



ELECTRONIC TUBE REFERENCE

100NB

Specialized - Radiation Counter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

GEIGERMULLERCOUNTER

Based version of the neon-filled self-quenching Geiger-Müller counter for beta detection, using a thin mica window and broad operating plateau for general radiation-counting instrumentation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	— / —	PARALLEL HEATER	— / —
HEATING	Indirect; cold cathode	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 GeigerMullerCounter

No fixed ratings recorded.

Counter-tube source does not publish ordinary active-electrode promoted fields; counter performance is retained in parameters.

100NB — Beta Radiation Counter Tube

The **100NB** is a permanent-sensitivity, thin-window radiation counter tube designed specifically for beta detection applications. Featuring a stainless steel cathode, a neon gas filling with a quenching admixture, and a thin mica window, the tube is engineered for stable radiation measurement under a nominal operating potential of 700 V DC.

Construction and Physical Specifications

The 100NB is constructed with a robust mechanical envelope and specialized window materials to facilitate the entry and detection of beta particles.

Window and Cathode Design

The tube incorporates a thin mica window at its entry port. The physical properties of this window are tightly controlled to minimize attenuation of beta radiation:

- **Average Window Thickness:** 0.0005 inches (equivalent to 3.5 mg/cm² or 12.70 microns)
- **Effective Window Diameter:** 1-3/32 inches

The cathode structure is fabricated entirely from stainless steel, ensuring long-term stability and resistance to degradation. The physical dimensions of the effective cathode are:

- **Length:** 1-1/2 inches
- **Outside Diameter (O.D.):** 1-3/16 inches
- **Wall Thickness:** 3/32 inches

Overall Dimensions and Base

The tube is designed with a standard plug-in base for secure mounting and electrical connection:

- **Maximum Overall Dimensions:** 1-3/8 inches diameter by 4-11/32 inches length
- **Base Configuration:** 4-pin base

Electrical and Operating Characteristics

The 100NB operates as a self-quenched Geiger-Müller style counter tube, utilizing a neon gas filling combined with a quenching admixture. This chemistry provides a stable plateau and prevents continuous discharge after an ionization event.

Operating Parameters

- **Nominal Operating Voltage:** 700 V DC
- **Plateau Region:** The voltage plateau extends in excess of 200 volts, allowing reliable operation even with slight variations in the high-voltage power supply.
- **Plateau Slope:** The slope of the plateau is rated between 5% and 10% per 100 volts, indicating a highly stable counting rate across the operating voltage range.
- **Dead Time:** The approximate dead time of the tube is 200 microseconds, which defines the resolving time of the detector between consecutive ionizing events.
- **Background Count:** When housed in a standard 2-inch lead shield, the background count is restricted to a maximum of 50 counts per minute.

Environmental and Durability Ratings

The 100NB is designed to operate reliably under demanding environmental conditions and offers an exceptionally long service life.

- **Operating Temperature Range:** The tube is rated for operation across a wide thermal gradient, from -55°C to +75°C.

- **Life Expectancy:** The tube's operational life is unlimited by use, meaning the quenching gas admixture is not depleted during normal discharge cycles, maintaining permanent sensitivity over time.

Related Designations and Comparisons

The 100NB shares identical electrical characteristics, gas filling, and window dimensions with the [**100N**](#) counter tube. Both models operate at 700 V DC, feature a 200-volt plateau, and have a 200-microsecond dead time. However, they differ in physical packaging and base configuration: the [**100N**](#) has maximum overall dimensions of 1-1/2 by 3-3/4 inches, whereas the 100NB is longer and narrower, measuring 1-3/8 by 4-11/32 inches, and is specifically equipped with a 4-pin base.

Additionally, the 100NB can be compared to the [**100C**](#) and [**100CB**](#) models in the same size class. While the 100NB uses a neon-based filling and operates at 700 V DC for beta detection, the [**100C**](#) and [**100CB**](#) utilize an argon-based filling with a higher operating voltage of 1200 V DC, a plateau in excess of 300 volts, and are rated for both Beta and X-Ray applications.



SOURCE OPERATING CONDITIONS

1953 Amperex

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1953 AMPEREX

Section 1 · GeigerMullerCounter

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Starting voltage maximum	625 V	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum counting rate	830 counts/s	—
Dead time approximate	200 us	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1958 Amperex Industrial

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1958 AMPEREX INDUSTRIAL

Section 1 · GeigerMullerCounter

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Filling	Neon + quenching admixture	—
Operating voltage	700 V	DC
Window thickness	0.0005 in	MicaWindow
Window areal density	3.5 mg/cm ²	MicaWindow
Effective mica-window diameter	1-3/32 in	—
Cathode dimensions	1-1/2 long x 1-3/16 OD x 3/32 wall	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum overall tube dimensions	1-3/8 x 4-11/32; 4-pin base	—
Radiation application	Beta	—
Operating temperature range minimum	-55 degC	—
Operating temperature range maximum	75 degC	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plateau length	in excess of 200 V	—
Plateau slope	5% to 10% per 100 V	—
Dead time	200 us	Approximate
Maximum shielded background	50 counts/min	Shielded by 2 inches of lead

TUBE TINKER

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