



ORDELA MODEL 1410N

POSITION-SENSITIVE PROPORTIONAL COUNTER SYSTEM

DESCRIPTION

The ORDELA Model 1410N is a gas-filled, multi-anode proportional neutron counter designed and manufactured by ORDELA, Inc. for applications in neutron scattering and diffraction research requiring high count-rate capability and good angular resolution.

The counting gas is $^3\text{He-CF}_4$ at ~ 490 kPa absolute pressure for optimum detection efficiency and uniformity, low gamma cross-section, and high count-rate capability. A set of 624 anodes on a 0.2° pitch covers a neutron-sensitive scattering arc of 124.8° . The focal distance of the detector volume is 71 cm measured from the inside of the 0.32 cm thick aluminum window. The counting volume is 5.1 cm high and 3.8 cm deep. A high-voltage distribution and filtering circuit and a gas purifier are integral detector parts.

The position decoder consists of one preamplifier, shaping amplifier, and discriminator circuit connected to each of the 624 anode outputs. Every detected neutron event is stored in its corresponding memory bin. The discriminators are interconnected and their levels are set so that multiple counting of single neutrons is avoided. The overall detection-time resolution is . 500 ns; therefore, the detector can operate at count rates . 2×10^5 neutrons per second per anode (pixel) with 10% coincidence losses. At these rates, the count rate detected on any anode is independent of the count rate detected at adjacent anodes.

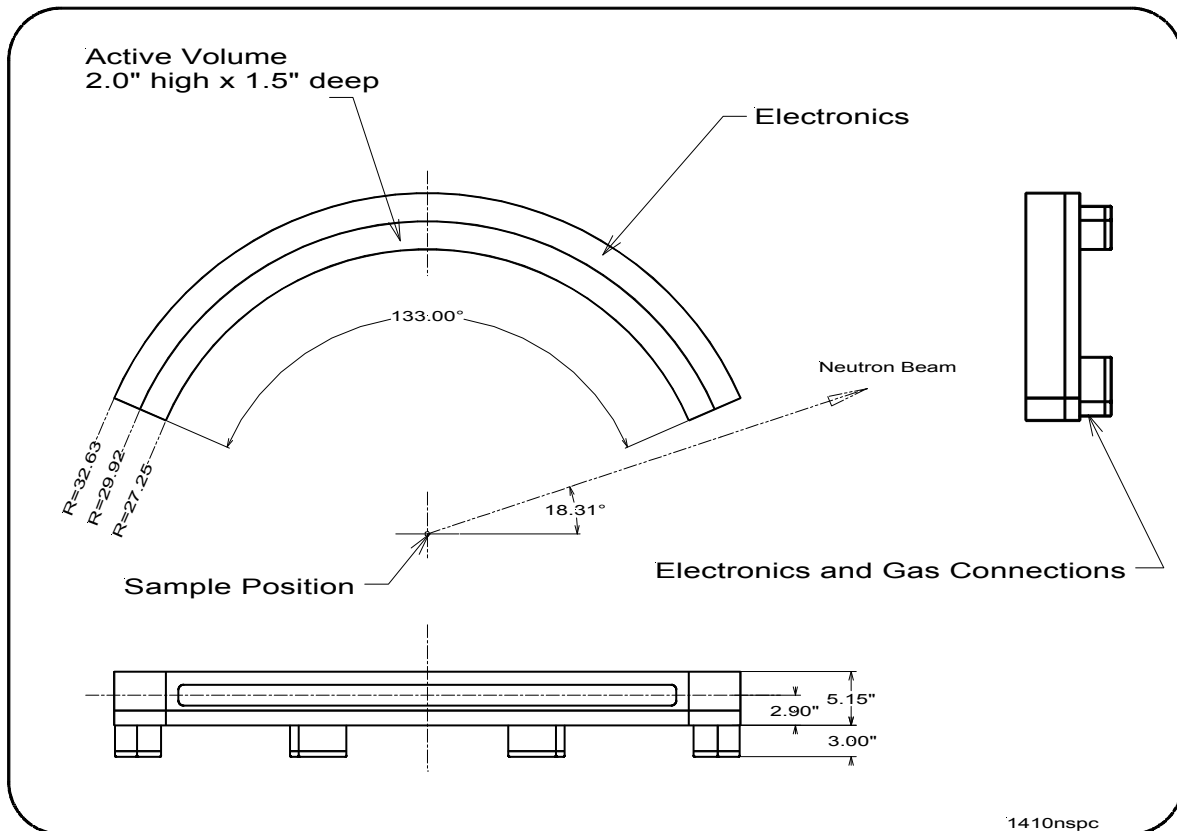
The data acquisition is a micro-processor-controlled system. Each of its 624 memory bins may be polled and cleared through the system communication bus without interruption of the counting process. The data processor may be networked via Ethernet (or similar network) to a VAX computer for data transfer and analysis and remote control of the detector system.

SPECIFICATIONS

ACTIVE VOLUME:	5 cm high x 3.8 cm deep, on a 124.8° arc
FOCAL DISTANCE:	71 cm from the inside of the window
SPATIAL RESOLUTION:	624 picture elements (pixels)
PIXEL SIZE:	0.2° of arc
DETECTION EFFICIENCY:	75% for 1.3 Å neutrons
COUNT-RATE CAPABILITY:	10^7 neutrons per second overall, 2×10^5 neutrons per pixel per second for 10% coincidence losses.
LINEARITY:	2% integral, 15% differential
WINDOW:	0.32 cm thick aluminum (6061-T6)
BIAS VOLTAGE:	<4 kV
SHIPPING SIZE:	60 cm x 70 cm x 140 cm
SHIPPING WEIGHT:	70 kg

MAINTENANCE

The proposed system will be shipped as completely tested and integrated instrument. Instruction and operation manuals, containing routine maintenance and calibration procedures are included as deliverables of this project. Few repairs and calibrations should be required during the operation of the proposed system. However, maintenance and calibration services are available and may be negotiated separately from this proposal.



ORDELA Model 1410N detector outline 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.

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