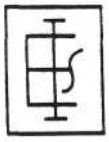
TECHNICAL MANUAL

BETA-GAMMA DETECTOR ASSEMBLY

MODEL HP-177B



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LIST OF EFFECTIVE PAGES

Insert latest revised pages; dispose of superseded pages.

NOTE: On a revised page, the portion of the text affected by the latest change is indicated by a vertical line in the outer margin of the page.

TOTAL NUMBER OF PAGES IN THIS MANUAL IS 10, CONSISTING OF THE FOLLOWING:

Page No.	Change in Effect	Latest Change Date
Title	Original	June 1, 1964
A	Change 1	March 1, 1967
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MODEL HP-177B

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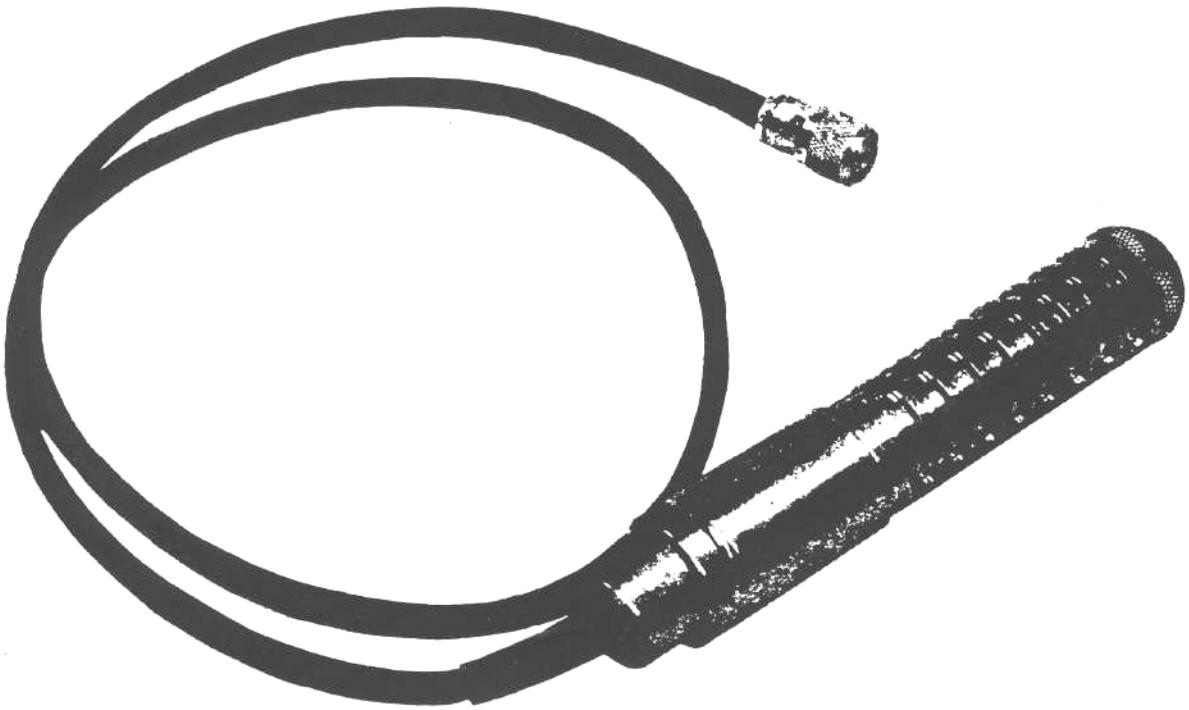

Figure 1-1. Model HP-177B Detector Probe Assembly
(Shown with RG-59/U cable and TNC connector.)

SECTION I

GENERAL DESCRIPTION

A. PURPOSE:

The HP-177B detector assembly is a beta-gamma detecting probe. The detecting element is an argon-filled, halogen quenched GM tube mounted in a holder with beta discriminating shield.

B. GENERAL DESCRIPTION:

1. The detector assembly is a hand held probe used to monitor gamma and/or beta radiation. It is equipped with a beta discriminating shield for beta elimination when monitoring for gamma activity.

2. The assembly consists of:

   a. Geiger-Mueller tube
   b. Tube guard and beta shield.
   c. Tube socket and cable connector assembly.

C. SPECIFICATIONS

1. GM Tube: 30 mg/cm^ stainless steel wall, halogen quenched with .72" diameter x 2-9/32 long sensitive volume.

2. Operating Voltage: 900 ±50 volts.

3. Sensitivity: Approximately 1400 CPM per mr/hr in ^{60}Co field.

4. Dead Time: Approximately 100 microseconds.

5. Plateau: 100 volts minimum length with slope approximately 10% per 100 volts.

6. Energy Response: See figure 1-2.

7. Housing: 1/16" thick chrome plated brass rotating beta shield.

8. Environment: Completely waterproof. Operating temperature range-40° to+160°F.

9. Cable: Integrally attached with strain relief bushing. Choice of RG-59/U coaxial cable or coiled cord. Coiled cord should not be used if counting instrument is more sensitive than 0.1 volts due to flexing noise in the cord.

10. Connector: Choice of UHF, BNC, TNC, MHV or special Eberline waterproofed connectors.

11. Size: 1-1/8" diameter x 6.3" long excluding cable.

12. Weight: 1 pound including 3 ft. cable.

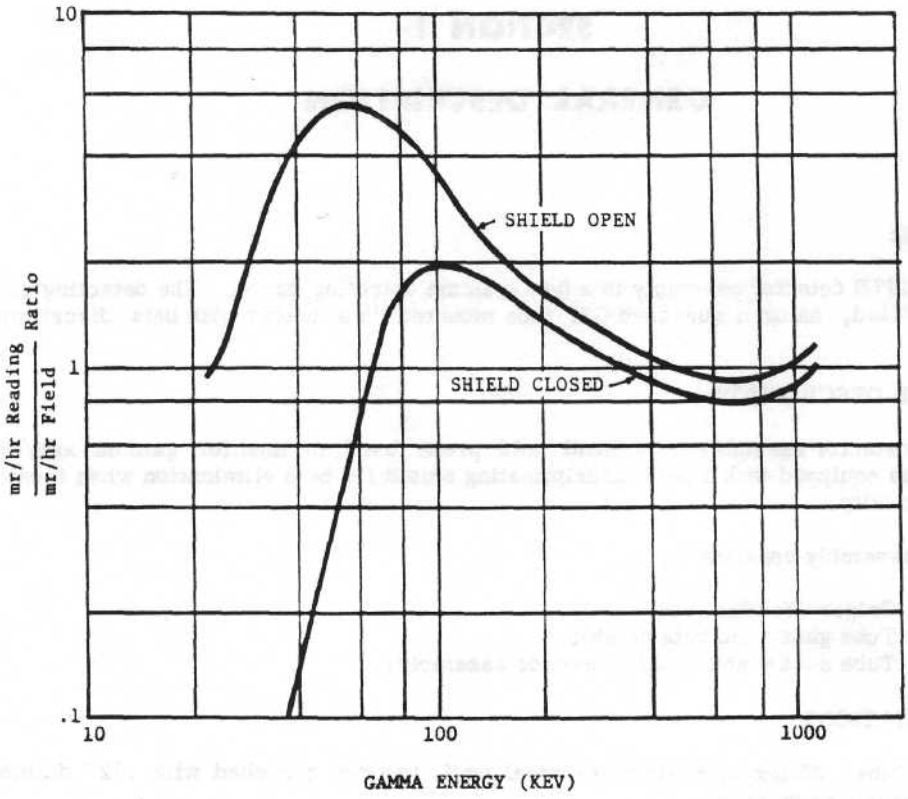

Figure 1-2. Typical Energy Response of E-120

SECTION II

OPERATION

The HP-177B detector assembly may be used with any counting instrument which is capable of providing a nominal regulated 900 VDC to the Geiger tube.

The beta shield may be opened or closed by grasping the probe base and the cover and rotating until apertures are open or closed.

When monitoring for gamma radiation the probe should beheld perpendicular to the source of radiation with the beta shield completely closed.

When monitoring for beta activity, open the beta shield completely. Hold the detector with the window apertures toward and as close as possible to the surface to be monitored and parallel with it.

Low energy gamma radiation can cause considerable error in reading. An estimate of the energy may be made by taking the ratio of shield open and shield closed readings and referring to figure 1-2.

SECTION III

MAINTENANCE

The detector should be clean and dry at all times.

Contamination of the detector assembly or circuit noise may occur at any time. The following procedure may be used to determine if the probe is contaminated or the high count rate is due to circuit noise.

1. Disconnect probe. Check instrument meter for any reading. Should the meter indicate any reading, the instrument should be checked out. Refer to maintenance section of the instrument manual. If the meter indicates no CPM proceed to Paragraph 2.

2. Noisy cable or connector: Remove the GM tube from holder as outlined in paragraph 3, reconnect probe cable to instrument and apply power. Flex the cable in one foot increments while observing the meter. The meter should not indicate. If meter does indicate any up scale value, discontinue tests and return faulty cable to manufacturer for repair and/or replacement.

3. Replace GM tube. Decontaminate holder and cable connector assemble before putting in new GM tube. Refer to Decontamination procedures below. To remove GM tube, grasp cable connector end of holder in one hand and the aperture section in the other hand, twist counter clockwise until the two sections loosen. Holding the head end of the probe holder down, unscrew the connector section and place to one side. Remove GM tube from guard section and remove o-ring from tube base. Place o-ring on new GM tube and put tube in guard section. Reassemble using reverse procedure, being sure the sections are hand tight together. DO NOT use any tools. Couple detector assembly to instrument and again check for higher than normal meter reading.

4. Decontamination or clean: To decontaminate or clean the detector assembly, remove from the instrument and disassemble as outlined in paragraph 3 above. Wash all parts in mild soap and water. DO NOT wash tube socket cable connector section. Use alcohol and clean cloth to clean inside of tube socket section. The outside of the connector section may be cleaned with a damp cloth. DO NOT permit any water to get inside the tube socket section. The least amount of moisture in this section may cause total failure of the instrument. Thoroughly rinse the soap washed parts under a running stream of clean water. Dry and reassemble.

SECTION IV

PARTS LIST

ACCESSORIES:

HP-177B	Beta-Gamma Hand Probe Detector Assembly
112	GM Tube
RG-59/U Or 10434-A17	Coaxial Cable with connectors. As required for each application. Coiled Cord with connector.
E-177B 4-5(-17)	Shield bushing and screw

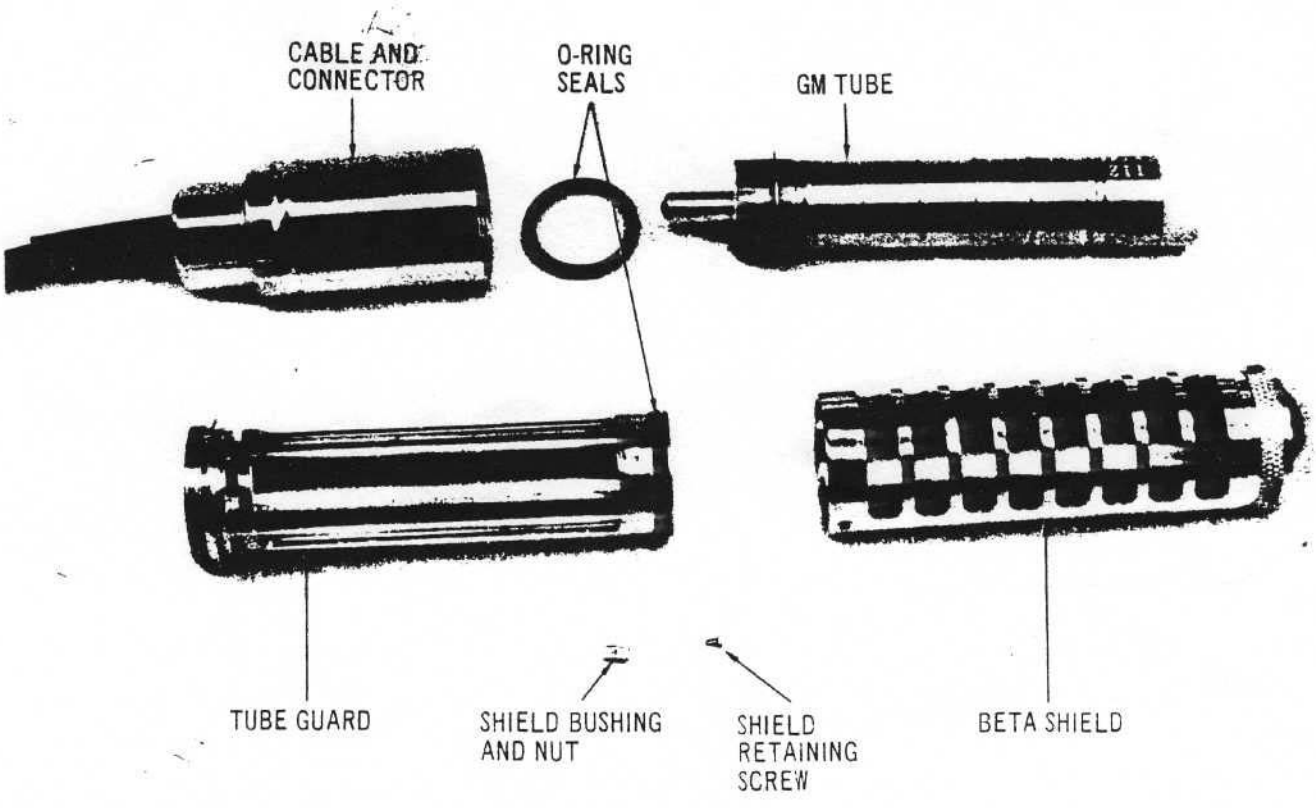

Figure 4-1. Composite Parts, HP-177B Detector Assembly