



**MIRION**  
TECHNOLOGIES

# Software and Screens for Contamination Monitors

## Features & Benefits

### USER INTERFACE

- Touch screen graphical user interface – no keyboard required
- Optional tablet connectivity for easy monitor access
- Intuitive menu structure requiring minimal training
- User friendly and easy-to-use diagnostic and setup screens
- Graphical selection of detectors for setup and calibration
- Common screens and software platform for CANBERRA Cronos<sup>®</sup>-1/-4/-11, GEM<sup>™</sup>-5, Sirius<sup>™</sup>-5, and Argos<sup>™</sup>-3/-5 monitors; no retraining needed

### WEB INTERFACE

- Ability to access any contamination monitor via PC/tablet web browser
- Proprietary software is not required, thus eliminating IT constraints
- Easy access to the monitor status, parameter setting, result files and maintenance screens
- Simple dashboard provides an overview of the monitors' status (working, contaminated, out of service, maintenance)

### ALGORITHM

- Selection of Traditional (Gaussian) or Bayesian algorithm (compliant with the ISO 11929:2010 Standard requirements)
- Automatic background compensation (consecutive compensation method)
- Tracking of background changes during measurement
- Automatic calculation of optimized count time
- Self Diagnostics for quick troubleshooting and minimum downtime
- Comprehensive data logging capability



## Description

This document provides a synopsis of the Monitor software Version 9.0, which enables WebRemote<sup>®</sup> as a standard for all CANBERRA contamination monitors. WebRemote provides an ergonomic and easy-to-use touch screen graphical user interface (GUI); accessible locally or via PC or tablet web browser when a CANBERRA contamination monitor is connected to a LAN. Monitor software Version 9.0 also allows the use of the traditional interface with the keyboard and function keys. This software has evolved over many years by incorporating customers' suggestions and is now recognized as the best contamination monitor software on the market.

CANBERRA's contamination monitors can be integrated with Horizon Supervisory Software to provide an integrated solution with CANBERRA instruments. Horizon complements the functionality of the WebRemote Contamination Monitor Interface.

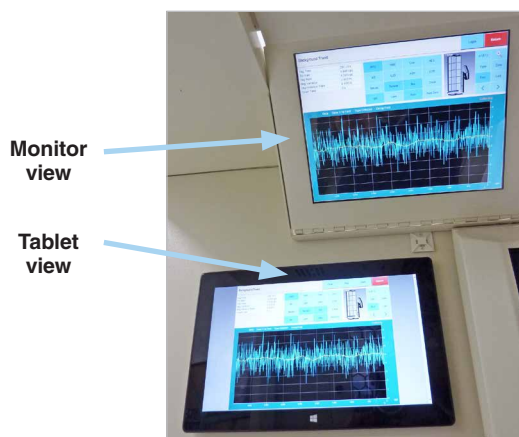
### WEB INTERFACE

The web browser access and the touch screen give health physicists and technicians an easy and intuitive interface to access contamination results, monitor parameters and status with the touch of a finger or from anywhere in the facility.

The new interface greatly improves the ability to find a specific command. It displays a main menu and a sub-menu in the same page, thus giving a general view in a single glance. With touch screens, keyboards are no longer necessary. One can easily select the detector of choice on the monitor's pictogram to start the calibration process or simply review the detector's settings.

The look of the interface is modern and pleasing. The screen's large display and colored buttons, graphical charts and the layout of the contamination pattern can easily be interpreted by the user.

# Software and Screens for Contamination Monitors



**Figure 1.**  
Easy and intuitive interface offering a large display with colored buttons.

A web browser is the only application needed to access any contamination monitor linked to a PC or tablet. The link can either be a LAN network, a Wi-Fi® connection or a direct link to the monitor's PC. Proprietary software like CRemote is no longer needed to access the monitor parameters, status or maintenance information.

A simple dashboard view similar to the CRemote dashboard is also available through the web browser access.

## ALGORITHM

CANBERRA's contamination monitors are compliant with the IEC 61098 and ISO 11929 standards. The introduction of CANBERRA's BAYEX algorithm continues the tradition of incorporating features which are both customer and standards driven, in this case meeting the requirements of the new ISO 11929:2010 standard.

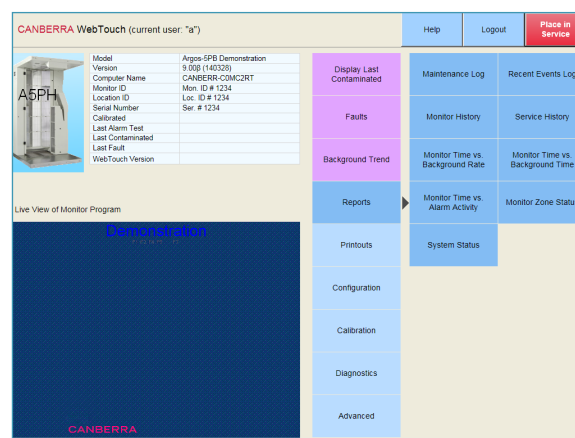
BAYEX stands for our BAYesian algorithm that provides EXact results (estimated with known uncertainties). The Monitor software (version 8.05 and up) offers the option of the traditional algorithm based on the Gaussian statistics or the BAYEX algorithm, which was created using the Bayesian statistics. The user can select one of the two algorithms to determine which mathematical algorithm is used for the statistical decisions required to make clean/contaminated conclusions during personnel monitoring.

BAYEX improves the sensitivity and accuracy of the detection of contamination and enhances overall measurement reliability. It also contributes to reducing operational cost and is able to detect lower radiation levels with higher confidence by taking into consideration uncertainties not previously included.

## SETUP AND CALIBRATION

WebRemote software is both intuitive and effective in accessing all the menu screens from one unified and easy-to-use main page. Display screens, such as the Common Setup Values, provide full setup, diagnostics, and history of monitor information.

Related setup screens include full control of operating parameters and features like monitoring count time, voice selection, messages to be displayed, detector bias and discriminator levels. All parameters necessary for setup, optimization and calibration of the monitor are user selectable.



**Figure 2.**  
WebTouch provides access to all setup, monitoring, and diagnostic screens from a unified main page.

## OPERATION

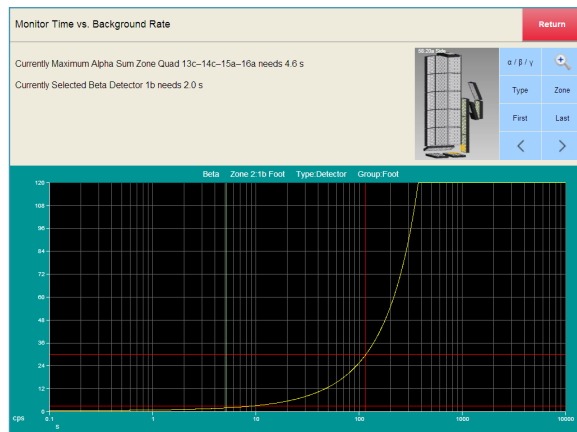
When a person approaches a monitor, its motion sensor detects the occupant who is then greeted with a "READY" message on a LCD display and a voice prompt. After stepping into the monitor, the occupant is greeted by both voice and on-screen instructions for proper positioning prior to monitoring. Once the occupant is in the correct position the display shows a countdown for the monitoring sequence. Should the occupant accidentally move from the correct position during the measurement, the monitor will prompt for repositioning of the occupant and will continue counting down only when conditions have been corrected. When monitoring is finished, voice and display messages "CLEAN" or "CONTAMINATED" are issued. If contamination has been detected the location and amount of contamination is displayed on the screen.

# Software and Screens for Contamination Monitors

## MONITORING TIME

Monitoring time depends on the average background rate, detection and false alarm probabilities, detection efficiency, background count time and other operational settings. The software continuously monitors the background rate and automatically adjusts the monitoring time. User defined fixed count times are also possible.

The Monitor Time vs. Background Rate screen (Figure 3) is a useful graphical tool in determining the effect of the background on the monitoring count time. The yellow line indicates the time needed to meet the release limit criteria for the current background rate. The upper and lower red lines are the maximum and minimum count times as selected, the green line is the current background rate.

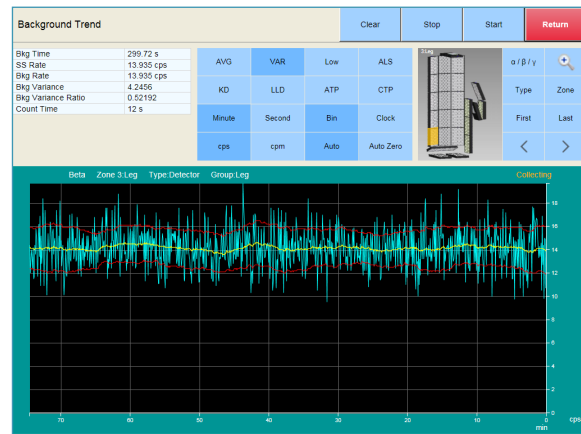


**Figure 3.**  
This screen shows the effect of background on count time.

## BACKGROUND CALCULATIONS

The contamination monitor will not go out of service due to unstable background conditions. The history of background count rates is stored for each detector, as shown in Figure 4. The yellow line is the continuously smoothed background rate that is used for the background compensation during monitoring.

The software also monitors counting variance during measurement. A variance change above a user chosen statistical setpoint is attributed to a “Background Change” during measurement (such as when a large “step” change in the average background rate has occurred). This method is able to significantly reduce False Alarm Rates or False Negatives due to a changing background environment.



**Figure 4.**  
Each detector has a separate background history.

## SELF DIAGNOSTICS

The contamination monitor continuously checks the functionality and performance of each detector and other hardware components, and will alert in case of failure or malfunction. The “Out of Service” screen is a visual tool in communicating to operator why it’s out of service, and helps in getting the monitor back in service in a timely manner, avoiding long downtimes. The contamination monitor also has the option to automatically warn operator when the unit is due for recalibration or alarm testing.

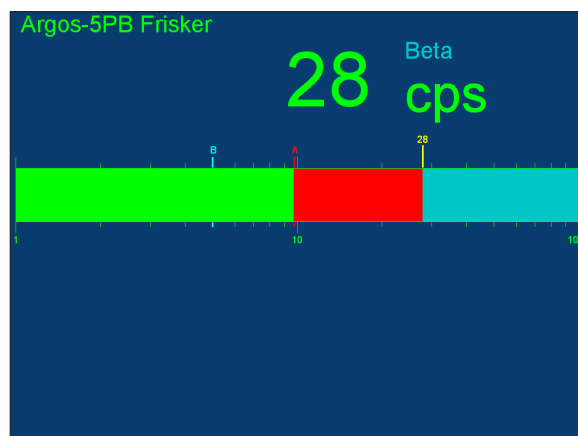
Common Values		Default	Load Defaults	Discard & Return	Save & Return
Name	Value				
Monitor ID	Mon. ID # 1234				
Location ID	Loc. ID # 1234				
Serial Number	Ser. # 1234				
Count Rate Units	cps				
Activity Units	Bq				
Emission Rate Units	/s				
Alarm Calibration Type	Activity (4π)				
High Contamination Alarm	Disable				
Extend Count if Contaminated	YES				
Count Feet in 2 Steps	YES				
Count Top of Head in 2 Steps	YES				
Approach Sensor during Initialize Background	Stay Back				

**Figure 5.**  
Diagnostics and Setup screens are easy to use and provide useful data.

# Software and Screens for Contamination Monitors

## DATA LOGGING

The standard Data Log and Printout screens allow the user to select and save health physics and operational files. These files can be saved in the industry standard CSV (comma separated value) or/and ASCII text formats and are automatically created and stored on the internal hard drive and can also be automatically stored on a mapped network drive. The saved data can be extracted later for further processing and analysis.



**Figure 6.**  
This screen is shown as soon as the optional frisker is lifted from its cradle.

## Specifications

### ALGORITHM

- Selection between the Traditional (Gaussian) and Bayesian method.
- Bayesian method is fully compatible with the ISO 11929: 2010 standard.
- Similar setup screens between the two methods. The Bayesian method also requires user to enter and/or select additional uncertainty values (uncertainty of activity of calibration source and other user defined uncertainties), detection probability, false alarm probability and probability of confidence interval.
- Bayesian specific reported values include Best Estimate of Activity and its uncertainty and upper and lower confidence intervals.

### ALARMS

- Alarm zones can be set for specified level in Bq, dpm, nCi, pCi, or  $\mu$ Ci.
- Independent alarms can be set for each detector and sum zone.
- Count time is automatically optimized and minimized for current background rate and alarm activity release limit.
- Customer selectable min/max count times with on-screen countdown timer and voice prompt.
- Individual average background rates are continuously updated and subtracted from the gross count rates for each detector during monitoring.
- Flexible alarm activity release limit settings and automatic count time calculation.
- Automatic reset capability after excessive background radiation excursion.
- Customer selectable alarm activity release limits and selected confidence of alarm.

### CALIBRATION, SERVICE AND DIAGNOSTICS

- Simple calibration by placing a calibration source on each detector; strength and activity units are entered with the alpha-numeric on-screen touchpad (or optional keyboard connected via USB); automatic source decay correction provided.
- Individual calibration values for each detector, HV, discriminator settings, and alarm activity levels are stored on the internal hard disk.
- Monitoring of cross-contaminated detectors and automatic return to service after decontamination.
- Display has service, setup, test, and calibrate modes to provide full system diagnostics.
- Automatic generation of plateau and discriminator plots for each detector (if required) with cursor readout.
- Automatic diagnostics remove unit from service due to different causes such as failed detector, excessive background, out-of-range high voltage, detector contamination, or system malfunction.
- Automatic restart after power loss (auto-reboot, test and run).

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