

Picture Tube

RECTANGULAR GLASS TYPE
LOW-VOLTAGE ELECTROSTATIC FOCUS

ALUMINIZED SCREEN
MAGNETIC DEFLECTION

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	μmf
Cathode to all other electrodes.	5	μmf
External conductive coating to ultor . .	{1500 max. 1000 min.	{μmf μmf
Focusing Method.	Electrostatic	
Deflection Method.	Magnetic	
Deflection Angles (Approx.):		
Diagonal	114°	
Horizontal	102°	
Vertical	85°	
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	11-3/8" ± 1/4"
Greatest width	16-13/32" ± 1/8"
Greatest height.	13-11/32" ± 1/8"
Diagonal	18-5/8" ± 1/8"
Neck length.	4-1/8" ± 1/8"

Radius of curvature of faceplate:

	Radius at center	Radius at edge
External surface	48"	21"
Internal surface:		
In plane of diagonal deflection	30"	20"
In plane of horizontal deflection.	30"	20"
In plane of vertical deflection	30"	14"

Screen Dimensions (Minimum):

Greatest width	15-1/8"
Greatest height.	12"
Diagonal	17-9/16"
Projected area	172 sq. in.

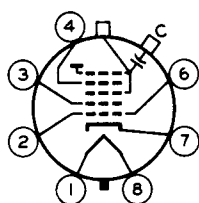


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Weight (Approx.) 14 lbs
 Operating Position Any
 Cap Recessed Small Cavity (JEDEC No. J1-21)
 Bulb J149A1
 Base Small-Button Neoeightar 7-Pin, Arrangement 1,
 (JEDEC No. B7-208)

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—Ultror
 (Grid No.3,
 Grid No.5,
 Collector)
 C—External
 Conductive
 Coating

GRID-DRIVE[▲] SERVICE

*Unless otherwise specified, voltage values
 are positive with respect to cathode*

Maximum and Minimum Ratings, Design-Maximum Values:

ULTOR VOLTAGE	{ 20000 max. 11000 min.	volts volts
GRID-No.4 (FOCUSING) VOLTAGE:		
Positive value	1100 max.	volts
Negative value	550 max.	volts
GRID-No.2 VOLTAGE	{ 550 max. 200 min.	volts volts
GRID-No.1 VOLTAGE:		
Negative-peak value	220 max.	volts
Negative-bias value	154 max.	volts
Positive-bias value	0 max.	volts
Positive-peak value	2 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	200 max.	volts
Heater positive with respect to cathode	200 max.	volts

Equipment Design Ranges:

*With any ultor voltage (E_{c5k}) between 11000 and 20000 volts
 and grid-No.2 voltage (E_{c2k}) between 220 and 550 volts*

Grid-No.4 Voltage for
 focus 0 to 400 volts

Grid-No.1 Voltage (E_{c1k})
 for visual extinction of
 focused raster See Raster-Cutoff-Range Chart
 for Grid-Drive Service



Grid-No.1 Video Drive from Raster Cutoff (Black level): White-level value (Peak positive)	Same value as determined for E_{c1k} except video drive is a positive voltage	
Grid-No.4 Current	-25 to +25	μa
Grid-No.2 Current	-15 to +15	μa
Field Strength of Adjustable Centering Magnet*	0 to 8	gausses

Examples of Use of Design Ranges:

With ultor voltage of	16000	volts
and grid-No.2 voltage of	400	volts
Grid-No.4 Voltage for focus*	0 to 400	volts
Grid-No.1 Voltage for visual extinction of focused raster	-36 to -94	volts
Grid-No.1 Video Drive from Raster Cutoff (Black level): White-level value	36 to 94	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max.	megohms
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CATHODE-DRIVE 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	{ 20000 max. 11000 min.	volts 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	{ 700 max. 350 min.	volts volts
GRID-No.2-TO-CATHODE VOLTAGE	550 max.	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 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



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Equipment Design Ranges:

With any ultor-to-grid-No.1 voltage (E_{c5g_1}) between 11000 and 20000 volts and grid-No.2-to-grid-No.1 voltage (E_{c2g_1}) between 225 and 700 volts

Grid-No.4-to-Grid-No.1 Voltage for focus	0 to 400	volts
Cathode-to-Grid-No.1 Voltage (E_{kg_1}) 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_{kg_1} except video drive is a negative voltage	
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:

With ultor-to-grid-No.1 voltage of	16000	volts
and grid-No.2-to-grid-No.1 voltage of	400	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	36 to 78	volts
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black level):		
White-level value	-36 to -78	volts

Maximum Circuit Values:

Grid-No.1 Circuit Resistance	1.5 max.	megohms
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- ▲ Grid drive is the operating condition in which the video signal varies the grid-No.1 potential with respect to cathode.
- Individual tubes will have satisfactory focus at some value of grid-No.4 (or grid-No.4-to-grid-No.1) voltage between 0 and 400 volts with the combined bias voltage and video-signal voltage adjusted to produce an ultor current of 100 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 5/16-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 3/16-inch deflection of the spot from the center of the tube face.
- ◆ 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.



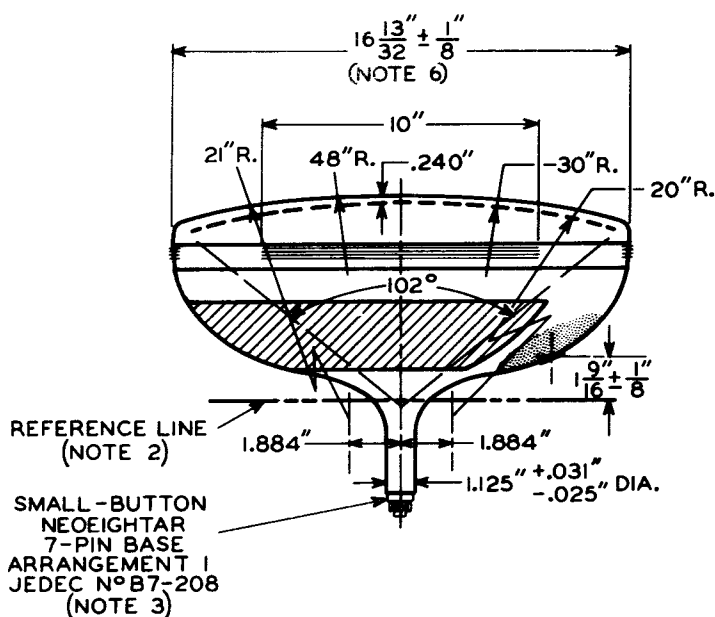
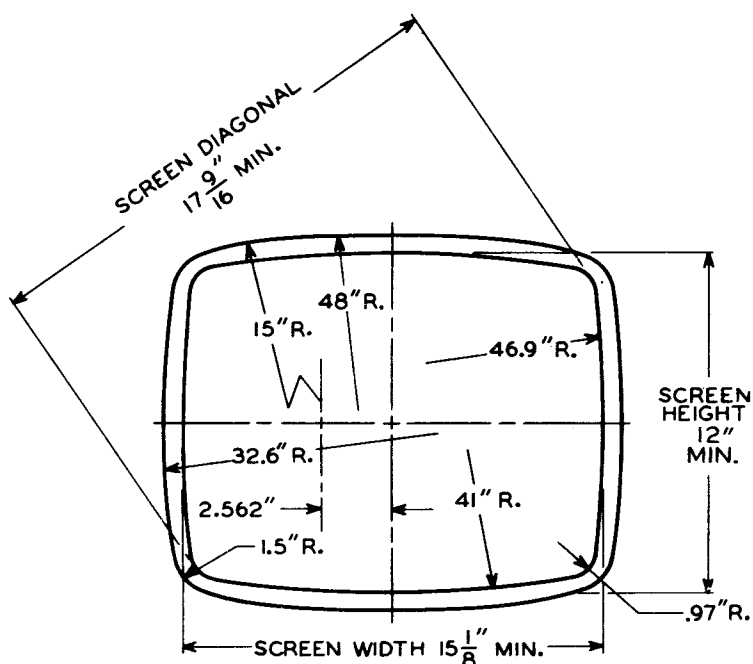
OPERATING CONSIDERATIONS

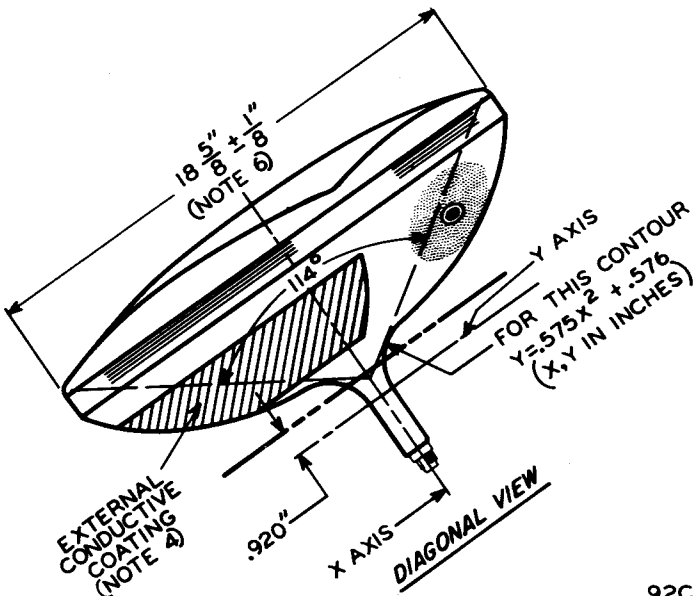
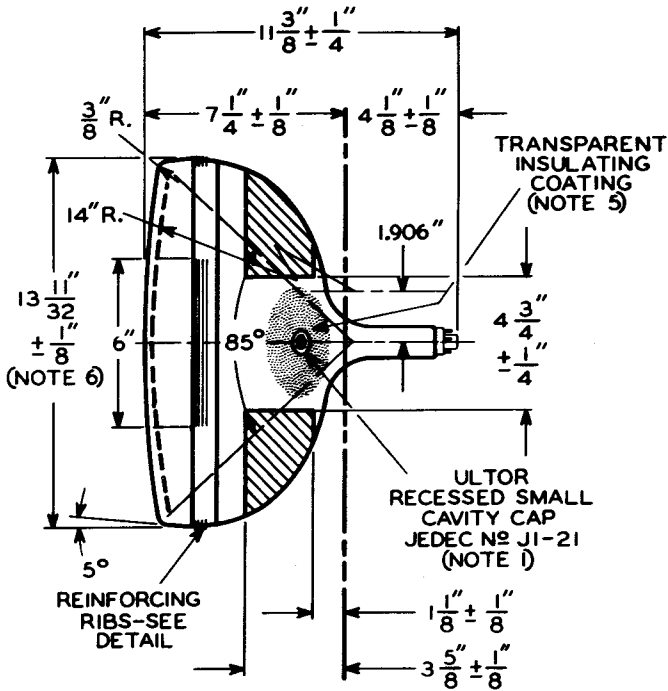
X-Ray Warning. When operated at ultor voltages up to 16 kilovolts, this picture tube does not produce any harmful X-ray radiation. However, because the rating of this type permits operation at voltages as high as 20 kilovolts (Design-maximum value), shielding of this picture tube for X-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages 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 against possible damage resulting from tube implosion under some abnormal condition. This safety cover can also provide X-ray protection when required.



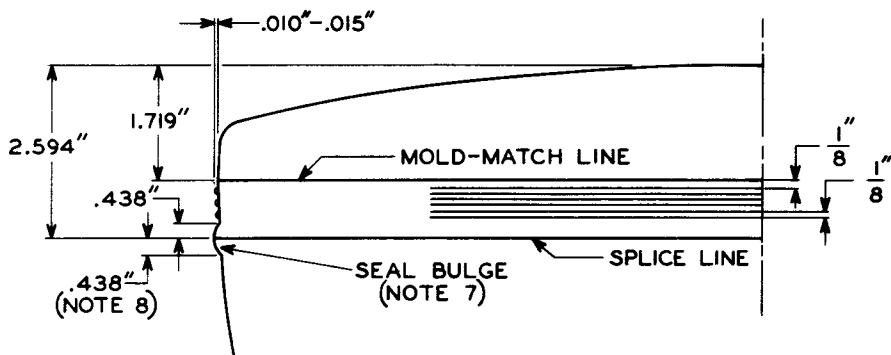
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92CL-10670RI





DETAIL OF PANEL

NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN 4 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF $\pm 30^\circ$. ULTOR TERMINAL IS ON SAME SIDE AS PIN 4.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JEDEC No. G-126 (SHOWN AT FRONT OF THIS SECTION) 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 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. THE DESIGN OF THE SOCKET SHOULD BE SUCH THAT THE CIRCUIT WIRING CANNOT IMPRESS LATERAL STRAINS THROUGH THE SOCKET CONTACTS ON THE BASE PINS. BOTTOM CIRCUMFERENCE OF BASE WAFER WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 1-3/4".

NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

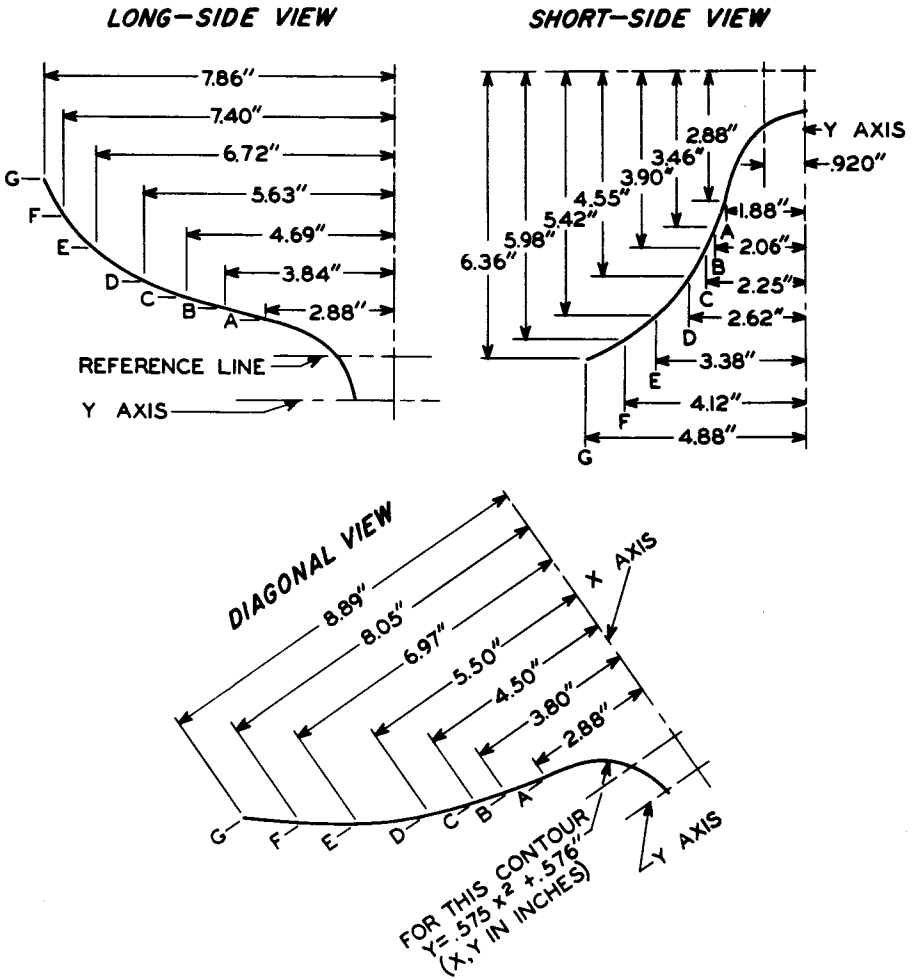
NOTE 5: TO CLEAN THIS AREA, WIPE ONLY WITH SOFT DRY LINT-LESS CLOTH.

NOTE 6: MEASURED AT THE MOLD-MATCH LINE.

NOTE 7: BULGE AT SPLICE-LINE SEAL MAY INCREASE THE INDICATED MAXIMUM VALUE FOR ENVELOPE WIDTH, DIAGONAL, AND HEIGHT BY NOT MORE THAN 1/8", BUT AT ANY POINT AROUND THE SEAL, THE BULGE WILL NOT PROTRUDE MORE THAN 1/16" BEYOND THE ENVELOPE SURFACE AT THE MOLD-MATCH LINE.

NOTE 8: UNDISTURBED AREA BETWEEN MOLD-MATCH LINE AND SPLICE LINE IS 3/8" MINIMUM. THIS SHOULD BE THE MAXIMUM WIDTH OF THE TUBE SUPPORT BAND. TUBE MOUNTING AND YOKE SUPPORT CLAMPS MUST BE SPACED FROM THE TUBE BY USE OF CUSHIONING PADS MADE OF MATERIAL SUCH AS ASPHALT-IMPREGNATED FELT, OR EQUIVALENT.

BULB-CONTOUR DIMENSIONS

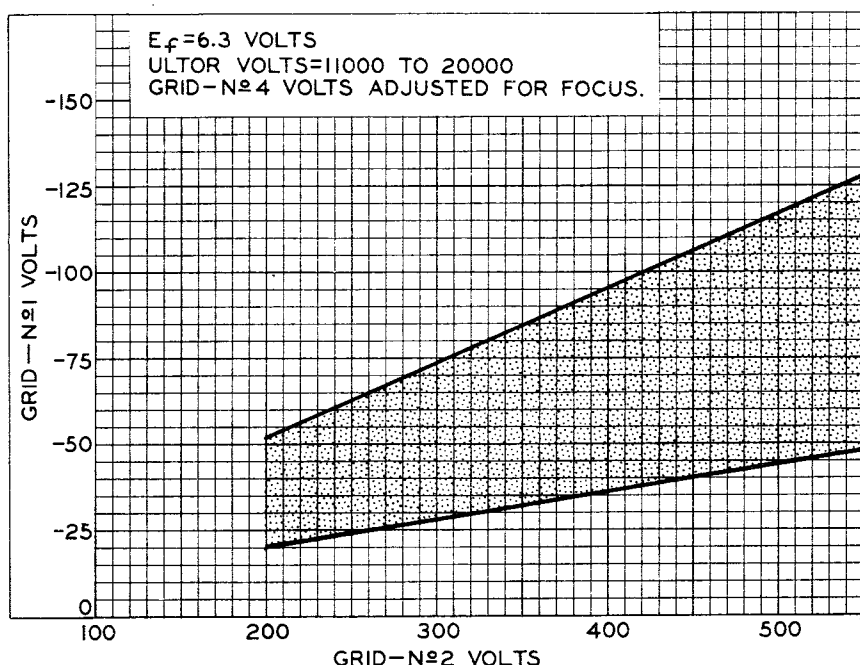


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NOTE: PLANES A THROUGH G ARE NORMAL TO THE TUBE AXIS AND AT FIXED LOCATIONS FROM THE Y AXIS. THESE COORDINATES DESCRIBE THE BOGIE-BULB EXTERNAL CONTOUR IN PLANES THROUGH THE TUBE AXIS AND THE RESPECTIVE FACEPLATE AXES.

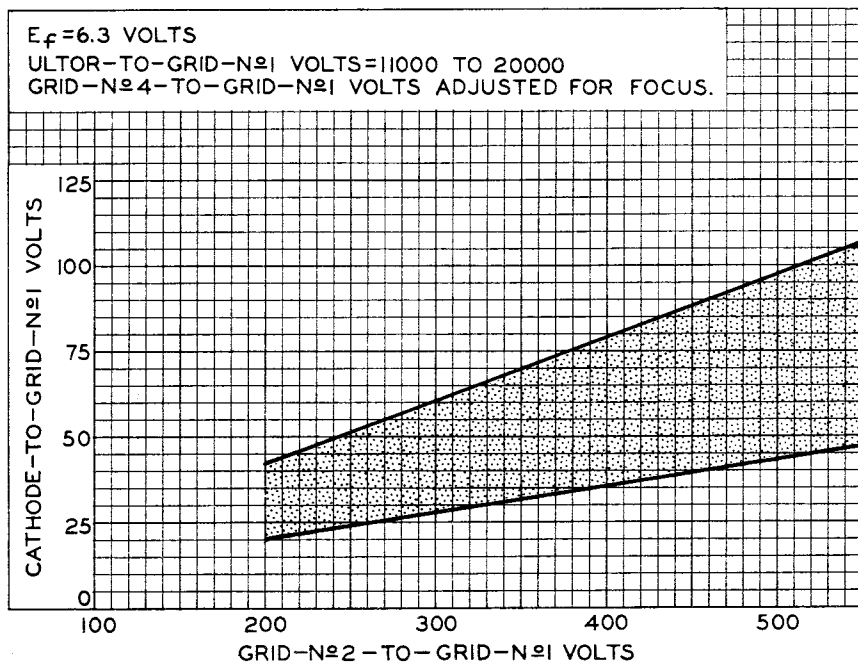


RASTER-CUTOFF-RANGE CHARTS Grid-Drive Service



92CS-10640

Cathode-Drive Service



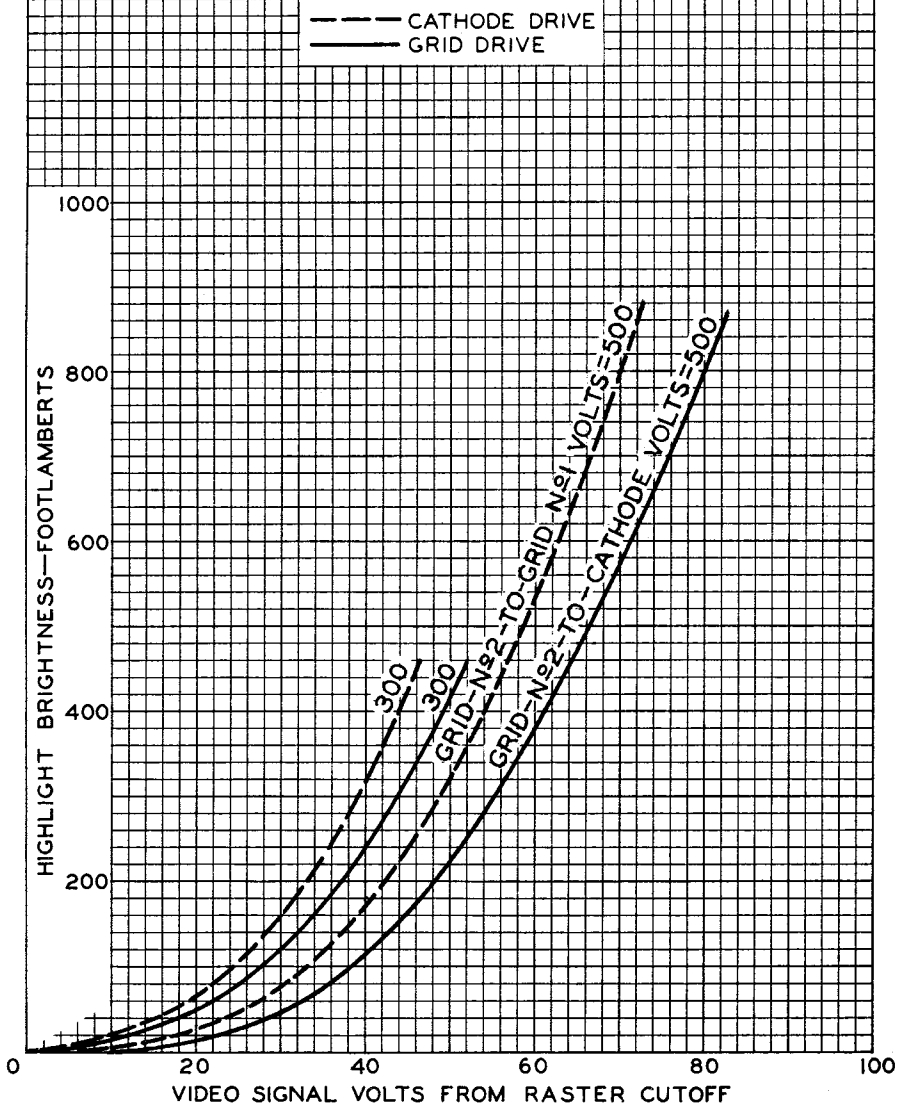
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AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE
 $E_f = 6.3$ VOLTS
 ULTOR-TO-GRID-№1 VOLTS = 16000
 CATHODE BIASED POSITIVE WITH
 RESPECT TO GRID №1 TO GIVE
 FOCUSED RASTER CUTOFF.
 RASTER FOCUSED
 AT AVERAGE BRIGHTNESS.
 RASTER SIZE = $14" \times 10\frac{1}{2}"$

GRID-DRIVE SERVICE
 $E_f = 6.3$ VOLTS
 ULTOR VOLTS = 16000
 GRID №1 BIASED NEGATIVE WITH
 RESPECT TO CATHODE TO GIVE
 FOCUSED RASTER CUTOFF.
 RASTER FOCUSED
 AT AVERAGE BRIGHTNESS.
 RASTER SIZE = $14" \times 10\frac{1}{2}"$

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



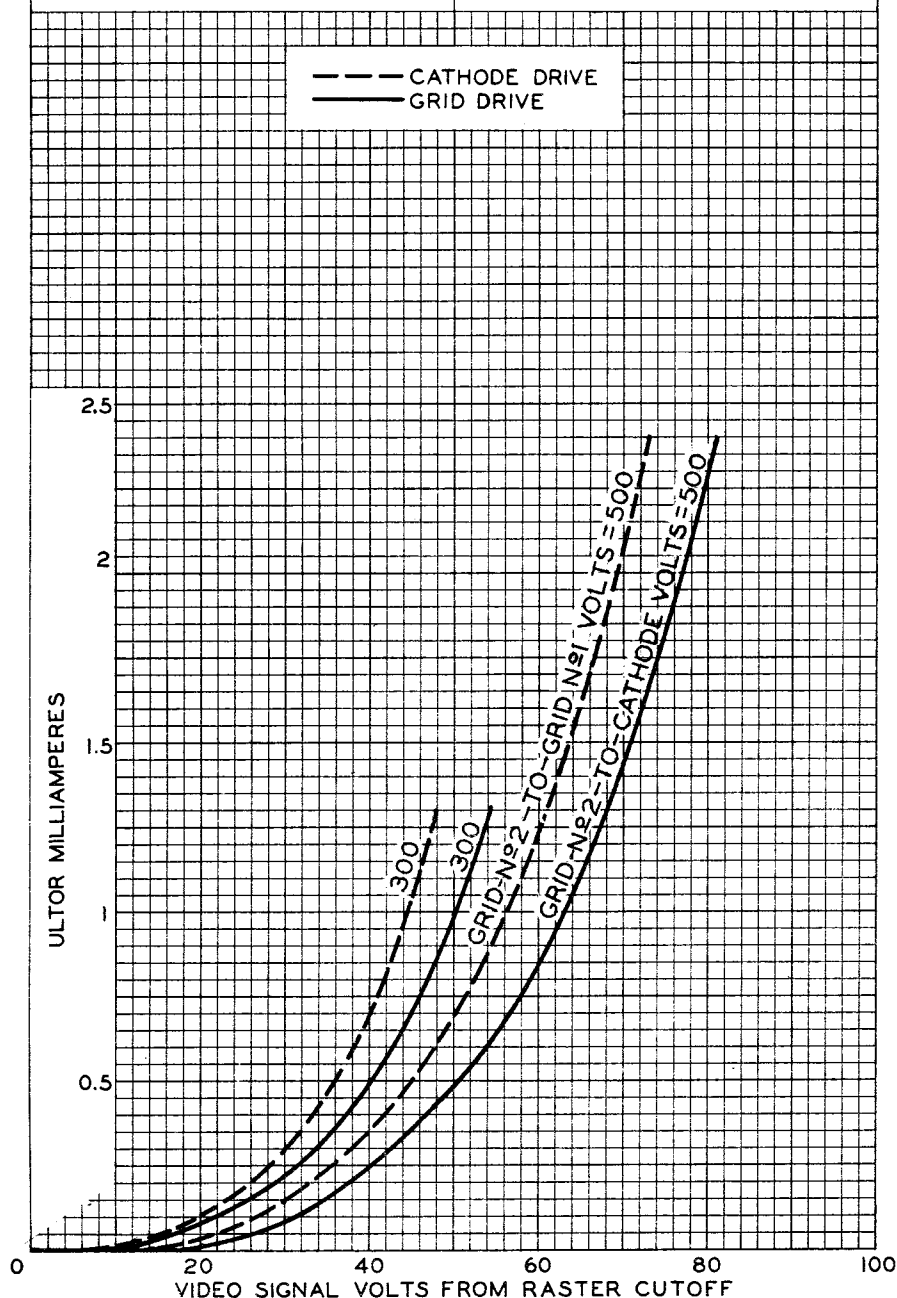
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AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE
 $E_f = 6.3$ VOLTS
 ULTOR-TO-GRID- N_2
 VOLTS = 11000 TO 20000
 CATHODE BIASED POSITIVE WITH
 RESPECT TO GRID N_2 TO GIVE
 FOCUSED RASTER CUTOFF.

GRID-DRIVE SERVICE
 $E_f = 6.3$ VOLTS
 ULTOR VOLTS = 11000 TO 20000
 GRID N_2 BIASED NEGATIVE WITH
 RESPECT TO CATHODE TO GIVE
 FOCUSED RASTER CUTOFF.



92CM-10643