

ELECTRONIC TUBE REFERENCE

12ABP14

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Twelve-inch cathode-ray display tube with electrostatic focusing and magnetic deflection. It uses a P14 blue-purple medium-long-persistence phosphor and is intended for high-voltage direct-view display service, with an anode rating extending to about 13.2 kV.

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	
MAXIMUM PLATE VOLTAGE	13200 V
Cathode-ray display/electron-gun section.	

12ABP14 — Electrostatic-Focus Magnetic-Deflection Cathode-Ray Tube

The **12ABP14** is a 12-inch, direct-viewed, round glass cathode-ray tube designed for specialized display applications. It features a spherical faceplate made of gray filter glass with a light transmittance of 74 percent. The tube utilizes electrostatic focusing and magnetic deflection, with a nominal deflection angle of approximately 55 degrees.

The 12ABP14 is equipped with a P14 phosphor screen, which exhibits purple fluorescence and yellow phosphorescence with a medium-long persistence. This makes it suitable for applications requiring prolonged image retention without rapid decay.

Physical and Mechanical Construction

The mechanical design of the 12ABP14 is characterized by its round glass envelope and specific dimensional tolerances. The tube has a nominal bulb diameter of 12 inches (with a tolerance of $\pm 1/8$ inch) and an overall length of 18 inches (with a tolerance of $\pm 3/8$ inch). The minimum useful screen diameter is 11 inches.

The tube features a small shell duodecal 6-pin base (designated B6-63) and utilizes a 12M basing arrangement. The high-voltage anode connection is made via a recessed small cavity cap bulb contact (designated J1-21). This bulb contact is aligned with the vacant pin position No. 3 within a tolerance of ± 10 degrees.

To prevent electrical discharge, an anti-corona coating is applied to the bulb, extending to a minimum radius of 1-1/2 inches concentric with the anode contact. Safe handling practices dictate that the tube must not be handled by the portion of the bulb carrying this anti-corona coating. The reference line of the tube is mechanically defined as the point where a ring gauge with a diameter of 1.500 inches (+0.003, -0.000 inches) and a length of 2 inches will stop.

Electrical Characteristics and Heater Ratings

The 12ABP14 operates with an indirectly heated cathode. The heater is designed for AC or DC operation with the following nominal ratings:

Parameter	Value
Heater Voltage	6.3 V
Heater Current	$0.6 \pm 10\%$ A

The direct interelectrode capacitances of the tube are relatively low, minimizing capacitive loading in the drive circuitry:

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

Operating Conditions and Focus Adjustment

Under typical operating conditions, the 12ABP14 is operated with an anode potential of 10,000 V DC. The electrostatic focusing electrode (Grid No. 4) is typically biased between 0 and 300 V DC to achieve sharp focus. Grid No. 2 is operated at a typical potential of 300 V DC.

The control grid (Grid No. 1) voltage required for visual extinction of a focused raster ranges from -28 to -72 V DC. If a stationary focused spot is used instead of a raster, the extinction voltage must be adjusted to be approximately 5 volts more negative.

To optimize the quality of the focused spot, an adjustable beam alignment magnet with a field strength of 0 to 4 Gauss is recommended. This magnet should be positioned approximately 5-5/16 inches from the reference line.

For proper focus adjustment, Grid No. 1 is adjusted to establish an anode current of 100 microamperes, and then the Grid No. 4 voltage is adjusted to achieve the best overall focus across a 7-1/2' x 10' raster pattern. While the tube can operate at lower anode voltages, both brilliance and definition decrease as the anode voltage is reduced; consequently, the anode voltage should generally not be operated below 8,000 V.

Absolute Maximum Ratings and Safety Considerations

The 12ABP14 must be operated within its absolute maximum ratings to prevent damage and ensure safe operation:

Parameter	Absolute Maximum Value
Anode Voltage	13,200 V DC
Grid No. 4 Voltage (Focusing Electrode)	-550 to +1100 V DC
Grid No. 2 Voltage	770 V DC
Grid No. 1 Negative Bias Value	200 V DC
Grid No. 1 Positive Bias Value	0 V DC
Grid No. 1 Positive Peak Value	0 V
Peak Heater-Cathode Voltage (Heater Negative)	200 V DC
Peak Heater-Cathode Voltage (Heater Positive)	200 V DC
Grid No. 1 Circuit Resistance	1.5 MΩ Max.

At or near the maximum anode voltage rating, the effective resistance of the anode power supply must be sufficient to limit the total anode input power to 6 watts.

Operating the tube at voltages higher than the maximum rated anode voltage or above 16,000 volts (whichever is less) presents a risk of X-ray radiation. Under these conditions, appropriate X-ray radiation shielding must be installed to prevent personal injury from prolonged close-range exposure.

Related Designations

The 12ABP14 belongs to a family of closely related cathode-ray tubes that share the same physical dimensions, electrostatic focusing, and magnetic deflection characteristics, but differ in screen phosphor or screen treatment:

- **12ABP14A**: Identical to the 12ABP14, except that it incorporates an aluminized screen for enhanced brightness and efficiency.
- **12ABP7 / 12ABP7A**: Utilize a P7 phosphor screen, which features blue fluorescence, yellow phosphorescence, and long persistence. The "A" suffix denotes the aluminized version.

- **12ABP19 / 12ABP19A**: Utilize a P19 phosphor screen, which features orange fluorescence, orange phosphorescence, and long persistence. The "A" suffix denotes the aluminized version. For the 12ABP19, care must be taken to employ minimum beam current densities to prevent burning, as the screen can be permanently damaged if the current density is allowed to rise too high.

Technical Summary

The **12ABP14** is a specialized 12-inch round glass cathode-ray tube featuring electrostatic focusing, 55-degree magnetic deflection, and a medium-long persistence P14 phosphor screen. Operating with a 6.3 V, 0.6 A heater, it is designed for high-resolution display applications with a typical anode operating voltage of 10,000 V. By utilizing an adjustable beam alignment magnet and a dedicated focusing grid (Grid No. 4), the tube achieves precise spot focus. The aluminized variant, **12ABP14A**, offers identical electrical and mechanical characteristics with the benefit of an aluminized screen structure.



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	55 deg	Approximate



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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Anode voltage maximum	13200 V	—
Grid No. 2 voltage maximum	770 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No. 1 negative bias maximum	200 V	—
Heater-cathode peak voltage	200 V	—

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