

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
SURGEPROTECTOR

1960

Specialized - Switching Tube electronic tube

RCA protective breakdown tube for AC circuits, conducting when voltage exceeds its threshold to protect associated equipment from excessive voltage.

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

SECTION1 SurgeProtector
No fixed ratings recorded.
Source-derived section; promoted fields populated where applicable.

1960 — Protective Tube

The **RCA-1960** is a specialized, voltage-sensitive protective tube designed to safeguard electrical circuits. Housed in a T10-1/2 glass envelope with a unique terminal configuration, the device is engineered to provide reliable voltage-limiting and breakdown performance under varying environmental conditions.

Mechanical Construction and Mounting

The RCA-1960 features a robust physical design optimized for high-voltage protection systems. It is constructed with a **T10-1/2 bulb** envelope and utilizes a **cap and flange** terminal arrangement instead of a conventional pinned base.

The physical dimensions of the device are specified as follows:

- **Maximum Overall Height:** 2-15/16" $\pm$ 1/8"
- **Maximum Diameter:** 1.920" (inclusive of the flange assembly)
- **Maximum Flange Diameter:** 1-3/8"
- **Cap Diameter:** 0.360" $\pm$ 0.005"

Due to its cap and flange terminal configuration, the tube requires a **special mounting** arrangement. It is rated for operation in **any mounting position**, allowing for versatile integration into diverse equipment layouts.

Electrical Characteristics and Breakdown Behavior

The electrical performance of the RCA-1960 is characterized by its breakdown thresholds and voltage drop when operated on a **60-cycle sine-wave supply**. The tube exhibits a low interelectrode capacitance of **1.35 μ pf**.

When subjected to a 60-cycle supply, the tube's electrical parameters are defined by the following limits:

- **Minimum Peak Supply Voltage:** 425 V
- **Maximum Peak Initial Breakdown Voltage (Cold Tube):** 425 V
- **Maximum Peak Recurrent Breakdown Voltage:** 285 V (at a tube current of 30 mA)
- **Tube Voltage Drop:** 175 V (at a tube current of 30 mA)

The initial breakdown voltage represents the peak potential required to initiate conduction when the tube is cold, which is capped at a maximum of 425 V. Once conduction is established, the recurrent breakdown voltage required to maintain or re-initiate conduction on subsequent cycles drops to a maximum of 285 V at a current of 30 mA. During active conduction at this same 30 mA current level, the voltage drop across the tube stabilizes at a nominal 175 V.

Application and Operating Considerations

The primary intended application of the RCA-1960 is as a **protective tube**. It acts as a voltage-clamping or shunt device to protect sensitive downstream components from transient overvoltage conditions.

Temperature Independence

A key operational feature of the RCA-1960 is its stability under varying environmental conditions. Normal variations in ambient temperature have a negligible effect on the tube's breakdown and conduction performance, ensuring consistent protection across a wide thermal operating range.

Arc Prevention Limitation

When designing circuits incorporating the RCA-1960, engineers must observe a critical operating limitation: the energy dissipated in the tube must not be sufficient to establish a sustained arc. A sustained arc can lead to thermal runaway, permanent damage to the tube, or a failure of the protective function. Consequently, the external circuit must be designed to limit the duration and magnitude of the current passing through the tube during a breakdown event.

Technical Summary

The **RCA-1960** is a **T10-1/2 bulb, cap-and-flange protective tube** designed for voltage-limiting applications. It features an interelectrode capacitance of **1.35 μpf** and can be mounted in **any position** using a special mounting interface. Under **60-cycle sine-wave supply** conditions, the tube is characterized by a minimum peak supply voltage of **425 V**, a maximum cold initial breakdown voltage of **425 V**, a maximum recurrent breakdown voltage of **285 V** at 30 mA, and a conducting voltage drop of **175 V** at 30 mA. The device offers excellent thermal stability, with normal ambient temperature variations having a negligible effect on performance, provided that circuit design prevents the dissipation of energy from establishing a sustained arc.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1940 RCA

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

1940 RCA

Section 1 · SurgeProtector

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
The RCA	1960	The RCA-1960 is designed for use as a protective tube. The voltage
PEAK SUPPLY VOLTAGE	425 V	PEAK SUPPLY VOLTAGE 425 min. Volts
PEAK INITIAL BREAKDOWN VOLTAGE (Tube cold)	125 V	PEAK INITIAL BREAKDOWN VOLTAGE (Tube cold) 125 max. Volts
PEAK RECURRENT BREAKDOWN VOLTAGE*	285 V	PEAK RECURRENT BREAKDOWN VOLTAGE* 285 max. Volts
TUBE VOLTAGE DROP*	175 V	TUBE VOLTAGE DROP* 175 Volts
With tube current of	30 mA	With tube current of 30 ma.

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
characteristics shown under TENTATIVE DATA apply only for6	0	characteristics shown under TENTATIVE DATA apply only for60-cycle sine-wave
Characteristics Measured on	60	Characteristics Measured on 60-Cycle Sine-WNave Supply