

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

19EJP4

Specialized - Cathode Ray electronic tube

1 SECTION
CONSTRUCTION
CATHODERAY

Wide-angle aluminized P4 monochrome television picture tube using electrostatic focusing and magnetic deflection, designed for high-voltage direct-view service with a large approximately 19-inch screen.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 450 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray
No fixed ratings recorded.
Television CRT electron-gun/display section.

19EJP4 Television Picture Tube

The **19EJP4** is a television picture tube designed with a 114-degree magnetic deflection system and low-voltage electrostatic focusing. It features an aluminized P4 phosphor screen with spherical gray filter glass, providing approximately 49% light transmittance at the center. The tube incorporates a tension band for implosion protection and an external conductive coating that serves as a supplementary filter capacitance.

Mechanical and Screen Characteristics

The 19EJP4 is constructed with an EIA J149F1 glass bulb and utilizes an EIA B7-208 small button 7-pin base. The physical dimensions of the tube are characterized by the following specifications:

- **Overall Length:** 11.625 inches $\pm$ 0.250 inches
- **Neck Length:** 4.375 inches $\pm$ 0.125 inches
- **Neck Diameter:** 1.168 inches maximum at the splice
- **Greatest Diagonal:** 18.733 inches $\pm$ 0.125 inches
- **Greatest Width:** 16.552 inches $\pm$ 0.125 inches
- **Greatest Height:** 13.446 inches $\pm$ 0.125 inches
- **Net Weight:** 15 lbs

The screen provides a minimum useful projected area of 172 square inches, with the following minimum dimensions:

- **Diagonal:** 17.562 inches
- **Horizontal:** 15.188 inches
- **Vertical:** 12 inches

For safety and proper operation, the tension band and the external conductive coating must be grounded. The electrical resistance between the external coating and the tension band is a minimum of 5 Megohms.

Heater and Electrical Connections

The 19EJP4 features an indirectly heated cathode with a controlled warm-up time.

Parameter	Value
Heater Voltage	6.3 V
Heater Current	450 $\pm$ 5% mA
Heater Warm-up Time	11 seconds

The heater warm-up time is defined as the time required to reach 80% of the rated voltage under a specified series resistance test.

The tube uses the EIA 8HR basing configuration. The pin connections, viewed from the bottom of the base, are as follows:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 3	Grid No. 2
Pin 4	Grid No. 4 (Focusing Electrode)
Pin 6	Grid No. 1
Pin 7	Cathode

Pin Number	Connection
Pin 8	Heater
Anode Cap	Recessed small cavity (EIA J1-21)

Base pin 4 aligns with the major axis of the tube within 30 degrees and is located on the same side as the anode terminal. To prevent mechanical damage, the socket must be equipped with flexible leads to avoid lateral strains on the pins.

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the tube are:

- **Cathode to all other electrodes:** 5 pF (approximate)
- **Grid No. 1 to all other electrodes:** 6 pF (approximate)
- **External conductive coating to anode:** 1000 pF minimum / 1500 pF maximum

Absolute Maximum Ratings

The following ratings are established under the Design-Maximum System. All voltages are positive and measured with respect to Grid No. 1 unless otherwise specified.

Parameter	Minimum	Maximum
Anode Voltage	12,000 V	20,000 V
Grid No. 4 (Focusing Electrode) Voltage	-550 V	+1,100 V
Grid No. 2 Voltage	20 V	60 V
Cathode Voltage (Positive Bias)	—	154 V
Cathode Voltage (Positive Peak)	—	220 V
Cathode Voltage (Negative Bias)	—	0 V
Cathode Voltage (Negative Peak)	—	2 V

Heater-Cathode Voltage Limits

- **Heater negative with respect to cathode (during warm-up, <= 15 seconds):** 450 V maximum
- **Heater negative with respect to cathode (after warm-up):** 300 V maximum
- **Heater positive with respect to cathode:** 200 V maximum

Typical Operating Conditions and Circuit Limits

In typical cathode drive operation, the voltages are applied with respect to Grid No. 1:

- **Anode Voltage:** 16,000 V
- **Grid No. 4 Voltage:** 0 to 400 V
- **Grid No. 2 Voltage:** 30 V
- **Cathode Voltage for Raster Cutoff:** 30 to 45 V

When operating the 19EJP4 at anode voltages exceeding 16,000 V, appropriate shielding may be required to limit very soft X-ray radiation.

Circuit Resistance Limits

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms
- **Minimum Grid No. 2 and Grid No. 4 Circuit Resistance:** 10,000 Ohms (protective resistance is advisable to prevent damage to the electrodes)

Centering Magnet Requirements

A permanent magnet (PM) centering magnet providing a field of 0 to 8 gauss may be used. This magnet should extend no more than 2.125 inches from the Yoke Reference Line, as determined by JEDEC Reference Line Gauge No. 126.

Technical Summary

The **19EJP4** is a 15-pound, 114-degree magnetic deflection television picture tube utilizing low-voltage electrostatic focusing and an aluminized P4 phosphor screen. Operating with a 6.3 V, 450 mA heater, it features a controlled 11-second warm-up time. The tube is designed for cathode-drive service, typically operating with a 16,000 V anode supply, a low Grid No. 2 voltage of 30 V, and a focusing voltage range of 0 to 400 V. It incorporates essential safety and performance features, including tension band implosion protection and an external conductive coating, both of which must be grounded.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Westinghouse Data Book

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

1965 WESTINGHOUSE DATA BOOK

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	450 mA	—
Heater Warm-up Time	11 s	—
Focusing Method	Low Voltage Electrostatic text	—
Deflection Method	Magnetic text	—
Horizontal Deflection Angle	103 deg	Approximate
Vertical Deflection Angle	86 deg	Approximate
Diagonal Deflection Angle	114 deg	Approximate
Phosphor	Aluminized P4 text	—
Fluorescence	White text	—
Persistence	Short to Medium text	—
Light Transmittance	49 percent	Approximate
Cathode-to-All Capacitance	5 pF	Approximate
Grid1-to-All Capacitance	6 pF	Approximate
External Coating-to-Anode Capacitance Minimum	1000 pF	—
External Coating-to-Anode Capacitance Maximum	1500 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	20000 V	—
Minimum Anode Voltage	12000 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Focus Electrode Voltage Positive	1100 V	Grid4
Maximum Focus Electrode Voltage Negative	-550 V	Grid4
Maximum Grid2 Voltage	60 V	—
Minimum Grid2 Voltage	20 V	—
Maximum Heater-Cathode Voltage During Warmup	450 V	Duration<=15s
Maximum Heater-Cathode Voltage After Warmup	300 V	—
Typical Anode Voltage	16000 V	CathodeDrive
Typical Focus Voltage Minimum	0 V	Grid4
Typical Focus Voltage Maximum	400 V	Grid4
Typical Grid2 Voltage	30 V	CathodeDrive
Cathode Voltage for Raster Cutoff Minimum	30 V	CathodeDrive
Cathode Voltage for Raster Cutoff Maximum	45 V	CathodeDrive
Maximum Grid1 Circuit Resistance	1.5 Mohm	—

TUBE TINKER

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