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: $6.3 \, \text{ac or dc volts}$
- Current: $0.6 \pm 5\% \, \text{amp}$
- Warm-up time (Average): $11 \, \text{sec}$

For definition of heater warm-up time and method of determining it, see sheet HEATER WARN-UP TIME MEASUREMENT at front of Receiving Tube Section.

Direct Interelectrode Capacitances:
- Grid No.1 to all other electrodes: $6 \, \mu\text{f}$
- Cathode to all other electrodes: $5 \, \mu\text{f}$
- External conductive coating to ultor: $[2500 \, \text{max.}, \, 1700 \, \text{min.}] \, \mu\text{f}$

Faceplate, Spherical:
- Filterglass
- Light transmission (Approx.): 74%
- Phosphor (for curves, see front of this section): P4—Sulfide Type Aluminized
  - Fluorescence: White
  - Phosphorescence: White
  - Persistence: 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: $18-1/8'' \pm 3/8''$
- Greatest width: $22-11/16'' \pm 1/8''$
- Greatest height: $18-7/16'' \pm 1/8''$
- Diagonal: $24'' \pm 1/8''$
- Neck length: $4-1/2'' \pm 3/16''$
- Radius of curvature of faceplate (External surface): 40''

Screen Dimensions (Minimum):
- Greatest width: 21-7/16''
- Greatest height: 16-7/8''
- Diagonal: 22-13/16''
- Projected area: 332 sq. in.
- Weight (Approx.): 32-1/2 lbs
- Operating Position: Any
- Cap: Recessed Small Cavity (JEDEC No. J1-21)
- Bulb: J192A/B
- Base: Short Small-Shell Duodecal 6-Pin (JEDEC Group 4, No. B6-203), or Small-Shell Duodecal 6-Pin, Arrangement 1 (JEDEC Group 4, No. B6-63)
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

GRID-DRIVE* SERVICE

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

Maximum 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 \(E_{c4h}\) between 12000 and 20000 volts
and grid-No.2 voltage \(E_{c2h}\) between 200 and 500 volts

Grid-No.4 Voltage for
focus$ .................. -75 to +400 volts

Grid-No.1 Voltage \(E_{c1h}\) 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
\(E_{c1h}\) except video drive is a
positive voltage

Grid-No.4 Current ............... -25 to +25 $\mu$A

$,$,$,$: see next page.
Grid-No.2 Current. .......... -15 to +15 \( \mu A \)
Field Strength of Adjustable Centering Magnet. .......... 0 to 8 gausses

Examples of Use of Design Ranges:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>With  ultor voltage of</td>
<td>18000 volts</td>
</tr>
<tr>
<td>and grid-No. 2 voltage of</td>
<td>300 volts</td>
</tr>
<tr>
<td>Grid-No.4 Voltage for focus</td>
<td>-75 to +400</td>
</tr>
<tr>
<td>Grid-No.1 Voltage for visual extinction of</td>
<td>-35 to -72</td>
</tr>
<tr>
<td>focused raster</td>
<td></td>
</tr>
<tr>
<td>Grid-No.1 Video Drive from Raster Cutoff</td>
<td></td>
</tr>
<tr>
<td>(Black Level):</td>
<td></td>
</tr>
<tr>
<td>White-level value</td>
<td>35 to 72</td>
</tr>
</tbody>
</table>

Maximum Circuit Values:

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

CATHODE-DRIVE\textsuperscript{a} SERVICE

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

Maximum Ratings, Design-Center Values:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULTROR-TO-GRID-No.1 VOLTAGE.</td>
<td></td>
</tr>
<tr>
<td>GRID-No.4-TO-GRID-No.1 VOLTAGE:</td>
<td></td>
</tr>
<tr>
<td>Positive value</td>
<td>1000 max. volts</td>
</tr>
<tr>
<td>Negative value</td>
<td>500 max. volts</td>
</tr>
<tr>
<td>GRID-No.2-TO-GRID-No.1 VOLTAGE.</td>
<td></td>
</tr>
<tr>
<td>Positive-peak value</td>
<td>200 max. volts</td>
</tr>
<tr>
<td>Positive-bias value</td>
<td>140 max. volts</td>
</tr>
<tr>
<td>Negative-bias value</td>
<td>0 max. volts</td>
</tr>
<tr>
<td>Negative-peak value</td>
<td>2 max. volts</td>
</tr>
</tbody>
</table>

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 \((E_{c581})\) between 12000 and 20000 volts and grid-No.2-to-grid-No.1 voltage \((E_{c381})\) between 225 and 640 volts

Grid-No.4-to-Grid-No.1 Voltage
for focus$§.  ....... -75 to +400 volts
Cathode-to-Grid-No.1 Voltage
\((E_{k1})\) for visual extinction
of focused raster . See Raster-Cutoff-Range Chart
for Cathode-Drive Service

$§, $¶: see next page.

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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

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:

<table>
<thead>
<tr>
<th>With utlor-to-grid-</th>
<th>18000 volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.1 voltage of</td>
<td></td>
</tr>
<tr>
<td>and grid-No.2-to-grid-</td>
<td>300 volts</td>
</tr>
<tr>
<td>No.1 voltage of</td>
<td></td>
</tr>
<tr>
<td>Grid-No.4-to-Grid-No.1</td>
<td>-75 to +40C volt</td>
</tr>
<tr>
<td>Voltage for focus ...</td>
<td></td>
</tr>
<tr>
<td>Cathode-to-Grid-No.1 Voltage for visual extinction</td>
<td>33 to 60 volts</td>
</tr>
<tr>
<td>of focused raster</td>
<td></td>
</tr>
<tr>
<td>Cathode-to-Grid-No.1 Video</td>
<td>-33 to -60 volts</td>
</tr>
<tr>
<td>Drive from Raster Cutoff</td>
<td></td>
</tr>
<tr>
<td>(Black Level):</td>
<td></td>
</tr>
<tr>
<td>White-level value ...</td>
<td></td>
</tr>
</tbody>
</table>

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 utlor-or utlor-to-grid-No.1 voltage is 11,000 volts, below which the serviceability of the 24AUP4 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 utlor-or utlor-to-grid-No.1 voltage is never less than 11,000 volts.

†† The grid-No.4 voltage or grid-No.4-to-grid-No.1 voltage required for focus of any individual tube is independent of utlor current and will remain essentially constant for values of utlor voltage (or utlor-to-grid-No.1 voltage) or grid-No.2 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 1/2-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 other electrodes.

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

**GRID-DRIVE SERVICE**

**E_C = 6.3 VOLTS**

ULTOR VOLTS = 12000 TO 20000

GRID-N#4 VOLTS ADJUSTED FOR FOCUS.

**CATHODE-DRIVE SERVICE**

**E_C = 6.3 VOLTS**

ULTOR-TO-GRID-N#1 VOLTS = 12000 TO 20000

GRID-N#4-TO-GRID-N#1 VOLTS ADJUSTED FOR FOCUS.

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 3".

NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

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

CATHODE-DRIVE SERVICE
E_F = 6.3 Volts
ULTOR-TO-GRID-N°1 VOLTS = 16000
CATHODE BIASED POSITIVE WITH
RESPECT TO GRID N°1 TO GIVE
FOCUSED RASTER CUTOFF.
RASTER FOCUSED
AT AVERAGE BRIGHTNESS.
RASTER SIZE = 21" x 16"

GRID-DRIVE SERVICE
E_F = 6.3 Volts
ULTOR VOLTS = 16000
GRID N°1 BIASED NEGATIVE WITH
RESPECT TO CATHODE TO GIVE
FOCUSED RASTER CUTOFF.
RASTER FOCUSED
AT AVERAGE BRIGHTNESS.
RASTER SIZE = 21" x 16"

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92CM-9352
AVERAGE DRIVE CHARACTERISTICS

CATHODE-DRIVE SERVICE
- $E_f = 6.3$ Volts
- ULTOR-TO-GRID-N#1 Volts = 12000 to 20000
- CATHODE BIASED POSITIVE WITH RESPECT TO GRID N#1 TO GIVE FOCUSED RASTER CUTOFF.

GRID-DRIVE SERVICE
- $E_f = 6.3$ Volts
- ULTOR VOLTS = 12000 to 20000
- GRID N#1 BIASED NEGATIVE WITH RESPECT TO CATHODE TO GIVE FOCUSED RASTER CUTOFF.