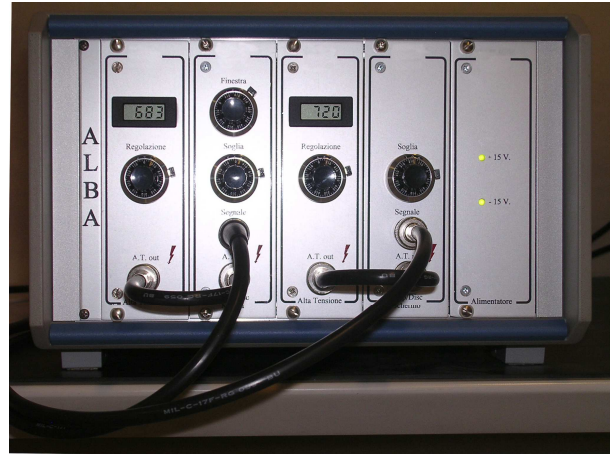


ALPHA-BETA COUNTING SYSTEMS

ALBA 2000 series

MAIN FEATURES

- Counting systems for alpha and beta measurements
- Plastic ZnS scintillation detectors
- User friendly processing software
- Measurement display: integral counts, cps, cpm, Bq/cm², Bq/cm³, Bq/m³ and Bq
- Automatic quality control procedure
- Data archiving on text files
- Modular electronics
- Low background version available, with anti-coincidence circuit
- Lead shielding
- RS232/RS485 interface



DESCRIPTION

The **ALBA 2000** series is designed for high-sensitivity measurements of radioactive contamination, discriminating between alpha and beta radiation; typical samples include airborne particulate filters and smear tests. Several system configurations are available, allowing **ALBA 2000** to comply to any specific requirements; the low-background versions provide best performances and most accurate results.

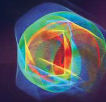
The **ALBA 2000** counting systems comprises the alpha/beta detector, which is a plastic scintillator covered by a thin layer of zinc sulphide (ZnS). The lead shielding lodging the detector is equipped with a holder sledge. The samples are positioned on the sledge and then inserted in the system. For the alpha version, a compact aluminium shielding is used instead.

In the low-background versions of the **ALBA 2000**, an anti-coincidence guard detector is installed under the alpha-beta detector, the sample being placed in between. Therefore, the particles emitted by the sample can interact with only one detector, while the gamma radiation coming from the environment will interact with both detectors. The anticoincidence circuit allows to discard the simultaneous events of the two detectors, eliminating almost completely the environmental contribute to the measurement.

The acquisition and counting electronics is composed by independent modules, providing HV power supply and signal processing. The modules are mounted in a compact table rack, and can be easily added or replaced thanks to their modular design. This is a huge advantage as far as maintenance and system updating is concerned. Furthermore, plastic scintillators require much less maintenance than for example gas detectors, which require more frequent and expensive controls (e.g. gas and mylar window maintenance).

The RS485 interface allows to manage the system from the PC of the control console, through the processing and analysis software; it can also be created a multidrop network to control several ALBA units from the same control console.





AVAILABLE VERSIONS

The ALBA counting system is available in the following versions:

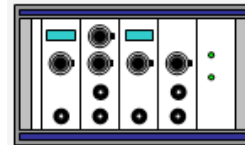
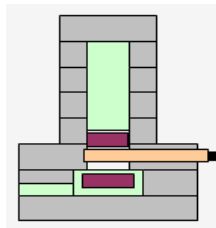
- ALBA 2000 LLAB Low-background alpha-beta
- ALBA 2000 LLB Low-background beta
- ALBA 2000 AB Alpha-beta
- ALBA 2000 A Alpha

COMPONENTS

The counting systems of the ALBA series are configured as described below:

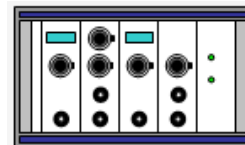
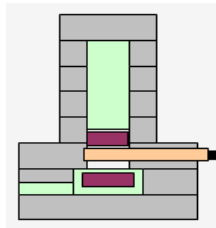
ALBA 2000 LLAB

- Alpha/beta detector
- Guard detector
- Lead shielding
- HV module 2 Nos.
- Amplifier module 2 Nos.



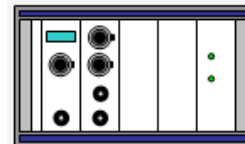
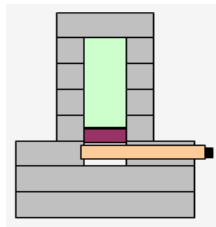
ALBA 2000 LLB

- Beta detector
- Guard detector
- Lead shielding
- HV module 2 Nos.
- Amplifier module 2 Nos.



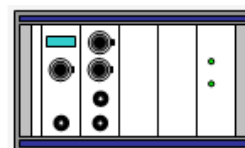
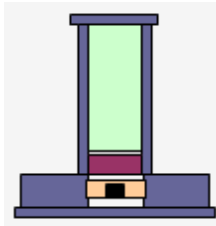
ALBA 2000 AB

- Alpha/beta detector
- Lead shielding
- HV module 1 Nos.
- Amplifier module 1 Nos.



ALBA 2000 A

- Alpha detector
- Aluminium shielding
- HV module 1 Nos.
- Amplifier module 1 Nos.



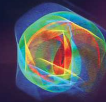
-
- All versions of ALBA 2000 series are managed through the PC with ALBA software installed



OPTIONS AVAILABLE UPON REQUEST

In addition to standard supply, the following options are available upon request:

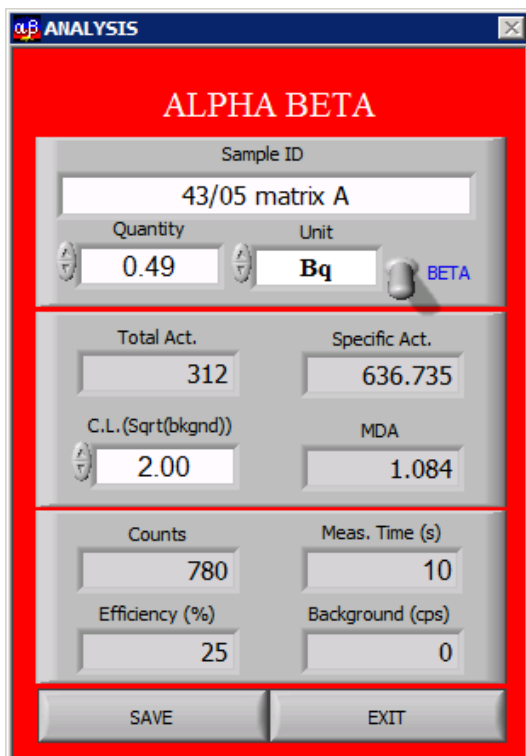
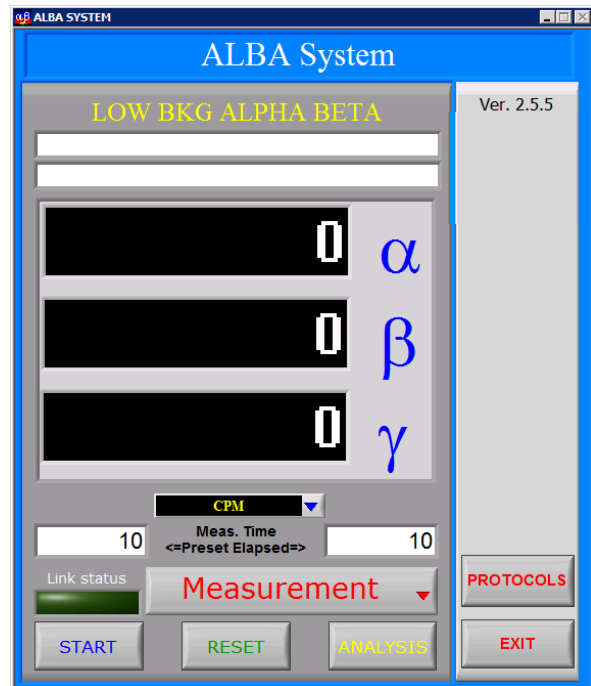
- Steel sample holder for paper filters up to $\varnothing=55$ mm
- Steel sample holder with upturned edge for solid samples



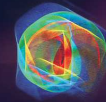
ALBA SOFTWARE

The ALBA software performs the following main operations:

- Alpha-beta counts acquisition from the detectors, for a selectable time interval
- Measurement stop and restart without data loss (pause mode)
- Visualization of elapsed time and selected time
- Real time visualization of the measurement of the three channels: alpha, beta and gamma (anti-coincidence)
- Available measurements: counts, activity, specific activity, efficiency
- Selectable measurement units: cps, cpm, Bq, Bq/l, Bq/m³, Bq/m², % (efficiency)
- Automatic background subtraction
- Unlimited measurement protocols, with customizable protocol name and measurement parameters
- Sample's activity and specific activity calculation updated every second
- Real time calculation of the minimum detectable activity (MDA) with customizable confidence level



- Two selectable thresholds for pre-alarm and alarm
- Continuous check of the threshold trespassing with immediate visual signalling
- Automatic report generation in text file with all the information concerning the measurement
- Efficiency and background value calculation, with automatic saving in the measurement parameters
- Automatic management of consecutive measurement sequences (cycles)
- Visualization of the performed measurements number and of the total schedule
- Quality check with reference source and visual signalling in case of abnormal result
- Simultaneous management of two ALBA counting systems
- Automatic assignment of a code to the measured sample



TECHNICAL SPECIFICATIONS

Measurement performance

- Alpha efficiency¹: 30%
- Alpha background: 0.2 cpm
- Beta efficiency¹: 30%
- Beta background: 2 cpm (LLAB and LLB) | 10 cpm (AB)
- Maximum sample dimensions: $\varnothing = 55$ mm
- Temperature range: $0 \div 40$ °C

Alpha/beta detector

- Alpha: ZnS scintillator
- Beta: Plastic scintillator
- Active part dimensions: $\varnothing \times H = 51 \times 1$ mm

Guard detector (LLAB and LLB)

- Type: Plastic scintillator
- Active part dimensions: $\varnothing \times H = 90 \times 40$ mm

Lead shielding (LLAB, LLB, AB)

- Material: Lead
- Thickness: 5 cm (minimum)
- Dimensions: $\varnothing \times H = 280 \times 400$ mm
- Weight: 180 kg

Aluminium shielding (A)

- Material: Aluminium
- Dimensions: $L \times H \times P = 400 \times 190 \times 309$ mm
- Weight: 10 kg

Acquisition and counting electronic unit

- Data output: RS485
- Alimentation: in 220 VAC 50 Hz / out ± 15 V
- Maximum absorbed power: 40 W
- Dimensions: $L \times H \times P = 250 \times 180 \times 300$ mm
- Weight: 5 kg
- Networkable through RS485 connection

HV module

- Regulation: $0 \div 1000$ V
- Resolution: 1 V
- Integrated LCD display with HV value

Amplifier/discriminator module

- Threshold regulation: $0 \div 300$ mV
- Window regulation: $0 \div 3$ V
- Resolution: 1/100 of the maximum

Control console

- Type: PC
- Operative system: Windows
- Data interface: RS232/RS485
- Installed software: ALBA

¹ Efficiency refers to the ratio of net count rate to 2π surface emission rate of circular ²⁴¹Am (alpha) or ⁹⁰Sr/⁹⁰Y (beta) source.