



20HP4-A/20LP4 CATHODE-RAY TUBE

20-INCH RECTANGULAR, GLASS
FOCUS—LOW VOLTAGE ELECTROSTATIC
DEFLECTION—MAGNETIC
70-DEGREE DEFLECTION ANGLE

17- BY 12³/₄-INCH PICTURE SIZE
FACEPLATE—SPHERICAL, GRAY
ION-TRAP GUN
EXTERNAL CONDUCTIVE COATING

DESCRIPTION AND RATING

The 20HP4-A/20LP4 is an electrostatic-focus and magnetic-deflection, direct-view all-glass picture tube which provides a 17- by 12³/₄-inch picture for television applications. The electron gun has a focusing voltage range of -0.4 to +2.2 percent of the anode voltage and is used with an external single-field ion-trap magnet. Other features of this tube include a high-quality gray faceplate which increases picture contrast and detail under high-ambient-light conditions, and a space-saving rectangular face shape. An external conductive coating serves as a filter capacitor when grounded.

GENERAL

ELECTRICAL

Heater Voltage .....	.63	Volts
Heater Current	0.6 ± 10%	Amperes
Focusing Method—Electrostatic		
Deflecting Method—Magnetic		
Deflection Angle, approximate		
Diagonal .....	.70	Degrees
Horizontal .....	.65	Degrees
Vertical .....	.50	Degrees
Direct Interelectrode Capacitances, approximate		
Cathode to All Other Electrodes .....	.5	μμf
Grid-No. 1 to All Other Electrodes .....	.6	μμf
External Conductive Coating to Anode		
Maximum	1500	μμf
Minimum .....	.750	μμf

OPTICAL

Phosphor Number—P4, Sulfide Type	
Fluorescent Color—White	
Phosphorescent Color—White	
Persistence—Short	
Faceplate—Gray	
Light Transmission at Center, approximate73 Percent



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MECHANICAL

Over-all Length 21 $\frac{3}{4}$ \pm $\frac{3}{8}$ Inches

Greatest Bulb Dimensions

Diagonal 20 $\frac{3}{32}$ \pm $\frac{1}{8}$ Inches

Width 18 $\frac{11}{16}$ \pm $\frac{1}{8}$ Inches

Height 14 $\frac{15}{16}$ \pm $\frac{1}{8}$ Inches

Minimum Useful Screen Dimensions

Diagonal 18 $\frac{5}{8}$ Inches

Width 17 Inches

Height 12 $\frac{3}{4}$ Inches

Neck Length 7 $\frac{1}{2}$ Inches

Bulb Number, ASA Designation—J161-C1

Bulb Contact—Recessed Small-cavity Cap, JETEC No. J1-21

Base—Small-shell Duodecal 6-Pin, JETEC No. B6-63

Basing—JETEC Designation—12L

Bulb Contact Alignment

Anode Contact Aligns with Pin No. 6 \pm 30 Degrees

Mounting Position—Any

Net Weight, approximate 22 $\frac{1}{2}$ Pounds

MAXIMUM RATINGS

DESIGN-CENTER VALUES*

Anode Voltage \dagger 16,000 Max Volts DC

Focusing-Electrode Voltage -500 to +1000 Max Volts DC

Grid-No. 2 Voltage 500 Max Volts DC

Grid-No. 1 Voltage

Negative-Bias Value 125 Max Volts DC

Positive-Bias Value 0 Max Volts DC

Positive-Peak Value 2 Max Volts

Peak Heater-Cathode Voltage \S

Heater Negative with Respect to Cathode

During Warm-up Period not to Exceed 15 Seconds 410 Max Volts

After Equipment Warm-up Period 180 Max Volts

Heater Positive with Respect to Cathode 180 Max Volts

TYPICAL OPERATING CONDITIONS

Anode Voltage π 14,000 Volts DC

Focusing-Electrode Voltage for Focus \blacktriangle -56 to +308 Volts DC

Focusing-Electrode Current -15 to +25 Microamperes DC

Grid-No. 2 Voltage 300 Volts DC

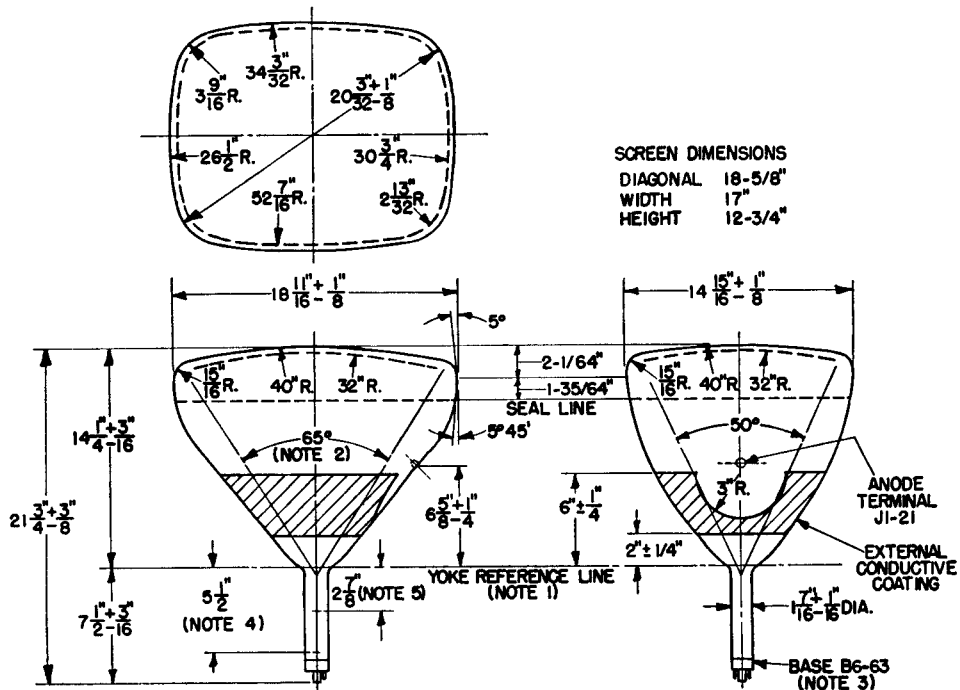
Grid-No. 1 Voltage \blacklozenge -28 to -72 Volts DC

Ion-Trap Field Intensity ϕ , approximate 35 Gauss

MAXIMUM CIRCUIT VALUES

Grid-No. 1 Circuit Resistance 1.5 Max Megohms

- * The maximum ratings provide a ten-percent safety factor in accordance with the standard design-center system of rating cathode-ray tubes. The tube will withstand the combined effects of variations in line voltage and components provided the maximum design-center values are not exceeded by more than ten percent.
- † Anode, grid-No. 3 and grid-No. 5 which are connected together within the tube are referred to herein as anode. If this tube is operated at voltages in excess of 16,000 volts, x-ray radiation shielding may be necessary to avert possible danger of personal injury from prolonged exposure at close range. The protective face-viewing window of apparatus using tubes of this type may provide such a safeguard. If the radiation measured in contact with this window does not exceed 6.25 milliroentgens per hour, the window will normally provide adequate protection.
- § Cathode should be returned to one side or to the midtap of the heater transformer winding.
- π Brightness and focus quality decrease with decreasing anode voltage. In general, the anode voltage should not be less than 12,000 volts.
- ▲ The focusing electrode may be modulated within the stipulated maximum range without damage to the tube.
- ◆ For visual extinction of focused raster.
- φ Single-field ion-trap magnet adjusted to optimum position, equivalent to 35 milliamperes through JETEC ion-trap magnet No. 117.



NOTES:

1. REFERENCE LINE IS DETERMINED BY THE PLANE OF THE UPPER EDGE OF THE REFERENCE-LINE GAGE (RETMA NO. 110) WHEN THE GAGE IS RESTING ON THE CONE.
2. DEFLECTION ANGLE ON DIAGONAL IS 70 DEGREES.
3. ANODE TERMINAL ALIGNS WITH PIN-NO. 6 ± 30 DEGREES.
4. APPROXIMATE POSITION OF ION-TRAP MAGNET.
5. APPROXIMATE POSITION OF CENTERING MAGNET, IF USED.

