

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

16RP4

1 SECTION
CONSTRUCTION
CATHODERAY

Specialized - Cathode Ray electronic tube

Direct-view cathode-ray picture tube documented by manufacturer data for type 16RP4; available extracted technical detail is limited, so the description remains conservative.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12N	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

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	16000 V
MAXIMUM SCREEN VOLTAGE	41 V
CRT-specific anode/focus/deflection ratings retained as parameters rather than mapped to ordinary plate/screen fields.	

16RP4 — Rectangular Cathode Ray Picture Tube

The **16RP4** and **16RP4A** are direct-view, rectangular glass cathode ray picture tubes designed for television receiver applications. These tubes feature magnetic focusing and magnetic deflection, a grey filter faceplate, a unipotential cathode, and require an external single-field ion trap. The two designations are identical in construction and electrical ratings, with the sole exception that the **16RP4A** incorporates an aluminized screen for enhanced brightness, whereas the standard **16RP4** does not.

The tubes provide a nominal raster size of 10 1/8" by 13 1/2", housed in a rectangular glass envelope that minimizes space requirements compared to contemporary round designs.

Mechanical Specifications and Physical Dimensions

The 16RP4 and 16RP4A utilize a rectangular glass bulb construction with a nominal diagonal dimension of 16 inches. The physical dimensions and tolerances are specified as follows:

- **Overall Length:** $18 \frac{3}{4} \pm \frac{3}{8}$ inches
- **Greatest Bulb Diagonal:** $16 \frac{1}{8} \pm \frac{1}{8}$ inches
- **Greatest Bulb Width:** $14 \frac{3}{4} \pm \frac{1}{8}$ inches
- **Greatest Bulb Height:** $11 \frac{1}{2} \pm \frac{1}{8}$ inches
- **Minimum Useful Screen Diagonal:** $14 \frac{7}{8}$ inches
- **Minimum Useful Screen Width:** $13 \frac{1}{2}$ inches
- **Minimum Useful Screen Height:** $10 \frac{1}{8}$ inches

Base, Basing, and Connections

The tube is equipped with a **Small Shell Duodecal 5-pin base** (designation **B5-57**) and uses the **12N** basing configuration. High-voltage anode connection is made via a **recessed small cavity cap** (designation **J1-21**). The alignment of this bulb contact is designed to align with pin position #6 within a tolerance of ± 30 degrees.

The pin connections, viewed from the bottom of the base, are:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1
- **Pin 10:** Grid No. 2
- **Pin 11:** Cathode
- **Pin 12:** Heater
- **Anode Cap:** Anode

Electrical and Optical Characteristics

The electron gun structure consists of an indirectly heated unipotential cathode, a control grid (Grid No. 1), and a screen grid (Grid No. 2). The focusing and deflection systems are entirely magnetic.

Optical Data

The screen utilizes **Phosphor No. 4**, which is characterized by:

- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium
- **Faceplate Light Transmission:** Approximately 66% at the center of the grey filter faceplate.

Deflection and Capacitance

The deflection angles are approximately:

- **Horizontal Deflection Angle:** 65 degrees
- **Diagonal Deflection Angle:** 70 degrees

Direct interelectrode capacitances are:

- **Cathode to all other electrodes:** 5 μF (pF)
- **Grid No. 1 to all other electrodes:** 6 μF (pF)
- **External conductive coating to anode (Maximum):** 1,500 μF (pF)
- **External conductive coating to anode (Minimum):** 750 μF (pF)

The external conductive coating acts as a capacitor in conjunction with the internal anode coating, providing filtering for the high-voltage anode power supply.

Maximum Ratings (Design Center System)

The following maximum ratings are established under the Design Center System. Operating the tube beyond these limits can impair performance and tube life.

Parameter	Rating	Unit
Heater Voltage	6.3	V
Heater Current	0.6	A
Maximum DC Anode Voltage	16,000	V
Maximum DC Grid No. 2 Voltage	410	V
Maximum Grid No. 1 DC Negative-Bias Value	125	V
Maximum Grid No. 1 DC Positive-Bias Value	0	V
Maximum Grid No. 1 Circuit Resistance	1.5	M Ω

Heater-Cathode Voltage Limits

To prevent insulation breakdown between the heater and the cathode, the following peak voltage limits must be observed:

- **Heater negative with respect to cathode:**
 - During equipment warm-up period (not to exceed 15 seconds): **410 V**
 - After equipment warm-up period (normal operation): **150 V**
- **Heater positive with respect to cathode: 150 V**

Typical Operating Conditions

Under typical operating conditions, the tube is operated with an anode potential of 12,000 V. The required grid voltages and focusing/ion-trap currents are detailed below:

- **DC Anode Voltage:** 12,000 V
- **DC Grid No. 2 Voltage:** 300 V
- **DC Grid No. 1 Voltage (for visual extinction of undeflected focused spot):** -33 V to -77 V
- **DC Focusing Coil Current (Approximate):** $100 \pm 20\%$ mA
- **DC Ion Trap Current (Standard Coil #111, Approximate):** $75 \pm 50\%$ mA

Focusing and Ion Trap Specifications

The typical focusing coil current of $100 \pm 20\%$ mA is specified for a **Standard Focus Coil #109** (or equivalent). This specification applies when the combined Grid No. 1 bias voltage and video signal voltage are adjusted to produce a highlight brightness of 30 foot-lamberts on the standard 10 1/8" by 13 1/2" picture size. The physical placement of the focus coil requires that the distance from the reference line to the center of the air gap on the focus coil be exactly 3.50 inches.

The ion trap requires an external single-field ion trap magnet. When using a **Standard Coil #111**, the typical current is $75 \pm 50\%$ mA to properly align the electron beam and prevent ion burn on the phosphor screen.

Technical Summary

The **16RP4** and **16RP4A** are 16-inch rectangular glass cathode ray tubes designed for television display applications. Operating with a nominal 6.3 V, 0.6 A heater, they feature magnetic focus and deflection (with a 70-degree diagonal deflection angle), a grey filter faceplate, and require an external single-field ion trap. The **16RP4A** is distinguished by its aluminized screen, which provides higher brightness than the non-aluminized **16RP4**. Both types utilize a Small Shell Duodecal 5-pin base (B5-57) with a 12N pinout and a recessed small cavity cap (J1-21) for the high-voltage anode connection. Under typical operating conditions, they run at an anode voltage of 12,000 V and a Grid No. 2 voltage of 300 V, requiring a Grid No. 1 bias of -33 V to -77 V for spot extinction.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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	16000 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

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1966 Tung Sol Electronic Tubes 4 of 4

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1966 TUNG SOL ELECTRONIC TUBES 4 OF 4

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAGNETIC FOCUS b DEFLECTION – value 1	13 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAGNETIC FOCUS b DEFLECTION – value 2	1 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAGNETIC FOCUS b DEFLECTION – value 3	2 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
HEATER	6.3 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
OC ANODE VOLTAGE	12000 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
OC GRID #2 VOLTAGE – value 1	2 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
OC GRID #2 VOLTAGE – value 2	3 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DC GRID #1 VOLTAGE A	77 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
OC FOCUSING COIL CURRENT S (APPROX.)	2 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.) – value 1	111 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.) – value 2	75 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.) – value 3	5 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DFOR STANDARD FOCUS COIL N109 r OR EDUIVALEXT r WITH THE COMBINED GRID #1 BIAS VOLTAGE AND VI DEC	1 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
SIGNAL VOLTAGE ADJUSTED TO PRODUCE A NiGXL IGH T BRIGMTNEGG OF j0 F00T LAMBERTS OX A 10 1/8" – value 1	10 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
SIGNAL VOLTAGE ADJUSTED TO PRODUCE A NiGXL IGH T BRIGMTNEGG OF j0 F00T LAMBERTS OX A 10 1/8" – value 2	1 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
SIGNAL VOLTAGE ADJUSTED TO PRODUCE A NiGXL IGH T BRIGMTNEGG OF j0 F00T LAMBERTS OX A 10 1/8" – value 3	8 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
1j 1/2" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER OF AIR GAP OX FOCUS COIL GN ALL BE – value 1	1	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
1j 1/2" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER OF AIR GAP OX FOCUS COIL GN ALL BE – value 2	2	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM DC ANODE	16000 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM DC GRID #2 VOLTAGE – value 1	2 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM DC GRID #2 VOLTAGE – value 2	41 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 1	1 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 2	1.5 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.



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