



Revised 9/28/00

## ORDELA MODEL 8400AB-P PORTABLE PERALS SPECTROMETER

### DESCRIPTION

The ORDELA Model 8400AB-P Portable PERALS<sup>®</sup> Spectrometer is designed to quickly screen soil, water, liquid, air filter, and smear samples for alpha contamination by rapid alpha spectrometry. The Portable PERALS<sup>®</sup> has an optional battery pack for standalone field operation, and will interface with any contemporary multichannel analyzer (MCA), including portable, computer-based, or desktop MCA.

Standard features include a 37 x 24 x 22 cm (L x W x H) shock- and water-resistant aluminum case and 115/220 volt ac operation for benchtop or field use. The internal high voltage power supply features an automatic HV disable function when the sample chamber is opened. An included jack allows powering the unit from an external source, such as a 12 volt battery or vehicle cigarette lighter (NOTE: cable NOT included). Alpha resolutions of better than 250 keV FWHM are possible. Sample preparation is easy, and does not require time- and labor-intensive radiochemistry. Short assay times are possible due to the 4-B counting geometry and low backgrounds of the model 8400AB-P.

The Portable PERALS<sup>®</sup> offers an unexcelled Figure-of-Merit (FOM) of >9,900,000 and Minimum Detectable Activity (MDA). It offers nonpareil 99.7% counting efficiency, low backgrounds of 0.001 dpm over the entire alpha energy spectrum from 4-10 MeV, and beta/gamma background rejection capability of 99.95%. With its virtual 100% counting efficiency, the Portable PERALS<sup>®</sup> efficiency is almost seven times greater than the 15% you would expect from solid-state detectors in a similar application. In addition, it is almost three times greater than the 35% alpha efficiency from low-background gas flow proportional counters. Sample self-absorption is not a problem with the Portable PERALS<sup>®</sup>! While other plate counting methods are limited to densities of 100-200  $\mu\text{g}/\text{cm}^2$ , the Portable PERALS<sup>®</sup> can offer effective concentrations of 1200  $\mu\text{g}/\text{cm}^2$  for <sup>238</sup>U in a small, 1 ml sample and up to 18,000  $\mu\text{g}/\text{cm}^2$  for <sup>230</sup>Th in the same volume.

### SPECIFICATIONS

INPUTS:	AC PWR: Standard 3-prong NEMA-type connector accepts 110/115 V or 200/230 V, 50/60 Hz input power. EXTERNAL +12 V: Switchcraft <sup>®</sup> type 712-A male jack accepts +12 V input power from external source.
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 : s dwell time, 100 S 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 : s dwell time, 100 S output impedance; time coincident with all Pulse Height outputs having amplitudes between the PSD and Pile-up set points.

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**CONTROLS:** PULSE SHAPE: Front panel BNC connector; provides unipolar, positive pulses, 0 to 10 V amplitude (approximately 0.5 V/ns); 1.5 : s dwell time, 100 S 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 approximately 35 ns. PERALS PWR: Rocker switch controls power to unit from ac, + 12 V external source, or optional internal rechargeable battery. 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 output 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 REJECTION: 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.

**INDICATORS:** PERALS PWR: Red LED; illuminates to indicate application of bias to the photomultiplier tube (PMT).

**MECHANICAL:** DIMENSIONS: 24 cm wide, 22 cm high, and 37 cm long  
WEIGHT: (Shipping) 7.5 kg (Net) 5 kg

## ACCESSORIES

Standard accessories, delivered with the Model 8400AB are: (1) one six-foot ac power line cord and (1) jack to connect with an external +12 volt power source, such as a vehicle battery or cigarette lighter (NOTE: cable NOT included).

## 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.