

ELECTRONIC TUBE REFERENCE

10TE9

Specialized - Switching Tube electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
THYRATRON

Cold-cathode gas switching tube with two auxiliary paths for telephone and remote-control switching. Gas discharge provides heaterless control conduction.

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 Thyratron
No fixed ratings recorded.
Published ratings and characteristics promoted from the approved TESLA source.

10TE9 — Cold-Cathode Trigger Tube

The **10TE9** is a cold-cathode, gas-filled switching tube (trigger tube) featuring two auxiliary control electrodes. Manufactured by TESLA, this subminiature device is designed for direct current (DC) operation as an electronic switch in telecommunications and remote control systems.

Overview

The 10TE9 belongs to the class of cold-cathode gas-discharge tubes, which require no heater power and consume zero standby current when in the non-conducting state. The tube contains a main anode-cathode discharge path and two independent auxiliary paths (trigger electrodes). Conduction in the main path is initiated by establishing a discharge in either of the auxiliary paths, making the device highly suitable for logic, switching, and control functions.

The primary documented applications for the 10TE9 include:

- **Telephone equipment:** Serving as a switching element in telephony and switching systems.
- **Remote control devices:** Used as a trigger or control valve in telecontrol and remote signaling apparatus.

Construction and Physical Characteristics

The 10TE9 is built in an all-glass subminiature envelope with five flexible leads made of clad wire. Because the tube is a cold-cathode device, it does not contain a filament or heater, eliminating heater-related power consumption and thermal dissipation issues.

To facilitate correct identification and wiring of the electrodes, the leads are color-coded with colored dots on the glass envelope:

- **Cathode leads** are marked with **yellow dots**.
- **Auxiliary path leads** are marked with **red dots**.

Physical Dimensions and Weight

- **Maximum diameter:** 10.5 mm
- **Maximum body length (excluding tip and leads):** 30.0 mm
- **Top tip length:** 8.0 mm
- **Minimum lead length:** 20.0 mm
- **Maximum weight:** 5.5 g
- **Base configuration:** Special base with 5 free, flexible leads.

Pinout and Electrode Layout

The five leads are arranged in a circular pattern on the base of the tube. Viewed from the bottom, the electrode connections are positioned as follows:

- **Cathode (k):** Two separate leads connected to the cathode, located at the 9 o'clock and approximately 5 o'clock positions.
- **Anode (a):** Located at the 3 o'clock position.
- **First auxiliary electrode (g1):** Located at the 12 o'clock position.
- **Second auxiliary electrode (g2):** Located at the 6 o'clock position.

Electrical and Operating Characteristics

The 10TE9 operates via gas-discharge ionization. The electrical characteristics of the main and auxiliary paths under nominal DC operating conditions are defined by the following parameters:

- **Main path breakdown voltage (U_{az}):** 205 V. This is the minimum anode voltage required to initiate a self-sustaining discharge in the main path when the auxiliary electrodes are not active.

- **Main path maintaining voltage (U_{arc}):** 70 V. Once the main discharge is ignited, the voltage drop across the anode-cathode path stabilizes at this value when operating at a nominal current (I_a) of 4 mA.
- **First auxiliary path breakdown voltage (U_{g1z}):** 89 V.
- **Second auxiliary path breakdown voltage (U_{g2z}):** 89 V.
- **Auxiliary breakdown voltage difference ($U_{g1z} - U_{g2z}$):** Less than 10 V. This close matching ensures symmetrical triggering characteristics between the two control channels.

Maximum and Minimum Ratings

To ensure reliable operation, maintain stable discharge characteristics, and prevent damage to the tube, circuits must be designed to respect the following limit values:

Main Path Current (I_a)

- **Minimum current:** 4 mA. Operating the tube below this limit may result in an unstable discharge or premature extinguishing of the main arc.
- **Maximum current:** 8 mA. Exceeding this limit can cause excessive cathode sputtering, altering the tube's characteristics and shortening its operating life.

Auxiliary Path Currents

- **First auxiliary path current for direct triggering ($I_{g1 \max}$):** 30 μ A.
- **Second auxiliary path current for direct triggering ($I_{g2 \max}$):** 50 μ A.

These maximum auxiliary currents represent the limits for direct triggering control to ensure reliable transition to main path conduction without overloading the trigger electrodes.

Technical Summary

The **TESLA 10TE9** is a subminiature, cold-cathode, gas-filled trigger tube featuring two auxiliary control electrodes. Designed for DC-operated switching applications in telephony and remote control systems, the tube requires no heater power and features a five-lead all-glass construction with color-coded leads for easy identification.

With a main breakdown voltage of 205 V, a maintaining voltage of 70 V at 4 mA, and closely matched auxiliary trigger voltages of 89 V, the 10TE9 provides precise and reliable switching. Its compact physical dimensions (10.5 mm maximum diameter, 30.0 mm body length) and low weight (maximum 5.5 g) make it highly suitable for compact, low-power, and zero-standby-power electronic control circuits.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

195X Tesla

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

195X TESLA

Section 1 · Thyatron

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MainPathStrikingVoltage	205 V	—