

## ORDELA MODEL 8100AB PERALS<sup>®</sup> SPECTROMETER

### DESCRIPTION

The ORDELA Model 8100AB Photon-Electron Rejecting Alpha Liquid Scintillation (PERALS<sup>®</sup>) Spectrometer is an electronic module optimized for efficient, rapid, and accurate counting and spectrometry of alpha particles from alpha-emitting nuclides in appropriate extractive scintillators. The Model 8100AB is packaged in a triple-width Nuclear Instrument Module (NIM) and contains the following functional circuits and sub-systems:

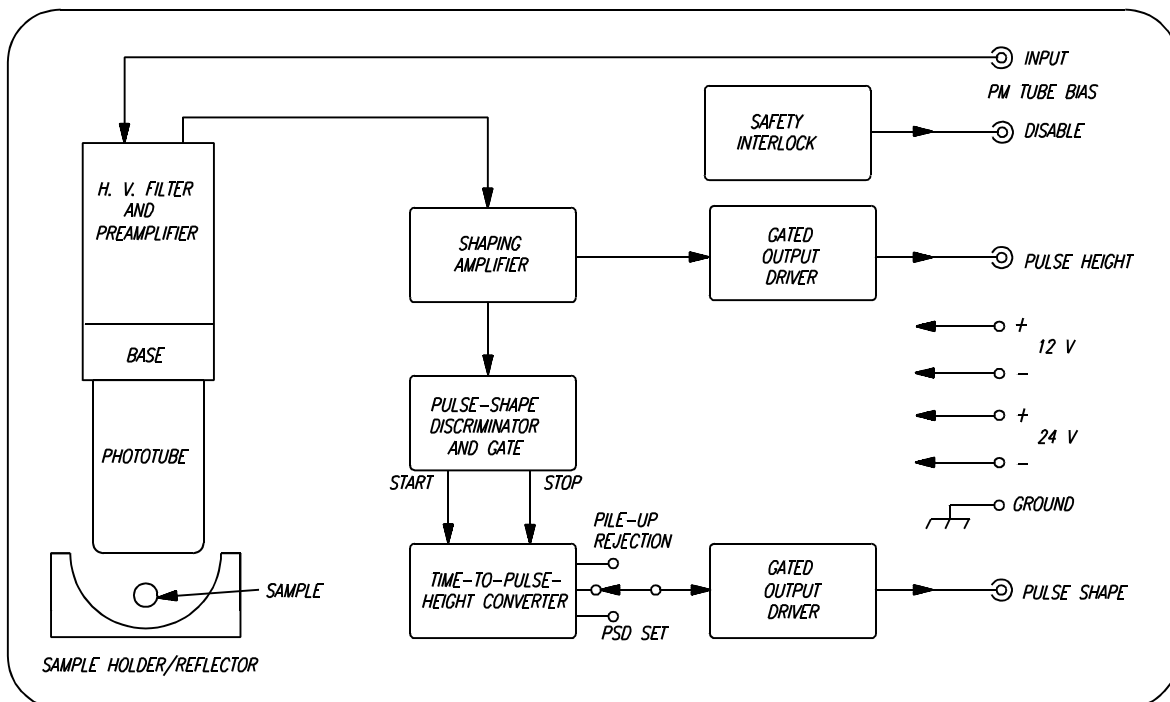
- S Integrated Photo Multiplier Tube (PMT) detector and sample-chamber
- S Preamplifier
- S High-voltage filter and bias interlock circuit
- S Shaping amplifiers
- S Time-to-pulse-height converter
- S Pulse-shape discriminator and coincidence gate
- S Pulse-shape discriminator level marker
- S Pulse pile-up rejection

With these circuits, the Model 8100AB contains all functions necessary for alpha scintillation spectrometry with 99.7% counting efficiency, 99.95% rejection capability of unwanted pulses from electrons and photons, 300 keV resolution at 6 MeV, and excellent linearity.

### SPECIFICATIONS

- INPUTS:** BIN POWER: Rear panel NIM Bin connector;  $\pm 12$  V @ 450 mA,  $\pm 24$  V @ 240 mA.  
INPUT: Rear panel SHV connector; accepts +500 V @ 1 mA input current to provide power to the photomultiplier tube (PMT). (Note: Not required if internal high voltage module option is installed.)
- OUTPUTS:** PULSE HEIGHT: Front panel BNC connector; provides unipolar, positive pulses, 0 to 10 V amplitude; linear with alpha energy (6 MeV alpha energy = 6 V output at GAIN = 10); 1.5  $\mu$ s dwell time, 100  $\Omega$  output impedance; <300 keV (fwhm) resolution at 6 MeV alpha energy; output internally gated by Pulse-Shape Discriminator (PSD) setting.  
GATE: Front panel BNC connector; provides unipolar, positive pulses, 3.5 V amplitude, 3  $\mu$ s dwell time, 100  $\Omega$  output impedance; time coincident with all Pulse Height outputs having amplitudes between the PSD and Pile-Up set points.  
PULSE SHAPE: Front panel BNC connector; provides unipolar, positive pulses, 0 to 10 V amplitude (approx. 0.5 V/ns); 1.5  $\mu$ s dwell time, 100  $\Omega$  output impedance; 10 ns (fwhm) resolution. For samples having beta/gamma and alpha activity, the multichannel analyzer display of the pulse shape spectrum shows two peaks separated by approx. 35 ns.  
DISABLE: Rear panel BNC connector; provides short to ground to disable bias and prevent damage to PMT when sample chamber is opened. (Note: Not required if internal high voltage option is installed.)

**CONTROLS:** **GAIN:** Front panel, 10-turn potentiometer; 0.4 X - 1.4 X range. Allows calibrating the energy scale from 2.4 V to 8.4 V for 6 MeV alpha energy.  
**PSD SET:** Front panel, 10-turn potentiometer, 0 to 10 V range. Sets the lower level discriminator of the Pulse Shape pulses to eliminate beta/gamma background.  
**DISPLAY:** Front panel, two position, momentary contact switch; allows superposition of the PSD lower level discriminator setting and the Pile-up upper level discriminator setting on the Pulse Shape output spectrum.  
**PILE-UP:** Front panel, multi-turn trimpot, 0 to 10 V range. Sets upper level discriminator for rejection of pulses with longer decay times than alpha particles of interest.  
**LLD:** Rear panel, multi-turn trimpot, factory set lower-level discriminator for the Pulse Height output spectrum.  
**EXP:** Rear panel, multi-turn trimpot, factory set gain for the Pulse Shape output spectrum.  
**SHIFT:** Rear panel, multi-turn trimpot, factory set offset for the Pulse Shape output spectrum.  
**DIMENSIONS:** 3 NIM wide module, 10.2 cm wide, 22.1 cm high, and 24.6 cm long.  
**WEIGHT:** (shipping) 5 kg (Net) 2.5 kg



**ORDELA MODEL 8100AB INTERCONNECTION DIAGRAM**

## WARRANTY

ORDELA, Inc. warrants its products to be free from defects in materials and workmanship for 12 months after shipment. No other warranty is included. Specifically, no warranty of merchantability or fitness for a particular purpose is implied. ORDELA's liability under this warranty is limited to repairing or replacing the product at ORDELA's option. This warranty is void if the product is operated improperly, disassembled, or modified other than in the ORDELA laboratory.