23CP4

Picture Tube

BI-PANEL RECTANGULAR GLASS TYPE — ALUMINIZED SCREEN
LOW-VOLTAGE ELECTROSTATIC FOCUS — MAGNETIC DEFLECTION

With Heater Having Controlled Warm-Up Time

DATA

General:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.6 ± 5%	amp
Warm-up time (Average)	11	sec
Direct Interelectrode Capacitances:		
Grid No.1 to all other electrodes	6	μμf
Cathode to all other electrodes	5	μμf
External conductive coating to ultor	2500 max. 2000 min.	μμf μμf
Faceplate and Protective Panel	Filterglass	
Total light transmission (Approx.)	40%	
Phosphor (For curves, see front of this Section)	P4—Sulfide Type Aluminized	
Fluorescence	White	
Phosphorescence	White	
Persistence	Medium Short	
Focusing Method	Electrostatic	
Deflection Method	Magnetic	
Deflection Angles (Approx.):		
Diagonal	110°	
Horizontal	99°	
Vertical	82°	
Electron Gun	Type Requiring No Ion-Trap Magnet	
Tube Dimensions:		
Overall length	15-3/16" ± 3/8"	
Greatest width	21-5/16" + 1/8" - 1/16"	
Greatest height	17-5/16" + 1/8" - 1/16"	
Diagonal	24-45/64" + 3/32" - 1/16"	
Neck length	5-1/8" ± 1/8"	

Radius of curvature of protective panel (External surface):

	Radius at center	*Radius at edge*
In plane of diagonal deflection	50-1/4"	See *Dimensional Outline*
In plane of horizontal deflection	50-1/4"	35-1/4"
In plane of vertical deflection	45-1/2"	35"

Radius of curvature of faceplate (Internal surface):

	Radius at center	*Radius at edge*
In plane of diagonal deflection	39-1/2"	31-1/2"
In plane of horizontal deflection	39-3/4"	26-1/2"

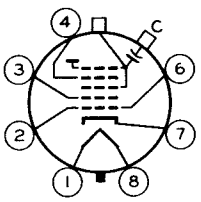
23CP4

	Radius at center	*Radius at edge*
In plane of vertical deflection	36-3/4"	18-1/2"

Screen Dimensions (Minimum):
- Greatest width . . . . . 19-5/16"
- Greatest height . . . . . 15-1/4"
- Diagonal . . . . . 22-5/16"
- Projected area . . . . . 282 sq. in.

Weight (Approx.) . . . . . 33 lbs
Operating Position . . . . . Any
Cap . . . . . Recessed Small Cavity (JEDEC No.J1-21)
Bulb . . . . . J187 Fitted with Protective Panel FP198
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

GRID-DRIVE▲ SERVICE

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

Maximum and Minimum Ratings, *Design-Center Values:*

ULTOR VOLTAGE	20000 max. volts 12000● min. volts	
GRID-No.4 (FOCUSING) VOLTAGE:		
Positive value	1000	max. volts
Negative value	500	max. volts
GRID-No.2 VOLTAGE	500	max. volts
GRID-No.1 VOLTAGE:		
Negative-peak value	200	max. volts
Negative-bias value	140	max. volts
Positive-bias value	0	max. volts
Positive-peak value	2	max. volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode:		
During equipment warm-up period not exceeding 15 seconds	410	max. volts
After equipment warm-up period	180	max. volts
Heater positive with respect to cathode	180	max. volts

Equipment Design Ranges:

With ultor voltage (E_{c_5k}) between 12000● and 20000 volts and grid-No.2 voltage (E_{c_2k}) between 200 and 500 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	*18000*	*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	−44 to −94	volts
Grid-No.1 Video Drive from Raster Cutoff (Black level): White-level value	44 to 94	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max.	megohms

CATHODE-DRIVE♦ SERVICE

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

Maximum and Minimum Ratings, *Design-Center Values:*

ULTOR-TO-GRID-No.1 VOLTAGE	20000	max.	volts
	12000●	min.	volts
GRID-No.4-TO-GRID-No.1 (FOCUSING) VOLTAGE:			
Positive value	1000	max.	volts
Negative value	500	max.	volts
GRID-No.2-TO-GRID-No.1 VOLTAGE	640	max.	volts
GRID-No.2-TO-CATHODE VOLTAGE	500	max.	volts
CATHODE-TO-GRID-No.1 VOLTAGE:			
Positive-peak value	200	max.	volts
Positive-bias value	140	max.	volts
Negative-bias value	0	max.	volts
Negative-peak value	2	max.	volts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode:			
During equipment warm-up period not exceeding 15 seconds	410	max.	volts

After equipment warm-up period.	180 max.	volts
Heater positive with respect to cathode. .	180 max.	volts

Equipment Design Ranges:

With ultor-to-grid-No.1 voltage ($E_{c_5g_1}$) between 12000● and 20000 volts and grid-No.2-to-grid-No.1 voltage ($E_{c_2g_1}$) between 225 and 640 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	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-to-grid-No.1 voltage of	*18000*	*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.	42 to 78	volts
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black level): White-level value	−42 to −78	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	1.5 max.	megohms

▲ Grid drive is the operating condition in which the video signal varies the grid-No.1 potential with respect to cathode.

● This value is a working design-center minimum. The equivalent ***absolute minimum*** ultor (or ultor-to-grid-No.1) voltage is 11,000 volts below which the serviceability of the 23CP4 will be impaired. The equipment designer has the responsibility of determining a minimum design value such that under the worst probable operating conditions involving supply-voltage variation and equipment variation the absolute minimum ultor (or ultor-to-grid-No.1) voltage is never less than 11,000 volts.

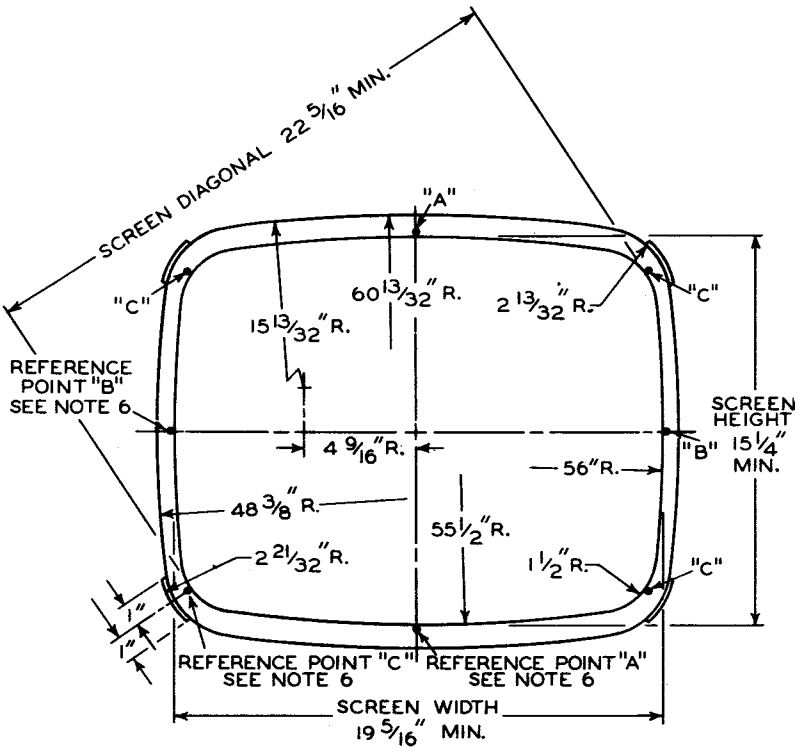
★ The grid-No.4 (or grid-No.4-to-grid-No.1) voltage required for optimum focus of any individual tube may have a value anywhere between 0 and 400 volts; is independent of ultor current; and will remain essentially constant for values of ultor (or ultor-to-grid-No.1) voltage, or grid-No.2 (or grid-No.2-to-grid-No.1) voltage, within design ranges shown for these items.

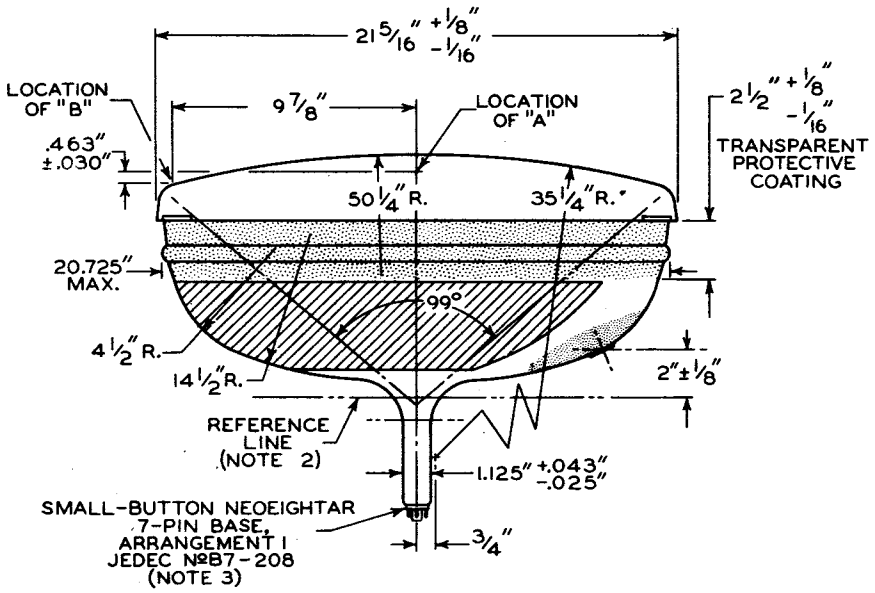
♦ Distance from *Reference Line* for suitable PM centering magnet should not exceed 2-1/4". Excluding extraneous fields, the center of the undeflected focused spot will fall within a circle having a 3/8-inch radius concentric with the center of the tube face. It is to be noted that the earth's magnetic field can cause as much as 1/2-inch deflection of the spot from the center of the tube face.

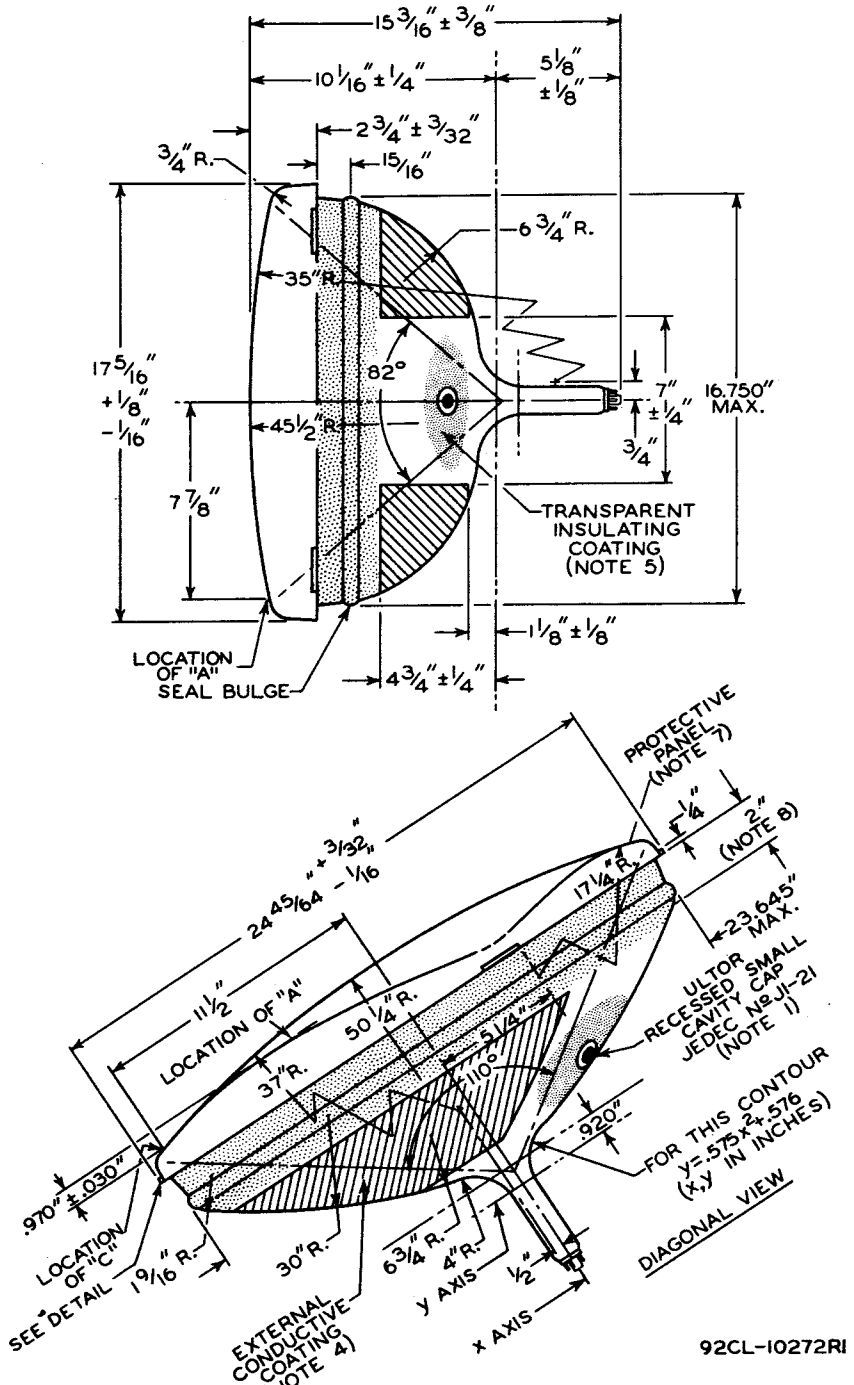
♦ Cathode drive is the operating condition in which the video signal varies the cathode potential with respect to grid No.1 and the other electrodes.

For X-ray shielding considerations, see sheet
X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES
at front of this Section

23CP4


SCREEN DIAGONAL 22 5/16" MIN.
"A"
"C"
"C"
15 13/32" R.
60 13/32" R.
2 13/32" R.
REFERENCE POINT "B" SEE NOTE 6
SCREEN HEIGHT 15 1/4" MIN.
4 9/16" R.
"B"
56" R.
48 3/8" R.
55 1/2" R.
2 21/32" R.
1 1/2" R.
"C"
1"
1"
REFERENCE POINT "C" SEE NOTE 6
REFERENCE POINT "A" SEE NOTE 6
SCREEN WIDTH 19 5/16" MIN.


21 5/16" +1/8" -1/16"
LOCATION OF "B"
9 7/8"
LOCATION OF "A"
2 1/2" +1/8" -1/16"
TRANSPARENT PROTECTIVE COATING
.463" ±.030"
50 1/4" R.
35 1/4" R.
20.725" MAX.
99°
4 1/2" R.
14 1/2" R.
2" ±1/8"
REFERENCE LINE (NOTE 2)
1.125" +.043" -.025"
SMALL-BUTTON NEOEIGHTAR 7-PIN BASE, ARRANGEMENT I JEDEC NO B7-208 (NOTE 3)
3/4"


15 3/16" ± 3/8"
10 1/16" ± 1/4"
5 1/8" ± 1/8"
2 3/4" ± 3/32"
3/4" R.
15/16"
6 3/4" R.
35" R.
82°
17 5/16" + 1/8" - 1/16"
45 1/2" R.
7 7/8"
7" ± 1/4"
3/4"
16.750" MAX.
TRANSPARENT INSULATING COATING (NOTE 5)
1 1/8" ± 1/8"
LOCATION OF "A" SEAL BULGE
4 3/4" ± 1/4"
PROTECTIVE PANEL (NOTE 7)
1/4"
2" (NOTE 8)
24 45/64" + 3/32" - 1/16
17 1/4" R.
23.645" MAX.
11 1/2"
LOCATION OF "A"
50 1/4" R.
37" R.
5 1/4"
.1106"
.920"
ULTOR RECESSED SMALL CAVITY CAP JEDEC No. J1-21 (NOTE 1)
FOR THIS CONTOUR y=.575x²+.576 (x,y IN INCHES)
DIAGONAL VIEW
.970" ± .030"
LOCATION OF "C"
SEE "DETAIL"
1 9/16" R.
30" R.
6 3/4" R.
4" R.
y AXIS
1/2"
x AXIS
EXTERNAL CONDUCTIVE COATING (NOTE 4)
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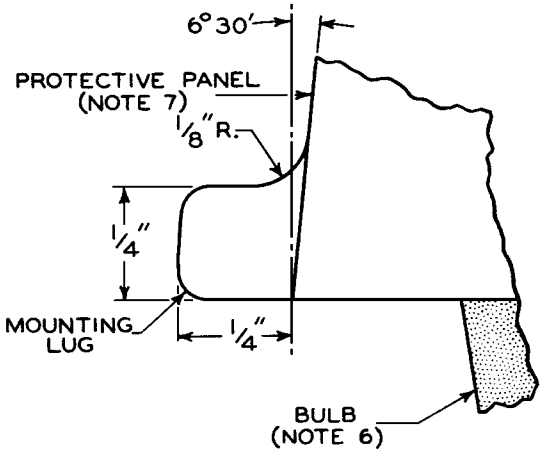
DETAIL OF MOUNTING LUG



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 ± 30°. 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 OF 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.

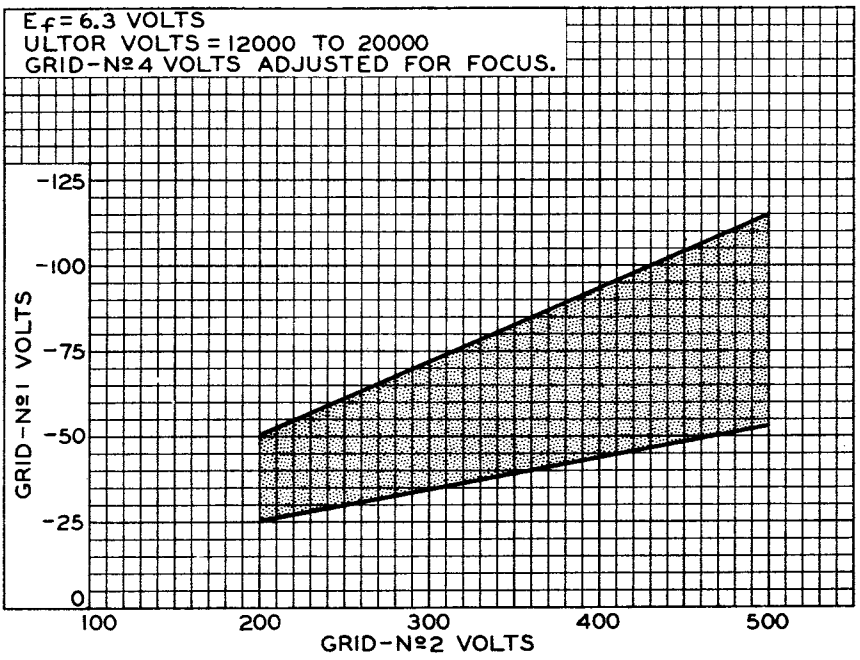
NOTE 6: REFERENCE POINTS A, B, AND C ARE PROVIDED FOR USE IN DESIGN OF A MASK CONTOURED FOR CLOSE FIT TO THE PROTECTIVE PANEL.

NOTE 7: THE CENTER OF THE PROTECTIVE PANEL MAY BE ECCENTRIC WITH RESPECT TO THE AXIS OF THE TUBE ENVELOPE. ASSOCIATED SHIFT OF THE PROTECTIVE PANEL ALONG ITS MINOR AND/OR MAJOR AXIS WILL NOT EXCEED 1/16".

NOTE 8: KEEP THIS CIRCUMFERENTIAL AREA FREE OF MOUNTING HARDWARE.

NOTE 9: ADEQUATE TUBE SUPPORT IS OBTAINED BY CLAMPING TO THE MOUNTING LUGS PROVIDED AT EACH CORNER OF THE PROTECTIVE PANEL. 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.

RASTER-CUTOFF-RANGE CHARTS
Grid-Drive Service



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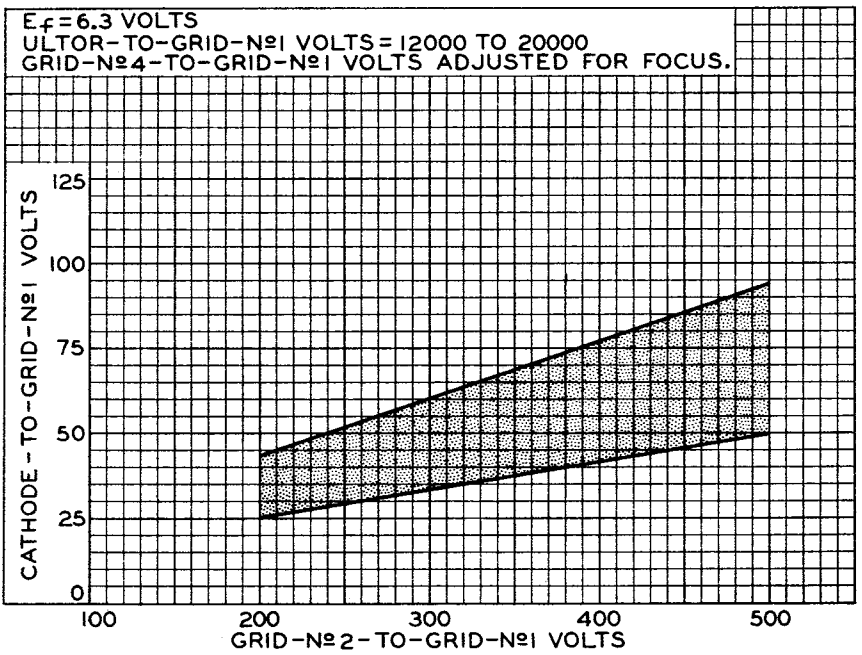
Cathode-Drive Service



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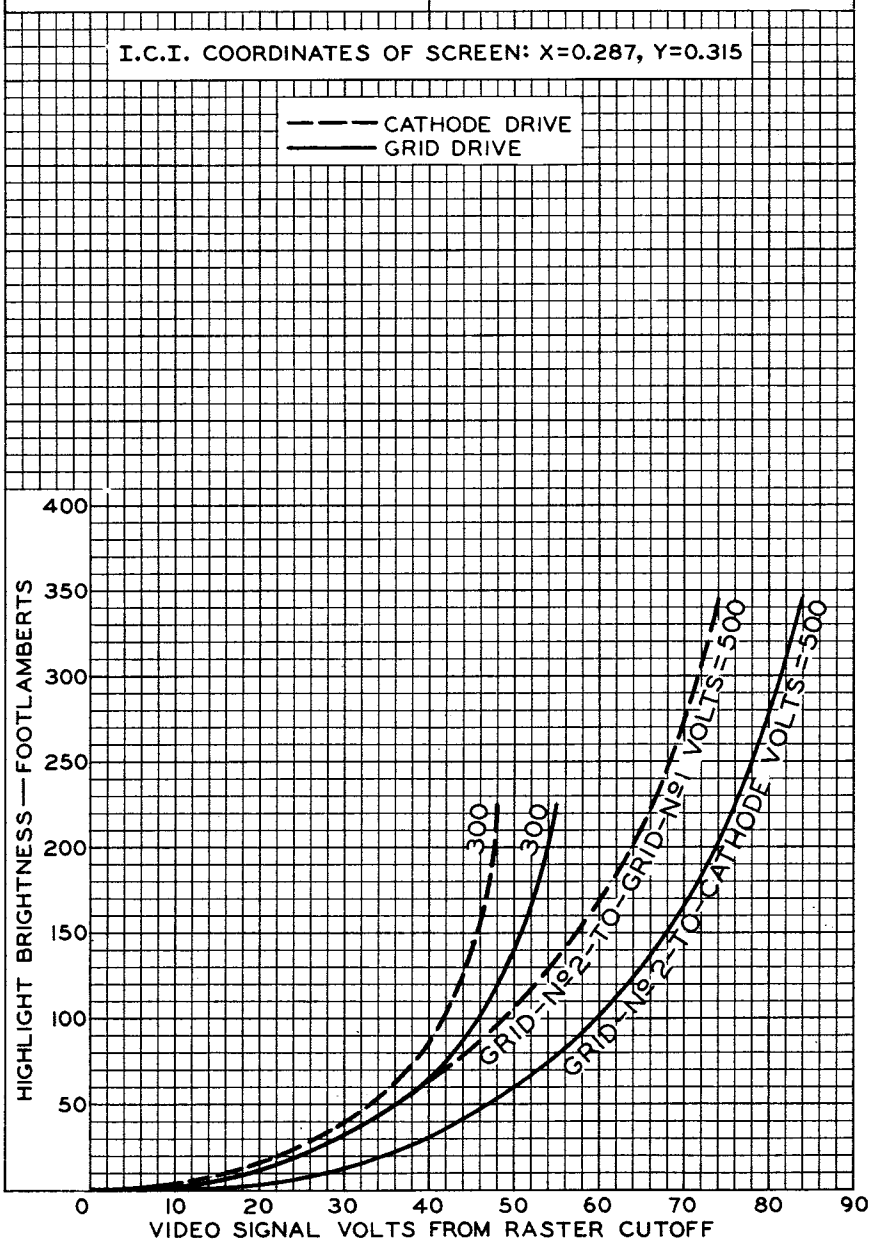
23CP4

AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE	GRID-DRIVE SERVICE
E_f = 6.3 VOLTS	E_f = 6.3 VOLTS
ULTOR-TO-GRID-№1 VOLTS = 16000	ULTOR VOLTS = 16000
CATHODE BIASED POSITIVE WITH RESPECT TO GRID №1 TO GIVE FOCUSED RASTER CUTOFF.	GRID №1 BIASED NEGATIVE WITH RESPECT TO CATHODE TO GIVE FOCUSED RASTER CUTOFF.
RASTER FOCUSED AT AVERAGE BRIGHTNESS.	RASTER FOCUSED AT AVERAGE BRIGHTNESS.
RASTER SIZE = 18" x 13½"	RASTER SIZE = 18" x 13½"



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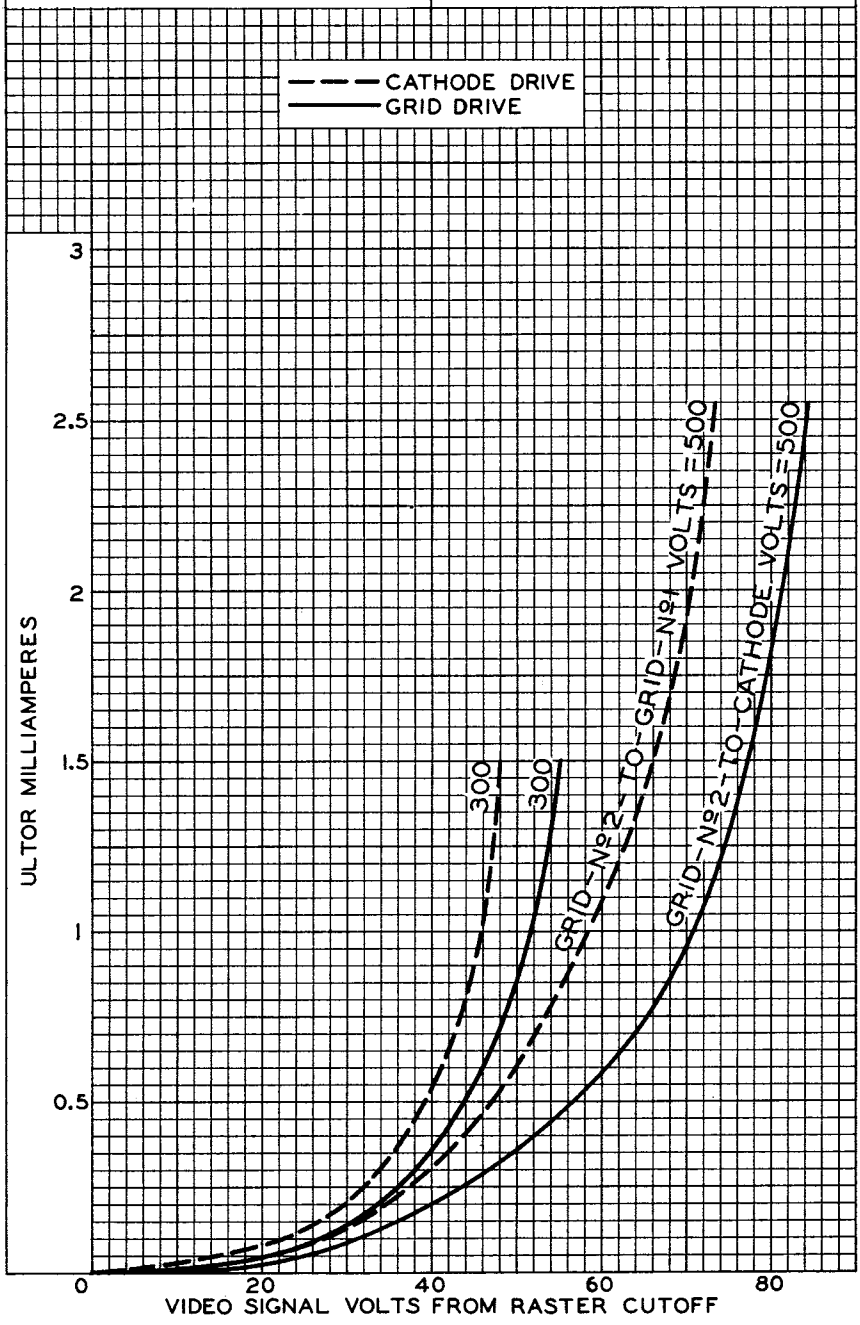
AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE	GRID-DRIVE SERVICE
Ef = 6.3 VOLTS	Ef = 6.3 VOLTS
ULTOR-TO-GRID-No1 VOLTS = 12000 TO 20000	ULTOR VOLTS = 12000 TO 20000
CATHODE BIASED POSITIVE WITH RESPECT TO GRID No1 TO GIVE FOCUSED RASTER CUTOFF.	GRID No1 BIASED NEGATIVE WITH RESPECT TO CATHODE TO GIVE FOCUSED RASTER CUTOFF.



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