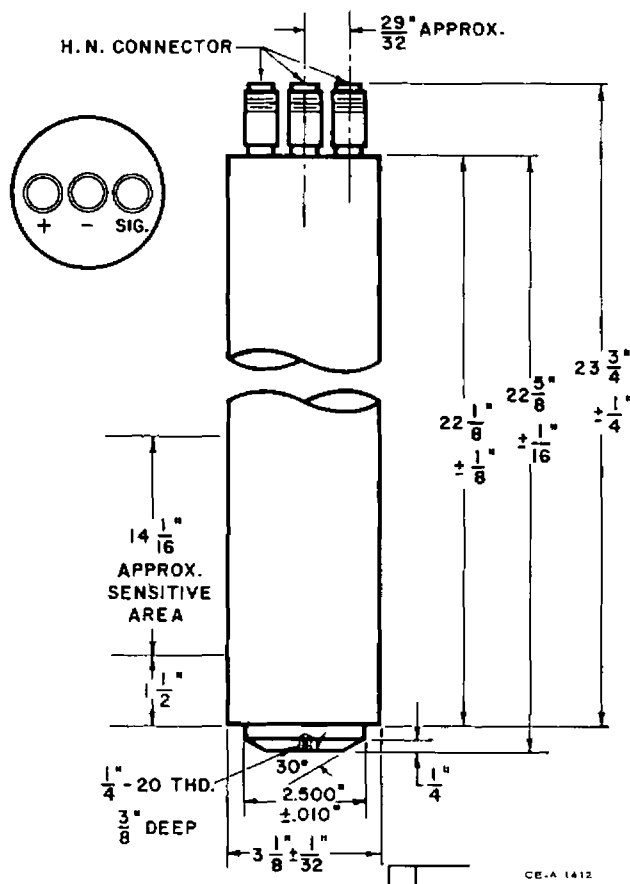


December 5, 1958

## 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  $2.5 \times 10^2$  to  $2.5 \times 10^{10}$  neutrons/cm<sup>2</sup>/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  $4 \times 10^{-14}$  amperes/neutron/cm<sup>2</sup>/second. Gamma sensitivity is approximately  $3 \times 10^{-11}$  amperes/R/hr when operated uncompensated but is reduced to approximately  $3 \times 10^{-13}$  amperes/R/hr in compensated operation thus extending the operating range two decades lower.



## 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%<br>with B-10 1 mg/cm <sup>2</sup> thick |

## MAXIMUM RATINGS:

## Absolute Maximum Values

|                             |                                       |
|-----------------------------|---------------------------------------|
| Thermal Neutron Flux        | $10^{11}$ max. n/cm <sup>2</sup> /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        | $4 \times 10^{-14}$ Amp/n/cm <sup>2</sup> /sec                   |
| Thermal Neutron Flux Range | $2.5 \times 10^2$ to $2.5 \times 10^{10}$ n/cm <sup>2</sup> /sec |

## Approx. Signal Electrode Output Impedance:

|                    |                     |
|--------------------|---------------------|
| Capacity           | 160 uuf             |
| Leakage Resistance | $10^{14}$ min. ohms |

## TYPICAL SATURATION CHARACTERISTICS:

For Neutron Flux of  $2.5 \times 10^{10}$  neutrons/cm<sup>2</sup>/second

|                   |                   |
|-------------------|-------------------|
| Operating Voltage | 800 Volts         |
| Output Current    | $10^{-3}$ Amperes |

For Neutron Flux of  $2.5 \times 10^9$  neutrons/cm<sup>2</sup>/second

|                   |                            |
|-------------------|----------------------------|
| Operating Voltage | 300 Volts                  |
| Output Current    | $2 \times 10^{-4}$ 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.

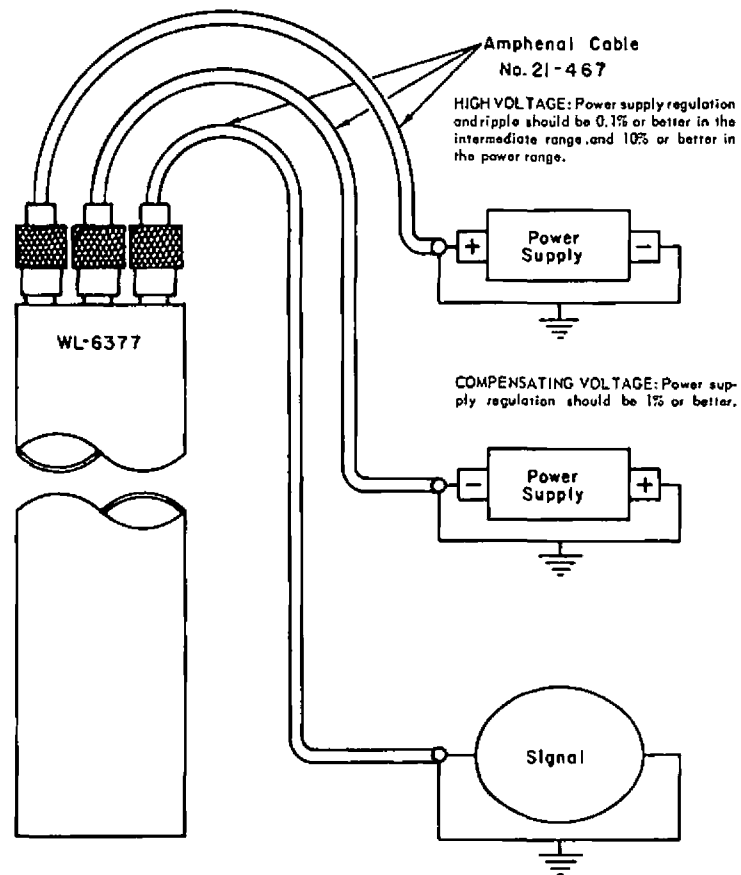
⊙ By varying the voltage on an electrode.

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

Neutron &amp; Radiation Detector Section

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.

TYPICAL CONNECTION DIAGRAM



CE-A1324

TYPICAL SATURATION CHARACTERISTICS

