

Picture Tube

NO ION-TRAP MAGNET REQUIRED

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

ALUMINIZED SCREEN
 114° MAGNETIC DEFLECTION
 CATHODE-DRIVE TYPE

Electrical:

Direct Interelectrode Capacitances:

Grid No.1 to all other electrodes.	6	pf
Cathode to all other electrodes.	5	pf
External conductive coating to anode	{ 2500 max. 1700 min.	pf

Heater Current at 6.3 volts. 600 $\pm$ 30 ma

Heater Warm-Up Time (Average). 11 seconds

Electron Gun Type Requiring No Ion-Trap Magnet

Optical:

Phosphor (For curves, see front of this section). . . P4—Sulfide Type

Aluminized

Faceplate. Filterglass

Light transmission at center (Approx.) 78%

Mechanical:

Weight (Approx.) 24 lbs

Overall Length. 14.531" $\pm$.281"

Neck Length. 5.125" $\pm$.125"

Projected Area of Screen 282 sq. in.

External Conductive Coating:

Type Regular-Band

Contact area for grounding Near Reference Line

For Additional Information on Coatings and Dimensions:

See *Picture-Tube Dimensional-Outlines and Bulb J187 B* sheets
 at front of this section

Cap. Recessed Small Cavity (JEDEC No.J1-21)

Base Small-Button Noveightar 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

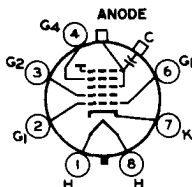
Pin 6—Grid No.1

Pin 7—Cathode

Pin 8—Heater

Cap—Anode (Grid No.3,
 Grid No.5, Screen,
 Collector)

C—External
 Conductive Coating



23NP4

Maximum and Minimum Ratings, Design-Maximum Values:

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

Anode Voltage.	{ 22000 max. 11000 min.	volts volts
Grid-No. 4 (Focusing) Voltage:		
Positive value	1250 max.	volts
Negative value	400 max.	volts
Grid-No. 2 Voltage.	{ 70 max. 40 min.	volts volts
Cathode Voltage:		
Negative peak value.	2 max.	volts
Negative bias value.	0 max.	volts
Positive bias value.	155 max.	volts
Positive peak value.	220 max.	volts
Heater Voltage	{ 6.9 max. 5.7 min.	volts 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	300 max.	volts
Heater positive with respect to cathode:		
Combined AC and DC voltage	200 max.	volts
DC component	100 max.	volts

Typical Operating Conditions for Cathode-Drive Service:

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

Anode Voltage.	18000	volts
Grid-No. 4 Voltage.	200	volts
Grid-No. 2 Voltage.	50	volts
Cathode Voltage for visual extinction of focused raster	34 to 52	volts

Maximum Circuit Value:

Grid-No. 1 Circuit Resistance	1.5 max.	megohms
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For X-radiation shielding consideration, see sheet

X-RADIATION PRECAUTIONS FOR CATHODE-RAY TUBES
at front of this Section



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	μf
Cathode to all other electrodes. . . .	5	μf
External conductive coating to ultor .	{2500 max. 1700 min.	{μf μf
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):	

	Center	Intermediate	Edge
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°)

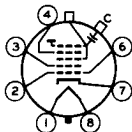


23NP4

Base. Small-Button Neoeightar 7-Pin, Arrangement 1,
(JEDEC No.87-208)

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. 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. 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. 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-</i>		
<i>No.1 voltage of</i>	18000	volts
<i>and grid-No.2-to-grid-</i>		
<i>No.1 voltage of</i>	50	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

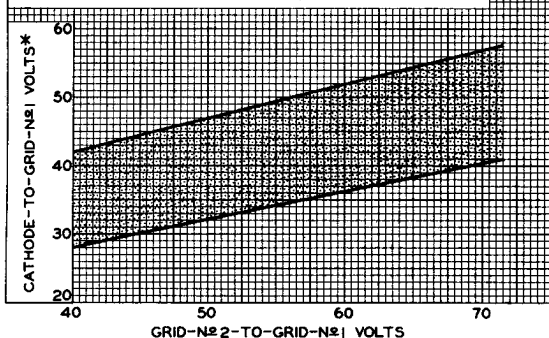
RASTER-CUTOFF-RANGE CHART Cathode-Drive Service

$E_f = 6.3$ 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.



92CS-10623



CATHODE-DRIVE CHARACTERISTICS

$E_f = 6.3$ VOLTS

ULTOR-TO-GRID-N ϕ 1 VOLTS=16000

GRID-N ϕ 2-TO-GRID-N ϕ 1 VOLTS=50

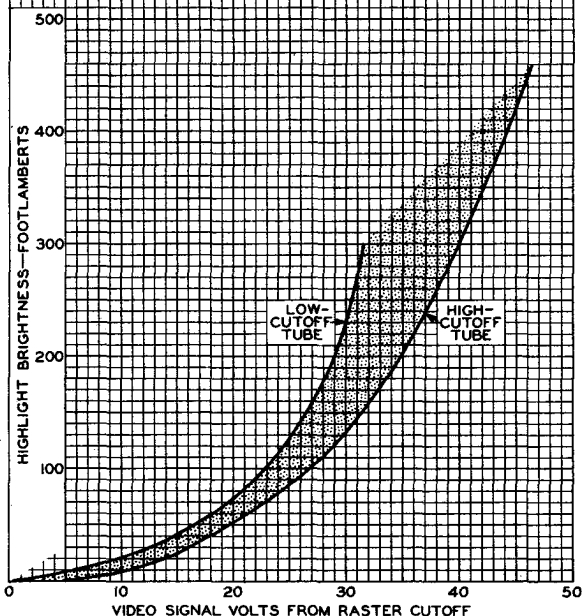
CATHODE BIASED POSITIVE WITH RESPECT TO

GRID N ϕ 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



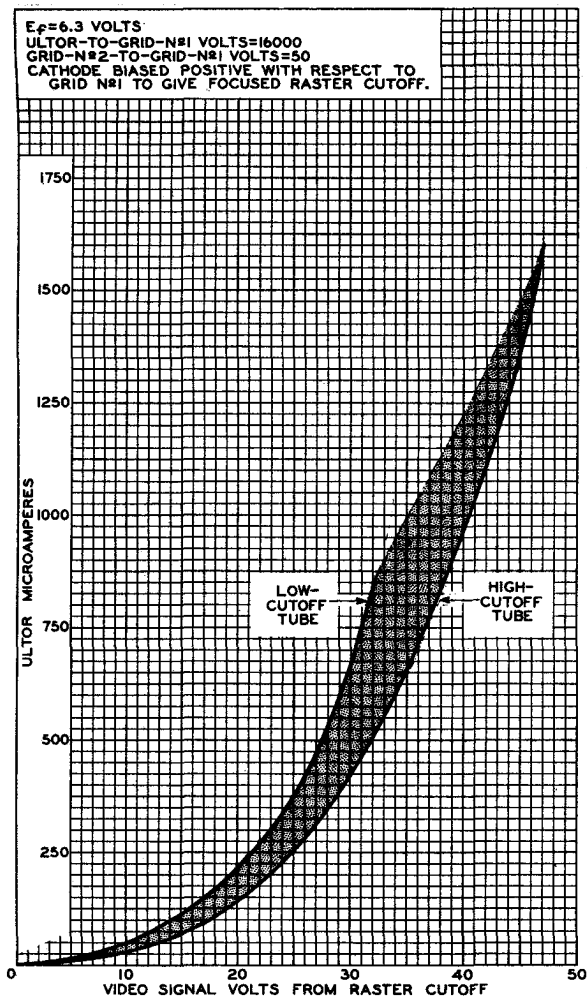
92CM-10622



RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

DATA 3
10-60

CATHODE-DRIVE CHARACTERISTICS



92CM-9946R1