



ELECTRONIC TUBE REFERENCE

16GP4A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Direct-view P4 television picture tube using magnetic focusing and deflection, with white medium-persistence fluorescence, approximately 70-degree deflection, and typical 12 kV anode operation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	120	BASE PINS	5
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	14000 V
MAXIMUM SCREEN VOLTAGE	410 V
<i>CRT-specific anode/focus/deflection ratings retained as parameters rather than mapped to ordinary plate/screen fields.</i>	

16GP4A — Direct-View Cathode Ray Picture Tube

The **16GP4A** is a direct-view cathode ray picture tube designed for television applications. It features a round metal cone construction, magnetic focusing and deflection, and an indirectly heated unipotential cathode. The tube belongs to a family of four closely related variants—the **16GP4**, **16GP4A**, **16GP4B**, and **16GP4C**—which share identical electrical and mechanical structures but are distinguished by their faceplate treatments. The **16GP4A** is specifically characterized by its clear glass faceplate.

Faceplate and Optical Characteristics

The primary distinction among the tubes in this family lies in the optical properties of their faceplates:

- **16GP4**: Grey filter faceplate
- **16GP4A**: Clear glass faceplate
- **16GP4B**: Grey filter, frosted faceplate
- **16GP4C**: Clear glass, frosted faceplate

All four variants utilize **Phosphor No. 4**, which exhibits a **white** fluorescent color, a **white** phosphorescent color, and **medium** persistence. The faceplate light transmission at the center of the screen is approximately **65 percent**. For the frosted grey filter variant (**16GP4B**), the specular reflection of ambient light is rated at **2.5 percent**. The tube is designed to project a standard **10" x 13 1/4" raster size**.

Mechanical Design and Basing

The 16GP4A is constructed with a round metal body. The metal shell lip serves as the electrical contact for the anode and Grid No. 3.

Physical Dimensions

- **Overall Length**: 17 11/16 inches maximum
- **Greatest Diameter of Bulb**: 15 7/8 ± 1/8 inches
- **Minimum Useful Screen Diameter**: 14 3/8 inches
- **Bulb Contact**: Metal shell lip
- **Base**: Small shell duodecal 5-pin base (designation **B5-57**)
- **Basing Arrangement**: **12D**

Pin Connections

When viewed from the bottom of the base, the pin connections are assigned as follows:

- **Pin 1**: Heater
- **Pin 2**: Grid No. 1
- **Pin 10**: Grid No. 2
- **Pin 11**: Cathode
- **Pin 12**: Heater
- **Metal Shell Lip**: Anode and Grid No. 3

The neck of the tube requires a clear space of 4 inches from the reference line to accommodate the external single-field ion trap magnet.

Electrical Ratings

The electrical ratings for the 16GP4A are defined under the Design Center system. Operating the tube beyond these limits may impair performance or cause permanent damage.

Heater and Electrode Limits

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A
- **Maximum DC Anode & Grid No. 3 Voltage:** 14,000 V
 - *Power Limitation:* The product of the DC anode voltage and the average anode current must not exceed **6 watts**.
- **Maximum DC Grid No. 2 Voltage:** 410 V
- **Maximum Grid No. 1 Voltage:**
 - **DC Negative-Bias Value:** 125 V
 - **DC Positive-Bias Value:** 0 V
 - **Positive-Peak Value:** 2 V
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Heater-Cathode Voltage Limits

- **Maximum DC Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode:**
 - During warm-up period (not to exceed 15 seconds): 410 V
 - After equipment warm-up period: 150 V
 - **Heater positive with respect to cathode:** 150 V

Interelectrode Capacitances

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

Typical Operating Conditions

Under typical operating conditions, the 16GP4A is configured with the following parameters:

- **DC Anode & Grid No. 3 Voltage:** 12,000 V
 - *Operating Note:* Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be operated below 12,000 V.
- **DC Grid No. 2 Voltage:** 300 V
- **DC Grid No. 1 Voltage:** -33 V to -77 V
 - *Extinction:* This range represents the bias required for the visual extinction of the undeflected focused spot.
- **DC Focusing Coil Current:** Approximately 100 mA

- *Focusing Setup*: This value applies when using a standard focus coil #109 (or equivalent). The combined Grid No. 1 bias voltage and video signal voltage must be adjusted to produce a highlight brightness of 30 foot-lamberts on a 10" x 13 1/4" picture size. The distance from the reference line to the center of the air gap on the focus coil must be maintained at 3 inches.
- **Deflection Angle**: Approximately 70 degrees (using magnetic deflection)
- **Ion Trap Magnet (Rated Strength)**:
 - **35 Gauss**es for the **16GP4A** and **16GP4B**
 - **23 Gauss**es for the **16GP4** and **16GP4C**

The requirement for a stronger ion trap magnet (35 Gauss versus 23 Gauss) is a critical operational difference between the clear-glass/frosted clear-glass variants (16GP4A, **16GP4B**) and the grey-filter variants (**16GP4**, **16GP4C**).

Technical Summary

The **16GP4A** is a **70-degree magnetic deflection and focus** cathode ray tube featuring a **clear glass faceplate**, a **unipotential cathode**, and a **round metal cone** construction. It operates with a **6.3 V, 0.6 A** heater and is designed for direct-view television applications.

The tube is part of a unified family of four designations (**16GP4**, 16GP4A, **16GP4B**, **16GP4C**) that share identical electrical ratings, physical dimensions, and a **small shell duodecal 5-pin base (B5-57)**. However, the 16GP4A and **16GP4B** require a stronger **35 Gauss** external single-field ion trap magnet compared to the **23 Gauss** magnet specified for the **16GP4** and **16GP4C**. When operating at a typical anode potential of **12,000 V**, the tube provides a **10" x 13 1/4"** white-phosphor (No. 4) display with medium persistence, provided that the anode power is limited to **6 watts** and the Grid No. 1 circuit resistance does not exceed **1.5 Megohms**.



SOURCE OPERATING CONDITIONS

1961 Tung Sol

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

1961 TUNG SOL

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	14000 V	—
Typical Anode Voltage	12000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Grid2 Voltage	300 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DeflectionAngleApproximate	70 degree	—
FocusingMethod	Magnetic	—
DeflectingMethod	Magnetic	—
PhosphorNumber	4	—
FluorescentColor	White	—
Persistence	Medium	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1966 Tung Sol Electronic Tubes 4 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 4 OF 4

Section 1 · Cathode Ray

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing method	Magnetic	—
Deflecting method	Magnetic	—
Phosphor	P4	White;MediumPersistence

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	70 deg	Approximate
Faceplate light transmission at center	65 %	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate
Grid #1 to all other electrodes capacitance	6 pF	Approximate

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Maximum DC anode voltage	14000 V	—
Maximum DC grid #2 voltage	410 V	—
Maximum grid #1 negative-bias magnitude	125 V	—
Maximum grid #1 positive DC bias	0 V	—
Maximum grid #1 positive peak	2 V	—
Typical DC anode voltage	12000 V	TelevisionPictureTube
Typical DC grid #2 voltage	300 V	TelevisionPictureTube
Typical grid #1 voltage minimum	-77 V	VisualExtinctionRange
Typical grid #1 voltage maximum	-33 V	VisualExtinctionRange

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing coil current	200 mA	Approximate
Ion trap magnet strength	35 gauss	Approximate
Maximum heater-cathode voltage during warm-up	410 V	HeaterNegative;Warmup<=15s

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	Direct-view television picture tube	—

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