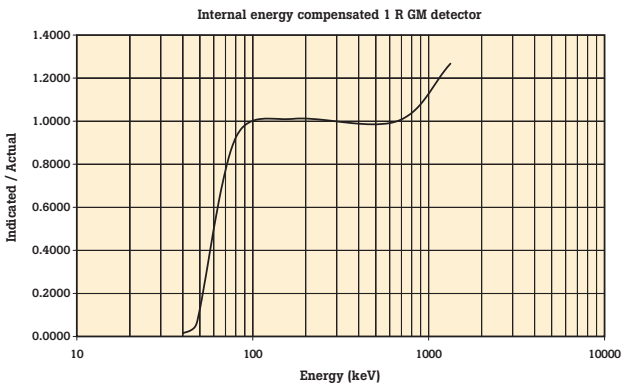
Warm up time	5 second diagnostic check
Check source	Natural uranium, mounted on the case
Power requirements	Two "D" cells, 150 hours operation, automatically indicates when battery is low
Housing material	Proprietary polycarbonate, splash-proof case
Display	Liquid crystal display, 5.6 cm x 5.6 cm (2.2 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 cm^2 (1.75 in Ø) mica, 1.4 mg/cm^2 to 2.0 mg/cm^2
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)
Effeciency	The internal pancake detector efficiency is shown below. In a recent performance check, the numbers shown represent typical results obtained:

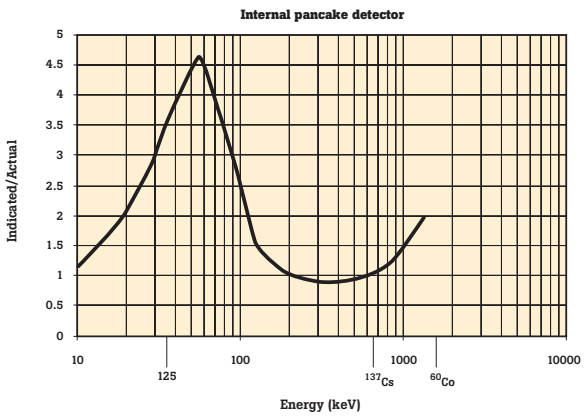
Isotope		% Efficiency	
^{14}C	^{241}Am	5 %	8 %
^{99}Tc	^{129}I	12 %	2 %
^{137}Cs	^{230}Th	24 %	15 %
^{90}Sr	^{239}Pu	59 %	12 %
^{36}Cl		26 %	

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





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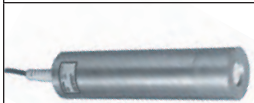
Model comparison

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

	Type	Model	Features
	**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)
	**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)
	**Alpha Scintillation Probe**	Model 489-60	• Alpha above 4 MeV • 1.5 in Ø ZnS (Ag)
	**Alpha/Beta Scintillation Probe**	Model 425-200	• Alpha above 350 keV • Beta above 14 keV • Plastic scintillator
	**Low Energy Gamma Scintillation Probe**	Model 425-110	• Gamma and x-ray > 10 keV • NaI (Tl) 1 mm thick
	**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)
	**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
	**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)
	**Scintillation Pancake Probe**	Model 489-200	• Beta above 100 keV • Gamma and x-ray > 25 keV • NaI (Tl) rectangular

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Ordering information

Models/descriptions

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.

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. Highly credentialed and equipped with a NVLAP Lab Code 200566-0 accredited laboratory, Fluke Biomedical also offers the best in quality and customer service for all your equipment calibration needs.

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 test device manufacturer, we recognize and follow certain quality standards and certifications when developing our products. We are ISO 9001 and ISO 13485 medical device certified and our products are:

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

Fluke Biomedical.
Better products. More choices. One company.

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