MIRION TECHNOLOGIES

Series 5 LB5500™

Large Area Automatic Low Background Alpha/Beta Counting System

KEY FEATURES

- Automatic single 5 inch detector, ultra-low background counting system
- Enhanced low background capability
- Gas Stat digital gas conservation and monitoring system
- Fifty planchet sample changer
- Low background passive shielding
- Reduced system footprint and integrated cart
- High performance 12.7 cm (5.0 in.) gas flow detector with ultra-thin window 80 µg/cm^2
- Advanced electronic diagnostics continuously monitor operating conditions
- Universal auto-sensing power supply
- Coded positive sample carrier identification
- Optional external bar code reader
- CE compliant

DESCRIPTION

Large Area Counting System

The Series 5 LB5500 low background alpha/beta counter offers a completely integrated, computer controlled system for maximum flexibility in analyzing larger size samples. The LB5500 system is designed for counting large samples, up to 12.7 cm (5 in.) in diameter. Built on the same foundation of quality and innovation as other Series 5 systems, the LB5500 counter offers low background performance for applications requiring a large area counting system. The capabilities of Apex-Alpha/Beta™ Software make the LB5500 unit a state-of-the-art counting system that easily integrates into today's count room. Specially designed detector windows provide the LB5500 system with excellent counting efficiency exceeding current regulatory requirements.

Whether counting large area air filters or for methods requiring additional sample amounts, the LB5500 counter is the system of choice.

Enhanced Low Background and Productivity – Simply the Best

Due to increasing environmental regulations to reach lower detection limits, sample count times have increased reducing the overall sample throughput in the laboratory. The LB5500 counter incorporates enhanced technology to reduce system background and increase sample throughput. Using an improved guard detector, the system sensitivity for high energy, cosmic background is increased, enabling the anti-coincidence circuitry to detect and reject more spurious background events.

The beta background for the LB5500 counter has been reduced by as much as 25% over older systems. Beta backgrounds as low as 3.0 cpm can be achieved. This means that the system can count almost twice as many samples for a given detection limit as a counter with a beta background of 5.0 cpm.

Passive Metric Shield

Using a graded shielding system, the LB5500 unit counts large area samples with more accuracy than any other low background counter. The passive shield system provides 10 cm (4 in.) of low background lead surrounding the detector. The shield comprises standard 5 x 10 x 20 cm metric lead bricks which weigh no more than 12 kg (25 lb) each. This lead is secured within a steel housing for further safety and to ensure minimal shifting.

Time Proven Reliability

The sample changer of the LB5500 unit is time and field proven. The highly reliable design of the automated sample changer transports and counts samples day after day providing worry free operation.

Ultra-Thin Detector Windows

The standard gas flow detector of the Series 5 family of systems incorporates a high performance pancake-style 12.7 cm (5.0 in.) detector. The entrance window of the detector is made with state-of-the-art technology and special materials to provide the highest counting efficiency and the lowest alpha background of any counter. Standard detector windows are 80 µg/cm^2 with 500 µg/cm^2 window as an option.

Positive Sample Identification and Bar Code – The Advantage

Today's changing requirements demand sample identification that is maintained through the counting data. Data defensibility is a priority.

The LB5500 unit incorporates unique carrier and sample identification systems to maintain chain-of-custody. As the sample is counted, the carrier ID or sample bar code are automatically captured by the software and stored with the sample count data forming the missing link in sample custody in the count room.

Only sample carriers are washable for easy cleaning and decontamination.

Each carrier is permanently coded with a unique number that is non-removable after numerous washings.

Circuitry So Advanced, It Thinks for Itself

The electronics package of the Series 5 family of counting systems provides the most advanced control and monitoring system available to assure accurate results. The Series 5 incorporates hardware diagnostics which continuously monitor internal and external parameters including gas pressure and flow, system voltage, power distribution, sample and guard counts, and other system critical parameters. The user is alerted on the front panel if any of these parameters fall below normal operation thresholds.

Human Factor Engineering

Often computer controlled analytical equipment requires additional laboratory space for the computer system and peripherals. The LB5500 counter answers that problem with an integrated mobile cart that provides all of the support necessary for the gas tank, computer system, monitor and printer. The articulating monitor support provides adjustable viewing angles without requiring additional space on the desktop. The retractable shelf opens to hold printer and supplies.

The LB5500 system is designed to be a completely integrated, self contained counting system. The LB5500 counter has the industry's smallest footprint for a large area counting system, so it takes up less space compared to other large area systems.

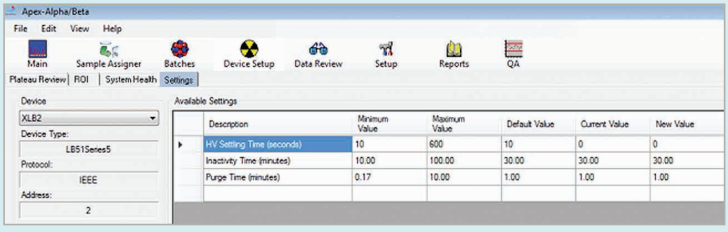
Gas Stat Gas Conservation System

Conventional low background counters have manual gas flow control and use the equivalent of a 1A gas cylinder on the average of once per six weeks. Changing gas supplies usually means re-verification of critical system calibrations which can be an unnecessary time consuming process. Time and the impact on data quality can become significant issues when frequent re-calibrations must be performed due to a change in gas quality.

The Series 5 includes Gas Stat, the industry standard for gas management, which eliminates the high frequency of re-calibrations due to counting gas changes. Gas Stat is a microprocessor-controlled gas monitoring and control system that provides worry free operation by eliminating the need to adjust manual flow meters. The normal gas flow rate is set by the operator through software control, and flow rates are digitally displayed in real time on the computer screen.

The Series 5 hardware 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. This prevents atmospheric impurities from diffusing into the detector and causing questionable results. When the user starts a count, Gas Stat automatically purges the detector and resets the flow rate back to normal. Gas Stat uses a preset maximum flow rate for the detector purging; so, it is virtually impossible to cause window damage due to over pressurization.

Gas Stat effectively increases the useful life of the gas supply thereby reducing the frequency of instrument re-verification, saving time and improving the quality of counting data.



Software – Powerful and Flexible

The LB5500 counter has been designed to take full advantage of computer-based system integration. The LB5500 unit can be operated with the legacy Eclipse™ software, or can use the state-of-the-art Apex-Alpha/Beta™ software to provide the optimum combination of power and ease of use for a low background system.

Apex-Alpha/Beta software includes Microsoft SQL Server Express database for fast and efficient data storage. Custom reports can be easily developed for your application or presentation using an integrated reporting tool without the need for any third-party software. See the Apex-Alpha/Beta specification sheet for more detail on its advanced features.

Final activity results can be viewed on-screen for each sample as it is counted. An intuitive, symbolic icon tool bar provides access to functions at the push of a button.

No other large area counter can match the advanced automation capabilities and features of the LB5500 system and Apex-Alpha/Beta software.

SPECIFICATIONS

*All specifications are based on measurements performed at a Mirion manufacturing facility with 12.7 cm (5.0 in.) detector with 80 µg/cm^2 window, unless noted otherwise.

PERFORMANCE

Background:

(Measured with 80 µg/cm^2 window)

	WARRANTY
Gross (alpha+beta)	≤3.8 cpm
Alpha	≤0.3 cpm
Beta	≤3.5 cpm

Efficiency:

- Measured with a NIST traceable standard point source 5 x 0.3 cm (2 in. x 1/8 in.) planchet in 0.3 cm (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.
- NOTE: 2π efficiency is calculated based on observing 100% of the particles emitted from the source.

80 µg/cm^2 window	Warranty	2π Efficiency Typical
Alpha (^{210}Po)	≥38%	74%
Beta (^{90}Sr/^{90}Y)	≥45%	74%

Spillover:

- ≤1.0 ± 0.5% ^{210}Po alpha into beta channel with the system adjusted for a <0.1% spillover of ^{90}Sr beta into the alpha channel.

Detector Plateau:

- Alpha (^{210}Po) ≤2.5% slope/100 V: ≥800 V plateau.
- Beta (^{90}Sr) ≤2.5% slope/100 V: ≥200 V plateau.

Sample Count Rate:

- 500 000 cpm with ≤1.5% deadtime loss.

Counting Time Preset:

- Adjustable between 0.2 and 9999 minutes.

PHYSICAL

Sample Changer Capacity:

- Standard – 50 samples.

POWER REQUIREMENTS

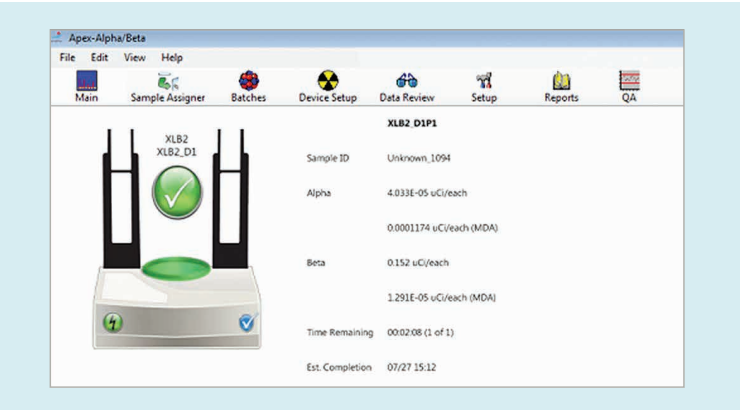
The Series 5 is equipped with a universal power supply and automatically adapts to voltage and frequency.

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

Weight:

Series 5 System (Net weight less cart)

- Standard System 635 kg (1400 lb).
- Net weight Cart with casters 68 kg (150 lb).



Software – Powerful and Flexible

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.

Dimensions:

Series 5 System	Height x Width x Depth
Table top model	34.3 x 68.9 x 96.5 cm (13.5 x 27 x 38 in.)
With 50 sample capacity	72.4 x 68.9 x 96.5 cm (28.5 x 27 x 38 in.)
Cart with casters	73.2 x 68.9 x 96.5 cm (30 x 27 x 38 in.)

ORDERING INFORMATION

5500 Models and Accessories:

DOMESTIC MODEL

- 55S5050D – LB5500 Series 5 Low Background Alpha Beta counter; 5 in. detector, 50 sample capacity.

EXPORT MODEL

- 55S5050E – LB5500 Series 5 Low Background Alpha Beta counter; 5 in. detector, 50 sample capacity.

  (Export models do not include on-site installation.)
- 55S5L – 10 cm LB5500 Lead Shielding (REQUIRED)

MISCELLANEOUS

AB-CPU7

- Windows 7 PC with LCD monitor

  Requires IEEE-488 interface such as the 488USB.
- S556C – Apex-Alpha/Beta Software.
- S550C – Eclipse Software (Existing Eclipse Users Only).
- LB-Integ – Integration of customer supplied computer.
- 488PCI – IEEE-488 Card and Cable (PCI Bus).
- 488USB – IEEE-488 Interface (USB).
- XLB-GR – Single Stage Gas Regulator.

ACCESSORIES

- 1750-38 – Carrier Plates Coded 1-50
- 1750-44 – Carrier Plates Coded 51-100
- 1750-49 – Carrier Plates Coded 101-150
- 1750-37 – Group Plates A – J, Control Plate Kit
- 6200-121 – Carrier Inserts 5 x 1/8 in.
- 6200-122 – Carrier Inserts 5 x 1/4 in.
- 6200-123 – Carrier Inserts 5 x 5/16 in.
- 6200-267 – 5 in. to 2 in. Sample Adapter
- 6200-275 – 5 in. to 1 in. Sample Adapter

Replacement Detectors and Windows

- WIND580 – Replacement premium window 5 in. ultra-thin window.
- WIND580AL – Replacement standard window 5 in. thin window.
- 55S5F5 – 5 in. Detector for LB5500.

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