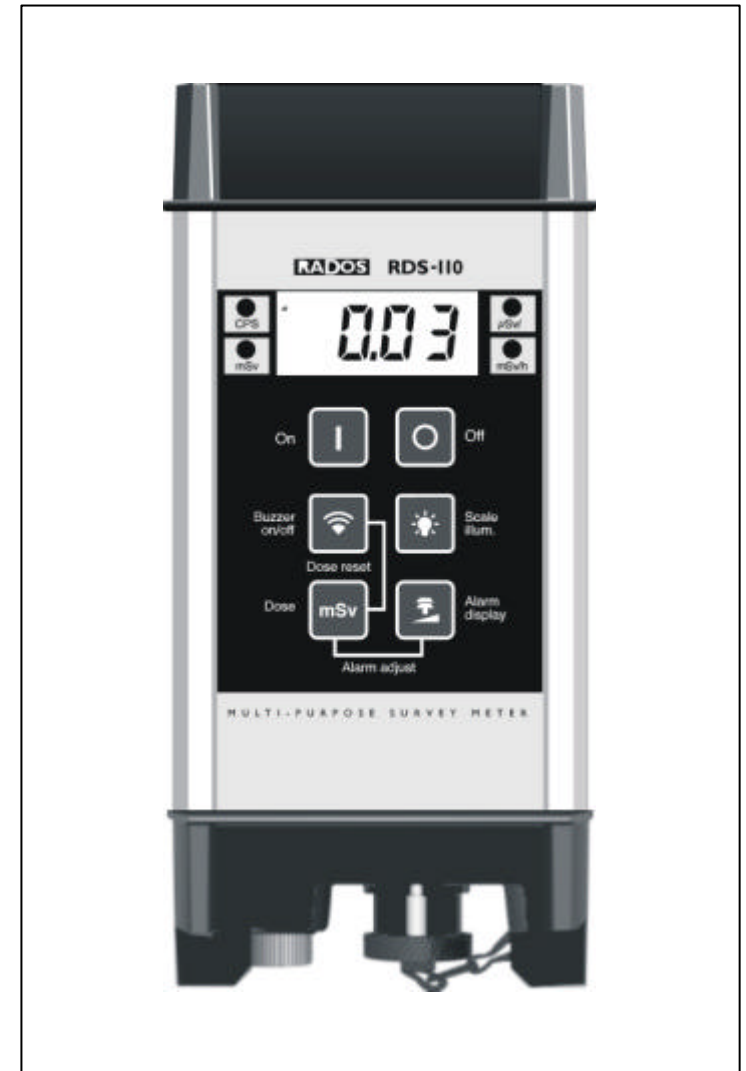




RDS-110 Multi-purpose Survey Meter

USER'S MANUAL



RADOS

- **RADOS Technology Oy**
P.O.Box 506, FIN- 20101 Turku, Finland
Tel. +358-2-468 4600 Fax +358-2-468 4601
- **RADOS Technology GmbH**
P.O.Box 501245, D-22712 Hamburg, Germany
Tel. +49-40-851 930 Fax +49-40-851 932 56

www.rados.com

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1. INTRODUCTION

This document contains operating instructions for the Multi-Purpose Survey Meter RDS-110. It will describe the operation of the software version 3.010 or newer.

The RDS-110 is a microprocessor based Multi-Purpose Survey Meter designed for monitoring gamma, X-ray and beta radiation. Because of its versatile functions and durability it has a wide range of applications, e.g. in the military, civil defence and rescue or industrial use.

The radiation is detected by one halogen quenched, energy compensated GM tube, which combined with the microprocessor technology, backed up by an advanced counting algorithm, gives a reliable response even in low background radiation fields.

An external beta or gamma probe can be connected to the RDS-110, for example for contamination or remote control measurements.

One dose rate alarm, one dose alarm or with external beta probe one CPS rate alarm threshold can be set in the meter. Audible alarms are given when either the dose rate, accumulated dose or CPS rate exceeds the corresponding programmed threshold level. CPS rate alarm is active only when an external beta probe is connected.

The alarm levels can also be disabled. Even in this case the user is not left totally unprotected as the meter gives an alarm if the dose, dose rate or CPS rate measurement range has overflowed.

Case:	impact resistant, aluminum case, shielded against RF interferences and NEMP
Dimensions:	90 x 200 x 42 mm
Weight:	530 g without batteries, 600 g with batteries
Connections:	6-pin lockable connector with protective cap for external detectors
External detectors:	GMP-11 Beta Probe Measurement range: 0 -9999 cps Energy range: > 30 keV, beta GMP- 12L Gamma Probe Measurement range: 0.05 µSv/h - 99.99 mSv/h Energy range: 50 keV - 1,25 MeV GMP- 12H Gamma Probe Measurement range: 0.1 mSv/h - 3000 mSv/h Energy range: 80 keV - 1,25 MeV GMP- 15 Beta Probe Measurement range: 0 -9999 cps Energy range: > 30 keV, beta

8. OPTIONAL ACCESSORIES

1233-092	Mains Adapter & Wall Mounting Kit
1233-122	GMP-11 Beta Probe
1233-176	GMP-15 Beta Probe (pancake)
1233-190	GMP-12L Gamma Probe (Low range)
1233-191	GMP-12H Gamma Probe (High range)
	User defined internal alarm sequence

2. BATTERY REPLACEMENT

The RDS-110 can be powered by three IEC LR6 (AA) alkaline batteries, equivalent dry cells, rechargeable NiCd batteries, or it can be connected to the mains supply using an optional adapter. Suitable adapters for RDS-110 are supplied by RADOS (see chapter 8. Optional Accessories). The use of alkaline batteries is recommended.

The battery life of alkaline cells is about 200 hours at the normal background level. The battery life of dry cells or rechargeable NiCd batteries is considerably shorter than the 200 hours, especially in cold conditions. The dry cells are prone to leakage.

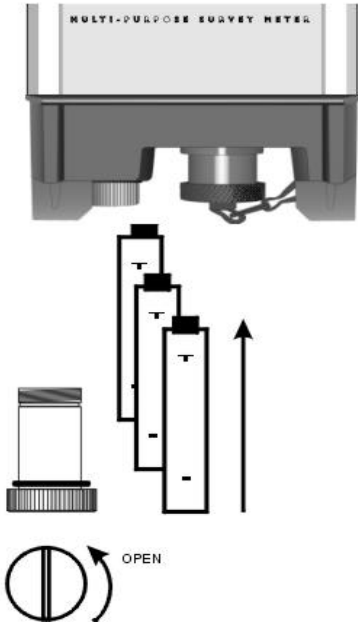


Figure 1. Battery replacement

The battery compartment cover is at the bottom of the meter. Turn the battery cover counter-clockwise to open it. Batteries are inserted into the meter positive (+) pole first. is recommended that the hole set of batteries (3) is changed at the same time.

The RDS-110 meter gives a message of the low battery condition (see chapter 3.3).The meter has a facility to run a battery test (see chapter 3.2 battery test).

If the batteries are exhausted or the meter is not used for a long period of time, take out the batteries to avoid battery leakage.

3. OPERATION

The RDS-110 Multi-Purpose Survey Meter is operated using the display and the push buttons. On the right and the left side of the display there are two red LED indicators. The battery compartment cover and the connector for external probes are at the bottom of the meter.

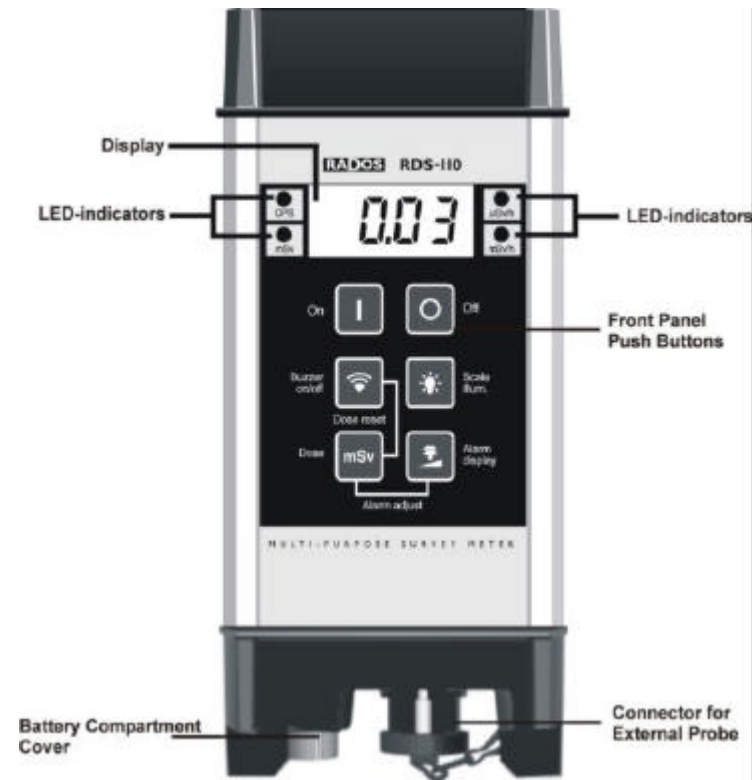


Figure 2. RDS-110 Front view

7. SPECIFICATIONS

Radiation detected:	gamma- and X-rays, 50 keV - 1.25 MeV beta radiation with an external probe
Detector:	one halogen quenched, energy compensated GM tube
Measurement range:	dose rate 0.05 μ Sv/h - 99.99 mSv/h dose 0.001 - 999.9 mSv pulse rate 0.1 - 9999 CPS automatic range indication by flashing LED signals
Alarm levels:	predefined or freely adjustable alarm levels for dose rate, accumulated dose and CPS rate.
Calibration accuracy:	$\pm$ 5 % of the reading in Cs-137 exposure, at +20°C
Dose rate linearity:	$\pm$ 15 % over the range 0.1 μ Sv/h - 99.99 mSv/h
Response to the angle of incidence:	$\pm$ 15 % within $\pm$ 90° from the calibration direction with 65 keV energy
Temperature range:	-25...+55°C operational , -40...+70°C storage
Power supply:	3 x alkaline cell IEC LR6 (recommended) or standard AA dry cells or rechargeable NiCd batteries of the same size
Battery life:	200 hours at normal background
Battery alarm:	two-step alarm for low battery voltage
Overload indication:	OFL information on display and audible alarm
Self-diagnostics:	continuous operational check of electronics and GM tube. Possible malfunction indicated by "dEF" on the display

6. MAINTENANCE AND DECONTAMINATION

No specific maintenance is required except for a periodic check of calibration.

The RDS-110 Multi Purpose Survey Meter is dust and water proof (protection class IP 67) when the protection cap is firmly fastened to the meter.

In a radioactive fallout situation it is advisable to keep the meter from the rain in order to protect it from radioactive substances. The meter should be decontaminated first by wiping it over with a disposable cloth and then by washing it with an appropriate detergent and rinsing with water. Before the decontamination, check that the protection cap is firmly fastened to the meter.

6.1. Periodical check

After a long period of storage, or when in doubt of perfect functioning it is advisable to check the operation of the meter according the following periodical checklist.

- Insert batteries.
- Switch the meter on.
- Check the dose by pressing the Dose-button to see if the meter is functioning properly.
- Make the battery test by pressing the Scale illum.-button.
- Let the meter measure background for 30 minutes to detect a possible detector failure.

3.1. LED Indicators

On the right hand side of the display there are red LED indicators for indicating the scale of the dose rate or the dose rate alarm threshold level ($\mu\text{Sv/h}$ or mSv/h) shown on the display. The blinking light shows the active scale of measurement. The blinking rate of the light does not correspond to the pulse rate of the detector.

On the lower left hand corner of the display there is a red LED indicator which indicates the unit of the dose or the dose alarm threshold level (mSv) shown on the display.

On the upper left hand corner of the display there is a red LED indicator which is blinking when an external beta probe is connected to the meter. At this time the meter is measuring counts per second (CPS).

3.2. Push Buttons

The meter gives a bleep to confirm the action each time a push button is pressed.



On

The meter is switched on by pressing the On button.

When the meter is switched on, it runs an automatic operation test, checking the functions of the meter and all the segments of the display. During the test, first the number of the software version and then the digits 8.8.8.8 will be displayed until the first dose rate values are calculated.

The dose rate is displayed as $\mu\text{Sv/h}$ (microSievert per hour) or mSv/h (milliSievert per hour). At the normal background level (0.10 to $0.20 \mu\text{Sv/h}$), the first calculated result will be displayed within about 10 - 25 seconds.

If an external probe is connected to the meter, it recognizes the probe type automatically, and shifts to pre-determined display range and unit. With the external gamma probe, the first calculated result will be displayed within about 30 - 40 seconds, except with GMP-12H probe at the normal background level.



Off

The meter is switched off by pressing the Off button. When the meter is switched off, the display goes blank. The accumulated dose data and current alarm levels will remain in the meter's non-volatile memory.



Buzzer on/off

The pulses of the GM tube can be made audible or be muted by pressing the Buzzer on/off button.

When pressing the button Buzzer on state is indicated by a double bleep. Buzzer off state is indicated by a single bleep.

At low dose rates the pulses are indicated as slow intermittent bleeps. At high dose rates the pulses are indicated as fast intermittent bleeps. In case of measurement overload, when measurement range is exceeded, the buzzer gives a continuous alarm. With the help of pulse indication it is easy to note changes in the dose rate or CPS values without glancing at the display.



Dose

The accumulated dose can be displayed by pressing the Dose (mSv) button. The dose is displayed for five (5) seconds or until you release the button. The dose value range is 0.001-999.9 mSv.

When the meter is switched on, it starts measuring the accumulated dose. When replacing the batteries or when the meter is switched off, the dose value is stored in the meter's non-volatile memory, thus the dose data is safely stored also in power-down situations. When the meter is again switched on, the new accumulated dose values are added to the stored and retrieved dose. The accumulated dose register can be reset. (See also display messages rOFL and CAL in chapter 3.3.)



Dose reset

The accumulated dose register can be reset by pressing the Buzzer on/off and the Dose buttons simultaneously for five (5) seconds. The dose data is cleared from the meter's non-volatile memory. You can check that the dose is reset by viewing the accumulated dose by pressing the Dose (mSv) button.

5.2. Activating the High-Resolution Dose Display

The default dose range of the RDS-110 is 0.001 - 999.9 mSv (see chapter 3.2. Dose button). The display can be set to a higher resolution in order to show the dose range of 0.001 - 9.999 μ Sv.

Activate the high-resolution dose display according to the following steps. Note that the time-out is 16 seconds and you must take the step in 16 seconds after performing the previous one, otherwise the meter will exit the setting and return to show the dose rate. If the meter has returned to show the dose rate, start again from Step 1. You can exit the setting at any time by waiting 16 seconds until the meter returns to show the dose rate.

STEP 1.



Press the Dose and the Scale Illum. buttons simultaneously to activate the Advanced Functions Mode. Release the buttons.

STEP 2.



Scroll through the Advanced Functions List with the Dose button until the display shows **Ac d**.

STEP 3.



Press the Dose and the Alarm Display buttons simultaneously until you hear a long bleep. Release the buttons. High-resolution dose display is activated.

Press the Dose button to view the dose. If the accumulated dose is smaller than 0.010 mSv the display alternates between **E-3** and **d.ddd** (accumulated dose). If the accumulated dose is 0.010 mSv or greater, the dose is displayed in a normal way.

The dose display can be changed to the default dose display only when the meter is switched off and on again.

!The accumulated dose is stored into NVRAM with a resolution of 0.1 μ Sv.

STEP 6.

When the correct time and a question mark is displayed, start the measurement for the selected period of time by pressing the Dose and Alarm Display buttons simultaneously until you hear a short bleep. The previous measurement result is reset and a new measurement is started.

During the measurement the meter gives short, low bleeps and the display shows the measurement result.

The integration can be discontinued only by switching off the meter.

When the specified time has elapsed, the meter gives an alarm (very fast intermittent sound, 1 series of bleeps every 3 seconds). The measurement discontinues. The last measurement result is shown on the display.

STEP 7.

The alarm sound can be reset by pressing the Alarm Display button.



The display shows the measurement result until it is reset by pressing the Dose button. When the Dose button is pressed the meter returns to show the default time value (10). When the time value is displayed you can activate a new measurement by following the instructions from Step 4. Otherwise the meter returns to the normal measurement mode in 16 seconds.

Cumulative counts are given on the display as kCP units (counts x 1000), i.e. 0.500 equals 500 counts.

**Scale illumination**

The display of the meter can be illuminated by pressing the Scale illum. button.

When the Scale illum. button is pressed shortly, one bleep occurs and the display is illuminated for 25 seconds, or until you press shortly the Scale illum. button again.

When the Scale illum. button is pressed and held until a second bleep occurs, the display is illuminated continuously. The illumination is switched off by pressing the button shortly again, or by turning the meter off.

Battery test

The RDS-110 meter has a facility to run a battery test. The test is run by pressing and holding the Scale illum. button for five (5) seconds until the meter gives a fast intermittent bleep.

When the test is run, the LED indicators will be illuminated and program version number is shown on the display.

If, after releasing the button, a colon (:) is shown in the middle of the display, prepare to fit a new battery set.

Alarm display

The RDS-110 will alarm under certain accumulated dose, dose rate and CPS rate conditions. The current programmed dose, dose rate and CPS rate alarm threshold levels can be viewed on the display by pressing the Alarm Display button. The dose alarm level is shown first for two (2) seconds and then the dose rate alarm level for two (2) seconds. If an external beta probe is connected to the meter, then only the CPS alarm level is shown for five (5) seconds. The appropriate LED indicator is flashing during the viewing. The dose, dose rate and CPS rate alarm threshold levels can be changed. See Chapter 4. for setting the thresholds.

3.3. Display

The numeric display is used for displaying the dose rate, dose and CPS rate values and for setting the alarm thresholds. In addition it shows the status of the meter (OFL, rOFL, dEF, CAL) and gives messages of the low battery conditions.

OFL Overload

Dose rate overload. If OFL symbol appears on the display when viewing the dose rate, the meter is exposed to a radiation field higher than 100 mSv/h. (With the GMP-12H probe the count is 3000 mSv/h, see chapter 8. Optional Accessories.)

Dose overload. If OFL symbol appears on the display when viewing the dose, the accumulated dose exceeds 999.9. mSv.

CPS rate overload. If OFL symbol appears on the display when the beta probe is in use, the pulse rate exceeds 9999 CPS. (See chapter 3.4 External probe.)

rOFL Dose rate overload during the dose display

If this symbol appears on the display alternately with the dose value after pressing the Dose button, the dose rate has exceeded the measurement range during the last dose measurement. This warning can be cleared only by resetting the dose.

dEF Meter defect

The microprocessor of the meter performs continuous checking of the electronics and components. The dEF-symbol will appear on the display if the meter is defected or the GM tube does not give any pulses in a specified time period.

If the dEF-symbol appears on the display, go through the procedures described in the Periodical Check in chapter 6.1 with a new set of batteries. If the symbol reappears, return the meter for servicing. If an external probe has been in use, read also the following note.

will exit the setting and return to show the dose rate. If the meter has returned to show the dose rate, start again from Step 1. You can exit the setting at any time by waiting 16 seconds until the meter returns to show the dose rate.

STEP 1.



Press the Dose and the Scale Illum. buttons simultaneously to activate the Advanced Functions Mode. Release the buttons.

STEP 2.



Press the Dose button until the display shows Cu d. (With the external beta probe: Cu c.)

STEP 3.



Press the Dose and Alarm Display buttons simultaneously to activate the time selection menu.

STEP 4.



Scroll the time menu by pressing the Alarm Display button. An integration period of 10, 30, 60 or 120 minutes can be chosen.

STEP 5.

5 a)



Select the desired time from the selection menu by pressing the Dose button. The display shows the selected time with a question mark (e.g. 10?).

5 b)

If the value is correct continue to Step 6.

If you want to change the value return to Step 4. by pressing the Dose button again.

5. ADVANCED FUNCTIONS

In the RDS-110 Multi-purpose survey meter there are advanced functions for more versatile use of the meter.

You can activate the Advanced Functions Mode by pressing the Dose and the Scale Illum. buttons simultaneously. You can scroll through the Advanced Functions List with the Dose button. The number of the advanced functions available depends on the version of the meter. The number of the version is displayed when switching on the meter.

For the meter with the version number 3. or newer the Dose/Counts Integration Mode and High-Resolution Display functions are available. If you want to use these functions simultaneously, for example when measuring low dose rate fields ($< 60 \mu\text{Sv h}^{-1}$), activate the High-Resolution Dose Display (see chapter 5.2.). before the Dose/Counts Integration Mode function.

It is possible that these functions do not operate properly during low battery (indicated with : in the middle of the display, see chapter 3.3.).

5.1. Dose/Counts Integration Mode

When the RDS-110 meter is switched on it starts recording accumulated dose (see chapter 3.2. Dose button). The accumulated dose can be reset at any time by pressing the Buzzer on/off and the Dose buttons simultaneously (see chapter 3.2. Dose reset). The RDS-110 can also **integrate accumulated dose** for a specified period of time, after which it gives an alarm and shows the accumulated dose value on the display. When the integration is started the previously accumulated dose is reset.

Normally the RDS-110 meter does not count cumulative pulses in the beta measurement mode (i.e. when external beta probe is in use). When the Dose/Counts Integration Mode is activated in the beta measurement mode **also the number of cumulative pulses can be counted**.

Start the accumulated dose integration or the cumulative counts integration and define the time period according to the following instructions. Note that the time-out is 16 seconds and you must take the step in 16 seconds after performing the previous one, otherwise the meter

Note! The dEF-symbol will appear after the specified time period also if an external probe is removed from the meter when the power of the meter is on. If the dEF-symbol appears, check first if an external probe has been removed from the meter when power on. If this is the case, the dEF-message can be cleared by switching the power off and on again. If the message still appears on display, return the meter for servicing.

Unit not calibrated

If this symbol appears on the display alternately with the dose value after pressing the Dose button, the dose rate and the dose are calculated with default calibration coefficient. This may indicate that non-volatile memory is non-operative. Return the meter for servicing.

Low battery

This character in the middle of the display indicates that the alkaline batteries should be replaced within five (5) hours.

Note! If rechargeable NiCd batteries are used, the batteries should be changed within 20 minutes, because drop in the voltage of rechargeable batteries is very rapid.

Replace the battery

This symbol indicates that the battery voltage has dropped to the level where guaranteed operation of the meter is no longer possible. The dose, dose rate and CPS rate measurement is discontinued. The last recorded dose value is stored in the meter's memory.

3.4. External Probe

An external beta or gamma probe can be connected to the meter. The probe is connected to the external 6-pin lockable connector interface at the bottom of the meter.

The meter must be switched off before the probe is connected to it. The probe is recognized by the meter at the start-up when you switch the meter on again. To connect the external probe to the meter, first remove the protection cap by turning the cap counter-clockwise. Connect the external probe by turning the connector of the probe clockwise until it is firmly fastened.

In the beta measurement mode the meter displays the results as pulses per second. When the beta probe is in use, the red LED indicator for CPS will be blinking. If the CPS rate exceeds the 9999 CPS value, then OFL- alarm is activated and the display alternates between OFL and xx.x, where the xx.x is the measured value in kCPS range. (k = 1000x)

In the gamma measurement mode the meter displays the results as μSv , mSv, $\mu\text{Sv/h}$ or mSv/h. When the gamma probe is in use, the corresponding LED indicator will be blinking.

After a gamma probe has been connected to the meter and the meter is switched on, wait for three (3) minutes to let the display stabilize at the background level.

The meter must be switched off when the probe is removed from the meter. The dEF-symbol will appear after a specified time period if an external probe is removed from the meter when the power of the meter is on.

Note! If the probe is connected to the meter when the power is on, the meter does not recognize the probe. **The meter must always be switched off before connecting or disconnecting the probe.**

STEP 1.



Press the Dose and the Alarm Display buttons simultaneously. Release the buttons.

STEP 2.



Press the Dose button to view the alarm units.

- drAL = Dose Rate Alarm
- Int = Internal Alarm (See chapter 8.)
- doAL = Dose Alarm
- CPS = External Probe Alarm, if an external beta probe is connected. (See chapters 4.2.3 and 8.)



When the Int - symbol is on the display, press the alarm display button to choose the Internal Alarm Mode. Release the button.

STEP 3.



Press the Dose and Alarm Display buttons simultaneously to activate the internal dose alarm levels.

You can view the first internal alarm level, or the one that is active, by pressing the Alarm Display button. The dose alarm level is shown first for two (2) seconds and then the dose rate alarm level for two (2) seconds.

Note! The multilevel internal dose alarms are deactivated when a new predefined or customized dose alarm level is set by the user.

4.3. Multilevel Internal Dose Alarms

The multilevel internal dose alarm function is a special feature of the RDS-110 meter. If the internal dose alarm function is activated, the meter gives an alarm when the dose value reaches the first preset threshold level. When the alarm is muted by pressing the Dose button for at least 0,5 seconds, the first alarm is reset and the next dose alarm threshold will be activated in the meter’s memory. The highest dose alarm level cannot be muted.

The internal dose alarm threshold levels are factory settings. The factory default dose alarm threshold levels are 15 mSv, 100 mSv, 250 mSv and 1 Sv.

The preset internal alarms must be activated before they are taken in use. If they are not activated, the alarm levels that are set by the user are in use. The multilevel internal dose alarms can be deactivated only by setting new predefined or customized dose alarm level.

When you switch on the meter or reset the accumulated dose, the lowest alarm level in the multilevel internal dose alarm list is active.

The internal alarms are activated as follows:

Note that you must take the next step in 20 seconds after performing the previous one, otherwise the meter will exit the internal alarm mode and return to show the dose rate. If the meter has returned to show the dose rate, start again from step one.

You can exit the internal alarm mode at any time by waiting 20 seconds, until the meter returns to show the dose rate. The internal alarm threshold levels will not be taken into use until you have activated the alarms (Step 3).

4. ALARMS

One dose rate alarm, dose alarm and CPS rate alarm threshold can be set in the meter. Audible alarms are given if either the accumulated dose, dose rate or CPS rate exceeds programmable threshold levels. The CPS rate alarm will be given only if an external beta probe is connected to the meter.

4.1. Audible Alarms

The audible alarms are

METER DEFECT	Intermittent (1 series of bleeps every 30 seconds)	— — — — —
DOSE RATE/ CPS RATE OVERFLOW	Very fast intermittent (5 bleeps in a second)	• • • • •
DOSE RATE ALARM/ CPS RATE ALARM	Fast intermittent (2 bleeps in a second)	• • • • •
DOSE ALARM and DOSE OVERFLOW ALARM	Slow intermittent (1 long bleep every 5 seconds)	— — — — —

Dose rate and CPS alarms will discontinue automatically when the meter or the external probe is removed from the high radiation field. The dose alarm can be reset by zeroing the accumulated dose or by setting the dose alarm level to a higher value. See Dose Reset in chapter 3.2.

Note! If the alarm threshold levels are set to zero values, the meter does not give dose rate, dose or CPS rate alarms. This does not inhibit the overflow alarms to activate.

For information on meter defect, see DEF-message in chapter 3.3.

4.2. Setting the Alarm Threshold Levels

You can set one dose rate alarm, dose alarm and CPS rate alarm threshold value to the meter. The alarm threshold values are saved in the meter's memory. The saved values are stored even if the meter is switched off or the batteries are removed.

You can set the threshold levels by choosing them from pre-defined set of values or you can set your own values (custom-set values).

4.2.1. Setting the Pre-defined Alarm Threshold Levels

You can set the dose rate and dose threshold levels by simply choosing the desired value from the menu according to the following instructions.

You must take the next step within 20 seconds after performing the previous one, otherwise the meter will exit the alarm threshold setting and return to show the dose rate. If the meter has returned to show the dose rate, start again from step one.

You can exit the alarm setting at any time by waiting 20 seconds, until the meter returns to show the dose rate. The alarm threshold levels will not be changed until you save the changes (Step 4).

STEP 1.



Press the Dose and the Alarm Display buttons simultaneously. Release the buttons.

STEP 2.



Press the Dose button to view the alarm units.

drAL = Dose Rate Alarm

Int = Internal Alarm (See chapters 4.3 and 8.)

doAL = Dose Alarm

CPS = External Probe Alarm, if an external beta probe is connected. (See chapters 4.2.3 and 8.)

STEP 6.



Press the Dose and Alarm Display buttons simultaneously until you hear a long bleep to save the selected alarm threshold level on the meter's memory.

If you do not save the changes, the previously set alarm threshold level will not be changed.

You can check that the new alarm levels are activated by pressing the Alarm Display button. The dose alarm level is shown first for two (2) seconds and then the dose rate alarm level for two (2) seconds.

Note! The customized alarm threshold levels are active until they are replaced with new values. If you have set customized values in the meter and you set new values in the normal mode, the values of the two least significant digits may be shown in the menu.

4.2.3. Setting the CPS Rate Alarm Threshold Levels

The CPS Rate Alarm Threshold Level is set according to instructions given in chapter 4.2.1 Pre-defined Alarm Threshold levels and chapter 4.2.2 Customised Alarm Threshold levels.

The external beta probe must be connected into the meter when setting the CPS threshold. The possible range of alarm threshold level is 0 - 9999 CPS with a resolution of 1 CPS.

The decades for dose are

	Numeric	LED	Possible range of alarm level
I	x.xxx	mSv	0 - 9.999 mSv
II	xx.xx	mSv	0 - 99.99 mSv
III	xxx.x	mSv	0 - 999.9 mSv

Note! You must always choose the decade before you can set new values.

There is only one decade for external beta probe.

	Numeric	LED	Possible range of alarm level
I	xxxx	CPS	0 - 9999

STEP 5.

5 a)



Press the Alarm Display button to activate the left most digit on the display. The selected digit will be blinking. The value is set by pressing shortly the Alarm Display button until you have the desired value.

5 b)



Press the Dose button to select the next digit. The activated digit will be blinking.



Set the value by pressing shortly the Alarm Display button until you have the desired value.

Repeat the step 5 b) until you have set all digits.

You can scroll through the digits by pressing the Dose button.



Press the Alarm Display button or wait three (3) seconds to choose the alarm unit on the display. Release the button.

STEP 3.

Change the threshold value by pressing the Dose or Alarm Display button until you have the desired value.



Press the Dose button to decrease the value.



Press the Alarm Display button to increase the value.

The values are 1, 1.5, 2, 2.5, 3, 4, ...9. This sequence is repeated on each decade of the measurement range.

It should be noted that the overflow alarm is activated at 100 mSv/h with internal GM-tube, even though the dose rate alarm level can be set to a value greater than that.

When the external probe GMP-12H is used, the overflow alarm is activated at 3000 mSv/h.

STEP 4.



Press the Dose and Alarm Display buttons simultaneously until you hear a long bleep to save the selected alarm threshold level on the meter's memory.

If you do not save the changes, the previously set alarm threshold level will not be changed.

You can check that the new alarm levels are activated by pressing the Alarm Display button. The dose alarm level is shown first for two (2) seconds and then the dose rate alarm level for two (2) seconds.

4.2.2. Setting the Customized Alarm Threshold Levels

The dose rate and dose alarm threshold levels can be custom set by the user. To be able to set the customized alarm threshold levels you must first start the meter in custom mode (Step 1). In the custom mode, the meter operates in a normal way. However, when setting the alarm thresholds, the predefined threshold values will not be displayed.

You can return the instrument into the normal mode by switching off the meter and then switching it on as usual (see chapter 3.2 On -push button).

The customized alarm levels are stored in the NVRAM of the instrument and are therefore active also when the meter is switched on later in the normal mode.

STEP 1.

First switch on the meter by pressing the On button. Immediately after or at the same time as pressing the On button

press the Dose and the Alarm Display buttons simultaneously, until you hear a long bleep. Release the buttons.

Note! The buttons must be pressed when the version number of the meter is displayed. If you press the buttons later than this, the instrument will go into the normal mode, where you can select the alarm threshold levels only from the pre-defined values list.

Wait until the dose rate or CPS rate is displayed (see chapter 3.2. On -push button).

From step 2. forward you must take the next step in five (5) seconds after performing the previous one, otherwise the meter will exit the alarm threshold setting and return to show the dose rate. If the meter has returned to show the dose rate, start again from step two.

You can exit the alarm setting at any time by waiting 15 seconds until the meter returns to show the dose rate. The alarm threshold levels will not be changed until you save the changes (Step 6).

STEP 2.

Press the Dose and the Alarm Display buttons simultaneously. Release the buttons.

STEP 3.

Press the Dose button to view the alarm units.

drAL = Dose Rate Alarm

Int = Internal Alarm. (See chapters 4.3 and 8.)

doAL = Dose Alarm

CPS = External Probe Alarm, if an external beta probe is connected. (See chapters 4.2.3 and 8.)

Press the Alarm Display button to choose the alarm unit you want. Release the button.

STEP 4.

Select the decade by shortly pressing the Dose button until you have the desired decade. The change of the decade is indicated by the digit value on the display and scaling led.

The decades for dose rate are

	Numeric	LED	Possible range of alarm level
I	xx.x	μSv/h	0 - 99.9 μSv/h
II	xxx	μSv/h	0 - 999 μSv/h
III	x.xx	mSv/h	0 - 9.99 mSv/h
IV	xx.x	mSv/h	0 - 99.9 mSv/h
V	xxx	mSv/h	0 - 999 mSv/h