

Ten-inch cathode-ray display tube with magnetic focusing and magnetic deflection. Its aluminized P15 screen produces blue-green fluorescence with extremely short persistence, making it suited to fast-changing displays where residual image must decay rapidly.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray
No fixed ratings recorded.
Flying-spot-scanner CRT electron-gun/display section.

10VP15 — Flying Spot Scanner Picture Tube

An aluminized, 10-inch round glass-type cathode-ray tube designed for flying spot scanner applications, featuring magnetic deflection, magnetic focus, and an extremely short-persistence phosphor.

Overview

The **10VP15** is a specialized 10-inch round glass-type cathode-ray tube developed by Sylvania Electric Products Inc. for use as a flying spot scanner. The tube features a spherical clear glass faceplate and an aluminized screen utilizing a P15 phosphor. This phosphor provides a characteristic blue-green fluorescence with an extremely short persistence, which is essential for high-speed scanning applications where rapid light decay is required to prevent image smearing.

While the standard 10VP15 is equipped with the P15 phosphor, the underlying 10VP- design can be supplied with several other screen phosphors to accommodate alternative spectral or decay requirements. The tube employs magnetic focusing and magnetic deflection, with a nominal deflection angle of approximately 50 degrees. It also incorporates an external conductive coating that must be grounded during operation.

Mechanical Design and Physical Dimensions

The 10VP15 is constructed using a J84C or J84D glass bulb and has a nominal weight of 9 pounds. It features a spherical faceplate with a minimum useful screen diameter of 9 1/8 inches.

The physical dimensions and mechanical features of the tube include:

- **Overall Length:** 17 5/8 $\pm$ 3/8 inches
- **Maximum Bulb Diameter:** 10 1/2 $\pm$ 1/8 inches
- **Neck Diameter:** 1 7/16 $\pm$ 1/16 inches
- **Neck Length:** 8 3/4 $\pm$ 3/16 inches
- **Bulb Contact:** Recessed small cavity cap (J1-21) for the high-voltage anode connection, located on the side of the bulb.
- **Base:** Small Shell Duodecal 5-Pin (B5-57) with a 12N basing configuration.
- **Reference Line:** Determined by the position where a JETEC No. 112 reference line gauge seats against the bulb.
- **Anode Cap Alignment:** The vacant pin position No. 3 of the base is aligned with the anode contact cap (J1-21) within an angular tolerance of 30 degrees.

Electrical Characteristics and Basing

The 10VP15 utilizes an indirectly heated cathode. The electrical requirements and interelectrode capacitances are as follows:

Heater and Cathode Ratings

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 $\pm$ 10% Ampere
- **Heating Method:** Indirect

Direct Interelectrode Capacitances

- **Cathode to All Other Electrodes:** 5 μ F (approximate)
- **Grid No. 1 to All Other Electrodes:** 6 μ F (approximate)
- **External Conductive Coating to Anode:** 2,500 μ F Maximum, 500 μ F Minimum. This external coating must be grounded during operation.

Basing Connection (12N Diagram)

The tube uses a 5-pin duodecal base (B5-57) with the following pin assignments:

- **Pin 1:** Heater (H)
- **Pin 2:** Grid No. 1 (G1)
- **Pin 3:** Vacant position (aligned with the anode cap)
- **Pin 10:** Grid No. 2 (G2)
- **Pin 11:** Cathode (K)
- **Pin 12:** Heater (H)
- **Recessed Cavity Cap (J1-21):** Anode (A)

Maximum Ratings (Absolute Maximum Values)

To ensure reliable operation and prevent damage, the 10VP15 must be operated within its absolute maximum ratings:

Parameter	Absolute Maximum Value
Anode Voltage	13,200 Volts dc
Grid No. 2 Voltage	450 Volts dc
Grid No. 1 Negative Bias Value	140 Volts dc
Grid No. 1 Positive Bias Value	0 Volts dc
Grid No. 1 Positive Peak Value	2 Volts
Grid No. 1 Circuit Resistance	1.5 Megohms Max.

Peak Heater-Cathode Voltage Limits

- **Heater Negative with Respect to Cathode:**
 - During warm-up period (not to exceed 15 seconds): **450 Volts**
 - After warm-up period: **154 Volts**
- **Heater Positive with Respect to Cathode: 154 Volts**

Typical Operating Conditions

Under typical operating conditions, the 10VP15 is configured with the following parameters:

- **Anode Voltage:** 11,000 Volts dc
- **Grid No. 2 Voltage:** 250 Volts dc
- **Grid No. 1 Voltage Required for Cutoff:** -28 to -72 Volts dc
- **Focusing Coil Current (Approximate):** 110 mA dc
- **Undelected Spot Position:** 16 mm Maximum

Operating Notes and Adjustments

1. **Cutoff Voltage:** The specified Grid No. 1 cutoff voltage range of -28 to -72 Volts is based on the visual extinction of a focused raster. Achieving visual extinction of a stationary focused spot requires that these bias values be made approximately 5 Volts more negative (i.e., -33 to -77 Volts dc).
2. **Focusing Coil:** The typical focusing coil current of 110 mA is specified for a standard focus coil (EIA No. 106 or equivalent). This is evaluated with the combined Grid No. 1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 40 foot-lamberts on a 6-inch by 8-inch picture area. The center of the focus coil's air gap must be positioned 3 1/4 inches from the reference line.
3. **Deflection and Focus:** Both focusing and deflection are achieved magnetically. The nominal deflection angle is approximately 50 degrees.

Radiation Safety Warning

Because the 10VP15 operates at very high voltages, X-ray radiation shielding may be necessary to protect personnel from potential injury. Prolonged exposure at close range must be avoided if the tube is operated at voltages higher than the manufacturer's maximum rated anode voltage (13,200 Volts dc) or 16,000 Volts, whichever is less.

Technical Summary

The **10VP15** is a specialized 10-inch round glass flying spot scanner tube featuring magnetic focus, magnetic deflection (50-degree angle), and an aluminized screen with extremely short-persistence P15 phosphor. Operating at a typical anode voltage of 11,000 V (with an absolute maximum of 13,200 V), it provides high-resolution scanning capabilities. The tube utilizes a 6.3 V, 0.6 A heater, a 5-pin duodecal base, and requires proper grounding of its external conductive coating. Due to the high operating voltages, appropriate X-ray shielding precautions must be observed when operating near or above its rated limits.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Focusing Method	Magnetic text	—
Deflection Method	Magnetic text	—
Deflection Angle	50 deg	Approximate
Phosphor	Aluminized P15 text	—
Fluorescence	Blue-Green text	—
Persistence	Extremely Short text	—
Cathode-to-All Capacitance	5 pF	Approximate
Grid1-to-All Capacitance	6 pF	Approximate
External Coating-to-Anode Capacitance Minimum	500 pF	—
External Coating-to-Anode Capacitance Maximum	2500 pF	—
Maximum Undelected Spot Radius	16 mm	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	13200 V	—
Maximum Grid2 Voltage	450 V	—
Maximum Grid1 Negative Bias	140 V	—
Maximum Grid1 Positive Peak	2 V	—
Maximum Heater-Cathode Voltage During Warmup	450 V	Duration<=15s

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Heater-Cathode Voltage After Warmup	154 V	EitherPolarity
Anode Voltage	11000 V	—
Grid2 Voltage	250 V	—
Grid1 Cutoff Voltage Minimum	-72 V	—
Grid1 Cutoff Voltage Maximum	-28 V	—
Focusing Coil Current	110 mA	Approximate
Maximum Grid1 Circuit Resistance	1.5 Mohm	—

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