



## ALPHA/BETA COUNTING

# LB4200™

*Multi-Detector Low Background  
Alpha/Beta Counting System*



## FEATURES

- An advanced alpha/beta analysis instrument with up to 50% lower counting gas usage and 30% lower background than previous generations of counters
- Delivers fewer gas changes (and associated re-calibrations) and reduced count times to meet required MDAs
- Flexible configuration from one to four counting drawers
- Multiple size detectors can be combined in a system
- Four sample detectors per drawer when configured with 5.7 cm (2.25 in.) or 3.1 cm (1.25 in.) detectors
- One sample detector per drawer when configured with 12.7 cm (5 in.) detectors
- High performance multi-anode 5.7 cm (2.25 in.) or 12.7 cm (5 in.) or single anode 3.1 cm (1.25 in.) gas flow detectors available
- Lowest warranted 5.7 cm detector background in the industry
- Gas Conservation and Monitoring System for maximum gas cylinder life
- Full front detector access without lifting lead shielding
- Small footprint and modular design for easy upgrading
- Individual window per detector with easy operator field replacement
- Independent detector start/stop
- Apex-Alpha/Beta™ Software Compatible
- Automatic calibrations for Plateau, Efficiency, Self-Absorption, and Background
- Simple USB 2.0 connectivity

## DESCRIPTION

The LB4200 counter is the advanced alpha/beta counting system designed to simplify lab operations. The LB4200 system is perfect for applications requiring high sample throughput with long counting times, or where a number of samples must be counted at the same time. The system can be configured from one to four counting drawers. The maximum detector capacity is sixteen 5.7 cm or 3.1 cm detectors, or four 12.7 cm detectors.

The LB4200 counter includes the Gas Stat Gas Conservation system. Gas Stat has been proven in the Mirion Series 5 Automatic Low-Background for years and is now available in a multi-detector manual system. Gas Stat dramatically reduces P-10 consumption by as much as 50% compared with past multi-detector alpha/beta systems. Plus, the LB4200 counter has an electronic gas monitoring system that automatically delivers optimal gas pressure to the detectors without manual flow valves.

Each detector has individual start and stop counting control for maximum flexibility. Front LED indicators provide system health, sample analysis and gas flow status at a glance.

The LB4200 system connects to a host computer using standard USB cables and is 100% compatible with the Mirion Apex-Alpha/Beta analysis and control software.

The LB4200 counter has the lowest published background specifications of any commercially available alpha/beta system using a 5.7 cm (2.25 in.) diameter gas flow proportional detector.

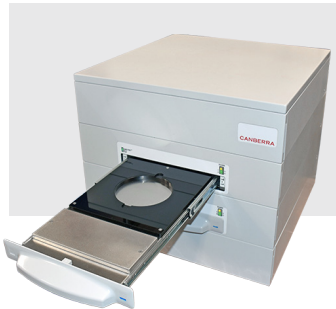
# LB4200 | MULTI-DETECTOR LOW BACKGROUND ALPHA/BETA COUNTING SYSTEM

## Maximum Capabilities – Minimum Floor Space

The LB4200 system measures only 56 x 56 cm (22 x 22 in.) and can be placed very close to walls since all routine maintenance is performed from the front of the unit. Maximum height of a four drawer system, including the table, is 138 cm (54 in.). A fully loaded 16-detector system with table takes up only 67 x 59 x 138 cm (26.4 x 23.2 x 54.3 in.) of precious laboratory space.

## Flexible Configuration

The LB4200 counter consists of a base package plus one to four drawers. Each drawer can independently contain 3.1 cm, 5.7 cm, or 12.7 cm detectors. Drawer upgrades consist of stackable, completely self-contained packages. The optional table uses standard spacing so that third party storage drawers can be added if desired.



## Counting Productivity Software

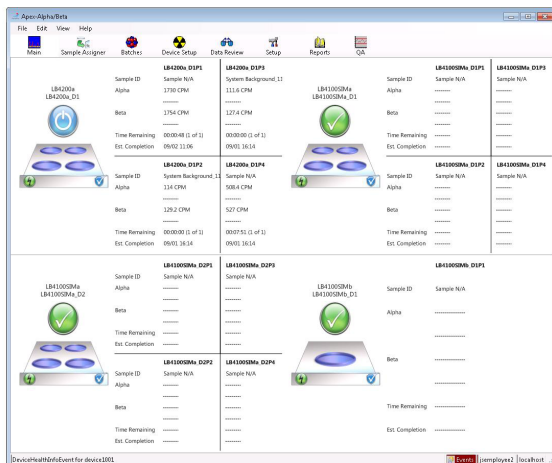
The LB4200 system incorporates the Apex-Alpha/Beta software application for control of system functions and analysis of counting data. A complete 4-drawer system connects directly to the controlling PC using only a single USB interface.

All system data is saved to a SQL Server database for extremely flexible output options. Graphical displays of system and detector status provide an interactive approach to nuclear counting applications.



## Automatic System Calibration

Routine calibration is integrated into Apex-Alpha/Beta software. Calibration is simple. Plateaus are automatic. The system automatically increases the detector voltage and creates a real-time onscreen graphical display of the plateau calibration.



## Low Background Shielding

The exceptional low background of the LB4200 system is the result of providing 10 cm (4 in.) of specially qualified, interlocking, low background shielding. Each counting drawer has additional shielding to reduce interference from adjacent detectors.

The LB4200 system incorporates graded shielding materials to reduce environmental background and uses drawer slide-out mounting rails so that no lead lifting is required for routine maintenance and service. High speed anti-coincidence circuitry is used to detect and reject any spurious background events.

## Gas Stat Gas Conservation and monitoring System

Changing gas supplies usually means verification of critical system calibrations which can be a time consuming process. The impact on throughput is significant when frequent calibrations must be performed due to a change in gas quality.



The LB4200 system incorporates a microprocessor controlled gas monitoring and control system that provides worry free operation. LB4200 Gas Stat eliminates the need to adjust manual flow meters because the system electronics takes care of everything.

The LB4200 measures the input pressure, regulates the input flow AND measures the output flow of gas – ensuring gas flow integrity.

The LB4200 senses when the system is not counting samples and automatically reduces the gas flow rate to a low quiescent flow to maintain detector gas quality. When the user starts a count, Gas Stat automatically purges the detector and resets the flow rate to normal.

Each drawer of the LB4200 counter has the gas usage equivalence of a Series 5 automatic unit. Gas savings on a multi-drawer system are significant, especially if the system is not in constant use. Gas Stat effectively increases the useful life of the gas supply, thereby reducing the frequency of gas cylinder change-out and the associated instrument re-verification. This saves time, increases system availability and improves the quality of counting data.

## Flexible Analysis

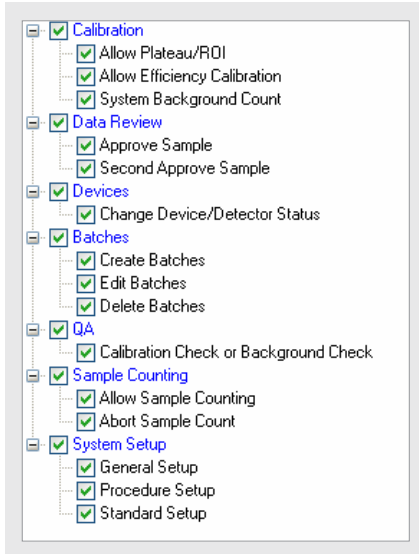
The LB4200 system with Apex-Alpha/Beta software uses easy to setup analysis procedures for calibration, QA, and sample counting. The calibration consists of count mode, background type, and efficiency type. Multiple calibrations can be created as needed for different types of samples.

Multiple analysis procedures can be linked to a single user-defined calibration. Counting procedures consist of counting time, iterations, and what types of corrections need to be performed.

**Security is a Priority**

In today’s laboratory environment, the need to ensure good laboratory practices and data integrity is of utmost importance. Apex-Alpha/Beta software provides the system administrator with the capability to limit system critical functions to qualified individuals, providing the security needed to ensure quality results.

All calibrations, QA counts, and samples can be approved automatically or can require one or two separate approvals by qualified personnel.



**Quality Control**

Monitoring system performance is easy on the LB4200 counter. Apex-Alpha /Beta software allows the operator to maintain quality control charts for each detector tracking background, source check efficiency percentage, and source check count rate. Mean and standard deviation values can be entered manually, derived from the calibration, or calculated based on the last N days of QA counts. Values can be charted and printed directly from the software.

**Multiple Detector Configurations**

The LB4200 system is a true multi-tasking counting system that is the right choice for many different counting applications.



The LB4200 counter can be equipped one to four drawers. Each counting drawer contains high quality gas-flow pancake style proportional detectors with ultra thin low background windows to provide the greatest measurement sensitivity. Drawers can be upgraded individually and are completely self-contained; no controller upgrades are necessary to add a drawer.

**Service and Training**

Mirion has one of the largest and best trained field service organization in the industry. Regionally located Field Service Engineers and Application Specialists stand ready to provide warranty, contract, and billable service when and where needed. Mirion is ready to assist with any issues that arise and to ensure your satisfaction from installation to decommissioning and every point in between.

**SPECIFICATIONS<sup>1</sup>**

BACKGROUND	3.1 cm	5.7 cm	12.7 cm
Gross (Alpha+Beta)	≤0.45 cpm	≤0.80 cpm	≤3.80 cpm
Alpha	≤0.1 cpm	≤0.1 cpm	≤0.3 cpm
Beta	≤0.35 cpm	≤0.75 cpm	≤3.5 cpm

EFFICIENCY <sup>2</sup>	3.1 cm	5.7 cm	12.7 cm
Alpha	≥35%	≥38%	≥38%
Beta	≥40%	≥45%	≥45%

**Spillover<sup>3</sup>:**

- For 3.1 cm detector: ≤2.0% Alpha into Beta
- For 5.7 and 12.7 cm detectors: ≤1.5% Alpha into Beta

**Detector Plateau Slope %/100 V:**

- Alpha (<sup>210</sup>Po) ≤2.5%: ≥800 V
- Beta (<sup>90</sup>Sr) ≤2.5%: ≥200 V

**Sample Count Rate:**

- 500 000 cpm with ≤1.5% deadtime loss

**Counting Time Preset:**

- Adjustable between 0.1 and 9999 minutes

**Sample Detector Capacity:**

- A drawer can be equipped with four 5.7 cm (2.25 in.) detectors or one 12.7 cm (5 in.) detector

**Power Requirements:**

- 100 – 240 V ac at 50 /60 Hz
- 20 W maximum

**Computer Interface:**

- Universal Serial Bus USB 2.0

**Environmental:**

- Operating Temperature: 0 to 50 °C (32 to 122 °F)
- Operating Humidity: 0 to 80% relative, non-condensing
- Meets the environmental conditions specified by EN 61010, Installation Category I, Pollution Degree 2

1. All performance specifications are based on measurements performed at a Mirion manufacturing facility using a standard 2.25 in. window and P-10 (90% Argon/10 Methane) gas.  
 2. 4π efficiency measured with a NIST traceable standard point source 5.08 x 3 cm (2 x 1/8 in.) planchet in 3 mm (1/8 in.) insert. Counting efficiency is dependent on operating voltage, source thickness and distance from detector. Backscattering of high energy emitters produces higher than expected efficiency.  
 3. This is the typical value using <sup>210</sup>Po as measured on a 5.7 cm (2.25 in.) detector adjusted for a 0.1% spillover of <sup>90</sup>Sr/<sup>90</sup>Y beta into the alpha channel. Other detector sizes, other nuclides, <sup>210</sup>Po that has decayed excessively, or radioactive sources not configured in an optimized geometry may yield higher alpha into beta spillover values.  
 4. Contact the factory for other LB4200 configurations.

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## REPLACEMENT DETECTORS AND WINDOWS

- S5-F2: Replacement 2.25 in. detector for XLB and LB4200 systems
- 55S5F5: Replacement 5 in. Detector for LB4200 and LB5500™ systems
- WIND280: Replacement premium 2.25 in. ultra-thin window
- WIND280AL: Replacement standard 2.25 in. thin window
- WIND580: Replacement premium window 5 in. ultra-thin window
- WIND580AL: Replacement standard window 5 in. thin window

## PHYSICAL DIMENSIONS AND ORDERING (Height x Width x Depth)

	<ul style="list-style-type: none"> <li>• LB42-PF Platform</li> <li>• 23.5 x 56.1 x 56.4 cm (9.25 x 22.1 x 22.2 in.)</li> <li>• 612 kg (1350 lb)</li> </ul>
	<ul style="list-style-type: none"> <li>• LB42-F1 Drawer with four 3.1 cm detectors</li> <li>• LB42-F2 Drawer with four 5.7 cm detectors</li> <li>• LB42-F5 Drawer with one 12.7 cm detector</li> <li>• 11.8 x 56.1 x 56.4 cm (4.625 x 22.1 x 22.2 in.), 218 kg (480 lb)</li> </ul>
	<ul style="list-style-type: none"> <li>• LB42-TBL</li> <li>• 71.4 x 58.7 x 67.3 cm (28.1 x 23.1 x 26.5 in.)</li> <li>• 66 kg (145 lb)</li> </ul>
	<ul style="list-style-type: none"> <li>• S556C Apex-Alpha/Beta Counting Productivity Software</li> </ul>
	<ul style="list-style-type: none"> <li>• AB-CPU10: Windows 10 PC with LCD monitor.</li> <li>• AB-GR: Dual Stage Gas Regulator.</li> <li>• INSTALL-B:             <ul style="list-style-type: none"> <li>– Domestic Installation and One Year On-site Warranty – For one or two drawers.</li> </ul> </li> <li>• INSTALL-D:             <ul style="list-style-type: none"> <li>– Domestic Installation and One Year On-site Warranty – For three or four drawers</li> </ul> </li> </ul> <p>Contact your local Mirion office outside of the US and Canada for pricing on installation and extended warranty.</p>

