



**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

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# 1 INTRODUCTION

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## 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/RDS-32iTx utilize an energy-compensated GM-tube as primary detector. RDS-32WR/RDS-32iTxWR offer an extended measurement range by addition of a silicon diode detector. RDS-32iTx/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 version 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, for example by customizing the alarm methods in use. With the software the user can also limit the menu functions available on the meter, for example by removing the possibility to adjust alarm settings.

**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 versatile keypad, with 4-way navigation keys and practical preprogrammed keypad direct functions. The functions include backlight activation, accumulated dose display and a mute function. One of the keys can be set as a custom shortcut with the CSW-32 configuration software.

**RDS-32** features dual alarm functionality offering a warning level setting in addition to an alarm setting for both dose rate and dose. The user can select between single alarm mode, dual mode or switch the alarms off.

**RDS-32** features a Scaler function for integration over time and acquiring the current background, to enable net measurements and improve MDA.

**RDS-32** is compatible with a wide array of external probes, including CSP™ (Canberra Smart Probe) probes for gamma, alpha, beta and neutron measurements. The compatible probes also include GMP-12 series external gamma dose rate probes and GMP-25, ABP-150 and GMP-11-3/15-3 probes for alpha/beta contamination measurements. When using an external probe, the meter provides an additional protective function to the user by simultaneously measuring and displaying the dose rate from the internal detector. In case a too high dose rate or an accumulated dose is measured, the alarms will be triggered.

## 1.2 RDS-32 VERSIONS

RDS-32 features two versions for different dose rate ranges: RDS-32 and RDS-32WR (Wide Range). All the RDS-32 versions are available with or without internal radio (iTx models marked with yellow/blue color) and either in Sv-units or in rem-units.



RDS-32

RDS-32iTx

RDS-32WR

RDS-32iTxWR

- GM-tube
- Dose rate up to 100 mSv/h (10 rem/h)
- iTx version with internal radio

- GM-tube + Si Diode
- Dose rate up to 10 Sv/h (1000 rem/h)
- iTx version with internal radio

### PRODUCT NO / DESCRIPTION

- 1233-321 RDS-32S SURVEY METER
- 1233-322 RDS-32R SURVEY METER
- 1233-323 RDS-32S WR SURVEY METER
- 1233-324 RDS-32R WR SURVEY METER
- 1233-325 RDS-32iTxS SURVEY METER (2.4GHz)
- 1233-326 RDS-32iTxR SURVEY METER (900MHz)
- 1233-327 RDS-32iTxS WR SURVEY METER (2.4GHz)
- 1233-328 RDS-32iTxR WR SURVEY METER (900MHz)

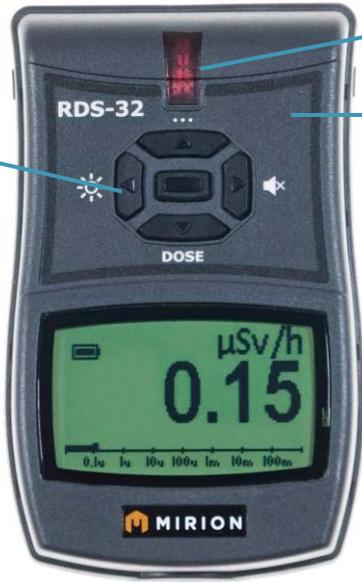
The version with Sievert-units is marked with 'S' and the version with rem-units with 'R'.

## 2 GETTING STARTED

### 2.1 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 version specification from Chapter 6.

RDS-32 front view



B.  
F.

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

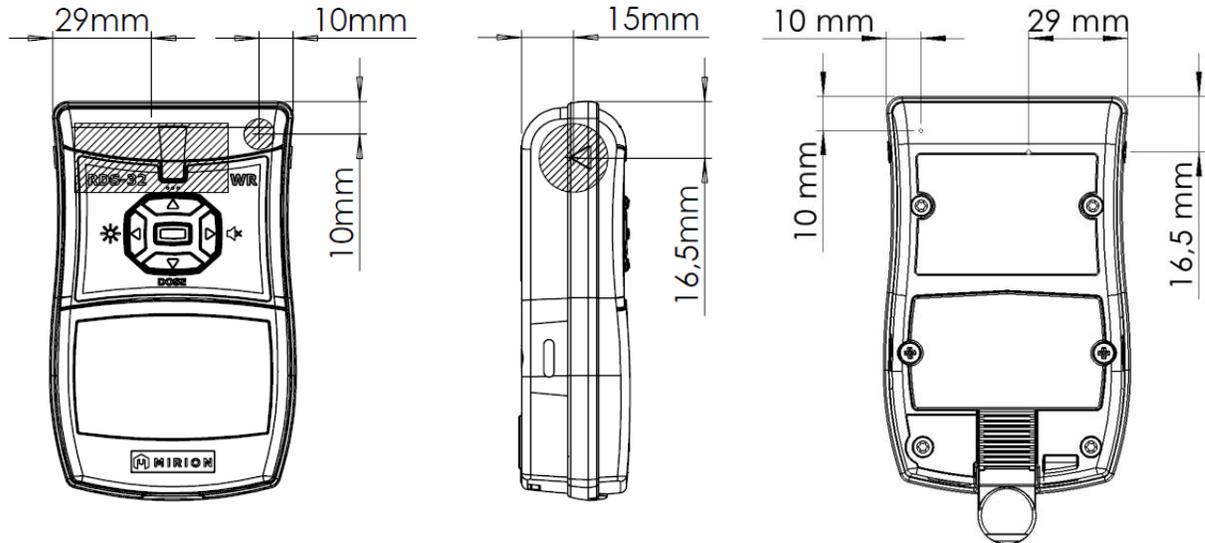


D.  
C.  
E.

C.

- A. Navigation keys with direct functions, Select key (ON/OFF) in the middle
- B. Flashing light for alarm and pulse rate
- 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 version.

Detector positions for GM-tube or both detectors, depending on the meter version, are illustrated in the picture below. The detector positions are also indicated with markings on the meter itself. The triangles on the meter sides indicate the reference line and the dot on the back of the meter indicates the GM-tube center point. On the WR models there is an additional dot to indicate the center point of the Si diode.



## 2.2 INSERTING BATTERIES

The instrument uses two IEC (LR6/ HR6) AA-size batteries.

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



RDS-32 is delivered with two battery covers. One of the covers has belt clip attached to it.

Alkaline or lithium batteries can be used. Battery monitoring is accurate for alkaline batteries. Lithium batteries are recommended for use with CSP probes. Rechargeable NiMH batteries can also be used. When using NiMH batteries, the CSW-32 Configuration software is required to select the correct battery type for battery charging and monitoring.

USB-RDS-32 Cable Link (Part no. 1233-333) can be used to charge NiMH batteries (power supply max. output power 15 W). Cradle for RDS-32 (Part no. 1241-251) includes power

supply and a wall mounting kit. The cradle can be mounted to wall using the screws provided in the kit and it is also compatible with most camera mounts.

**WARNING!** Risk of explosion if the battery is replaced with an incorrect type of battery.

**WARNING!** Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.

**WARNING!** Leaving a battery in an extremely high temperature surrounding environment can result in an explosion or the leakage of flammable liquid or gas.

## 2.3 POWER ON

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

The firmware version, time and calibration status are first shown on the display. If the time of meter's Real Time Clock is not set, the flashing 'TIME NOT SET' message is displayed. If necessary, the Real Time Clock can be reset with the CSW-32 Configuration Software.

When switched on the meter performs the following self-test functions:

- 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

After the initialization phase is complete, the Main display with dose rate will be shown.

## 2.4 POWER OFF

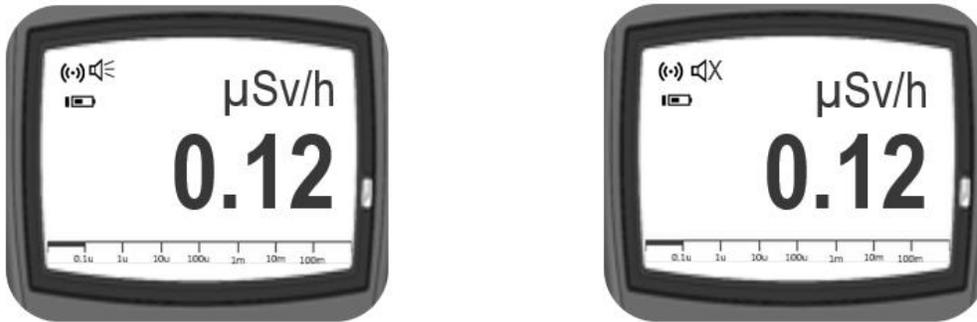
POWER OFF the device by first pressing the Select key so that the OFF selection is activated. Press the Select key again and hold for four seconds while the counter counts down.



If the select key is released before the countdown is complete, and the device powers off, the device will return to the menu display.

## 2.5 MAIN DISPLAY

After initialization phase the Main display with dose rate will be shown. The symbols visible on the Main display depend on the status of meter. The display symbols are presented in the following chapter.



The two example Main displays above show the measured dose rate, Sv unit with multiplier, battery capacity, analog dose rate indicator and different states of audio setting: chirp enabled (left), chirp disabled and key sounds disabled (right).

The basic instrument RDS-32 has two units: Sv-based and rem-based. 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 gamma dose rate probes, the same basic units can be used (Sv/h, Sv, rem/h and rem). With other external probes, the display can be configured to units cps, cpm, dpm, Bq or Bq/cm<sup>2</sup>. Which units are available will vary by probe type. The external probe unit in use is indicated above the reading.

When using external probes, the RDS-32 also displays the dose rate from the internal detector of the instrument and integrates accumulated dose. The RDS-32 internal detector dose rate is displayed on the bottom left corner of the Main display. The dose rate and dose alarms/warnings set for the RDS-32 detector are operational.



Example of the Main display with external dose rate probe connected.



Example of the Main display with alpha/beta probe connected.

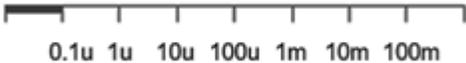
**2.6 DISPLAY SYMBOLS**

The RDS-32 Main display features a host of symbols relating to the current status or active setting of the meter.

**DISPLAY SYMBOLS AND THE RELATED FUNCTIONS:**

Display symbols for audio and alarming functions			
	Key and alarm buzzer enabled		Audible chirp enabled
	Key buzzer disabled, alarm buzzer enabled		All audible muted except alarm/warning
	Key buzzer enabled, alarm buzzer disabled		Vibration alarm is enabled
	Button and alarm buzzer disabled	<b>AL</b>	Alarm condition exists
		<b>W</b>	Warning condition exists
<b>NOTE:</b> If speaker and chirp symbols are not visible, the device is muted. Some of the above settings are only available in the CSW-32 Configuration Software.			

Display symbols for external detectors			
 CSP.INIT	Waiting for external detector connection	<b>EXT</b>	External detector is connected
$\alpha$	Alpha detector measuring	$\beta$	Beta detector measuring
$\gamma$	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 intervals.		Battery life indicator blinks on the left side of battery symbol
<b>NOTE:</b> Battery monitoring is accurate for alkaline batteries. Configuration software is needed to setup use of NiMH batteries.			
Display symbols for communication			
	Bluetooth		WRM transmission active



The analog bar is shown at the bottom of the Main display.

## 2.7 KEYPAD USE

The RDS-32 features a Select key in the middle of the keypad and four surrounding arrow keys for navigation in the RDS-32 menu:

- ENTER THE MENU by pressing the Select key.
- SCROLL IN THE MENU using the up and down arrow keys.
- MOVE INTO A MENU SECTION by pressing the Select key or the right arrow key.
- SAVE A VALUE, SELECT A FUNCTION, RESET A COUNTER by pressing the Select key.
- RETURN TO A HIGHER LEVEL in the menu by pressing the left arrow key or wait 15 seconds timeout to return to the Main display.

## 2.8 KEYPAD DIRECT FUNCTIONS

Keypad direct functions are preprogrammed into the arrow keys. The functions are operational in the Main display. Inside the menu the keys are reserved for navigation.

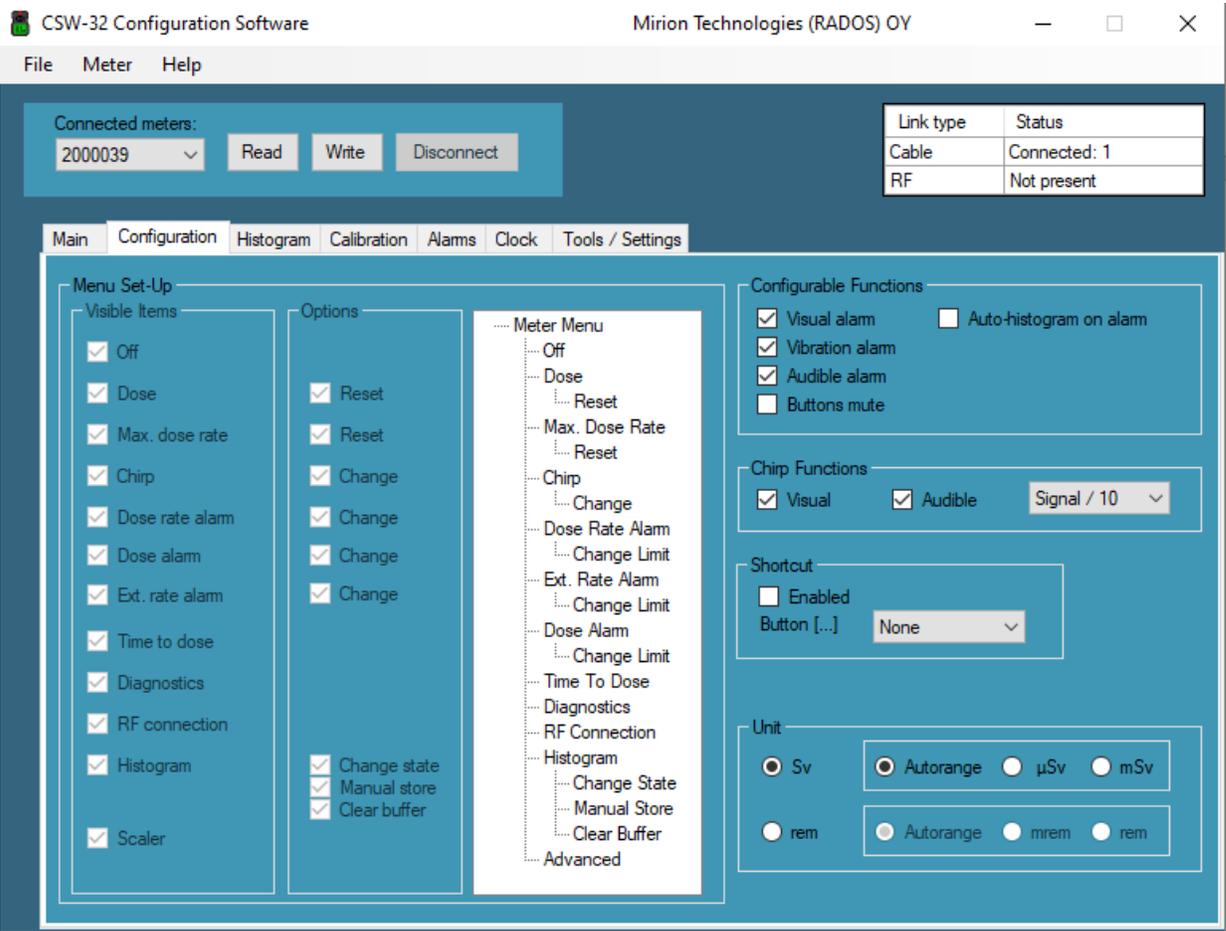
Activate a direct function in the Main display by pressing the corresponding arrow key. The factory set direct functions of the RDS-32 are shown in the below table.

	Switch backlight on or off
	Mute/Unmute chirp and key buzzer. In warning condition, acknowledges Audio, vibration and LED signal.
<b>DOSE</b>	Check accumulated dose, press again to check time to dose alarm
<b>...</b>	User settable function key (with CSW-32 software) Not factory set.

## 2.9 PARAMETER SETTINGS

The parameters of the device can be changed using the menu functions described later in this manual. The CSW-32 Configuration software can be used to simplify the operation or limit access to some parameter settings, like alarm levels. By default all the menu functions available are visible in the RDS-32 meter.

The CSW-32 Configuration Software offers some additional settings to functions available on the meter itself. For example, the backlight can be set as continuously on in the software. Also, the alarm methods (LED, audio and vibration) in use can be selected in the software. See the CSW-32 configuration software manual for details.



The menu configuration window of the CSW-32 software.

## 2.10 CONNECTING EXTERNAL PROBES

External probes can be quickly and easily connected to the RDS-32, there is no need to switch off the meter first.

To connect the external probe to the meter, first remove the rubber protection cap of the connector by pulling the cap out. Before making the connection to RDS-32, make sure the cable is well connected to the probe. Then observe the correct orientation by matching the internal ledge of the connector to the groove on the meter connector. This step is very important to avoid bending the connector pins. Finally, turn the fixing sleeve clockwise until it is firmly fastened.



Most probes are detected automatically. The display will show CSP.INIT or the symbol  while the connection is being established. For probes with an internal memory, the radiation detection starts without any need for additional input. For the few probes without internal memory, the meter will prompt to select a detector type before measurement begins. For detailed probe settings by probe type, see Chapter 3.11 External Probes.

### 3 RDS-32 FUNCTIONALITY

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



The lightbulb symbol will appear from time to time in the coming chapters to indicate a helpful tip for the user.

MENU ITEM	FUNCTION
OFF	Switch off the meter.
DOSE	Check and reset the current accumulated dose value.
MaxDR	Check and reset the current maximum recorded dose rate since last reset.
CHIRP	Adjust the sensitivity of the visual and audible pulse indication or switch them ON/OFF.
ALARM	Set dose and dose rate alarm levels and choose the alarm mode: single, dual or off
EXT.AL	Shown only if an external probe is connected: Check and change the external probe alarm levels.
TM.2.AL	Time left to reach the dose alarm in the current dose rate field.
DIAG	Activate the internal diagnostics, check software revision and battery capacity
COMM	WRM connection settings, BLE*
HISTO	Make the histogram data collection settings or clear saved data, save the current results and status manually.
SCALER	Set an integration time/count, acquire current background and start net or gross acquisition over time.
PROBE	Shown only if an external probe is connected: Check and change the probe settings such as probe type or measurement unit.

\*The WRM settings are in use in iTx radio models or when the RDS-32 data is being sent over local area network or as serial communication. The device has additionally BLE readiness.

The RDS-32 has a tilt sensor so that in the menu, the display can be rotated by tilting the device. This feature is not operational when an external probe is connected.

### 3.1 POWER OFF

The meter is powered off by first pressing the Select key so that the OFF selection is activated, then pressing the Select key again and holding for four seconds while the counter counts down.

If the Select key is released before the four second countdown and following beep, the meter will not power off. Instead, it will return to the menu display OFF.



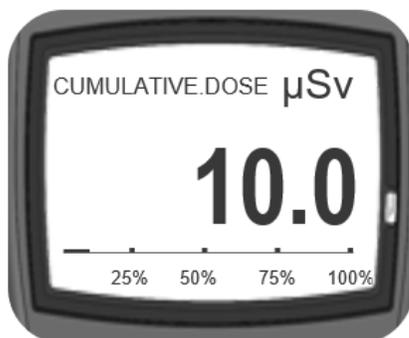
When powered off, the instrument does not completely shut down all the internal circuitries. The RTC-circuit remains active maintaining the time signal. The energy is supplied with the batteries. The time setting of the instrument RTC is lost in case the batteries are removed for more than 3 hours. The time can be reset using the CSW-32 Configuration Software.



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

### 3.2 CUMULATIVE DOSE

The meter integrates the cumulative dose continuously when switched on. The cumulative dose can be viewed by pressing the DOSE key in the Main display or by entering the menu and navigating to DOSE.



Example of the Cumulative dose display accessible via the DOSE key in the Main display. The display features a percentage scale which indicates the accumulated dose percentage with respect to the dose alarm level setting.

To reset the accumulated dose, navigate to DOSE in the menu, press the Select key once so that the RESET function starts to blink. Press the Select key a second time to see the confirmation phase SURE? Then press the Select key a second time to perform the reset.

Cancel the dose reset process by pressing the left arrow key.



The RDS-32 collects dose continuously while switched on and saves that value in the meter memory even if the meter is switched off/on. To follow accumulated dose by task or mission, reset the dose as indicated above. Alternatively, set a suitable histogram data save period so that the dose accumulation can be discerned from the histogram data. See Chapter 3.9 Histogram for more details. Note that the CSW-32 configuration software is required to access the histogram data.



Use the DOSE key to quickly check accumulated dose from the Main display. Press the key a second time to see time remaining until dose alarm.

### 3.3 MAXIMUM DOSE RATE RECORD

The meter monitors maximum dose rate while measuring. The maximum recorded dose rate can be viewed by entering the menu.

To reset the maximum recorded dose rate, navigate to MaxDR in the menu, press the Select key once so that the RESET function starts to blink. Press the Select key a second time to see the confirmation phase SURE? Then press the Select key a second time to perform the reset.

Cancel the maximum recorded dose reset process by pressing the left arrow key.



The RDS-32 records the measured maximum dose rate while switched on and saves that measured value even when the meter is switched off/on. To follow the maximum dose rate by task or mission, reset the record as indicated above. Alternatively, set a suitable histogram data save period so that the maximum dose rate can be discerned from the histogram data. The maximum dose rate is recorded with the same time interval as is set in the histogram settings. See Chapter 3.9 Histogram for more details. Note that the CSW-32 configuration software is required to access the histogram data.

### 3.4 CHIRP FUNCTION

The chirp function can be used to activate or deactivate the audible or visual chirp and to select the chirp divisor. The audible/visual chirp is an indication of the number of pulses received by the detector. The possible chirp 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 to CHIRP in the RDS-32 menu.

The menu shows AUD:ON or AUD:OFF depending on the current state of the audible chirp. Change the setting by navigating into the Audio menu.



The menu shows LED:ON or LED:OFF depending on the current state of the visual chirp. Change the setting by navigating into the LED menu.



The menu shows the chirp divisor which is in currently use as R:/x, where x is 1, 2, 5, 10, 20 or 50. Change the divisor by navigating into the Ratio menu.



Use the right arrow key in the Main display to mute or unmute the audible chirp and key sounds.



Use the chirp function to follow the number of pulses that the detector receives, for example to help search for a radiation source. Adjust the divisor to a suitable level depending on the number of pulses, so that the audible and visual signals can be interpreted.

### 3.5 ALARM FUNCTIONS

The RDS-32 features versatile alarm functions for dose rate and dose which can be set in the ALARM menu.

- Dose Rate indicates the current dose rate alarm level
- Dose Mode indicates the current dose alarm mode: single, dual or off
- Dose indicates the current dose alarm level
- DR Mode indicates the current dose rate alarm mode: single, dual or off

The alarm mode setting allows the user to select the desired alarm functionality. The user can select to apply a single alarm level only, a dual alarm with an additional warning level or switch the alarm completely off. The default mode is single alarm where only one alarm level is in use. The factory set alarm level is 50  $\mu\text{Sv/h}$  for dose rate and 500  $\mu\text{Sv}$  for accumulated dose. If the dual mode is taken into use, the factory preset warning levels are 10  $\mu\text{Sv/h}$  for dose rate and 100  $\mu\text{Sv}$  for accumulated dose. The alarm levels can be freely set by navigating further into the menu of each setting as described in the coming chapters.

By default, the activation of an alarm state will activate the audible alarm, the visual alarm (LED) and the vibration alarm. An active warning can be silenced in the Main menu by pressing the right arrow key. This will stop the audible alarm, the vibration and the visual (LED) alarm. If an active warning has been silenced, the display will still indicate the warning condition. The alarm methods which are in use can be changed from the CSW-32 Configuration Software.

#### 3.5.1 DOSE RATE ALARM

The dose rate alarm can have three different modes:

- Single
- Dual (different level is set for WARNING and ALARM)
- OFF

To switch between the different alarm modes, navigate to DR Mode and set the desired mode Dual, Single or OFF by pressing the Select key.

To set a new dose rate alarm level, navigate into Dose Rate and set a value by pressing the up/down arrow keys and then moving right (or left) between the numbers to complete your desired setting. When the alarm level has been entered, save by pressing the Select key.



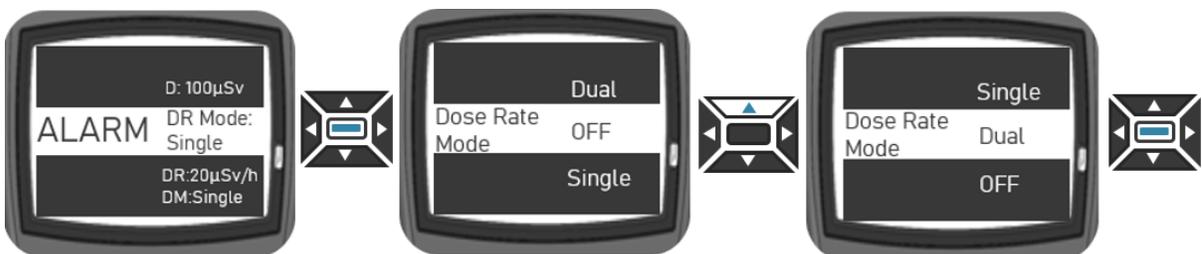
To set the desired alarm level it may be necessary to switch between unit multipliers. To switch between  $\mu\text{Sv/h}$ ,  $\text{mSv/h}$  or  $\text{Sv/h}$ , navigate to the unit (furthest right on the display) and change the selected unit multiplier with the up/down arrow keys. When the desired alarm level is selected, save by pressing the Select key. Note that  $\text{Sv/h}$  is only available in RDS-32WR versions.



To ignore the changes, press the left arrow key until the display returns to the previous menu level. Also waiting 12 seconds time out will switch the display back to Main display without changing the alarm level.

In dual mode the user can set two levels which will trigger the device alarming functions: a warning level and an alarm level.

To set the device in dual mode navigate into DR Mode and select Dual from the menu. To set a dose rate warning and alarm navigate into Dose Rate. The first available setting will be Dose Rate Warning. Set a suitable level, lower than the intended alarm level, according to the process described above. Save the desired level by pressing the Select key. The setting will move automatically to Dose Rate Alarm. Set a suitable dose rate alarm according to the process described above.





If the dose rate warning is muted from the Main display, the warning audible, vibration and LED indication will switch off. The display will still continuously show the warning symbol in the left upper corner and the display will blink.



During a dose rate warning the Main display will blink, showing the measured dose rate. The W symbol remains constantly on screen.



During a dose rate alarm the Main display will blink, showing the measured dose rate. The AL symbol remains constantly on screen.



Use the dual alarm mode to set a dose rate warning level to alert the user to a rising dose rate field which requires attention. The user is then alerted to the unusual condition and the meter will next alert the user if the alarm level is exceeded.



The configuration software offers additional control over the alarm methods. In the software the alarm method can be set freely to any single mode or a combination of audio/visual/vibration. For example, applying the vibration mode only can be useful for tactical situations.

### 3.5.2 DOSE ALARM

The dose alarm can have three different modes:

- Single
- Dual (different level is set for WARNING and ALARM)
- OFF

To switch between the different alarm modes navigate to Dose Mode and set the desired mode Dual, Single or OFF by pressing the Select key.

To set a new dose alarm level, navigate into Dose and set a value by pressing the up/down arrow keys and then moving right (or left) between the numbers to complete your desired setting. When the alarm level has been entered, save by pressing the Select key.



To set the desired alarm level, it may be necessary to switch between unit multipliers. To switch between  $\mu\text{Sv}$ ,  $\text{mSv}$  or  $\text{Sv}$ , navigate to the unit (furthest right on the display) and change the selected unit multiplier with the up/down arrow keys. When the desired alarm level is selected, save by pressing the Select key.

To ignore the changes, press the left arrow key until the display returns to the previous menu level. Also waiting 12 seconds time out will switch the display back to Main display without changing the alarm level.

In Dual mode the user can set two levels which will trigger the device alarming functions: a warning level and an alarm level.

To set the device in dual mode navigate into Dose Mode and select Dual from the menu. To set a dose warning and alarm navigate into Dose. The first available setting will be Dose Warning. Set a suitable level, lower than the intended alarm level, according to the process described above. Save the desired level by pressing the Select key. The setting will move automatically to Dose Alarm. Set a suitable dose alarm according to the process described above.

If the dose warning is muted from the Main display, the warning audible, vibration and LED indication will switch off. The display will still continuously show the warning symbol in the left upper corner and the display will periodically indicate the dose warning level and the text 'warning'.



During a dose warning the dose warning level will cycle on the Main display with the measured dose rate. The W symbol remains constantly on screen.



During a dose alarm the dose alarm level will cycle on the Main display with the measured dose rate. The AL symbol remains constantly on screen.



Use the Dual alarm mode to set an accumulated dose warning level to alert the user to an increasing dose. The meter will next alert the user if the accumulated dose alarm level is exceeded. See also Chapter 3.6 Time to Dose Alarm for a useful function to control the accumulated dose during a task or a mission.

### 3.5.3 EXTERNAL ALARM

When an external probe is connected to the RDS-32, the probe alarm setting can be checked and changed in the EXT.AL meter menu. The external alarms available in the menu are dependent on the connected probe. The external alarm is enabled by default.

For CSP series probes (product codes EM\*) the available alarm types and levels come from the probe memory. These vary with probe type, check the probe manual for details. The preset alarm levels for the CSP probes can be changed using the CSPA software

For the GMP-12 dose rate probe series, the user can choose any of the preset 8 dose rate alarm levels listed below.

Preset levels for GMP12 series dose rate alarm:

- OFF, 10, 50, 100, 500, 1 000, 5 000, 10 000 or 50 000  $\mu\text{Sv/h}$  or  $\text{mrem/h}$ .

For contamination probes such as GMP-25 or ABP-150 the preset units of the external alarm depend on the unit selected in the Probe menu: cps, cpm, dpm, Bq or Bq/cm<sup>2</sup>.

- CPS: OFF, 10, 15, 20, 60, 100, 60, 1000 or 6000 cps.
- CPM: OFF, 600, 900, 1200, 3600, 6000 cpm, 36 kcpm, 60 kcpm or 360 kcpm
- DPM: OFF, 1200, 1800, 2400, 7200 dpm, 12 kdpm, 72 kdpm, 120 kdpm or 720 kdpm
- Bq: 20, 30, 40, 120, 200, 1200, 2000 Bq or 12kbq
- Bq/cm<sup>2</sup>: list will be Bq values divided by detector area

For pulse rate probes like the GMP-11-3 only the cps and cpm units are available.

Set the probe alarm level by navigating into the EXT.AL menu and pressing the up/down arrow keys until the desired alarm level is the active selection. Press the Select key to save the desired alarm level.



Navigate into the Probe menu to change the probe measuring unit, if necessary. See Chapter 3.11 External Probes for more details.

### 3.6 TIME TO DOSE

The Time to Dose function shows the calculated remaining time until the dose alarm is activated in the current dose rate field. Check the status of the Time to Dose by pressing the Dose key twice or by navigating to TM.2.AL in the menu.

If the device shows +99h 99min there is more than 100 h left to the set dose alarm level in the current dose rate field. See Chapter 3.5.2 Dose Alarm for details on setting the dose alarm level.



Example of the Time to Dose screen with more than 100 hours left until dose alarm.



Example of the Time to Dose screen with 8 hours 25 minutes left until dose alarm.



The Time to Dose function can be used to help estimate the remaining work time on a certain task or on a mission. Reset the accumulated dose and then set the dose alarm to a suitable level, so that the user can check how much time they have left to stay in the dose field they are in.

### 3.7 DIAGNOSTICS

The Diagnostics menu has the following features:

- Manual activation of the meter selftest
- Display the device firmware version
- Display the battery capacity level

The device firmware can be updated using the CSW-32 Configuration Software. See the software manual for more details.

To activate the meter selftest routine, navigate into the DIAG menu, the selftest is the active selection and press the Select key to initiate.



The selftest 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.



When using NiMH batteries, set the correct battery type in the CSW-32 configuration software. When using NiMH batteries, the battery capacity indication is less accurate than for alkaline batteries.

## 3.8 COMMUNICATION

### 3.8.1 WRM

The WRM functionality is used to send data packets via radio system or an external data connection, for example serial line or Local Area Network. The WRM can be set to OFF or to send messages in intervals between two seconds to one hour.

In RDS-32iTx versions an internal radio modem enables the dose/dose rate data transmission to any WRM compatible system. To activate the WRM communication in an RDS-32iTx version (or set data send interval in RS communication or over Local Area Network):

Navigate into the WRM menu and select a suitable send interval from the available options: 2 s, 4 s, 10 s, 20 s, 30 s, 5 min, 10 min, 15 min, 30 min and 60 min.

Change the state to OFF to deactivate the WRM communication.



If the WRM is activated the Main display will show the symbol . See the software manual for the additional settings available for serial or LAN communication.

### 3.8.2 BLE

The device has readiness for Bluetooth communication. Contact Mirion for additional information.

BLE communication can be configured in the BLE menu. The user can manually activate BLE enumeration for 60 s. The user can also disable to BLE communication in this menu.

- ON will activate BLE enumeration for 60 seconds
- OFF will disable the BLE communication



If the BLE is activated the Main display will show the symbol  .

### 3.9 HISTOGRAM

The default setting in the RDS-32 is that the histogram is OFF. The histogram collection can be switched ON in the HISTO menu. By default the data collection is set at 10 second intervals.

Note that the histogram data is only accessible via the CSW-32 Configuration Software. The histogram memory is downloaded using the software and USB cable provided with the software package. The stored data is in XML format.

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.

It will take approximately 166 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 the histogram memory:

- Diagnostics (Automatic, manual or error found)
- reset of the dose or the max dose rate
- Calibration (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 being powered off, an 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.

### 3.9.1 STATE

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



The RDS-32 can be configured to automatically save histogram data when alarm conditions are met with the configuration software, although the histogram STATE would be set to OFF. See the software manual for more details.

### 3.9.2 CLEAR

The histogram memory can be cleared by navigating into the HISTO menu and selecting CLEAR. The user will be prompted to confirm by displaying SURE? Press the Select key again to confirm erasing the collected histogram data.



### 3.9.3 PERIOD

The period of storing measurement results to the histogram can be set by navigating into PERIOD in the HISTO menu. The time between saving results into the histogram memory can be selected from the predefined list in this menu by pressing the Select key. The intervals available are 10 s, 20 s, 1 min, 5 min, 10 min, 30 min, 1 h and 2 h.



### 3.9.4 LOCATION

A location can be stored as additional information to the histogram. There are up to 255 numbered locations. Using the CSW-32 Configuration Software it is possible to specify mnemonic or longitude and latitude values for the first 16 locations.



### 3.9.5 MANUAL SAVE

The Manual save functionality saves the current status and measurement results of the meter into the histogram memory. To initiate the save, navigate into the HISTO menu and select Manual.



Example display of the manual save function. The current status of the meter and the measurement result have been saved into the histogram memory.



Set the Manual save function as shortcut to the top arrow key for quick and easy saving.

### **3.10 SCALER**

The Scaler functionality allows the user to set a measurement integration time and to measure the current background. This enables net measurements. The scaler function can be used to improve the measurement MDA (Minimum Detectable Activity).

When an external probe is connected, the scaler functionality is reserved for the external probe.

The following chapters describe the scaler functionality for the RDS-32 internal detector or an external dose rate probe and other external probes.

#### **3.10.1 SCALER FUNCTION INTERNAL DETECTOR/DOSE RATE PROBE**

The Scaler menu of the RDS- 32 internal detector or an external dose rate probe has the following features:

- Settings
- Gross Meas.

The settings menu allows the user to set an integration time:

10 s, 1 min, 3 min , 6min, 10 min, 30 min and 60 min.

When the desired integration time has been set, the user can then select to perform a Gross measurement.

Initiate a scaler measurement by navigating into Gross Meas. and selecting start. The measurement result remains on the meter display until the Select key is pressed for a new acquisition or the left arrow key is pressed to exit the mode. Each acquisition in the scaler mode is automatically saved in RDS-32 memory.

Once a scaler measurement has been initiated it can be stopped at any time by pressing the Select key or the left arrow key. In that menu the measurement can be restarted, stopped or aborted. If the scaler measurement is stopped, the result of the measurement will be displayed. If the scaler measurement is aborted, the display will move to the Scaler menu without showing a result.



The result of a Scaler measurement with RDS-32 internal detector or with an external dose rate probe will show the dose R (P) and the time T.

### 3.10.2 SCALER FUNCTION WITH OTHER EXTERNAL PROBES

With an external probe connected, the Scaler menu has the following features:

- Settings
- Gross Meas.
- Background
- Net Meas.

The Settings menu allows the user to change the probe unit and to set a measurement integration time or number of counts. The preset time/count levels:

10 s, 1 min, 3 min, 6 min, 10 min, 30 min and 60 min or 100, 1000, 10000, 20000 counts.

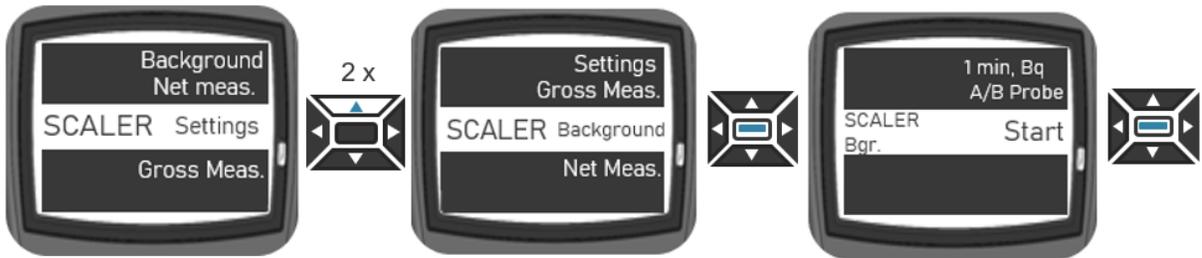
The options available in the scaler menu will depend on probe type. For example, for the GMP-25 probe there is a time setting available instead of time/count and the scaler menu will show the current isotope in use.

The following menu views are for a SAB-100 probe:



When the desired settings have been entered, the user can then select to perform a Gross measurement by navigating into Gross Meas. and selecting start.

In a Net measurement the background is reduced from the measured counts. Before initiating a Net measurement, acquire the Background by navigating into the Background menu and selecting start.



When the background measurement is finished, pressing the Select key will take to the Net measurement menu. This menu view will also show the current background measurement results. Initiate a Net measurement by selecting start.

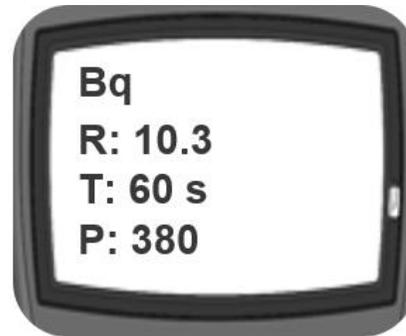


A scaler measurement result remains on the meter display until the select key is pressed for a new acquisition or the left arrow key is pressed to exit the mode. If the Net Meas. result is less than background it will be empty. Each acquisition in the scaler mode is automatically saved in RDS-32 memory.

Once a scaler measurement has been initiated it can be stopped at any time by pressing the Select key or the left arrow key. In that menu the measurement can be restarted, stopped or aborted. If the scaler measurement is stopped, the result of the measurement will be displayed. If the scaler measurement is aborted, the display will move to the Scaler menu without showing a result.



Example result of a Scaler measurement with an external alpha/beta probe showing time T and the result alpha and beta activity.



Example result of a Scaler measurement with an external alpha/ beta/ gamma pancake probe showing the result activity R in Bq, count time T and counted pulses P.

### 3.11 EXTERNAL PROBES

External probes can be connected to the RDS-32 quickly and easily, there is no need to switch off the meter first.

To connect the external probe to the meter, first remove the rubber protection cap of the connector by pulling the cap out. Before making the connection to RDS-32, make sure the cable is well connected to the probe. Then observe the correct orientation by matching the internal ledge of the connector to the groove on the meter connector. This step is very important to avoid bending the connector pins. Finally, turn the fixing sleeve clockwise until it is firmly fastened.

Most probes are detected automatically. The display will show CSP.INIT or the symbol  while the connection is being established. For probes with an internal memory, the radiation detection starts without any need for additional input. For the few probes without internal memory, the meter will prompt to select a detector type before measurement begins. See the below chapters for detailed instruction by probe series: CSP series, GMP-25/ABP-150/GMP-12 and probes without internal memory.

The Probe menu is visible only when an external probe is connected. The probe menu features items depending on the connected probe type.

#### 3.11.1 CSP (CANBERRA SMART PROBE) SERIES

The CSP series extends the RDS-32 capabilities with a large array of versatile probes. See Chapter 7.2 for a probe listing. With CSP probes use of lithium batteries is recommended.

The CSP probes (part nos beginning with EM\*) have an internal memory and are automatically recognized by the RDS-32. The probe menu with CSP probe connected features:

- PROBE TYPE
- PROBE UNIT

The units which are available will depend on the probe type. See the probe manual for more details. If the probe unit is changed in the RDS-32 menu, it will be saved into the probe memory.

To see the isotope coefficients, use the CSPA software or check the probe documentation, if the factory calibration and isotope settings have not been changed. The isotope coefficients can be changed in the CSPA software.

### 3.11.2 OTHER PROBES WITH INTERNAL MEMORY

GMP-25 and ABP-150 are contamination probes with internal memory. When these probes are connected to the meter they are automatically recognized. The probe menu features will depend on the probe type. For example, when a GMP-25 or an ABP-150 probe is connected to the meter, the Probe menu features:

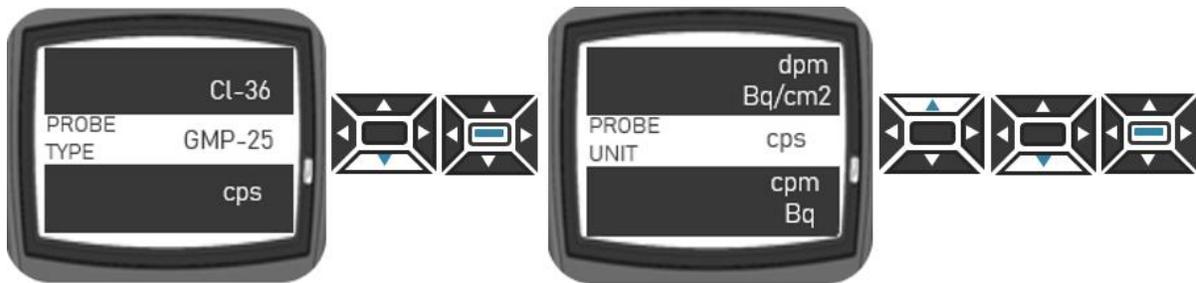
- PROBE TYPE
- PROBE UNIT
- PROBE Isotope

The GMP-12 probes are a series of dose rate probes with internal memory (except GMP-12SD). These probes have an internal memory and will be automatically recognized. However, they don't have any settings which could be in the Probe menu, so the menu will not be visible.

The following menu examples are with the GMP-25 pancake probe connected to the RDS-32.



The Probe Unit menu shows the probe measurement unit which is currently in use and allows the user to change the unit. For the GMP-25 probe the available units are cps, cpm, dpm, Bq and Bq/cm<sup>2</sup>. To change the measurement unit, navigate into the Probe Unit menu and select from the list. Note that when selecting Bq or Bq/cm<sup>2</sup>, the conversion from counts to Becquerels will be made using the isotope coefficient introduced in the next paragraph.



The Probe Isotope menu shows the name of the current isotope coefficient in use. To view the actual numerical coefficient or to change the isotope settings, use the CSW-32 software.

When using the ABP-150 probe, the Probe menu features also the radiation type selection - alpha or beta.

The RDS-32 reads data from the probe memory such as the unit of measurement and the saved isotopes. For example, the default unit in the GMP-25 is cpm. Even if the unit is changed from the meter menu, at the next power on the cpm unit will be read again from the probe memory. The CSW-32 software allows the user to create isotope profiles where the default unit can be changed, and several isotope coefficients can be saved. These profiles can be uploaded to the probe memory. The isotope in use (for GMP-15 or ABP-150) can then be selected from the meter menu. See the CSW-32 Software manual for more details.

### 3.11.3 PROBES WITHOUT INTERNAL MEMORY

The RDS-32 is compatible with some probes which don't have internal memory, the most common being the GMP-11-3 pulse rate probe, the GMP-15-3 pancake probe, the GMP-12SD dose rate probe with high dose endurance.

When connecting a probe with no memory, the user will be prompted first to select the probe type. There are three types:

- Gen.CHK.Def is for a probe with no internal memory that is tested for the pulse generation of the external probe. If no pulses are detected for a given time, the meter will show an error message. Select this type when using GMP-11-3 or GMP-15-3.
- Gen.No.Def is for a probe with no internal memory that is not tested for pulse generation. For example, probes which are alpha sensitive only, and there are no pulses at all in the determined time window.
- GMP-12SD is dedicated to the GMP-12SD dose rate probe. When using this probe type, select first the probe type and then the probe serial number to use the correct probe calibration coefficients. If the serial number is not selected, probe type default coefficients will be used. If the serial number is not available, the probe calibration coefficients have not been saved into the RDS-32 memory. The CSW-32 Configuration software is required to do that. See the software manual for instructions on how to save the probe coefficients.

The probe type can be changed without switching the meter off, by navigating into the PROBE menu and selecting another type. Selecting the wrong probe type may lead to an error condition Det.DFE accompanied by an audible alarm, as the pulses from the probe don't match to the expectation and the meter detects a detector fault. In this case, switch the meter off and select another probe type at start up.



The RDS-32 meter will remember the last selected probe type without internal memory. When connecting a probe without memory, if the user doesn't make a selection in the menu when prompted, the RDS-32 will use the type selected last which will be blinking in the display.

## 4 ERROR CODES AND OTHER DISPLAY MESSAGES

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

### 4.1 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  $10\% < \text{Capacity} < 30\%$

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

### 4.2 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.

### 4.3 DOSE RATE / DOSE WARNING (BLINKING DISPLAY)

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

The dose rate display is blinking, and the continuous audible alarm is on. The alarm can be silenced with right arrow key in the Main displa.

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

The dose rate display is on and the current dose warning level alternates in the display and the continuous audible alarm is on. The alarm can be silenced with the right arrow key in the Main display.

#### **4.4 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.

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.

#### **4.5 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.

#### **4.6 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 beeps every two seconds).

The dose rate measurement is prevented.

Error codes and types:

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

**FLS.DF** Non-volatile memory error

**DET.DF** Internal detector is faulty

**DET.DFE** External detector is faulty

**DG1.DF** High voltage is not within specified range

**DG2.DF** Internal power supply is out of specified range

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

**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.

## 5 MAINTENANCE AND DECONTAMINATION

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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.



A simple functional check of the meter can include switching it on and letting it run through the self-check routine at start up. Leave the meter on additionally for several minutes to check that the detector receives pulses as expected even at background level, or use a small radiation source to check that the meter responds.

### 5.1 FIRMWARE UPDATE

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

The latest RDS-32 firmware can be downloaded from [mirion.com](http://mirion.com)

**Note! If the RDS-32 becomes unresponsive during a firmware update, don't remove the batteries, simply try to run the firmware update again.**

## **5.2 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 back to the meter.

## **5.3 CALIBRATION**

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

## **5.4 MECHANICAL DECONTAMINATION**

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

## **5.5 CHEMICAL DECONTAMINATION**

During the decontamination procedure following items are needed:

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

The RDS-32 can be decontaminated with any commercially available decontamination solutions which are 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 after it has been confirmed that the IP67 sealing of the meter is intact. Please see the service manual or ask the manufacturer for more advices about immersing the RDS-32 in a decontamination solution.

## 6 SPECIFICATIONS

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Complies with IEC 60846 standards, designed to meet ANSI 42.17A, 42.17C standards. The device is CE and UKCA compliant.

### DETECTOR:

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
<b>DETECTOR 1 – Energy Compensated Geiger Mueller. SENSITIVITY (137Cs) – 1.5 c/s per 1 <math>\mu</math>Sv/h (manufacturer spec 18 cpm per mR/h, 60Co)</b>			
YES	YES	YES*	YES*
<b>DETECTOR 2 – Energy Compensated Si diode. SENSITIVITY (137Cs) 16 cps / 1mSv/h</b>			
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
<b>Operational quantity</b>			
Ambient dose equivalent H*(10)	Ambient dose equivalent H*(10)	Ambient dose equivalent H*(10)	Ambient dose equivalent H*(10)
<b>Radiation detected: gamma and X-rays: Low</b>			
48 keV	48 keV	55 keV   65 keV**	55 keV   65 keV**
<b>Radiation detected: gamma and X-rays: High***</b>			
1.8 MeV	1.8 MeV	1.8 MeV	1.8 MeV
<b>Dose rate measurement range</b>			
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
<b>IEC Dose rate measurement range: Low</b>			
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
<b>IEC Dose rate measurement range: High</b>			
100 mSv/h 10 rem/h	100 mSv/h 10 rem/h	10 Sv/h 1000 rem/h	10 Sv/h 1000 rem/h
<b>Dose measurement range: Low</b>			
0.1 µSv 0.01 mrem	0.1 µSv 0.01 mrem	0.1 µSv 0.01 mrem	0.1 µSv 0.01 mrem
<b>Dose measurement range: High</b>			
10 Sv 1000 rem	10 Sv 1000 rem	10 Sv 1000 rem	10 Sv 1000 rem
<b>Calibration accuracy at reference calibration direction and in the Cs-137 calibration field, temperature +20 °C (68°F). Compared to Finnish National Laboratory STUK.</b>			
± 5% @137Cs	± 5% @137Cs	± 5% @137Cs	± 5% @137Cs
<b>Dose rate linearity</b>			
-15% - 22% 0.3 µSv/h...0.1 Sv/h	- 15%-22% 0.3 µSv/h...0.1 Sv/h	-15% -22% 0.3 µSv/h...10 Sv/h	- 15% - 22% 0.3 µSv/h...10 Sv/h
<b>Variation of the response due to photon radiation energy and angle of incidence</b>			
(R E,A) 71% < RE,A < 167% (48 keV...1.8 MeV), ± 45°	(R E,A) 71% < RE,A < 167% (48 keV...1.8 MeV), ± 45°	(R E,A) 71% < RE,A < 167% (55 keV   65 keV**...1.8 MeV), ± 45°	(R E,A) 71% < RE,A < 167% (55 keV   65 keV**...1.8 MeV), ± 45°
<p>**for Si diode detector above 30 mSv/h dose rates</p> <p>*** High energy response ratio for GM tube: 2.2 at 4.4 MeV and 2.6 at 6.7 MeV High energy response ratio for Si diode: 1.2 at 4.4 MeV and 2.0 at 6.7 MeV</p>			

**FUNCTIONAL CHARACTERISTICS:**

<b>RDS-32</b>	<b>RDS-32 iTx</b>	<b>RDS-32 WR</b>	<b>RDS-32 iTx WR</b>
<b>4 navigation keys and a Menu/Select key to operate the instrument.</b>			
YES	YES	YES	YES
<b>3 default keypad direct functions: Backlight, Mute and Dose. One user defined shortcut.</b>			
YES	YES	YES	YES
<b>Configurable units: Sv(/h), rem(/h), with external detectors cps, cpm, dpm, Bq and Bq/cm2.</b>			
YES	YES	YES	YES
<b>Versatile histogram functions (dose rate, dose, diagnostic logging depending on configuration, time stamp, optional location control for mapping and repeating room control analysis).</b>			
YES	YES	YES	YES
<b>Histogram data stored in XML format; allowing additional histogram analyzing capabilities when downloaded from CSW32 software to a spreadsheet.</b>			
YES	YES	YES	YES
<b>Real Time Clock (RTC) function. Back-up time 3 hours</b>			
YES	YES	YES	YES
<b>Configurable audible, visual and a vibration alarm.</b>			
YES	YES	YES	YES
<b>Graphical LCD display with 128 x 64 square pixels; special symbols for alarm, external probe, battery, RF communication, vibration alarm, chirp and mute.</b>			
YES	YES	YES	YES

**COMMUNICATION PROTOCOLS:**

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
<b>USB-communication with suitable adapter.</b>			
YES	YES	YES	YES
<b>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).</b>			
YES	YES	YES	YES
<b>WRM radio 900 MHz or 2.4GHz. Max emitting Tx Power: - 298mW@900MHz - 86mW@2.4GHz</b>			
NO	YES	NO	YES

**ELECTRICAL CHARACTERISTICS:**

RDS-32	RDS-32 iTx	RDS-32 WR	RDS-32 iTx WR
<b>Batteries 2 x AA/LR6, alkaline, NiMH or lithium.</b>			
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)
<b>Contacts for external power and charging of NiMH battery (charging conditions +5... +35°C).</b>			
YES	YES	YES	YES
<b>Operation time with fresh batteries more than 2 months at background radiation at +23°C, 8 h use/24h.****</b>			
YES	YES	YES	YES
<b>Operation time with fully charged NiMH batteries more than 1.5 months at background radiation at +23°C, 8 h use/24h with 2900 mAh capacity.****</b>			
YES	YES	YES	YES
<b>Battery life more than 600 h (in background radiation, radios disabled).</b>			
YES	YES	YES	YES
<b>Alarm audio level in dB</b>			
86 dBA@30cm	86 dBA@30cm	86 dBA@30cm	86 dBA@30cm

\*\*\*\*Estimated operation times with radios disabled, display backlight off, LED off

**MECHANICAL CHARACTERISTICS:**

<b>RDS-32</b>	<b>RDS-32 iTx</b>	<b>RDS-32 WR</b>	<b>RDS-32 iTx WR</b>
<b>Dimensions</b>			
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)
<b>Weight without batteries</b>			
160 g (0.35 lbs)	170 g (0.37 lbs)	195 g (0.43 lbs)	205 g (0.45 lbs)
<b>Weight with batteries</b>			
210 g (0.46 lbs)	220 g (0.49 lbs)	245 g (0.54 lbs)	255 g (0.56 lbs)
<b>Enclosure class, including battery compartment.</b>			
IP67 (IEC 60529)	IP67 (IEC 60529)	IP67 (IEC 60529)	IP67 (IEC 60529)
<b>Case high impact durable PA6 Grilon EG30 glass fiber reinforced polymer. Tested 6 drops from 1 meter height to concrete floor (once for each face).</b>			
YES	YES	YES	YES
<b>Ergonomic design, rubber grip and cushioning around the case.</b>			
YES	YES	YES	YES
<b>Wrist strap</b>			
YES	YES	YES	YES
<b>Belt clip</b>			
YES	YES	YES	YES

**ENVIRONMENTAL CHARACTERISTICS:**

<b>RDS-32</b>	<b>RDS-32 iTx</b>	<b>RDS-32 WR</b>	<b>RDS-32 iTx WR</b>
<b>Operating temperature</b>			
-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)
<b>Storage temperature</b>			
-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)
<b>Relative humidity</b>			
+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)
<b>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)</b>			
YES	YES	YES	YES
<b>RF Emissions. Fulfills following standards: EN55032B</b>			
YES	YES	YES	YES
<b>FCC approval</b>			
2AH18-RDS-32	900 MHz version: 2AH18-RDS-32 contains FCC ID: 2AH18- XB900HP	2AH18-RDS-32	900 MHz version: 2AH18-RDS-32 contains FCC ID: 2AH18- XB900HP
<b>IC approval</b>			
26167-RDS32	900 MHz version: 26167-RDS32 contains IC: 26167-XB900HP	26167-RDS32	900 MHz version: 26167-RDS32 contains IC: 26167-XB900HP

**CONNECTOR:**

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

**RDS-32 VERSIONS 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 version with Sievert-units is marked with 'S' and the version with rem-units with 'R'.

## 7 ACCESSORIES AND PROBES

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### 7.1 ACCESSORIES

**PROBE CABLES:**

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

Part no. 1233-333 USB-RDS-32 Cable Link

**OTHER ACCESSORIES:**

Part no. 1233-300 Alarm Box (for fixed installation)

Part no. 1233-301 Alarm Box signaling set A (fixed on top)

Part no. 1233-302 Alarm Box signaling set B (wall mounting)

Part no. 1233-303 LAN Adapter to Alarm Box

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

Part no. 1233-311 Carrying bag for telescopic pole

Part no. EM109752 RDS/CSP Bracket (to fix RDS-32 to CSP probe body, excl. cable)

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

**7.2 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 Alpha/Beta/Gamma pancake probe

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

Part no. 1233-289 ABP-150 Alpha/Beta probe with 100 cm<sup>2</sup> detection area

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

Part no. EM90062 SA-20-2 Alpha CSP probe with 20 cm<sup>2</sup> detection area

Part no. EM75863 SA-100 Alpha CSP probe with 100 cm<sup>2</sup> detection area

Part no. EM75862 SB-100/A Beta CSP probe with 100 cm<sup>2</sup> detection area with Mylar window

## ACCESSORIES AND PROBES

Part no. EM82069	SB-100/A Beta CSP probe with 100 cm <sup>2</sup> detection area with Aluminum window
Part no. EM90666	SA-32: Alpha CSP probe with 32 cm <sup>2</sup> detection area
Part no. EM97330	SB-32: Beta CSP probe with 32 cm <sup>2</sup> detection area
Part no. EM99378	SAB-32 Alpha/Beta CSP probe with 32 cm <sup>2</sup> detection area
Part no. EM74672	SB-20 Beta CSP probe with 20 cm <sup>2</sup> detection area
Part no. EM78627	SX-2R 1.5" x 3 mm X-Ray CSP probe
Part no. EM75864	SAB-100 Alpha/Beta CSP probe with 100 cm <sup>2</sup> detection area
Part no. EM81933	SABG-100 Alpha/Beta/Gamma CSP probe with 100 cm <sup>2</sup> detection area
Part no. EM104616	SAB-250 Alpha/Beta CSP probe with 250 cm <sup>2</sup> detection area
Part no. EM108330	Easy-Count Alfa/Beta PIPS smear holder, belongs to CSP series
Part no. EM75860	SG-1R 1" x 1" NaI(Tl) Gamma CSP probe
Part no. EM75861	SG-2R 2" x 2" NaI(Tl) Gamma CSP probe
Part no. EM78766	SPAB-15 Alpha/Beta 15 cm <sup>2</sup> CSP probe with PIPS detector
Part no. EM83023	STTC Wide Range Gamma CSP probe
Part no. EM97953	STTC-W Wide Range Gamma CSP probe with 20 meter cable on reel
Part no. EM106944	TELE-STTC-2/R31 Wide Range Gamma telescopic CSP probe
Part no. EM108412	TELE-STTC-2L/R31 Wide Range Gamma telescopic CSP probe, ultralight
Part no. EM85916	SABG-15+ Alpha/Beta/Gamma pancake CSP probe
Part no. EM86790	SVLD Very Low Dose Rate Gamma CSP probe
Part no. EM108072	SN-D-2 Neutron Dose Rate CSP probe
Part no. EM85810	SN-S Neutron Search CSP probe
Part no. EM95464	SABS-579 Alfa/Beta 579 cm <sup>2</sup> Floor CSP probe
Part no. EM106271	SABP-525 Alfa/Beta 525 cm <sup>2</sup> Foot CSP probe

## 8 FCC COMPLIANCE STATEMENT

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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.

## 9 ICC COMPLIANCE STATEMENT

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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'Innovation, 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 susceptible d'en compromettre le fonctionnement.

## FEEDBACK

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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](http://www.mirion.com) filling out the contact form. Alternatively, you can directly contact the manufacturing site for RDS-32:

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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](http://www.mirion.com)*