MIRION TECHNOLOGIES

USER MANUAL
RDS-32™ SURVEY METER

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ATTENTION

The RDS-32 Radiation Survey Meter does not contain any hazardous or dangerous substances and can be recycled accordingly. The batteries of the device must be recycled separately as instructed by the manufacturer of the batteries.

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USER MANUAL – RDS-32 SURVEY METER

INTRODUCTION

1.1 RDS-32 SURVEY METER FAMILY

The RDS-32 Survey Meter continues the survey meter line of Mirion Technologies by offering modern design and versatile functionalities for radiation measuring applications.

RDS-32 is a small handheld, battery-operated radiation survey instrument. Models RDS-32 and RDS-32iTx utilize an energy-compensated GM-tube as primary detector. RDS-32WR and RDS-32iTxWR offer an extended measurement range by addition of a silicon diode detector. RDS-32iTx and RDS-32iTxWR models are equipped with an internal radio module enabling the dose/dose rate data transmission to any WRM compatible system. Additionally, but not featured in this manual, the product family includes RDS-32iTxSD variant for specialized long-term monitoring applications.

RDS-32 is suited for a wide range of applications in civil defense, industrial use, nuclear power plants, laboratories etc. CSW-32 Configuration Software can be used to easily optimize the behavior of the instrument to meet various working conditions and needs. With the CSW-32 user can define menu functions available on the meter itself from the bare essentials to a full functioning menu including alarm limit setting.

RDS-32 features excellent ergonomics; it is lightweight and easy to handle with visual and audible alarms and a built-in vibrating alarm. The instrument can be handled firmly even under difficult conditions thanks to the rubber grip around the instrument. The large graphic display can be easily read both in total darkness and in direct sunlight. The display additionally includes a tilt sensor enabling display rotation in menu mode.

RDS-32 can be operated with a single key (on/off) or taking advantage of the 4-way menu navigation. To facilitate easy operation of the instrument, shortcut functions have been configured to the arrow keys and marked with corresponding symbol. The predefined shortcuts include backlight activation, accumulated dose display and a mute function. With configuration software users can also customize the shortcut keys.

RDS-32 features both Bluetooth and NFC connectivity. A dedicated smart phone application is provided for changing meter settings and accessing measurement data.

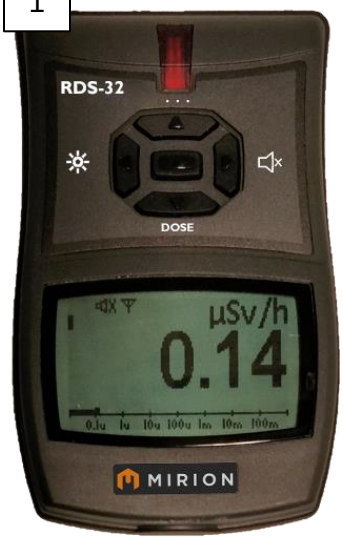
RDS-32 offers versatile possibilities to measure other types of radiation by using external probes. These detectors include an extensive range of CSP™ (Canberra Smart Probe) probes for gamma, alpha, beta and neutron measurements in various applications. The compatible probes also include GMP-12 series external gamma probes and GMP-25, ABP-150 and GMP-11-3/15-3 probes for alpha/beta contamination measurements. The various detectors can be added to the instrument using a connecting cable or an adapter cable. This provides users an easy and cost-effective way to extend their measuring capabilities.

The meter provides an additional protective function to the user: while using external probes, the meter simultaneously measures and displays the dose rate from the internal detector of the instrument. This allows the alarm to be triggered in case a too high dose rate or an accumulated dose is measured.

1.2 RDS-32 VARIANTS

The RDS-32 variants are available either in Sv-units or in rem-units.

1



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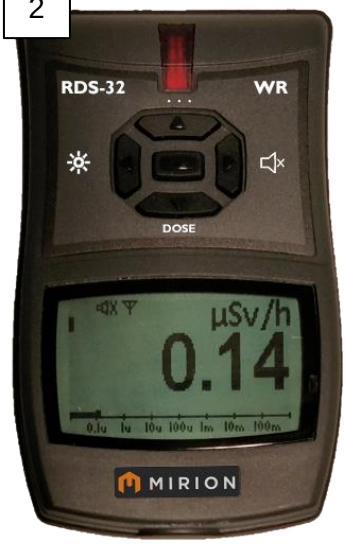


RDS-32 with **BLACK** front frame includes two variants for different dose rate areas

1	RDS-32 for max dose rate 100mSv/h
2	RDS-32WR for max dose rate 10Sv/h **WR** is marked on the upper right corner of front frame

3

4

iTx variants have a distinctive frame color. These variants include an internal radio and can be used in WRM compatible systems. **iTx** is marked on the upper right corner of front frame.

3	**YELLOW** for max dose rate 100mSv/h
4	**BLUE** for max dose rate 10Sv/h **WR** is marked on the upper right corner of front frame

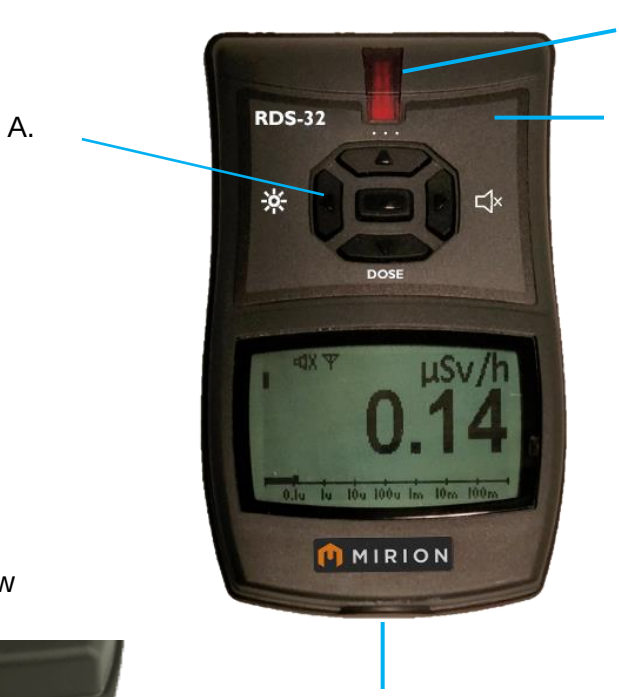
For more information see the back label of the meter and the detailed specifications in Chapter 6 SPECIFICATIONS.

GETTING STARTED

1.3 OVERVIEW OF THE METER

The RDS-32 is lightweight and is ergonomically designed for handheld use. Navigation keys are placed above the large display, and the rubber grip around the meter enables handling in all conditions. In menu mode the display tilts to ensure easy navigation. Enclosure class is IP67, including battery compartment. For performance characteristics, check the RDS-32 variant specification.

RDS-32 front view



Dimensions L x H x W
116 x 72 x 32 mm
(4.57 x 2.83 x 1.26 in)

RDS-32 bottom view

A. Navigation keys with shortcuts, Menu/Select key (ON/OFF) in the middle
B. Visual alarm
C. Binder connector with protective cap for external probes, cable connections and external alarming devices
D. Charging contacts
E. Fixing lug for the wrist strap
F. Additional information if the meter is WR or iTx variant.

Detector positions for GM-tube or both detectors depending on the variant. Observe the markings on the meter, which show the position of the detector(s).

1.4 INSERTING BATTERIES

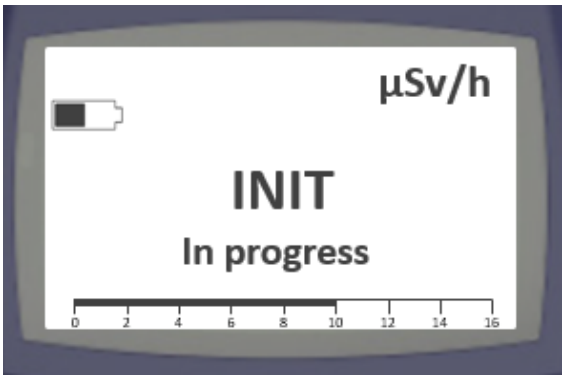
The instrument uses two IEC (LR6/ HR6) AA-size batteries. The use of alkaline batteries is recommended, but rechargeable NiMH batteries can also be used.

Open the battery compartment using a Pozidriv #1 screwdriver. Observe the correct polarity of the batteries.

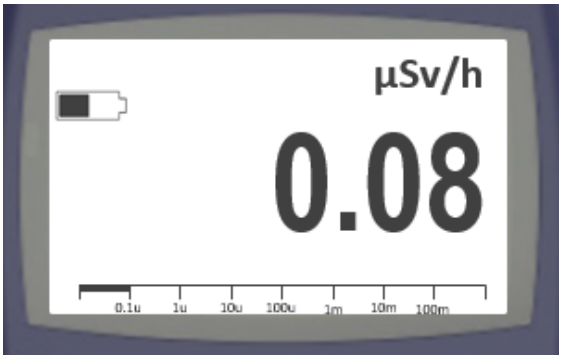
1.5 POWER ON/OFF

POWER ON the device by pressing the Menu/Select key for two seconds.

The firmware version, time and calibration status are first shown on the display. In case the time of meter's Real Time Clock is not set, the flashing 'TIME NOT SET' message is displayed. The Real Time Clock can be set with configuration software.



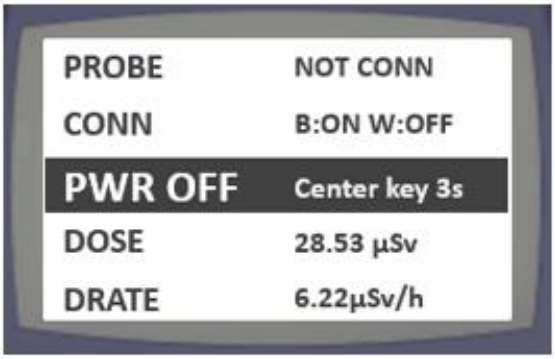
After the initialization phase is complete the operating screen with dose rate is displayed.



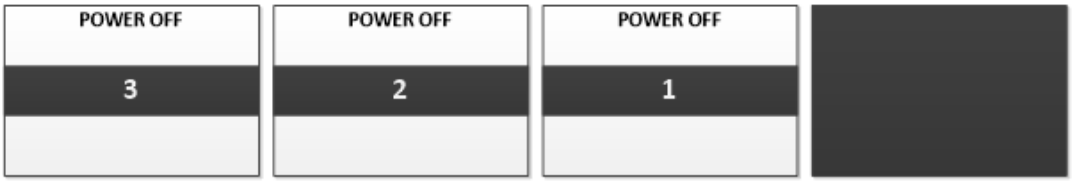
When switched on the meter performs a self-test function:

- All the display pixels are turned on
- The buzzer is activated
- The vibration is activated
- The display backlight is switched on
- The battery condition is tested
- The HV-generator is tested

POWER OFF the device by pressing the Menu/Select key so that the PWR OFF selection is activated. Press the Menu/Select key again for 3 seconds to POWER OFF the device.



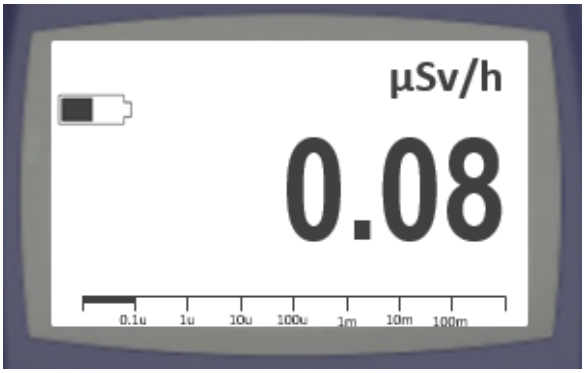
Pressing the Menu/Select key, a counter will emerge to guide the user.



If the user releases Menu/Select key before the counter is completed the device will return to menu selection screen.

1.6 OPERATING DISPLAY AND SYMBOLS

After initialization phase the operating screen with dose rate is displayed. The symbols visible on the operating display depend on the status of meter.

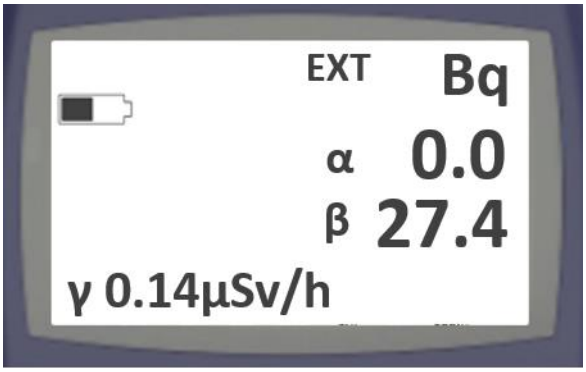


The basic instrument RDS-32 has two units: Sv-based and rem-based units. A suitable sub-multiplier ‘µ’ or ‘m’ is set to extend the display range. In addition, ‘/h’ is applied to indicate the dose rate. With external probes, additional units can be provided in the display, depending on the external detector.

With external gamma detectors, the same basic units can be used (Sv/h, Sv, rem/h and rem). With external contamination detectors, the display can be configured to units (cps, cpm, dpm, Bq or Bq/cm^2). The selected unit is indicated above the reading.

While using external probes, RDS-32 simultaneously measures and displays the dose rate from the internal detector of the instrument (bottom left corner of the display). The external readings are marked according to the type of radiation measured.

Display with alpha/beta probe:

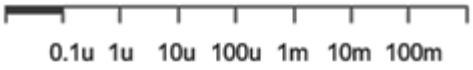


Display with gamma probe:

DISPLAY SYMBOLS AND THE RELATED FUNCTIONS:

Display symbols for audio and alarming functions			
	Button and alarm buzzer enabled		Audible chirp enabled
	Button buzzer disabled, alarm buzzer enabled		Audible chirp disabled
	Button buzzer enabled, alarm buzzer disabled		Vibration alarm is enabled
	Button and alarm buzzer disabled	**AL**	Alarm condition exists
NOTE: If speaker and chirp symbols are not visible, device is muted.			

Display symbols for external detectors			
	Waiting for external detector detection	EXT	External detector is connected
α	Alpha detector measuring	β	Beta detector measuring
γ	Gamma detector measuring (and internal detector measurement)	n	Neutron detector measuring
Display symbols for battery status			
	Battery full		50% capacity (changes showed in steps of 10%)
	Powered from USB or cradle. Alternates with battery capacity symbol in two second		Battery life indicator blinks on the left side of battery symbol
NOTE: Battery monitoring is for alkaline batteries.			
Display symbols for communication			
	Bluetooth		WRM transmission active
	NFC		

Analog bar is shown at the bottom of the display: 

The graph indicates very short integration time pulse rates and helps in searching.

1.7 NAVIGATION AND SHORTCUTS

Navigation in the RDS-32 menu:

- ENTER the menu by pressing the MENU/SELECT key.
- SCROLL DOWN in the menu using the UP and DOWN arrow keys.
- MOVE into a menu section by pressing the RIGHT arrow key.
- SELECT an item by pressing the MENU/SELECT key.
- RETURN to a higher level in the menu by pressing the LEFT arrow key
- SET a value, SELECT a function, or RESET a counter by pressing the MENU/SELECT key.

The parameters of the instrument can be changed using the menu functions described later in this manual. The configuration software is required to change those parameters that are either disabled from the Instrument Menu or are included only in the software. Almost all the menu functions can be disabled with the software. Display automatically returns to the operating display if keys are not pressed for 14 seconds.

Predefined shortcut functions of the RDS-32:

	Backlight on for 15 seconds
	Mute/Unmute active alarm and chirp
DOSE	Checking accumulated dose
▪ ▪ ▪	No predefined shortcut

The top arrow key does not have a predefined shortcut. The user can define a shortcut for this key with configuration software. The user can also change the predefined shortcut functions with configuration software.

1.8 CONNECTING EXTERNAL PROBE

To connect the external probe to the meter, first remove the rubber protection cap of the connector by pulling the cap out. Connect the external probe by carefully inserting the probe connector and then turn the fixing sleeve clockwise until firmly fastened.

The probe can be attached to or removed from the meter without any need to switch off the meter first.

Most probes are detected automatically, and the radiation detection starts immediately without any need for input. Probe menu opens when detector with no memory is connected to the meter. For detailed probe settings see Chapter 3.9 Probes.

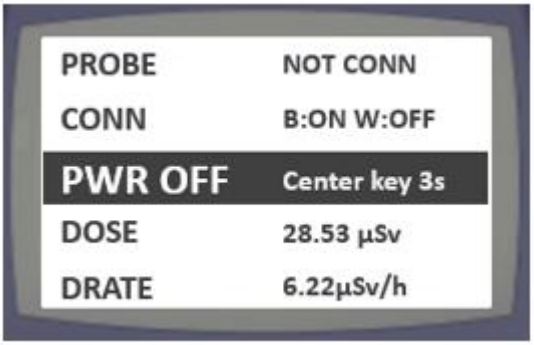
RDS-32 MENU ITEMS

Quick guide to menu items is provided below. For detailed operation, see the individual chapters for each item.

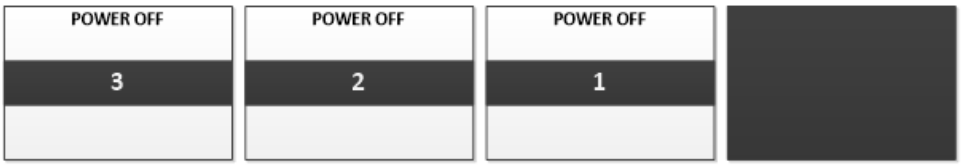
MENU ITEM	FUNCTION
PWR OFF	Switching off the meter
DOSE	Check and reset the current accumulated dose value
DRATE	Check and reset the current maximum recorded dose rate since last reset
CHIRP	Adjust the sensitivity of the visual and audible pulse indication
ALARM	Dose and dose rate alarm settings
HISTO	Operate the Histogram functions and/or pick manually the current data values into the memory
CONN	NFC, Bluetooth and WRM connection settings
DIAG	Activate the internal diagnostics, check software revision and battery capacity
PROBE	Settings for external probes

1.9 POWER OFF

POWER OFF the device by pressing the Menu/Select key so that the PWR OFF selection is activated. Press the Menu/Select key again for 3 seconds to power off the device.



Pressing the Menu/Select key, a counter will emerge to guide the user.



If the user releases Menu/Select key before the counter is completed the device will return to menu selection screen.

The instrument does not completely shut down all the internal circuitry. The RTC-circuit remains active maintaining the time signal. The energy is supplied with the batteries. The time setting of the instrument RTC is lost in case the batteries are removed for more than 1 minute.

In case the instrument is to be stored for a prolonged period, it is advisable to remove the batteries to prevent any leakage to the battery compartment.

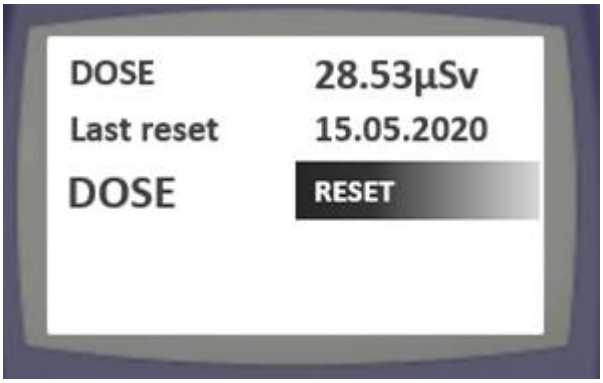
1.10 DOSE

The instrument integrates the cumulative dose continuously when switched on.

The cumulative dose can be viewed by pressing the DOSE shortcut key or by entering the menu.

To reset accumulated dose, navigate to DOSE in the main menu and select RESET by pressing the Menu/Select key.

The date/time of the dose reset is recorded and shown in the menu.



1.11 DOSE RATE

The instrument monitors maximum dose rate while measuring.

The maximum recorded dose rate can be viewed by entering the menu.

To reset maximum recorded dose rate, navigate to DRATE in the main menu and select RESET by pressing the Menu/Select key.

The date/time of the maximum dose rate reset is recorded and shown in the menu.

1.12 CHIRP

The chirp function can be used to activate or deactivate the audible or visual chirp and to select the Chirp divisor. The possible divisors are: 1/1, 1/2, 1/5, 1/10, 1/20 and 1/50.

The audible and visual Chirp can be disabled individually, but they share the common dividing ratio when enabled.

To see or change the chirp state navigate CHIRP in the RDS-32 menu.

The menu shows A:ON or A:OFF depending on the current state of the Audible Chirp.

The menu shows LED:ON or LED:OFF depending on the current state of the Visual Chirp.

To change the divisor of the chirp function navigate to SCALE.

MAIN MENU	
CHIRP	A :ON LED: ON

2ND LEVEL	
CHIRP	AUDIO
	LED
	SCALE

3RD LEVEL	
AUDIO	ON
	OFF
LED	ON
	OFF
SCALE	1/1
	1/2
	1/5
	1/10
	1/20
	1/50

1.13 ALARMS

ALARM menu selection includes the following items:

- Dose rate
- Dose
- TimeToDose: the remaining time is visible
- Mode

MAIN MENU		2ND LEVEL		3RD LEVEL
ALARM	DR: xx µSv/h DOSE: xx µSv	DRATE	xx µSv/h	Set alarm level
		DOSE	xx µSv	Set alarm level
		TimeToDose	hh/mm	
		Mode	Fix	

Selection structure and logic to set the dose rate or dose levels are similar for both and described in below chapters.

Alarm mode (fixed or dual, fixed is default) can be changed with configuration software.

1.13.1 DOSE RATE ALARM (DRATE)

Dose rate alarm can operate in two different modes

- Fixed alarm
- Dual alarm (different level is set for WARNING and ALARM)

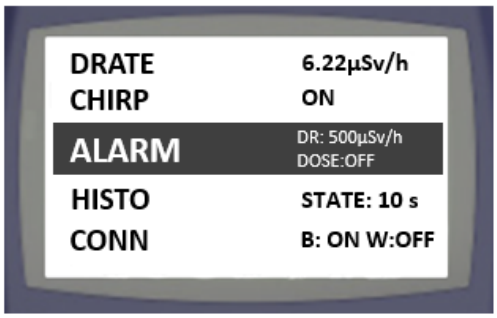
Default mode is fixed alarm. The mode can be changed only with configuration software.

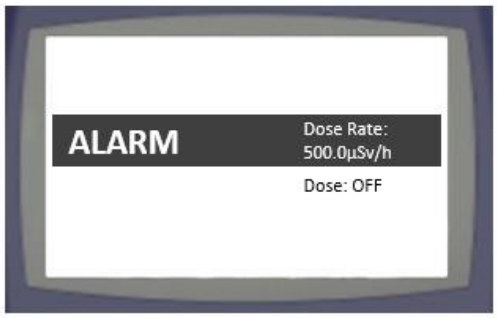
User can choose the fixed alarm threshold level from the 8 preset levels for dose rate alarm:

- DISABLED, 10, 50, 100, 500, 1000, 5000, 10000, 50000 µSv/h or mrem/h

The preset levels can be changed with configuration software.

To see the current dose alarm level or change it, navigate to ALARM in the menu.





On Dose Rate press the right arrow key and navigate further to right to modify alarm level.

The alarm level is modified using the top and bottom arrow keys and moving to right / next figure once ready. The measuring unit is modified the same way. The alarm level can be defined in format 000.0 and units can be selected from µSv/h, mSv/h or Sv/h (µrem/h, mrem/h, rem/h).

Alarm level is updated only if ‘Save´ is selected using the Menu/Select key. To ignore the change, select ‘Undo’ or press the left arrow key until returned to previous menu level. Also waiting 5 seconds will switch the display back to operating mode with no change to the alarm level.

1.13.2 DOSE ALARM

Dose alarm can operate in two different modes

- Fixed alarm
- Dual alarm (different level is set for WARNING and ALARM)

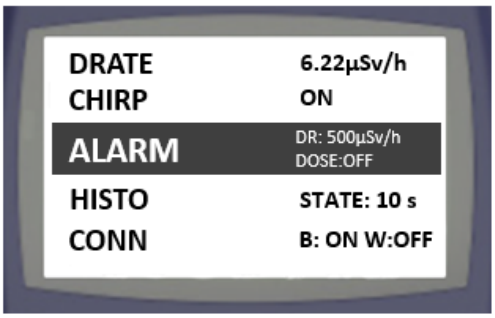
Default mode is fixed alarm. The mode can be changed only with configuration software.

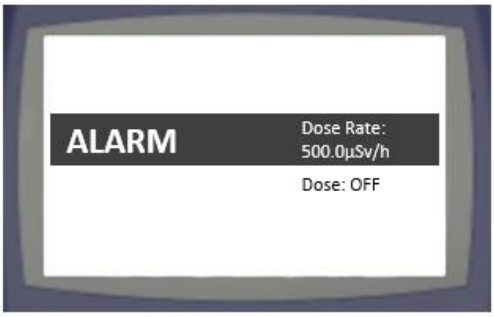
User can choose the fixed alarm threshold level from the 8 preset levels for dose rate alarm:

- DISABLED, 100, 500, 1000, 5000, 10 000, 50 000, 100 000 or 500 000 µSv or mrem.

The preset levels can be changed with configuration software.

To see the current dose alarm level or change it, navigate to ALARM in the menu.





Press right arrow key, navigate to Dose and navigate further to right to modify dose alarm level.

The alarm level is modified using the top and bottom arrow keys and moving to right / next figure once ready. The measuring unit is modified the same way. The alarm level can be defined in format 000.0 and units can be selected from µSv, mSv or Sv (µrem, mrem, rem).

Alarm level is updated only if ‘Save´ is selected using the Menu/Select key. To ignore the change, select ‘Undo’ or press the left arrow key until returned to previous menu level. Also waiting 5 seconds will switch the display back to operating mode with no change to the alarm level.

1.13.3 EXTERNAL DOSE RATE / COUNT RATE ALARM

The external alarm is dependent of the connected probe. For dose rate detectors the alarm is dose rate alarm and for count rate detectors the alarm is count rate alarm.

User can choose any of the preset 8 alarm levels listed below.

Preset levels for dose rate alarm:

- Disabled, 10, 50, 100, 500, 1 000, 5 000, 10 000 or 50 000 µSv/h or mrem/h.

Preset levels for count rate alarm:

- Disabled, 10, 15, 20, 60, 100, 600, 1000 or 6000 cps.

1.14 HISTOGRAM

The default setting in the RDS-32 is that the histogram is ON and collecting data at a 5 minute interval.

The meter memory is able to store approximately 60000 data sets. The information stored is the immediate value in the display, the average and maximum dose rate from the previous storing, the location and time. When an external detector is connected to the instrument, the histogram stores data from both internal and external detector.

The final number of stored data sets depends on the amount of diagnostics information that is also stored into the same memory area.

The histogram memory is downloaded using the configuration software and communication link.

It will take approximately 80 hours to fill the RDS-32 histogram memory when sampling at 10 second intervals. If the histogram memory becomes full the older data sets will be overwritten by new data sets.

In addition to the type of data sets mentioned above there are automatic records that are stored into histogram memory:

- Diagnostics (Automatic, manual or error found)
- The user has reset the dose or the max dose rate
- The instrument has been calibrated (New and old Coefficients are stored)

These data records also consume the histogram memory.

Calibration memory: The results of the 64 newest calibrations are stored in the memory. The oldest are overwritten in case more than 64 calibrations are performed.

Diagnostics memory: The first start-up of the day is stored here. In case the instrument operates continuously without going to the OFF state, automatic diagnostics is run at 00:00:00 and the results are stored into a specific diagnostics memory. This memory can store the data

of over one year of operation. When the memory becomes full, the oldest diagnostics data is overwritten.

These special memory areas cannot be cleared with the configuration software but require special service.

MAIN MENU		2ND LEVEL		3RD LEVEL	
HISTO	ON	HISTO	CLEAR	CLEAR	YES
			STATE	STATE	ON
			I: 5 min		OFF
			L: 0	I	10 s
			Manual		30 s
					1 min
					5 min
					10 min
					30 min
					1 h
					2 h
				L	0
					...
					255
				Manual	Save

1.14.1 CLEAR

The histogram memory can be cleared by selecting Clear in the HISTO menu.

1.14.2 STATE

The current state of the histogram data collection can be checked and changed ON/OFF in the STATE menu.

NOTE: With configuration software user can configure the instrument to automatically save histogram data when alarm conditions are met, although the histogram STATE would be set to OFF. See the software manual for more details

1.14.3 INTERVAL (I)

The interval of storing measurement results to the histogram can be selected from the predefined list in this menu by pressing the Menu/Select key. The intervals available are 10 s, 30 s, 1 min, 5 min, 10 min, 30 min, 1 h and 2 h.

1.14.4 LOCATION (L)

A location can be stored as additional information to the histogram.

There are up to 255 numbered locations. The location 0 is a general-purpose placement.

Using the RDS-32 configuration software it is possible to specify a mnemonic or longitude and latitude values for the first 16 locations.

1.14.5 MANUAL

By selecting Manual, the user can save the current values displayed by the meter into the histogram.

1.15 CONNECTIONS

MAIN MENU		2ND LEVEL		3RD LEVEL		4th LEVEL
CONN	N OFF	CONN	NFC: OFF	NFC	Init	
	BLE STBY		BLE: STBY		Read/Write	
	W OFF		WRM: OFF		OFF	
				BLE	NFC Pair	
					On for 30 s	
					OFF	
				WRM	ON	
					OFF	
					Interval	2 s
						4 s
						10 s
						30 s
						1 min
						5 min
						10 min
						30 min
						1 h
						2 h

1.15.1 WRM

WRM (Wireless Remote Monitoring) functionality can be enabled with configuration software. The WRM communication uses either internal WRM-radio in applicable models or serial line wired connection. The WRM can be set OFF or to send messages in intervals between 2 seconds to 2 hours. The WRM functionality is used to send data packets via radio system, RS communication or over Local Area Network.

In RDS-32iTx variants an internal radio modem enables the dose/dose rate data transmission to any WRM compatible system.

In RDS-32iTx variants the WRM setting are available in the menu as default. To activate the WRM communication in an RDS-32iTx variant:

- Scroll to WRM in the menu and check the current state of the communication link (WRM: xs | WRM:OFF). Change WRM ON/OFF and send interval as needed.

1.15.2 BLE

BLE communication can be configured in the BLE menu. The user can manually activate BLE enumeration for 30 s or use NFC pairing. The user can also disable to BLE communication in this menu.

- NFC Pair => activated with NFC (Standby ‘STBY’)
- ON for 30s => Manual activate BLE enumeration active for 30 seconds
- OFF => Disable the BLE communication

Basic device configurations can be performed via BLE interface by using dedicated Mirion application.

1.15.3 NFC

The NFC Tag mode can be set ‘ON’ when BLE communication is initiated with NFC reader or ‘OFF’ when BLE communication needs to be initiated via BLE menu selection, see 1.15.2.

- Tag mode
    - ON/OFF

1.16 DIAGNOSTICS

The user can manually activate the meter self test in the DIAG menu. The DIAG menu also contains information about the device firmware version and the time and date set to the RDS-32. The time and date can be set using the configuration software. The firmware can also be updated using configuration software. See the software manual for more details.

Activate the meter self test routine by navigating into the DIAG menu and by pressing Menu/Select on Self test.

MAIN MENU	
DIAG	BATT xx%
	LED: ON

2ND LEVEL	
DIAG	Self test
	BATT xx%
	v.xx.xx.xx
	00:00:00
	12.12.20
	CAL.CHECK

The self test routine includes checking the high voltage, the operating voltage and the battery capacity. During this process the user may also check the operation of all the display pixels, the visual alarm LED, the audible alarm and the vibration alarm.

Selecting CAL Check starts the calibration check procedure. The check dose rate value is set to 1 mSv/h as a default. With the configuration software, the value can be set to a more optimal value between 300 µSv/h - 3 mSv/h. After a fixed 1 minute waiting time the instrument measures a dose of 100 µSv (time calculated from the rate). In case the measured dose is within 10% from expected dose the check is cleared, otherwise there will be a warning and it is advised to perform a recalibration of the instrument. Start the calibration check procedure. The results of the check are stored into the Diagnostics histogram.

1.17 PROBES

Most probes are detected automatically, and the radiation detection starts immediately without any need for input.

Probe menu opens when detector with no memory is connected to the meter. From this sub-menu it is possible to change the detector profile, unit for external detector. For isotope profile detectors there is the possibility to change the used isotope. It is also possible to change radiation type for detectors that are capable to detect different radiations.

Gen.CHK.Def is profile for no-memory detector that is tested for the pulse generation of the external probe. If no pulses are detected for a given time the meter will show error message.

Gen.No.Def is profile for no-memory detector that is not tested for pulse generation. For instance alpha probes, and there are no pulses at all (some of the probes are alpha sensitive only) in the determined time window.

ERROR CODES AND OTHER DISPLAY MESSAGES

When necessary the meter will give display messages regarding battery condition, current alarms, and error situations.

1.18 LOW BATTERY WARNING

An audible low battery warning signal combined with a blinking battery symbol indication repeated every 6 minutes when the battery capacity is 10% < Capacity < 30%

Low battery warning: ——— – ——— (Long – Short – Long Bleep in five minutes intervals). The dose rate measurement continues normally.

1.19 LOW BATTERY ALARM

The display shows "LOBAT" blinking and the audible alarm is activated when the battery capacity is <10%.

Low battery alarm: ——— – ——— (Long – Short – Long Bleep in 20 second intervals).

NOTE: The dose rate measurement is prevented.

1.20 DOSE RATE / DOSE ALARM (BLINKING DISPLAY)

Dose rate alarm: ------ (two beeps per second).

The dose rate display is blinking, and the continuous audible alarm is on. The audible alarm can be silenced with mute shortcut (right arrow key).

Dose alarm: - - - - - - (one beep per two seconds).

The dose rate display is on and the current dose alarm level alternates in the display and the continuous audible alarm is on. The audible alarm can be silenced with mute shortcut (right arrow key).

1.21 DOSE RATE OVERFLOW ALARM (OFL)

When the measurement limits are exceeded, the display shows “OFL” (blinking). The continuous audible alarm is on.

Dose rate overflow: —— —— (continuous beeps).

The overflow alarm cannot be reset.

NOTE: When the dose rate overflow has been activated, there will be a message from this event in the dose read-out. When the dose is given, the display alternates between “DR.OFL” <-> dose. This flag will be set when the dose is reset. This is to inform the user that the measured dose might not give the true value due to exceeding the maximum measurable dose.

1.22 DEFECT ERRORS

In case there is a critical internal failure in the instrument, the Defect error is activated. The continuous audible alarm is on.

Error alarm: ——— ——— (continuous bleeps every two seconds).

The dose rate measurement is prevented.

Error codes and types:

Error1 = CAL.DF Calibration error, the calibration coefficient is default, or is out of accepted limits.

Error2 = FLS.DF Non-volatile memory error

Error3 = DET.DF Detector is faulty (internal or external)

Error4 = DG1.DF High voltage is not within specified range

Error5 = DG2.DF Internal power supply is out of specified range

Error6 = DG3.DF Firmware CRC error; the bit sum check of embedded software failed

Error7 = LFE.DF Cumulative dose overflow (>10 Sv). The GM-detector can be at the end of life.

Should an error occur, write down the Error message and return the meter to the manufacturer for service (for contact info: see the last page of this manual). The internal diagnostics memory will also store critical errors, but in case the problem is the memory itself, it cannot be completed.

MAINTENANCE AND DECONTAMINATION

No specific maintenance is required except for a periodic check of the calibration. The local authorities typically determine the required checking interval. Once a year under demanding conditions, or every second year under typical laboratory conditions is a recommended interval in maintaining the proper operational reliability of the instrument.

1.23 FIRMWARE UPDATE

Configuration software is needed for firmware update. Follow the procedures outlined in the software manual to upload a new firmware to the RDS-32.

1.24 BATTERY COVER AND SEAL CHANGE

For battery cover and seal change a replacement cover or seal and a Pozidriv #1 screwdriver are needed.

Instructions:

- Unscrew the battery cover from the meter
- Pull the rubber seal from the plastic cover.
- Attach the new rubber seal to the plastic cover.
- Make sure that the tips in the plastic are in the holes of the seal and the seal is well aligned.
- Screw the battery cover to the meter.

1.25 CALIBRATION

Configuration software is needed for the calibration of RDS-32. Follow the calibration procedure outlined in the software manual.

1.26 MECHANICAL DECONTAMINATION

The recommended mechanical method is vacuum cleaning or blasting with pressurized air.

1.27 CHEMICAL DECONTAMINATION

During the decontamination procedure following items are needed:

- Cleaning solution with neutral pH (non-corrosive preferred)
- Cotton pad, paper tissue, etc.

In principle the RDS-32 can be decontaminated with any commercially available decontamination solutions, suitable for polycarbonate/polyamide materials (e.g. Sprint 200 Free PH 7). Acetone is not recommended. Begin with wiping and/or brushing. Immersion is only recommended as a next step if necessary and the IP67 sealing has been confirmed. Please see service manual or ask factory for more advices about immersing the RDS-32 in a decontamination solution.

SPECIFICATIONS

DETECTOR:

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
DETECTOR 1 – Energy Compensated Geiger Mueller. SENSITIVITY (137Cs) – 1.5 c/s per 1 µSv/h (manufacturer spec 18 cpm per mR/h, 60Co)			
YES	YES	YES*	YES*
DETECTOR 2 – Energy Compensated SI diode. SENSITIVITY (137Cs) 16 cps / 1mSv/h			
NO	NO	YES*	YES*
** Changing from G-M to Si diode takes place at 30 mSv/h in increasing field and back from Si diode to G-M tube at 10 mSv/h in decreasing field.*			

RADIOLOGICAL CHARACTERISTICS:

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
Operational quantity			
Ambient dose equivalent H*(10)	Ambient dose equivalent H*(10)	Ambient dose equivalent H*(10)	Ambient dose equivalent H*(10)
Radiation detected: gamma and X-rays: Low			
48 keV	48 keV	55 keV I 65 keV**	55 keV I 65 keV**
Radiation detected: gamma and X-rays: High			
3 MeV	3 MeV	3 MeV	3 MeV
Dose rate measurement range			
0.05 µSv/h .. 100 mSV/h 0.005 mrem/h .. 10 rem/h	0.05 µSv/h .. 100 mSV/h 0.005 mrem/h .. 10 rem/h	0.05 µSv/h .. 10 SV/h 0.005 mrem/h .. 1000 rem/h	0.05 µSv/h .. 10 SV/h 0.005 mrem/h .. 1000 rem/h
IEC Dose rate measurement range: Low			
0.3 µSv/h 0.03 mrem/h	0.3 µSv/h 0.03 mrem/h	0.3 µSv/h 0.03 mrem/h	0.3 µSv/h 0.03 mrem/h
IEC Dose rate measurement range: High			
100 mSv/h 10 rem/h	100 mSv/h 10 rem/h	10 Sv/h 1000 rem/h	10 Sv/h 1000 rem/h
Dose measurement range: Low			
0.1 µSv 0.01 mrem	0.1 µSv 0.01 mrem	0.1 µSv 0.01 mrem	0.1 µSv 0.01 mrem
Dose measurement range: High			
10 Sv 1000 rem	10 Sv 1000 rem	10 Sv 1000 rem	10 Sv 1000 rem
Calibration accuracy at reference calibration direction and in the Cs-137 calibration field, temperature +20 °C (68°F). Compared to Finnish National Laboratory STUK			
± 5% @137Cs	± 5% @137Cs	± 5% @137Cs	± 5% @137Cs
Dose rate linearity			
± 15% least significant number 0.3 µSv/h...0.1 Sv/h	± 15% least significant number 0.3 µSv/h...0.1 Sv/h	± 15% least significant number 0.3 µSv/h...10 Sv/h	± 15% least significant number 0.3 µSv/h...10 Sv/h
Variation of the response due to photon radiation energy and angle of incidence			
(R E,A) 71% < RE,A < 167% (48 keV...3 MeV), ± 45°	(R E,A) 71% < RE,A < 167% (48 keV...3 MeV), ± 45°	(R E,A) 71% < RE,A < 167% (48 keV I 65 keV*...3 MeV), ± 45°	(R E,A) 71% < RE,A < 167% (48 keV I 65 keV*...3 MeV), ± 45°
***for Si diode detector above 30 mSv/h dose rates*			

FUNCTIONAL CHARACTERISTICS:

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
4 navigation keys and a Menu/Select key to operate the instrument.			
YES	YES	YES	YES
3 default shortcuts: Backlight, Mute and Dose. One user defined shortcut.			
YES	YES	YES	YES
Configurable units: Sv(/h), rem(/h), with external detectors Gy(/h), cps, cpm, dpm and Bq.			
YES	YES	YES	YES
Versatile histogram functions (dose rate, dose, diagnostic logging depending on configuration, time stamp, optional location control for mapping and repeating room control analysis).			
YES	YES	YES	YES
Histogram data stored in XML format; allowing additional histogram analyzing capabilities when downloaded from CSW-31 software to a spreadsheet.			
YES	YES	YES	YES
Real Time Clock (RTC) function. Back-up time 3 hours			
YES	YES	YES	YES
Configurable audible, visual and a vibration alarm.			
YES	YES	YES	YES
Graphical LCD display with 128 x 64 square pixels; special symbols for alarm, external probe, battery, RF communication, vibration alarm, chirp and mute.			
YES	YES	YES	YES

COMMUNICATION PROTOCOLS:

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
USB-communication with suitable adapter.			
YES	YES	YES	YES
Bluetooth Low Energy 4.2 protocol, BLE Class 2 communication. Three telemetry data channels including dose rate and dose (1 x internal and external probe with two channels). Basic device configurations can be performed via BLE interface by using dedicated Android application.			
YES	YES	YES	YES
NFC communication. BLE pairing by using NFC.			
YES	YES	YES	YES
WRM radio 900 MHz or 2.4GHz. Max emitting Tx Power: - 298mW@900MHz - 86mW@2.4GHz			
NO	YES	NO	YES
Graphical display with 128 x 64 square pixels; special symbols for alarm, external probe, battery, RF communication, vibration alarm, chirp and mute.			
YES	YES	YES	YES

ELECTRICAL CHARACTERISTICS:

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
Batteries 2 x AA/LR6, alkaline or NiMH - Battery monitoring not working with rechargeable lithium batteries			
2 x AA/LR6 (alkaline or NiMH)	2 x AA/LR6 (alkaline or NiMH)	2 x AA/LR6 (alkaline or NiMH)	2 x AA/LR6 (alkaline or NiMH)
Contacts for external power and charging of NiMH battery (charging conditions +5... +35°C).			
YES	YES	YES	YES
Operation time with fresh batteries more than 2 months at background radiation at +23°C, 8 h use/24h.			
YES	YES	YES	YES
Operation time with fully charged NiMH batteries more than 1 month at background radiation at +23°C, 8 h use/24h with 2900 mAh capacity. (radios disabled, display backlight off, LED off)			
YES	YES	YES	YES
Battery life ca. 600 h (in backgroud radiation, radios disabled).			
YES	YES	YES	YES
Real time clock secured with back up battery			
3 hours	3 hours	3 hours	3 hours
Alarm audio Level in dB			
86 dBA@30cm	86 dBA@30cm	86 dBA@30cm	86 dBA@30cm

MECHANICAL CHARACTERISTICS:

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
Dimensions			
116 x 72 x 32 mm (4.57 x 2.83 x 1.26 in)	116 x 72 x 32 mm (4.57 x 2.83 x 1.26 in)	116 x 72 x 32 mm (4.57 x 2.83 x 1.26 in)	116 x 72 x 32 mm (4.57 x 2.83 x 1.26 in)
Weight without batteries			
160 g	170 g	195 g	205 g
Weight with batteries			
210 g	220 g	245 g	255 g
Enclosure class, including battery compartment.			
IP67 (IEC 60529)	IP67 (IEC 60529)	IP67 (IEC 60529)	IP67 (IEC 60529)
Case high impact durable PA6 Grilon EG30 glass fiber reinforced polymer. Tested 6 drops from 1 meter hight to concrete floor (once for each face).			
YES	YES	YES	YES
Ergonomic design, rubber grip and cushion around the case.			
YES	YES	YES	YES
Wrist strap			
YES	YES	YES	YES
Belt clip			
YES	YES	YES	YES

ENVIRONMENTAL CHARACTERISTICS:

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
Operating temperature			
-25 °C...+60 °C (-13 °F to 140 °F)	-25 °C...+60 °C (-13 °F to 140 °F)	-25 °C...+50 °C (-13 °F to 122 °F)	-25 °C...+50 °C (-13 °F to 122 °F)
Storage temperature			
-40 °C...+70 °C (-40 °F to 158 °F)	-40 °C...+70 °C (-40 °F to 158 °F)	-40 °C...+70 °C (-40 °F to 158 °F)	-40 °C...+70 °C (-40 °F to 158 °F)
Relative humidity			
+10% to 85% at +35 °C (95 °F)	+10% to 85% at +35 °C (95 °F)	+10% to 85% at +35 °C (95 °F)	+10% to 85% at +35 °C (95 °F)
RF-immunity. Fulfills following standards: IEC61000-4-2 (2008), IEC61000-4-3 (2006 +A1:2007 + A2:2010), IEC61000-4-6 (2013), IEC61000-4-8 (2009)			
YES	YES	YES	YES
RF Emissions. Fulfills following standards: EN55032B			
YES	YES	YES	YES
FCC approval			
2AHI8-RDS-32	2AHI8-RDS-32	2AHI8-RDS-32	2AHI8-RDS-32
IC approval			
26167-RDS32	26167-RDS32	26167-RDS32	26167-RDS32

CONNECTOR:

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
Probe connector			
Binder-702-series	Binder-702-series	Binder-702-series	Binder-702-series
Existing detectors			
In separate list	In separate list	In separate list	In separate list
External alarm output max. 24 V			
YES	YES	YES	YES
Available accessories and ordering codes: See related chapter in User Manual			

RDS-32 VARIANTS AND ORDERING CODES:

Part no. 1233-321 RDS-32S SURVEY METER

Part no. 1233-322 RDS-32R SURVEY METER

Part no. 1233-323 RDS-32S WR SURVEY METER

Part no. 1233-324 RDS-32R WR SURVEY METER

Part no. 1233-325 RDS-32iTxS SURVEY METER (2.4GHz)

Part no. 1233-326 RDS-32iTxR SURVEY METER (900MHz)

Part no. 1233-327 RDS-32iTxS WR SURVEY METER (2.4GHz)

Part no. 1233-328 RDS-32iTxR WR SURVEY METER (900MHz)

The variant with Sievert-units is marked with ‘S’ and the variant with rem-units with ‘R’.

ACCESSORIES AND PROBES

1.28 ACCESSORIES

PROBE CABLES:

Part no. 1241-251 Cradle for RDS-32 including power supply and wall mounting kit

Part no. 1233-293 GMP-12SD/GSD/UW/GMP-25i coiled connection cable, 0,7 m - 1,6 m

Part no. 1233-295 GMP-12SD/GSD/UW/GMP-25i straight connection cable, length 20 m

Part no. 1233-318 RDS-32 - CSP probe adapter cable, length 0,4 m

Part no. 1233-319 RDS-32 - CSP probe straight adapter cable, length 1,5 m

Part no. 1233-320 RDS-32 - CSP probe coiled adapter cable, length 0,7 m - 1,6 m

SOFTWARE:

Part no. 1233-331 CSW-32 configuration software with USB Cable Link

OTHER ACCESSORIES:

Part no. 1233-213 Telescopic Pole for RDS-32 (Incl. carrying strap)

Part no. 1233-311 Carrying bag for telescopic pole

1.29 COMPATIBLE PROBES

Part no. 1233-294 GMP-12GSD Gamma dose rate probe

Part no. 1233-286 GMP-12SD Gamma dose rate probe

Part no. 1233-287 GMP-12UW Gamma dose rate probe

Part no. 1233-279 GMP-25 Alfa/Beta/Gamma pancake probe

Part no. 1233-291 GMP-25i Alfa/Beta/Gamma pancake probe

Part no. 1233-289 ABP-150 Alfa/Beta probe with 100 cm^2 detection area

Part no. 1233-274 GMP-11-3 Alfa/Beta/Gamma probe

Part no. 1233-276 GMP-12-3 Gamma dose rate probe

Part no. 1233-277 GMP-12L-3 Gamma dose rate probe

Part no. 1233-278 GMP-12H-3 Gamma dose rate probe

Part no. 1233-275 GMP-15-3 Alfa/Beta/Gamma pancake probe

Part no. EM90062 SA-20-2 Alpha probe with 20 cm^2 detection area

Part no. EM75863 SA-100 Alpha probe with 100 cm^2 detection area

Part no. EM74672 SB-20 Beta probe with 20 cm^2 detection area

Part no. EM78627 SX-2R 1.5'' x 3 mm X-Ray probe

Part no. EM75864 SAB-100 Alpha/Beta probe with 100 cm^2 detection area

Part no. EM81933 SABG-100 Alpha/Beta probe with 100 cm^2 detection area

Part no. EM108330 Easy-Count Alfa/Beta PIPS smear holder

Part no. EM75860 SG-1R 1" x 1" NaI(Tl) Gamma probe

Part no. EM75861 SG-2R 2" x 2" NaI(Tl) Gamma probe

Part no. EM78766 SPAB-15 Alpha/Beta 15 cm^2 probe with PIPS detector

Part no. EM83023	STTC Wide Range Gamma probe
Part no. EM85916	SABG-15+ Alpha/Beta/Gamma pancake probe
Part no. EM86790	SVLD Very Low Dose Rate Gamma probe
Part no. EM108072	SN-D-2 Neutron Dose probe
Part no. EM85810	SN-S Neutron Search probe
Part no. EM95464	SABS-579 Alfa/Beta 579 cm^2 Floor probe
Part no. EM106271	SABP-525 Alfa/Beta 525 cm^2

FCC COMPLIANCE STATEMENT

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Modifications: Any modifications made to this device that are not approved by Mirion Technologies Oy may void the authority granted to the user by the FCC to operate this equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

IC COMPLIANCE STATEMENT

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'In-novation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est sus-ceptible d'en compromettre le fonctionnement.

FEEDBACK

We are continuously working hard at producing correct and easy-to-read technical documents. However, complex systems are often difficult to explain or understand and therefore mistakes or inadequacies may occur occasionally in the documentation process. To correct these errors, we would like to hear your opinion on this document.

You can submit your feedback on our website www.mirion.com filling out the contact form. Alternatively, you can directly contact the manufacturing site for RDS-32:

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Finland

Email: services.finland@mirion.com
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Same contact information applies for all service-related matters.

As standards, specifications and design are subject to change over a period of time, please request for the confirmation of the information given in this publication.

For additional information on Mirion products and solutions please visit our webpage www.mirion.com.