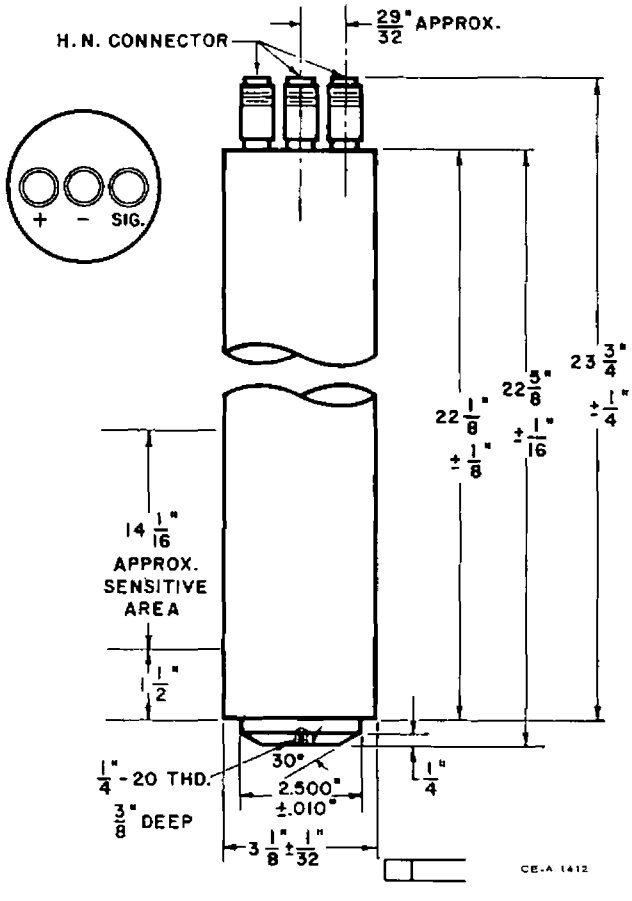
December 5, 1958

ELECTRICALLY COMPENSATED IONIZATION CHAMBER TYPE WL-7353

The WL-7353 is a high purity magnesium alloy, boron lined ionization chamber designed to detect thermal neutrons in the flux range from 2.5×10^2 to 2.5×10^{10} neutrons/cm²/second. This type is extremely rugged♦ and will operate in any position at temperatures not exceeding 175°F. Connections are made through "HN" type cable fittings. The gas filling is nitrogen at a pressure of 76 cm Hg.

The WL-7353 incorporates two outstanding features. The first is the use of a "guard ring" type of construction to minimize the reduction in signal currents due to leakage through the insulators. The second is the provision for adjustable gamma compensation.⊕ The neutron sensitivity of the chamber is approximately 4×10^{-14} amperes/neutron/cm²/second. Gamma sensitivity is approximately 3×10^{-11} amperes/R/hr when operated uncompensated but is reduced to approximately 3×10^{-13} amperes/R/hr in compensated operation thus extending the operating range two decades lower.



The WL-7353 is electrically similar to the WL-6377. The significant mechanical difference is that the WL-7353 has an extended portion with a tapped hole to facilitate mounting.

MECHANICAL:

Maximum Diameter	3-5/32	Inches
Maximum Overall Length	24-1/2	Inches
Approx. Sensitive Length	14-1/16	Inches
Net Weight	5-3/8	Pounds
Shipping Weight	19	Pounds

MATERIALS:

Body	Alloy 3% Al, 97% Mg
Insulation	Polystyrene & Alumina
Gas Filling	Nitrogen
Neutron Sensitive Material	Boron enriched to 92% with B-10 1 mg/cm² thick

MAXIMUM RATINGS:

Absolute Maximum Values

Thermal Neutron Flux	10^{11} max.	n/cm²/sec
Temperature	175 max.	°F
Interelectrode Voltage (dc)	1500 max.	Volts

TYPICAL OPERATING CHARACTERISTICS:

Approx. Operating Voltage□	300 to 800	Volts
Compensating Voltage■	-10 to -80	Volts
Neutron Sensitivity	4×10^{-14}	Amp/n/cm²/sec
Thermal Neutron Flux Range	2.5×10^2 to 2.5×10^{10}	n/cm²/sec
Approx. Signal Electrode Output Impedance:		
Capacity	160	uuf
Leakage Resistance	10^{14} min.	ohms

TYPICAL SATURATION CHARACTERISTICS:

For Neutron Flux of 2.5×10^{10} neutrons/cm²/second		
Operating Voltage	800	Volts
Output Current	10^{-3}	Amperes
For Neutron Flux of 2.5×10^9 neutrons/cm²/second		
Operating Voltage	300	Volts
Output Current	2×10^{-4}	Amperes

♦ The WL-7353 has passed military specifications MIL-S-901 for shock and BuShips 40T9 for vibration.

□ Guide to connections is shown on page 2. Saturation voltage varies with neutron flux as shown on page 3.

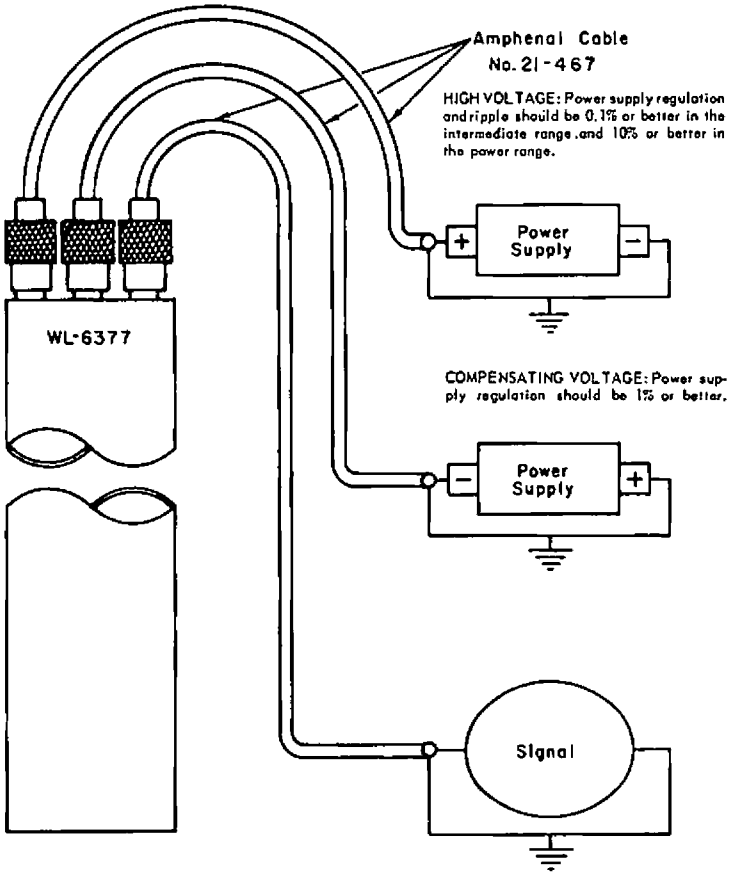
■ Value of compensating voltage is dependent on the gamma flux gradient on the tube.

⊕ By varying the voltage on an electrode.

NOTE: This tube may not be immersed in water and high humidity environments should be avoided since they may impair performance.

Neutron & Radiation Detector Section

TYPICAL CONNECTION DIAGRAM



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TYPICAL SATURATION CHARACTERISTICS