

ELECTRONIC TUBE REFERENCE

14XP4A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Aluminized P4 cathode-ray display tube using electrostatic focusing and approximately 90-degree magnetic deflection, with white short-to-medium persistence and typical 12 kV anode operation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 450 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	16500 V
Published maximum ratings and characteristics promoted semantically from the approved source.	

14XP4A — Television Picture Tube

The **14XP4A** is a 14-inch, direct-viewed, rectangular glass television picture tube. It features a spherical faceplate made of gray filter glass, electrostatic focusing, magnetic deflection, and an external single-field ion trap. The tube is designed with an external conductive coating that must be grounded during operation.

The 14XP4A is identical to the **14XP4** except for its screen construction. While the standard **14XP4** uses a standard P4 phosphor screen, the 14XP4A features an aluminized P4 screen. Both variants produce white fluorescence with a short-to-medium persistence.

Mechanical Design and Physical Dimensions

The 14XP4A utilizes a rectangular glass envelope with a spherical faceplate. The faceplate is constructed from gray filter glass with a light transmittance of approximately 78 percent.

Key mechanical specifications include:

- **Minimum Useful Screen Dimensions:** 12-1/16 x 9-1/2 inches
- **Minimum Useful Screen Area:** 104 square inches
- **Deflection Angles (approximate):** 79 degrees horizontal, 85 degrees diagonal
- **Bulb Contact:** Recessed small cavity cap (J1-21)
- **Base:** Small shell duodecal 6-pin base (B6-63)
- **Basing Configuration:** 12L

The physical alignment of the tube requires that base pin number 6 aligns with the anode contact terminal (J1-21) within 30 degrees. The external conductive coating has a designated contact area of 2 x 2 inches, located 90 degrees counterclockwise from the anode contact when viewed from the base end of the tube. The reference line of the tube is determined by the plane C-C' of a JETEC No. 116 reference line gauge when the gauge is resting on the glass cone.

Heater and Electrical Characteristics

The 14XP4A is designed with an indirectly heated cathode. The heater is rated for operation at a nominal voltage of 6.3 V and a current of 450 mA (with a tolerance of $\pm 5\%$).

Heater Warm-up Time

The heater warm-up time is specified as 11 seconds. This is defined as the time required for the voltage across the heater terminals to increase to 5.0 volts when tested in the JETEC test circuit, which utilizes a supply voltage (E) of 25 volts and a series resistance (R) of 42 ohms.

Interelectrode Capacitances

The approximate direct interelectrode capacitances of the tube are:

- **Cathode to all other electrodes:** 5 μpF
- **Grid No. 1 to all other electrodes:** 6 μpF
- **External conductive coating to anode:** 1500 μpF maximum, 1100 μpF minimum

Maximum Ratings

The absolute maximum ratings for the 14XP4A define the limits within which the tube must be operated to ensure safety and reliability:

Parameter	Absolute Maximum Value
Anode Voltage	16,500 V dc

Parameter	Absolute Maximum Value
Grid No. 4 Voltage (Focusing Electrode)	-550 to +1100 V dc
Grid No. 2 Voltage	440 V dc
Grid No. 1 Negative Bias Value	140 V dc
Grid No. 1 Negative Peak Value	180 V
Grid No. 1 Positive Bias Value	0 V dc
Grid No. 1 Positive Peak Value	2 V
Grid No. 1 Circuit Resistance	1.5 MΩ

Heater-Cathode Voltage Limits

The peak heater-to-cathode voltage ratings vary depending on the polarity and operating phase:

- **Heater negative with respect to cathode:**
 - During the warm-up period (not to exceed 15 seconds): 450 V
 - After the equipment warm-up period: 200 V
- **Heater positive with respect to cathode:** 200 V

Typical Operating Conditions

Under typical operating conditions, the 14XP4A is operated with an anode voltage of 12,000 V dc. The typical operating parameters are outlined below:

- **Anode Voltage:** 12,000 V dc
- **Grid No. 4 Voltage for Focus:** -50 to +350 V dc
- **Grid No. 2 Voltage:** 300 V dc
- **Grid No. 1 Voltage Required for Cutoff:** -28 to -72 V dc
 - *Note on Cutoff:* This range is for the visual extinction of a focused raster. Extinction of a stationary focused spot requires that these values be approximately 5 volts more negative (shifting the range to -33 to -77 V dc).
- **Ion Trap Magnet Current (Average):** 28 mA dc
 - This current applies when using a JETEC Ion Trap Magnet No. 117 with its pole pieces centered over Grid No. 2 on the mount and rotated to achieve maximum brightness.
- **Field Strength of PM Ion Trap Magnet:** 30 Gauss minimum
 - This minimum field strength applies to a typical permanent magnet (PM) ion trap magnet with a field strength tolerance of ± 3 gauss.

Operational Safety and X-Ray Warning

When operating the 14XP4A, proper precautions must be taken regarding X-ray radiation. If the tube is operated at voltages exceeding 16,000 volts or the manufacturer's maximum rated anode voltage of 16,500 volts (whichever is less), X-ray radiation shielding may be necessary. This shielding is required to protect against the potential danger of personal injury resulting from prolonged exposure at close range. Additionally, the external conductive coating must be reliably connected to ground during operation.

Technical Summary

The **14XP4A** is a 14-inch rectangular television picture tube featuring electrostatic focusing, magnetic deflection, and an aluminized P4 phosphor screen that produces a white display with short-to-medium persistence. Operating at a typical anode voltage of 12,000 V dc (with an absolute maximum of 16,500 V dc), the tube requires an external single-field ion trap magnet and a grounded external conductive coating. Its heater operates at 6.3 V and 450 mA, with a controlled warm-up time of 11 seconds. The 14XP4A is identical to the [14XP4](#) except for its aluminized screen, which provides enhanced brightness.



SOURCE OPERATING CONDITIONS

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Cathode Ray

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	16500 V	—
Typical Anode Voltage	12000 V	—

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P4	—
Focusing Method	Electrostatic	—
Deflecting Method	Magnetic	—



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	450 mA	—
Focusing Method	Electrostatic text	—
Deflection Method	Magnetic text	—
Fluorescence	White text	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Persistence	Short to Medium text	—
Phosphor	Aluminized P4 text	—
Horizontal Deflection Angle	79 deg	Approximate
Diagonal Deflection Angle	90 deg	Approximate
Light Transmittance	78 percent	Approximate
Ion Trap	External Single Field text	—
Cathode-to-All Capacitance	5 pF	Approximate
Grid1-to-All Capacitance	6 pF	Approximate
External Coating-to-Anode Capacitance Minimum	1100 pF	—
External Coating-to-Anode Capacitance Maximum	1500 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode Voltage	12000 V	—
Grid2 Voltage	300 V	—
Ion Trap Magnet Current	28 mA	Representative
Minimum Ion Trap Field Strength	30 gauss	—
Maximum Anode Voltage	16500 V	—
Maximum Grid2 Voltage	440 V	—
Focus Voltage Minimum	-50 V	Grid4
Focus Voltage Maximum	350 V	Grid4
Grid1 Cutoff Voltage Minimum	-72 V	—
Grid1 Cutoff Voltage Maximum	-28 V	—
Maximum Grid1 Circuit Resistance	1.5 Mohm	—