

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
CATHODERAY

15DP4

Specialized - Cathode Ray electronic tube

Direct-view P4 television picture tube using magnetic focusing and deflection, with white medium-persistence fluorescence, approximately 57-degree deflection, and typical 13 kV anode operation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	12
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	15000 V
MAXIMUM SCREEN VOLTAGE	410 V
CRT-specific electrode/focus/deflection values retained in parameter rows.	

15DP4 — Direct-View Cathode Ray Picture Tube

The **15DP4** and **15DP4A** are direct-view cathode ray picture tubes designed specifically for television receiver applications. These glass-bulb tubes are identical in their electrical and mechanical specifications, with the sole exception of the faceplate: the 15DP4 features a gray filter faceplate, whereas the **15DP4A** does not. Both types utilize magnetic focusing and magnetic deflection to produce a 12 3/4-inch by 9 1/2-inch raster size with high brilliance and definition. The electron gun design incorporates a bent electrode structure designed to operate with a single external magnetic field, which effectively eliminates ion spot blemishes on the screen.

Mechanical Construction and Basing

The 15DP4 is housed in a glass bulb designed for mounting in any position. Its physical dimensions and mechanical characteristics are as follows:

- **Overall Length:** $20 \frac{1}{2} \pm \frac{3}{8}$ inches
- **Greatest Diameter of Bulb:** $15 \frac{1}{2} \pm \frac{1}{4}$ inches
- **Minimum Useful Screen Diameter:** 14 inches
- **Bulb Contact:** Recessed small ball cap (J1-22)
- **Base:** Small shell duodecal 5-pin base (B7-51)
- **Basing Designation:** 12D

The recessed small ball cap (J1-22) serves as the connection for the anode and Grid No. 3. This bulb contact is aligned with pin position No. 3 within a tolerance of ± 10 degrees.

The 12D basing configuration provides the following pin connections, viewed from the bottom of the tube:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1
- **Pin 10:** Grid No. 2
- **Pin 11:** Cathode
- **Pin 12:** Heater
- **Cap:** Anode, Grid No. 3

Electrical Characteristics and Typical Operation

The 15DP4 features a coated unipotential cathode. The heater is designed for either AC or DC operation.

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A (with a $\pm 10\%$ tolerance)
- **Calculated Heater Power:** 3.78 W (calculated as $6.3 \text{ V} \times 0.6 \text{ A}$)

The direct interelectrode capacitances of the tube are approximately:

- **Cathode to all other electrodes:** 5 μF
- **Grid No. 1 to all other electrodes:** 7 μF

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

- **DC Anode Voltage:** 13,000 V
- **DC Grid No. 2 Voltage:** 250 V
- **DC Grid No. 1 Voltage:** -27 V to -63 V (for visual extinction of an undeflected focused spot)
- **DC Focusing Coil Current:** Approximately 146 mA
- **DC Ion Trap Magnet Current:** Approximately 105 mA (using standard coil No. 108)

The typical focusing coil current of 146 mA is specified for a standard focus coil No. 106 (or equivalent), with the combined Grid No. 1 bias voltage and video-signal voltage adjusted to produce a highlight

brightness of 38 foot-lamberts on a 9 1/2-inch by 12 3/4-inch picture. Under these conditions, the distance from the reference line to the center of the air gap on the focus coil is 3.0 inches. Additionally, the cathode should be returned to one side or to the mid-tap of the heater transformer winding.

Maximum Ratings and Operating Limits

The maximum ratings for the 15DP4 and [15DP4A](#) are interpreted according to the RMA Standard system. Operating outside these limits may compromise tube life or performance:

- **Maximum DC Anode Voltage (Anode + Grid No. 3):** 15,000 V
- **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 MΩ

The heater-to-cathode voltage limits are highly dependent on the operating state of the equipment:

- **Heater Negative with Respect to Cathode (Warm-up):** 410 V maximum (during an initial warm-up period not to exceed 15 seconds)
- **Heater Negative with Respect to Cathode (After Warm-up):** 140 V maximum
- **Heater Positive with Respect to Cathode:** 140 V maximum

Optical Characteristics

The tube utilizes a sulfide-type P-4 phosphor screen. The optical properties of this screen include:

- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium

Technical Summary

The **15DP4** and [15DP4A](#) are 15-inch class, magnetic-focus and magnetic-deflection cathode ray tubes designed for direct-view television applications. Operating with a nominal 6.3 V, 0.6 A heater, they feature a 57-degree deflection angle, a P-4 white-emitting phosphor screen with medium persistence, and a specialized bent electron gun structure that utilizes an external single-field ion trap magnet to prevent ion spot blemishes. With a maximum anode rating of 15,000 V and typical operation at 13,000 V, these tubes provide high-definition, bright displays for early television receivers.



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	15000 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	—
DeflectionAngleApproximate	57 degree	—
PhosphorNumber	4	—
FluorescentColor	White	—



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	—

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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	57 deg	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate
Grid #1 to all other electrodes capacitance	7 pF	Approximate

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Maximum DC anode voltage	15000 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	13000 V	TelevisionPictureTube
Typical DC grid #2 voltage	250 V	TelevisionPictureTube
Typical grid #1 voltage minimum	-63 V	VisualExtinctionRange
Typical grid #1 voltage maximum	-27 V	VisualExtinctionRange
Focusing coil current	146 mA	Approximate
Ion trap current	105 mA	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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