

Picture Tube

BI-PANEL RECTANGULAR GLASS TYPE
LOW-VOLTAGE ELECTROSTATIC FOCUSALUMINIZED SCREEN
MAGNETIC DEFLECTION

With Heater Having Controlled Warm-Up Time

DATA

General:

Heater, for Unipotential Cathode:

Voltage (AC or DC)	6.3 $\pm$ 10%	volts
Current at 6.3 volts.	0.6 $\pm$ 5%	amp
Warm-up time (Average).	11	sec

Direct Interelectrode Capacitances:

Grid No.1 to all other electrodes . . .	6	μ f
Cathode to all other electrodes	5	μ f

External conductive coating to ultor. .	2500 max.	μ f
	2000 min.	μ f

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" $\pm$ 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" $\pm$ 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
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In plane of horizontal deflection	50-1/4"	35-1/4"
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In plane of vertical deflection.	45-1/2"	35"
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Radius of curvature of faceplate (Internal surface):

Radius at center Radius at edge

In plane of diagonal deflection.	39-1/2"	31-1/2"
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In plane of horizontal deflection	39-3/4"	26-1/2"
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	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

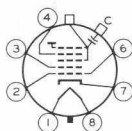
Pin 3-Grid No.2

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 any ultor voltage (E_{c5k}) between 12000[●] and 20000 volts and grid-No.2 voltage (E_{c2k}) between 200 and 500 volts

Grid-No.4 Voltage for focus [★]	0 to 400 volts
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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 μ a
Grid-No.2 Current. -15 to +15 μ a
Field Strength of Adjust-
able Centering Magnet 0 to 8 gauss

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 $\begin{cases} 20000 \text{ max. volts} \\ 12000 \text{ min. volts} \end{cases}$
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



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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 225 and 640 volts*

Grid-No.4-to-Grid-No.1
Voltage for focus*. 0 to 400 volts

Cathode-to-Grid-No.1 Volt-
age (E_{kg1}) for visual ex-
tinction 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_{kg1} except video drive is a
negative voltage μ a

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 gauss

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.



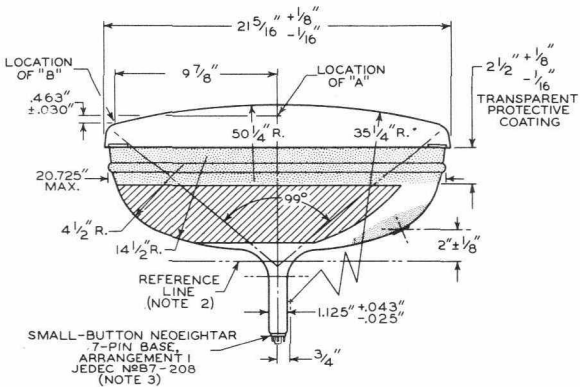
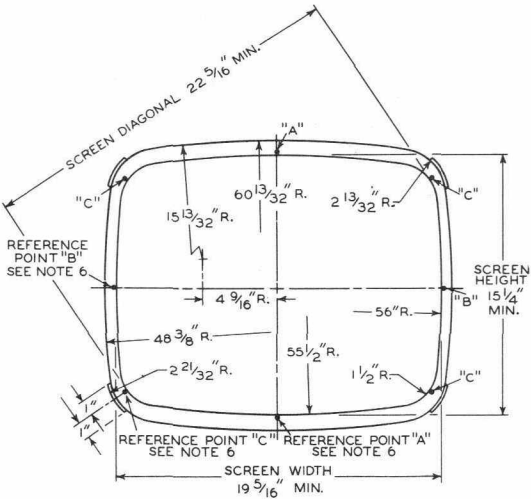
Distance from *Reference Line* for suitable PM centering magnet should not exceed 2-1/4". Excluding extraneous fields, the center of the undeflected focused spot will fall within a circle having a 3/8-inch radius concentric with the center of the tube face. It is to be noted that the earth's magnetic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

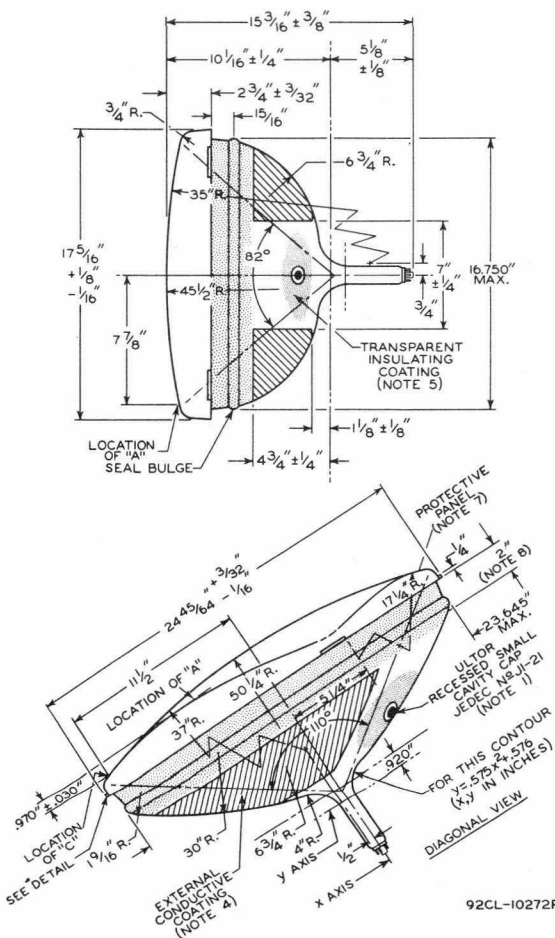
Cathode drive is the operating condition in which the video signal varies the cathode potential with respect to grid No.1 and the other electrodes.

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

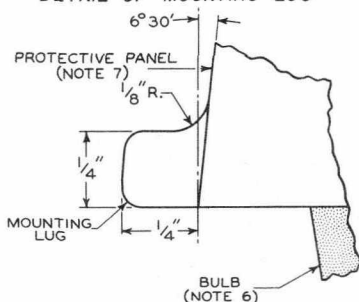


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DETAIL OF MOUNTING LUG



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 $\pm 30^\circ$. 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 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.

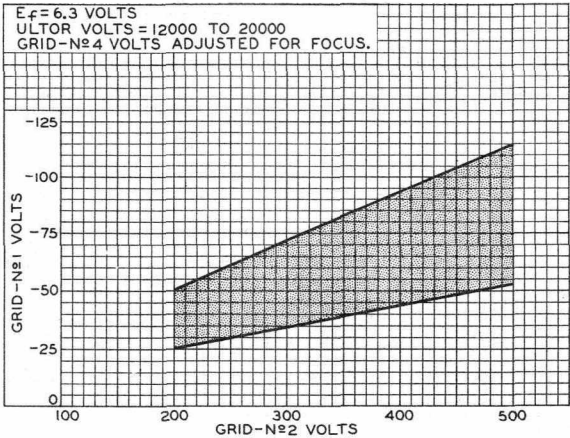
NOTE 6: REFERENCE POINTS A, B, AND C ARE PROVIDED FOR USE IN DESIGN OF A MASK CONTOURED FOR CLOSE FIT TO THE PROTECTIVE PANEL.

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.

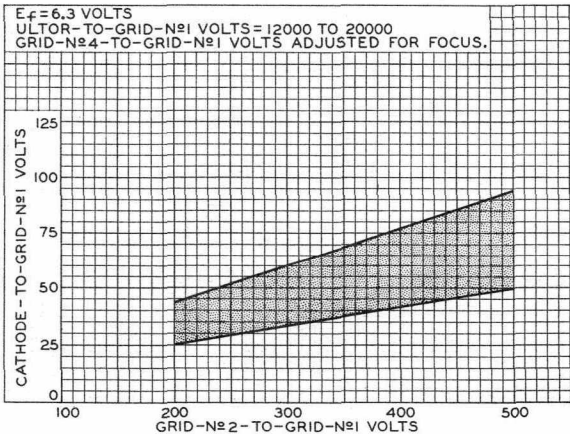
NOTE 9: ADEQUATE TUBE SUPPORT IS OBTAINED BY CLAMPING TO THE MOUNTING LUGS PROVIDED AT EACH CORNER OF THE PROTECTIVE PANEL. TUBE MOUNTING AND YOKE SUPPORT CLAMPS MUST BE SPACED FROM THE TUBE BY USE OF CUSHIONING PADS MADE OF MATERIAL SUCH AS ASPHALT-IMPREGNATED FELT, OR EQUIVALENT.

RASTER-CUTOFF-RANGE CHARTS Grid-Drive Service



92CS-10312

Cathode-Drive Service



92CS-10313



AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE

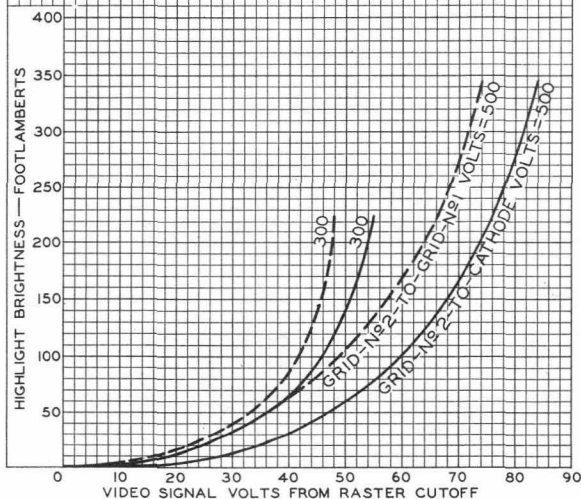
$E_f = 6.3$ VOLTS
 ULTOR-TO-GRID-№1 VOLTS = 16000
 CATHODE BIASED POSITIVE WITH
 RESPECT TO GRID №1 TO GIVE
 FOCUSED RASTER CUTOFF.
 RASTER FOCUSED
 AT AVERAGE BRIGHTNESS.
 RASTER SIZE = $18" \times 13\frac{1}{2}"$

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 = $18" \times 13\frac{1}{2}"$

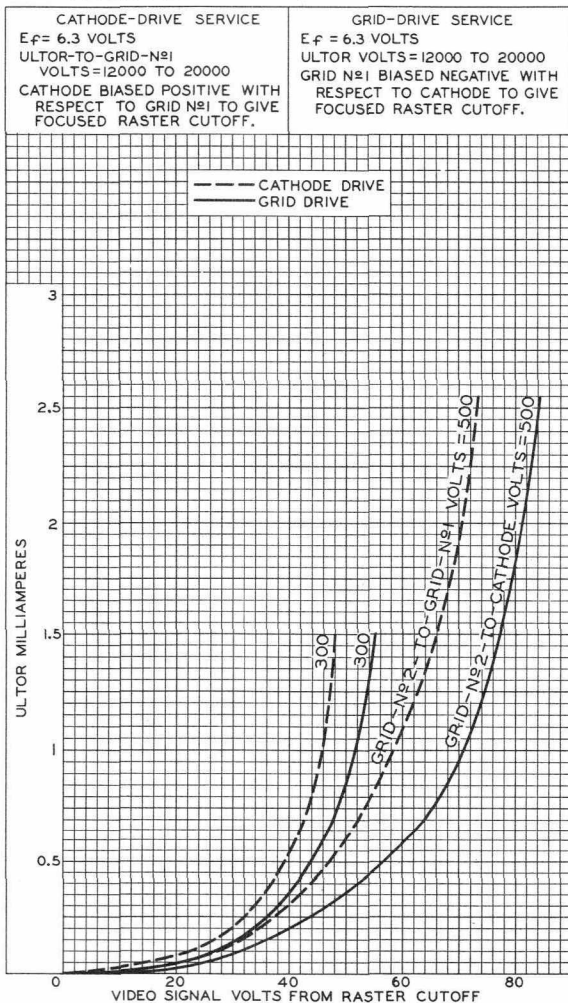
I.C.I. COORDINATES OF SCREEN: $X=0.287$, $Y=0.315$

--- CATHODE DRIVE
 — GRID DRIVE



92CM-10318

AVERAGE DRIVE CHARACTERISTICS



92CM-10317



