



21DSPA

21DSPA PICTURE TUBE

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

ALUMINIZED SCREEN
MAGNETIC DEFLECTION
CATHODE-DRIVE TYPE

DATA

General:

Heater, for Unipotential Cathode:

Voltage (AC or DC)	6.3	volts
Current	0.6	amp

Direct Interelectrode Capacitances:

Grid No.1 to all other electrodes . .	6	$\mu\mu\text{f}$
Cathode to all other electrodes . . .	5	$\mu\mu\text{f}$
External conductive coating to ultor.	{2500 max.	$\mu\mu\text{f}$
	{2000 min.	$\mu\mu\text{f}$

Faceplate, Spherical. Filterglass

Light transmission (Approx.) 74%

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. 90°

Horizontal. 85°

Vertical. 68°

Electron Gun. Type Requiring No Ion-Trap Magnet

Tube Dimensions:

Overall length. 18" \pm 3/8"

Greatest width. 20-1/4" \pm 1/8"

Greatest height 16-3/8" \pm 1/8"

Diagonal. 21-3/8" \pm 1/8"

Neck length 5-1/2" \pm 3/16"

Radius of curvature of faceplate (External surface) . . 33"

Screen Dimensions (Minimum):

Greatest width. 19-1/16"

Greatest height 15-1/16"

Diagonal. 20-1/4"

Projected area. 262 sq. in.

Weight (Approx.) 24 lbs

Operating Position. Any

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

Bulb. J171 D2/E1

Base. Small-Shell Duodecal 6-Pin, Arrangement 1
(JEDEC Group 4, No.B6-63), or
Short Small-Shell Duodecal 6-Pin
(JEDEC Group 4, No.B6-203)

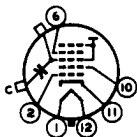
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Basing Designation for BOTTOM VIEW. 12L

Pin 1 - Heater
Pin 2 - Grid No.1
Pin 6 - Grid No.4
Pin 10 - Grid No.2
Pin 11 - Cathode
Pin 12 - Heater



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

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. 12000 [#] min.	volts volts
GRID-No.4-TO-GRID-No.1 VOLTAGE:		
Positive value.	1000 max.	volts
Negative value.	500 max.	volts
GRID-No.2-TO-GRID-No.1 VOLTAGE.	64 max.	volts
GRID-No.2-TO-CATHODE VOLTAGE.	64 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 any ultor-to-grid-No.1 voltage (E_{c5g1}) between 12000 and 20000 volts and grid-No.2-to-grid-No.1 voltage (E_{c2g1}) between 40 and 64 volts

Grid-No.4-to-Grid-No.1 Voltage for focus \S	0 to 400	volts
Cathode-to-Grid-No.1 Voltage (E_{kg1}) for visual extinction of focused raster.	<i>See Raster-Cutoff-Range Chart</i>	
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 voltage	



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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 350	volts
Cathode-to-Grid-No.1 Voltage♦ for visual extinction of focused raster	32 to 47	volts
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black level): White-level value	-32 to -47	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max.	megohms
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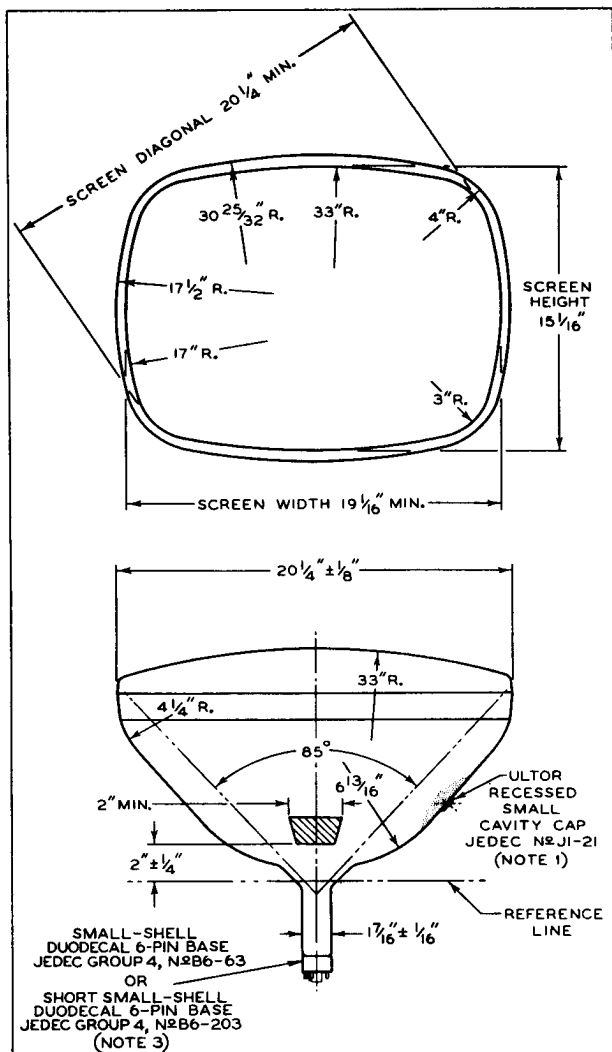
- Cathode drive is the operating condition in which the video signal varies the cathode potential with respect to grid No.1 and the other electrodes.
- ‡ Operation below this value is not recommended.
- § The grid-No.4 voltage or grid-No.4-to-grid-No.1 voltage required for focus of any individual tube is independent of ultor current and will remain essentially constant for values of ultor-to-grid-No.1 voltage 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 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.
- ♦ The cathode-to-grid-No.1 voltage (E_{k_1}) for visual extinction of focused raster will increase by approximately 2 per cent for every 1000-volt increase in ultor-to-grid-No.1 voltage and will decrease by approximately 2 per cent for every 1000-volt decrease in ultor-to-grid-No.1 voltage.

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

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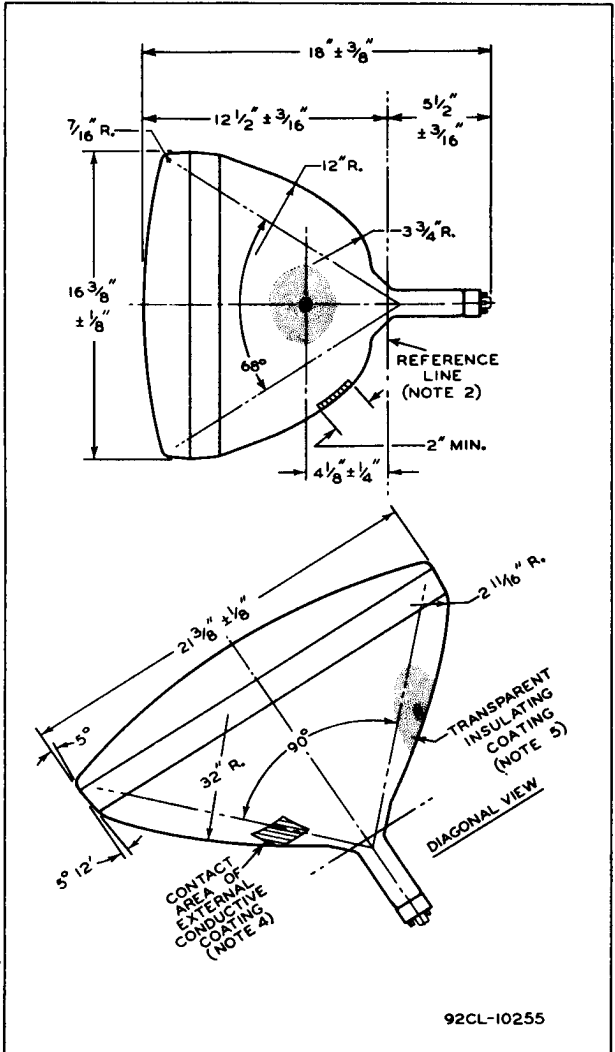




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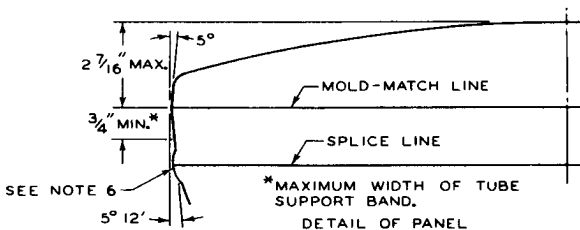
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NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN 6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF $\pm 30^\circ$. ULTOR TERMINAL IS ON SAME SIDE AS PIN 6.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JEDEC No. G-116 (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. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-3/4".

NOTE 4: THE DRAWING SHOWS THE MINIMUM SIZE AND LOCATION OF THE CONTACT AREA OF THE EXTERNAL CONDUCTIVE COATING. THE ACTUAL AREA OF THIS COATING WILL BE GREATER THAN THE CONTACT AREA SO AS TO PROVIDE THE REQUIRED CAPACITANCE. EXTERNAL CONDUCTIVE COATING MUST BE GROUNDING.

NOTE 5: TO CLEAN THIS AREA, WIPE ONLY WITH SOFT DRY LINTLESS CLOTH.

NOTE 6: 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.

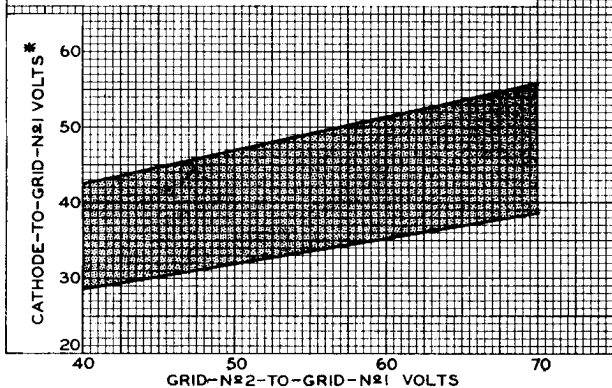


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RASTER-CUTOFF-RANGE CHART

$E_f = 6.3$ VOLTS
ULTOR-TO-GRID-N $\#$ 1 VOLTS = 18000
GRID-N $\#$ 4-TO-GRID-N $\#$ 1 VOLTAGE ADJUSTED FOR FOCUS.
* INCREASES OR DECREASES DIRECTLY BY APPROX. 2%
FOR EVERY 1000-VOLT CHANGE IN ULTOR-TO-GRID-N $\#$ 1
VOLTAGE.



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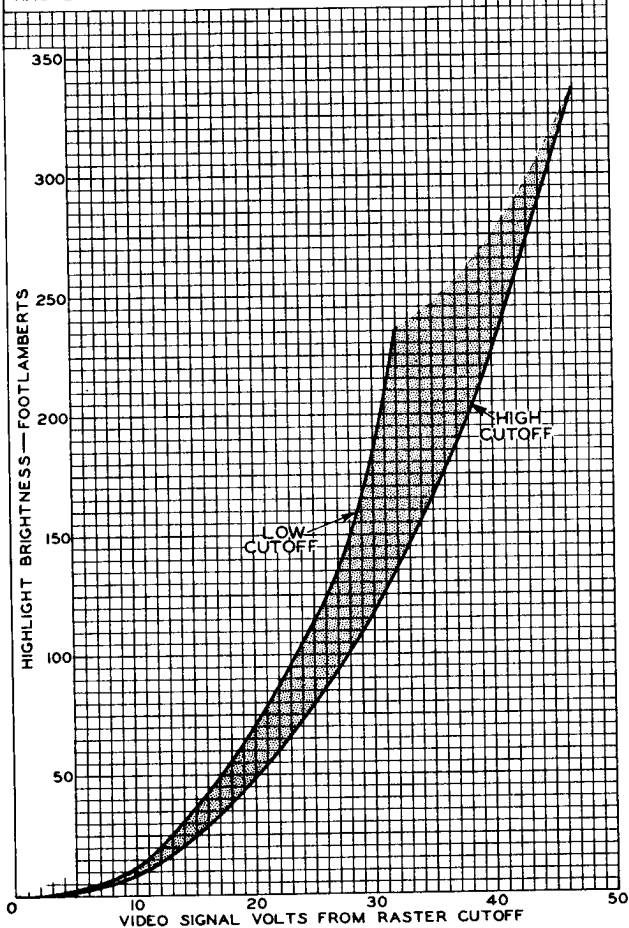
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CATHODE-DRIVE CHARACTERISTICS

$E_f = 6.3$ VOLTS
ULTOR-TO-GRID-№1 VOLTS = 18000
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" x 13-1/2"





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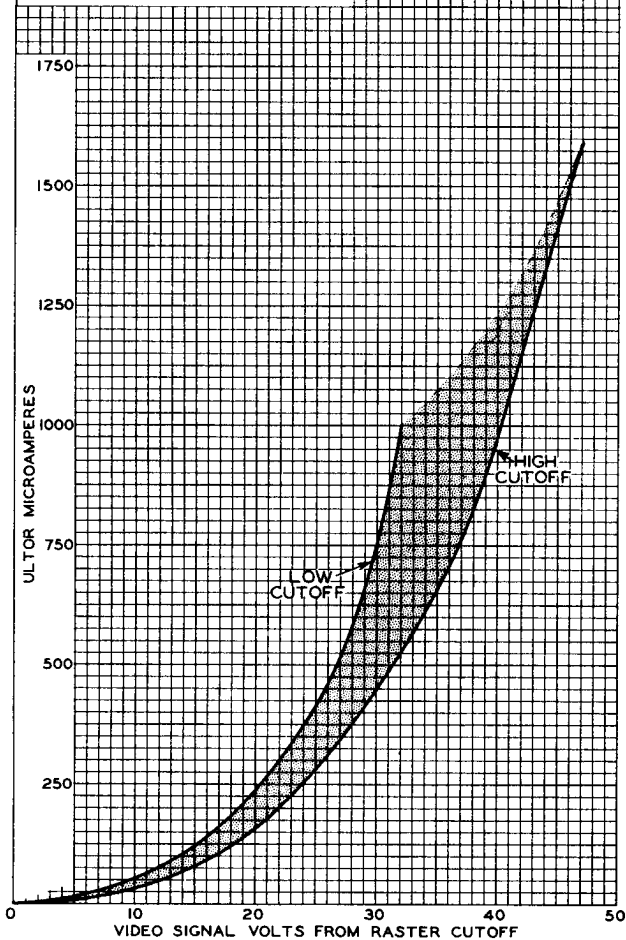
CATHODE-DRIVE CHARACTERISTICS

$E_f = 6.3$ VOLTS

ULTOR-TO-GRID-№1 VOLTS = 18000

GRID-№2-TO-GRID-№1 VOLTS = 50

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



ELECTRON TUBE DIVISION

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