

Picture Tube

RECTANGULAR GLASS TYPE
LOW-VOLTAGE ELECTROSTATIC FOCUS
LOW GRID-No.2 VOLTAGE

ALUMINIZED SCREEN
MAGNETIC DEFLECTION
CATHODE-DRIVE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Current at 6.3 volts.	600 ± 30	ma
Heater Warm-Up Time (Average).	11	seconds
Direct Interelectrode Capacitances:		
Grid No.1 to all other electrodes. . .	6	μuf
Cathode to all other electrodes. . . .	5	μuf
External conductive coating to ultor .	{2500 max. 1700 min.	{μuf μuf
Focusing Method.	Electrostatic	
Deflection Method.	Magnetic	
Deflection Angles (Approx.):		
Diagonal	114°	
Horizontal	102°	
Vertical	84°	
Electron Gun	Type Requiring No Ion-Trap Magnet	

Optical:

Faceplate.	Filterglass
Light transmission at center (Approx.)	78%
Phosphor (For curves, see front of this section) .	P4—Sulfide Type Aluminized
Fluorescence	White
Phosphorescence.	White
Persistence.	Medium Short

Mechanical:

Tube Dimensions:			
Overall length	14-3/8" ± 5/16"		
Greatest width	20-1/2" + 1/16" - 1/8"		
Greatest height.	16-1/2" ± 1/8"		
Diagonal	23-25/64" + 3/32" - 1/8"		
Neck length.	5-1/8" ± 1/8"		
Curvature of faceplate (Radii):			
	<i>Center</i>	<i>Intermediate</i>	<i>Edge</i>
External surface . . .	50"	—	36-3/4"
Internal surface . . .	30"	48"	24"
Screen Dimensions (Minimum):			
Greatest width	19-1/4"		
Greatest height.	15-1/8"		
Diagonal	22-5/16"		
Projected area	282 sq. in.		
Weight (Approx.)	24 lbs		
Operating Position	Any		
Cap.	Recessed Small Cavity (JEDEC No.J1-21)		
Bulb	J187 (114°)		

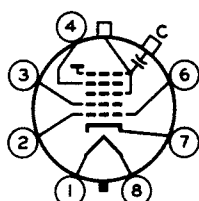


23NP4

Base. Small-Button Neoeightar 7-Pin, Arrangement 1,
(JEDEC No. B7-208)

Basing Designation for BOTTOM VIEW. 8HR

- Pin 1-Heater
- Pin 2-Grid No.1
- Pin 3-Grid No.2
- Pin 4-Grid No.4
- Pin 6-Grid No.1
- Pin 7-Cathode
- Pin 8-Heater



- Cap-Ultor
(Grid No.3,
Grid No.5,
Collector)
- C-External
Conductive
Coating

CATHODE-DRIVE^A SERVICE

*Unless otherwise specified, voltage values
are positive with respect to grid No.1*

Maximum and Minimum Ratings, Design-Maximum Values:

ULTOR-TO-GRID-No.1 VOLTAGE.	{22000 max. volts 11000 min. volts
GRID-No.4-TO-GRID-No.1 (FOCUSING) VOLTAGE:	
Positive value.	1250 max. volts
Negative value.	400 max. volts
GRID-No.2-TO-GRID-No.1 VOLTAGE.	{70 max. volts 40 min. volts
CATHODE-TO-GRID-No.1 VOLTAGE:	
Positive-peak value	220 max. volts
Positive-bias value	154 max. volts
Negative-bias value	0 max. volts
Negative-peak value	2 max. volts
HEATER VOLTAGE.	{6.9 max. volts 5.7 min. 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.	200 max. volts
Heater positive with respect to cathode	200 max. volts

Equipment Design Ranges:

*With any ultor-to-grid-No.1 voltage (E_{c5g1}) between 11000
and 22000 volts and grid-No.2-to-grid-No.1 voltage (E_{c2g1})
between 44 and 70 volts*

Grid-No.4-to-Grid-No.1	
Voltage for focus ^B	0 to 400 volts
Cathode-to-Grid-No.1 Voltage	
(E_{kg1}) for visual extinction	
of focused raster	See Raster-Cutoff-Range Chart for Cathode-Drive Service
Cathode-to-Grid-No.1 Video	
Drive from Raster Cutoff	
(Black level):	
White-level value	
(Peak negative)	Same value as determined for E_{kg1} except video drive is a negative value

Grid-No.4 Current	-25 to +25	μ a
Grid-No.2 Current	-15 to +15	μ a
Field Strength of Adjustable Centering Magnet [★]	0 to 8	gausses

Examples of Use of Design Ranges:

<i>With ultor-to-grid-No.1 voltage of</i>		
<i>and grid-No.2-to-grid-No.1 voltage of</i>	18000	volts
Grid-No.4-to-Grid-No.1 Voltage for focus [●]	0 to 400	volts
Cathode-to-Grid-No.1 Voltage for visual extinction of focused raster. . . .	34 to 49	volts
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black level):		
White-level value	-34 to -49	volts

Maximum Circuit Values:

Grid-No.1 Circuit Resistance.	1.5 max.	megohms
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- ▲ Cathode drive is the operating condition in which the video signal varies the cathode potential with respect to grid No.1 and the other electrodes.
- Individual tubes will have satisfactory focus at some value of grid-No.4-to-grid-No.1 voltage between 0 and 400 volts with the combined bias voltage and video-signal voltage adjusted to give an ultor current of 200 microamperes.
- ★ Distance from *Reference Line* for suitable PM centering magnet should not exceed 2-1/4". Excluding extraneous fields, the center of the undeflected focused spot will fall within a circle having a 7/16-inch radius concentric with the center of the tube face. It is to be noted that the earth's magnetic field can cause as much as 1/2-inch deflection of the spot from the center of the tube face.

OPERATING CONSIDERATIONS

X-Ray Warning. When operated at ultor voltages up to 16 kilovolts, this picture tube does not produce any harmful X-ray radiation. However, because the rating of this type permits operation at voltages as high as 22 kilovolts (Design-maximum value), shielding of this picture tube for X-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltage in excess of 16 kilovolts.

Shatter-Proof Cover Over the Tube Face. Following conventional picture-tube practice, it is recommended that the cabinet be provided with a shatter-proof, glass cover over the face of this picture tube to protect it from being struck accidentally and to protect it against possible damage resulting from tube implosion under some abnormal condition. This safety cover can also provide X-ray protection when required.

DIMENSIONAL OUTLINE and BULB-CONTOUR DIMENSIONS

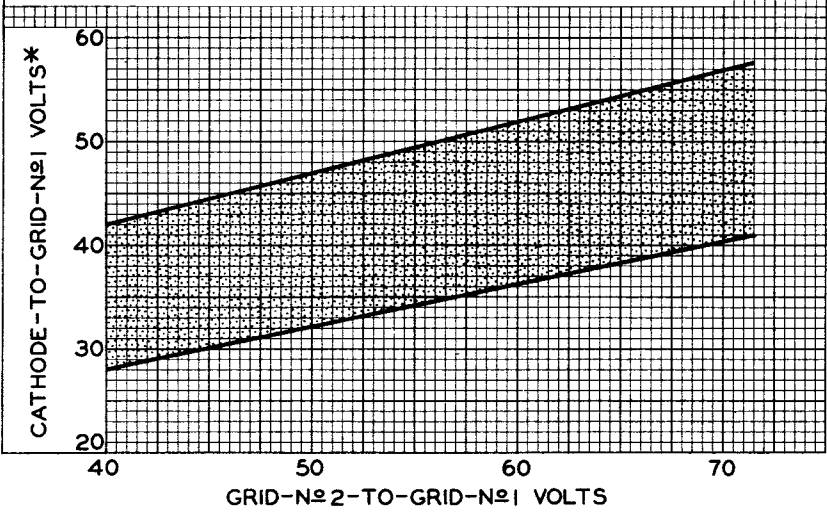
shown under Type 23MP4 also apply to the 23NP4



23NP4

RASTER-CUTOFF-RANGE CHART Cathode-Drive Service

$E_f = 6.3$ VOLTS
ULTOR-TO-GRID-N₂ VOLTS=16000
GRID-N₄-TO-GRID-N₂ VOLTS ADJUSTED FOR FOCUS.
* CATHODE-TO-GRID-N₂ VOLTAGE FOR VISUAL EXTINCTION
OF FOCUSED RASTER INCREASES OR DECREASES
DIRECTLY BY APPROX. 2% FOR EVERY 1000-VOLT
CHANGE IN ULTOR-TO-GRID-N₂ VOLTAGE.



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CATHODE-DRIVE CHARACTERISTICS

 $E_f = 6.3$ VOLTS

ULTOR-TO-GRID-№1 VOLTS=16000

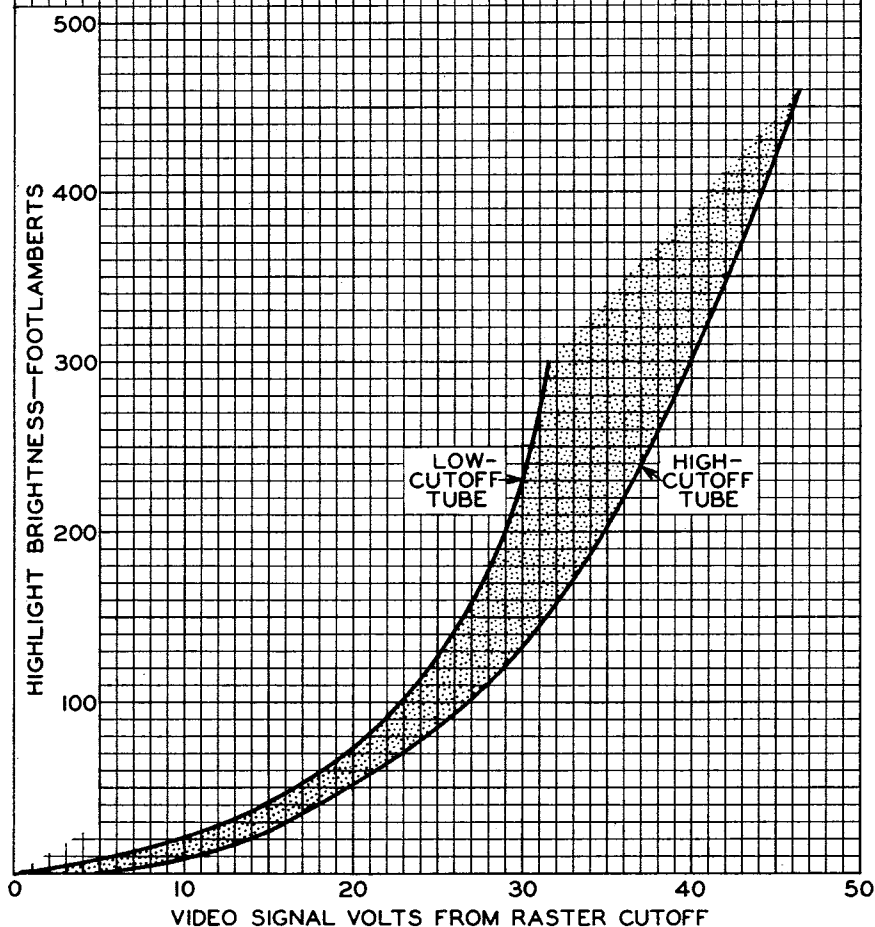
GRID-№2-TO-GRID-№1 VOLTS=50

CATHODE BIASED POSITIVE WITH RESPECT TO
GRID №1 TO GIVE FOCUSED RASTER CUTOFF.

RASTER FOCUSED AT AVERAGE BRIGHTNESS.

RASTER SIZE=18"x13-1/2"

CIE COORDINATES OF SCREEN: X=0.287, Y=0.315

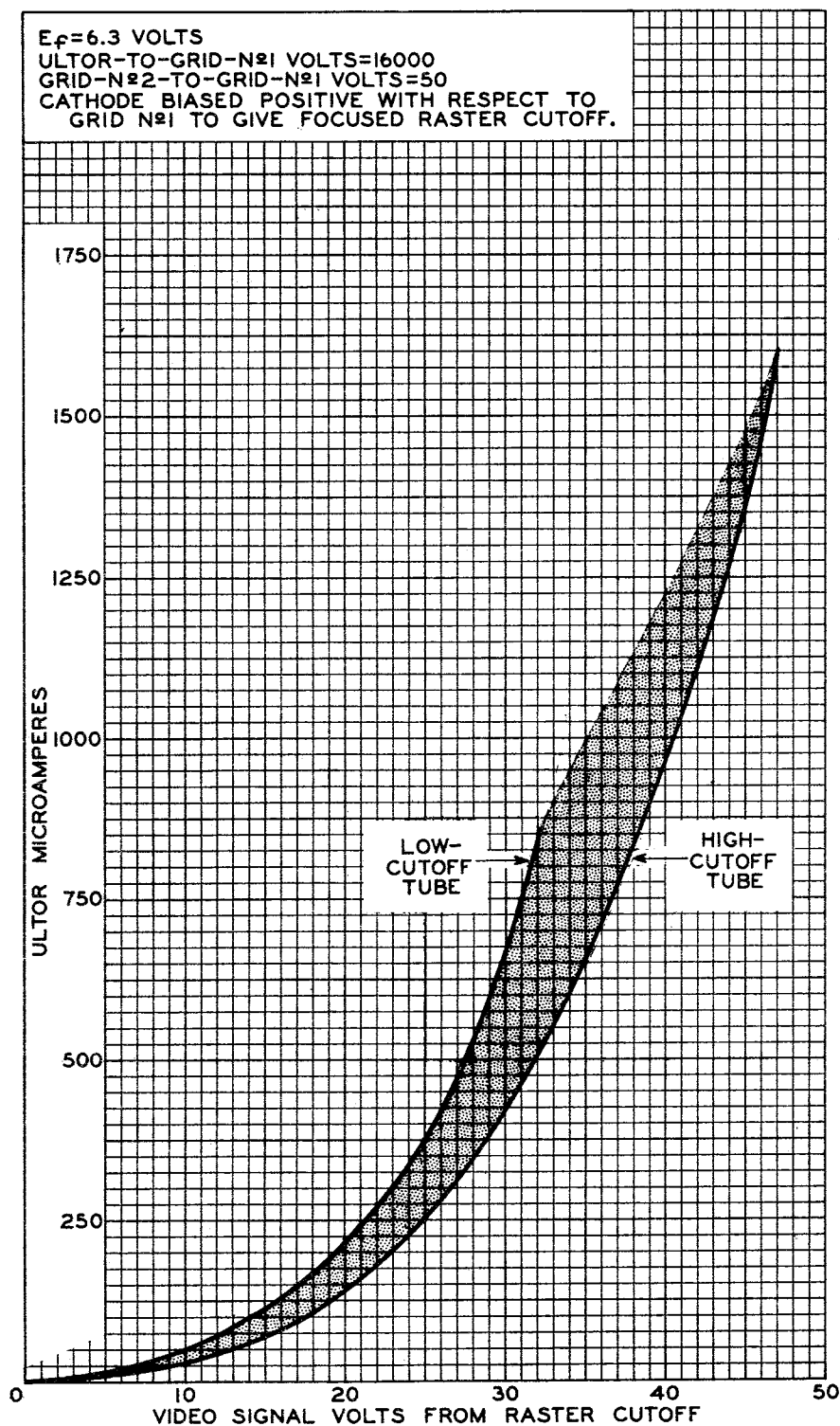


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23NP4

CATHODE-DRIVE CHARACTERISTICS



92CM-9946R1

