24CP4-A
KINESCOPE

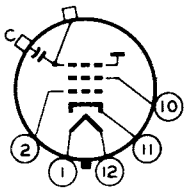
RECTANGULAR GLASS TYPE — ALUMINIZED SCREEN
MAGNETIC FOCUS — MAGNETIC DEFLECTION

DATA

General:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.6 ± 10%	amp ←
Direct Interelectrode Capacitances:		
Grid No.1 to all other electrodes	6	μμf
Cathode to all other electrodes	5	μμf
External conductive coating to ultor●	750 max. 500 min.	μμf μμf
Faceplate, Spherical		Filterglass
Light transmission (Approx.)		71% ←
Phosphor (For curves, see front of this section)		P4—Sulfide Type Aluminized ←
Fluorescence		White
Phosphorescence		White
Persistence		Short
Focusing Method		Magnetic
Deflection Method		Magnetic
Deflection Angles (Approx.):		
Diagonal		90°
Horizontal		85°
Vertical		68° ←
Ion-Trap Gun	Requires External Single-Field Magnet	
Tube Dimensions:		
Overall length		21-1/8" ± 3/8"
Greatest width		22-11/16" ± 1/8"
Greatest height		18-7/16" ± 1/8"
Diagonal		24" ± 1/8"
Screen Dimensions (Minimum):		
Greatest width		21-1/4"
Greatest height		16-3/4"
Diagonal		22-5/8"
Projected area		319 sq. in. ←
Weight (Approx.)		35 lbs
Mounting Position		Any
Cap	Recessed Small Cavity (JETEC No.J1-21)	
Bulb		J192
Base	Small-Shell Duodecal 5-Pin (JETEC No.B5-57)	
Basing Designation for BOTTOM VIEW		12N ←

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



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

● The "ultor" in a cathode-ray tube is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection. In the 24CP4-A, the ultor function is performed by grid No.3. Since grid No.3 and collector are connected together within the 24CP4-A, they are collectively referred to simply as "ultor" for convenience in presenting data and curves.

← Indicates a change.

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GRID-DRIVE▲ SERVICE

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

Maximum Ratings, *Design-Center Values:*

ULTOR VOLTAGE	20000 max.	volts
GRID-No.2 VOLTAGE	500 max.	volts
GRID-No.1 VOLTAGE:		
Negative bias value	125 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 any ultor voltage (E_{c_3k}) between 16000 and 20000 volts and grid-No.2 voltage (E_{c_2k}) between 200 and 500 volts*

Grid-No.1 Voltage for Visual Extinction of Focused Raster	-9.3% to -24% of E_{c_2k}	volts
Grid-No.1 Video Drive from Raster Cutoff (Black Level):		
White-level value (Peak positive)	9.3% to 24% of E_{c_2k}	volts
Grid-No.2 Current	-15 to +15	μamp
→ Focusing-Coil Current (DC)°	$\left[\sqrt{\frac{E_{c_3k}}{16000}} \times 108\right] \pm 20\%$	ma
→ Ion-Trap Magnet Current (Average)**	$\sqrt{\frac{E_{c_3k}}{16000}} \times 30$	ma
→ Minimum Field Strength of PM Ion-Trap Magnet§	$\sqrt{\frac{E_{c_3k}}{16000}} \times 33$	gausses
Field Strength of Adjustable Centering Magnet	0 to 8	gausses

Examples of Use of Design Ranges:

With ultor voltage of	*16000*	*18000*	*volts*
→ *and grid-No.2 voltage of*	*300*	*400*	*volts*
→ Grid-No.1 Voltage for Visual Extinction of Focused Raster	-28 to -72	-37 to -96	volts

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

*, °, **, §: See next page.

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Grid-No.1 Video Drive from Raster Cutoff (Black Level): White-level value (Peak positive)	28 to 72	37 to 96	volts ←
Focusing-Coil Current (DC). .	108 ± 20%	115 ± 20%	ma ←
Minimum Field Strength of PM Ion-Trap Magnet.	33	35	gausses ←

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 Ratings, *Design-Center Values:*

ULTOR-TO-GRID-No.1 VOLTAGE.	20000 max.	volts
GRID-No.2-TO-GRID-No.1 VOLTAGE.	625 max.	volts
GRID-No.2-TO-CATHODE VOLTAGE.	500 max.	volts
CATHODE-TO-GRID-No.1 VOLTAGE:		
Positive bias value	125 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 ($E_{c_3g_1}$) between 16000 and 20000 volts and grid-No.2-to-grid-No.1 voltage ($E_{c_2g_1}$) between 220 and 620 volts*

Cathode-to-Grid-No.1 Voltage for Visual Extinction of Focused Raster	8.5% to 19.4% of $E_{c_2g_1}$	volts
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black Level): White-level value (Peak negative)	8.5% to 19.4% of $E_{c_2g_1}$	volts

■ 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.

* Brilliance and definition decrease with decreasing ultor voltage or ultor-to-grid-No.1 voltage. In general, the ultor voltage or the ultor-to-grid-No.1 voltage should not be less than 16000 volts.

○: See next page.

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Grid-No.2 Current	−15 to +15	μamp
→ Focusing-Coil Current (DC)°	$\left[\sqrt{\frac{E_{c3g1}}{16000}} \times 108\right] \pm 20\%$	ma
→ Ion-Trap Magnet Current (Average)**	$\sqrt{\frac{E_{c3g1}}{16000}} \times 30$	ma
→ Minimum Field Strength of PM Ion-Trap Magnet§	$\sqrt{\frac{E_{c3g1}}{16000}} \times 33$	gausses
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*	*18000*	*volts*
and grid-No.2-to-grid-No.1 voltage of	*300*	*400*	*volts*
Cathode-to-Grid-No.1 Voltage for Visual Extinction of Focused Raster	25 to 58	34 to 78	volts
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black Level): White-level value (Peak negative)	25 to 58	34 to 78	volts
Focusing-Coil Current (DC)	108 ± 20%	115 ± 20%	ma
Minimum Field Strength of PM Ion-Trap Magnet	33	35	gausses

Maximum Circuit Values:

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

° For specimen focusing coil similar to JETEC Focusing Coil No.109 positioned with air gap toward kinescope screen and center line of air gap 3 inches from Reference Line *(See Dimensional Outline)*. The indicated current is for condition with sharp focus at center of picture area and combined grid-No.1 voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts measured on an Indian Head Test Pattern set for a 21" x 16" picture size.

** For JETEC Ion-Trap Magnet No.117, or equivalent, located with the trailing edge of the pole pieces located over the gap between grid No.1 and grid No.2 and rotated to give maximum brightness.

§ For specimen PM ion-trap magnet, such as Heppner Model No.E437, or equivalent, located in optimum position and rotated to give maximum brightness. For a given equipment application, the tolerance range for the strength of the PM ion-trap magnet should be added to the minimum value. The maximum strength of this magnet should not exceed the specified minimum value by more than 6 gausses. This procedure will insure use of a PM ion-trap magnet allowing adequate adjustment to permit satisfactory performance without loss of highlight brightness.

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

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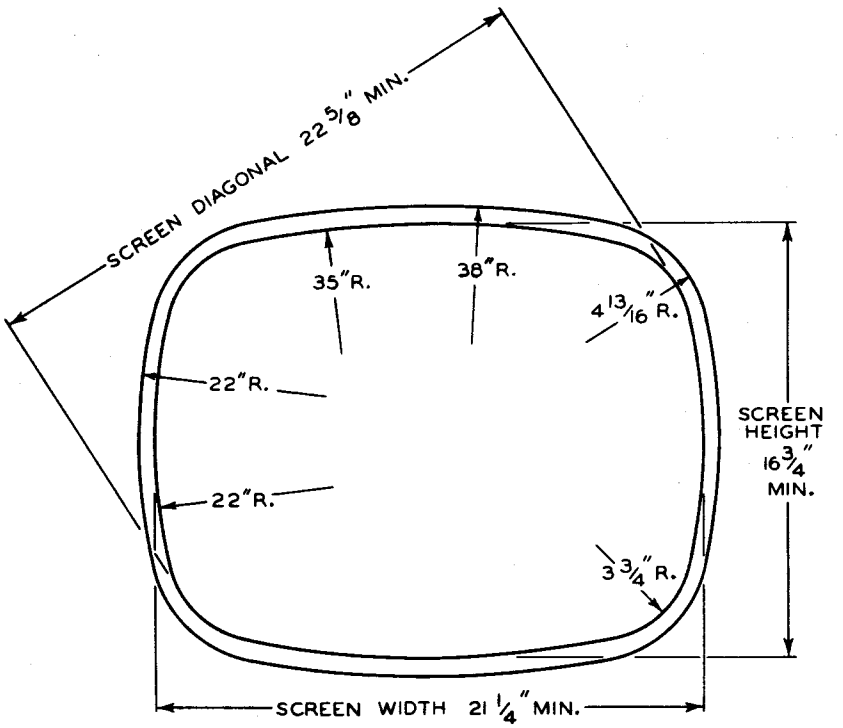

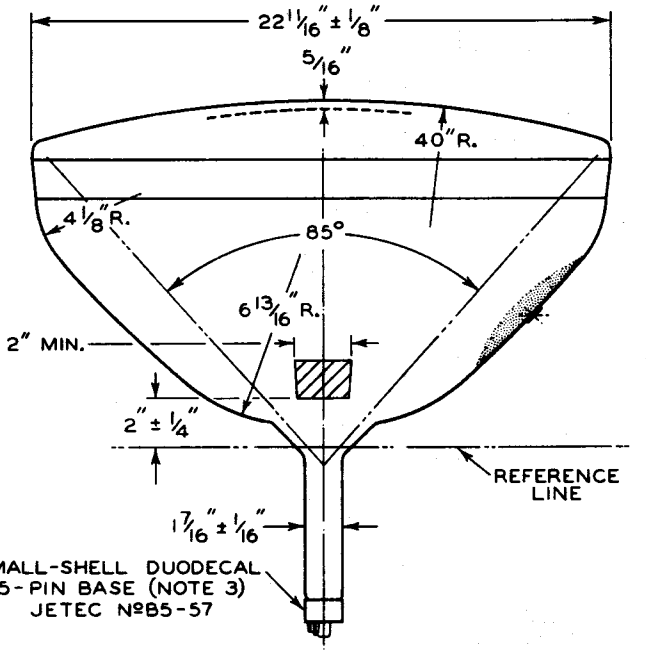

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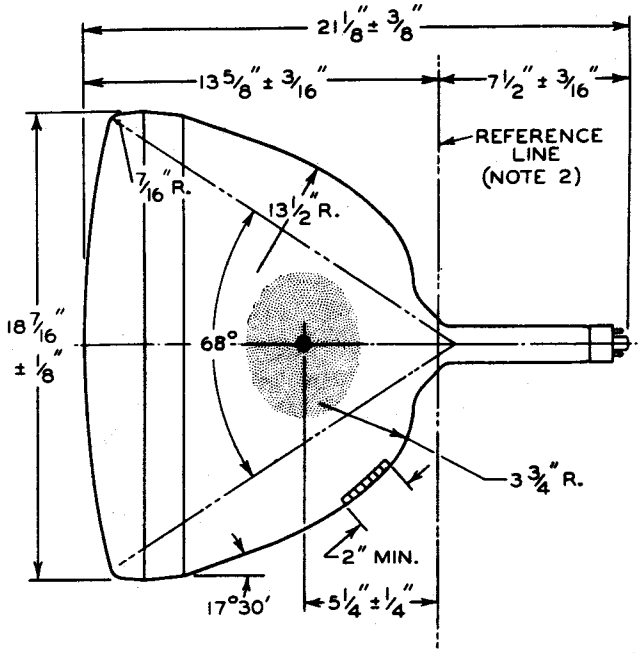

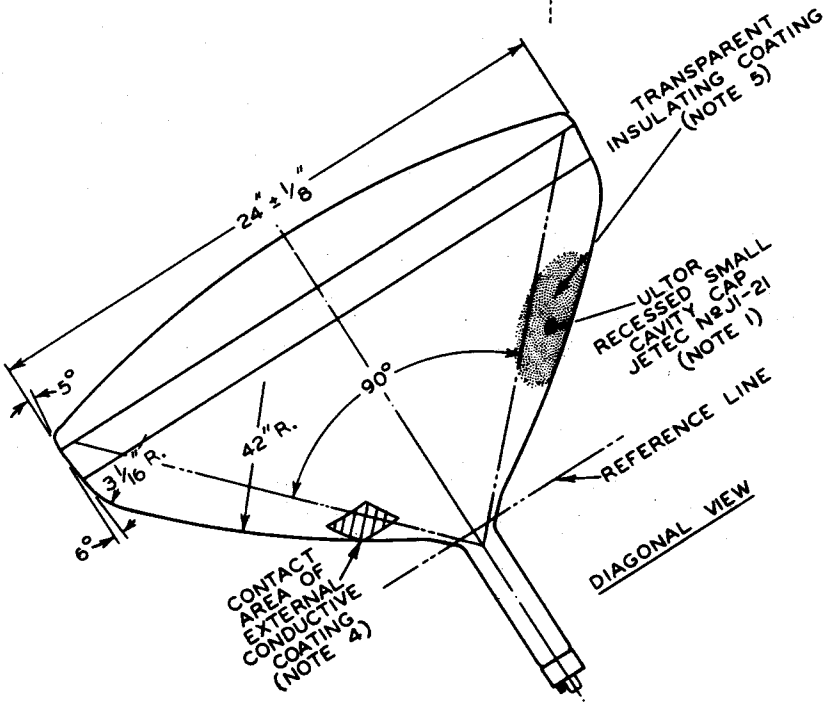

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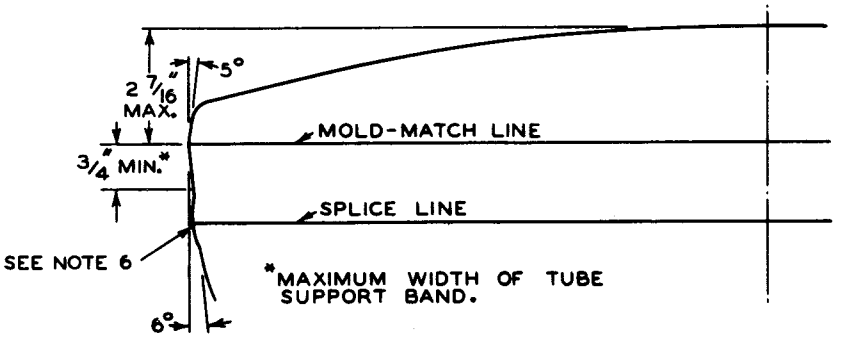

DETAIL OF PANEL

NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No.6 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 VACANT PIN POSITION No.6.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC No.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 3".

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 GROUNDED.

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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RCA

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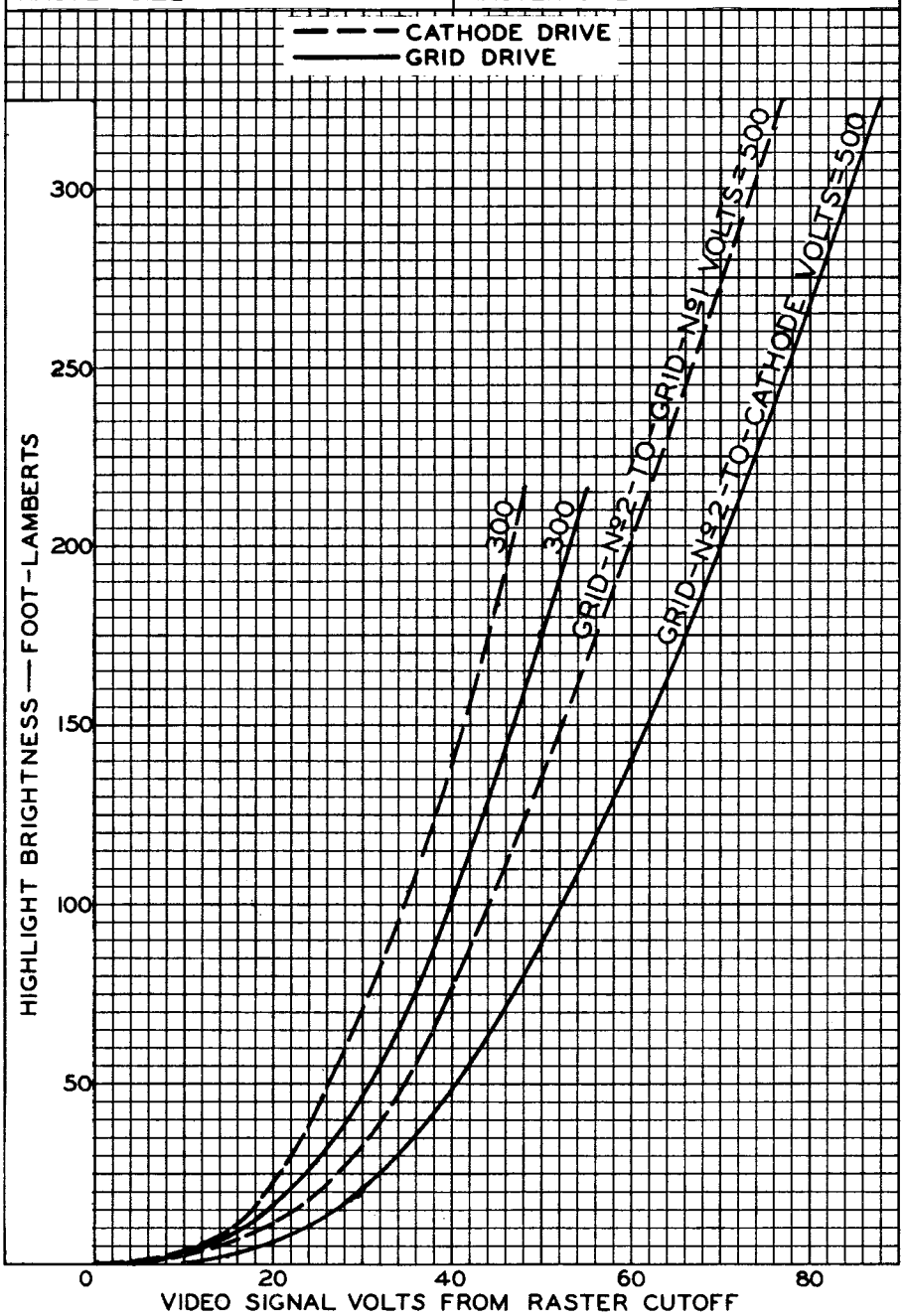
AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE	GRID-DRIVE SERVICE
Ef = 6.3 VOLTS	Ef = 6.3 VOLTS
ULTOR-TO-GRID-Nº1 VOLTS = 16000	ULTOR VOLTS = 16000
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
RASTER FOCUSED AT AVERAGE BRIGHTNESS	RASTER FOCUSED AT AVERAGE BRIGHTNESS
RASTER SIZE = 21" x 16"	RASTER SIZE = 21" x 16"



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AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE
E_f = 6.3 VOLTS
ULTOR-TO-GRID-Nº1 VOLTS = 16000 TO 20000
CATHODE BIASED POSITIVE WITH RESPECT TO GRID Nº1 TO GIVE FOCUSED RASTER CUTOFF

GRID-DRIVE SERVICE
E_f = 6.3 VOLTS
ULTOR VOLTS = 16000 TO 20000
GRID Nº1 BIASED NEGATIVE WITH RESPECT TO CATHODE TO GIVE FOCUSED RASTER CUTOFF