Technical Description and Operator's Manual

Survey Meter

SM 3 D

Sensortechnik und Elektronik Pockau GmbH

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Content:

Survey Meter SM 3 D

Hand-held, battery operated radiometer to measure ambient dose equivalent rate of gamma radiation. Beta radiation can be detected in a qualitative manner.

Areas of application:

- Medicine, Life-Sciences, Industry, research and development facilities
- Dose-rate measurements in mixed beta-photon fields
- Evaluation of workplaces

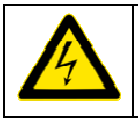
Technical features:

- Simple use
- Light-weight and robust
- Display range of dose rate: 0.00 µSv/h … 999 µSv/h
- Wide energy range for photons (40 keV … 1.3 MeV)
- Averaging at 60 seconds of the dose rate
- Acoustical impulse detection
- Counting tube overload indication
- Signalisation of dose rate overrun if dose rate > 999 µSv/h
- Background lighting

The complete package contains:

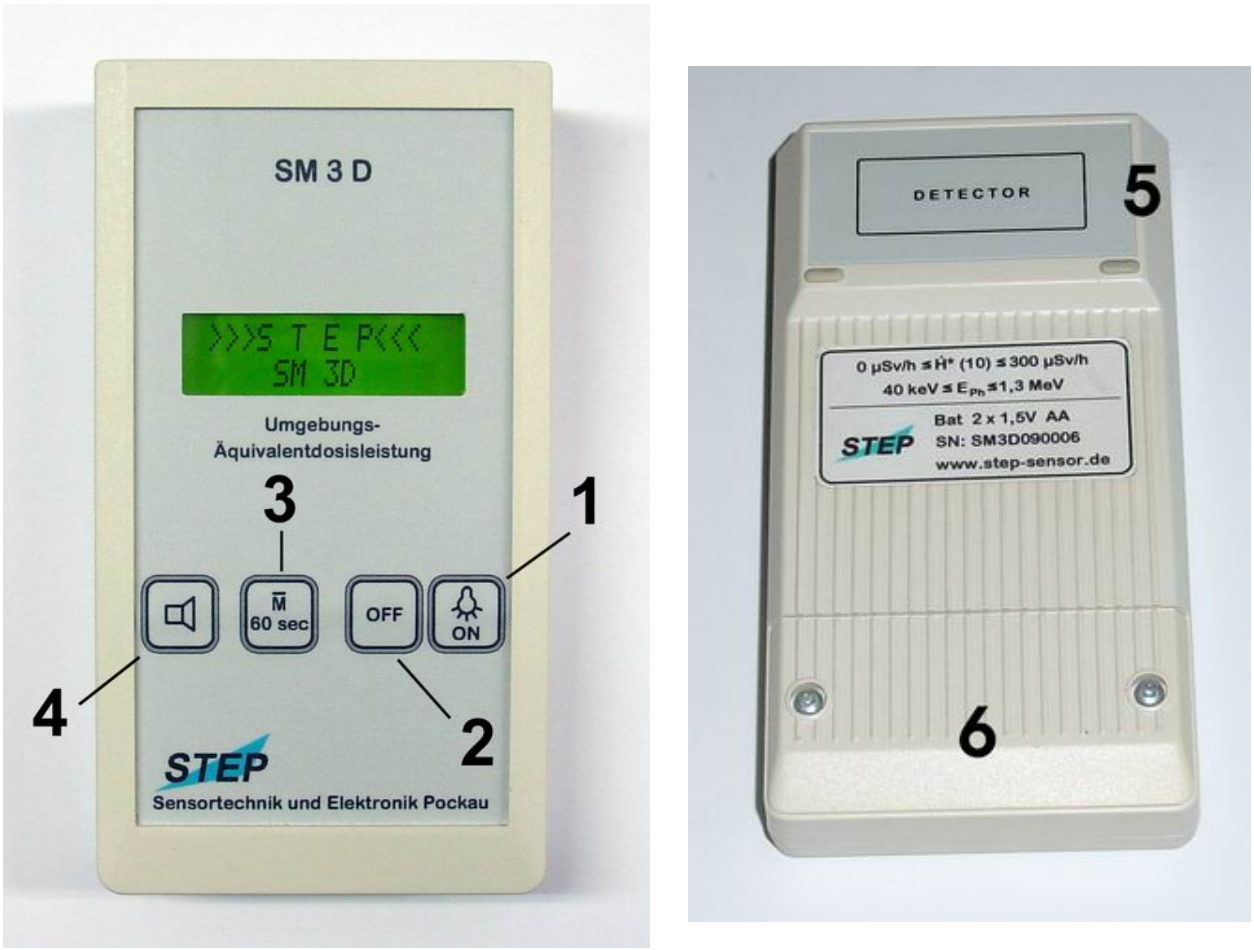
- 1 Survey Meter SM 3 D
- 1 Transport case
- Set of batteries
- 1 Technical Description and Operator’s Manual, certificate of calibration

1 Safety instructions

	- Do not open the device. In case of damages a contact voltage of up to 450 V may be reached at power-on state!

2 Design and control elements

The SM 3 D is a hand-held device to measure ambient dose equivalent rate of gamma radiation. Beta radiation can be detected in a qualitative manner.



1 Switch “Power on” / Light
2 Switch “Power off”
3 Switch “Average value” (60 sec)
4 Switch “Buzzer on / off”
5 Detector orientation
6 Battery compartment

Fig. 1 *Survey Meter SM 3 D*

3 Technical Data

Measuring value	Ambient dose rate equivalent dH*(10)/dt [µSv/h]
Display range of dose rate	0.00 µSv/h to 999 µSv/h (tube overload indication)
Energy range	Photons: 40 keV to 1.3 MeV
Intrinsic error	< 25 % (referring to Co-60)
Radiation detector	Energy-compensated halogen-quenched Geiger-Mueller tube
Overload capacity	10 times
Power supply	2 x 1.5 V LR06 (AA) or 2 x 1.2 V NiMH Accu AA
Operating lifetime	Typically 70 hours with alkaline cell @ background radiation level (background lighting is turn off) * With Accu is the lifetime depending of their capacity
Weight	250 g
Dimensions (L x W x H)	145 mm x 80 mm x 40 mm
Measurement output	Digital on LCD, 2 lines Acoustic
Operating temperature	From 0°C to +50°C
Relative humidity	75 % @ 30 °C
Protection class	IP 60

Note: Technical specifications are subject to change without notice.

4 Measuring principle

The survey meter SM 3 D is a counter tube operated dose rate meter. The counter tube is an energy compensated halogen quenched Geiger-Mueller counter tube for measuring X-ray and γ-ray dose rates. The correction filter has been designed for measuring the Ambient Dose Rate Equivalent H*(10) (in µSv/h) with a flat response within the photon energy range of 40 keV to 1.3 MeV. The counter tube is recommended for dose rates of 0.01 µSv/h up to 999 µSv/h.

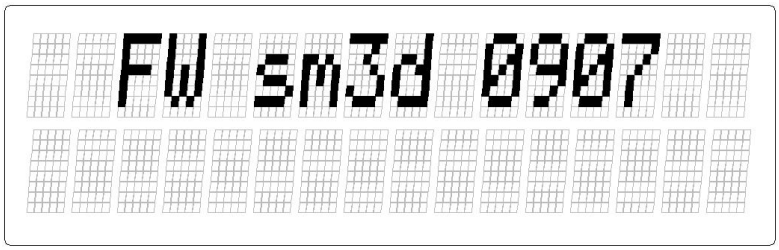
5 Performing measurements

Preparation

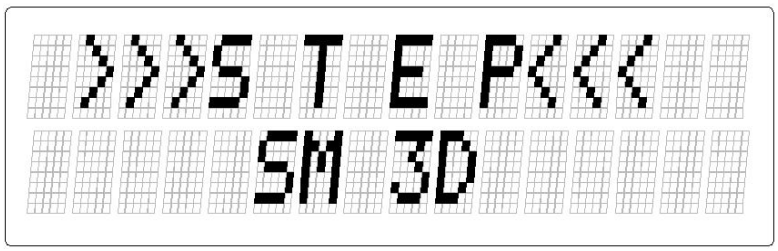
Insert 2 batteries 1,5 V, type AA. Ensure that batteries are inserted in the correct polarity.

Performing measurements

1. Switch the device on / activate background lighting:
Switch the device on (switch **1** in Fig. 1). For a short time the message of the current program version appears in the display:



followed by the equipment designation:

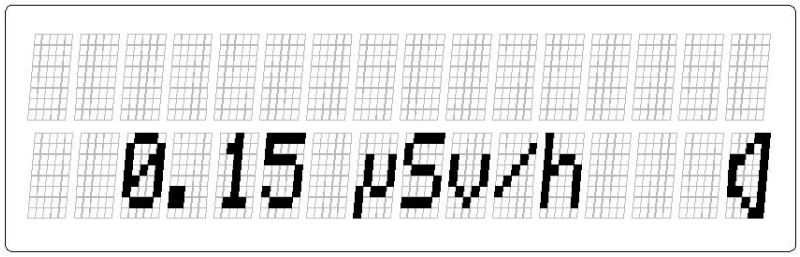


The device will be ready for measurement within a few seconds.

Note:
The background lighting will turn off automatically after 10 seconds. To reactivate it push switch **1** “Power on / light” (Fig. 1). The background lighting is turned on for 10 more seconds.

2. Measurement:

The measured value appears in the message line with the unit µSv/h. When switching the equipment on, the acoustic signal is activated automatically and is represented by the speaker symbol right down in the display:

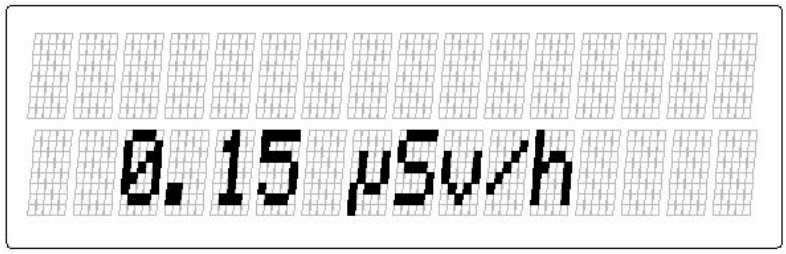


Note:

Depending from region a natural background radiation of 0,1 - 0.5 µSv/h is present. Due to random nature of radiation the reading normally fluctuates.

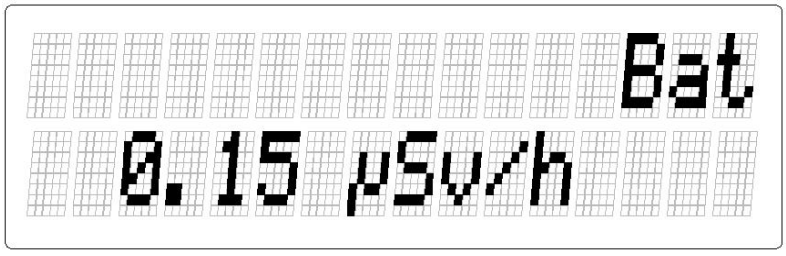
3. Acoustic Signal (deactivation by button 4)**:**

For acoustic message please push the switch **4** „Buzzer on / off“ (Fig. 1). Depending from this the lower right corner of the display shows the buzzer symbol or it is faded out.



4. Battery state:

Check battery state. Note that low battery is indicated by displaying “Bat” in the upper right display corner.

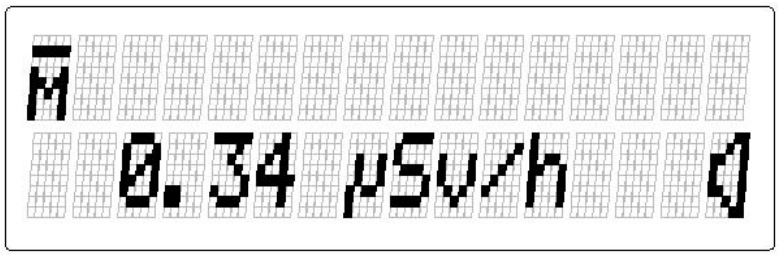


In case of low battery indication batteries must be replaced.

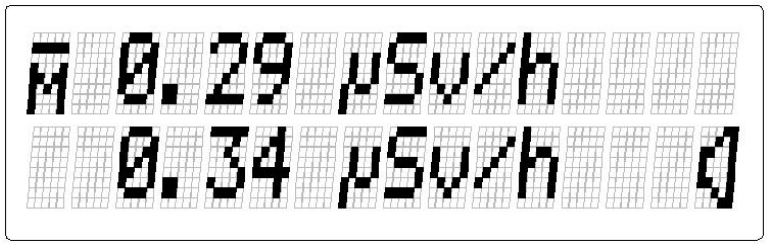
5. Averaging:

Due to the random nature of nuclear radiation the measured value fluctuates. In order to improve the accuracy of measurement you can calculate the average value of data obtained during one minute.

For this push the switch **2** „Average value“ (Fig. 1). In the upper left display corner the symbol $\overline{M}$ appears.



The internal measurement starts. After 60 seconds, in the display´s upper line the average value (for 60 seconds) of the dose rate appears:

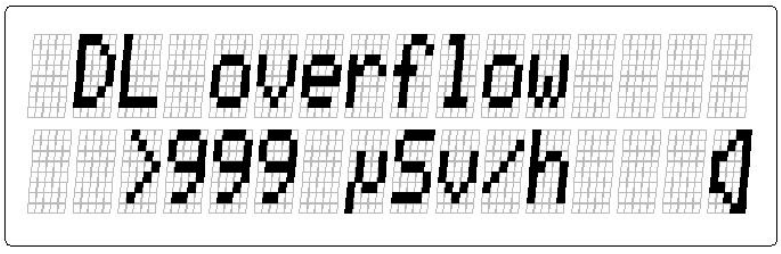


By renewed pressing of the button **2** (fig. 1) you deactivate the averaging and the messages in the upper line are deleted. To activate a further average value measurement the key 2 must be pressed again.

Note:
The measured average value remains visible in the display up to the start of a further average value measurement!

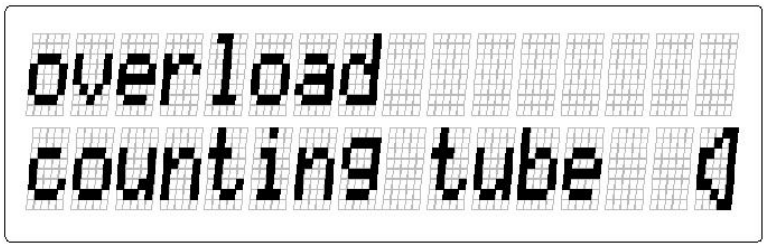
6 Alarm messages

In case of a dose rate overrun of more than 999 µSv/h, the display shows the following data:



Note: The buzzer is activated automatically!

At counting tube overload, in case of very high dose rates, the following message appears in the display :



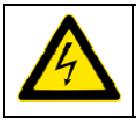
Note: The buzzer is activated automatically !

7 Shipment

- For shipment and storage, the case supplied by the manufacturer shall be used.
- Prior to long-time storage and transport the batteries must be removed and stored at the place provided in the case.

8 Maintenance

Avoid contamination of the device. If the device is intended to be operating in contaminated environments use appropriate protective means (e. g. plastic bag). If the device has been possibly contaminated, use a wet cloth for decontamination. Do not use substances like petrol, acetone, etc. since the polystyrene housing can be damaged.



Do not open the device. In case of damages a contact voltage of up to 450 V may be reached at power-on state!

There are no serviceable parts inside. Refer all servicing to the manufacturer.

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Appendix

Diagram 1: Energy response SM 3 D
Diagram 2: Angular response counter tube

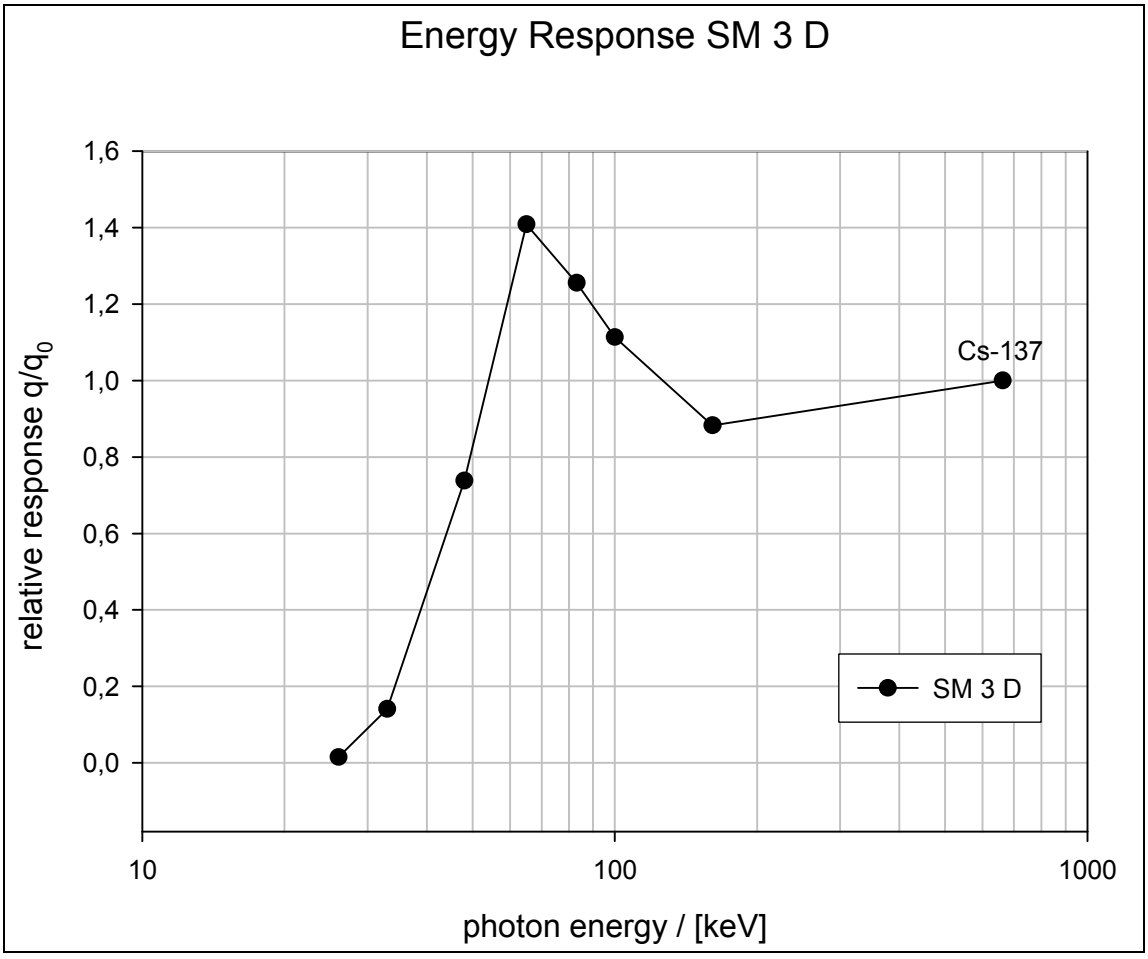

Diagram 1) *Energy Response SM 3 D.*

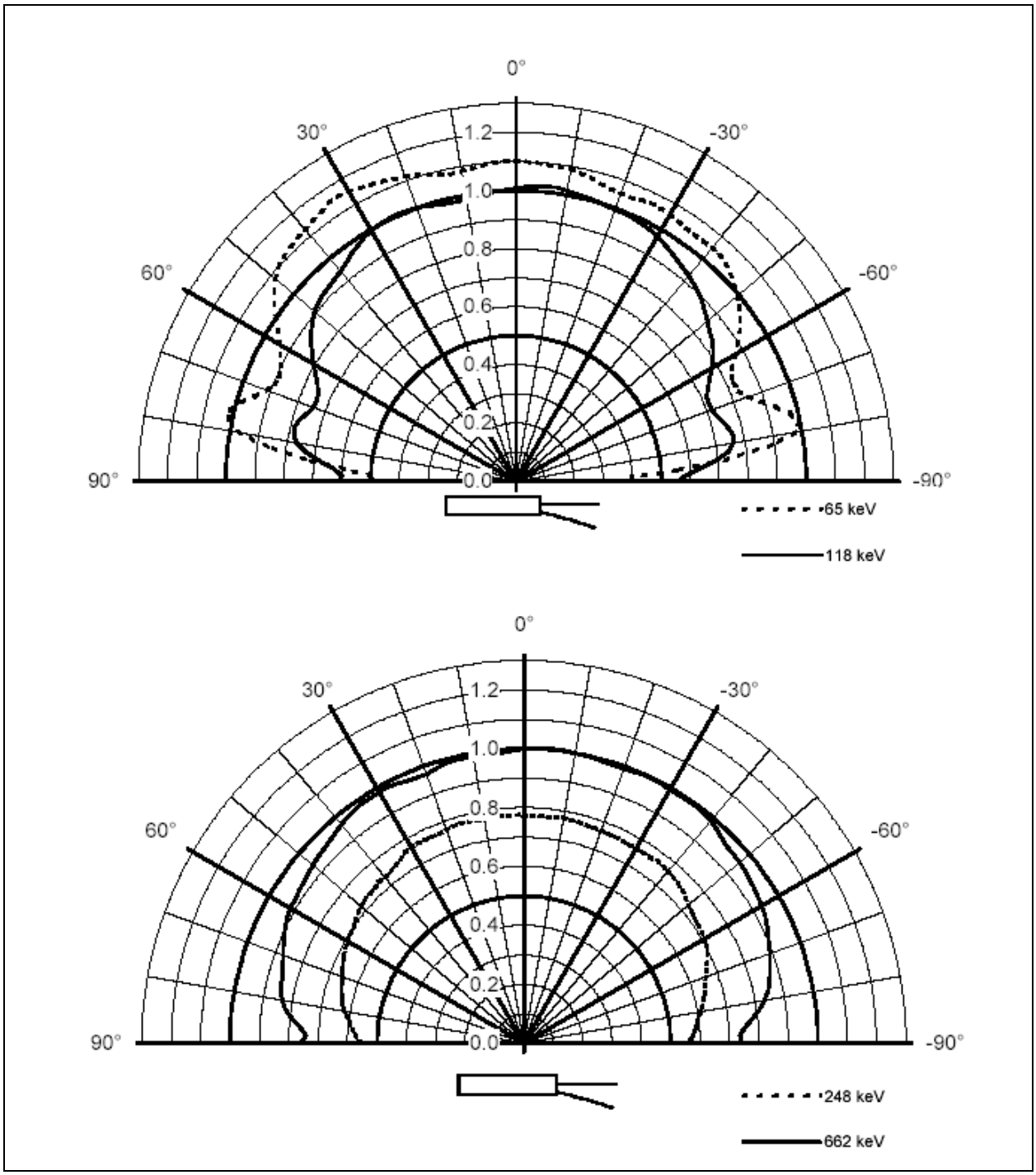

Diagram 2) *Angular response counter tube.*

Product accompanying document
SM 3 D

Device: Survey Meter SM 3 D

Serial number of the device : _____

Serial number of detector : _____

Program version : _____

Date of test : _____

Device tested by : _____

Date of shipment : _____

Repairs : _____

_____

Notes: _____

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