

ELECTRONIC TUBE REFERENCE

16ZP4

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 16ZP4.

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	16000 V
CRT-specific anode, focus, deflection and optical data retained as parameters rather than forced into ordinary plate/screen fields.	

16ZP4 — Direct-View Cathode-Ray Picture Tube

The **16ZP4** is a direct-view cathode-ray picture tube designed specifically for television receiver applications. It features a round glass construction, a grey filter faceplate, and an external conductive coating. The tube utilizes magnetic focus and deflection, a unipotential cathode, and requires an external double field ion trap for proper operation.

Mechanical and Optical Specifications

The 16ZP4 is constructed with a round glass bulb and a grey filter faceplate that provides a light transmission of approximately 65% at the center. This faceplate design enhances picture contrast under ambient room lighting.

Physical Dimensions

- **Overall Length:** 22-1/4" $\pm$ 3/8"
- **Greatest Diameter:** 15-7/8" $\pm$ 1/8"
- **Minimum Useful Screen Diameter:** 14-1/2"
- **Raster Size:** Approximately 10-1/8" x 14-1/2" to 10-1/4" x 14-1/2"

Optical Characteristics

- **Phosphor:** No. 4
- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium

Bulb and Base Connections

The tube is equipped with a recessed small cavity cap (J1-21) for the high-voltage anode connection. The base is a small shell duodecal 5-pin base (B5-57) with a 12N basing configuration. The recessed small cavity cap is aligned with pin position number 3 within a tolerance of $\pm$ 10 degrees.

Electrical Connections and Basing

The bottom view of the base provides the following pin connections:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 10	Grid No. 2
Pin 11	Cathode
Pin 12	Heater
Cap	Anode

The direct interelectrode capacitance between the external conductive coating and the anode is rated as:

- **Maximum:** 2,000 μ f
- **Minimum:** 750 μ f

Maximum Ratings (Design Center Values)

The operating limits of the 16ZP4 are defined by the following Design Center Values. Operating the tube beyond these limits may impair performance or cause permanent damage.

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 Ampere
- **Maximum DC Anode Voltage:** 16,000 Volts
- **Maximum DC Grid No. 2 Voltage:** 410 Volts
- **Maximum Grid No. 1 Voltage:**
 - **DC Negative-Bias Value:** 125 Volts
 - **DC Positive-Bias Value:** 0 Volts
 - **Positive-Peak Value:** 2 Volts
- **Maximum DC Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode (during warm-up period ≤ 15 seconds):** 410 Volts
 - **Heater negative with respect to cathode (after equipment warm-up):** 125 Volts
 - **Heater positive with respect to cathode:** 125 Volts

Typical Operating Conditions and Characteristics

Under typical operating conditions, the 16ZP4 is configured with the following electrical and magnetic parameters:

- **DC Anode Voltage:** 12,000 Volts
- **DC Grid No. 2 Voltage:** 300 Volts
- **DC Grid No. 1 Voltage:** -33 to -77 Volts (for visual extinction of the undeflected focused spot)
- **DC Focusing Coil Current:** Approximately 110 mA. This value is specified using a standard focus coil #109 or equivalent, with the combined Grid No. 1 bias and video signal adjusted to produce a highlight brightness of 20 foot-lamberts on a 10-1/4" x 14-1/2" (or 10-1/8" x 14-1/2") picture. The distance from the reference line to the center of the focus coil air gap is 3.25 inches.
- **DC Ion Trap Current:** Approximately 120 mA when using a standard double field ion trap coil #108.

Circuit Constraints

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Deflection and Focusing

The 16ZP4 employs magnetic deflection and magnetic focusing. The nominal deflection angle is approximately 52 degrees. The external double field ion trap must be adjusted to prevent ion burn on the phosphor screen and to maximize raster brightness.

Technical Summary

The **16ZP4** is a 15-7/8 inch round glass cathode-ray picture tube designed for television applications. It features magnetic focus and deflection with a 52-degree deflection angle, a unipotential cathode, and a white-emitting No. 4 phosphor screen with medium persistence. Operating at a typical anode voltage of 12,000 Volts (with a maximum rating of 16,000 Volts), the tube requires an external double field ion trap

and a standard focusing coil to achieve optimal focus and brightness. Its electrical interface is provided via a 5-pin small shell duodecal base and a recessed small cavity cap 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	16000 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	52 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	125 V	HeaterNegativeAfterWarmup
Peak heater-cathode voltage	125 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	110 mA	Approximate
Ion trap current	120 mA	Approximate

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	52 degrees	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
External conductive coating to anode capacitance	2000 pF	Maximum
External conductive coating to anode capacitance	750 pF	Minimum

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