

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

10WP14A

1 SECTION
CONSTRUCTION
CATHODERAY

Specialized - Cathode Ray electronic tube

Ten-inch cathode-ray display tube with electrostatic focusing and magnetic deflection. The aluminized P14 blue screen has medium-long persistence; typical operation uses about 10 kV anode voltage with adjustable electrostatic focus.

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.
Cathode-ray display/electron-gun section.

10WP14A — Electrostatic-Focus Magnetic-Deflection Cathode-Ray Tube

The **10WP14A** is a special-purpose, 10-inch direct-viewed round glass cathode-ray tube (CRT) designed for display applications. It features electrostatic focusing and magnetic deflection with an approximate deflection angle of 50 degrees. The tube is equipped with a spherical faceplate made of gray filter glass, which provides a light transmittance of 76 percent.

The "A" suffix designation indicates that the 10WP14A is identical to the standard 10WP14, except that it incorporates an aluminized screen to enhance display performance.

Screen and Phosphor Characteristics

The 10WP14A utilizes a **P14 phosphor** screen. The physical and optical characteristics of this phosphor are defined by:

- **Fluorescence:** Purple
- **Phosphorescence:** Yellow
- **Persistence:** Medium-Long

The aluminized screen structure of the 10WP14A distinguishes it from the non-aluminized [10WP14](#). Other related variants in this tube family include the [10WP7](#) and [10WP19](#) (along with their respective aluminized "A" versions, the [10WP7A](#) and [10WP19A](#)), which utilize different phosphors (P7 and P19) to achieve different colors and persistence characteristics.

To prevent screen burning, particularly under high current densities, operators must employ minimum beam current densities.

Mechanical Specifications and Physical Dimensions

The physical construction of the 10WP14A consists of a round glass bulb, a spherical faceplate, and a specialized neck assembly. The mechanical dimensions and features include:

- **Overall Length:** $16 \frac{1}{8} \pm \frac{3}{8}$ inches
- **Faceplate Diameter:** $10 \frac{1}{2} \pm \frac{1}{16}$ inches
- **Minimum Useful Screen Diameter:** 9 inches
- **Bulb Contact:** Recessed small cavity cap (J1-21)
- **Base:** Small shell duodecal 6-pin (B6-63)
- **Basing Configuration:** 12M
- **Bulb Contact Alignment:** Aligns with the vacant pin position No. 3 within a tolerance of ± 10 degrees.
- **Anode Contact to Base Distance:** $9 \frac{5}{16} \pm \frac{3}{8}$ inches

Reference Line and Handling Precautions

The mechanical reference line of the tube is defined as the point where a ring gauge with a diameter of 1.500 (+0.003, -0.000) inches and a length of 2 inches stops when slid against the bulb.

An anti-corona coating is applied to the bulb, extending to a minimum radius of 1-1/2 inches concentric with the J1-21 bulb contact. Due to the delicate nature of this coating, the tube must not be handled by any part of the bulb that has the anti-corona coating.

Electrical Data and Basing

The 10WP14A uses a 12-M basing arrangement. The electrical connections are distributed across the 6 active pins of the B6-63 duodecal base and the external bulb contact:

Pin / Contact	Connection	Description
Pin 1	H	Heater
Pin 2	G1	Grid No. 1 (Control Grid)
Pin 6	G4	Grid No. 4 (Focusing Electrode)
Pin 10	<u>G2</u>	Grid No. 2 (Screen Grid)
Pin 11	K	Cathode
Pin 12	H	Heater
Bulb Contact	A	Anode

Heater Ratings and Capacitances

The tube's heater is designed for AC or DC operation with the following nominal ratings:

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

Heater Power Calculation: Using the nominal values, the nominal heater power (P_h) is calculated as: $P_h = 6.3 \text{ V} * 0.6 \text{ A} = 3.78 \text{ Watts}$

Accounting for the $\pm 10\%$ heater current tolerance (ranging from 0.54 A to 0.66 A), the operating heater power range is:

- Minimum: $6.3 \text{ V} * 0.54 \text{ A} = 3.40 \text{ Watts}$
- Maximum: $6.3 \text{ V} * 0.66 \text{ A} = 4.16 \text{ Watts}$

The direct interelectrode capacitances of the tube are approximately:

- **Cathode to all other electrodes:** 5 μF
- **Grid No. 1 to all other electrodes:** 6 μF

Typical Operating Conditions

Under typical operating conditions, the 10WP14A is configured with the following electrical parameters:

- **Anode Voltage:** 10,000 Volts dc
- **Grid No. 4 Voltage (for Focus):** 0 to 300 Volts dc
- **Grid No. 2 Voltage:** 300 Volts dc
- **Grid No. 1 Voltage (for Cutoff):** -28 to -72 Volts dc

Focus and Cutoff Characteristics

To achieve the best overall focus on a 6" x 8" raster pattern, Grid No. 4 (the focusing electrode) is adjusted within its typical range of 0 to 300 Volts while Grid No. 1 is adjusted to maintain a beam current

(Ib) of 100 microamperes.

The Grid No. 1 voltage range of -28 to -72 Volts dc represents the limit for visual extinction of a focused raster. If a stationary focused spot is used, visual extinction requires the Grid No. 1 bias to be approximately 5 Volts more negative (shifting the cutoff range to -33 to -77 Volts dc).

Operating the tube below an anode voltage of 7,000 Volts is generally not recommended, as both display brilliance and definition decrease significantly with decreasing anode voltage.

Maximum Ratings and Safety Constraints

The following absolute maximum ratings must not be exceeded under any operating conditions:

- **Anode Voltage:** 13,200 Volts dc
- **Grid No. 4 Voltage (Focusing Electrode):** -550 to +1100 Volts dc
- **Grid No. 2 Voltage:** 770 Volts dc
- **Grid No. 1 Voltage:**
 - Negative bias value: 200 Volts dc
 - Positive bias value: 0 Volts dc
 - Positive peak value: 0 Volts
- **Peak Heater-Cathode Voltage:**
 - Heater negative with respect to cathode: 200 Volts dc
 - Heater positive with respect to cathode: 200 Volts dc
- **Grid No. 1 Circuit Resistance:** 1.5 Megohms maximum

Power and Radiation Safety Limits

When operating at or near the absolute maximum anode voltage, the effective resistance of the anode supply must be high enough to limit the total anode input power to a maximum of 6 watts.

Additionally, if the tube is operated at voltages exceeding its maximum rated anode voltage (13,200 Volts) or 16,000 volts (whichever is less), X-ray radiation shielding may be necessary. This shielding protects operators from potential personal injury resulting from prolonged exposure at close range.

Technical Summary

The **10WP14A** is a 10-inch, round glass, electrostatic-focus and magnetic-deflection cathode-ray tube. It features a spherical gray filter glass faceplate with 76% light transmittance and an aluminized screen utilizing a medium-long persistence P14 phosphor (purple fluorescence, yellow phosphorescence). Operating with a 6.3 V, 0.6 A heater, the tube typically runs at an anode voltage of 10,000 V dc, utilizing a Grid No. 4 focusing voltage of 0 to 300 V dc and a Grid No. 2 voltage of 300 V dc. It is housed in a B6-63 duodecal base with a J1-21 anode cap, requiring careful handling to protect its anti-corona coating and proper shielding when operated near its maximum electrical limits.



SOURCE OPERATING CONDITIONS

1960 Du Mont

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

1960 DU MONT

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Focusing Method	Electrostatic text	—
Deflection Method	Magnetic text	—
Phosphor	P14 text	—
Fluorescence	Blue/purple text	—
Persistence	Medium-long text	—
Deflection Angle	50 deg	Approximate
Screen Construction	Aluminized/metal-backed text	—



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	Electrostatic text	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection Method	Magnetic text	—
Deflection Angle	50 deg	Approximate
Phosphor	P14 text	—
Fluorescence	Blue text	—
Persistence	Medium-Long text	—
Screen Aluminized	Yes text	—
Light Transmittance	76 percent	Approximate

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	13200 V	—
Focus Electrode Voltage Minimum	-550 V	Grid4
Focus Electrode Voltage Maximum	1100 V	Grid4
Maximum Grid2 Voltage	550 V	—
Maximum Heater-Cathode Voltage During Warmup	450 V	Duration<=15s
Maximum Heater-Cathode Voltage After Warmup	200 V	—
Anode Voltage	10000 V	—
Focus Voltage Minimum	0 V	Grid4
Focus Voltage Maximum	300 V	Grid4
Grid2 Voltage	300 V	—
Grid1 Cutoff Voltage Minimum	-72 V	—
Grid1 Cutoff Voltage Maximum	-28 V	—
Maximum Grid1 Circuit Resistance	1.5 Mohm	—

TUBE TINKER

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