

Color Picture Tube

70° Round

New Rare-Earth (Red) Phosphor

Antiglare Integral Protective Window HI-LITE Screen

Unity Current Ratios

70° Magnetic Deflection

ELECTRICAL

Electron Guns, Three with Axes Tilted

Toward Tube Axis Red, Blue, Green

Heater, of Each Gun Parallel

Connected within Tube with

Each of the Other Two Heaters:

Current at 6.3 volts^a 1.9 'A

Focusing Method Electrostatic

Focus Lens Bipotential

Convergence Method Magnetic

Deflection Method Magnetic

Deflection Angles (Approx.):

Horizontal 70 deg.

Vertical 55 deg.

Direct Interelectrode Capacitance (Approx.):

Grid No.1 of any gun

to all other electrodes 10 pF

Grid No.3 to all other electrodes 12 pF

All cathodes to all other electrodes 16 pF

External conductive coating

to anode (Approx.) { 2500 max. pF
2000 min. pF

OPTICAL

Faceplate and Protective Window Filterglass

Light transmission at center (Approx.) 39%

Surface of Protective Window Treated to minimize
specular reflection

Screen, on Inner Surface of Faceplate:

Type Aluminized, Tricolor, Phosphor-Dot

Phosphor (three separate phosphors,

collectively) P22-New Rare-Earth (Red),
Sulfide (Blue & Green) Type

Fluorescence and phosphorescence

of separate phosphors, respectively . . Red, Blue, Green

Persistence of group phosphorescence Medium Short

Dot Arrangement Triangular group consisting of
red dot, blue dot, and green dot

Spacing between centers of adjacent

dot trios (Approx.) 0.029 in

21GVP22

MECHANICAL

Minimum Screen Area (Projected)	267 sq. in
Bulb Funnel Designation	JEDEC No.J164-1/4A1
Bulb Panel Designation	JEDEC No.FP166-1/2D1
Protective Window Designation.	JEDEC No.FP166-1/2B1
Base	Small-Shell Neodiheptal 12-pin
Operating Position	Tube Axis Horizontal, V-grooved panel pad on top (Base pin 12 near top)
Socket	Alden Nos.214NMINSC (Radial leads), 214NMINC (Axial leads), or equivalent
Weight (Approx.)	41 lb

MAXIMUM AND MINIMUM RATINGS, DESIGN-MAXIMUM VALUES

*Unless otherwise specified, values are for each gun
and voltage values are positive with respect to cathode*

Anode Voltage	{ 27,500 max. volts 20,000 min. volts
Total Anode Current,	
Long-Term Average	1000 max. μ A
Grid-No.3 (Focusing Electrode) Voltage	6000 max. volts
Peak Grid-No.2 Voltage, Including	
Video Signal Voltage	1000 max. volts
Grid-No.1 Voltage:	
Negative bias value.	400 max. volts
Negative operating cutoff value	200 max. volts
Positive bias value.	0 max. volts
Positive peak value	2 max. volts
Heater Voltage (ac or dc):	
Under operating conditions ^a	{ 6.9 max. volts 5.7 min. volts
Under standby conditions ^c	5.5 max. volts
Peak Heater-Cathode Voltage:	
Heater negative with respect to cathode:	
During equipment warm-up period not exceeding 15 seconds	450 max. volts
After equipment warm-up period:	
Combined AC and DC value	200 max. volts
DC component value	200 max. volts
Heater positive with respect to cathode:	
AC component value	200 max. volts
DC component value	0 max. volts

EQUIPMENT DESIGN RANGES

*Unless otherwise specified, values are for each gun
and voltage values are positive with respect to cathode*

For anode voltages between 20,000 and 27,500 volts

Grid-No.3 (Focusing Electrode) Voltage	16.8% to 20% of Anode volts
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Grid-No.2 and Grid-No.1 Voltages

for Visual Extinction of Focused

Spot See *CUTOFF DESIGN CHART*

Maximum Ratio of Grid-No.2 Voltages, Highest

Gun to Lowest Gun in Any Tube (At grid-No.1

spot cutoff voltage of -100 volts) 1.86

Grid-No.3 Current (Total) -45 to +15 μ AGrid-No.2 Current -5 to +5 μ A

To Produce White of 9300°K + 27 M.P.C.D.

(CIE Coordinates $x = 0.281$, $y = 0.311$):

Red Blue Green

Percentage of total anode current

supply by each gun (average) . . . 34 32 34 %

Ratio of cathode currents:

	Min.	Typ.	Max.
Red/blue	0.75	1.10	1.50
Red/green	0.65	1.00	1.50
Blue/green	0.60	0.91	1.30

Displacements, Measured at Center of Screen:

Raster centering displacement:

Horizontal ± 0.60 inVertical ± 0.45 in

Lateral distance between the blue beam and

the converged red and green beams ± 0.40 in

Radial convergence displacement excluding

effects of dynamic convergence (each beam). ± 0.50 inMaximum Required Correction for Register^d (In-

cluding Effect of Earth's Magnetic Field when

Using Recommended Components) as Measured

at the Center of the Screen

in any Direction 0.005 in max.

LIMITING CIRCUIT VALUES

High-Voltage Circuits:

Grid-No.3 circuit resistance 7.5 max. megohms

In order to minimize the possibility of damage to the tube caused by a momentary internal arc, it is recommended that the *high-voltage power supply* and the *grid-No.3 power supply* be of the limited-energy type, in which the short-circuit current does not exceed 20 mA.

Low-Voltage Circuits:

Effective grid-No.1-to-cathode-

circuit resistance (each gun) 0.75 max. megohm

The low-voltage circuits, including all heater circuits, should be analyzed by assuming the color picture tube heater is connected directly to the receiver chassis ground. Under

21GVP22

these conditions the circuits to the elements of all tubes, including the color picture tube, operating from the same heater winding and all connections of any other circuits to the heater winding should each have an impedance such that their respective power sources in combination will not supply a continuous short-circuit current of more than 750 mA total in the assumed picture tube heater ground connection. The leads from all other circuits must be separated from the picture tube leads by a minimum distance of 0.25 inch to prevent energy transfer to the picture tube circuits. Such current limitation will help prevent picture tube damage in case of momentary cascade arcing.

- ^a For maximum cathode life, it is recommended that the heater supply be regulated at 6.3 volts. The series impedance to any chassis connection in the DC biasing circuit for the heater should be between 100,000 ohms and 1 megohm.
- ^b For curve, see *Group Phosphor P22-New Rare-Earth (Red), Sulfide (Blue & Green)* at front of this section.
- ^c For "instant on" applications, a maximum heater voltage of 5.5 volts (design-maximum value) may be maintained on the color picture tube when the receiver is in the "off" (standby) position. All other voltages normally applied to the tube must be removed during standby operation.
- ^d Register is defined as the relative position of the beam trios with respect to the associated phosphor-dot trios.

X-RADIATION WARNING

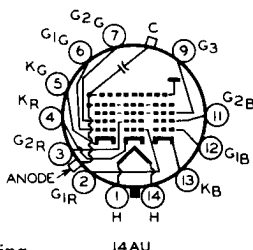
Because the 21GVP22 is designed to be operated at anode voltages as high as 27.5 kilovolts (design-maximum value), shielding of the 21GVP22 for X-radiation may be needed to protect against possible injury from prolonged exposure at close range.

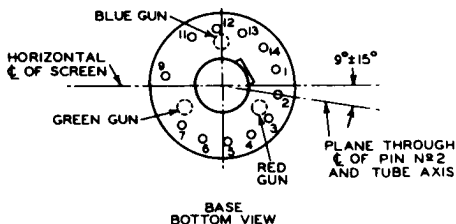
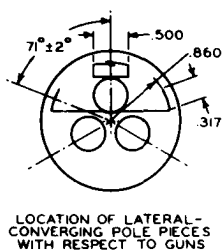
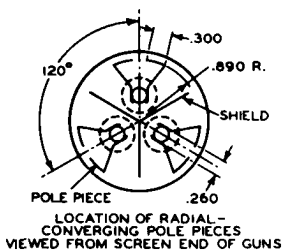
TERMINAL DIAGRAM (Bottom View)

- Pin 1- Heater
- Pin 2- Grid No.1 of Red Gun
- Pin 3- Grid No.2 of Red Gun
- Pin 4- Cathode of Red Gun
- Pin 5- Cathode of Green Gun
- Pin 6- Grid No.1 of Green Gun
- Pin 7- Grid No.2 of Green Gun
- Pin 9- Grid No.3
- Pin 11- Grid No.2 of Blue Gun
- Pin 12- Grid No.1 of Blue Gun
- Pin 13- Cathode of Blue Gun
- Pin 14- Heater

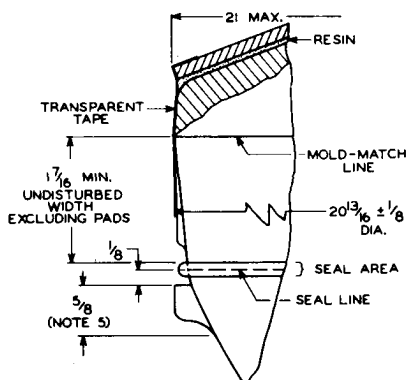
Cap - Anode

C - External Conductive Coating



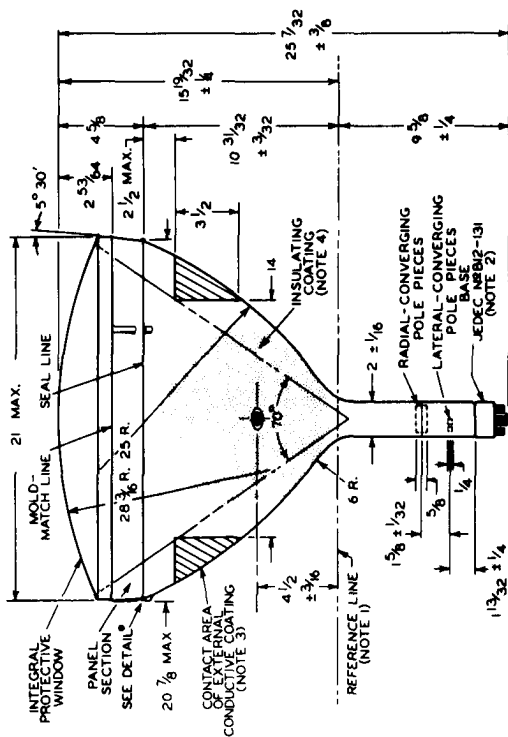


DIMENSIONAL OUTLINE DETAIL



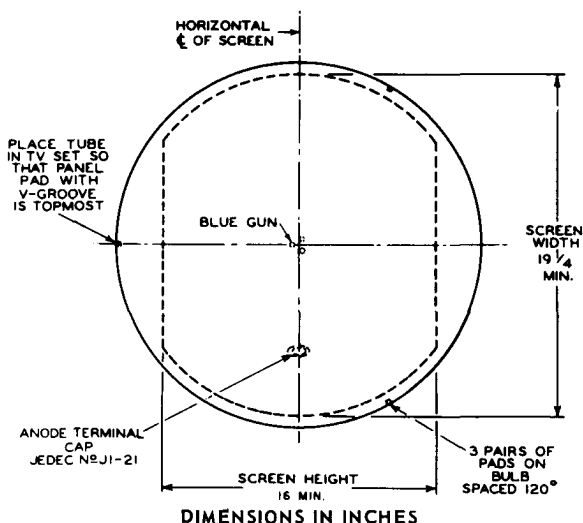
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DIMENSIONAL OUTLINE



DIMENSIONS IN INCHES

DIMENSIONAL OUTLINE (Top View)

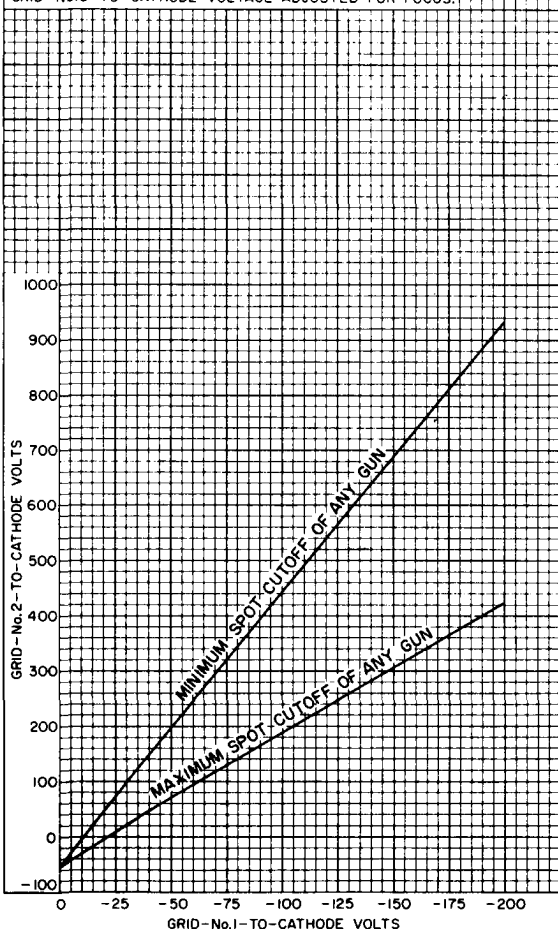


NOTES FOR DIMENSIONAL OUTLINE

- Note 1:** With tube neck inserted through flared end of reference-line and neck-funnel-contour gauge JEDEC No. G-150 and with tube seated in gauge, the reference line is determined by the intersection of the plane CC' of the gauge with the glass funnel.
- Note 2:** Socket for this base should not be rigidly mounted; it should have flexible leads and be allowed to move freely. Bottom circumference of base shell will fall within a circle concentric with bulb axis and having a diameter of 3".
- Note 3:** The drawing shows the size and location of the contact area of the external conductive coating. The actual area of this coating will be greater than that of the contact area so as to provide the required capacitance. External conductive coating must be grounded with multiple contacts.
- Note 4:** To clean this area, wipe only with soft dry lintless cloth.
- Note 5:** The maximum effective width of a funnel pad is 5/8".

CUTOFF DESIGN CHART

HEATER VOLTAGE = 6.3 VOLTS
 ANODE-TO-CATHODE VOLTAGE = 20,000 TO 27,500 VOLTS
 GRID-No.3-TO-CATHODE VOLTAGE ADJUSTED FOR FOCUS.



92CM-12330