

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

19FEP4A

1 SECTION
CONSTRUCTION
CATHODERAY

Specialized - Cathode Ray electronic tube

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.

19FEP4A Television Picture Tube

The **19FEP4A** is a television picture tube featuring a spherical gray filter glass screen, low-voltage electrostatic focusing, and a 114° magnetic deflection system. It utilizes an aluminized P4 phosphor screen and incorporates a tension band for implosion protection, eliminating the need for an external ion trap.

Mechanical and Physical Specifications

The 19FEP4A is constructed using the EIA J149F1 bulb envelope and has a net weight of 15 lbs. The screen features spherical gray filter glass with a light transmittance of approximately 49% at the center. Implosion protection is provided by a tension band, which must be grounded.

Physical Dimensions

- **Overall Length:** 11.625" $\pm$ 0.250"
- **Greatest Diagonal:** 18.733" $\pm$ 0.125"
- **Greatest Width:** 16.552" $\pm$ 0.125"
- **Greatest Height:** 13.446" $\pm$ 0.125"
- **Neck Length:** 4.375" $\pm$ 0.125"
- **Maximum Neck Diameter at Splice:** 1.168"

Screen Dimensions

The projected minimum useful screen dimensions provide a total useful area of 172 square inches:

- **Diagonal:** 17.562"
- **Horizontal:** 15.125"
- **Vertical:** 12"

Deflection and Alignment

The tube utilizes magnetic deflection with a horizontal deflection angle of 103° and a vertical deflection angle of 86°, resulting in a diagonal deflection angle of 114°. The yoke reference line is determined by the plane surface of the flared end of JEDEC Reference Line Gauge No. 126. If a permanent magnet (PM) centering magnet (0 to 8 gauss) is used, it must extend no more than 2.125" from the Yoke Reference Line.

Electrical Connections and Heater Ratings

The 19FEP4A uses an EIA B7-208 small-button 7-pin base with an EIA 8HR basing configuration. The anode connection is made via an EIA J1-21 bulb contact.

Pin Connection Table

The pinout configuration for the EIA 8HR basing is detailed below:

Pin Number	Electrode Connection
Pin 1	Heater (H)
Pin 2	Grid No. 1 (G1)
Pin 3	Grid No. 2 (G2)
Pin 4	Grid No. 4 (G4, Focusing Electrode)
Pin 6	Grid No. 1 (G1)
Pin 7	Cathode (K)

Pin Number	Electrode Connection
Pin 8	Heater (H)

Heater Characteristics

The heater is designed for a nominal voltage of 6.3 V and operates at a current of $450 \pm 5\%$ mA. Under specified test conditions, the heater has a warm-up time of 11 seconds to reach 80% of its rated voltage.

Electrostatic and Interelectrode Capacitances

The direct interelectrode capacitances and associated electrical characteristics of the envelope coatings are:

- **Cathode to all other electrodes:** Approximately 5 pF
- **Grid No. 1 to all other electrodes:** Approximately 6 pF
- **External conductive coating to anode:** 1250 pF minimum to 1750 pF maximum
- **Minimum resistance from external coating to implosion hardware:** 5 Megohms

Typical Operating Conditions (Cathode Drive)

Under typical cathode drive operation, where voltages are positive with respect to Grid No. 1, the operating parameters are established as follows:

Parameter	Typical Value
Anode Voltage	16,000 V
Grid No. 4 (Focusing Electrode) Voltage	0 to 400 V
Grid No. 2 Voltage	30 V
Cathode Voltage for Raster Cutoff	30 to 45 V

Design Maximum Ratings and Circuit Limits

The following limiting values are specified under the Design Maximum System. All voltages are positive and measured with respect to Grid No. 1 unless otherwise noted.

Electrode Voltage Limits

- **Anode Voltage:** 12,000 V minimum to 23,500 V maximum
- **Grid No. 4 (Focusing Electrode) Voltage:** -550 V to +1100 V
- **Grid No. 2 Voltage:** 20 V minimum to 60 V maximum
- **Cathode Voltage:**
 - Maximum negative bias value: 0 V

- Maximum negative peak value: 2 V
- Maximum positive bias value: 154 V
- Maximum positive peak value: 220 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:** 200 V maximum
- **Heater positive with respect to cathode:** 200 V maximum

Limiting Circuit Values

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

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	1250 pF	—
External Coating-to-Anode Capacitance Maximum	1750 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	23500 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	200 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	—