Electronic TUBES

21EP4-A AND 21EP4-B

CATHODE-RAY TUBE

21-INCH RECTANGULAR, GLASS
FOCUS—MAGNETIC
DEFLECTION—MAGNETIC
70-DEGREE DEFLECTION ANGLE
19⅛- BY 13⅞-INCH PICTURE SIZE
FACEPLATE—CYLINDRICAL, GRAY
ION-TRAP GUN
EXTERNAL CONDUCTIVE COATING
21EP4-B—ALUMINIZED SCREEN

DESCRIPTION AND RATING

The 21EP4-A is a magnetic-focus and deflection, direct-view all-glass picture tube which provides a 19⅛- by 13⅞-inch picture for television applications. The electron gun is designed for use 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, a space-saving rectangular face shape, and a cylindrical front surface which materially reduces the effects of specular reflection. An external conductive coating serves as a filter capacitor when grounded.

The 21EP4-B has the additional feature of a reflective aluminized screen which increases light output.

GENERAL

ELECTRICAL

Heater Voltage	6.3	Volts
Heater Current	0.6 ± 10%	Amperes
Focusing Method—Magnetic		
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	uuf
Grid-No. 1 to All Other Electrodes	6	uuf
External Conductive Coating to Anode		
Maximum	750	uuf
Minimum	500	uuf

OPTICAL

Phosphor Number—P4, Sulfide Type		
Fluorescent Color—White		
Phosphorescent Color—White		
Persistence—Short		
Faceplate—Gray		
Light Transmission at Center, approximate	71	Percent

Supersedes ETR-144 and ETR-145, dated 4-52

MECHANICAL

Over-all Length	$23\frac{1}{32} \pm \frac{3}{8}$	Inches
Greatest Bulb Dimensions		
Diagonal	$21\frac{7}{32} \pm \frac{3}{16}$	Inches
Width	$20\frac{1}{4} \pm \frac{3}{16}$	Inches
Height	$15\frac{9}{16} \pm \frac{3}{16}$	Inches
Minimum Useful Screen Dimensions		
Diagonal	$20\frac{1}{8}$	Inches
Width	$19\frac{1}{8}$	Inches
Height	$13\frac{7}{8}$	Inches
Neck Length	$7\frac{1}{2}$	Inches

Bulb Number, ASA Designation—J170-A1
Bulb Contact—Recessed Small-cavity Cap, JETEC No. J1-21
Base—Small-shell Duodecal 5-Pin, JETEC No. B5-57
Basing, JETEC Designation—12N
Bulb Contact Alignment
Anode Contact Aligns with Pin No. 6 Position ±30 Degrees

Mounting Position—Any

Net Weight, approximate	27	Pounds

MAXIMUM RATINGS

DESIGN-CENTER VALUES*

Anode Voltage†	18,000 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‡		
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§	16,000	Volts DC
Grid-No. 2 Voltage	300	Volts DC
Grid-No. 1 Voltage#	−28 to −72	Volts DC
Focusing-Coil Current▲, approximate	116	Milliamperes DC
Ion-Trap Field Intensity♦, approximate	40	Gausses

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 voltages and components provided the maximum design-center values are not exceeded by more than ten percent.

†Anode and grid-No. 3 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.

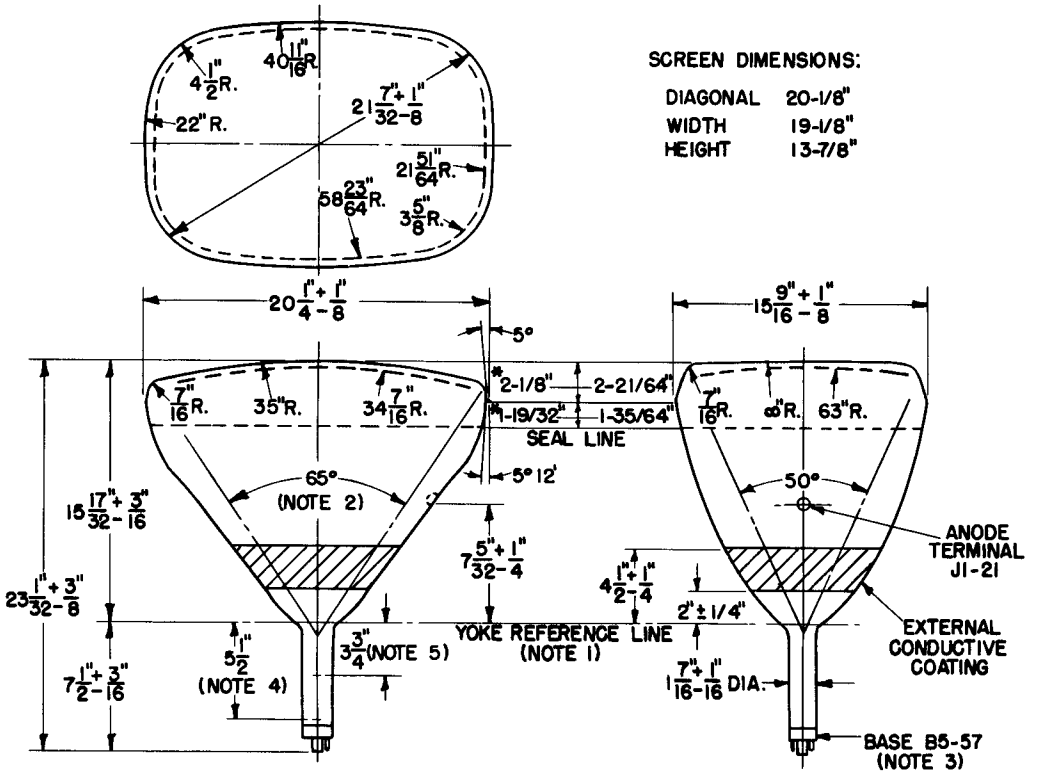
‡Cathode should be returned to one side or to the midtap of the heater transformer winding.

§Brightness and focus quality decrease with decreasing anode voltage. In general, the anode voltage should not be less than 14,000 volts.

πFor visual extinction of focused raster.

▲For JETEC focusing coil No. 109 with distance from the yoke-reference-line to center-of-air-gap equal to 3¾ inches.

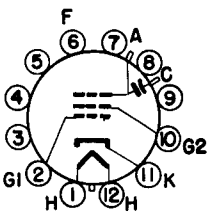
♦Single-field ion-trap magnet adjusted to optimum position, equivalent to 40 milliamperes through JETEC ion-trap magnet No. 117.



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 POSITION ±30 DEGREES.
4. APPROXIMATE POSITION OF ION-TRAP MAGNET.
5. RECOMMENDED POSITION FOR CENTER OF FOCUSING FIELD.

* THIS SET OF VALUES ALSO POSSIBLE.



BASING DIAGRAM
12N