

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	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°)		

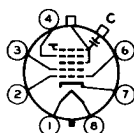


23MP4

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^A SERVICE

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

Maximum and Minimum Ratings, Design-Maximum Values:

ULTOR VOLTAGE	{ 22000 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 22000 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 <i>Raster-Cutoff-Range Chart</i> 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	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 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	-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	{ 22000 max. 11000 max.	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

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 225 and 700 volts*

Grid-No.4-to-Grid-No.1 Voltage for focus*	0 to 400	volts
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Cathode-to-Grid-No.1 Voltage (E_{k_1}) for visual extinction of focused raster.	See <i>Raster-Cutoff-Range Chart for Cathode-Drive Service</i>	
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black level): White-level value (Peak negative).	Same value as determined for E_{k_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	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.	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 under conditions with the combined bias voltage and video-signal voltage adjusted to produce 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 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.

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

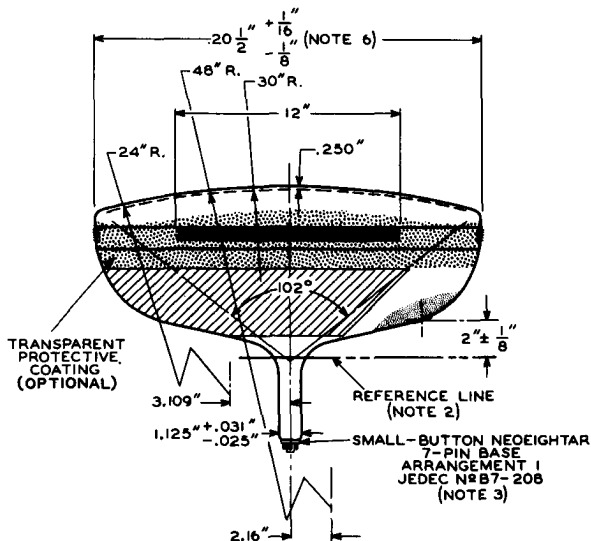
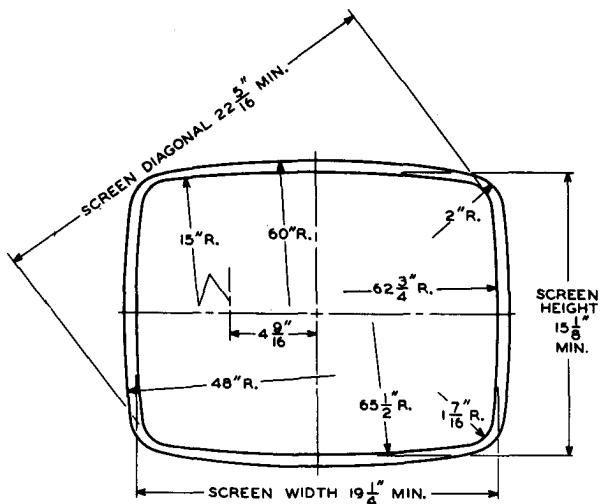


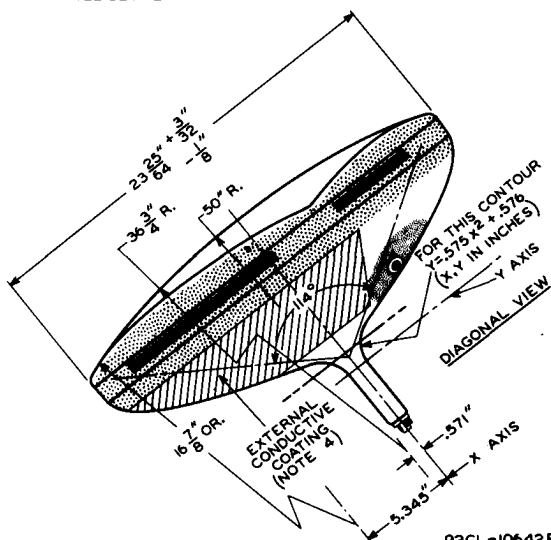
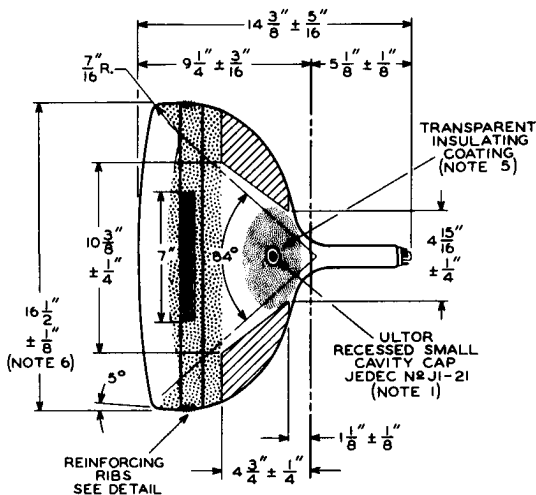
exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.

Shatter-Proof Cover Over the Tube Face. Following conventional picture-tube practice, it is recommended that the cabinet be provided with a shatterproof, 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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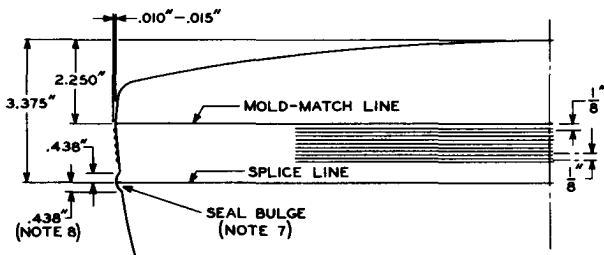




92CL-10642R1



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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 CIRCUITRY 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.

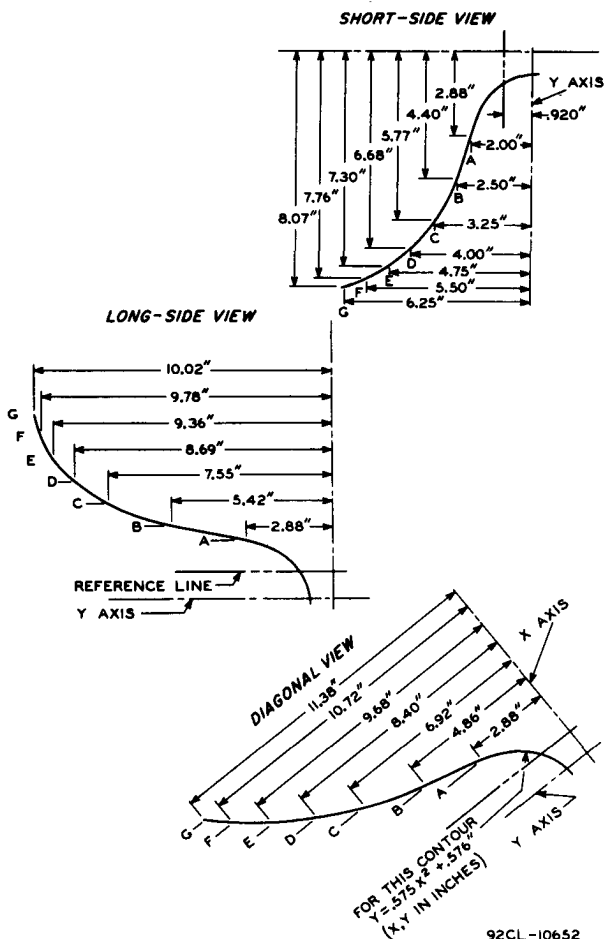
NOTE 5: TO CLEAN THIS AREA, WIPE ONLY WITH SOFT DRY LINT-LESS CLOTH.

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 LOCATION SPECIFIED FOR DIMENSIONING THE ENVELOPE WIDTH, DIAGONAL, AND HEIGHT.

NOTE 8: AREA BETWEEN MOLD-MATCH LINE AND SEAL BULGE IS $1/2''$ MINIMUM. THIS SHOULD BE THE MAXIMUM WIDTH OF TUBE SUPPORT BAND. SUPPORTS MUST BE SPACED FROM THE TUBE BY THE USE OF CUSHIONING PADS MADE OF ASPHALT, IMPREGNATED FELT OR EQUIVALENT.

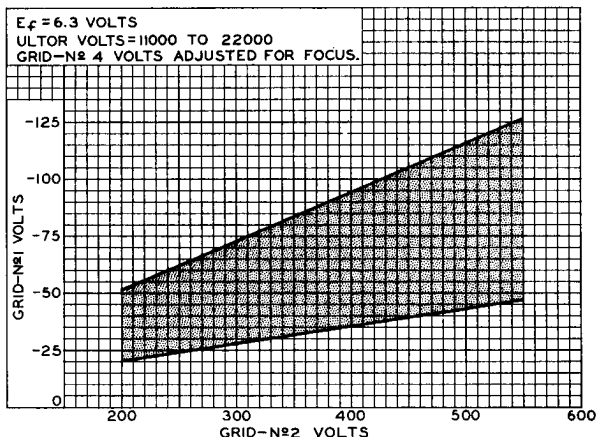
BULB-CONTOUR DIMENSIONS



NOTE: PLANES A THRU 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.

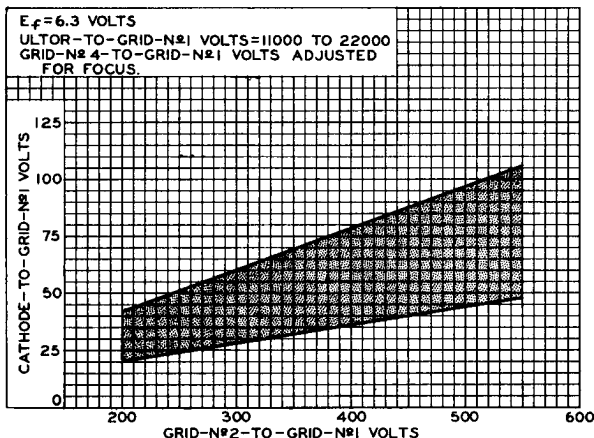


RASTER-CUTOFF-RANGE CHARTS Grid-Drive Service



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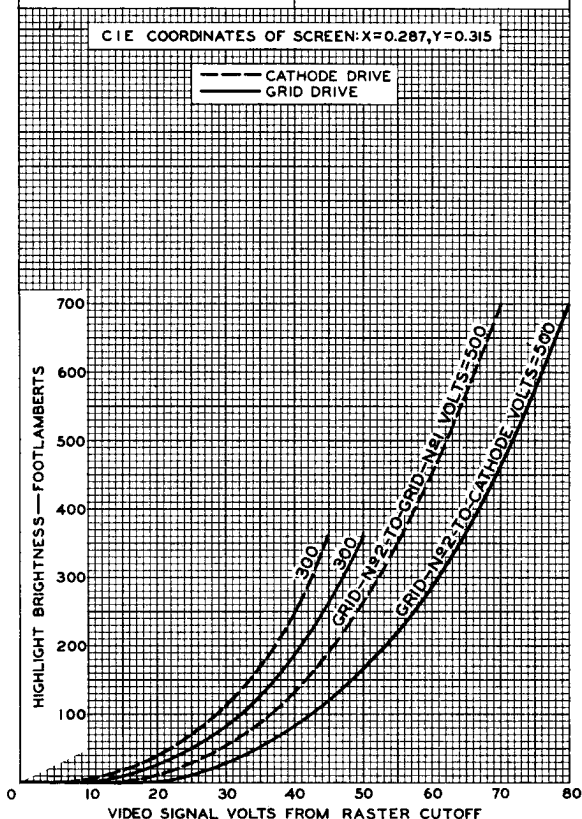
Cathode-Drive Service



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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"



92CM-10625



AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE

$E_f = 6.3$ VOLTS

ULTOR-TO-GRID-N₂

VOLTS = 11000 TO 22000

CATHODE BIASED POSITIVE WITH
RESPECT TO GRID N₂ TO GIVE
FOCUSED RASTER CUTOFF.

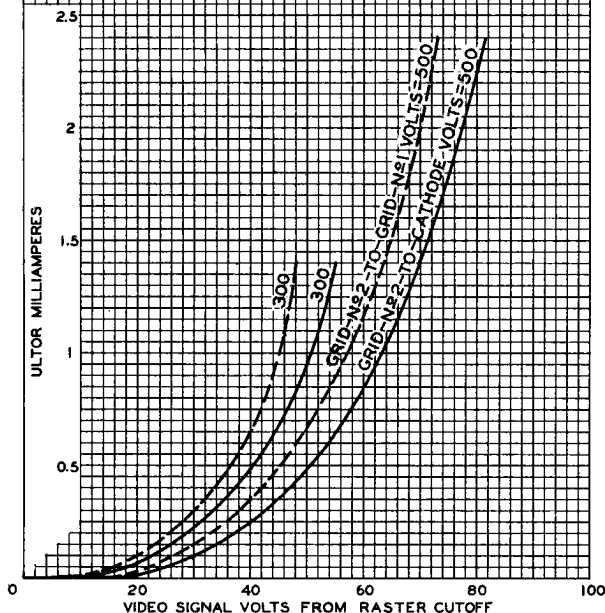
GRID-DRIVE SERVICE

$E_f = 6.3$ VOLTS

ULTOR VOLTS = 11000 TO 22000

GRID N₂ BIASED NEGATIVE WITH
RESPECT TO CATHODE TO GIVE
FOCUSED RASTER CUTOFF.

--- CATHODE DRIVE
— GRID DRIVE



92CM-10618

