

ELECTRONIC TUBE REFERENCE

16YP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

P4 cathode-ray display tube documented for high-voltage direct-view operation, using magnetic deflection and manufacturer-specified beam focusing and control arrangements appropriate to type 16YP4.

GENERAL CHARACTERISTICS

BASE DESIGNATION	BS-57	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	14000 V
CRT-specific anode, focus, deflection and optical data retained as parameters rather than forced into ordinary plate/screen fields.	

16YP4 — Cathode Ray Picture Tube

A direct-view, round glass picture tube designed for television receiver applications, featuring magnetic focus and deflection, a grey filter faceplate, and an external conductive coating.

Overview

The **16YP4** is a specialized direct-view cathode ray tube (CRT) designed for monochrome television display systems. It features a round glass envelope with a nominal outer diameter of 16 inches (specifically, a maximum bulb diameter of 15 7/8 inches) and is capable of displaying a standard 10 1/4" by 14 1/2" raster.

The tube utilizes magnetic deflection and magnetic focusing. To optimize picture contrast under ambient room lighting, the 16YP4 is equipped with a grey filter faceplate. It also incorporates an external conductive coating that, when grounded, forms a high-voltage filter capacitor in conjunction with the tube's internal conductive anode coating. Operation of the tube requires an external single-field ion trap magnet to prevent ion-burn damage to the phosphor screen.

Mechanical Specifications and Physical Dimensions

The mechanical design of the 16YP4 is tailored for standard television chassis mounting. The physical dimensions and alignment parameters are as follows:

- **Overall Length:** $17 \frac{5}{16} \pm \frac{3}{8}$ inches
- **Greatest Diameter of Bulb:** $15 \frac{7}{8} \pm \frac{1}{8}$ inches
- **Minimum Useful Screen Diameter:** $14 \frac{1}{2}$ inches
- **Neck Diameter:** $1 \frac{7}{16} \pm \frac{1}{16}$ inches
- **Bulb Contact:** Recessed small cavity cap (J1-21)
- **Base:** Small shell duodecal 5-pin base (B5-57)
- **Basing Designation:** 12N
- **Anode Terminal Alignment:** The J1-21 recessed cavity cap aligns with pin position #3 within a tolerance of ± 10 degrees.
- **Ion Trap Magnet Clearance:** A space of $3 \frac{7}{8} \pm \frac{1}{16}$ inches along the neck, measured from the reference line, must be kept clear for the installation and adjustment of the external single-field ion trap magnet.

Electrical and Optical Characteristics

The electrical and optical parameters of the 16YP4 define its performance as a display device.

Optical Data

- **Phosphor Number:** No. 4 (P4)
- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium
- **Faceplate Light Transmission:** Approximately 70% at the center of the faceplate.

Direct Interelectrode Capacitances

- **Cathode to all other electrodes:** Approximately $5.0 \mu\text{F}$
- **Grid No. 1 to all other electrodes:** Approximately $6.0 \mu\text{F}$
- **External conductive coating to anode:**
 - **Maximum:** $2,000 \mu\text{F}$
 - **Minimum:** $750 \mu\text{F}$

Terminal Connections and Pinout

The 16YP4 uses a duodecal 5-pin base (B5-57) with the 12N basing arrangement. The electrical connections, viewed from the bottom of the tube base, are as follows:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 10	Grid No. 2 (Screen Grid / Accelerator)
Pin 11	Cathode
Pin 12	Heater
Recessed Cap	Anode (High Voltage Terminal)

Ratings and Operating Limits

The ratings for the 16YP4 are established under the Design Center system. Operating the tube beyond these limits may impair performance or shorten its service life.

Parameter	Rating (Design Center Values)
Heater Voltage	6.3 V
Heater Current	0.6 A
Maximum DC Anode Voltage	14,000 V
Maximum DC Grid No. 2 Voltage	410 V
Maximum DC Grid No. 1 Negative-Bias	125 V
Maximum DC Grid No. 1 Positive-Bias	0 V
Maximum Grid No. 1 Positive-Peak	2 V
Maximum Grid No. 1 Circuit Resistance	1.5 MΩ

Heater-Cathode Voltage Limits

To prevent insulation breakdown between the heater and the cathode, the peak voltage between these elements must not exceed the following limits:

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

- **Heater positive with respect to cathode: 150 V**

Typical Operating Conditions

For typical television receiver operation, the 16YP4 is operated under the following conditions:

- **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:** Approximately 100 mA

Focusing Coil Specifications

The typical focusing coil current of 100 mA is specified using a standard focus coil (such as the #109 or equivalent). This operating point is defined under the following conditions:

- The combined Grid No. 1 bias voltage and video signal voltage are adjusted to produce a highlight brightness of 30 foot-lamberts.
- The raster size is adjusted to 10 1/4" by 14 1/2".
- The distance from the reference line to the center of the air gap on the focus coil is exactly 3.25 inches.

Technical Summary

The **16YP4** is a 16-inch round glass, direct-view cathode ray tube designed for television receivers. It features a 70-degree magnetic deflection angle, magnetic focusing, and requires an external single-field ion trap magnet. Operating with a standard 6.3 V, 0.6 A heater, the tube is rated for a maximum DC anode voltage of 14,000 V and utilizes a P4 phosphor screen to produce a white-emitting display with medium persistence. The grey filter faceplate provides a light transmission of 70% to optimize contrast. Electrical connections are made via a small shell duodecal 5-pin base (B5-57) and a recessed small cavity cap (J1-21) for the high-voltage anode.



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	14000 V	—
Typical Anode Voltage	12000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Grid2 Voltage	300 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Magnetic	—
DeflectingMethod	Magnetic	—
DiagonalDeflectionAngleApproximate	70 degree	—
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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum DC grid 2 voltage	410 V	—
Maximum grid 1 negative-bias voltage	125 V	NegativeBias
Maximum grid 1 positive-bias voltage	0 V	PositiveBias
Maximum grid 1 positive-peak voltage	2 V	PositivePeak
Peak heater-cathode voltage	410 V	HeaterNegativeWarmup
Peak heater-cathode voltage	150 V	HeaterNegativeAfterWarmup
Peak heater-cathode voltage	150 V	HeaterPositive
DC anode voltage	12000 V	TypicalOperation
DC grid 2 voltage	300 V	TypicalOperation
DC grid 1 voltage	-33--77 V	TypicalOperation
Focusing coil current	100 mA	Approximate
Faceplate transmission at center	70 %	Approximate

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	70 degrees	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
External conductive coating to anode capacitance	2000 pF	Maximum
External conductive coating to anode capacitance	750 pF	Minimum