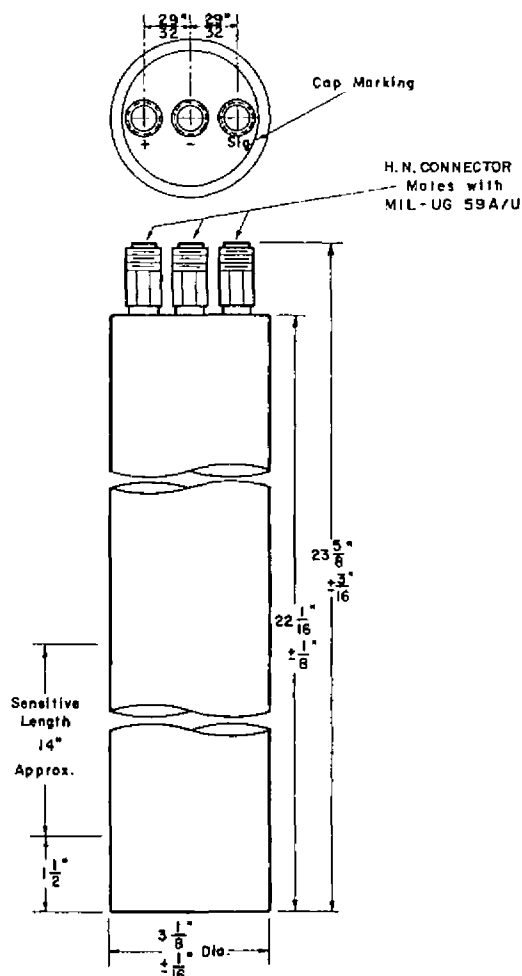


COMPENSATED IONIZATION CHAMBER TYPE 8074

The 8074 compensated ionization chamber is designed to detect thermal neutrons in the presence of high gamma radiation fields. Provision for electrical adjustment of compensation after installation makes it particularly useful for Intermediate and Power range operation in reactor facilities where high gamma gradients are encountered. The use of stabilized polystyrene and the rugged, guard-ring design assures noise-free operation and minimizes spurious signal currents due to electrical leakage.

The use of materials of low-activation cross section minimizes handling problems and shift of characteristics during exposure. Careful design of the sensitive volumes minimizes shift in compensation characteristics over a wide range of gamma dose rates (See Figure 3).

The thermal neutron sensitivity of the 8074 is approximately 4×10^{-14} amperes/neutron/cm²/second. The gamma sensitivity, when operated uncompensated, is approximately 3×10^{-11} amperes/R/hour. The combination of these parameters permits highly reliable operation from 2.5×10^2 to 2.5×10^{10} neutrons/cm²/second.



MECHANICAL:

Maximum Diameter	3-3/16	Inches
Maximum Overall Length	23-13/16	Inches
Approximate Sensitive Length	14	Inches
Net Weight	5-3/8	Pounds
Shipping Weight	19	Pounds

MATERIALS:

Outer Case	3% Al, 97% Mg Alloy
Electrodes	3% Al, 97% Mg Alloy
Insulation	Stabilized Polystyrene
Neutron Sensitive Material:	
Content	Baron enriched in B-10
Thickness	1 mg/cm ²
Gas Filling	Nitrogen

IMPEDANCE:

Resistance: (Note 2)		
Signal Electrode to Case (Minimum) . . .	10^{13}	Ohms
H.V. Electrode to Case (Minimum) . . .	10^{12}	Ohms
Compensating Electrode to Case (Minimum)	10^{12}	Ohms
Capacitance: (Note 1)		
Signal Electrode to Case (Approx.) . . .	275	μfd
H.V. Electrode to Case (Approx.) . . .	315	μfd
Compensating Electrode to Case (Approx.)	125	μfd

MAXIMUM RATINGS:

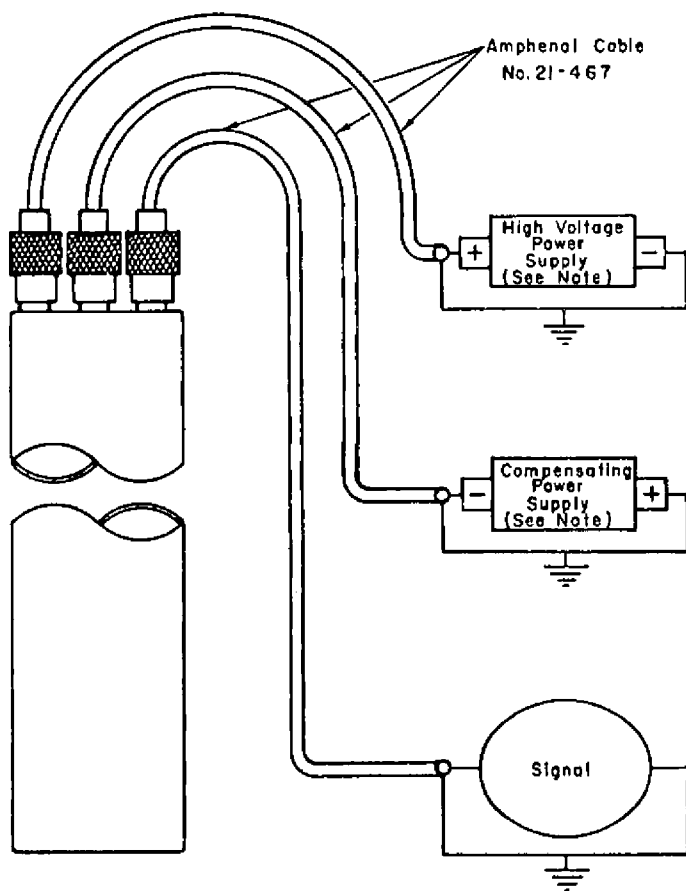
Voltage Between Electrodes (dc) . . .	1500 max.	Volts
Temperature	175 max.	Degrees F
External Pressure (Note 3)	180 max.	Pounds/Inch ²
Thermal Neutron Flux	5×10^{11} max.	nv

TYPICAL OPERATION:

Typical Connection	See Figure 1
Operating Voltage	300 to 800 Volts
Compensating Voltage (See Figure 3)	-10 to -80 Volts
Saturation Characteristics	See Figure 2
Thermal Neutron Flux Range	2.5×10^2 to 2.5×10^{10} nv
Thermal Neutron Sensitivity	4×10^{-14} Amperes/nv
Gamma Sensitivity:	
Total Compensation	zero
Uncompensated	3×10^{-11} Amperes/R/hour

1. Capacitance is measured between an electrode and case, with all other electrodes grounded.
2. The detector may not be immersed directly in water, and high humidity environments should be avoided as they will impair performance.
3. The pressurizing atmosphere must be dry and non-corrosive.

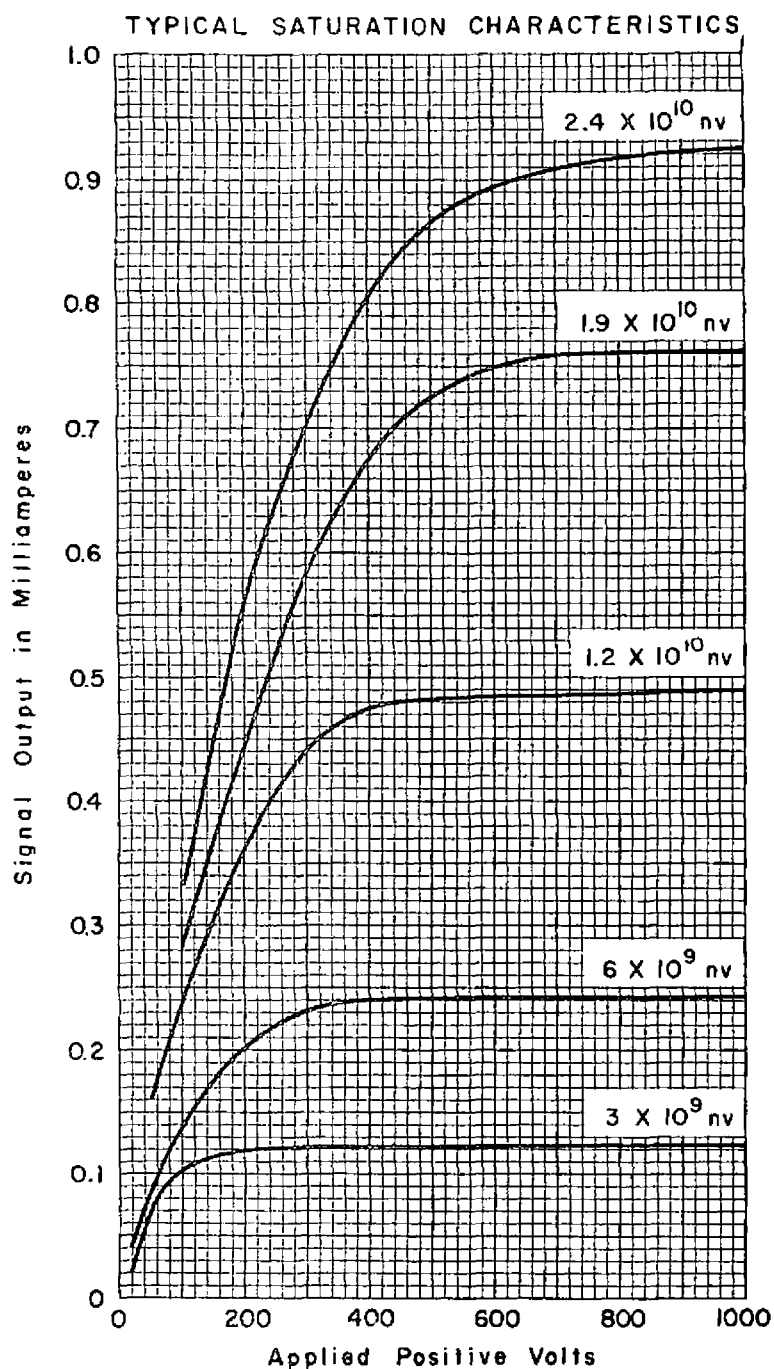
TYPICAL CONNECTION DIAGRAM



Note: Permissible power supply regulation and ripple will depend upon the particular application. See Section entitled "Ionization Chamber Operation."

FIGURE 1

CE-A1324 R1



CE-A1284 R2

FIGURE 2

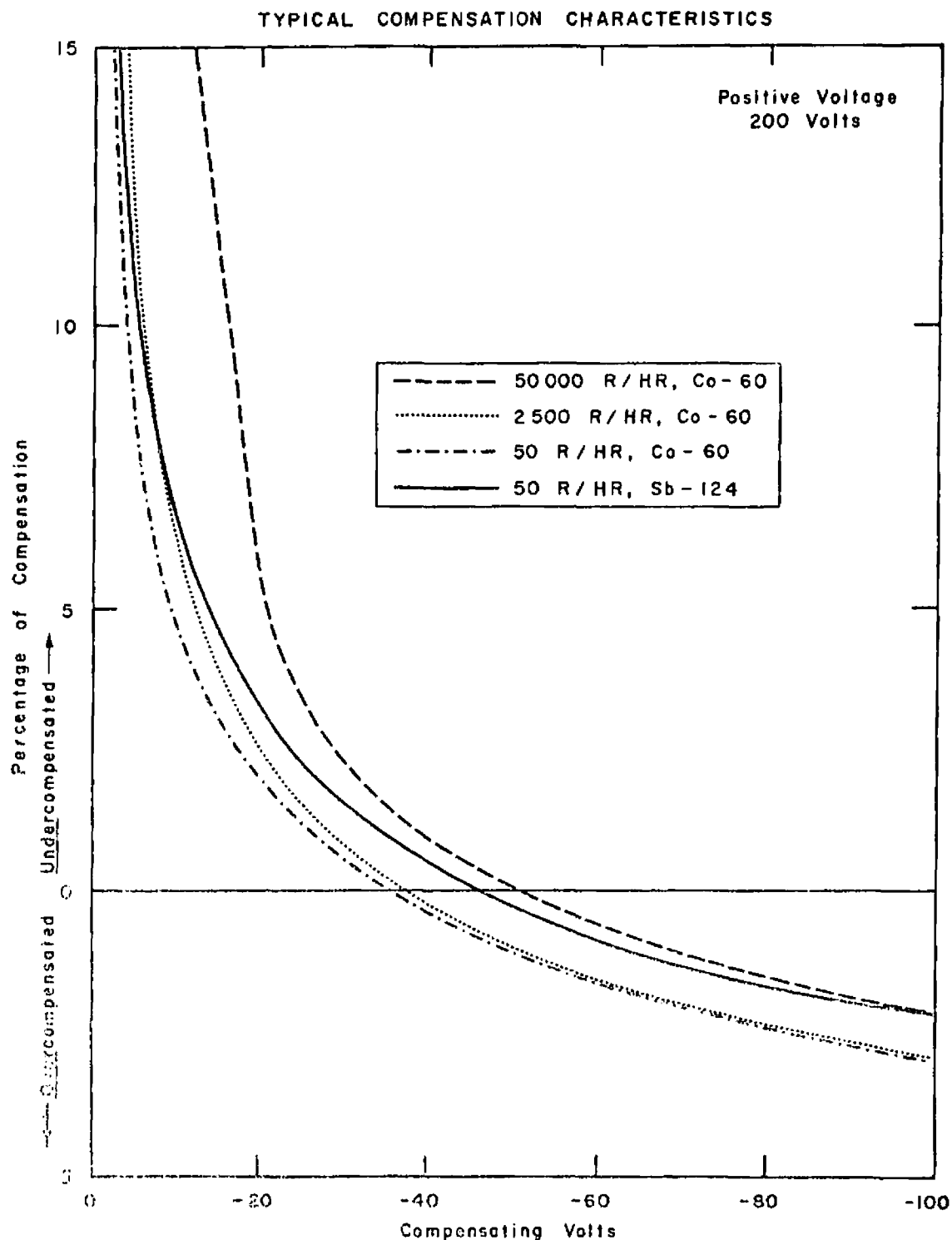


FIGURE 3