USER MANUAL

MiniSentry-2
TRANSPORTABLE
GAMMA PORTAL MONITOR

SEPTEMBER 2023

WARNING

MIRION TECHNOLOGIES SAS cannot be held responsible for any damage incurred by the buyer due to faulty use, connection to the wrong voltage, or non-observance of the instructions found in this manual.

This device is designed to be used exclusively in an industrial environment.

The information contained herein may be altered without notice.

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SUMMARY

1 GENERAL SAFETY INSTRUCTIONS

Read these instructions carefully before using the device and keep them for future reference.

Observe all warning and recommendations marked on the device.

Never try to intervene yourself on the device, such as opening or removing covers that could expose you to dangerous voltage or other hazards, and that would void the manufacturer's warranty. Refer to the services of qualified people for the maintenance of the product.

Disconnect this product from all power supplies and refer to qualified personnel for the following cases:

- When the power cable or plug is damaged or cracked,
- If the unit does not operate normally and the operating instructions have been followed. Only perform the checks that are covered by the operating instructions since improper performance of other controls may result in damage and will often require additional work by a qualified technician to restore the unit to its normal operating condition.
- If the device has dropped and its case has been damaged,
- If the device shows a significant change in performance, this indicates the need for qualified service personnel to repair the device.

2 SAFETY INSTRUCTIONS

 : Warning, risk of electric shock.

Indicates the presence of the mains and a risk of electric shock if the protections are removed.

Always disconnect the mains cable completely from the case whenever you use the device.

Only qualified personnel will be able to open the box.

 : Caution, the accompanying documents must be consulted.

3 USE PRECAUTIONS

The intended use of Transportable Gamma Portal Monitors is for contamination monitoring for people. Any other use is considered prohibited.

Do not touch the LCD screen as well as the function keys with sharp or hard objects.

Do not use strippers, waxes, or corrosive solvents to clean the front of the unit, use only a soft, dry or damp cloth.

Only equipment and accessories recommended and sold by MIRION TECHNOLOGIES SAS must be connected to the Minisentry-2.

 : The replacement of the power cable must be done with a cable identical to that recommended (See § 4).

 : **12 VDC power supply option**. Do not connect dangerous voltage to the terminals of the 12 VDC auxiliary power supply, voltage that may present a risk of electric shock or burn.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
Any changes or modifications to this equipment not expressly approved by **MIRION TECHNOLOGIES SAS** *may cause, harmful interference and void the FCC authorization to operate this equipment.*

 : To avoid portal tip over we recommend fixing the feet on the ground.

 : The MiniSentry-2 can be used only according to the characteristics and technical specifications in § 20, defined by MIRION TECHNOLOGIES SAS.
If the device is used of a way which is not specified by MIRION TECHNOLOGIES SAS, the protection provided by the device may be compromised.

 : The ON / OFF switch of the MiniSentry-2 control unit must always remain accessible to the user.

4 DISPOSAL OF THIS EQUIMPENT

This equipment may contain substances that could influence the environment and human health.

Users / owners of this equipment are responsible for ensuring that the equipment is not a risk to the environment or health when it is no longer used and must be disposed of.

The following symbol, which you will also find on **MIRION TECHNOLOGIES SAS** products, indicates that these products should not be disposed in unsorted municipal waste. It must be sorted.

This equipment is subject to the Decree 2005-829 of 20/07/05 on the disposal of Waste Electrical and Electronic Equipment (WEEE), please contact your nearest **MIRION TECHNOLOGIES SAS** office for advice on the proper disposal of this equipment.

5 PACKING LISTS FOR MINISENTRY-2

Refer to the configuration sheet DOC021249.

6 PRESENTATION

The MiniSentry-2 Computer Based Portable Portal Monitor is a portable emergency gamma portal monitor. It was designed as a monitoring solution for emergency response to allow the screening of people exiting a contaminated area, as well as monitoring the entrances to large public gatherings to detect people who are carrying dangerous radioactive materials. It can also be configured to function as a vehicle monitor if this option is purchased.

Erection or disassembly can be carried out by one person in less than 10 minutes with no tools required. The MiniSentry-2 is designed for outdoor as well as indoor use.

The software is adapted to reflect the actual configuration of each model, such as the type, number and location of detectors and the applicable options. As a result, the screens displayed on different models may differ slightly from those in this manual; however, the procedures described apply to all units, except where noted.

7 DESCRIPTION

7.1 PHYSICAL DESCRIPTION

The basic configuration of MiniSentry pedestrian (Figure 1) is equipped with:

- Footplate for each post with mounting hardware (x2),
- Primary detector post with MiniSentry Control unit,
- Top cross piece with attached elbows for pedestrian configuration,
- Secondary detector post,
- Power cable,
- Transport case?
- 91.5 cm (36 in) top cross piece kit for extended pedestrian configuration.

Depending on configuration, equipment can be added (see section 5) such as:

- Red / green light tower,
- Frisker probe and holder,
- Battery extension.

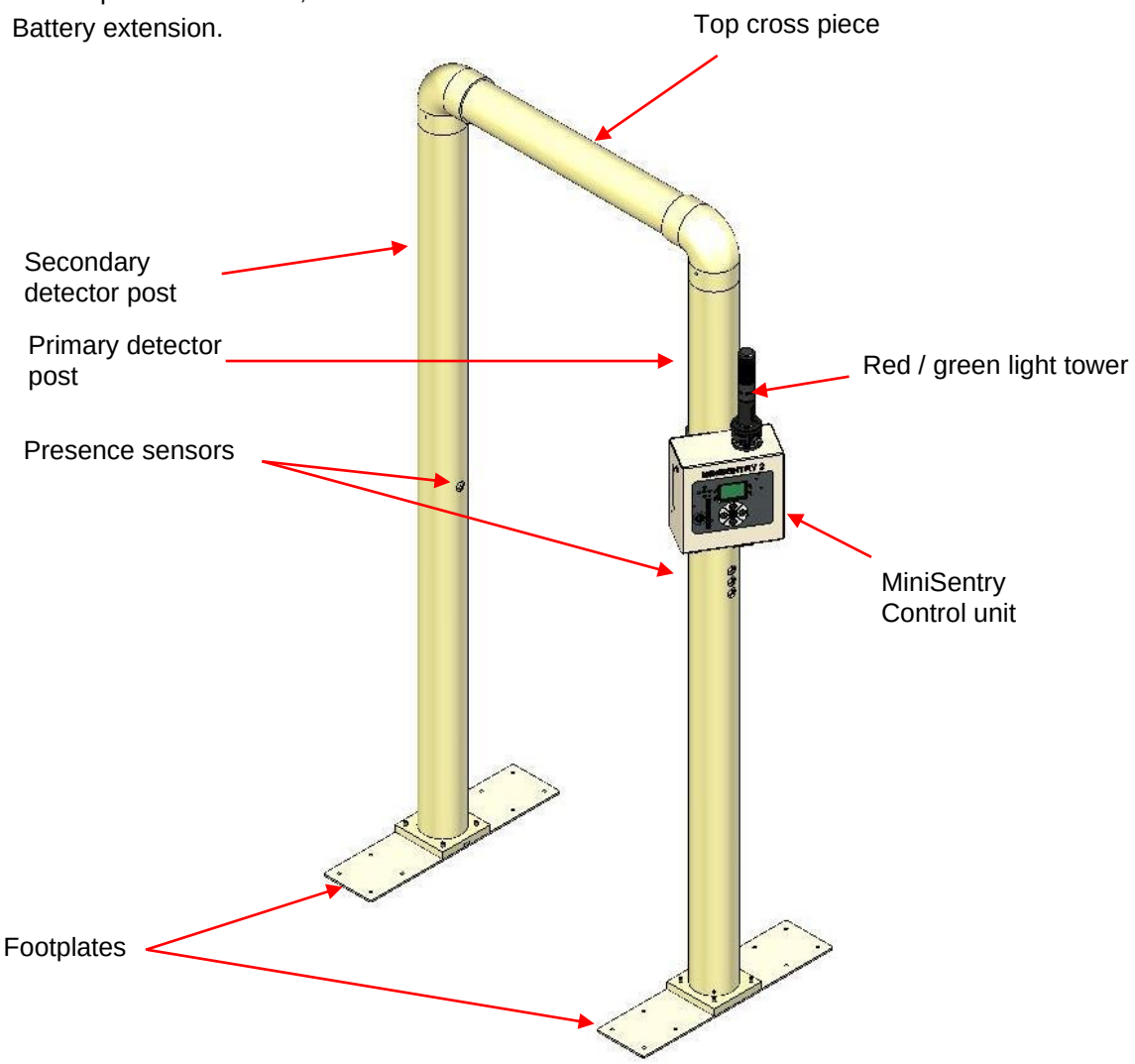


Figure 1 Pedestrian Configuration

7.2 VEHICLE OR EXTENDED PASSAGE CONFIGURATION

The MiniSentry vehicle or extended passage configuration (Figure 2) is equipped with:

- Primary detector post with MiniSentry Control unit
- Secondary detector post
- End caps (x2) for vehicle configuration needs, extended passage, and shipping
- Red / green light tower (Optional)
- Power cable
- Nylon case and foam pieces needed for future shipping
- Footplate for each post with mounting hardware (x2)
- Vehicle baseplates and bolts for each post
- 2.5 m (8.20 ft) rubber spacers
- 2.7 m (8.86 ft) cable set between the base of each detector post

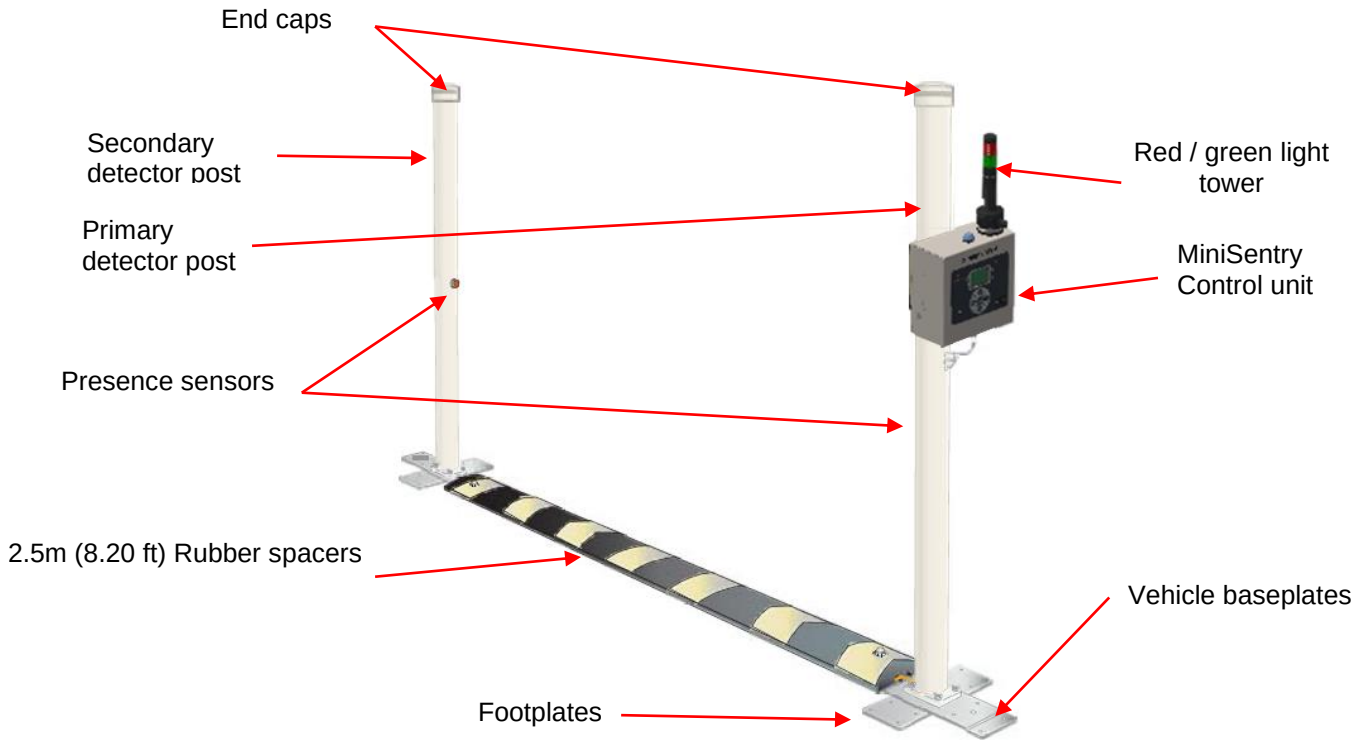


Figure 2 Vehicle configuration

7.3 MINISENTRY CONTROL UNIT

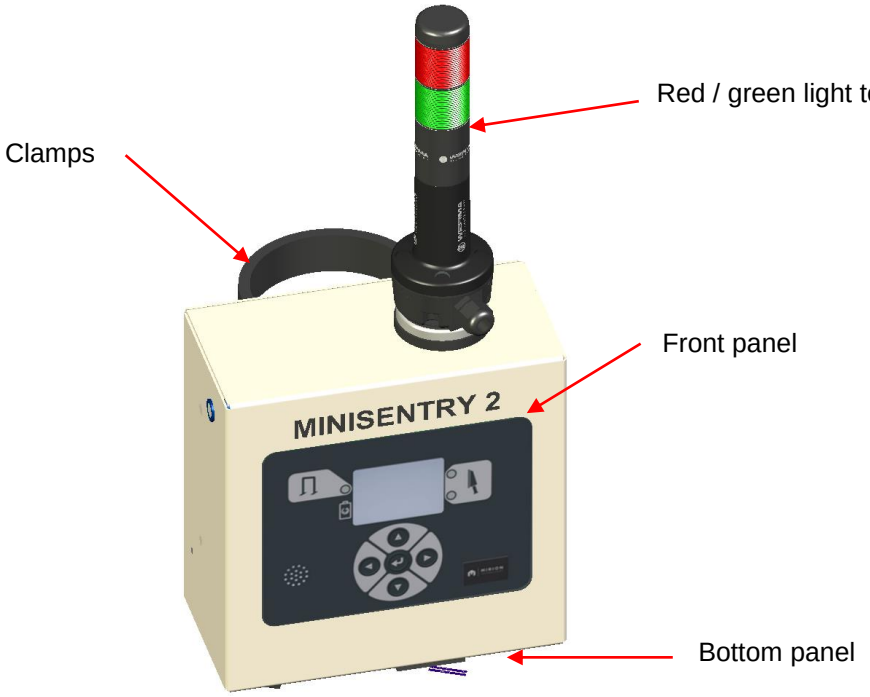


Figure 3 Controller module electronics

7.3.1 Front panel

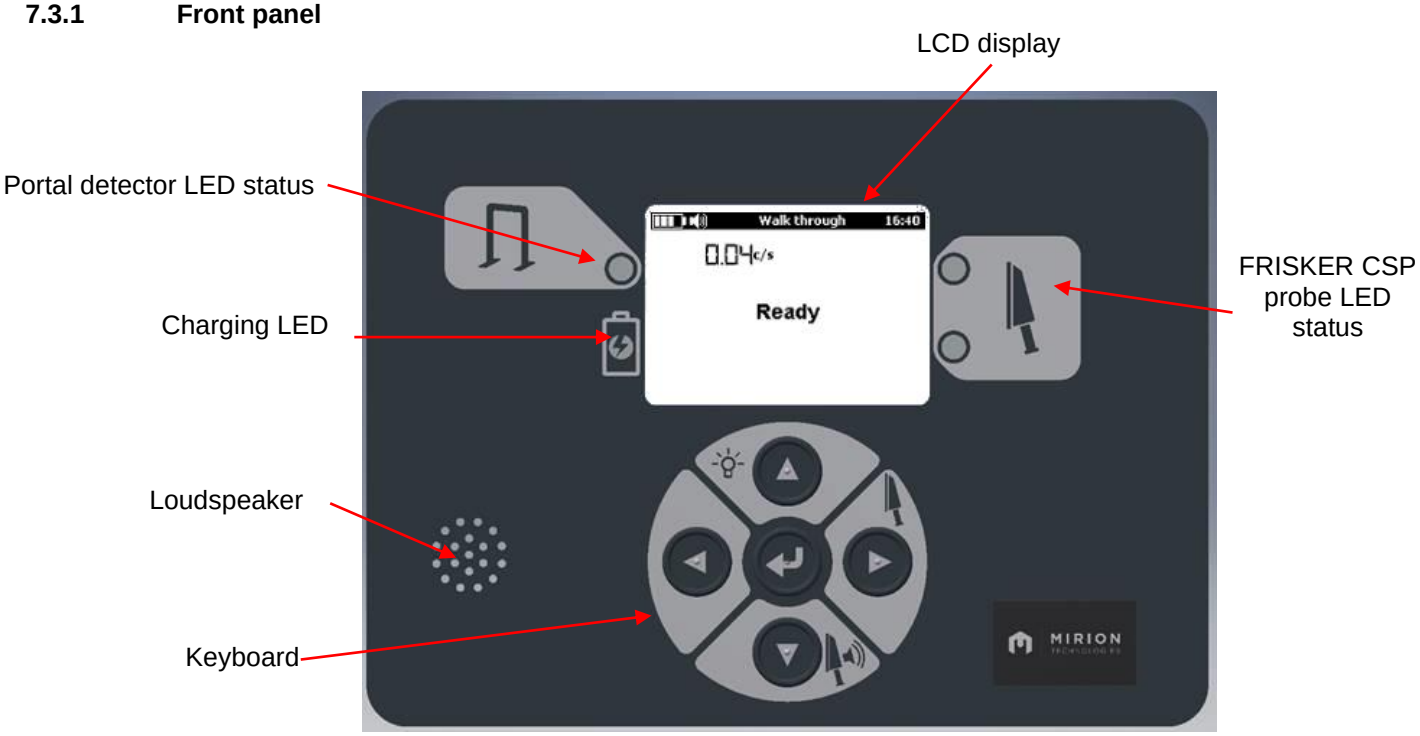


Figure 4 MiniSentry-2 - Front panel

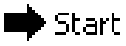
7.3.2 Keyboard and menu bar functions

The keyboard, equipped with five keys, allows:

	Main menu entry / exit Validation key (See table below)
	Back left arrow in the menus
	Right arrow of selection in the menus On / Off from the Frisker probe screen
	Down navigation arrow in the menus On / Off from simulated sound of the Frisker probe
	Arrow up menu navigation On / Off from the backlight

Corresponding keyboard keys with screen information

Keys	Bottom screen	Function
	Select	Selection key
	Edit	Edit key
	Back	Return key to previous menu
	Collapse	Close a folder
	Confirm	Validate a setting
	Save	Save a data
	Back	Back left arrow or cancel
	Cancel	
	Left	Move the selection to the left
	-	Decrease a level

Keys	Bottom screen	Function
		Increment a level
		Move the selection to the right
		Export Log files
		Save a data
		Start a measurement
		Navigation down arrow Decrease Value (In value edition)
		Decrease a value
		Arrow up navigation Increment Value (In Value Edition)
		Increment a value

7.3.3 Charging indicator

The indicator lights  up green, orange, or red to indicate the status of the batteries and power supply:

External power supply 110 - 240 Vac	Optional External	*Internal Li-Ion*	Charging LED indicator
Plugged	-	-	
Not plugged	> 25%	-	 pulse
Not plugged	>5% and <25%	-	 pulse
Not plugged	<5%	-	 pulse
Not plugged	Not present or flat	*Low bat*	 Blink

On LCD screen, a message appears when the battery level is less than 5%.

An internal battery status symbol is present on the top banner of the LCD screen.

Fixed square	Flashing square	Battery status	Sound alarm
		Internal battery fault or missing	
		Internal Low Battery	✓
		Internal Battery charged less than 25%	
		Internal Battery charging less than 25%	
		Internal Battery charged between 25 & 50 %	
		Internal Battery charging between 25 & 50 %	
		Internal Battery charged between 50 & 75 %	
		Internal Battery charging between 50 & 75 %	
		Internal Battery charged between 75 & 100 %	
		Internal Battery charging between 75 & 100 %	

7.3.4 FRISKER CSP probe LEDs

Two multi-color LEDs (Red, Green, Blue, Orange, and Purple) are associated with Interface to indicate alarms and malfunctions. LEDs cannot be disabled.

	Color	Indication
Upper LED channel 1 	Off	Missing probe
	Flashing green	Connected probe being initialized or searched or calculation of the background noise
	Flashing Purple	Saturation or probe fault or system fault *(2 flashing LEDs, channel 1&2)*
	Fixed green	Channel 1 connected probe
	Flashing red	High threshold alarm
	Flashing orange	Low threshold alarm
Bottom LED channel 2 	Off	Missing probe
	Flashing green	Connected probe being initialized or searched or calculation of the background noise
	Flashing Purple	Saturation or probe fault or system fault *(2 flashing LEDs, channel 1&2)*
	Fixed green	Channel 2 connected probe
	Flashing red	High threshold alarm
	Flashing orange	Low threshold alarm

7.3.5 Portal probe LED

Multi-color LEDs (Red, Green, Blue, Orange, and Purple) are associated with portal probe to indicate alarms and malfunctions.

	Color	Indication
	Off	Ready to measure or measure in progress
	Flashing green	Connected probe being initialized or searched or calculation of the background noise
	Flashing Purple	Saturation or probe fault or system fault or presence of person during BGK acquisition *(flashing LED)*
	Fixed green	Clean Measure
	Fixed red	Contaminated Measure

7.3.6 Loudspeaker

The loudspeaker emits several modulated sounds in frequency and fixed or adjustable level:

- A **simulated** sound for the audible indication of the count rate of the Frisker probe (Enabled and adjustable in volume by the operator),

  Note: Sound activation is represented by the symbol  at the top of the screen.
- An alarm sound portal probe threshold of fixed volume,
- An alarm sound Frisker low threshold of fixed volume,
- An alarm sound Frisker high threshold of fixed volume,
- A sound of saturation, of fixed volume, of the Frisker probe or portal probe.
- Alert sound for messages: « **Low battery** », « **CPC expired** », « **IPC expired** », « **Error monitor IPC expired** », « **Error monitor CPC expired** » and portal error messages.

7.4 BOTTOM PANEL

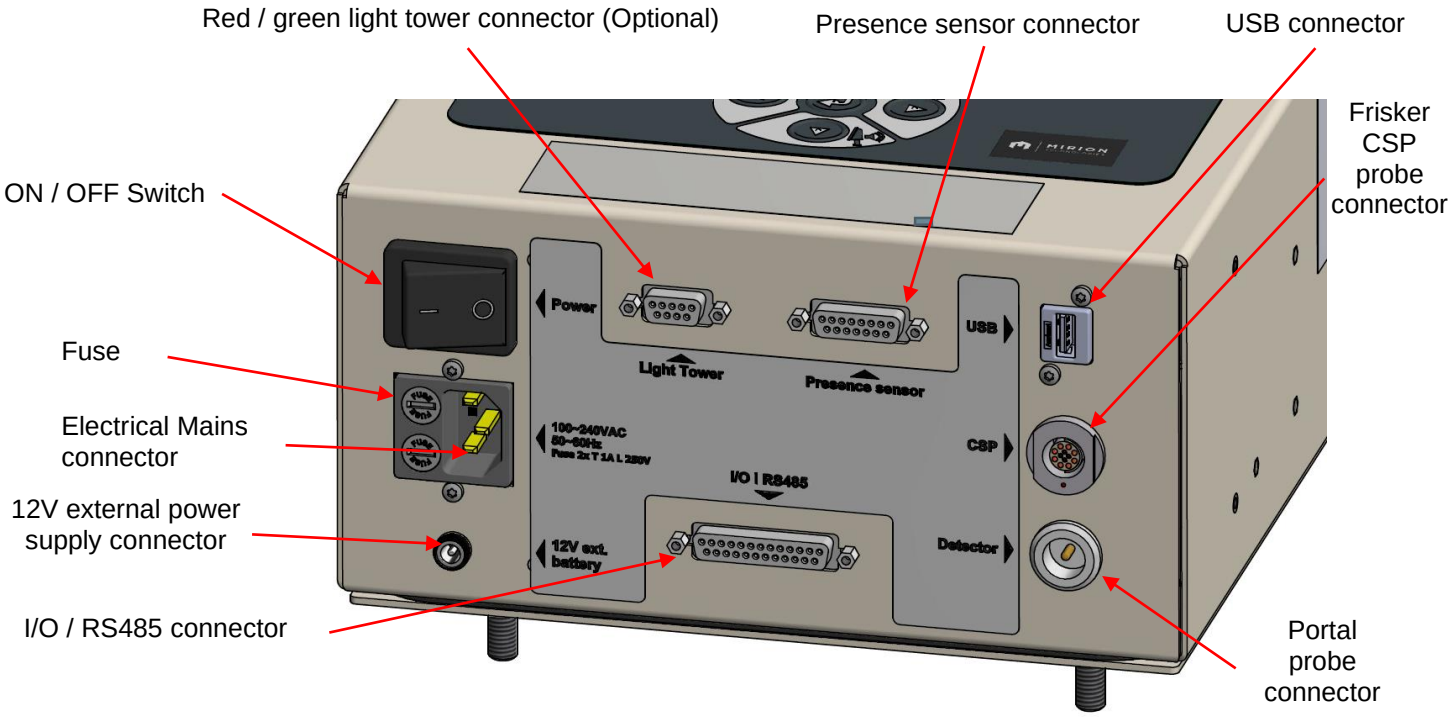


Figure 5 Bottom panel

8 Operation

8.1 MEASURE MODES

The MiniSentry Portable Portal Monitor provides three different operational modes. Those modes are :

- « **Enter-Wait** » (stand and count),
- « **Walk through** »,
- « **Count-Rate** ».

The « **Enter-Wait** » and « **Walk through** » modes are suitable for pedestrian traffic while the « **Count-Rate** » mode is used primarily for vehicle traffic.

For higher sensitivity or in higher background applications, the « **Enter-Wait** » mode will provide better results but provides lower throughput since each measurement takes longer.

The « **Walk through** » mode provides higher throughput at a lesser sensitivity, but still meets the United States Federal Emergency Management Agency (FEMA) guidelines at normal backgrounds.

In the « **Count-Rate** » mode the MiniSentry continuously measures while the photo-sensor indicates that the portal is occupied.

Figure 6 MiniSentry Assembled (Pedestrian Version).

8.2 BACKGROUND MANAGEMENT

Each measure mode can provide measure either in net if background is enabled or in gross if disabled. To get the most accurate background value, it is continuously updated when the portal is free, discard and delay time process avoids the chance that a contaminated person affects the background while they are still in the vicinity of the detector. Also, a variation detection is able to detect a background variation and adapt the background level to make it more representative.

8.3 ALARM MANAGEMENT

The MiniSentry-2 is equipped with visual (front panel LED), red / green light tower (Optional) and audible (annunciator) alarms. The alarm levels and modes are set in the "**Measure settings**" menus for each of the operational modes.

If a contamination alarm level value is exceeded, then a specific action is taken as defined by the user-selected mode for the alarm.

The modes of operation for the alarm are:

- alarm disabled,
- automatic reset (non-latching),
- manual reset (latching), with or without sound alarm.

The alarm disabled mode suppresses the alarm.

In the automatic reset mode, the alarm clears when the alarm condition is removed in the « **Count-Rate** » mode, or after two seconds in the « **Walk through** » or « **Enter-Wait** » mode.

In the manual reset mode pressing any key is required to clear the alarm.

For each measure mode, alarm thresholds can be set as a fixed rate value or using the standard deviation above the background rate.

An alarm condition is signaled visually by a red LED indicator and audibly by an annunciator.

8.4 POWER ON

The power is turned on by pressing the ON / OFF switch of the MiniSentry control unit.

The last measure mode used is launched at start up.

During the start-up phase, the system initializes, a sound signal is generated, the software version is displayed at the bottom of the screen, the front panel LEDs light up according to the red, green and blue color cycle then go off (the relays follow a cycle of activation and deactivation).

If the "**Profiles**" option is activated in "**Profile settings**" the last used profile's password is requested, in case of failure the profile "**Operator**" is activated. The startup continues with the last used profile if the password is correct or "**Operator**" if the password is incorrect.

If the "**Profiles**" option is disabled in "**Profile Settings**", the startup sequence without asking for the password.

Minisentry-2 has 3 user levels:

- **Administrator**, user and system manager, with an increased knowledge of metrology.
- **Technician**, person who uses the system and has a metrological culture.
- **Operator**, person who uses the system and has no particular knowledge of metrology.

All user profiles can access to any measurement modes.

Access to the functions of MiniSentry-2 according to the user level are given in the table:

		Functions	Administrator	Technician	Operator
		Alarm acknowledgement	✓	✓	
		Power off (§ 8.13)	✓	✓	✓
Measure settings		Unit of portal probe (§8.9.1)	✓	✓	
		Walk through settings (§ 8.9.2)	✓	✓	
		Enter wait settings (§ 8.9.3)	✓	✓	
		Count rate settings (§ 8.9.4)	✓	✓	
		Frisker settings & unit (§ 8.9.5)	✓	✓	
		Unit system (§ 8.9.6)	✓	✓	
General settings	Display and sound	Backlight adjustment (§ 8.10.1)	✓	✓	✓
		Simulated Sound level setting (§ 8.10.2)	✓	✓	✓
		Contrast setting (§ 8.10.3)	✓	✓	✓
		Date and time (§8.10.4)	✓	✓	
	Memory	Erasing Log files (§8.10.5)	✓	✓	
		Reset settings (§ 8.10.6)	✓		
		Internal memory format (§ 8.10.7)	✓		
		Language settings (§ 8.10.8)	✓	✓	
	Profile settings	Password (§ 8.10.9.1)	✓		
		Password resetting (§ 8.10.9.2)	✓		
		Enabling/Disabling Profiles (§ 8.10.9.3)	✓		
		View of the software version (§ 8.10.10)	✓	✓	✓
Advanced setting		Fault alarms (§ 8.11.1)	✓	✓	
		Background noise (§ 8.11.2)	✓	✓	
	Calibration	Monitor calibration (§ 8.11.3)	✓		
		Portal probe calibration check (§ 8.11.4)	✓		
		Frisker calibration check (§ 8.11.5)	✓		
Profiles		Selection of User Profile (§ 8.12)	✓	✓	✓
USB mode		Connect to a PC (§ 11.1)	✓		
	Connect USB stick (§ 11.3)	Export Log (§ 13.2)	✓	✓	
		Export setting (§ 15.1)	✓	✓	
		Import setting (§ 15.2)	✓		
		Software update (§15.3)	✓		
		Portal calibration (CSPS)	✓		

Starting continues following one of two cases:

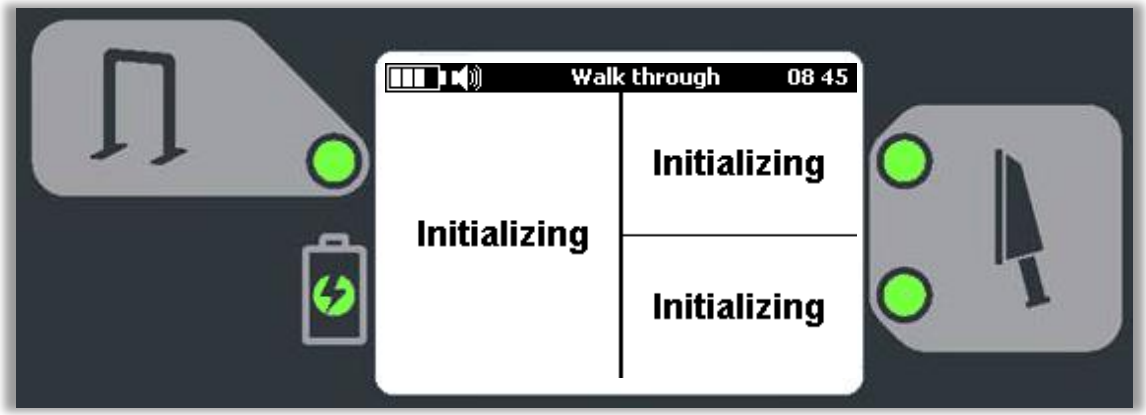
- Without FRISKER CSP probe connected,
- With FRISKER CSP probe connected.

Without FRISKER CSP probe connected

At power on, the LED associated will flash with on the screen the message « **Searching…** », « **Probe found** » then « **Initializing** »:

With FRISKER CSP probe connected

By connecting a CSP probe, the two LEDs associated will flash with on the screen the message « **Searching….** », « **Probe found** » then « **Initializing** »:



At the end of the probe search, Minisentry-2 is in **Walk Through** Mode and the lights are fixed green on the connected interface.

According to the type of probe connected, the displays may include the following:

Portal probe only

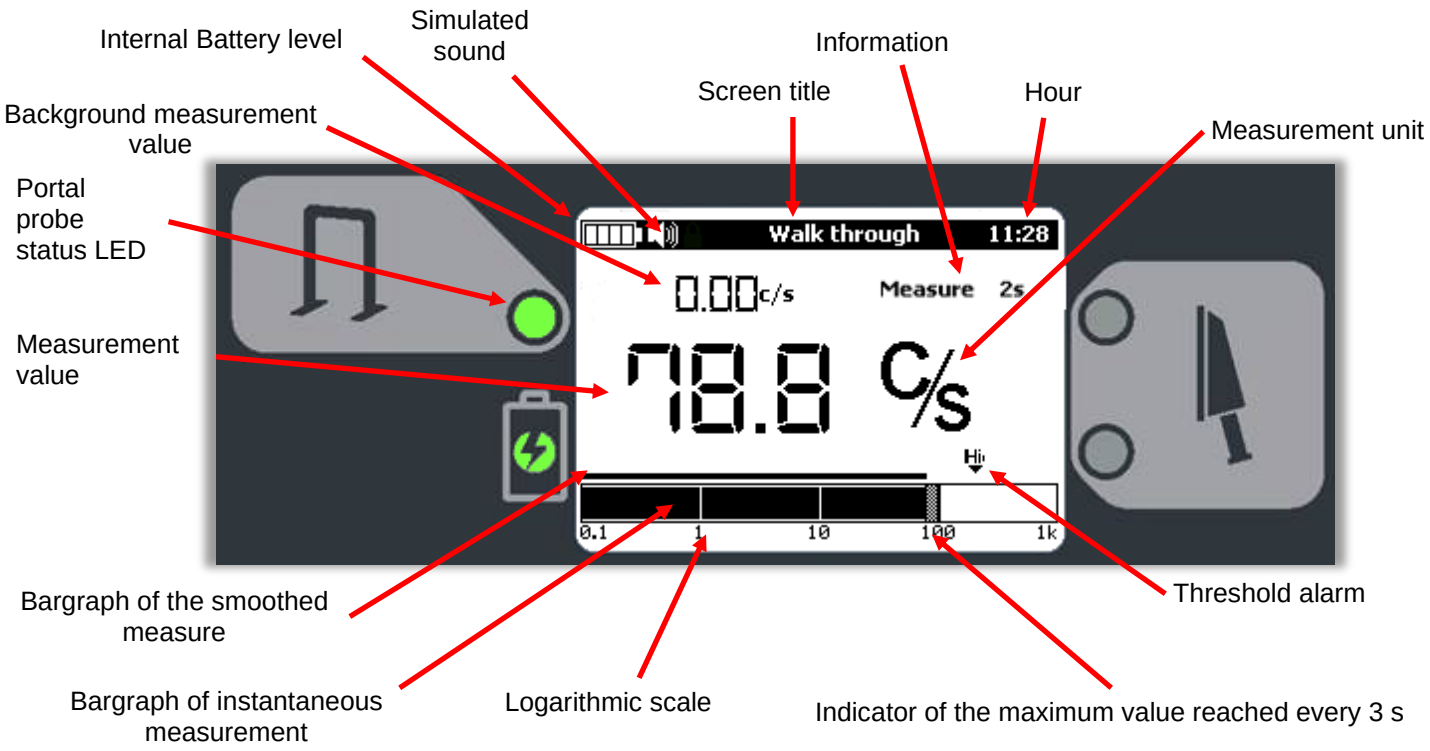


Figure 7 Portal probes

Portal probe and Frisker probe connected

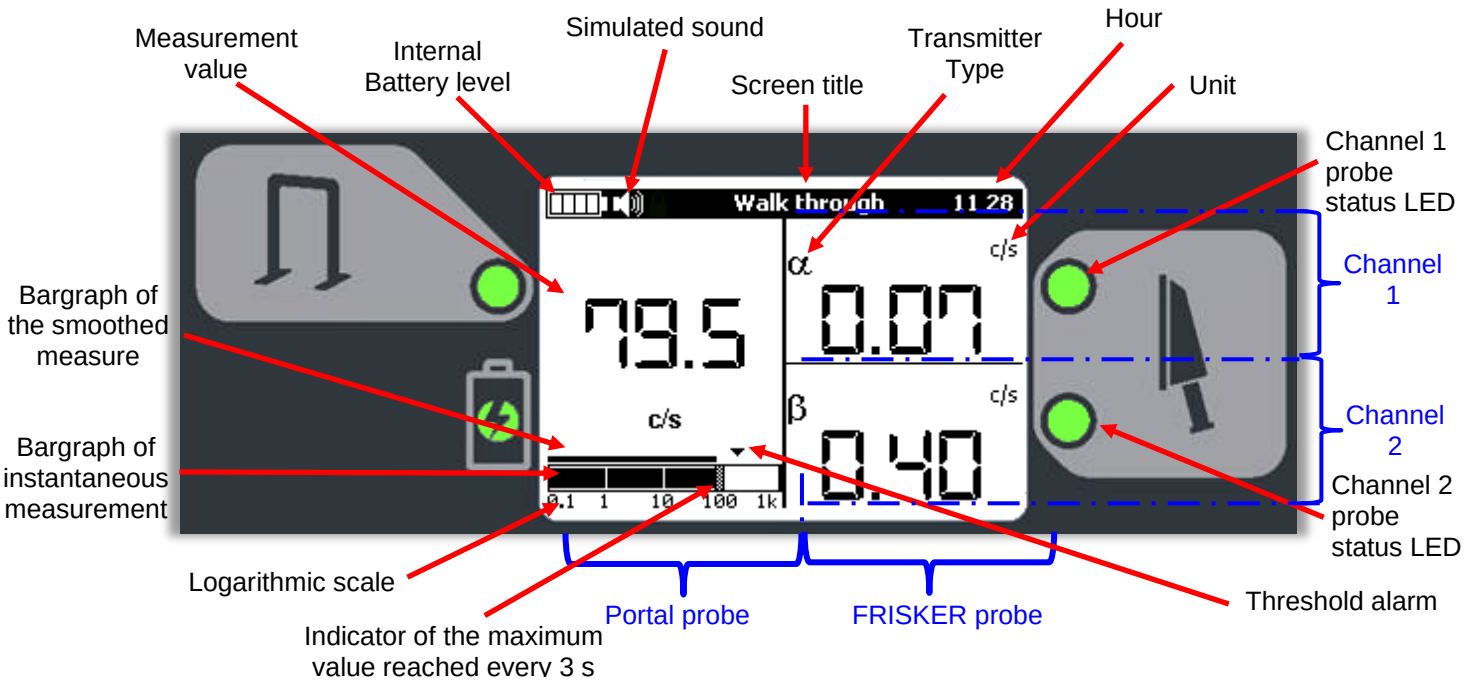


Figure 8 Portal probe with FRISKER CSP probe

8.5 WALK-THROUGH MODE

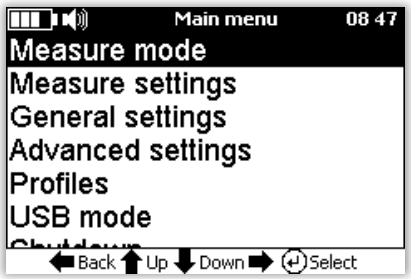
The Walk-Through mode provides for the highest throughput of traffic by allowing pedestrians to walk non-stop through the portal. Count times are adjustable from 1 to 5 seconds.

While in operation the MiniSentry is continuously counting for 250 ms time intervals and storing the results in a delay buffer. When the person being measured breaks the photo-sensor beam, the MiniSentry halts any background count updates. In the walk-through mode the counts in the buffer that occurred in one half of the specified count time before the photo-sensor beam was broken are added to the counts that occur for one half of the specified count time after the photo-sensor beam was broken. This results in a measurement interval that is centered on the moment that the beam was first broken, providing the best measurement as the person walks through the portal. The front of the person is thus counted as they approach the monitor, and their back is counted as they leave the monitor. Thus, in addition to the time that the individual is in the portal they are also monitored during that enter end exit time during which any contamination present would significantly affect the count rate in the detectors.

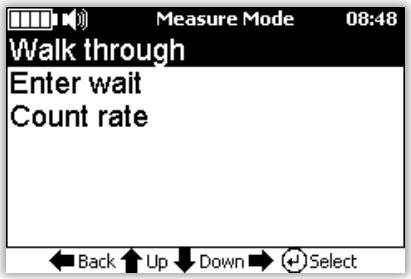
If the « **Walk through** » mode is not selected after a power on then:

1. Press the key  to access the main menu.

Note: The « **Measure Mode** » line is selected by default. If necessary, press the  or  keys to select the line.

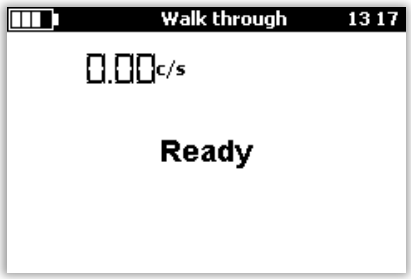


2. Press the key  or  to display the « **Measure Mode** » and press the key  to select the line « **Walk through** ».

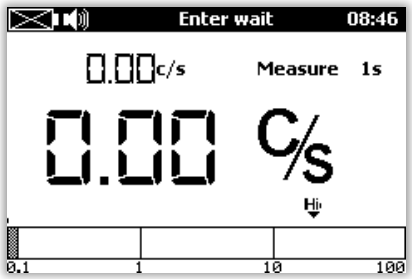


3. Press the  key to start the measurement mode. The following screen appears with background measurement (or not according to the **« Walk through settings** »):

The MiniSentry system is ready with the blue beacon on.



The user must walk slowly through the gate without stopping.



The user leaves the portal and the Minisentry-2 is ready for another measure with the blue beacon on.

8.5.1 Before measurement

- The background noise is updated while no presence is detected.
- A blue beacon triggers when the measure is ready to be performed.
- If the background noise is not valid and a presence is detected in the gate, a message is displayed telling the person to leave, and the LEDs blinks purple.

8.5.2 During measurement

- The measurement time is between 1 and 5 seconds (according to the **« Walk through settings** ») while the user is going through the gate.
- Background noise is subtracted from the measure if it is set.
- The measurement time start when the user triggers the detector (e.g. if the measurement time is set to 1 second, the device adds 0.5 seconds before detection and 0.5 seconds after detection).

8.5.3 After measurement

- According to setting, the device triggers an alarm if the measure reaches an alarm threshold with beacon (Optional) and status LED lighting red and a sound alarm. The alarm is activated until the alarm process clears the alarm.
- If the result is negative, the green beacon (Optional), LEDs and result display shall stay in place until either another person walk through the gate, or the result timeout time is reached.

8.6 ENTER-WAIT MODE

The « **Enter Wait** » mode is used to perform a body measurement.

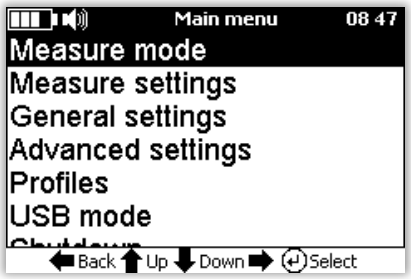
The « **Enter-Wai**t » mode requires the person being measured to step into the portal, break the photo-sensor beam, remain in that location until the measurement has completed, and exit when the indication of the end of the count time results in either a “clean” or “contaminated” message and audible indication. Moving out of the portal before the count cycle is complete will result in a “**Measure Failed**” message and audible indication. The count time and alarm level for this mode can be set independently of other modes (as is also the case for the other modes). It supports a minimum count time of 1 second, and a maximum count time of 60 seconds. This mode is useful to obtain better sensitivity by requiring a longer count time while the person is centered in the portal.

Background subtractions can be disabled, and alarm threshold level can be set as rate or standard deviation. Using rate alarm, the measure count time requires reaching the alarm Threshold with a wrong alarm coefficient is computed automatically (see « **Enter Wait** » settings).

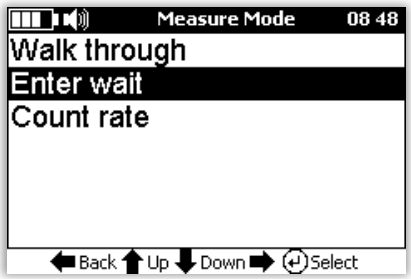
If the « **Enter wait** » mode is not selected after a power on then:

1. Press the key  to access the main menu.

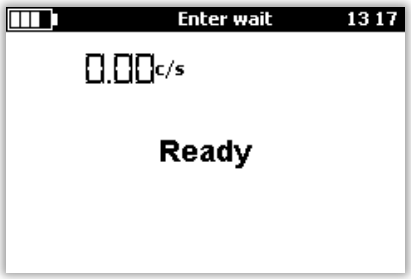
Note: The « **Measure Mode** » line is selected by default. If necessary, press the  or  keys to select the line.



2. Press the key  or  to display the « **Measure Mode** » and press the key  to select the line « **Enter wait** ».



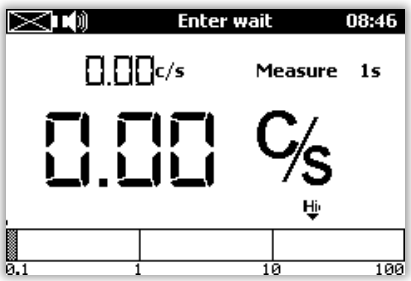
3. Press the  key to start the measurement mode. The following screen appears with background measurement (or not according to the **« Enter wait settings** »):



or

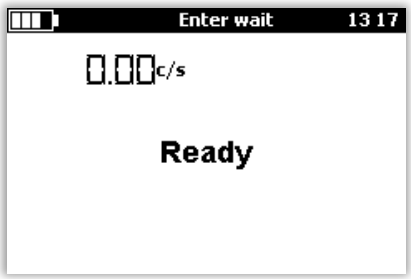
The MiniSentry system is ready with the blue beacon on.

The user walks up to the gate and stop for a set amount of time until the measure is done when the blue beacon is on.



or

The user leaves the portal, and the Minisentry-2 is ready for another measure with the blue beacon on.



8.6.1 Before measurement

- The device continuously updates the background noise while no presence is detected.
- The device triggers a blue beacon when the measure is ready to be performed.
- If the background noise is not valid and a presence is detected in the gate, the device shall display a message telling the person to leave, and the LEDs blinks purple.
- If no presence is detected, the device displays the current background noise, as well as its unit and its remaining calculation time if applicable.

8.6.2 During measurement

- The measurement time is set by the user in the « **Measure settings** » when a presence is triggered.
- A countdown shows the remaining measurement time.
- Background noise is subtracted from the measure.

8.6.3 After measurement

- According to setting, the device triggers an alarm if the measure reaches an alarm threshold with beacon (Optional) and status LED lighting red and a sound alarm. The alarm is activated until the alarm process clears the alarm.
- If the result is negative, the green beacon, LEDs and result display stays in place until the result timeout time is reached.

8.7 COUNT-RATE MODE

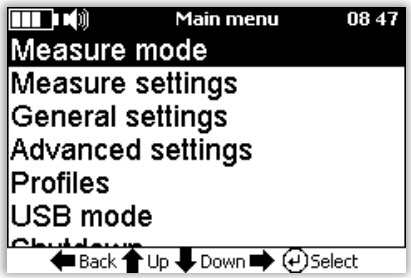
The « **Count rate** » mode is primarily used for vehicle applications or any other application where the occupation interval of the portal may be extended. The « **Count rate** » mode allows the MiniSentry-2 to monitor continuously if the photo-sensor beam is broken, using an averaging algorithm to calculate the current count rate. This algorithm adapts the measure integration time according to current fluctuation to get an accurate value: If measure counts are stable the integration time increase constantly, but if abnormal fluctuation is detected the integration time is decreased.

If background is enabled, the background rate is subtracted from the average count rate to yield the net measure. The measure is compared to the alarm level (either rate alarm or standard deviation). This net count rate is compared to the alarm count rate (also a net value) and an alarm is generated if background exceeds the threshold.

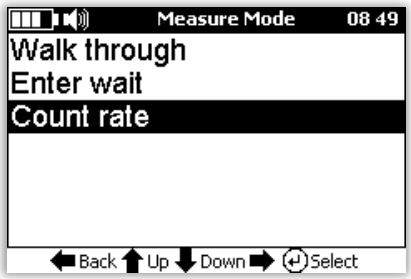
If the « **Count rate** » mode is not selected after a power on then:

1. Press the key  to access the main menu.

Note: The « **Measure Mode** » line is selected by default. If necessary, press the  or  keys to select the line.



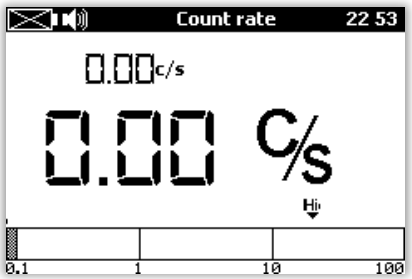
2. Press the key  or  to display the « **Measure Mode** » and press the key  to select the line « **Count rate** ».



3. Press the  key to start the measurement mode. The following screen appears with background measurement (or not according to the **« Count rate settings** »):

The MiniSentry-2 system is ready with the blue beacon on.

The user or vehicle goes through the gate and stops for an undetermined amount of time and measures until the user leaves.



8.7.1 Before measurement

- The device continuously updates the background noise while no presence is detected.
- The device triggers a blue beacon when the measure is ready to be performed.
- If the background noise is not valid and a presence is detected in the gate, the device displays a message telling to leave, and the LEDs blinks orange.
- If no presence is detected, the device displays the current background noise, as well as its unit and its remaining calculation time if applicable.

8.7.2 During measurement

- The device measures until the presence is gone.
- Background noise is subtracted from the measure.
- The device reacts in real time to alarm thresholds and act accordingly.

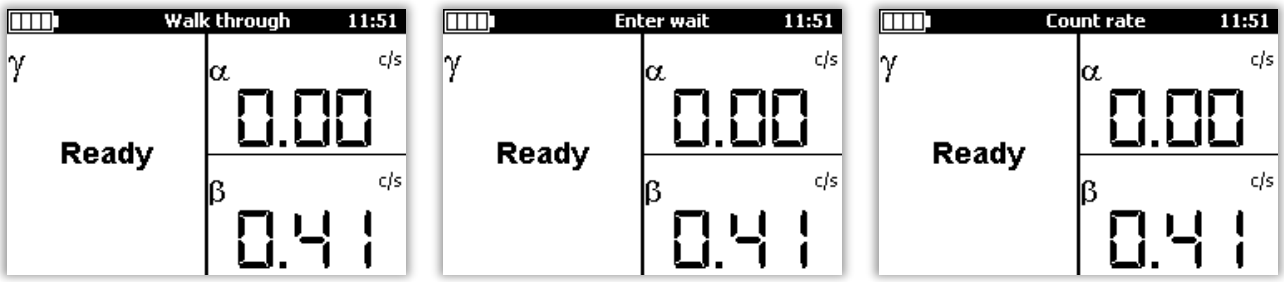
8.8 FRISKER PROBE OPTION

During either measure mode, a user shall be able to use the external alpha beta probe to perform a secondary measurement at any time, with both results being displayed at the same time on the screen.

When a FRISKER probe is connected, the LED associated will flash with on the screen the message « **Searching…** », « **Probe found** » then « **Initializing** »:

Measurement is displayed and the simulated sound becomes on.

To show or hide Frisker probe measure, press the key.



8.9 MEASURE SETTINGS

: « **Measure settings** » are only accessible at the « **Administrator** » and « **Technician** » user level (To change the user level, refer to § 8.12).

8.9.1 Unit

Unit of MiniSentry-2 can be set and is applied for all measure modes of the portal probe.

The Frisker probe unit can be set separately (see § 8.9.5).

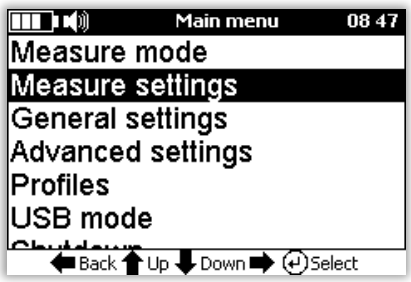
Units of portal probes available are:

For unit systems set (§ 8.9.6)	Possible Unit Values
SI	**c/s**, **Bq** and **Ci**
US	**cpm, dpm** and **Ci**

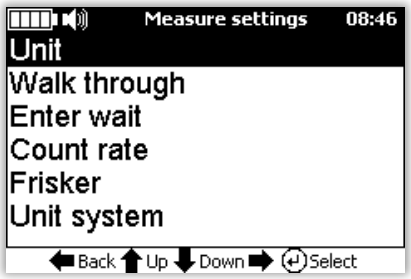
For Portal probe of MiniSentry-2:

1. Press the key to access the main menu.

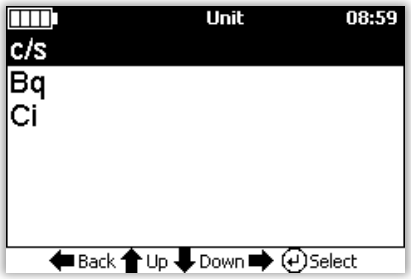
Note: The « **Measure Mode** » line is selected by default. If necessary, press the or keys to select the line « **Measure settings** ».

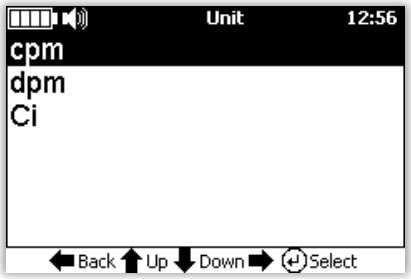


2. Press the key to display the « **Measure settings** » screen



3. Press the key to display the **« Unit** » screen:





To select a value in SI or US system:

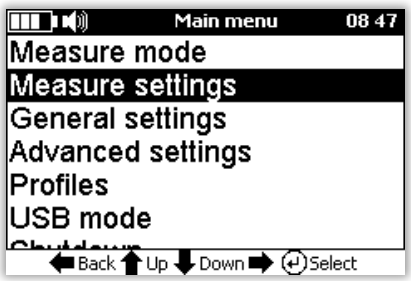
- Select the line with or ,
- Validate with the key to return to « **Measure settings** » screen.

4. Press the key to return to measurement screen,

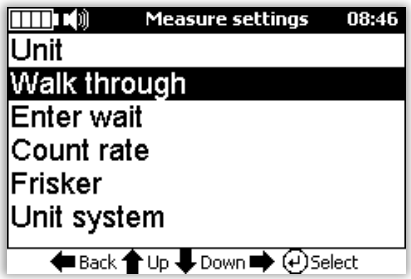
8.9.2 Walk through settings

1. Press the key to access the main menu.

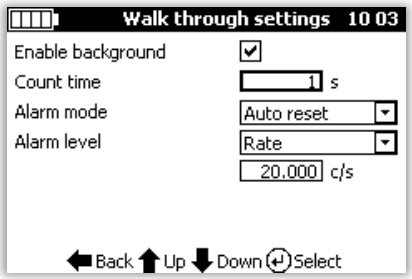
Note: The « **Measure Mode** » line is selected by default. If necessary, press the or keys to select the line « **Measure settings** ».

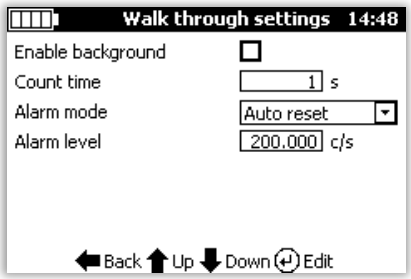


2. Press the key to display the « **Measure settings** » screen and select the line **« Walk through** » with or key



3. Press the key to display the « **Walk through settings** » screen:





To modify a value:

- Select the line with or key,
- Edit the value with the key,
- Select the value or confirm the option with the or key,
- Change column with or key,
- Exit edit mode with the .key.

Settings	Scroll menu	Definition
« **Enable background** »		Enable or disable background measurement
« **Count time** »		Duration of background measurement in second
« **Alarm mode** »	« **Disabled** »	Completely disables the alarm (visual and sound)
	« **Auto reset** »	Acknowledgment of alarm is automatic after a certain amount of time or an action has been performed
	« **Manual reset** »	Acknowledgment of alarm by the user (by pressing any button on the keyboard)
	« **Auto reset** 🔇»	Acknowledgment of alarm is automatic after a certain amount of time or an action has been performed
	« **Manual reset** 🔇»	Acknowledgment of alarm by the user (by pressing any button on the keyboard)
« **Alarm level** » With background measurement disabled:		Fixed value in the current monitor unit
« **Alarm level** » With background measurement enabled	« **Rate** »	Defined value in the current monitor unit
	« **STD** »	Value of the standard deviation « $\boldsymbol{\sigma}$ »

4. Press the ◀ key to save and return to the measurement screen,

8.9.2.1 Alarm management

If background is disabled, only « **Rate** » alarm threshold can be used.

Rate:

The alarm threshold rate is expressed in the current unit selected (see § 8.9.1)

STD:

In « **Walk through** » mode, the alarm level at which the gate shall trigger an alarm is as follows:

$$Alarm\ trip\ point[cps] = BkgRate[cps] + SigmaLvl[STD] \times \sqrt{\frac{BkgRate[cps]}{CountTime[s]}}$$

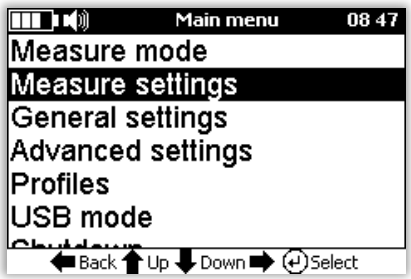
With:

- *BkgRate*: Rate of the Background in cps
- *SigmaLvl*: Digital value of the Standard Deviation « $\boldsymbol{\sigma}$ » (« **STD** » setting)
- *CountTime*: Duration in second of the measure

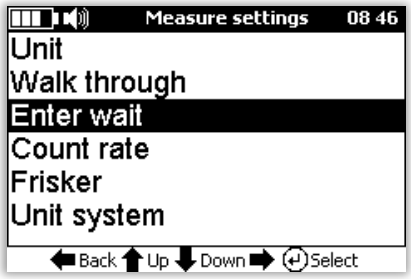
8.9.3 Enter wait settings

1. Press the key to access the main menu.

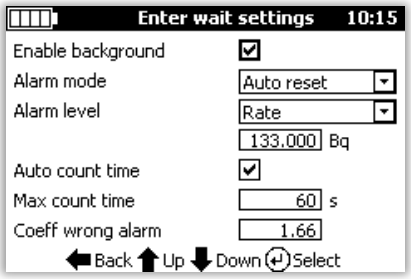
Note: The « **Measure Mode** » line is selected by default. If necessary, press the or keys to select the line « **Measure settings** ».

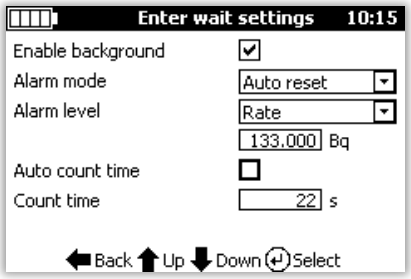


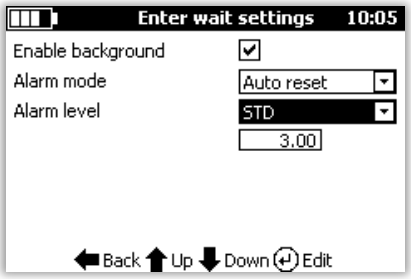
2. Press the key to display the « **Measure settings** » screen and select the line **« Enter wait** » with or key

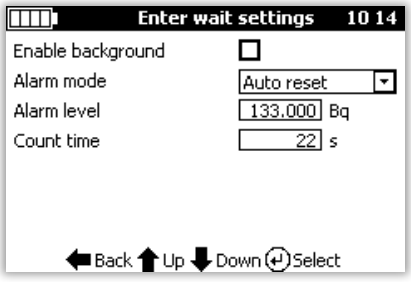


3. Press the key to display the « **Enter wait settings** » screen:









To modify a value:

- Select the line with  or  key,
- Edit the value with the  key,
- Select the value or confirm the option with the  or  key,
- Change column with  or  key,
- Exit edit mode with the  .key.

5. Press the  key to save and return to the measurement screen,

Setting	Scroll menu	Definition
« **Enable background** »		Enable or disable background measurement
« **Alarm mode** »	« **Disabled** »	Completely disables the alarm (visual and sound)
	« **Auto reset** »	Acknowledgment of alarm is automatic after a certain amount of time or an action has been performed
	« **Manual reset** »	Acknowledgment of alarm by the user (by pressing any button on the keyboard)
	« **Auto reset**  »	Acknowledgment of alarm is automatic after a certain amount of time or an action has been performed
	« **Manual reset**  »	Acknowledgment of alarm by the user (by pressing any button on the keyboard)
« **Alarm level** » With background measurement disabled:		Fixed value in the current monitor unit
« **Alarm level** » With background measurement enabled:	« **Rate** »	Defined value in the current monitor unit
	« **STD** »	Value of the standard deviation « σ »
« **Auto count time** » enabled with background measurement		Enable or disable automatic calculation of integration time
« **Max count time** » with « **Auto count time** » is enabled		Max time in second of the integration time
« **Coeff wrong alarm** » with « **Auto count time** » enabled		Wrong alarm coefficient value used to compute integration time
« **Count time** »		Duration of integration time in second

8.9.3.1 Auto count time management

With background enabled and alarm threshold in rate, auto count time can be selected, allowing to have a dynamic count time computed every measure. This count time is computed according to current background, wrong alarm coefficient and rate alarm threshold level.

$$\boldsymbol{T_{measure}(s) = \frac{1}{2}\left(\sqrt{X_0^2 - 4Y_0} - X_0\right)}$$

Where :

$$X_0 = \frac{2X_1Y_1 - 4ALS^2K_b^2(ALS + R_{bkg})}{W_1}$$

$$Y_0 = \frac{X_1^2}{W_1}$$

$$X_1 = R_{bkg}(K_a^2 - K_b^2) - ALS.K_b^2$$

$$Y_1 = \frac{R_{bkg}}{T_{bkg}}(K_a^2 - K_b^2) - ALS^2$$

$$W_1 = Y_1^2 - 4.ALS^2.K_b^2\frac{R_{bkg}}{T_{bkg}}$$

ALS is the threshold of alert in cps
K_a is the coefficient of false alarm
K_b is the coefficient of no detection
R_{bkg} is the average value of the BKG
T_{bkg} is the time of acquisition of the BKG

Note: Only Kb can be set, and Ka = Kb.

8.9.3.2 Alarm management

If background is disabled, only « **Rate** » alarm threshold can be used.

Rate:

The alarm threshold rate is expressed in the current unit selected (see § 8.9.1).

STD:

In « **Enter Wait** » mode, the alarm level at which the gate shall trigger an alarm is as follows:

$$Alarm\ trip\ point[cps] = BkgRate[cps] + 2xSigmaLvl[STD] \times \sqrt{\frac{BkgRate[cps]}{CountTime[s]}}$$

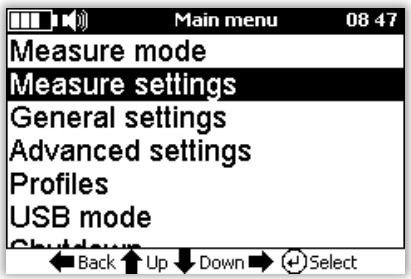
With:

- *BkgRate*: Rate of the Background in cps
- *SigmaLvl*: Digital value of the Standard Deviation « $\boldsymbol{\sigma}$ » (« **STD** » setting)
- *CountTime*: Duration in second of the measure

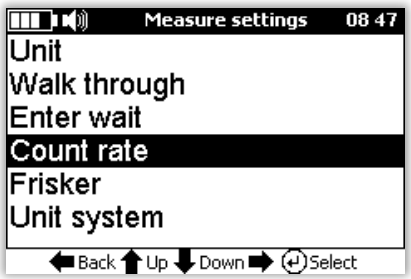
8.9.4 Count rate settings

1. Press the key to access the main menu.

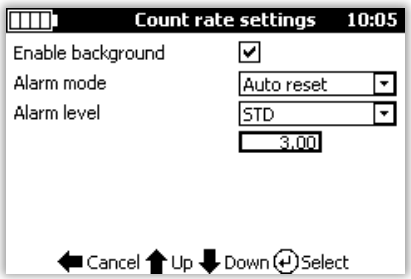
Note: The « **Measure Mode** » line is selected by default. If necessary, press the or keys to select the line « **Measure settings** ».

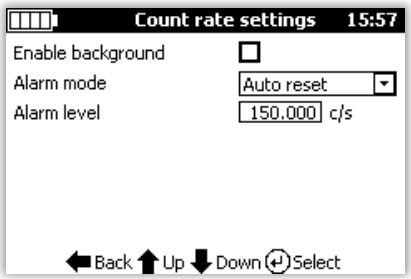


2. Press the key to display the « **Measure settings** » screen and select the line **« Count rate** » with or key



3. Press the key to display the « **Count rate settings** » screen:





To modify a value:

- Select the line with or key,
- Edit the value with the key,
- Select the value or confirm the option with the or key,
- Change column with or key,
- Exit edit mode with the .key.

Setting	Scroll menu	Definition
« **Enable background** »		Enable or disable background measurement
« **Alarm mode** »	« **Disabled** »	Completely disables the alarm (visual and sound)
	« **Auto reset** »	Acknowledgment of alarm is automatic after a certain amount of time or an action has been performed
	« **Manual reset** »	Acknowledgment of alarm by the user (by pressing any button on the keyboard)
	« **Auto reset** 🔇»	Acknowledgment of alarm is automatic after a certain amount of time or an action has been performed
	« **Manual reset** 🔇»	Acknowledgment of alarm by the user (by pressing any button on the keyboard)
« **Alarm level** » With background measurement disabled:		Fixed value in the current monitor unit
« **Alarm level** » With background measurement enabled:	« **Rate** »	Defined value in the current monitor unit
	« **STD** »	Value of the standard deviation « σ »

4. Press the ◀ key to save and return to the measurement screen,

8.9.4.1 Alarm management

In « **Count rate** » mode, the alarm can be set manually by the user either in net count rate or net activity.

8.9.5 Frisker settings

The threshold values of low alarm, the threshold alarm high and the units of the connected probe are accessible from the user « **Technician** » level.

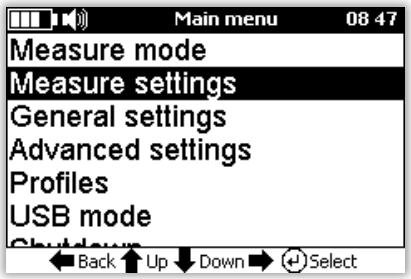
User level « **Operator** » can only see current unit and thresholds.

For probes of the Frisker type, 10 threshold values by unit of measure are pre-recorded in the probe. The thresholds can be changed without possibility of adding.

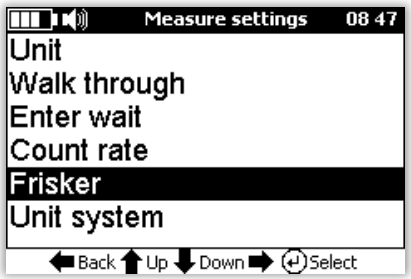
The following table shows an example for a CSP probe (SAB 100):

Units	**Channel α – Low or high alarm thresholds**									
c/s	0.4	0.8	4	8	40	80	200	800	4000	8000
Bq	4	8	40	80	400	800	2000	8000	40000	80000
Bq/cm^2	0.04	0.08	0.4	0.8	4	8	20	80	400	800
cpm	24	48	240	480	2 400	4 800	12 000	48 000	240 000	480 000
dpm	240	480	2 400	4 800	24 000	48 000	120 000	480 000	2 400 000	4 800 000
dpm/100 cm^2	240	480	2 400	4 800	24 000	48 000	120 000	480 000	2 400 000	4 800 000
	Channel β – Low or high alarm thresholds									
c/s	8	16	40	80	160	400	800	1600	4000	8000
Bq	40	80	200	400	800	2000	4000	8000	20000	40000
Bq/cm^2	0.4	0.8	2	4	8	20	40	80	200	400
cpm	480	960	2400	4800	9 600	24 000	48 000	96 000	240 000	480 000
dpm	2 400	4 800	12 000	24 000	48 000	120 000	240 000	480 000	1 200 000	2 400 000
dpm/100 cm^2	2 400	4 800	12 000	24 000	48 000	120 000	240 000	480 000	1 200 000	2 400 000

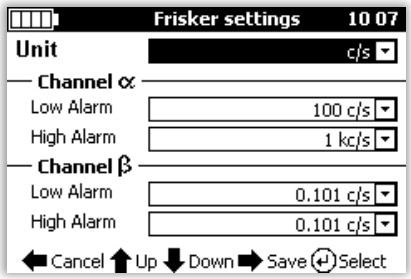
1. Press the key  to access the main menu. Press the  or  keys to select the line « **Measure settings** »



2. Press the  key to display the « **Measure settings** » screen and select the line **« Frisker** » with  or  key



3. Press the key to display the « **Frisker settings** » screen:



To modify a value:

- Select the line with or key,
- Edit the value with the key,
- Select the value or confirm the option with the or key,
- Change column with or key,
- Exit edit mode with the .key.

Settings	Definition
« **Unit** »	Choices are : - For **SI** units: **c/s**, **Bq Bq/cm² or Sv/h** (**) - For **US** units: **cpm, dpm**, **dpm/100cm² or rem/h** (**)
« **Channel α** »	
« **Low alarm** » (*)	Alarm low threshold in the « **Unit** » selected
« **High alarm** » (*)	Alarm high threshold in the « **Unit** » selected
« **Channel β** »	
« **Low alarm** » (*)	Alarm low threshold in the « **Unit** » selected
« **High alarm** » (*)	Alarm high threshold in the « **Unit** » selected
(*): The low threshold is always inferior to the high threshold, if the low threshold is higher than the high threshold then high threshold is automatically set equal to the low threshold and conversely (**): According to Frisker probe type	

4. Press the key to return to the measurement screen,

8.9.5.1 Alarm management

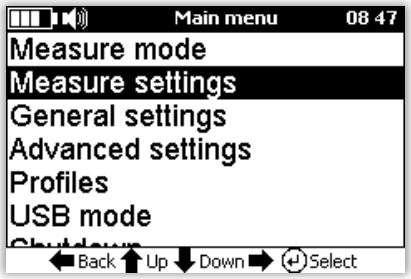
In case of exceeding of the threshold alarm, sound alarm is activated and Frisker LED blinks red.

8.9.6 Unit system

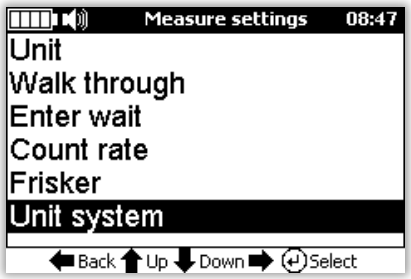
The unit system is applicable for both portal probe and Frisker probe.

1. Press the key to access the main menu.

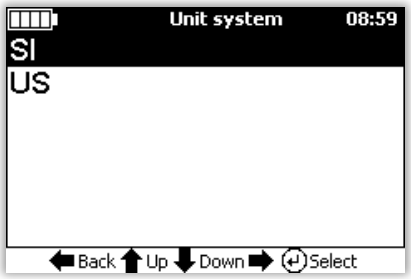
Note: The « **Measure Mode** » line is selected by default. If necessary, press the or keys to select the line « **Measure settings** ».



2. Press the key to display the « **Measure settings** » screen and select the line **« Unit system** » with or key



3. Press the key to display the « **Unit system** » screen:



To modify a value:

- Select the line with or key,
- Select the value and exit with the key,

Unit system choice	Unit Values available
SI	**c/s**, **Bq** and **Ci**
US	**cpm, dpm** and **Ci**

4. Press the key to return to the previous screen,

8.10 GENERAL SETTING

8.10.1 Backlight adjustment

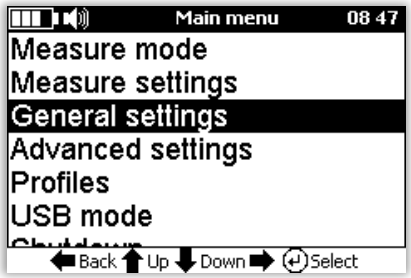
: The backlight adjustment level can greatly reduce the battery level when MiniSentry-2 is operating on battery power.

In the measure screens, the backlighting can be switched off by briefly pressing the key  and direct access to the setting by pressing and holding the key  (See step 4), in this case The backlight level only appears for a few seconds without pressing a key.

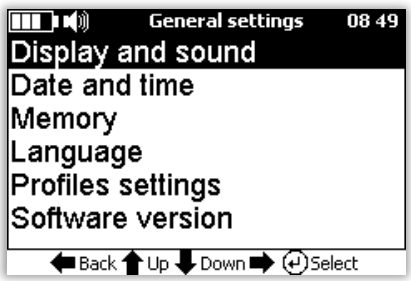
In other modes, a long press enables or disables the backlight.

To access the setting through the menus:

1. Press the key  to access the main menu and press the  or  keys to select the « **General settings** » line



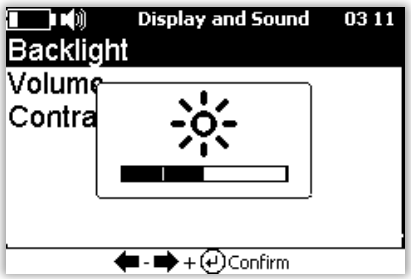
2. Press the  or  key to view the « **General settings** » screen.



3. Press the  or  key to view the « **Display and sound** » screen.

Note: The « **Backlight** » line is selected by default.

4. Press the  or  key to view the level of the backlight and adjust it with the  or  keys.



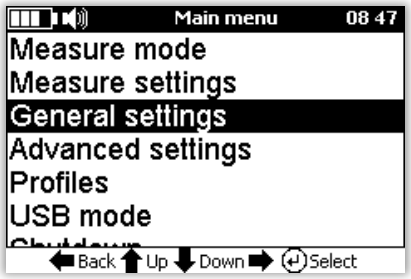
5. Press the key  to save the setting and return to the previous menu.
6. Press the key  to return to the main menu.

8.10.2 Simulated sound volume setting

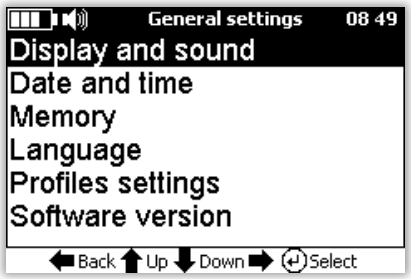
The simulated sound of the Frisker probes can be activated (Symbol ) or deactivated by briefly pressing the key  .

To access the volume:

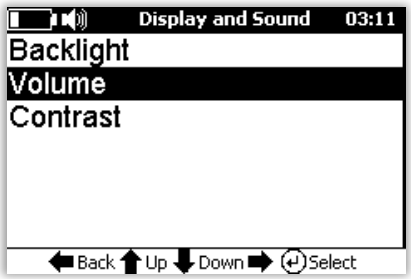
1. Press the key  to access the main menu and press the  or  keys to select the « **General settings** » line



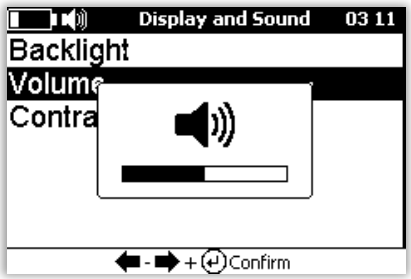
2. Press the  or  key to view the « **General settings** » screen and if necessary press the  or  keys to select the « **Display and Sound** » line.



3. Press the or key to view the « **Display and Sound** » screen and press the or keys to select the « **Volume** » line



4. Press the or key to view the volume level and adjust it with the or keys.



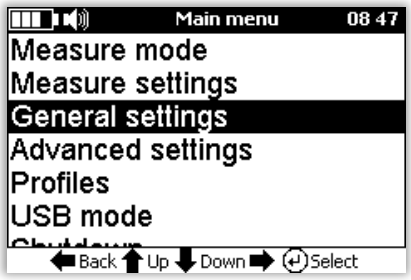
5. Press the key to save the setting and return to the previous menu.

   Note: The volume control does not activate the simulated sound

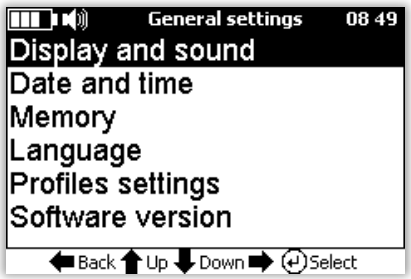
6. Press the key to return to the main menu

8.10.3 Contrast adjustment

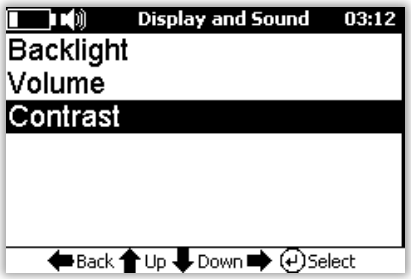
1. Press the key to access the main menu and press the or keys to select the « **General settings** » line



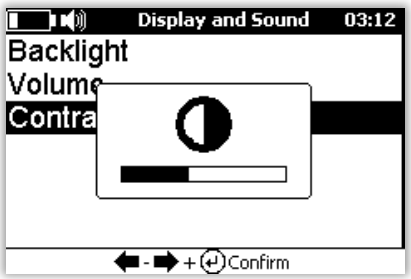
2. Press the ▶ or ↵ key to view the « **General settings** » screen and the ▲ or ▼ keys to select the « **Display and Sound** » line.



3. Press the ▶ or ↵ key to view the « **Display and Sound** » screen and press the ▲ or ▼ keys to select the « **Contrast** » line.



4. Press the ▶ or ↵ key to view the level and adjust it with the ▶ or ◀ keys.

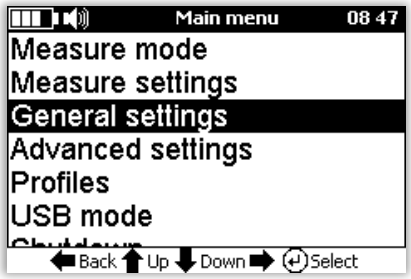


5. Press the key ↵ to keep the setting and return to the previous menu.
6. Press the key ◀ to return to the main menu.

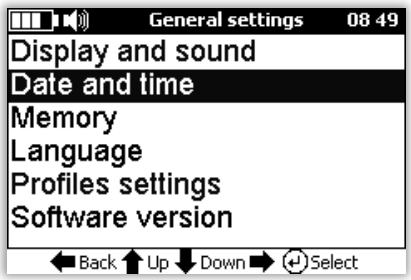
8.10.4 Date and time

This setting is only accessible at the « **Administrator** » and « **Technician** » user level (To change the user level, refer to § 8.12).

1. Press the key to access the main menu and press the or keys to select the « **General settings** » line.



2. Press the or key to view the « **General settings** » screen and press the or keys to select the « **Date and time** » line.



3. Press the or key to display and select the time zone

Note: A restart of the MiniSentry-2 is required to apply the new time zone.

4. Press the  or  key to display the calendar

To update the date and time:

- Move the cursor to the month with the key  ,
- Select the month and year with the  or  keys. A long press scrolls through the years, a short press scrolls through the months.
- Select the day with the  ,  ,  or  keys.
- Save the date with the key  and change to the time setting,

- Select the hour or minutes with  or  ,
- Change between the hour or minutes with the keys  or  ,
- Press the key  to save the date and time and return to the « **Options** » menu.

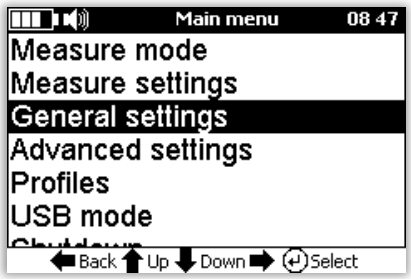
5. Press the key  to return to the main.

8.10.5 Erasing Log files

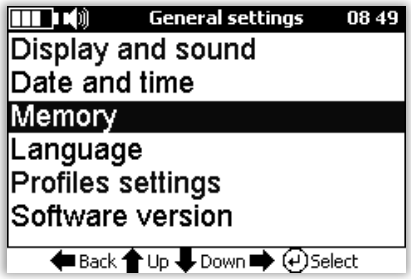
: This function deletes all the record files located in the « **LOG** » directory.

This function is only accessible at the « **Administrator** » and « **Technician** » user level (To change the user level, refer to § 8.12).

1. Press the key to access the main menu and press the or keys to select the « **General settings** » line

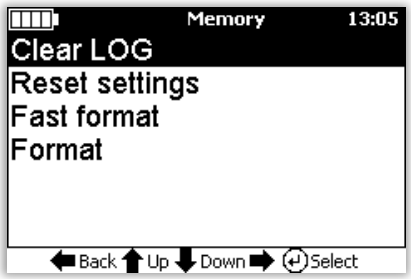


2. Press the or key to view the « **General settings** » screen and press the or keys to select the « **Memory** » line.

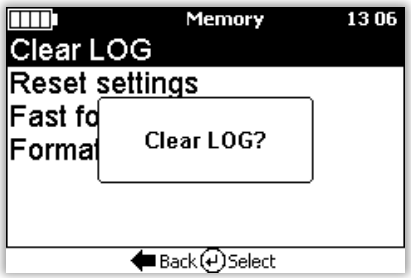


3. Press the or key to display the « **Memory** » screen

Note: The « **Clear LOG** » line is selected by default



4. Press the  or  key to initiate the erasing of the Log.



5. Press the key  to confirm the erasing of the Log and return to the « **Memory** » menu.

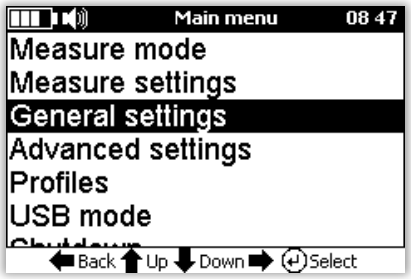
6. Press the key  twice to return to the main menu.

8.10.6 Reset of settings

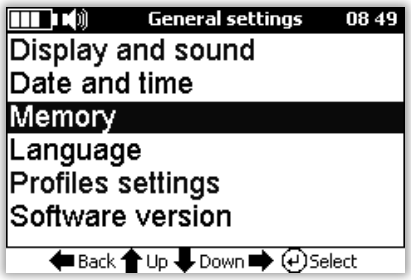
 : This function restore the file « **DeviceSettings.cfg** » (see § 15) to restore the MiniSentry-2 in the factory output configuration.
This function is only accessible at the « **Administrator** » user level (To change the user level, refer to § 8.12).

1. Press the key  to access the main menu

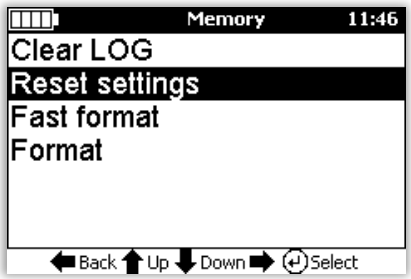
Note: The « **Measure Mode** » line is selected by default. If necessary press the  or  keys to select the « **Settings** » line



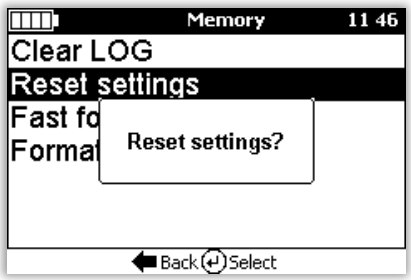
2. Press the  or  key to view the « **General settings** » screen and press the  or  keys to select the « **Memory** » line.



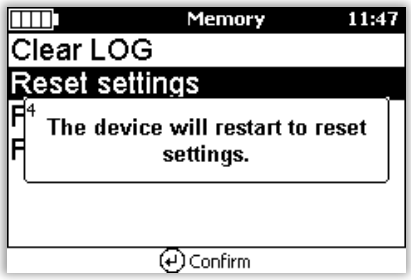
3. Press the  or  key to display the « **Memory** » screen and press the  or  keys to select the line « **Reset settings** ».



4. Press the  or  key for reset the settings.



5. Press the  key to confirm the reset.



The MiniSentry-2 restarts with the factory settings and with the user level "**Operator**".

The user must fill in:

- Language,
- Unit system,
- Time zone,
- Date,
- Time.

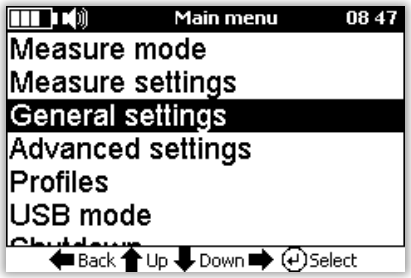
8.10.7 Internal memory format

: This function deletes all the record files located in the « **LOG** » directory (see § 12.5). The current settings aren't erased.
This function is only accessible at the « **Administrator** » user level (To change the user level, refer to § 8.12).

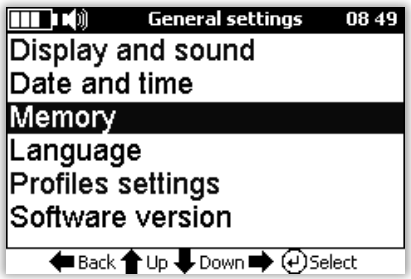
Two formatting modes are available, quick, or normal.

1. Press the key to access the main menu

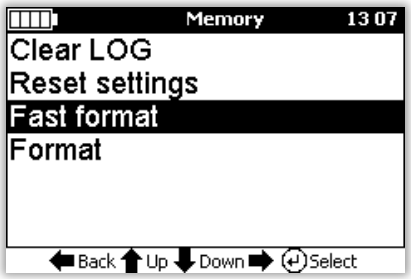
Note: The « **Measure Mode** » line is selected by default and press the or keys to select the « **General settings** » line



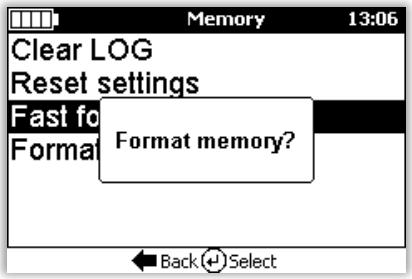
2. Press the or key to view the « **General settings** » screen and press the or keys to select the « **Memory** » line..

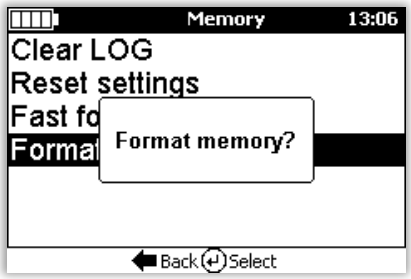


3. Press the or key to display the « **Memory** » screen and press the or keys to select the line « **Fast format** » or « **Format** ».

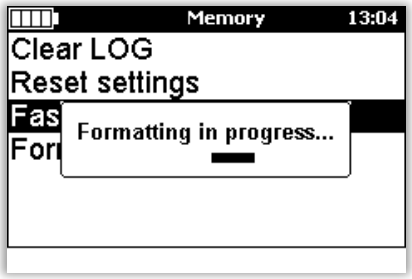


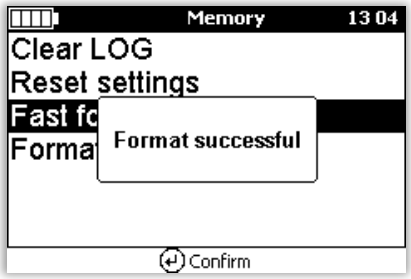
4. Press the  or  key to format the internal memory.





5. Press the key  to confirm formatting.



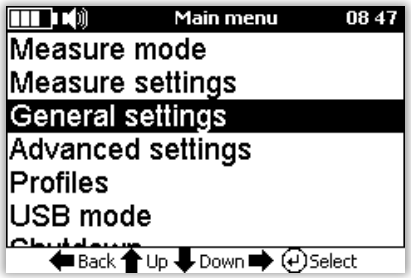


6. Press the key  to return to the main menu.

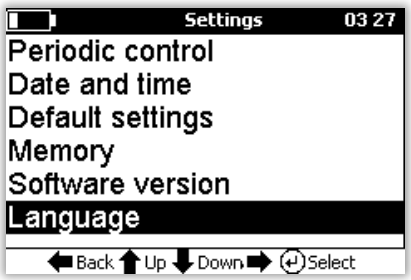
8.10.8 Language setting

: This function is only accessible at the « **Administrator** » and « **Technician** » user level (To change the user level, refer to § 8.12).

1. Press the key to access the main menu and press the or keys to select the « **General settings** » line



2. Press the or key to view the « **General settings** » screen and press the or keys to select the « **Language** » line.



3. Press the or key to display the « **Language** » screen and press the or keys to select another language then to activate the chosen language.

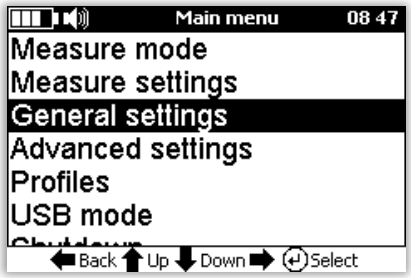
4. Press the key several times to return to the main menu

8.10.9 Profile settings

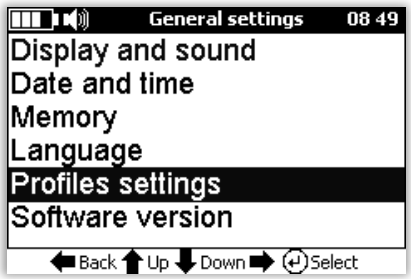
« **Password** », « **Password reset** » and « **Profiles: Enable / disable** » are only accessible at the « **Administrator** » user level (To change the user level, refer to § 8.12).

8.10.9.1 Password

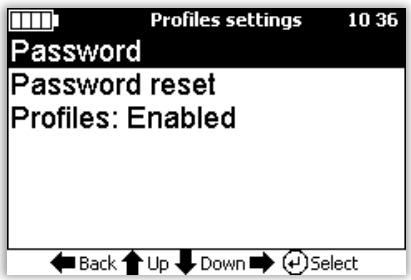
1. Press the key to access the main menu and press the or keys to select the « **General settings** » line



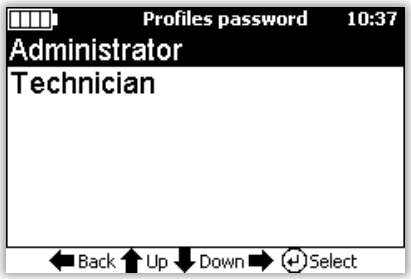
2. Press the or key to view the « **General settings** » screen and press the or keys to select the « **Profiles settings** » line



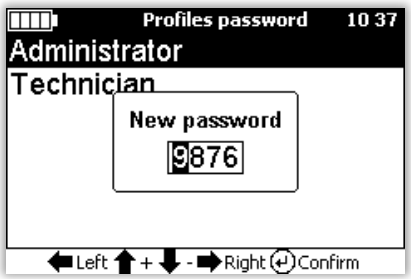
3. Press the or key to view the « **Profiles settings** » screen.

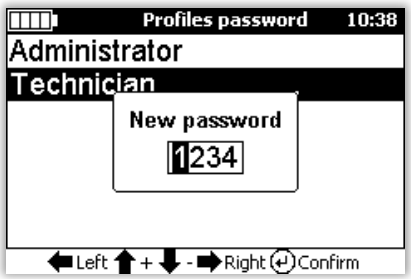


4. Press the  or  key to view the « **Profiles password** » screen and press the  or  keys to select the password of the profile to be changed.



5. Press the  or  key to change password.





To modify a value:

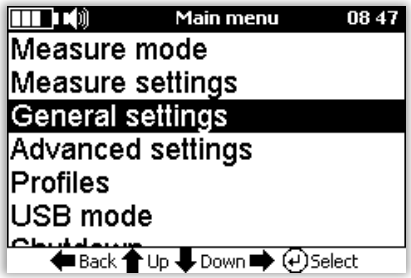
- Select the number with  or  key,
- Changing columns with  or  key
- Validate password with  key, a confirmation message is displayed.

6. Press the key  several times to return to the main menu

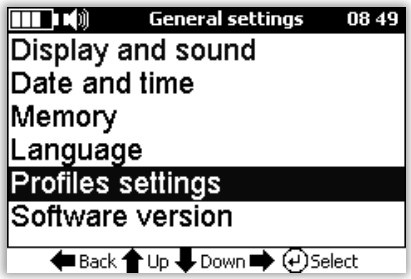
8.10.9.2 Password resetting

: The "**Reset Passwords**" requires the master password. Once reset the active user profile is the last one enabled.

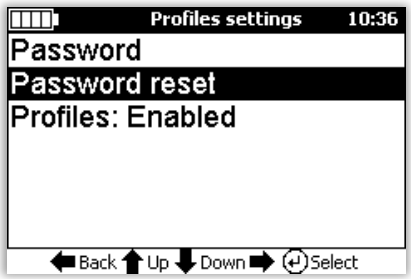
1. Press the key to access the main menu and press the or keys to select the « **General settings** » line



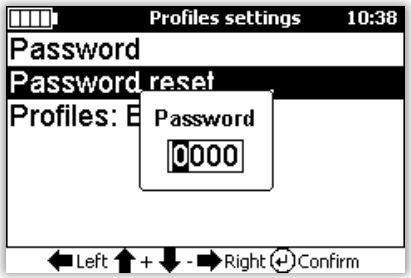
2. Press or key to view the « **General settings** » screen and Press the or keys to select the « **Profiles setting** » line



3. Press or key to view the « **Profiles settings** » screen and press the or key to select the « **Password reset** » line.



4. Press or key and enter the master password.



To enter the master password:

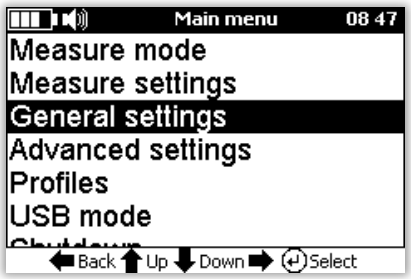
- Select the number with or key,
- Changing columns with or key,
- Validate password reset with key.

5. Press the key several times to return to the main menu

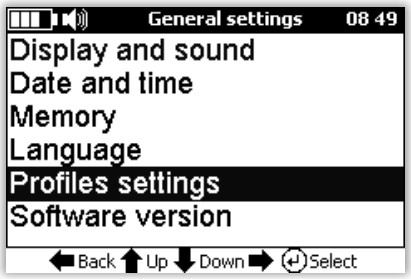
8.10.9.3 Enabling/Disabling Profiles

: When the profiles are disabled, the user has access to all the functions of the device even after reboot.

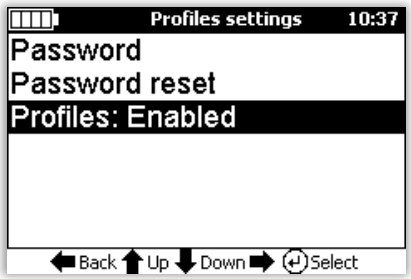
1. Press the key to access the main menu and press the or keys to select the « **General settings** » line



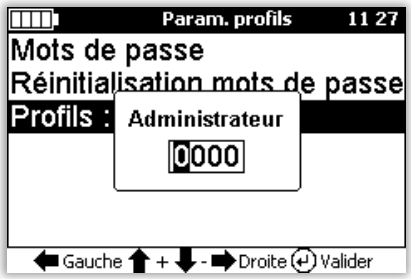
2. Press or key to view the « **General settings** » screen and press the or keys to select the « **Profiles setting** » line



3. Press or key to view the « **Profiles settings** » screen and press the or key to select the « **Profiles:…..** » line and display the status of profiles; "**Enabled**" or "**Disabled**".



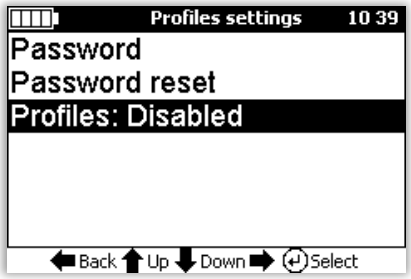
4. Press ou key and enter the administrator password.



To enter the administrator password:

- Select the number with or key,
- Changing columns with or key,

5. Validate password with key, profiles become « **Disabled** ». To reactivate the profiles, repeat the previous operation.

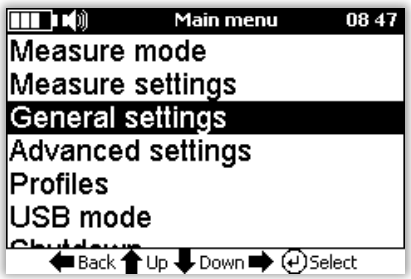


6. Press the key several times to return to the main menu

8.10.10 Software version display

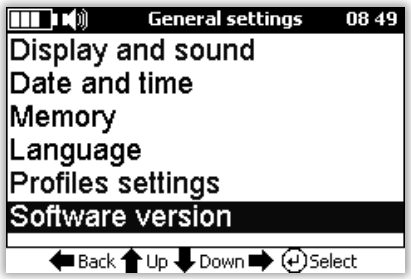
1. Press the key  to access the main menu.

Note: The « **Measure Mode** » line is selected by default. If necessary, press the  or  keys to select the « **Settings** » line



2. Press the  or  key to view the « **Settings** » screen.

Note: The line « **Background noise** » is selected by default. Press the key  or  to display « **Software version** » line.



3. To view the software versions, press the  or  key and press the key  to return to the previous menu.

Two versions are available:

- **Bootloader** (startup software)
- **Application** (main application)
- **Configuration** («**MINISENTRY-2**»)

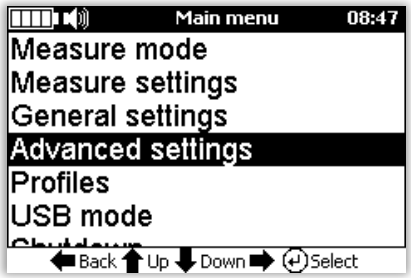
8.11 ADVANCED SETTINGS

: « **Advanced settings** » are only accessible at the « **Administrator** » and « **Technician** » user level (To change the user level, refer to § 8.12).

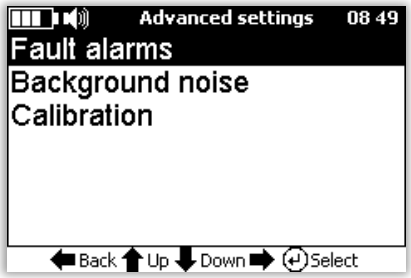
8.11.1 Fault alarms

The « **Fault Alarms** » menu allows the user to set conditions for unexpected operations, including both low and high-count rates, calibration expiration, and AC power loss. These conditions can generate a warning or take the MiniSentry-2 « **Out of Service** » until the condition is remedied. This is discussed in the « **Fault Alarms** » Menu.

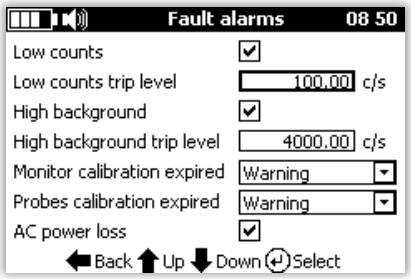
1. Press the key to access the « **Main menu** ». and press the or keys to select the line « **Advanced settings** ».



2. Press the key to display the « **Advanced settings** » screen.



3. Press the key to display the **« Fault alarms** » screen:



To select a value:

- Select the line with or key,
- Validate or enter in edit mode with the Key.

4. Press the key to return to previous screen,

Settings	Definition
« **Low counts** »	Enable or disable low count alarm
« **Low counts trip level** »	Value of low counts in c/s (see § 8.11.2.1)
« **High background** »	Enable or disable high background
« **High background trip level** »	Value of high background in c/s (see § 8.11.2.2 & § 8.11.2.3)
« **Monitor calibration expired** »	
- « **Out of service** »	the MiniSentry-2 wait until the condition is remedied
- « **Warning** »	The message is displayed and the MiniSentry-2 is operational
- « **Ignore** »	No message is displayed
« **Probes calibration expired** »	
- « **Out of service** »	the MiniSentry-2 wait until the condition is remedied
- « **Warning** »	The message is displayed and the MiniSentry-2 is operational
- « **Ignore** »	No message is displayed
« **AC power loss warning** »	Enable or disable the alarm of power loss

8.11.2 Background noise

The MiniSentry measures and displays the background level when the portal is not occupied. The level of background stored is subtracted from the gross rate before the alarm level is checked. This logic sequence allows the alarm level to "ride" on changing background levels. The background value is obtained by averaging readings acquired while the MiniSentry is not occupied. The count rates sampled every quarter second are processed by a running average filter.

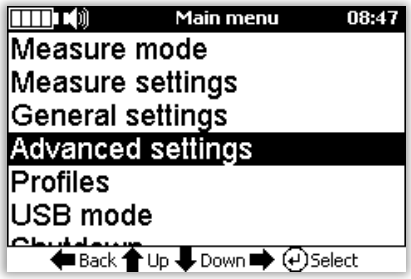
The minimum averaging time setting guaranty, having enough background integration before starting a measure. Once this minimum time is reach, the background is valid and still increase the integration time to have a more accurate value. A background variation detection algorithm allows to reduce and adapt the background integration:

The averaging time ranges from 1-60 seconds, with a default value of 5 seconds. Before the count-rate samples are processed by the filter, they are put into a delay buffer. This enables the samples to be used as the first half of a measurement in the Walk-Through mode.

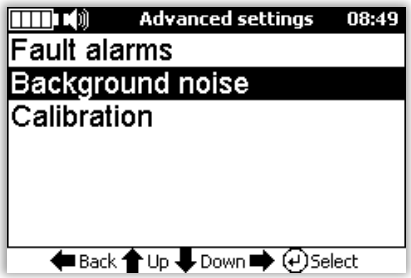
- The background noise is calculated all the time as long as no presence is detected.
- The background noise is calculated during a time to be considered as valid (averaging time).
- The background noise discards a time before starting averaging (delay time).
- The background noise discards a time when a presence is detected (discard time).
- The background noise is valid for a period of set time.
- The background noise is considered invalid if an abrupt change is detected of more than the variation coefficient.

1. Press the key  to access the main menu.

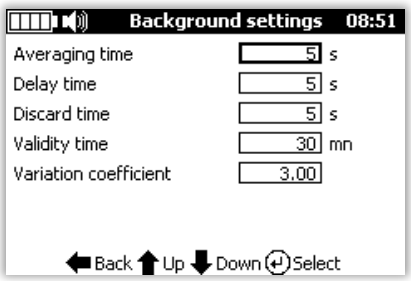
Note: The « **Measure Mode** » line is selected by default. If necessary, press the  or  keys to select the line « **Advanced settings** ».



2. Press the  key to display the « **Advanced settings** » screen and select the line **« Background noise** » with  or  key.



3. Press the key to display the « **Background settings** » screen:



To select a value:

- Select the line with or key,
- Validate or enter in edit mode with the Key.

5. Press the key to return to previous screen,

Background settings are common to all measure modes and can be change by user:

Background	Range	Default value
« **Minimum averaging time** »	1 s à 60 s	30 s
« **Delay time** »	3 s à 10 s	5 s
« **Discard time** »	3 s à 10 s	5 s
« **Validity time** »	1 min to 24 hours	30 min
« **Variation coefficient** »	0,01σ to 10 σ	3

8.11.2.1 Low background noise

If the background noise value is below the « **Low counts trip level** », an « **Out of service** » error shall be displayed (unless the setting is set to « **Ignore** ».

8.11.2.2 High background noise

If the background noise exceeds the « **High counts trip level** », an « **Out of service** » error shall be displayed (unless the setting is set to « **Ignore** ».

8.11.2.3 Excessive background noise

When the background is enabled and a rate alarm is set, the device is able to figure out if the alarm threshold can be reach in the needed confidence level.

If the SD decision threshold is greater than or equal to the set alarm threshold in the probe, there is the « **Excessive noise** » message notification.

The SD decision threshold is calculated according to the formula:

$$SD = K_a \sqrt{R_{bkg}\left(\frac{1}{T_{bkg}} + \frac{1}{T_{measure}}\right)}$$

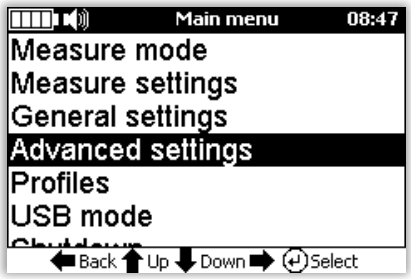
With:

- K_a is the coefficient of false alarm,
- R_{bkg} is the average value of the BKG,
- T_{bkg} is the time of acquisition of the BKG T,
- $T_{measure}$ is the measurement time.

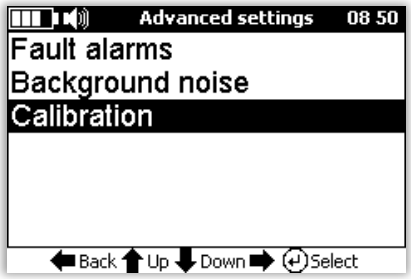
8.11.3 Monitor calibration

8.11.3.1 Check of the calibration date

1. Press the key to access the « **Main menu** ». and press the or keys to select the line « **Advanced settings** ».

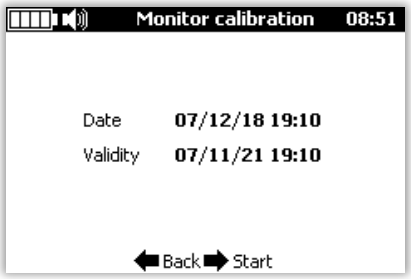


2. Press the key to display the « **Advanced settings** » screen and press the or keys to select the line « **Calibration** ».



3. Press the key to display the « **Calibration** » screen:

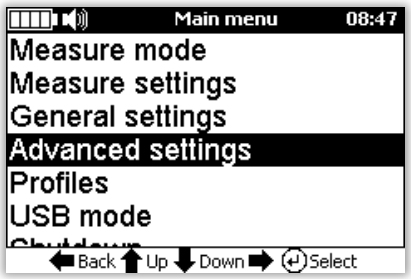
4. Press the key to display the « **Monitor calibration** » screen and check the validity date:



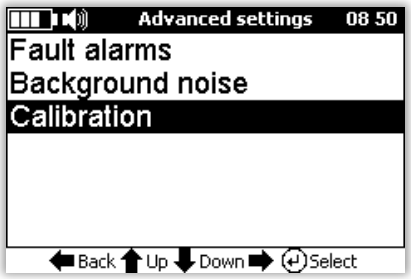
5. Press the key to return to previous screen.

8.11.3.2 Performing the calibration

1. Perform the operations of properly working check in § 23.2.
2. Press the key to access the « **Main menu** ». and press the or keys to select the line « **Advanced settings** ».

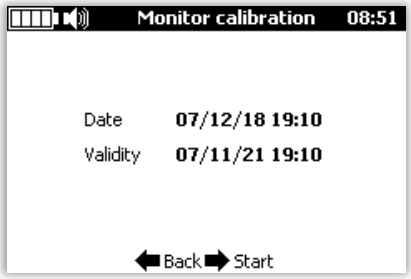


3. Press the key to display the « **Advanced settings** » screen and press the or keys to select the line « **Calibration** ».

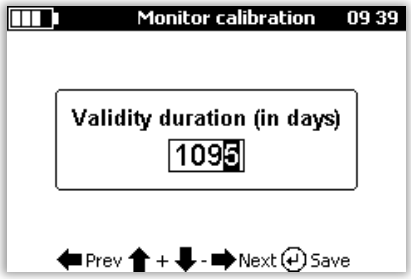


4. Press the key to display the « **Calibration** » screen:

5. Press the key to display the « **Monitor calibration** » screen:



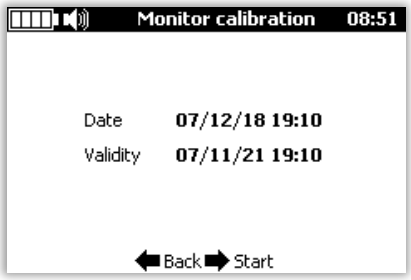
6. Press the the key to set the number of validity days of the calibration.



To fill in the number of days:

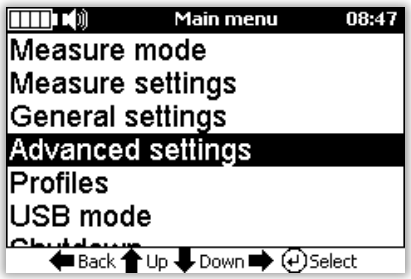
- Select the number with or key,
- Change column with or key,

7. Press the key to save the duration (in days) of the calibration.

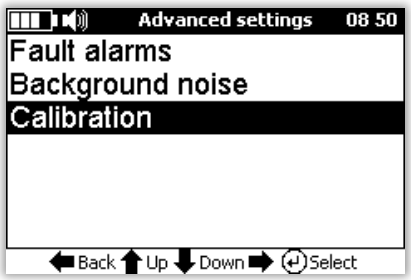


8.11.4 Portal probe calibration check

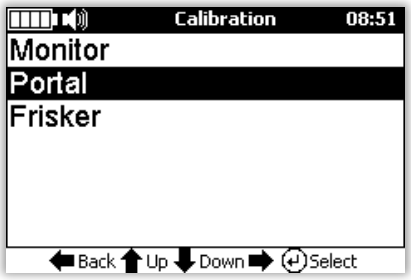
1. Press the key to access the « **Main menu** ». and press the or keys to select the line « **Advanced settings** ».



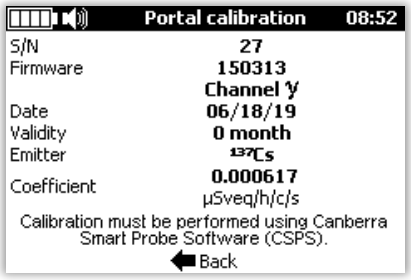
2. Press the key to display the « **Advanced settings** » screen



3. Press the key to display the « **Calibration** » screen:



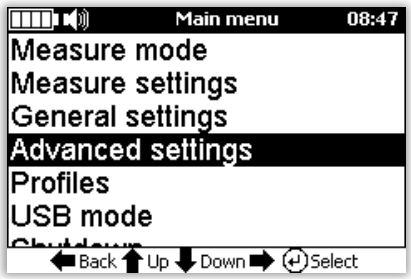
4. Press the key to display the « **Portal calibration** » screen:



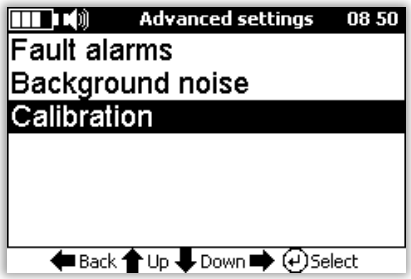
5. Press the key to return to previous screen.

8.11.5 Frisker calibration check

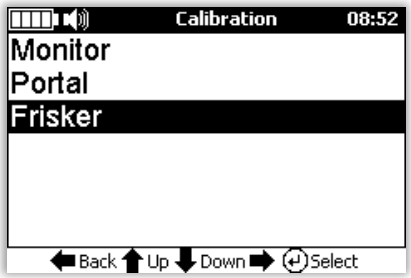
1. Press the key to access the « **Main menu** ». and press the or keys to select the line « **Advanced settings** ».



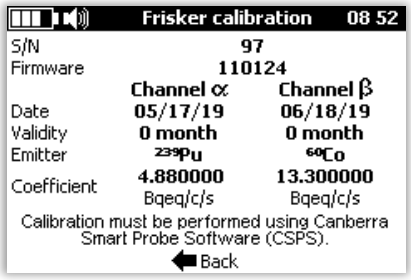
2. Press the key to display the « **Advanced settings** » screen



3. Press the key to display the « **Calibration** » screen:



4. Press the key to display the « **Frisker calibration** » screen:



5. Press the key to return to previous screen.

The calibration must be performed using **Canberra Smart Probe Software** (CSPS).

8.12 SELECTION OF USER PROFILES & DEFAULT PASSWORDS

The MiniSentry-2 has 3 user levels:

- « **Administrator** »
- « **Technician** »
- « **Operator** »

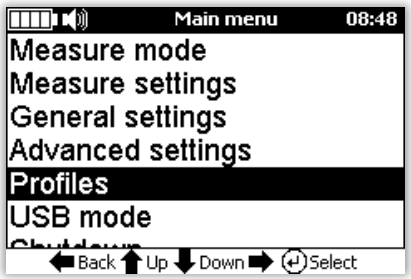
User profiles can be disabled (see § 8.10.9.3). When the profiles are disabled, the user has access to all the functions of the device even after reboot.

The default passwords are defined in the following table

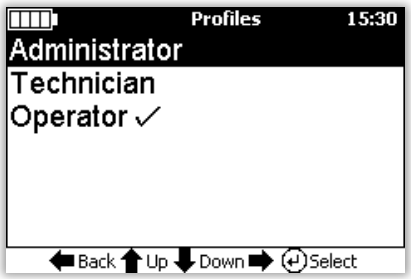
User	Default passwords
Administrator	**9 8 7 6**
Technician	**1 2 3 4**
Operator	*empty*
Master password	
1 9 6 5	

To change the user level:

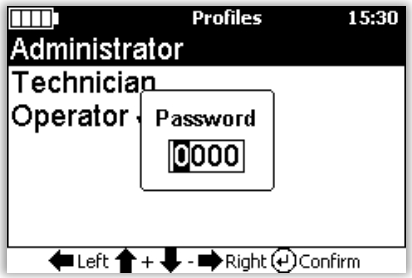
1. Press the key  to access the main menu and press the  or  keys to select the line « **Profiles** »

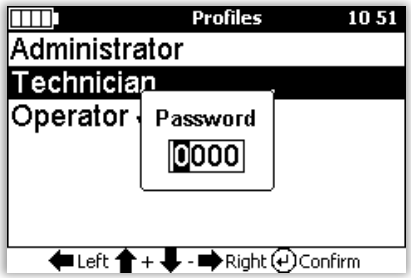


2. Press the  or  key to display the « **Profiles** » screen and press the  or  key to select a user level.



3. Press the key  to enter the password of the selected level.





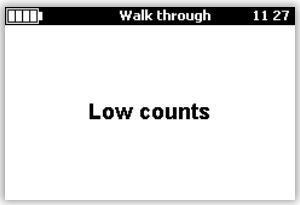
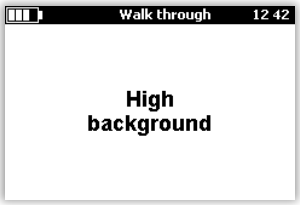
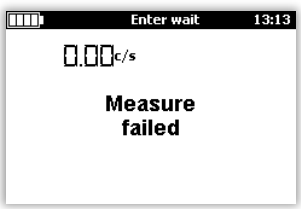
To enter the password:

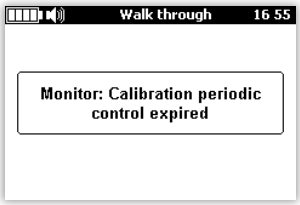
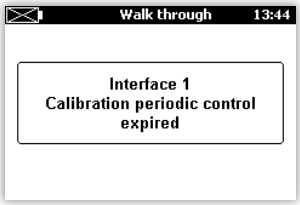
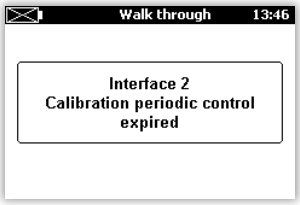
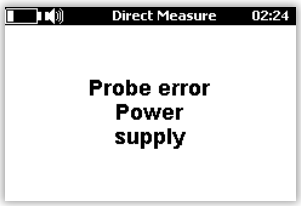
- Select the column with the  or  key,
- Change the number with the  or  key
- Confirm the password with the  key.

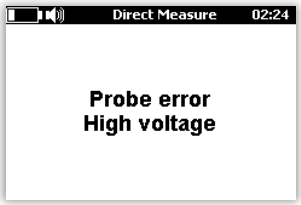
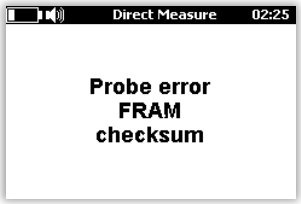
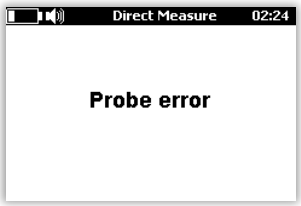
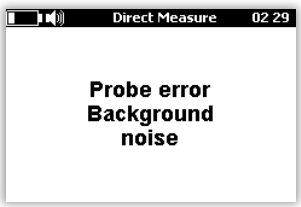
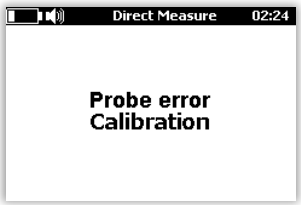
8.13 SHUTDOWN

The shutdown of the MiniSentry-2 is automatically by pressing the ON / OFF switch of the MiniSentry control unit.

9 USER MESSAGES

Messages on screen	Action
« **Access denied** »	Unauthorized function for current user, change user level (§ 8.12)
« **Excessive noise** »	The decision threshold SD is greater than or equal to the alarm threshold set in the probe. Check the background noise parameters (§ 8.11.2)
	In « **Enter wait** » and « **Walk through** » modes, a variation of background noise is detected, release the portal to perform the background acquisition
	The “**low counts**” alarm option is enabled, and count is lower than the “**Low counts trip level**”. Adjust the value
	The “**High background**” alarm option is enabled and background is upper than the “**High background trip level**”. Adjust the value
 With purple portal LED blinking.	In « **Enter wait** » and « **Walk through** » modes, release the portal to perform the background acquisition
	In « **Enter wait** » mode, the user leaves before the end of measurement.

Messages on screen	Action
	« **Monitor calibration expired** » setting is with « **Warning** » option. The monitor is usable, but it is imperative to carry out a calibration (§ 8.11.3).
 With purple LEDs blinking	« **Monitor calibration expired** » setting is with « **Out of service** » option. The monitor is out of service, and it is mandatory to carry out a calibration (§ 8.11.3).
	« **Probe calibration expired** » setting is with « **Warning** » option. The portal probes is usable, but it is imperative to carry out a calibration with **Canberra Smart Probe Software (CSPS)** software (§ 13)
 With purple LEDs blinking	« **Probe calibration expired** » setting is with « **Out of service** » option. The portal probes is not usable, and it is imperative to carry out a calibration with **Canberra Smart Probe Software (CSPS)** software
	The Frisker probe is no longer usable, and it is imperative to carry out a calibration with **Canberra Smart Probe Software (CSPS)** software
	Replace the probe cable Replace the probe

Messages on screen	Action
	Replace the probe cable Replace the probe
	Replace the probe
	Replace the probe
	Check the probe calibration with the **Canberra Smart Probe Software (CSPS)** software. Replace the probe
	Check the probe calibration with the **Canberra Smart Probe Software (CSPS)** software.
 LEDs off	Connect the portal probe to the interface connector

Messages on screen	Action
 Flashing LEDs and audible alarm	Portal probe saturated, move the source away until the LEDs return to the green state
 Flashing Frisker probe LEDs	The cable is connected to the MiniSentry Box unit but not to the Frisker probe. Connect the cable to the Frisker probe.
Flashing symbol  with an audible alarm and « **Low battery** » message	Recharge the battery
« **Probe not compatible** »	When the probe is not compatible with the current mode and configuration of the monitor. Change the background noise settings or change the probe.

10 DEFAULT USER PARAMETERS

All the following parameters shall be modifiable by the user (bold = default):

NAME	UNIT	MIN	DEFAULT	MAX
MEASURE MODE SETTINGS				
Walk through				
Background noise		Disabled – **Enabled**		
Count time	s	0.5	**1**	5
Alarm mode		Disabled – **Auto Reset** – Manual Reset		
Alarm level type		**STD** - Unit		
Alarm level [STD]	STD	0.01	**4**	100
Alarm level [c/s cpm]	cps	1	**20**	1 000 000
Alarm level [Bq dpm Ci]	Bq	1	**133**	125 000 000
Enter wait				
Background noise		Disabled – **Enabled**		
Auto count time		**Disabled** – Enabled		
False alarm coefficient		0.01	**1.66**	10
Count time	s	1	**2**	60
Alarm mode		Disabled – **Auto Reset** – Manual Reset		
Alarm level type		**STD** - Unit		
Alarm level [STD]	STD	0.01	**3**	100
Alarm level [c/s cpm]	cps	1	**20**	1 000 000
Alarm level [Bq dpm Ci]	Bq	1	**133**	125 000 000
Count rate				
Background noise		Disabled – **Enabled**		
Alarm mode		Disabled – **Auto Reset** – Manual Reset		
Alarm level type		**STD** - Unit		
Alarm level [STD]	STD	0.01	**3**	100
Alarm level [c/s cpm]	cps	1	**20**	1 000 000
Alarm level [Bq dpm Ci]	Bq	1	**133**	125 000 000
Unit		**cps** – cpm – Bq – DPM – Ci		
ADVANCED SETTINGS				
Fault alarms				
Low counts		Disabled – **Enabled**		
Low counts trip level	cps	1	**100**	100 000
High background		Disabled – **Enabled**		
High background trip level	cps	1 000	**4 000**	1 000 000
Monitor calibration expired action		Out of service – Ignore – **Warning**		
Probes calibration expired action		Out of service – Ignore – **Warning**		
AC power loss warning		Disabled – **Enabled**		
Background				
Averaging time	s	1	**5**	60
Delay	s	3	**5**	10
Discard	s	3	**5**	10
Validity time	min	1	**30**	1440
Variation coefficient		0	**3**	10

NAME	UNIT	MIN	DEFAULT	MAX
GENERAL SETTINGS				
Display and sound				
Backlight	%	0	**100**	100
Volume	%	0	**50**	100
Contrast	%	0	**50**	100
Date and time				
Time zone		Stored in RTC		
Date		Stored in RTC		
Time		Stored in RTC		
Memory				
Clear logs		Action only – no value saved		
Reset settings		Action only – no value saved		
Fast format		Action only – no value saved		
Format		Action only – no value saved		
Language		**English** – French		
Profile settings				
Passwords		0000	See § 8.12	9999
Password reset		Action only – no value saved		
Enable/Disable profiles		Action only – no value saved		
Software version		Action only – no value saved		

11 USB MODE

: This mode is only accessible at the « **Administrator** » and « **Technician** » user level (To change the user level, refer to § 8.12).

USB mode connects the MiniSentry-2 to a computer with a USB port using the USB type A cable or to a USB stick.

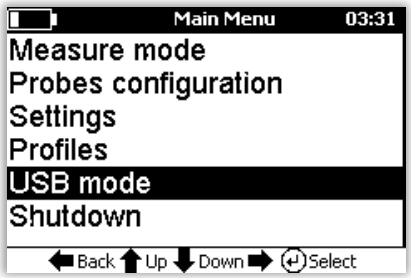
This feature allows you to transfer files or access files from the MiniSentry-2 to a computer or USB stick. The possibilities are:

- Import and export event logging log files during measurements,
- Update of the MiniSentry-2 software,
- Import and export of « **DeviceSettings.cfg** » configuration files to facilitate the identical upgrade of all devices of the same park and to save the nominal configuration (see § 15). This configuration file contains all the setting parameters except for « **Date and time** ».
- Portal calibration feature, allow to connect the Monitor to a computer using the USB, to calibrate the portal using **Canberra Smart Probe Software** (CSPS).

11.1 COMPUTER CONNECTION

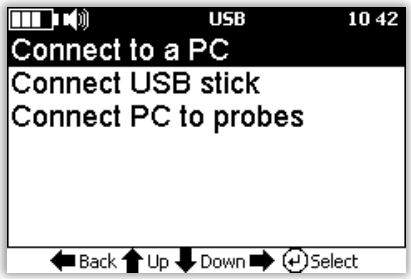
1. Press the key  to access the main menu.

   Note: The « **Measure Mode** » line is selected by default. If necessary, press the  or  keys to select the « **USB Mode** » line.

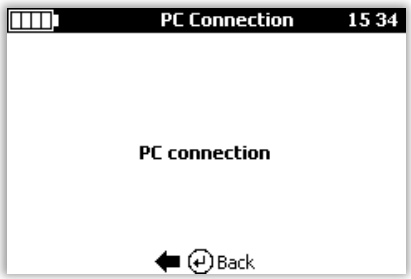


2. Press the  or  key to display the « **USB Mode** » screen.

   Note: The line « **Connect to a PC** » is selected by default. Press the  or  keys to select the line.



3. Press the key  to turn on the USB mode. The following message is displayed.

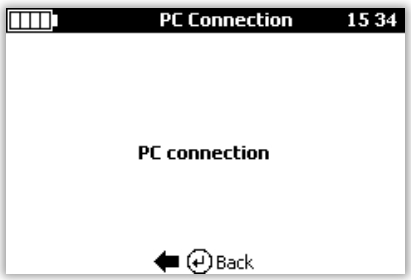


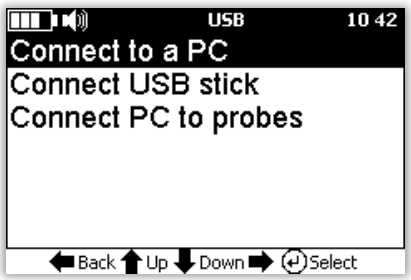
4. Connect the USB Cable. For computers with Windows 7 or later (with no user restrictions), the device driver installation is done automatically and the « **MINISENTRY_2** » appears in the file explorer as an external storage device.

11.2 DISCONNECTING A COMPUTER

To disable the computer connection:

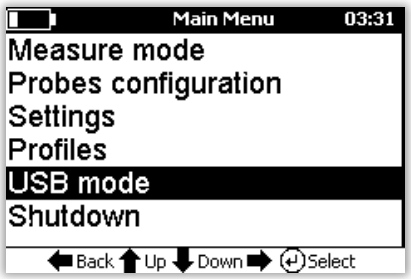
1. Press the  or  key , to return to the screen « **USB Mode** ».





2. Press the key  to access the main menu.

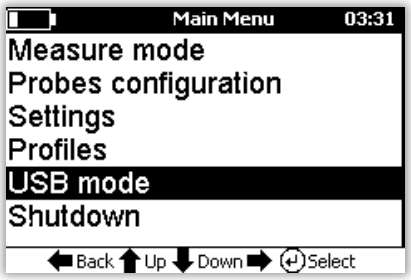
   Note: The LEDs of Interfaces 1 and 2 light up in the red, green and blue color cycle and return to the previous state



11.3 USB STICK CONNECTION

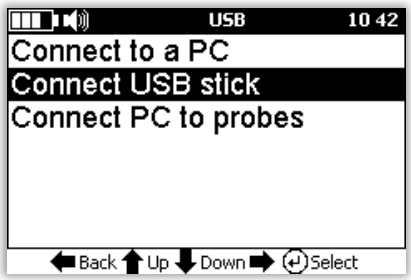
1. Press the key  to access the main menu.

   Note: The « **Measure Mode** » line is selected by default. If necessary, press the  or  keys to select the « **USB Mode** » line.



2. Press the ▶ or ↵ key to display the « **USB Mode** » screen.

Note: The line « **Connect to a PC** » is selected by default. Press the ▲ or ▼ keys to select the « **Connect USB stick** » line.



3. Press the key ↵ and connect the USB stick to display the « **USB Stick Mode** » menu.

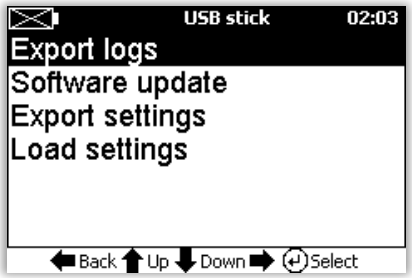
Note: If a USB stick is already connected, a 3-second delay may be required before it is recognized.

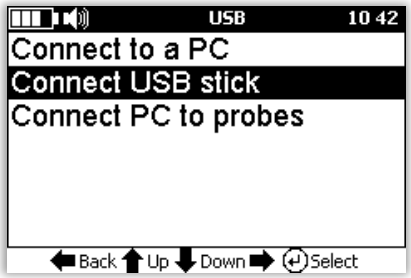
For detailed information, refer to:

- § 13.2 for the export of Log files,
- § 14 for updating the software.
- § 15 to save / restore the "**DeviceSettings.cfg"** configuration file**.**

11.4 DISCONNECTING A USB STICK

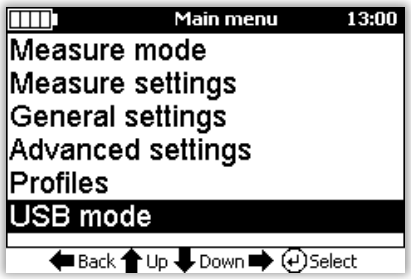
1. Press the ◀ key , to return to the screen « **USB Mode** ».





2. Press the key  to access the main menu.

   Note: The LEDs of Interfaces 1 and 2 light up in the red, green and blue color cycle and return to the previous state



12 PORTAL PROBE CALIBRATION

The MiniSentry-2 Portable Portal Monitor is a gamma sensitive instrument. It should be set up (plateau curves and detector checks) with a gamma source. The most common and recommended source is ^{137}Cs which provides the 660 keV gamma rays that are used for normal calibration. This radioactive source is available from several manufacturers and quantities up to 185 kBq (5 µCi) are considered "exempt" by the United States Nuclear Regulatory Commission (NRC) and most state regulations, meaning that no radioactive materials license is needed to possess and use these sources. "Exempt" quantities may be different for your country—please check with your local regulatory body.

The sensitivity of the MiniSentry-2 meets the FEMA requirements of 37 kBq (1 µCi) of ^{137}Cs passing midway through the width of the portal at any point 15 cm (6 inches) above the portal base and 15 cm (6 inches) below the upper inside edge of the portal frame. This makes a 37 kBq (1 µCi) ^{137}Cs source very useful for everyday operational check.

Note: One should take into consideration the radioactive decay of the source when determining its current activity ($T½ \approx 30.1$ years for ^{137}Cs).

While a 37 kBq (1 µCi) source can be used for a quick operational check, a 185 kBq (5 µCi) source is ideal for plateau collection, for it exposes both detectors to an elevated field providing sufficient counts for good statistical measurements.

These sources can be kept in the MiniSentry-2 case with no danger to the instrument or the people around it. However, since the MiniSentry-2 is very sensitive, the source(s) should not be located near (within 3 m or 10 feet of) the instrument while it is being used to avoid artificially raising the background radiation level.

The calibration must be performed using a PC connected to the USB plug and with **Canberra Smart Probe Software** (CSPS).

12.1 HIGH VOLTAGE

The high voltage is typically set to the value indicated by the maximum FOM value calculated in the plateau process. The value is typically between 900 and 1100 V. High voltage settings greater than 1200 V will not usually provide any added benefit and will shorten the lifespan of the detector. The high voltage is continuously measured by the MiniSentry-2. The high voltage measurement is calibrated at the factory and while it is good practice to confirm that the high voltage set matched the actual high voltage with a plus or minus 10 V tolerance during the annual calibration, the scintillation detectors function well over a wide range of high voltage settings with only minimal changes in sensitivity with variations of the high voltage.

Note: Detector pairs are matched at the factory to provide optimal performance.

12.2 DISCRIMINATOR

The discriminator setting is an arbitrary voltage which determines how large a pulse must be to be counted. In some applications the discriminator is used as a measure of the energy deposited in the detector by the radiation event, but the MiniSentry-2 is a gross counting instrument (all pulses above the noise level) and uses the discriminator setting to distinguish between radiation pulses and weaker pulses due to other sources such as electronic noise. The discriminator level is usually set to 25 mV.

Settings higher than this may result in higher voltage settings, while settings lower than this may result in increased background counts.

12.3 EFFICIENCY

The efficiency is the ratio of detector counts to source decay rate and will always be less than 100 percent. It is calculated based on the activity of the source and is only used when the position and characteristics of the unknown quantity of radioactive material being monitored for is well known. The efficiency value only affects measurements that use activity units (dpm, Bq, or nCi) so it does not affect measurements in either the Walk-Through or Enter-Wait modes or in the Count-Rate mode when the units are in count rate.

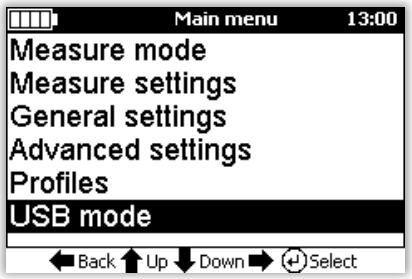
Nominally, the efficiency of the MiniSentry to a ^{137}Cs point source at different elevations along its centreline range from 0.7% to 1% [counts/gamma] with the highest efficiency at the midpoint.

12.4 PC TO PORTAL PROBES CONNECTION

: This feature is only used with **Canberra Smart Probe Software** (CSPS) software to calibrate the portal probes (see §12.5).

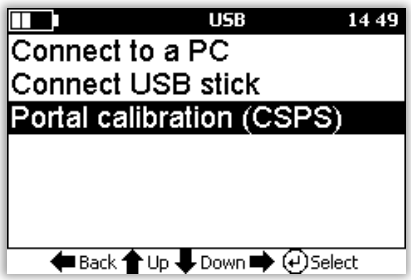
1. Press the key to access the main menu.

   Note: The « **Measure Mode** » line is selected by default. If necessary, press the or keys to select the « **USB Mode** » line.

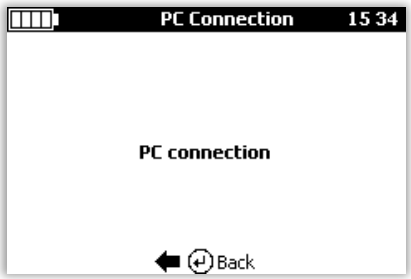


2. Press the  or  key to display the « **USB Mode** » screen.

Note: The line « **Connect to a PC** » is selected by default. Press the  or  keys to select the « **Portal calibration (CSPS)** » line.



3. Press the key  to turn on the USB mode. The following message is displayed.



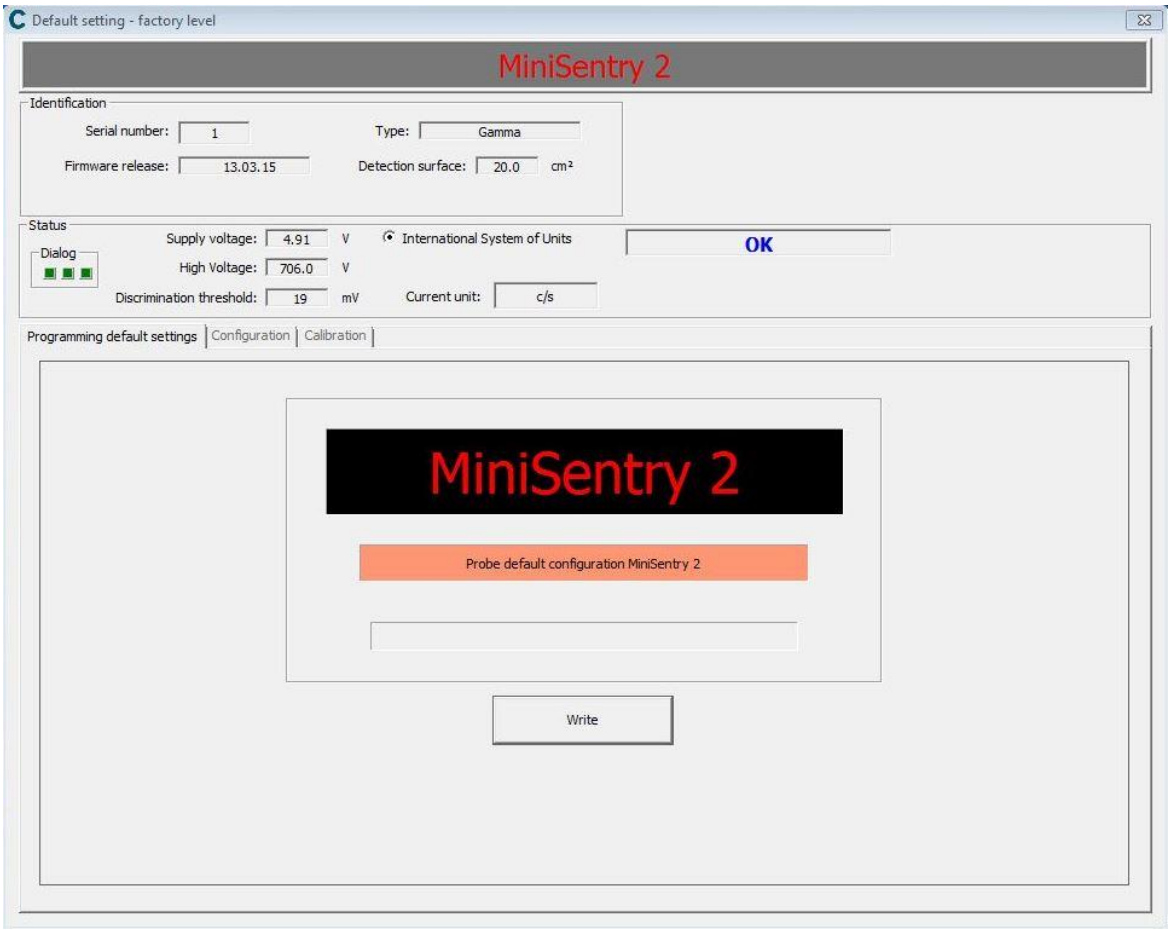
4. Connect the USB Cable. For computers with Windows 7 or later (with no user restrictions), the device driver installation is done automatically.
5. Perform the portal calibration procedure.

12.5 FACTORY PRE-CALIBRATION PARAMETERS

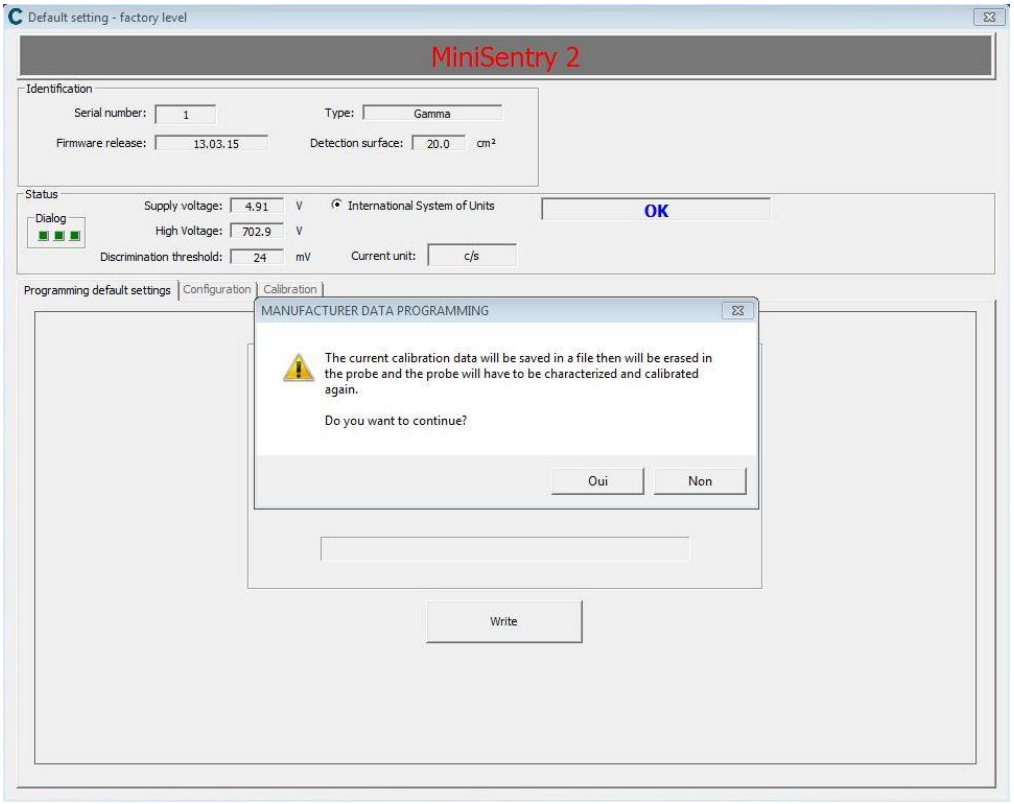
This step makes it possible to specify the default parameters of the probe. It is essential to calibrate the probe correctly.

This step is mandatory.

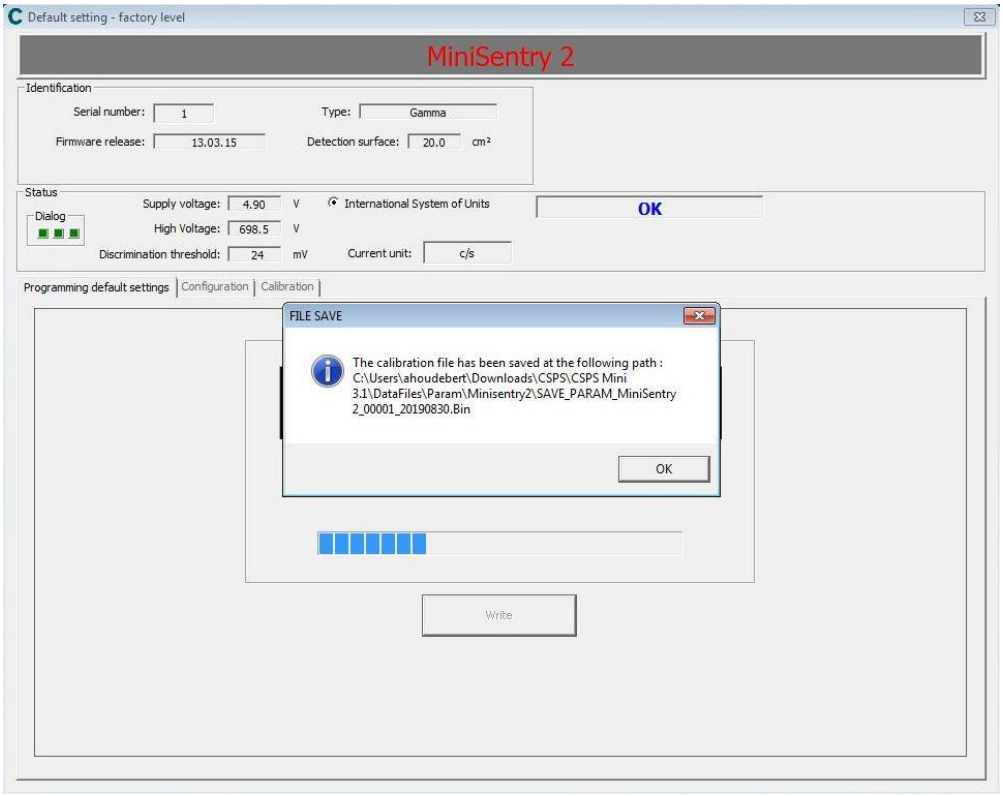
1. Click on  icon to display the « **Default setting – factory level** » screen:



2. Click on « **Write** » button, a message is displayed and click on « **Yes** » button to accept that probe will be erased and will be calibrated again.



3. Click on « **OK** » button to save Portal probe parameters:



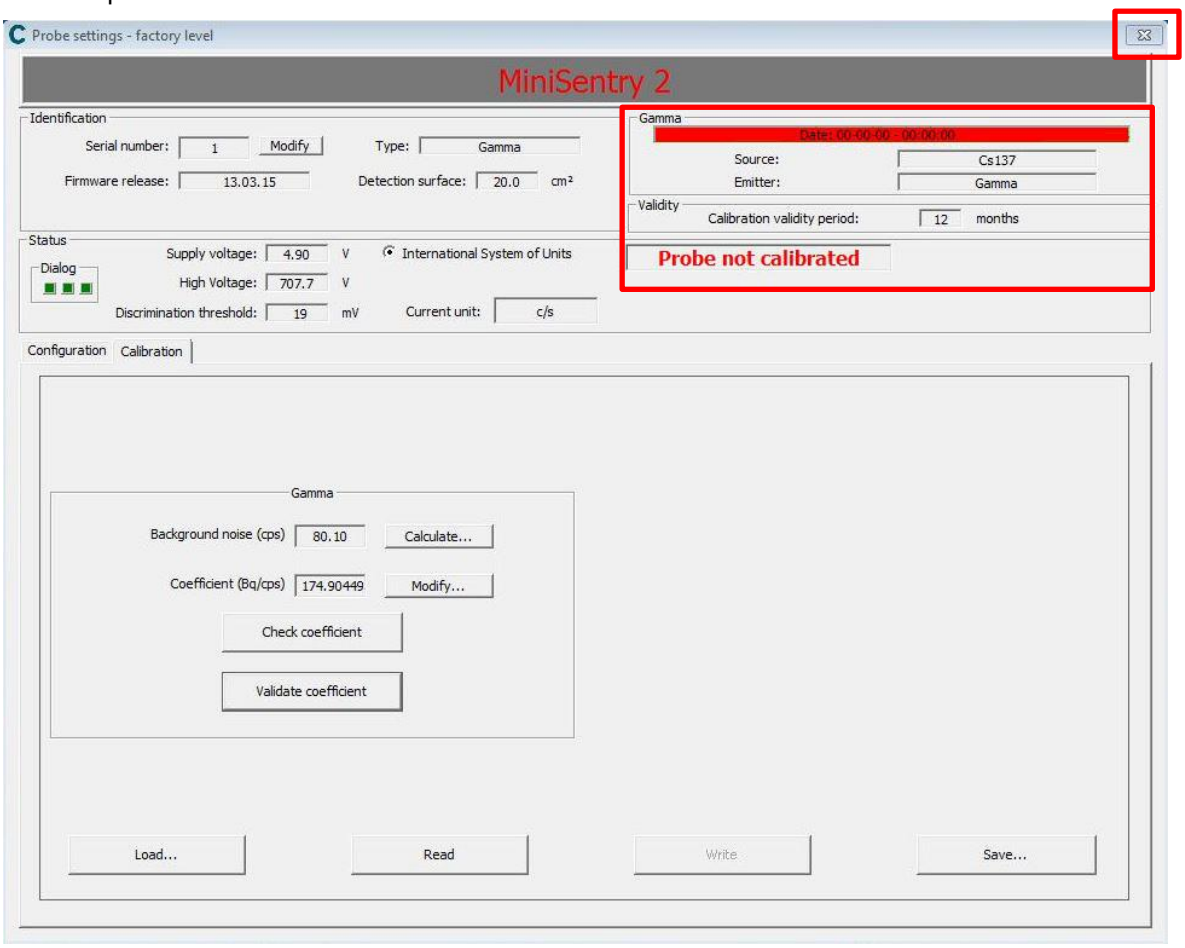
The automatic recording of the calibration is carried out in the following non-modifiable path, located in the application directory: « **C:\...\Application directory\DataFiles\Param\Minisentry2** »:

The file name, unchangeable, as follows:

« **SAVE_PARAM_Minisentry 2_SERIAL NUMBER_YYYYMMDD** ».

Note: If several calibrations for the same probe have been generated on the same day, only the most recent will be saved.

4. The portal probe is in initializated and in « **Probe not calibrated** » state, click on « **X** » button to quit.

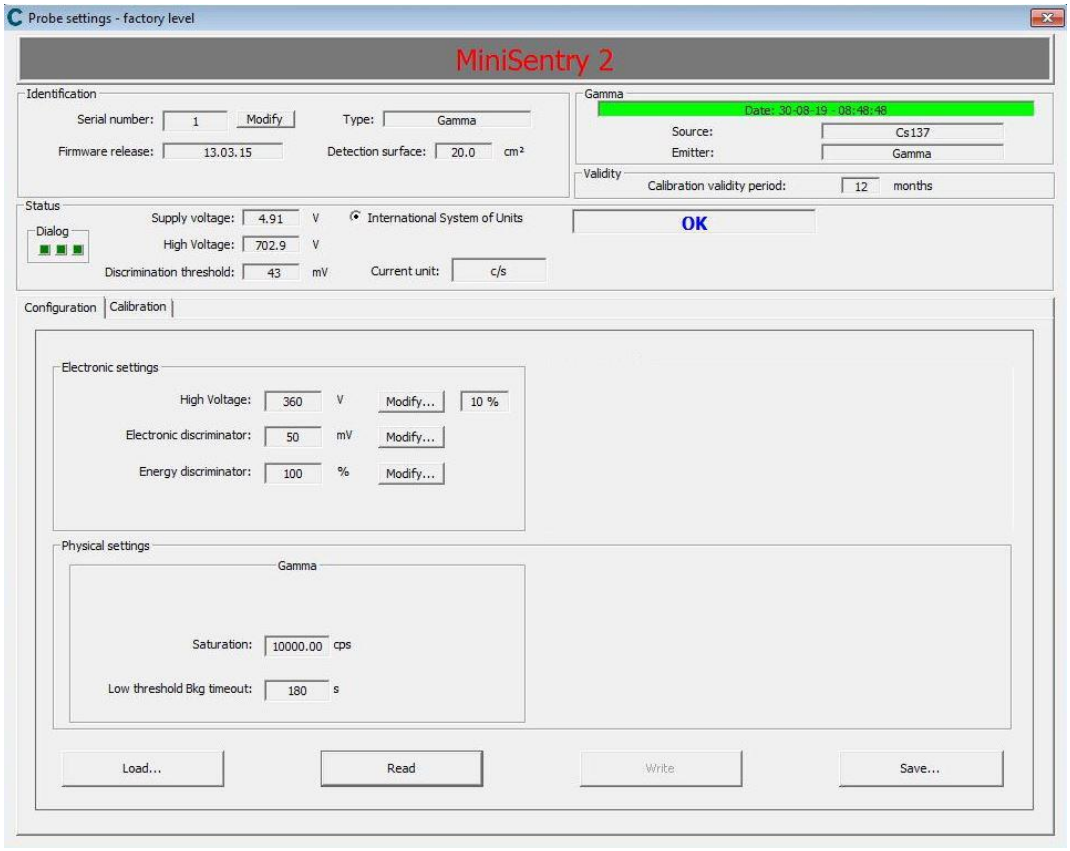


12.6 HIGH VOLTAGE

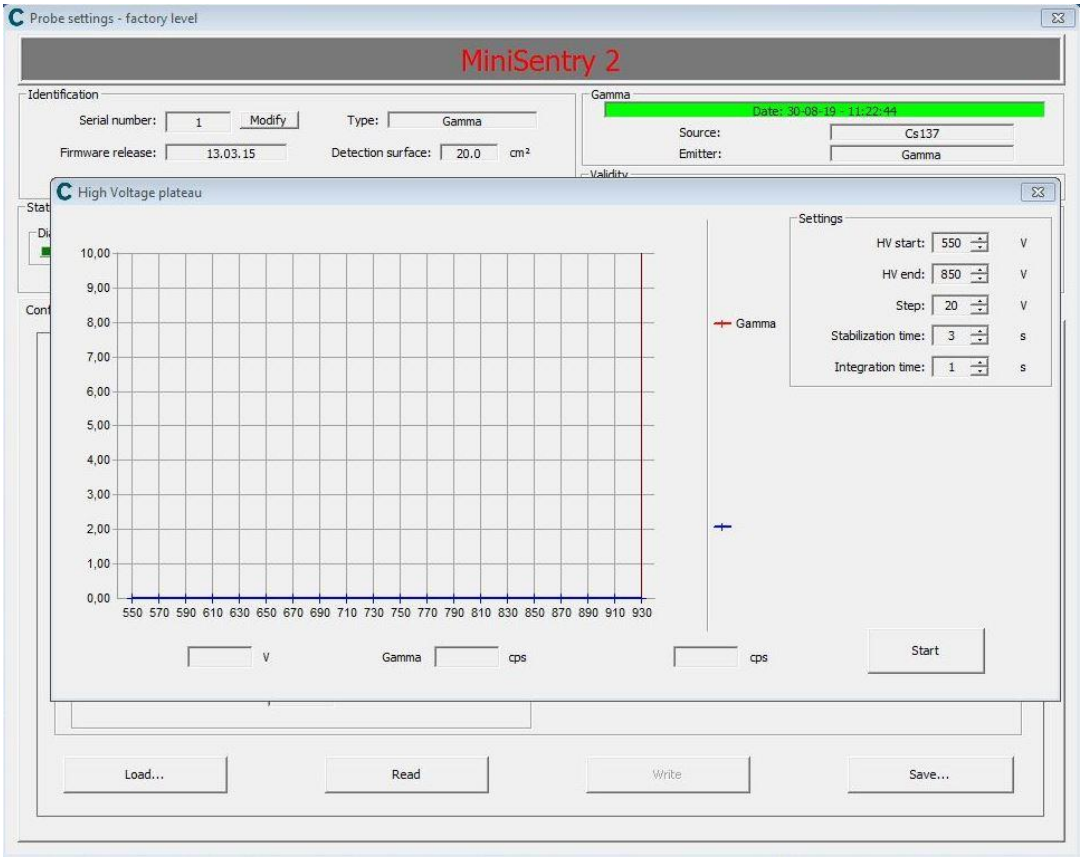
You can set the high voltage either by clicking on the high voltage value and set a new value or through a high voltage plot as described below.

This operation is not mandatory and is not recommended for users because the high voltage by default guarantees the operation of the probe.

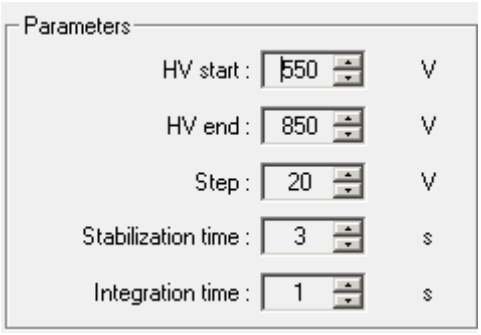
1. Click on  icon to display the « **Probe settings** » screen and select « **Configuration** »" tab:



2. Click on « **Modifiy...** » button of « **High voltage:** » line to display the following screen:



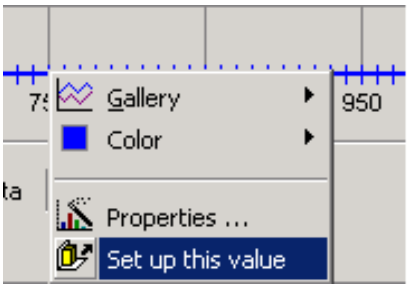
3. . Locate the "**Parameters**" area. See the following screenshot.



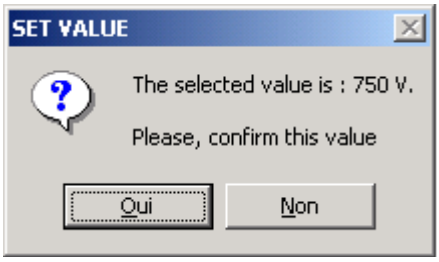
You may change the settings from the "**Parameters**" area within the limits shown in the following table. However, values **between 900 and 1100 V** for the HV should be preferentially used to avoid any eventual probes damages.

parameter name	min. value	max. value	unit
HV start	900	1000	V
HV end	1050	1100	V
step	10	50	V
stabilization time	3	100	s
integration time	3	100	s

4. Click on the "**Start**" button. The high voltage plateau appears on the plot area.
5. You may program one of the values represented on the graph curve into the connected device. Proceed as follows:
   - Put the mouse cursor onto one of the points of the curve;
   - Click on the curve point with the left button of the mouse. The context menu shown on the following screenshot appears.



   - Click on the command "**Set up this value**". The dialog box shown on the following screenshot appears.



   - When prompted, click on the "**Yes**" button. After the write process, a new confirmation box appears, as shown on the following screenshot.

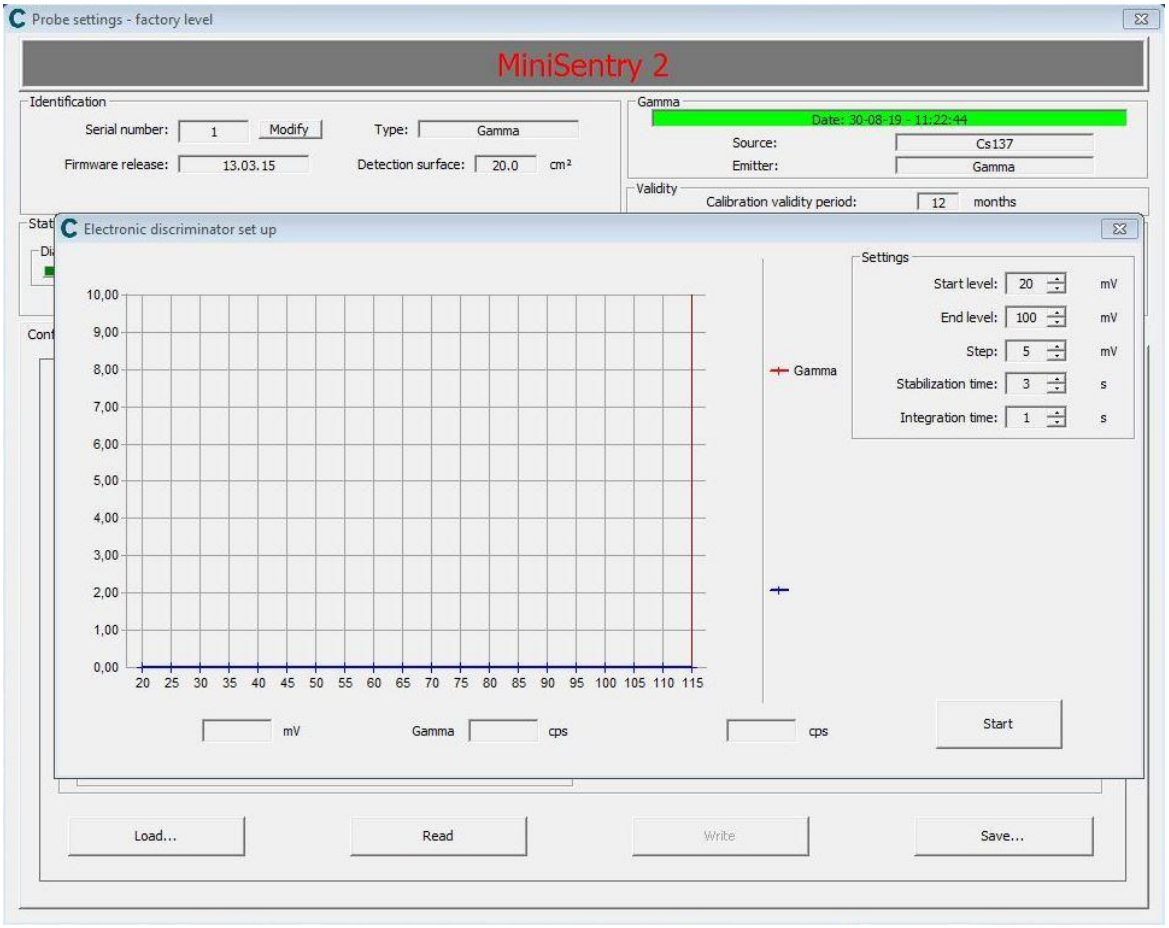
   - Click on the "**OK**" to close the confirmation box.
6. Close the "High Voltage plateau" window, as shown on the following screenshot.

12.7 ELECTRONIC DISCRIMINATION

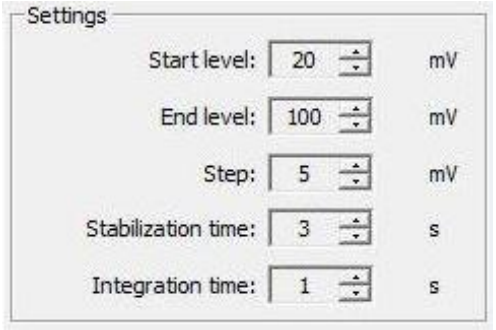
You can set the electronic discriminator either by clicking on discriminator value and set a new value or through a plot as described below.

You can

1. Click on « **Modifiy..** » button of « **Electronic discrimination:** » line to display the following screen:



2. Locate the “Settings” section. See the following screenshot.

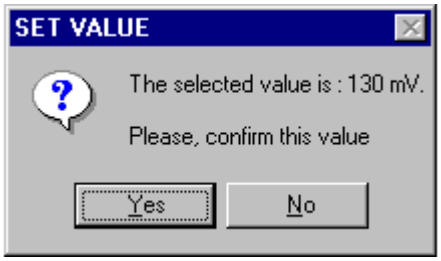


3. You may change the parameters from the "**Settings**" area within the limits shown in the following table.

CSP probes	Parameter name	Min. value	Max. value	Unit
γ probes	Discriminator start	0	2000	mV
	Discriminator end			
β + α probes SAB-100	Discriminator start	0	4500	mV
	Discriminator end			
β + α probes SPAB-15/Beta	Discriminator start	0	Discri Alpha	mV
	Discriminator end			
SPAB-15/Alpha	Discriminator start	Discri Beta	4500	mV
	Discriminator end			
X probes	Discriminator start	0	2050	mV
	Discriminator end			
Neutron probe SN-S	Discriminator start	50	3200	mV
	Discriminator end			
	Step	1	50	mV
	Stabilization time	3	100	s
	Integration time	1	100	s
All probes	step	10	200	mV
	stabilization time	3	100	s
	integration time	3	100	s

4. Click on the "**Start**" button. The curve of the Electronic discriminator appears on the plot area.
5. Program one of the values represented on the graph curve into the connected device. Proceed as follows.
   - Put the mouse cursor onto one of the points of the curve;
   - Click on the curve point with the left button of the mouse. The context menu shown on the following screenshot appears.

   - Click on the command "**Set up this value**". The dialog box shown on the following screenshot appears.



- When prompted, click on the "**Yes**" button. After the write process, a new confirmation box appears, as shown on the following screenshot.

- Click on "**OK**" to close the confirmation box.

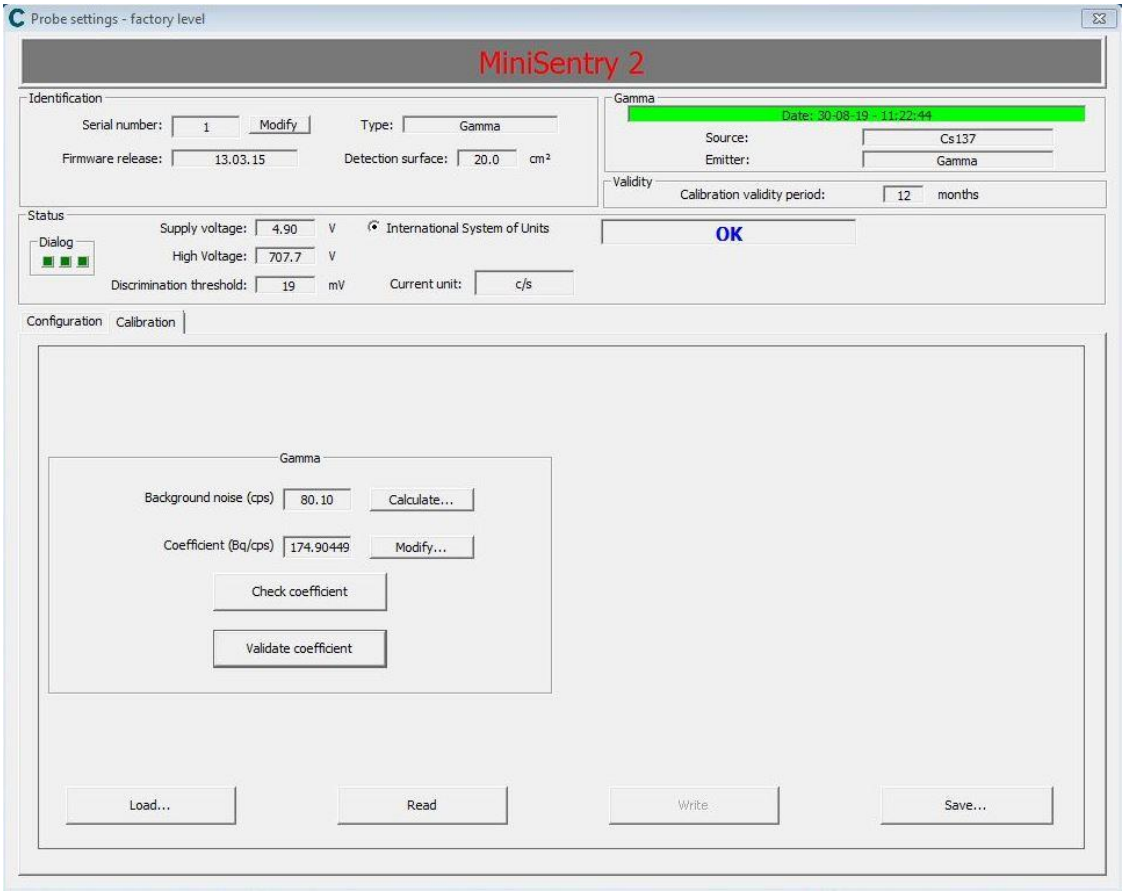
6. Close the "**Electronic discriminator set up**" window, as shown on the following screenshot:

12.8 BACKGROUND NOISE

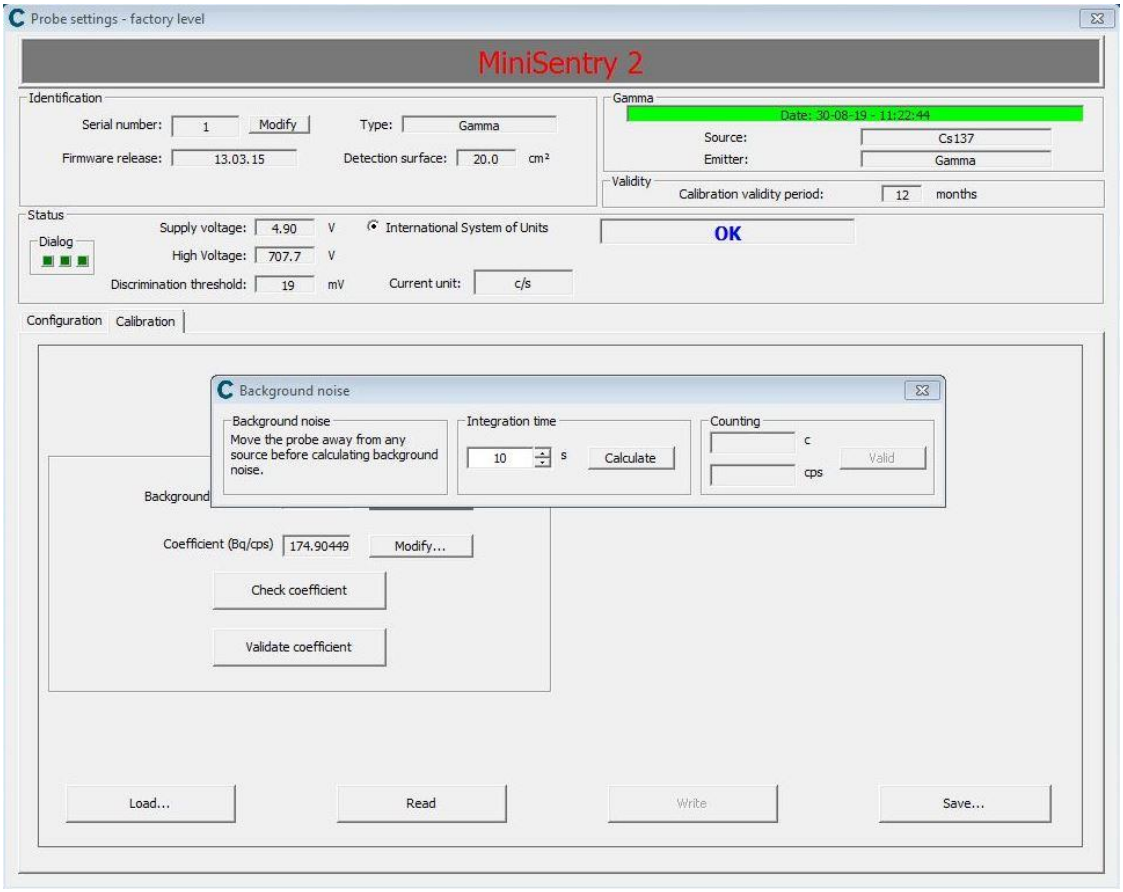
Check the background noise of the probe against light leakage and electronic noise.

This measurement is systematic.

1. Click on « **Calibration** » tab:



2. Click on « **Calculate...** » button of « **Background noise (cps)** » line to display the following screen:



3. Enter the integration time and click on the "**Calculate**" button.
4. Click on the "**Valid**" button to record the background noise.

12.9 COEFFICIENT CALCULATION

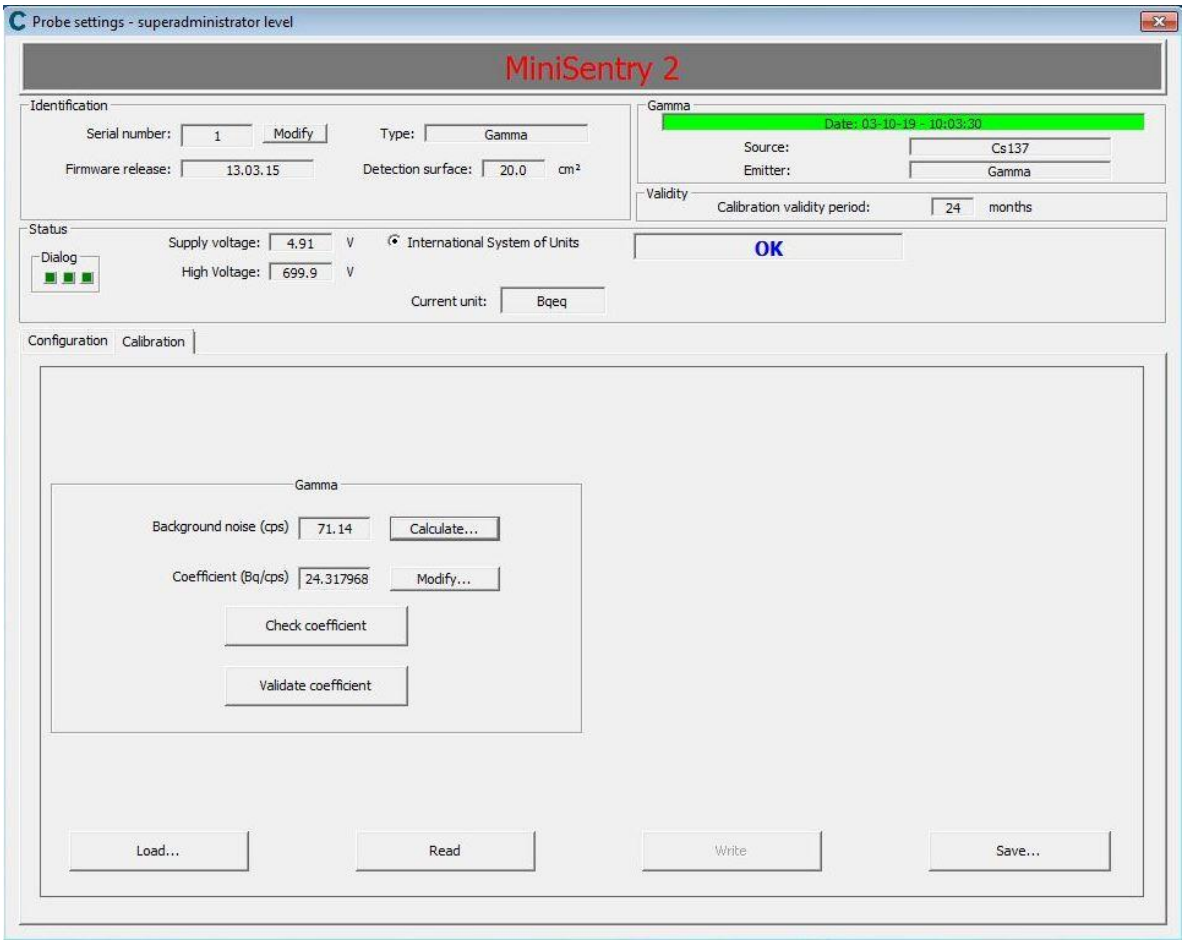
Calculation of the coefficient is no longer systematic.

Verification of efficiency with the default calibration coefficient is sufficient to validate the probe.

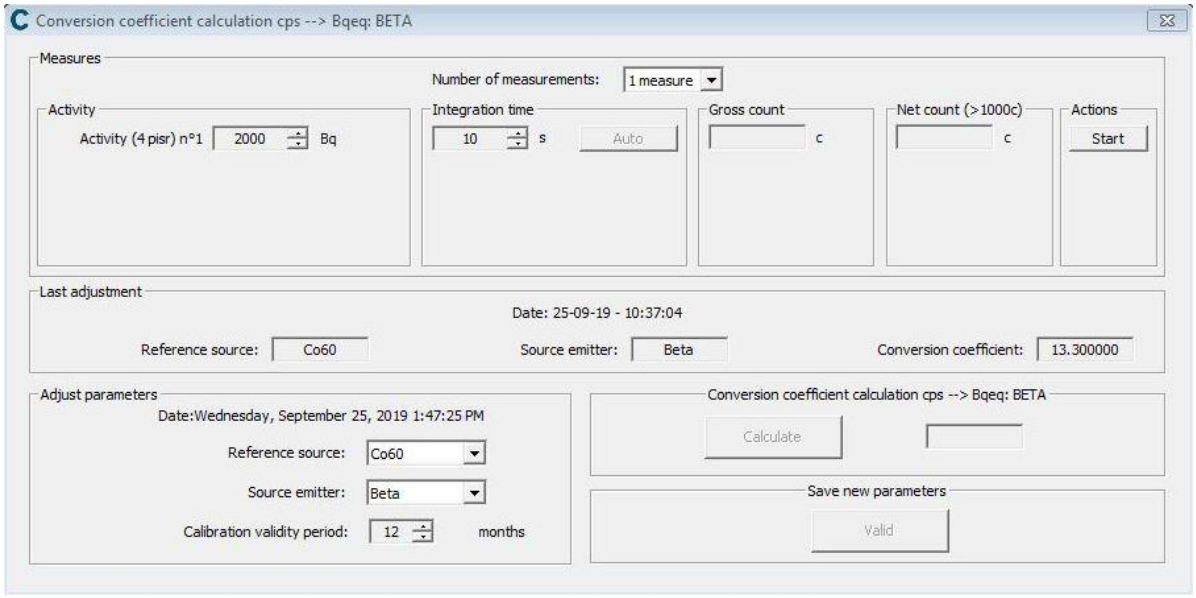
A measurement of activity will be proposed to verify that the probe detects the activity of the source used.

If the measurement is +/- 25% of the source used, the probe must be calibrated with the current date. In the opposite case, the user has the choice of returning to the high voltage stage and restarting his calibration or calculating his own calibration coefficient despite the risks.

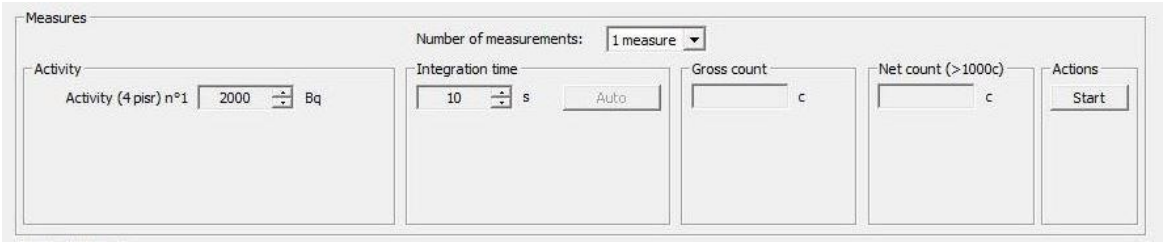
1. Click on « **Calibration** » tab:



2. Click on the "**Modify...**" button. The "**Conversion coefficient calculation….**" interface appears. See the following screenshot:

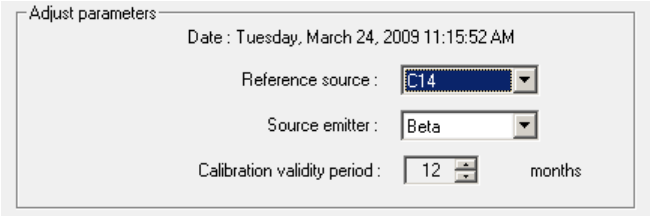


3. Locate the "**Measure**" area. See the following screenshot.



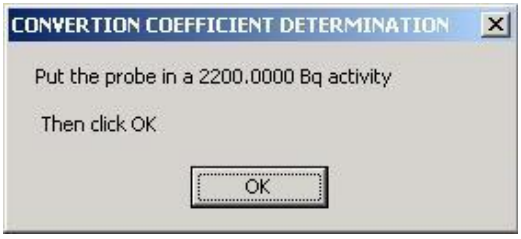
- Select the "**Number of measurements**" to perform;
- Set the "**Activity n°1**" in accordance to your radioactive source;
- Set the "**Integration time**" according to your radioactive source

4. Locate the "**Adjust parameters**" area. See the following screenshot:

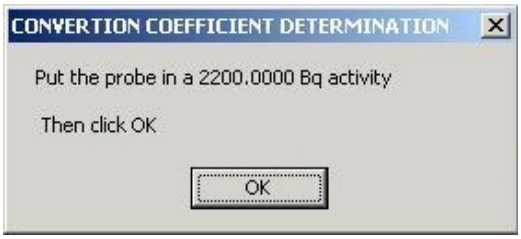


5. Select the "**Reference source**" in the "**Adjust parameters**" area in accordance to your radioactive source. The source emitter is displayed automatically. Selecting a reference source enable the "**Start**" button.
6. Choose the "**Calibration validity period**" in months.

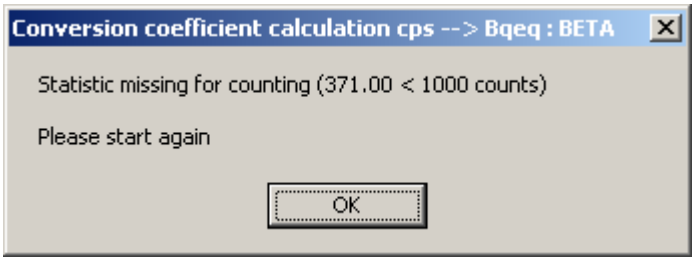
7. For every measurement to perform, do the following:
   - Click on the "**Auto**" button. This will evaluate the necessary time to get at list 1000 counts. This value is the minimum to get good statistics on measurements.



   - Put the probe in the dose rate first listed in the Measures area, as indicated in the prompt box, then click on "**OK**" to confirm and run the estimation of the integration time.
   - Once the integration time has been estimated, click on the "**Start**" button. A prompt box appears, as shown on the following screenshot:



   - Put the probe in the activity first listed in the Measures area, as indicated in the prompt box, then click on "**OK**" to confirm and make the measurement.
   - While the measurement is being performed, do one of the following:
     - Wait until the current measure is complete.
     - Click on the "**Stop**" button to cancel the current measurement.
   - After measurement, if you have not considered the time calculated by the "**Auto**" function and set manually the integration time, the following prompt message may show up to warn about missing statistics.



Possible reasons are:

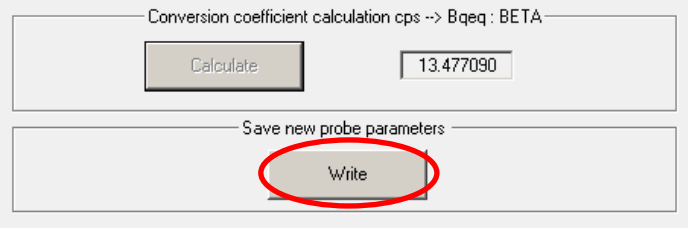
- The integration time is too low.
- The selected activity is higher than the actual detected activity.

If statistics are missing, refer to the following instructions:

- Do one of the following:
  - Lower the activity.
  - Set a longer integration time.
  - Let the “**Auto**” function estimate the necessary time
- Start a new measurement.

When the measurement is complete, the conversion coefficient “**Calculate**” button of conversion coefficient calculation is available

8. Click on “Calculate” button.



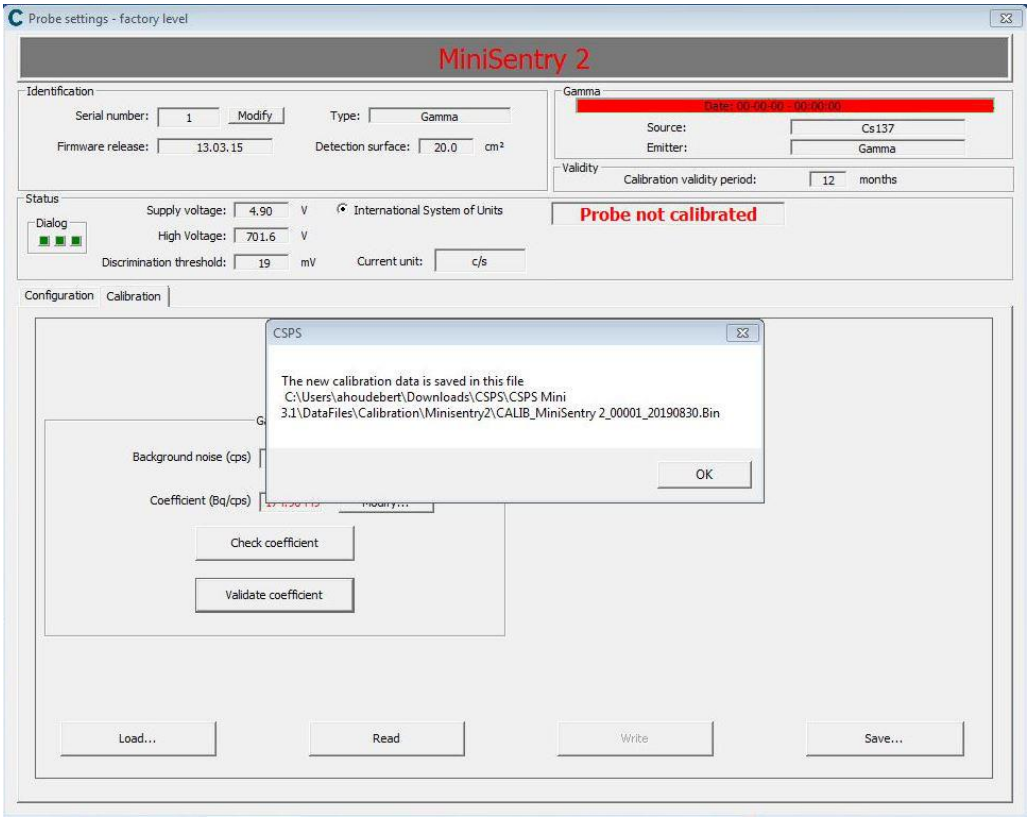
After calculation,

- The conversion coefficient is displayed,
- The “**Calculation**” button is disabled,
- The “**Write**” button is enabled.

9. Click on the button "**Write**" to enter in red the coefficient in the window of "**Calibration**" gamma

12.10 COEFFICIENT VALIDATION

1. Click on « **Validate coefficient** » button to display the following screen:

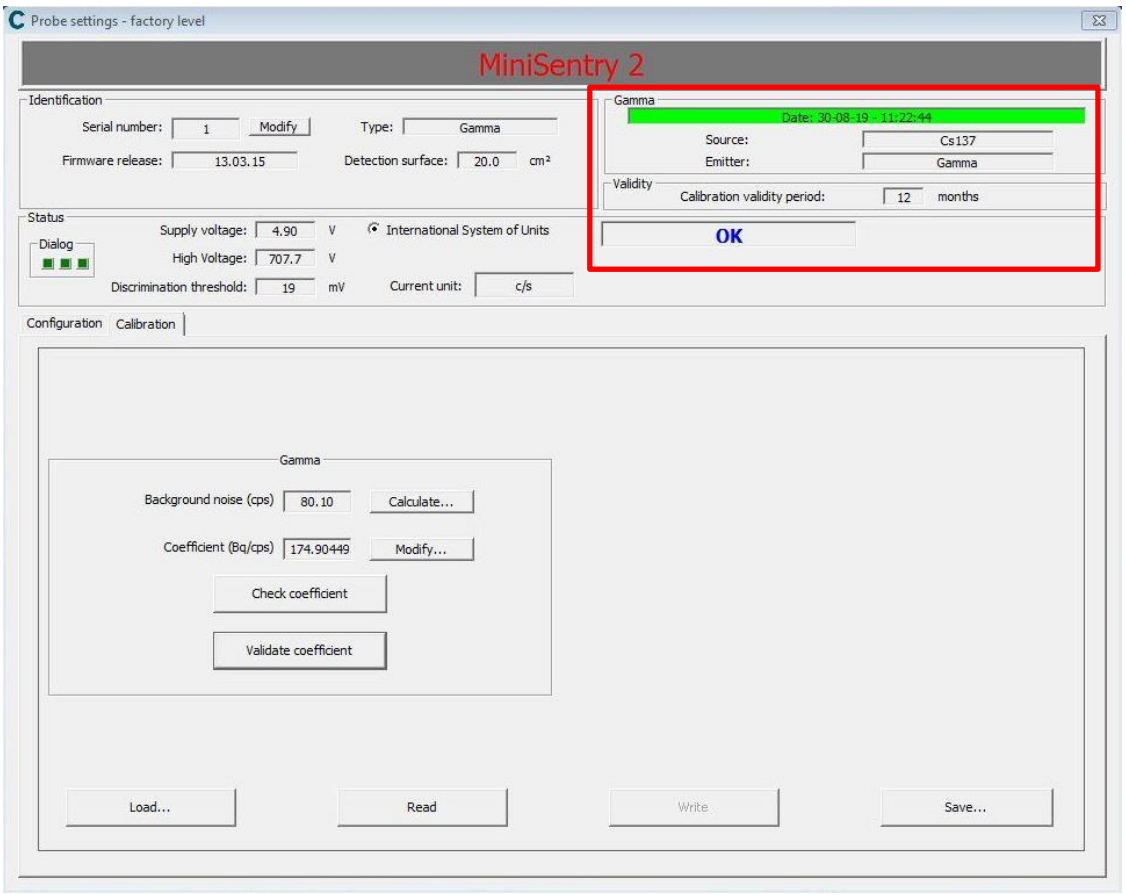


The calibration file is saved in the following non-modifiable path, located in the application directory: « **C:\...\Application directory\DataFiles\Calibration\Minisentry2** ».

The file name, unchangeable, as follows:

« **CALIB_Minisentry 2_SERIAL NUMBER_YYYYMMDD** ».

2. Click on « **OK** » button, the Portal probes are in a « **Calibrate** » state with the current date:



13 LOG FILES

13.1 LOG FILE FORMAT

The MiniSentry-2 allow storage more than 100 days of data at the rate of one point per minute. In case of full memory, the first records are erased.

Overrun and overflow alarms and alerts are time stamped by the second.

A separate, dated file is recorded on demand for each measurement mode.

A file is also saved automatically for each event (Alarms, Alert) and the current measurement.

The file names are generated automatically with the default prefix « **MS2** ». Only the prefix is editable, up to 10 characters, when the MiniSentry-2 is connected in USB mode to a computer (See 11.1).

The log files are stored in a « LOG » directory containing 4 subdirectories:

– **WALK_THROUGH**:
- « **MS2_WALKTHROUGH_0001_2019-08-22_1.csv** » for on-demand recording of the Walk-Through mode.

– **ENTER_WAIT:**
- « **MS2_ENTERWAIT_0001_2019-07-23_1.csv** » for on-demand recording of Enter Wait mode.

– **COUNT_RATE**:
- « **MS2_COUNTRATE_0001_2019-08-22_1.csv** » for on-demand recording of count rate.

– **FRISKER**:
- « MS2_FRISKER_0001_2023-04-23_1.csv » Record frisker alarms

The contents of the log files include the following fields:

Fields	Description	Count rate	Enter Wait	Frisker probe	Walk Through
Index	Record number	✓	✓	✓	✓
Date	Date, hour, minute and seconds	✓	✓	✓	✓
Time zone	Time zone	✓	✓	✓	✓
Profile	User level	✓	✓	✓	✓
Integration time (s)	Duration of the measure in second		✓		✓
Mode	Type of transmitter	✓	✓	✓	✓
Measure	Value of the measure	✓	✓	✓	✓
Unit	Unit of the measure	✓	✓	✓	✓
Background noise (cps)	Value of the background		✓	✓	✓
Alarm level	Status of the alarm		✓	✓	✓
Alarm threshold	Value of the threshold		✓	✓	✓
Calibration coefficient	Calibration coefficient in Bqeq/cps	✓	✓	✓	✓
Calibration source	Type of calibration source	✓	✓	✓	✓
Calibration date	Date of calibration	✓	✓	✓	✓
Calibration validity (months)	Period of validity of the calibration	✓	✓	✓	✓
Probe name	Name of the probe	✓	✓	✓	✓
Probe serial number	Serial number		✓	✓	✓
Detector information	Area of the probe in cm^2		✓	✓	✓
Software Version	Software of the probe	✓	✓	✓	✓

13.2 EXPORTING LOG FILES TO USB STICK

The features of the USB stick for backup must be:

- Formatting in FAT12, FAT16 or FAT32
- Size up to 8GB

: Many files and directories may slow down the Minisentry 2.

To export Log files to a USB stick:

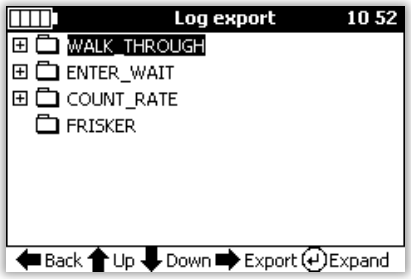
Using the USB female / mini-USB cable, connect the USB flash drive to the Monitor.

Select the « **Connect USB stick** » function (refer to § 11.3).

Press the or key to start the export.

Note: The line « **Export logs** » is selected by default. If necessary, press the or keys to select the line.

Press the key or to display the LOG folders



To select a directory or file:

- Select the directory or file with or ,
- Expand/collapse the directory with the key .

Press the key  or  the directory or LOG file

Press the key  to return to the main menu.

13.3 BACKING UP AND BROWSING LOG FILES ON A COMPUTER

LOG files can be viewed and exported directly to a computer using the Microsoft Windows © file explorer.

1. Using the USB cable, connect the Monitor to the computer.
2. Select the function « Connect to a PC » (Refer to § 11.1).

It appears in the file explorer as an external storage device named « **MINISENTRY2** ».

The LOG files are stored in the « **LOG** » directory, at the root of the « **MINISENTRY2** » device.

14 UPDATE OF MINISENTRY-2

The update can be done in two ways:

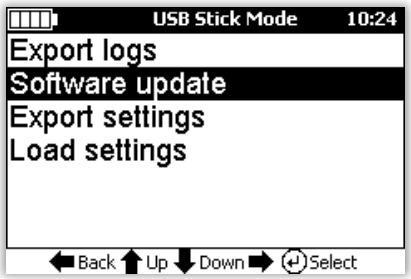
- From a USB stick
- From a computer

14.1 UPDATE FROM A COMPUTER

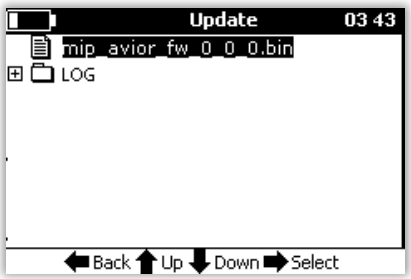
1. Using the USB cable, connect the MiniSentry-2 to the computer.
2. Select the function « Connect to a PC » (Refer to § 11.1).
3. Using the Microsoft Windows © explorer, copy the « **mip_avior_fw_ms_0_0_0.bin** » file to the root.
4. Disconnect the MiniSentry-2 from the PC (Refer to § 11.2).
5. Turn off and unplug the MiniSentry-2 from AC and external battery.
6. Turn on the MiniSentry-2 and wait for the update to complete.
7. Check the software version at the bottom of the screen at startup or in the « **Parameters** » menu.

14.2 UPDATE FROM USB STICK

1. Connect the USB stick to the MiniSentry-2.
2. Select the « **Connect USB stick** » function (refer to § 11.3).
3. Select the line « **Software Update** » with the or keys



4. Press the or key to display the contents of the USB stick and select the file (extension « **.bin** ») with the or keys.



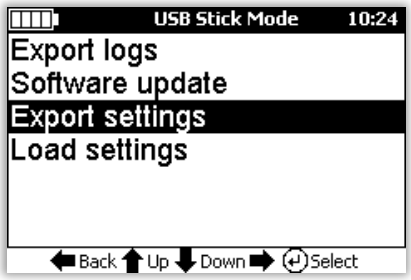
5. Press the key to start the update: the copy of the update file is done then the MiniSentry-2 restarts automatically.
6. Check the software version at the bottom of the screen at startup or in the « **Parameters** » menu (see § 8.10.10).

15 CONFIGURATION FILE SETTING

15.1 SAVING THE CONFIGURATION FILE ON USB STICK

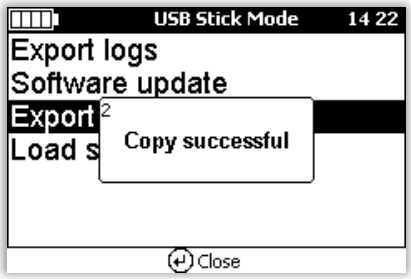
To save the « **DeviceSettings. cfg** » configuration file on a USB stick:

1. Connect the USB stick to the MiniSentry-2.
2. Select the « **Connect USB stick** » function (refer to § 11.3).
3. The « **Export logs** » line is selected by default, press the or button to select the « **Export settings** » line.



4. Press the or button to save the « **DeviceSettings.cfg** » file.

   Note: A « **config** » directory is created at the root of the USB stick, containing the « **DeviceSettings.cfg** » file. Each export command create a separate file



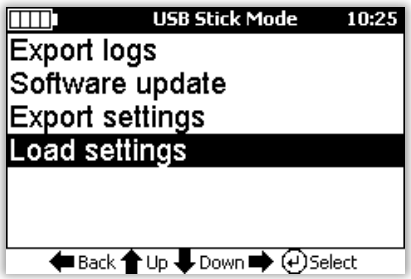
5. Press the button to return to the previous screen.

15.2 RESTORING THE CONFIGURATION FILE WITH A USB STICK

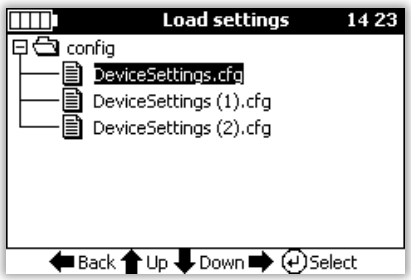
To restore the « **DeviceSettings.cfg** » configuration file from a USB stick

1. Connect the USB stick to the MiniSentry-2.
2. Select the « **Connect USB stick** » function (refer to § 11.3).

3. The « **Export logs** » line is selected by default, press the or button to select the « **Load settings** » line.



4. Press the or button to display the contents of the USB stick.



To select a directory or file:

- Select the directory or file with the or keys.
- Expand the directory with the key.

5. Press the or button to restore the « **DeviceSettings.cfg** » file. The following message appears:

6. Press the to return to the previous screen.

15.3 CONFIGURATION FILE BACKUP AND VIEWING ON COMPUTER

The « **DeviceSettings.cfg** » files can be consulted and exported directly to a computer using the Microsoft Windows © File Explorer.

1. Using the USB cable, connect the MiniSentry-2 to the computer.
2. Select the « **Connect to a PC** » function (refer to § 11.1).

The Minisentry 2 appears in the file explorer as an external storage device named « **MINISENTRY2** ».

The « **DeviceSettings.cfg** » files are stored in the "**config**" directory storage device.

16 FRISKE CONNECTOR

Probe input	
Signal	Pin
RXD Signal	1
TXD Signal	2
Ground	3
+5V Power	4
Pulse Signal	5
CSP detection signal	6
SCL (I2C)	7
SDA (I2C)	8

17 SDB15 CONNECTOR

Probe input	
Signal	Pin
12V Lights	1
12V Lights	2
Presence detector	3
Not allocated	4-5
Ext Input1	6
Ext Input2	7
Ext Input3	8
Ground	9 to 12
Ext Ground	13 to 15

18 SUBD9 – LIGHT TURRET CONNECTOR

SUBD9 – Light Turret connector		
Description	Signal	Pin
12V Power Supply	+12V LIGHT	1
12V Power Supply	+12V LIGHT	2
Common	COM LIGHT	3
Red LED	RED LIGHT	4
Green LED	GREEN LIGHT	5
GND	GND	6
GND	GND	7
GND	GND	8
GND	GND	9

19 NETWORK COMMUNICATION FUNCTION & DIGITAL I / O

An input / output connector (see § 7.4) allows to communicate the collected information over a network.

This link mainly transmits the time stamped alarm, saturation, and malfunction information in the form of I/O digital signals and on a network link RS485 sends the values of the contamination measurement.

Other information is available such as connected probe type, background noise, device identification, etc.

Refer to section 19.2 for details of the information available on the network link.

19.1 CONNECTORS PINOUT

RS485 connector and digital input / output

	Description	Signal	Pin
DB25	ModBus	RS485 -	20
	ModBus	RS485 +	8
	ModBus	VP	21
	ModBus	GND ModBus	7
	Power ground	GND +5/+24V	14
	Power input	24VDC / 500 mA	1
	Power output	5VDC / 150 mA	2
	Digital input	GND digital input	12
		Optocoupler 1	25
		Optocoupler 2	13
	Digital output No.1	Relay 1 NO	16
		Relay 1 COM	3
		Relay 1 NC	15
	Digital output No.2	Relay 2 NO	19
		Relay 2 COM	6
		Relay 2 NC	18
	Digital output No.3	Relay 3 NO	24
		Relay 3 COM	11
		Relay 3 NC	23
	Digital output No.4	Relay 4 NO	5
		Relay 4 COM	17
		Relay 4 NC	4
	Digital output No.5	Relay 5 NO	9
		Relay 5 COM	22
		Relay 5 NC	10

19.2 NETWORKING

Communication with the Minisentry-2 can be done via an RS485 network following the ModBus protocol.

19.3 MODBUS SETTING

To change the slave ID of the device:

1. Connect the device to a PC and launch the « **Connect to a PC** » USB mode.
2. From the file Explorer open the « **/MINISENTRY2/config/deviceSettings.cfg** » file with a text editor. In the section **[globalSettings]** replace the value of the "**modbusSlaveId**" field by desired ID.

Required serial port configuration:

- Speed: **115200** bauds
- Data bits: **8**
- Parity: **None**
- Stop bit: **1**
- Flow control: **None**

19.3.1 ModBus data

The modbus data isn't yet available in the current release, but it will come in the a future software version.

19.3.2 Digital input/output

Default operating table of MiniSentry-2 relays.

			RL1	RL2	RL3	RL4	RL5	byte
		Digital input	0	0	0	0	0	**MSB**
		Unacknowledged fault	0	0	0	0	0	
		Unacknowledged alarm	0	0	0	0	0	
		MiniSentry-2 fault	0	0	0	0	1	
Interface 2		Probe fault	0	0	0	0	1	
	Channel 2	Measure	0	0	0	0	0	
		Saturation	0	0	0	1	0	
		Alarm	0	0	0	1	0	
		Alert	0	0	0	1	0	
	Channel 1	Measure	0	0	0	0	0	
		Saturation	0	0	1	0	0	
		Alarm	0	0	1	0	0	
		Alert	0	0	1	0	0	
Interface 1		Probe fault	0	0	0	0	1	
	Channel 2	Measure	0	0	0	0	0	
		Saturation	0	1	0	0	0	
		Alarm	0	1	0	0	0	
		Alert	0	1	0	0	0	
	Channel 1	Measure	0	0	0	0	0	
		Saturation	1	0	0	0	0	
		Alarm	1	0	0	0	0	
		Alert	1	0	0	0	0	**LSB**

Setting table of fault relays of MiniSentry-2

		« DeviceSettings. cfg » file	
Relays	**MSB LSB**	**Decimal value**	**Parameter**
RL1	00000000000000000111	7	**rl1signalcondition**
RL2	00000000000000001110000	112	**rl2signalcondition**
RL3	00000000000111000000000	3584	**rl3signalcondition**
RL4	00000011100000000000000	57344	**rl4signalcondition**
RL5	00011000000000100000000	393472	**rl5signalcondition**

20 CARACTERISTICS OF THE MONITOR

20.1 DECLARATION OF CONFORMITY

Electromagnetic compatibility: The MiniSentry-2 has successfully passed the electromagnetic compatibility (EMC) tests according to the EU directive and 62244 standards.

MiniSentry-2 comply with FEM-REP-21.

Full declarations of conformity are available upon request to:

MIRION TECHNOLOGIES SAS

174 route d'Eyguières

13113 LAMANON

FRANCE

20.2 MECHANICAL CHARACTERISTICS

- Assembled Dimensions (W x H x l): 2159 mm x 1118 mm x 452 mm (85 in x 44 in x 17.8 in)
- Weight: 42.5kg (93.7 lb)

20.3 ENVIRONMENTAL CHARACTERISTICS

Environmental characteristics

- Audible alarm: Greater than 85 dB (A) at 30 cm (11.81 in)
- Operating temperature: -25°C (*) (-14°F) to + 50°C (122°F).
- Storage temperature: -25°C (-13°F) to + 60°C (140°F)
- Relative Humidity: Non-Condensing, up to 93%
- Weather resistant for outdoor operation in adverse weather conditions
- Max operating altitude: 2000 m (6,562 ft)
- Protection class: IP54 according to IEC 60526, considered only on battery use
- Pollution Degree (CEI 60664-1): 2
- Surge category: II

(*) Below -10°C, measurement and alarms remain fully operational though the instant measurement display on the screen may be downgraded.

20.4 ELECTRICAL CHARACTERISTICS

Power supply

- DC power supply output: 12VDC, 500 mA
- AC power supply input:
  - CEE 7/7 Plug and IEC 320 C13 socket
  - 100-240V 50/60 Hz, 500 mA
  - MAINS supply voltage fluctuations up to ±10 % of the nominal voltage
  - Protection: 2 fuses (5 x 20 mm, 1A, T type glass, UL standard)

Inputs/Outputs:

- 5 relay outputs: NO, NC, 125 VAC, 60 VDC, 1A contacts
- 2 opto-coupled inputs: control voltage between 5VDC and 24VDC
- RS485 link: 2-wire MOD BUS
  - +5 V output; 150 mA
  - +24 V Input; 500 mA

Internal Battery

- Type: Lithium-ion,
- Capacity: 3.7V/5.3 Ah, 19.6W, max current 1,5A
- Charging time: less than 4 h.
- Performance of cycle of charge: 70% of the original capacity after 850 cycles of discharge at 100%

Autonomy in measure ambient dose of 1 µGy/h including a period of 30 minutes in sound and visual alarm without backlight:

- 13h with internal battery (depending on configuration),
- 65h with an 7Ah, 12V external battery (depending on configuration).

20.5 PERFORMANCE

Units of measurement of the portal:

- SI units :cps, Bq, µCi,
- US units: cpm, dpm, µCi.

Display: 3 digits, floating point with 2 significant digits

Efficiency

- 241Am: 0.0002 cps/Bq
- 60Co: 0.018 cps/Bq
- 137Cs: 0.009 cps/Bq

21 FRISKER PROBE COMPATIBILITY TABLES

				Units displayed				Cable CSP				
		Emitter displayed	Detector size	c/s	Bq	Bq/cm²	Sv/h	Straight cable 1,5 m 77336	Coil cable. 77337	Straight cable 20 m 86153	Presence sensor	Alarm setting
CSP(1)	SPAB-15	α, β	15 cm²	•	•	•		•	•	•		I
	SG-1R	γ, X	1"φ x 1"	•			•	•	•	•		I
	SG-2R	γ, X	2"φ x 1"	•			•	•	•	•		I
	SAB 100	α, β	100 cm²	•	•	•		•	•	•		I
	SAB(G)-100	α, β,(γ)	100 cm²	•	•	•		•	•	•		I
	SAB-32	α, β	32 cm²	•	•	•	•	•	•	•		
	EZPAB-17	α, β	17 cm²	•	•	•		•	•	•		I
	SAB 250	α, β	250 cm²	•	•	•		•	•	•	•	I
	SABP 464	α, β	464 cm²	•	•	•		•	•	•	•	I
	SABP 525	α, β	525 cm²	•	•	•		•	•	•	•	I
	SABS-579	α, β	579 cm²	•	•	•		•	•	•		I
	SABG-15+	α, β,γ	15 cm²	•	•	•		•	•	•		I
	SBM2D-CSP	α, β,γ	30 cm²	•	•	•		•	•	•		I
	SABG-30B	α, β	30cm²	•	•	•		•	•	•		I
	SA-100	α	100 cm²	•	•	•		•	•	•		I
	SA-32	α	32 cm²	•	•	•		•	•	•		I
	SA-20-2	α	20 cm²	•	•	•		•	•	•		I
	SB-100	β	100 cm²	•	•	•		•	•	•		I
	SB-20	β	20 cm²	•	•	•		•	•	•		I
	SB-32	β	32 cm²	•	•	•		•	•	•		I
	SX-2R	X	1.5"φ x 0.3 mm	•	•	•		•	•	•		I
	STTC	γ	-				•	•	•	•		I
	SVLD	γ	-				•	•	•	•		I
	SN-D	η	-	•				•	•	•		I
	SN-S	η	-	•				•	•	•		I

I : Individual alarm value per probe chosen among **10 predefined values, stored in the probe**

(1) : Non-exhaustive list of CSP compatible probes.

22 STORAGE AND TRANSPORT

22.1 STORAGE

The Minisentry 2 should be kept as far as possible from shock, crushing, and any other element that may affect its integrity. It must also be kept out of the weather and under environmental conditions corresponding to its storage area (- 25°C to + 60°C (-13°F to 140°F)).

 : During storage, the battery of the Minisentry 2 requires recharging every 18 months.

22.2 TRANSPORT

The packaging of Minisentry-2 for transportation must be sized to protect it from shock and shock and to be compatible with standard delivery conditions.

23 PREVENTIVE MAINTENANCE

23.1 PERIODIC TABLE

The following table shows the preventive maintenance operations to perform:

Operation	Periodicity	Procedure
Verification that the MiniSentry 2 is working properly Battery charging	1 year	See § 23.2
	18 months in storage	
Battery charging	According to need in use	See § 8.4

23.2 PROPERLY WORKING CHECK

Functionality to check	Procedure
Portal probes	- Power on the Minisentry-2. The screen should display « **Searching** » followed by « **Probe found** », « **Initializing** » & « **Configuring** » and final state « **Ready** »
Detection of the Frisker CSP probes	- Connect a Frisker CSP probe. The screen should display « **Searching** » followed by « **Probe found** », « **Initializing** », « **Configuring** » and final state measuring screen
Powered by the sector	- Check that the charging LED  lights green after the power connection.
Internal battery	- Check that symbol  is present on the top banner of the LCD screen.
Powered by 12VDC power supply	- Disconnect sector and connect 12VDC power supply - Check that the charge LED  lights green, orange or red when connecting 12VDC.
USB stick detection	- Open the menu, and go to « **USB mode** », then « **Connect USB stick** ». (see § 11.3) - Check the communication with the USB stick.
Detection on PC	- Open the menu, and go to « **USB mode** », then « **Connect to a PC** » (see § 11.1). - Check that the MiniSentry-2 is accessible from the PC..
Loudspeaker sound	- Adjust the volume to check the operation of the speaker (see § 8.10.2).
Navigation buttons	- Browse the menu using at least once the 5 buttons to check their operation.
Backlight	- Adjust the level of backlight to check the correct operation (see § 8.10.1).
Contrast	- Adjust the level of contrast to check the correct operation (see § 8.10.1).
Sensor and optional light tower	- Perform an « **Enter wait** » measure to check the correct operation of sensors (see § 8.6) and red / green light tower.
Digital I/O check	- Check the state of the relays with an ohmmeter.
Receipt of data by the RS485	- Connect the Minisentry-2 to a PC via the I/O RS485 connector. - Open a software using the ModBus protocol and then interrogate the device.

24 DECONTAMINATION AND CLEANING

MiniSentry-2 are easily decontaminable.

The Monitor have an IP54 protection rating which protects them from dust deposits and splashing and splashing water.

Do not use stripper, wax, or corrosive solvents to clean the front of the unit, use only a soft, dry or damp cloth.

24.1 DECONTAMINATION PROCEDURE

Tools and ingredients:

- Lint-free clean cloth
- ALCATUM pre-impregnated towels
- Wipes impregnated with water SED (demineralized)
- Nitric acid diluted to 5%
- Sponge
- Vacuum

General precautions:

- MiniSentry-2 should be cleared of radioactive dust and liquid agent as soon as possible after detection.
- Tools, equipment, and work areas must be free of radioactive contamination.
- The user is responsible for conducting the surveys and the rapid decontamination of all objects and surfaces.
- Wearing protective clothing is mandatory during decontamination operations. Minimum requirements include wearing an NBC suit and two pairs of gloves (Triple Gloves are strongly recommended).

24.1.1 Procedure for non-fixed contamination

1. Before any operation, aspirate potentially contaminated dust and particles from the parts.
2. Wrap a towel impregnated with ALCATUM around the sponge and clean the parts by making several passes (at least two) from top to bottom then from left to right.
3. Rinse with SED water (wet wipes).
4. Check that the background noise has returned to normal.

Otherwise:

5. Clean the parts again,
6. Check that the background noise has returned to normal.

24.1.2 Operating mode for a fixed contamination

1. Before any operation, aspirate the dust and particles potentially contaminated on the parts.
2. Using a lint clean cloth, apply nitric acid diluted to 5% on the parts.
3. Let stand 15 minutes
4. Rinse with water (wet wipes) SED
5. Check that the background noise is again correct.

25 TROUBLESHOOTING

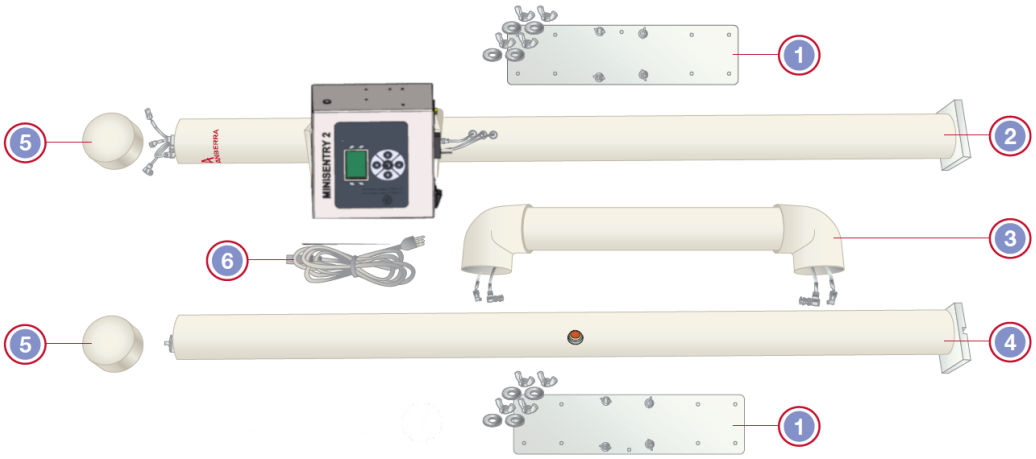
25.1 DAMAGE MOST LIKELY

The following table shows troubleshooting not requiring disassembly of the Minisentry 2

Symptom	Action
Minisentry-2 does not start	Connect the mains cable, USB or, depending on the option, the 12 VDC power supply.
Battery fault, flashing  symbol with audible alarm	Replace the internal battery  : Do not replace the battery with a battery or battery other than that recommended
External battery  blinking	Charge the external battery Replace the external battery
 Portal LED flashing purple	Use CSPS to see error details.
 2 Frisker LEDs flashing purple	Replace the probe cable Replace the probe
Difficulty erasing LOG files	Format the RAM (See § 8.10.7)

26 ASSEMBLY GUIDE, PEDESTRIAN CONFIGURATION

26.1 PART LIST



Item	Description
1	Footplate for each post with flat washers and wing nuts
2	Primary detector post with MiniSentry 2 Monitor
3	Top cross piece with attached elbows for pedestrian configuration
4	Secondary detector post
5	End caps (x2) for vehicle configuration needs and shipping
6	Power cord
-	Kit for Extended passage width (91.5 cm (36 in)) (Option)

26.2 ASSEMBLY INSTRUCTION

1. Arrange the pieces on the floor and make the connections as diagramed. Some connections are not used for the pedestrian configuration (See Note 1). These are used for the vehicle configuration (optional)

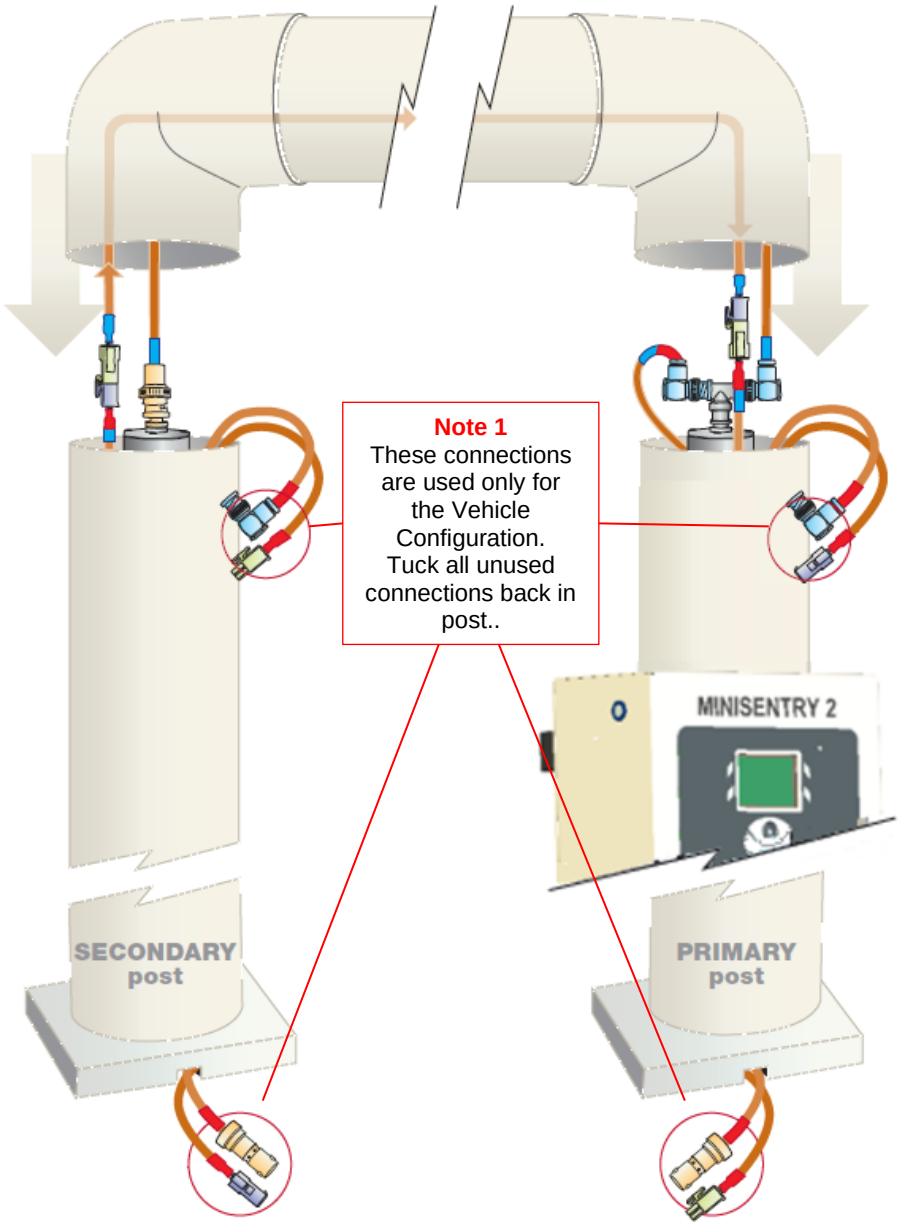
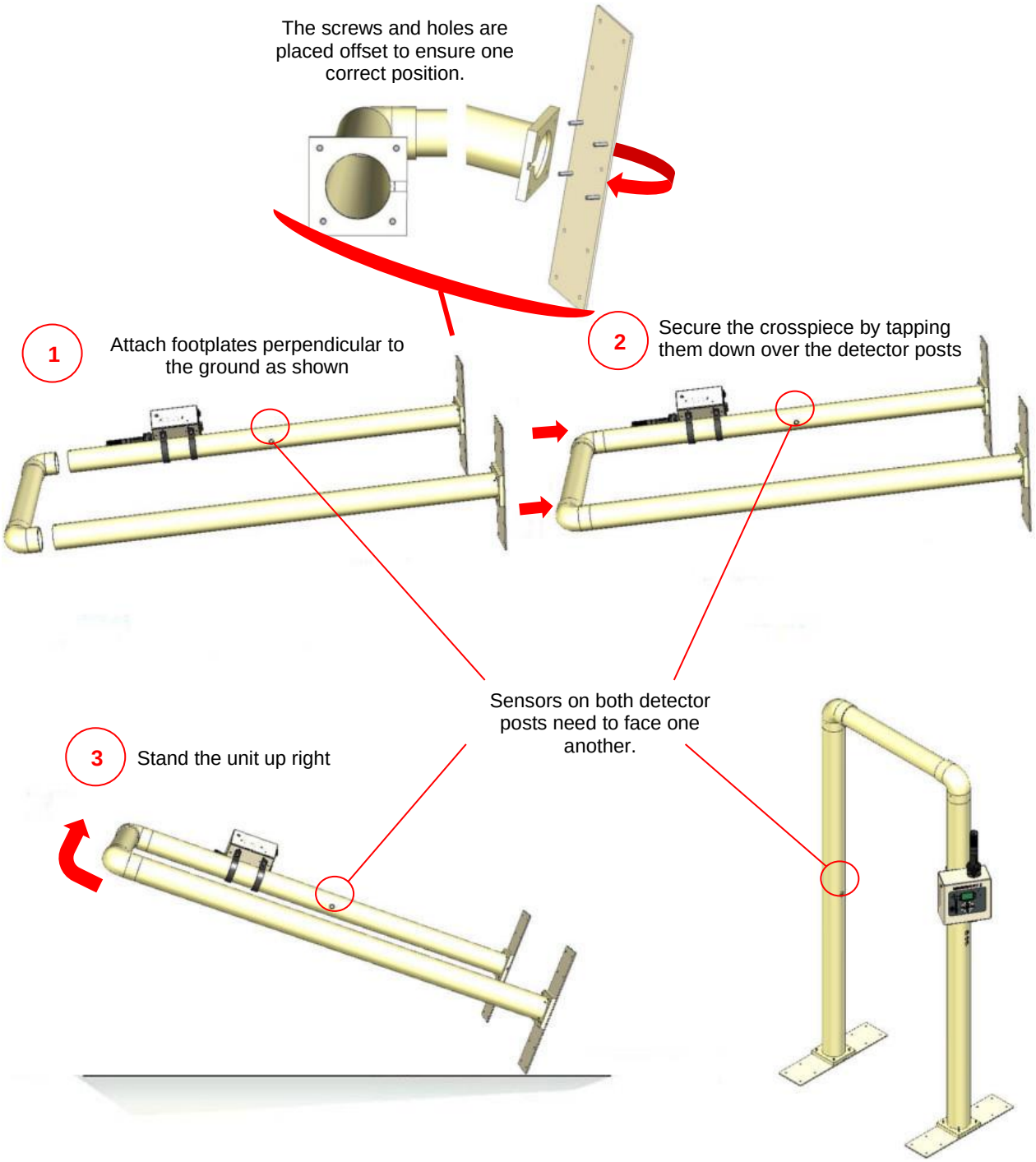


Figure 1 Pedestrian configuration installation

2. Remove (and keep) the flat washers and wing nuts from the footplates.
3. Align one footplate's blots with the holes on the base plate of the leg and push the base plate onto the footplate (Note; The footplate bolts and post holes are spaced so the footplate can only be attached in one direction on the post).
4. Place a flat washer and a wing nut on each of the footplate's retaining bolts.
5. Tighten each of the four wing nuts.

6. Repeat steps 2-4 for the other leg.



: The device must be connected to the electrical mains on a grounded power supply and with a 3-conductor cable of 1 mm^2.

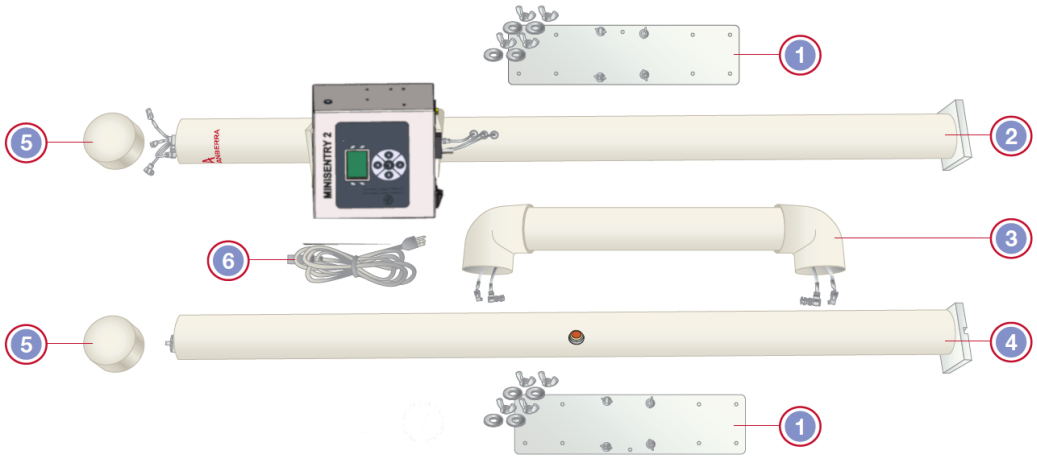
7. Power up the unit and go to the start-up screen.

ON / OFF Switch

Upon powering up the MiniSentry, the above start-up screen will appear after a few seconds.

27 ASSEMBLY GUIDE, VEHICLE CONFIGURATION

27.1 PEDESTRIAN KIT



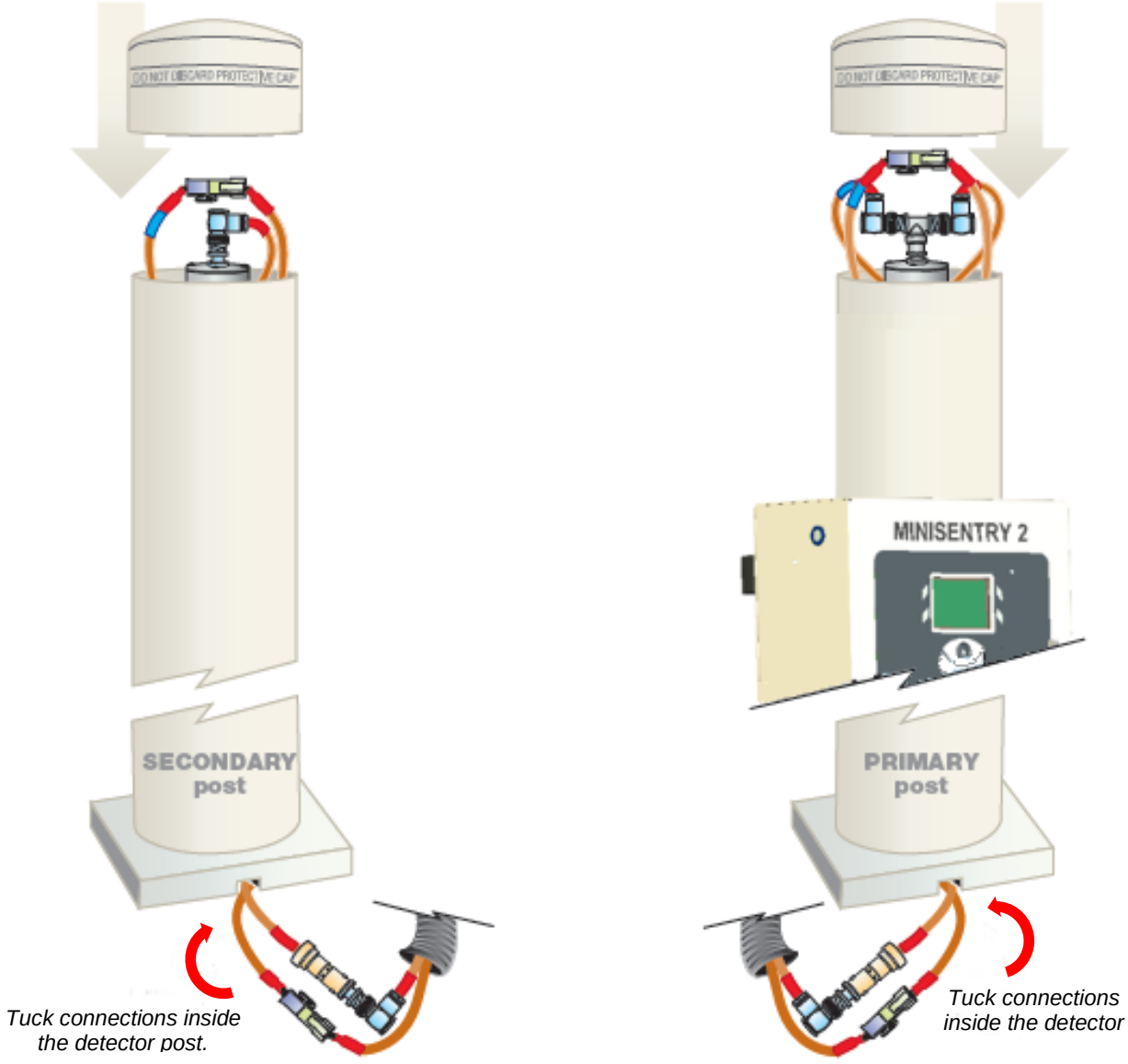
Item	Description
1	Footplate for each post with flat washers and wing nuts
2	Primary detector post with MiniSentry 2 Monitor
3	Top cross piece with attached elbows for pedestrian configuration
4	Secondary detector post
5	End caps (x2) for vehicle configuration needs and shipping
6	Power supply cable

27.2 VEHICLE PART LIST

Item	Description
1	Vehicle baseplates and bolts for each post
2	2.5 m (8.20 ft) Rubber spacers
3	Cable 2.7 m (8.86 ft.) cables and protections

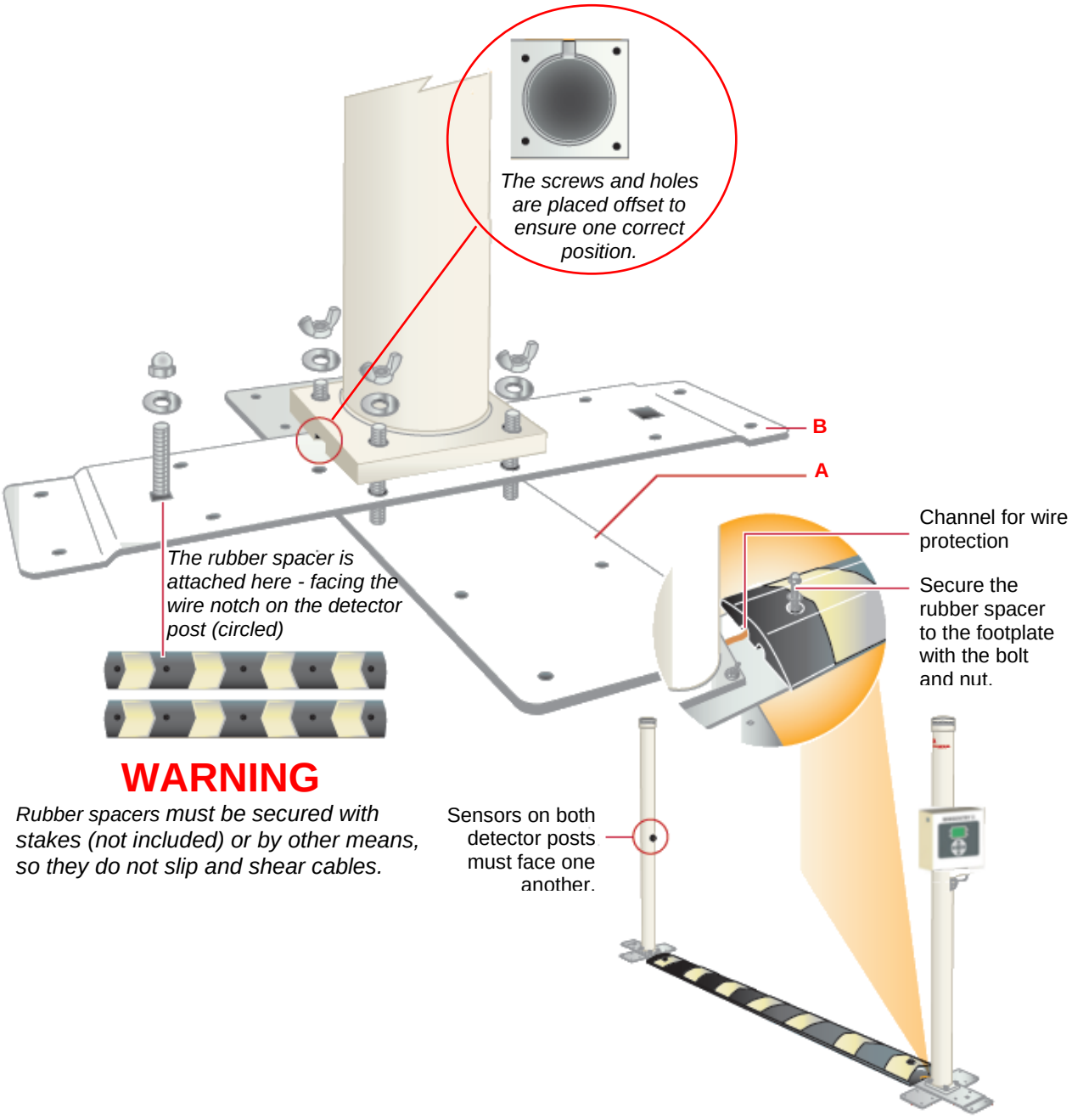
27.3 ASSEMBLY INSTRUCTION

1. Make the connections as diagrammed.
2. Push down the end caps.
3. Once the connections are complete, go to step 4 to attach the foot plates.



4. Remove (and keep) the flat washers and wing nuts from the footplates.
5. Align the "**A**" pedestrian baseplate's bolts with the holes on the "**B**" vehicle baseplate as shown.
6. Lower the base of the detector post over the screws as shown.

   Note: The footplate bolts and post holes are spaced so the footplate can only be attached in one direction on the post.
7. Place a flat washer and a wing nut on each of the footplate's retaining bolts. Tighten each of the four wing nuts.
8. Use the bolt to secure the rubber spacer as shown. Repeat steps 5–8 for the other leg.
9. Run the connection wires under the rubber spacers and set the desired distance between the detector posts.



WARNING

Rubber spacers must be secured with stakes (not included) or by other means, so they do not slip and shear cables.

: The device must be connected to the electrical mains on a grounded power supply and with a 3-conductor cable of 1 mm^2.

10. Power up the unit and go to the start-up screen.

ON / OFF Switch

Upon powering up the MiniSentry, the above start-up screen will appear after a few seconds.

28 SPARE PARTS LIST

1-2 years	3-5 years	Description	Order No. (Mirion)	Order No. (Canberra)
X	X	Battery kit	NOM006447	*93652*
X	X	Monitor kit – MiniSentry V2	NOM006650-SAV	-
X	X	Frisker monitor kit – MiniSentry V2	NOM007928-SAV	-
X	X	Kitted hardware. One set includes: - 8x screw 4.5 X 80 (ACO007543) - 8x screw 3 X 30 (ACO006015) - 8x wing nut (ACO007574)	NOM008084-SAV	108486
X	X	Standard MiniSentry Base Plate	ANT007333	107759
X	X	Vehicle Option Base Plate (if applicable)	ANT007338	108314
X	X	Pipe Caps kit (also used as protective end caps for Standard MiniSentry), PIPE CAP FOR VEHICLE OPTION, 2 PCS PER SET	ACO007548	107754
X	X	Sub-D 15 connector for sensor cables	ACO007572	108123
X	X	AC Power Cable EU	ACO007001	EU: 79025
X	X	AC Power Cable US	ACO007832	US: 68025
X	X	AC Power Cable UK	ACO008568	UK: 88559
X	X	High voltage top member cable	ANT007330	107741
X	X	High voltage "T" adaptator	ACO007547	107749

29 DISASSEMBLING

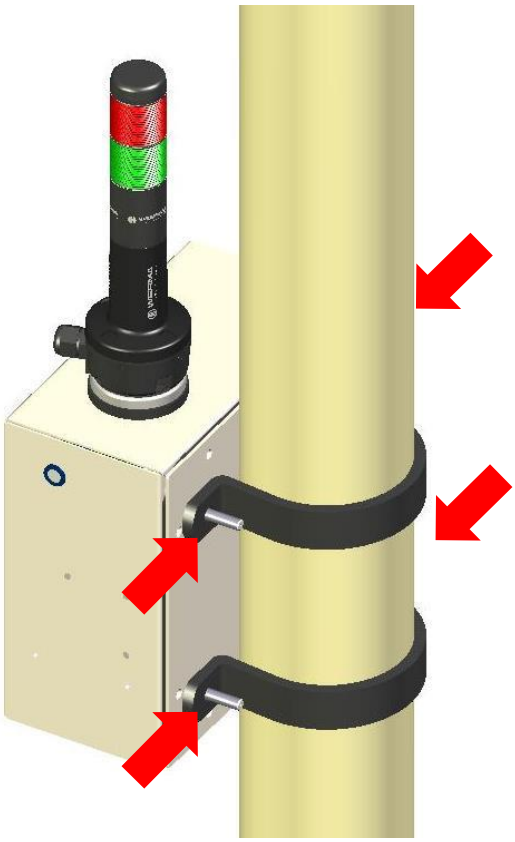
29.1 MONITOR REMOVAL/INSTALLATION

29.1.1 Tools:

- 17 mm wrench

29.1.2 Removal

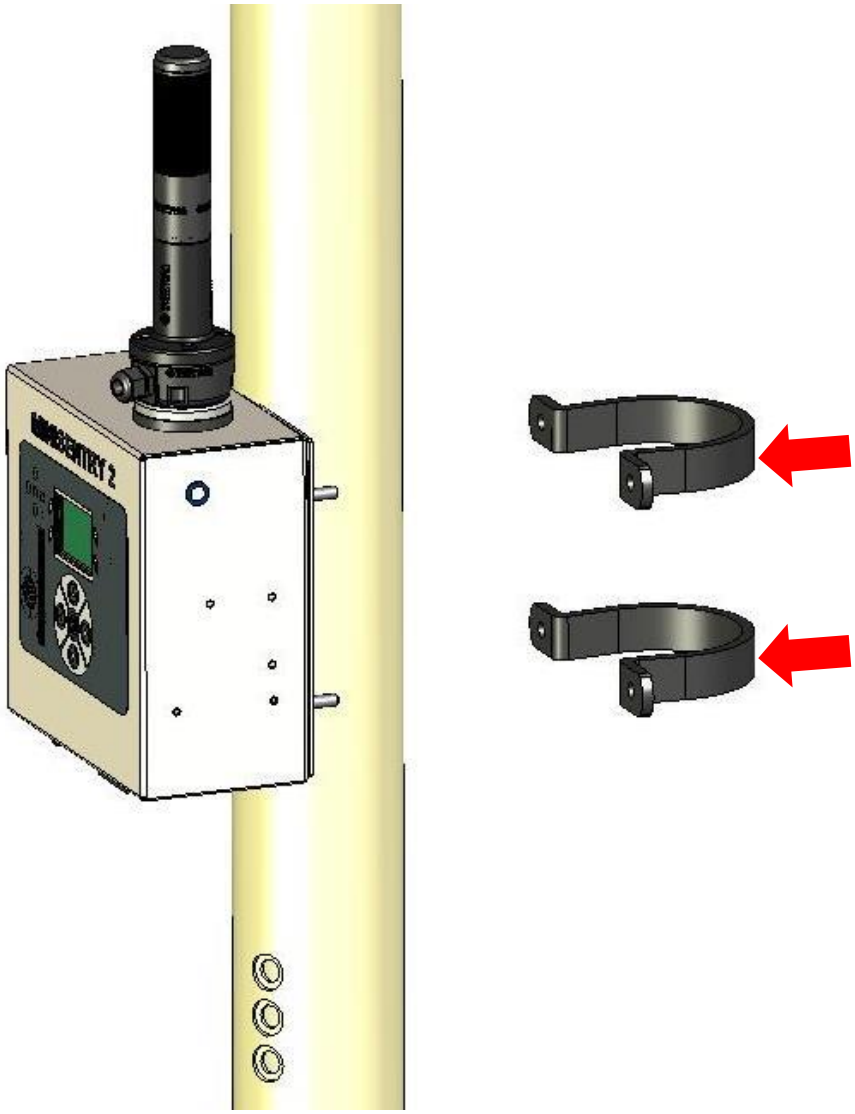
1. Switch Off the device.
2. Disconnect any external connection
3. While supporting the monitor, unscrew the 4 nuts using the 17 mm wrench.



4. Remove the monitor and the 2 clamps.

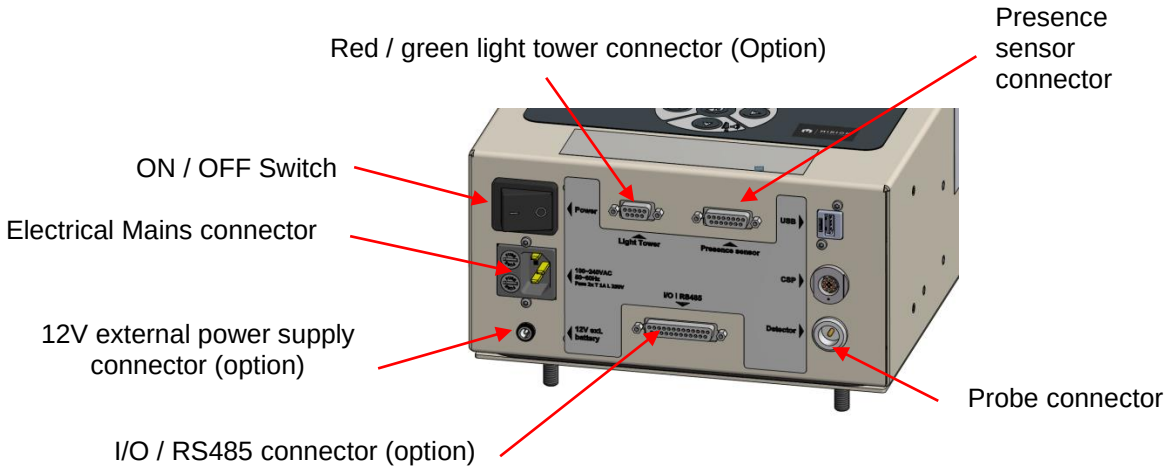
29.1.3 Installation

1. Install and maintain the monitor with the two clamps on primary post.



2. Screw the 4 screws using the 17 mm wrench.

3. Connect cables:
    - Presence sensor
    - Portal Probe
    - Electrical main or 12V external power supply (Option)
    - Red / green Light tower (Option)
    - I/O / RS485 (option)



4. Power up the unit and go to the start-up screen. Upon powering up the MiniSentry, the above start-up screen will appear after a few seconds.

29.2 REAR COVER REMOVAL/INSTALLATION

29.2.1 Tools:

- 2.5 mm hexagon key

: Before opening the monitor it's mandatory to:

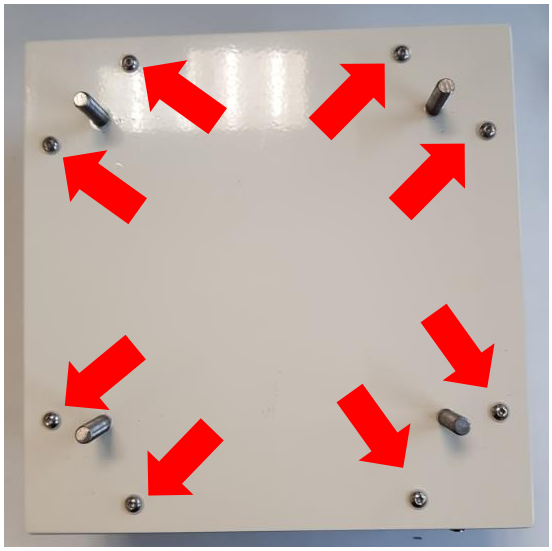
- Disconnect any external connection.
- Switch Off the device.

29.2.2 Preliminary operations:

- Remove the monitor § 29.1

29.2.3 Removal

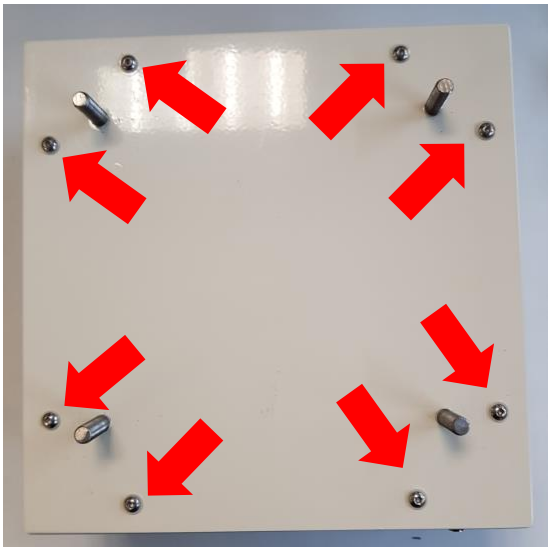
1. Unscrew the 8 screws from the rear of the monitor. Be careful to not lose the washers by removing the screw.



2. Remove the cover

29.2.4 Installation

1. Install the cover.
2. Screw the 8 screws with washers on the rear of the monitor.



3. Install the monitor § 29.1.3.

29.3 BATTERY REMOVAL/INSTALLATION

29.3.1 Tools:

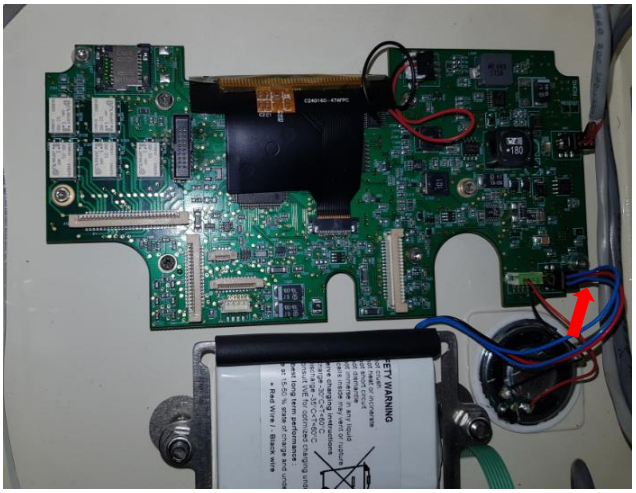
- 8 mm wrench

29.3.2 Preliminary operations:

- Remove rear cover § 29.2

29.3.3 Removal

1. Disconnect the flex wire from the mother board (red arrows).



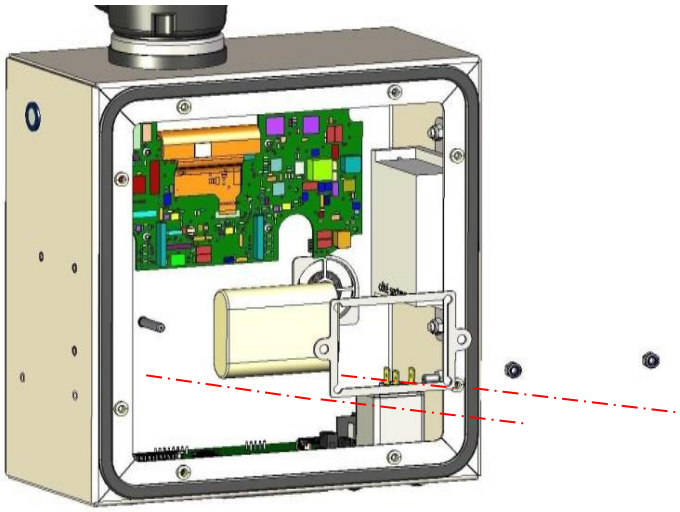
2. Remove both nuts using the 8mm wrench.

3. Remove the metal plate.

4. Extract the battery.

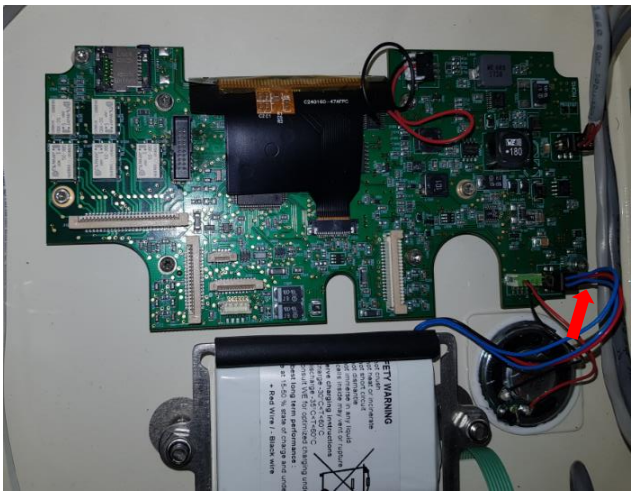
29.3.4 Installation

1. Install the battery with the metal plate.



2. Screw both nuts using the 8mm wrench.

3. Connect the flex wire on the mother board (red arrows).



4. Install rear cover § 29.2.

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- ⇨ Title, reference and index of manual.
- ⇨ Chapter, paragraph and page concerned.