



**RADIO MANUFACTURERS ASSOCIATION**  
**ENGINEERING DEPARTMENT**

TYPE 1P30\*

(Gas Filled Phototube)  
(2 Electrodes)

GENERAL CHARACTERISTICS

Electrical

|                                               |                                         |
|-----------------------------------------------|-----------------------------------------|
| Spectral Response                             | S1                                      |
| Luminous Sensitivity at 90 volts,<br>0 cycles | Nom. 125 ua/Lumen<br>(Min. 95 ua/Lumen) |
| Max. gas amplification                        | 10.0                                    |
| Interelectrode Capacitances                   | 2.0 - 6.0 uuf                           |
| Maximum dark current at 90 volts              | 0.1 ua                                  |
| Wavelength of maximum response                | Approx. 8000 A                          |
| Sensitivity at maximum response               | 0.01 ua/uwatt                           |

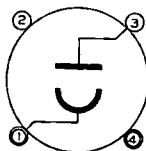
Mechanical

|                                                   |                |
|---------------------------------------------------|----------------|
| Window dimensions (Min. useful)                   | 1.00" x 0.969" |
| Seated Height to Center of<br>Useful Cathode Area | 1.938 in.      |
| Maximum Overall Height                            | 3.625 in.      |
| Maximum Seated Height                             | 3.000 in.      |
| Maximum Diameter                                  | 1.563 in.      |
| Base                                              | Med. 4-pin     |
| Permissible Mounting Position                     | Any            |
| Base connections                                  | 2G             |

Maximum Ratings (Absolute)

|                                                                              |                |
|------------------------------------------------------------------------------|----------------|
| Anode Voltage (DC or Peak AC)                                                | 90 Volts       |
| Cathode Current Density                                                      | 100 ua/sq. in. |
| Average Cathode Current based on<br>0.2 sq. in. of sensitive<br>cathode area | 20 ua          |
| Ambient Temperature                                                          | 100°C          |

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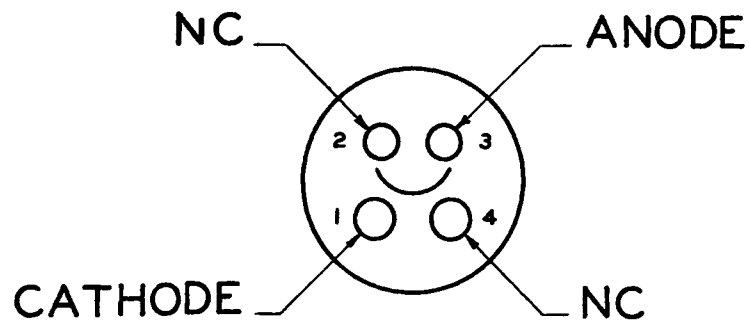
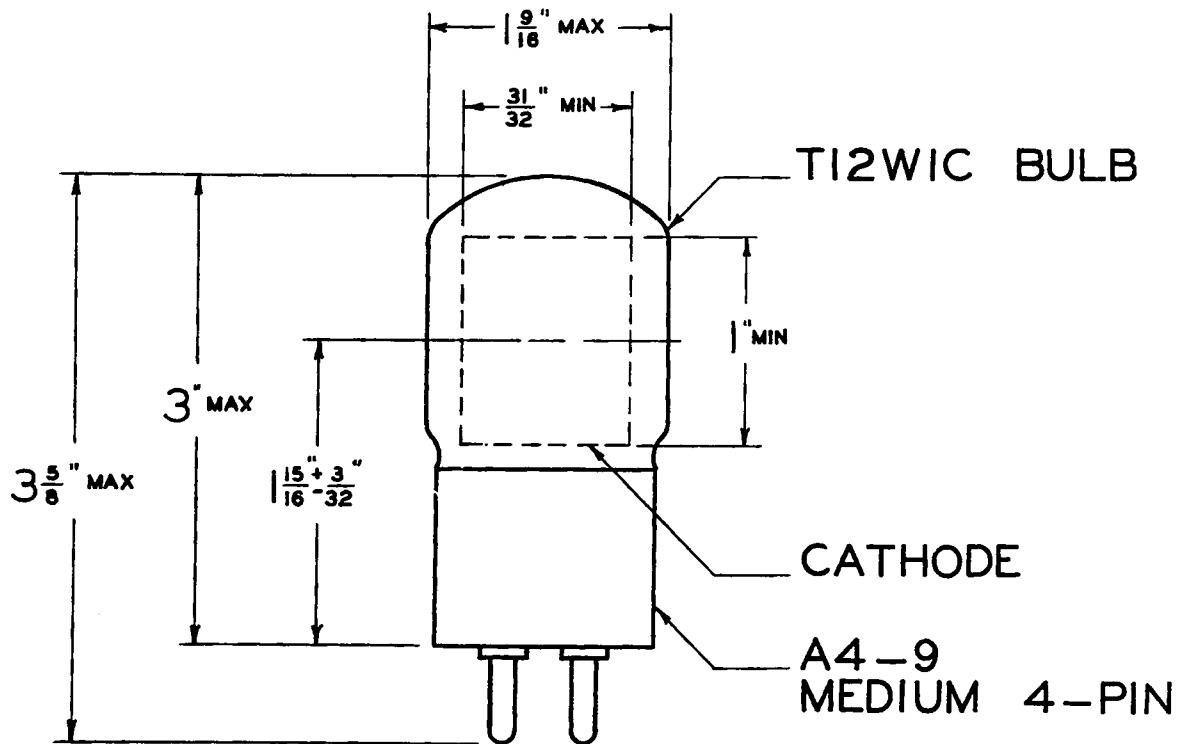


\*(CE-2C; 71A)



Release No. 397  
February 10, 1945

# RMA TYPE IP 30





**RADIO MANUFACTURERS ASSOCIATION**  
**ENGINEERING DEPARTMENT**

TYPE 1P31\*

Release No. 397

February 10, 1945

sponsored by  
Continental Electric Co.

(Gas Filled Phototube;  
2 Electrodes)

GENERAL CHARACTERISTICS

Electrical

|                                               |                                        |
|-----------------------------------------------|----------------------------------------|
| Spectral Response                             | S1                                     |
| Luminous Sensitivity at 95 volts,<br>0 cycles | Nom. 75 ua/Lumen<br>(Min. 55 ua/Lumen) |
| Max. gas amplification                        | 10                                     |
| Interelectrode Capacitances                   | 1.5 - 6.5 uuf                          |
| Maximum dark current at 95 V                  | 0.1 ua                                 |
| Wavelength of maximum response                | Approx. 8000 A                         |
| Sensitivity at maximum response               | 0.007 ua/uwatt                         |

Mechanical

|                                                   |                                  |
|---------------------------------------------------|----------------------------------|
| Window Dimensions (Min. Useful)                   | 1.47 x 0.97                      |
| Seated Height to Center of Useful<br>Cathode Area | 2.9" Approx.                     |
| Maximum Overall Height                            | 4.500 in.                        |
| Maximum Seated Height                             | 4.500 in.                        |
| Maximum Diameter                                  | 2.375 in.                        |
| Base                                              | Special Base                     |
| Permissible Mounting Position                     | Any                              |
| Base Connections                                  | 6" Lead Cathode<br>4" Lead Anode |

Max. Ratings (Absolute)

|                                                                              |            |
|------------------------------------------------------------------------------|------------|
| Anode Voltage (DC or Peak AC)                                                | 95 Volts   |
| Cathode Current Density                                                      | 100 ua/in. |
| Average Cathode Current based on<br>0.2 sq. in. of sensitive<br>cathode area | 20 ua      |
| Ambient Temperature                                                          | 100°C      |

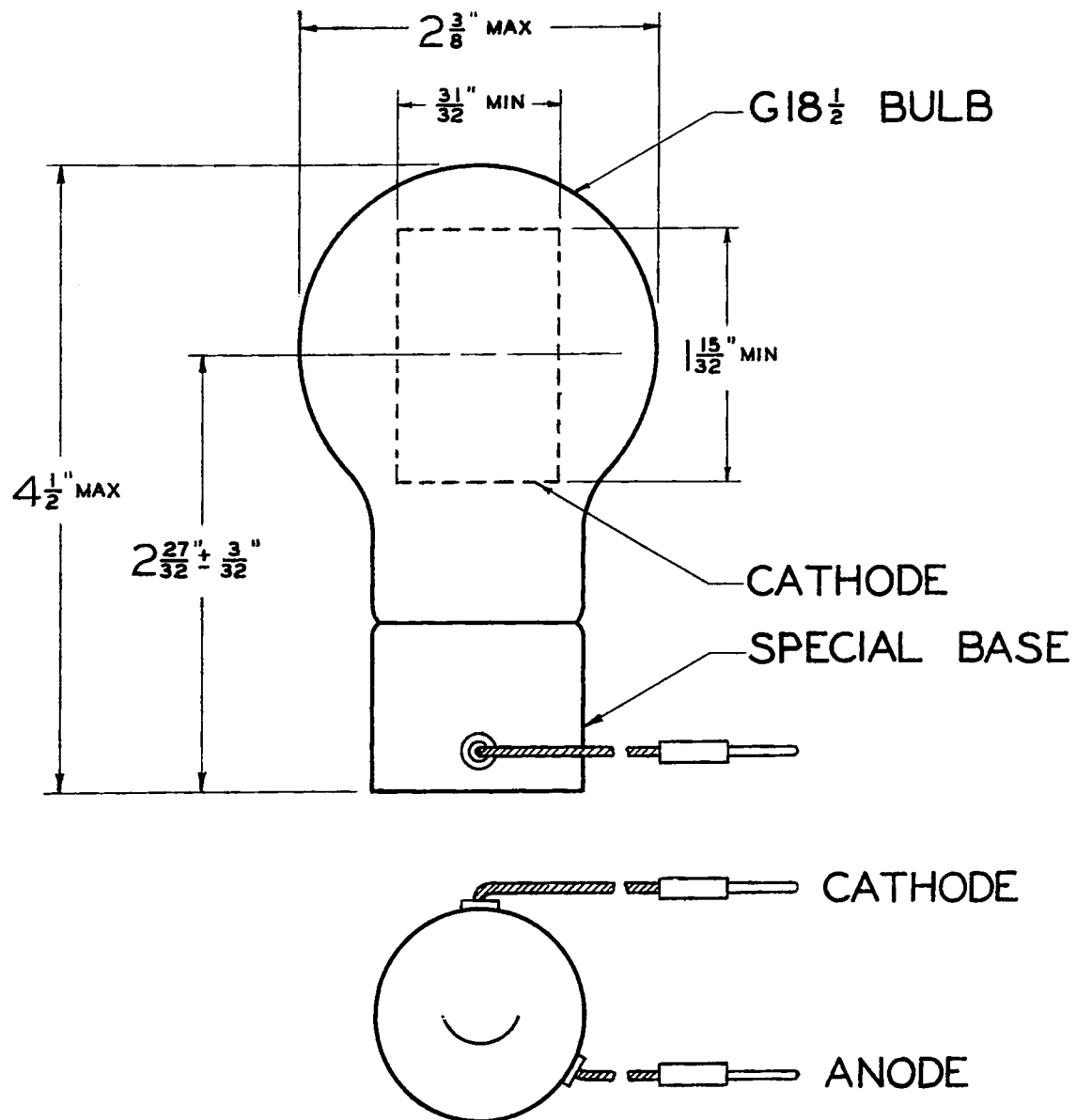
\*(CE-3D; WE-3A; 79A; G10)



Release No. 397

February 10, 1945

# RMA TYPE IP 31

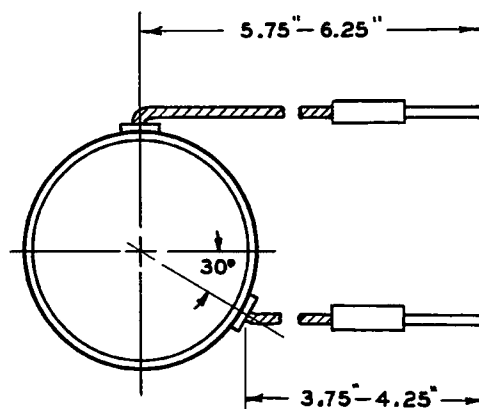
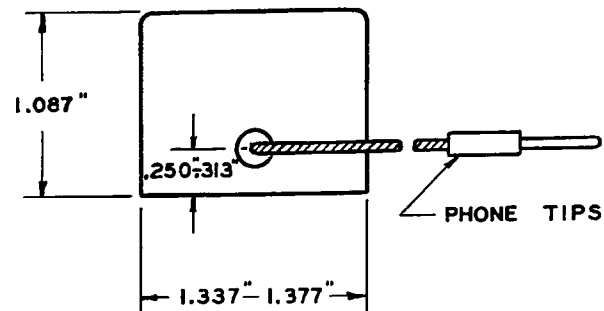




Release No. 397

February 10, 1945

# SPECIAL BASE FOR IP 31





**RADIO MANUFACTURERS ASSOCIATION**  
**ENGINEERING DEPARTMENT**

TYPE 1P32\*

Release No. 397

February 10, 1945  
sponsored by  
Continental Electric Co.

(Gas Filled Phototube;  
2 Electrodes)

GENERAL CHARACTERISTICS

Electrical

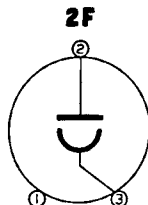
|                                               |                                       |
|-----------------------------------------------|---------------------------------------|
| Spectral Response                             | S1                                    |
| Luminous Sensitivity at 90 Volts,<br>0 cycles | Nom 125 ua/Lumen<br>(Min 95 ua/Lumen) |
| Max. gas amplification                        | 12.0                                  |
| Interelectrode Capacitances                   | 1.1 - 4.0 uuf                         |
| Maximum dark current at 90 volts              | 0.1 ua                                |
| Wavelength of maximum response                | 8000 A Approx.                        |
| Sensitivity at maximum response               | .01 ua/uwatt                          |

Mechanical

|                                                   |               |
|---------------------------------------------------|---------------|
| Window Dimensions (Min. Useful)                   | .688" x .438" |
| Seated Height to Center of Useful<br>Cathode Area | 1.406 in.     |
| Maximum Overall Height                            | 2.438 in.     |
| Maximum Seated Height                             | 1.938 in.     |
| Maximum Diameter                                  | 0.669 in.     |
| Base                                              | PeeWee 3 Pin  |
| Permissible Mounting Position                     | Any           |
| Base Connections                                  | 2F            |

Maximum Ratings (Absolute)

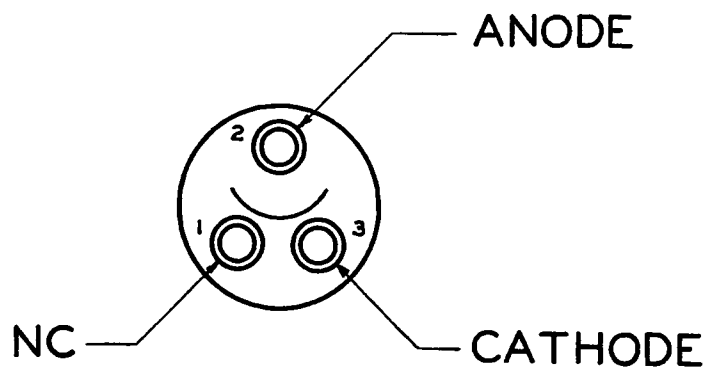
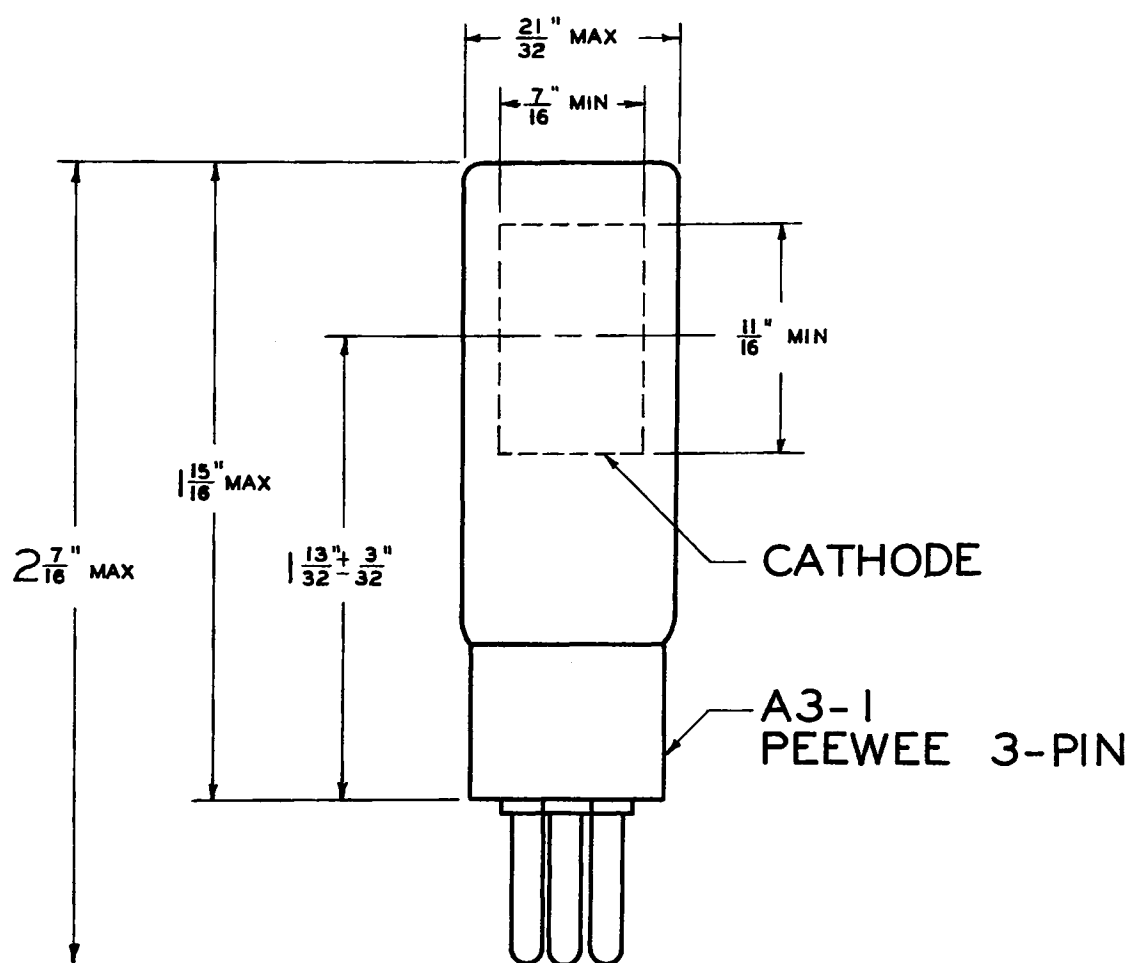
|                                                                              |               |
|------------------------------------------------------------------------------|---------------|
| Anode Voltage (DC or Peak AC)                                                | 90 Volts      |
| Cathode Current Density                                                      | 100 ua/sq.in. |
| Average Cathode Current based on<br>0.2 sq. in. of sensitive<br>cathode area | 2 ua          |
| Ambient Temperature                                                          | 100°C         |



\*(CE-25C; 51A)



# RMA TYPE 1P 32





**RADIO MANUFACTURERS ASSOCIATION**  
**ENGINEERING DEPARTMENT**

TYPE 1P33\*

Release No. 397

February 10, 1945

(Gas Filled Phototube;  
2 Electrodes)

sponsored by  
Continental Electric Co.

GENERAL CHARACTERISTICS

Electrical

|                                               |                                        |
|-----------------------------------------------|----------------------------------------|
| Spectral Response                             | S1                                     |
| Luminous Sensitivity at 95 volts,<br>0 cycles | Nom. 75 ua/Lumen<br>(Min. 55 ua/Lumen) |
| Max. Gas amplification                        | 10                                     |
| Interelectrode Capacitances                   | 1.5 - 6.5 uuf                          |
| Maximum dark current at 95 volts              | 0.1 ua                                 |
| Wavelength of maximum response                | Approx. 8000 A                         |
| Sensitivity at maximum response               | 0.007 ua/uwatt                         |

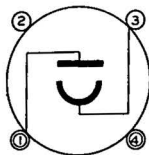
Mechanical

|                                                   |              |
|---------------------------------------------------|--------------|
| Window Dimensions (Min. Useful)                   | 1.47 x 0.97  |
| Seated Height to Center of Useful<br>Cathode Area | 2.9" Approx. |
| Maximum Overall Height                            | 5.125"       |
| Maximum Seated Height                             | 4.500"       |
| Maximum Diameter                                  | 2.375"       |
| Base                                              | Med. 4-Pin   |
| Permissible Mounting Position                     | Any          |
| Base Connections                                  | 2X           |

Maximum Ratings (absolute)

|                                                                              |               |
|------------------------------------------------------------------------------|---------------|
| Anode Voltage (DC or Peak AC)                                                | 95 volts      |
| Cathode Current Density                                                      | 100 ua/sq.in. |
| Average Cathode Current based on<br>0.2 sq. in. of sensitive<br>cathode area | 20 ua         |
| Ambient Temperature                                                          | 100°C         |

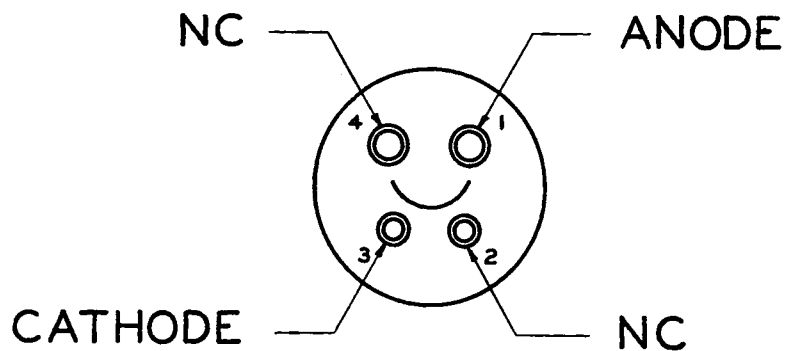
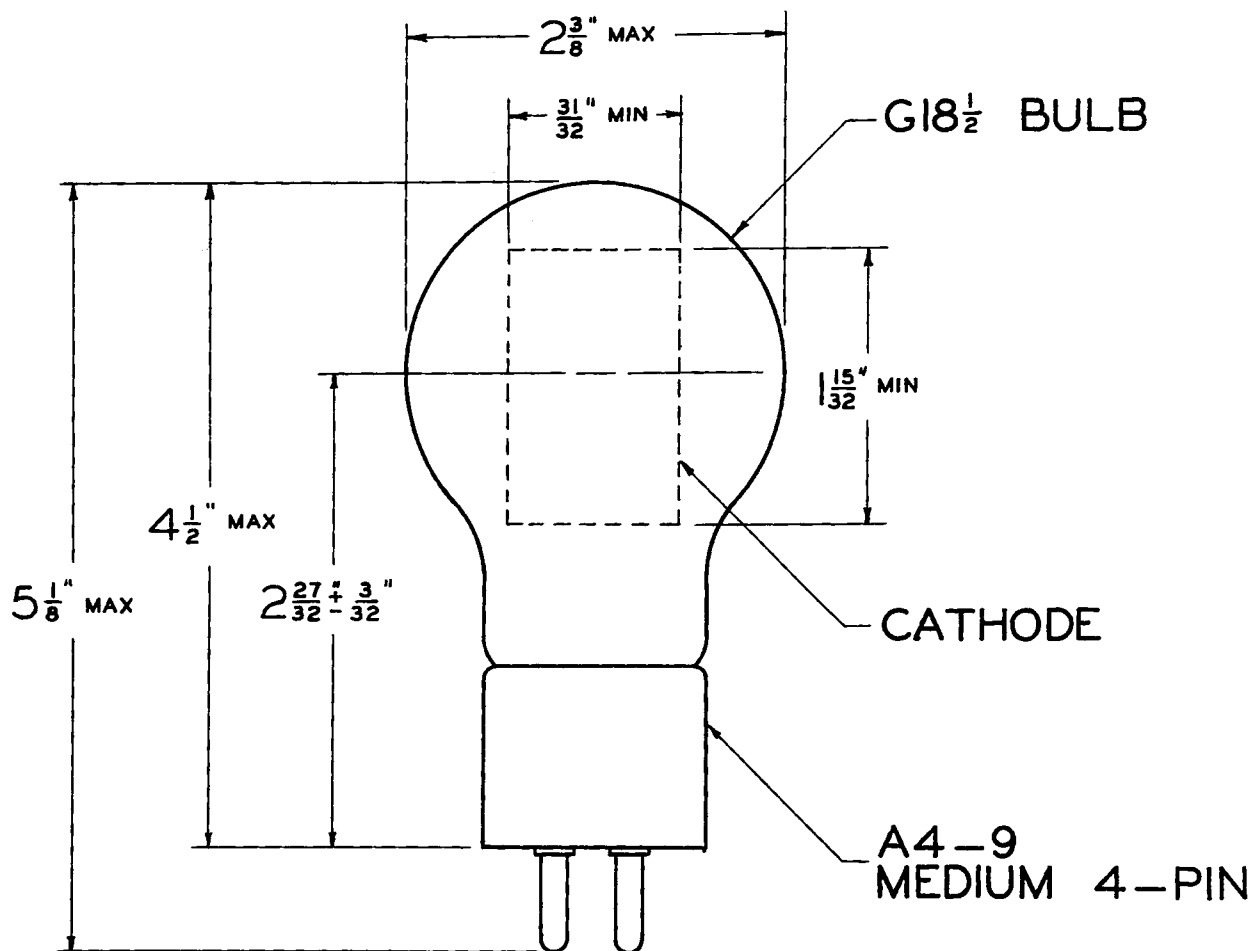
2X



\*(CE-26D; WE-6A)



# RMA TYPE IP 33





**RADIO MANUFACTURERS ASSOCIATION**  
**ENGINEERING DEPARTMENT**

TYPE 1P34\*

(Gas Filled Phototube)  
(2 Electrodes)

Release No. 397

February 10, 1945

sponsored by  
Continental Electric Co.

GENERAL CHARACTERISTICS

Electrical

|                                               |                                          |
|-----------------------------------------------|------------------------------------------|
| Spectral Response                             | Sl                                       |
| Luminous Sensitivity at 90 volts,<br>0 cycles | Nom. 200 ua/Lumen<br>(Min. 150 ua/Lumen) |
| Max. gas amplification                        | 10.0                                     |
| Interelectrode Capacitance                    | 2 - 6 uuf                                |
| Maximum dark current at 90 volts              | 0.1                                      |
| Wave-Length of maximum response               | 8500 A Approx.                           |
| Sensitivity at maximum response               | 0.013 ua/uwatt                           |

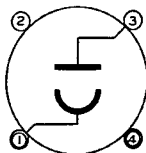
Mechanical

|                                                   |             |
|---------------------------------------------------|-------------|
| Window Dimensions (Min. useful)                   | 1 x 1.375   |
| Seated Height to Center of Useful<br>Cathode Area | 2.406 in.   |
| Maximum Overall Height                            | 4.250 in.   |
| Maximum Seated Height                             | 3.500 in.   |
| Maximum Diameter                                  | 1.198 in.   |
| Bulb                                              | T-9         |
| Base                                              | Small 4-Pin |
| Permissible Mounting Position                     | Any         |
| Base Connection                                   | 2G          |

Maximum Ratings (Absolute)

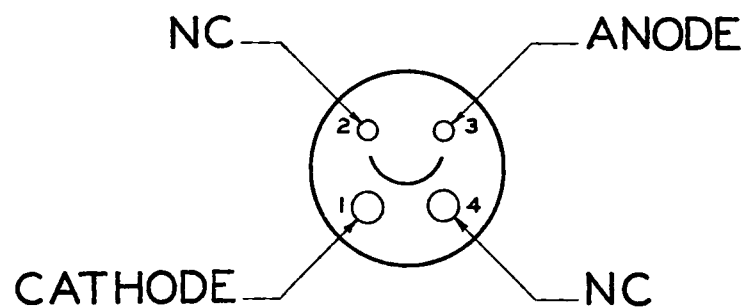
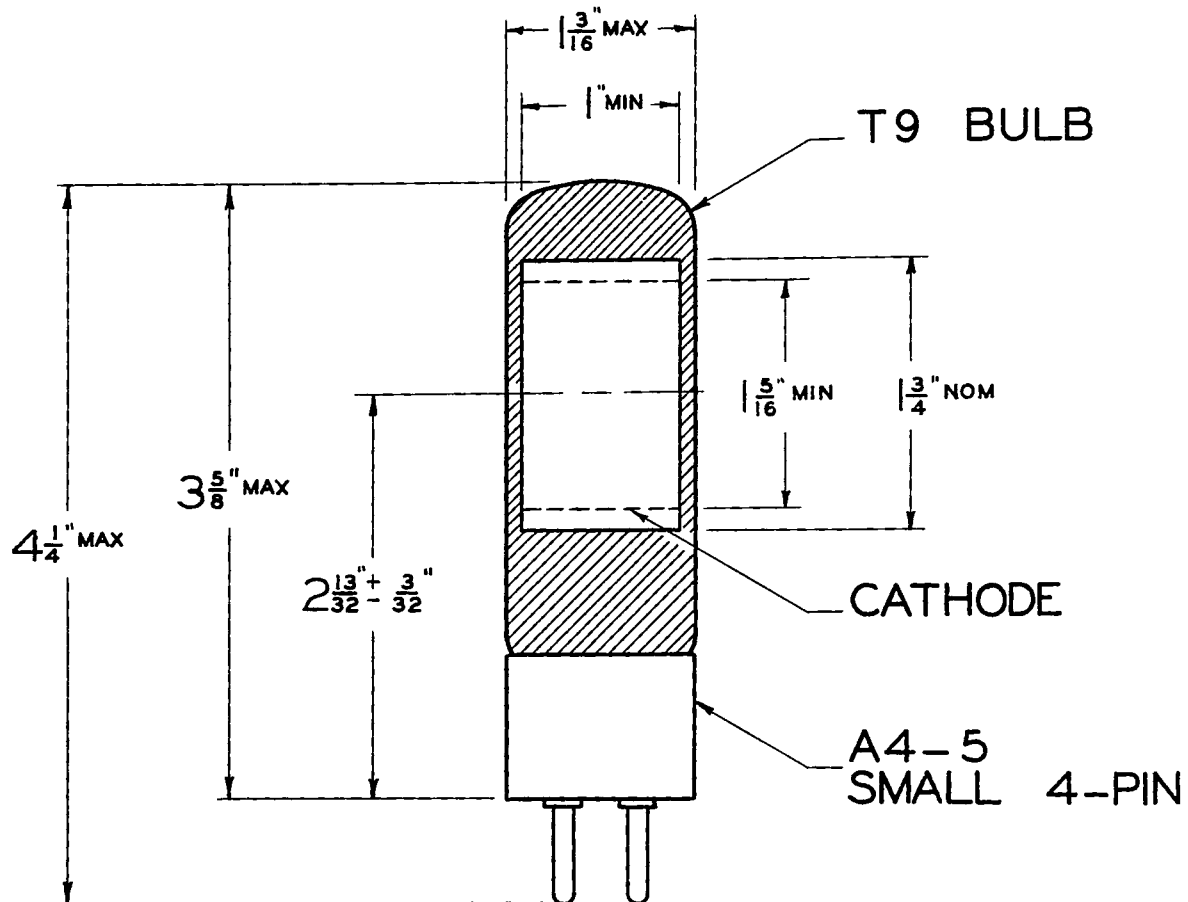
|                                                                              |               |
|------------------------------------------------------------------------------|---------------|
| Anode Voltage (DC or Peak AC)                                                | 90 volts      |
| Cathode Current density                                                      | 100 ua/sq.in. |
| Average Cathode Current based on<br>0.2 sq. in. of sensitive<br>cathode area | 20 ua         |
| Ambient Temperature                                                          | 100°C         |

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# RMA TYPE IP 34



# 5CUP18 CATHODE RAY TUBE

## TELEVISION FILM RECORDING TUBE

The 5CUP18 is a 5-inch electrostatic-focus and magnetic-deflection cathode ray tube intended primarily for use in high definition television recorders. A particular feature of this tube is an optically flat faceplate utilizing non-browning glass. Other features include a metal backed screen for high brightness and a straight electron gun. With other special phosphors the same generic tube may be used as a flying spot light source, monitor, or radar type cathode ray tube.

### GENERAL CHARACTERISTICS

#### Electrical Data

|                                                 |                    |
|-------------------------------------------------|--------------------|
| Heater Voltage .....                            | 6.3 Volts          |
| Heater Current .....                            | 0.6-1.0 Amperes    |
| Focusing Method .....                           | Electrostatic      |
| Deflecting Method .....                         | Magnetic           |
| Deflection Angle, approximate .....             | 50 Degrees         |
| No-Ion-Trap Gun .....                           | No Magnet Required |
| Direct Interelectrode Capacitances, approximate |                    |
| Grid No. 1 to All Other Electrodes .....        | 7.5 uuf            |
| Cathode to All Other Electrodes .....           | 5.0 uuf            |

#### Optical Data

|                    |                |
|--------------------|----------------|
| Screen .....       | P18 Aluminized |
| Fluorescence ..... | White          |
| Persistence .....  | Short          |

#### Mechanical Data

|                                                        |                                             |
|--------------------------------------------------------|---------------------------------------------|
| Over-all Length .....                                  | 11-5/8±3/8 Inches                           |
| Greatest Diameter of Bulb .....                        | 5±1/16 Inches                               |
| Minimum Useful Screen Diameter (maximum assured) ..... | 4-1/4 Inches                                |
| Neck Length .....                                      | 7-3/4 Inches                                |
| Bulb Contact .....                                     | Recessed Small Cavity Cap, JEDEC No. J1-21  |
| Base .....                                             | Small Shell Duodecal 7-pin, JEDEC No. B7-51 |
| Basing .....                                           | JEDEC Designation 12C                       |

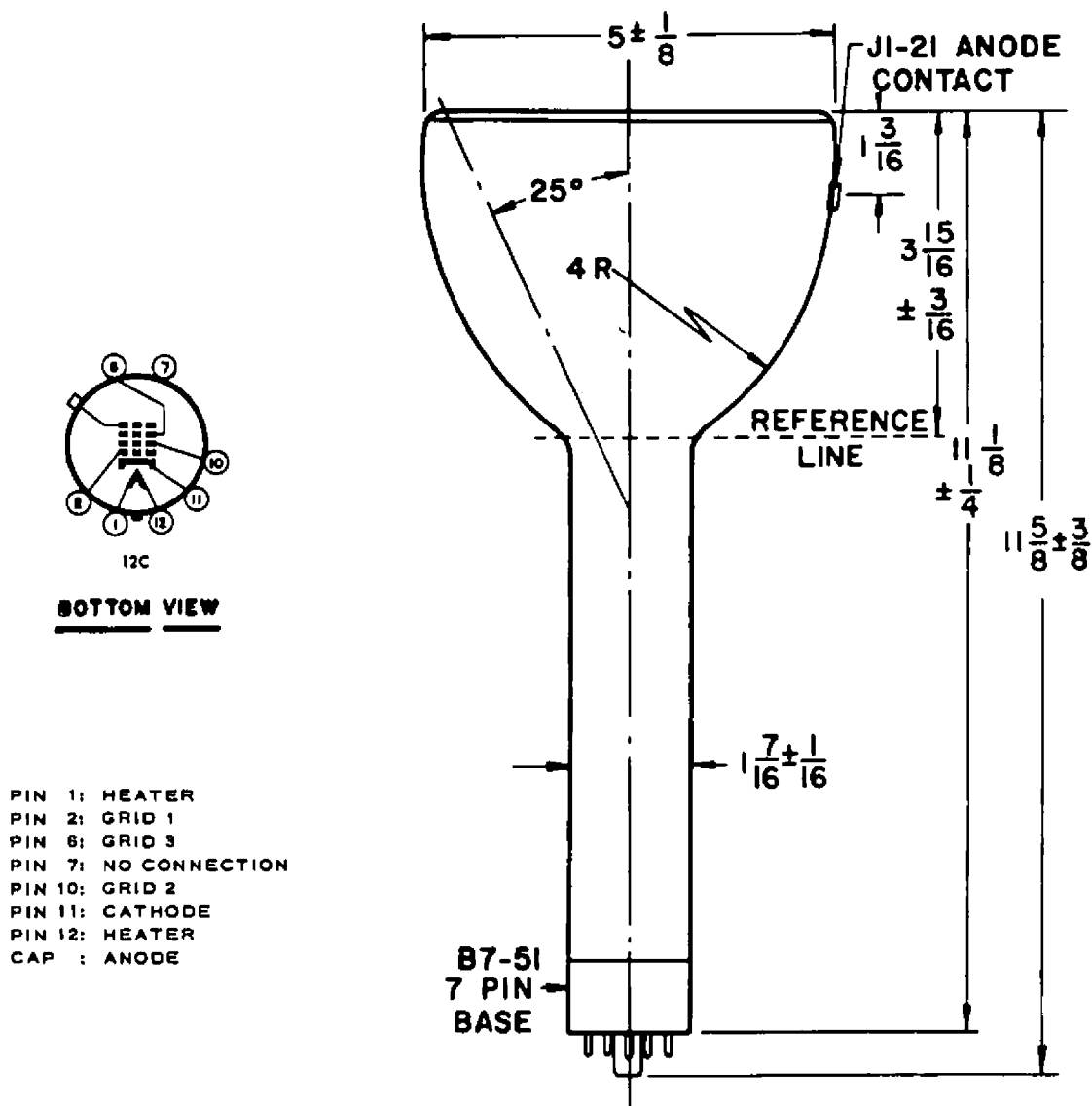
#### Maximum Ratings (Absolute Maximum Ratings)

|                                               |                   |
|-----------------------------------------------|-------------------|
| Anode No. 2 Voltage .....                     | 30,000 Max. Volts |
| Anode No. 1 Voltage (Focus) .....             | 6000 Max. Volts   |
| Grid No. 2 Voltage .....                      | 350 Max. Volts    |
| Grid No. 1 Voltage:                           |                   |
| Negative Bias Value .....                     | 150 Max. Volts    |
| Positive Bias Value .....                     | 2 Max. Volts      |
| Peak Heater-Cathode Voltage:                  |                   |
| Heater negative with respect to cathode ..... | 175 Max. Volts    |
| Heater positive with respect to cathode ..... | 10 Max. Volts     |

#### Typical Operating Conditions

|                                            |                   |
|--------------------------------------------|-------------------|
| Anode No. 2 Voltage*                       | 27,000 Volts      |
| Anode No. 1 (Focus) .....                  | 4500 Volts        |
| Grid No. 2 Voltage .....                   | 200 Volts         |
| Grid No. 1 Voltage for Visual Cutoff ..... | -70 to -110 Volts |

\*Brilliance and definition decrease with decreasing anode voltages. In general, Anode No. 2 voltage should not be less than 20,000 volts.

**OUTLINE DRAWING**


1. The reference line is determined by the position where reference line gauge JEDEC No. 112 rests against the funnel.
2. X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range when this tube is operated at recommended anode voltages.
3. At or near maximum anode potential suitable precautions should be taken to prevent arcing between the anode button and the deflection yoke during high humidity conditions.
4. The anode contact aligns with vacant pin position No. 3  $\pm 10^\circ$ .

## 5CXP2 CATHODE RAY TUBE

The 5CXP2 is a 5-inch flat-faced electrostatically focused and deflected cathode ray tube, designed for oscillographic applications where low deflection plate capacitances are essential. All four deflection plate leads are short and direct, terminating in heavy wire contacts on the neck of the tube rather than in the tube base. Employing low accelerating voltages, the 5CXP2 has high deflection sensitivity and brilliant light output. The flat face reduces errors in measurements made from the screen. These features, combined with the high degree of accuracy inherent in the tight-tolerance design, make the 5CXP2 particularly well suited for accurate analysis of high frequencies and rapid pulses and transients.

### GENERAL CHARACTERISTICS

#### Electrical Data

|                                              |                 |
|----------------------------------------------|-----------------|
| Heater Voltage .....                         | 6.3 Volts       |
| Heater Current .....                         | 0.6*10% Amperes |
| Focusing Method .....                        | Electrostatic   |
| Deflecting Method .....                      | Electrostatic   |
| Direct Interelectrode Capacitances (approx.) |                 |
| Cathode to All Other Electrodes .....        | 5.0 uuf         |
| Grid No. 1 to All Other Electrodes .....     | 5.0 uuf         |
| Deflecting Plates D1 and D2 .....            | 2.0 uuf         |
| Deflecting Plates D3 and D4 .....            | 2.0 uuf         |
| D1 to All Other Electrodes except D2 .....   | 2.5 uuf         |
| D2 to All Other Electrodes except D1 .....   | 2.5 uuf         |
| D3 to All Other Electrodes except D4 .....   | 2.0 uuf         |
| D4 to All Other Electrodes except D3 .....   | 2.0 uuf         |

#### Optical Data

|                    |       |
|--------------------|-------|
| Screen .....       | P2    |
| Fluorescence ..... | Green |
| Persistence .....  | Long  |
| Faceplate .....    | Clear |

#### Mechanical Data

|                                                     |                                               |
|-----------------------------------------------------|-----------------------------------------------|
| Overall Length .....                                | 14-3/4*3/8 Inches                             |
| Greatest Diameter of Bulb .....                     | 5-1/4*3/32 Inches                             |
| Minimum Useful Screen Diameter .....                | 4-1/2 Inches                                  |
| Neck Contacts .....                                 | Wire Leads                                    |
| Base .....                                          | Small Shell Duodecal 12-pin, JEDEC No. B12-43 |
| Base Alignment:                                     |                                               |
| D1D2 trace aligns with Pin No. 4 and tube axis .... | ±10 Degrees                                   |
| Angle between D3D4 and D1D2 traces .....            | 90±1 Degrees                                  |

#### Maximum Ratings (Design Center Values)

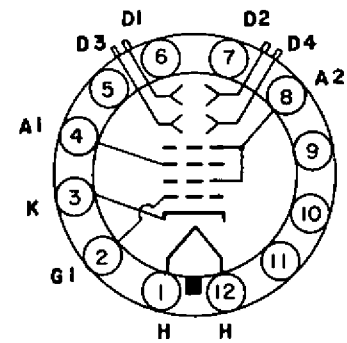
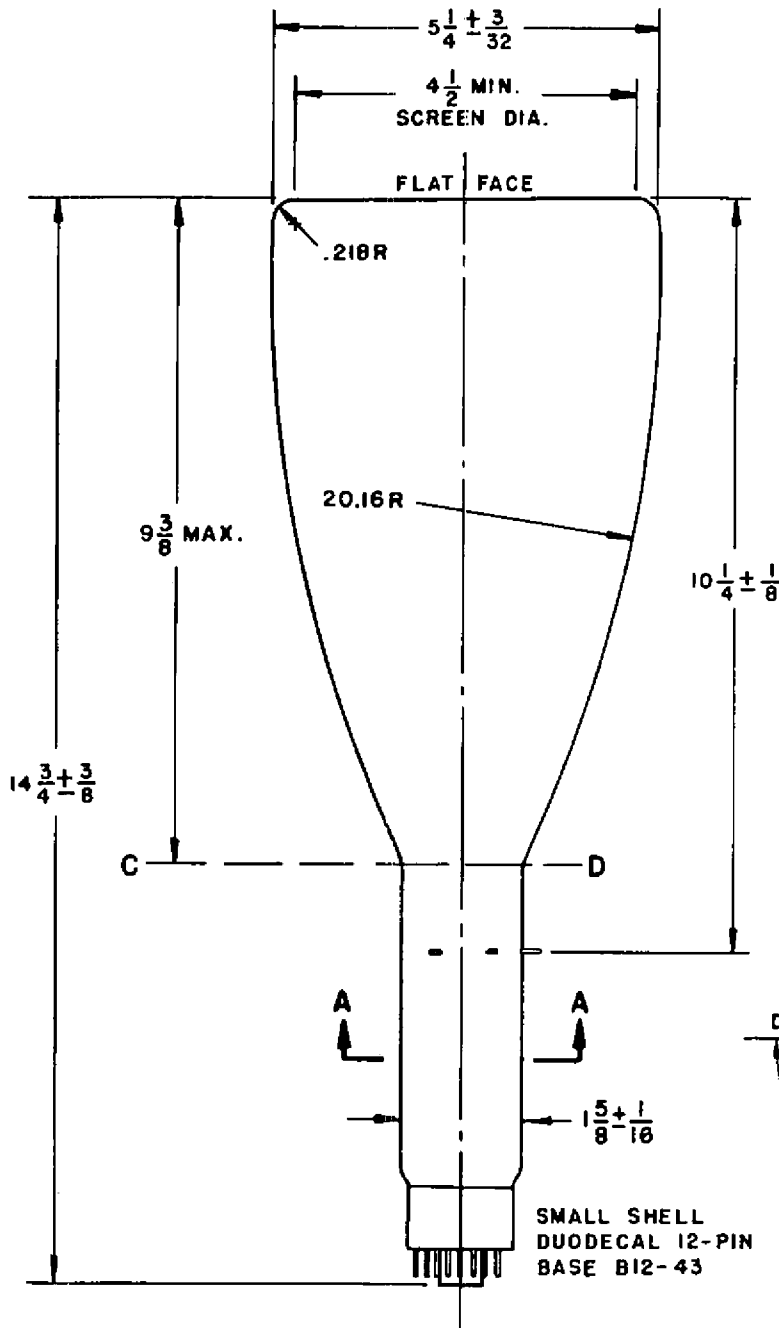
|                                          |                 |
|------------------------------------------|-----------------|
| Anode No. 2 Voltage .....                | 2750 Max. Volts |
| Anode No. 1 (Focusing) Voltage .....     | 1100 Max. Volts |
| Grid Voltage                             |                 |
| Negative Bias Value .....                | 220 Max. Volts  |
| Positive Bias Value .....                | 0 Max. Volts    |
| Positive Peak Value .....                | 2 Max. Volts    |
| Peak Voltage between Anode No. 2 and any |                 |
| Deflection Plate .....                   | 550 Max. Volts  |

#### Typical Operating Conditions

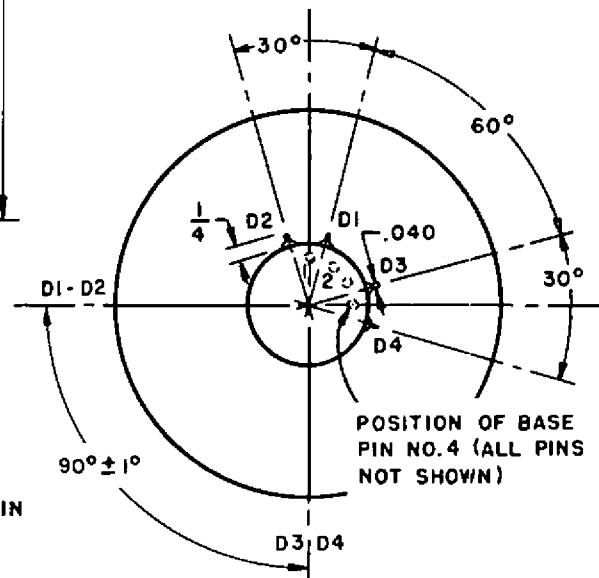
|                                                |                  |
|------------------------------------------------|------------------|
| Anode No. 2 Voltage .....                      | 1500 Volts       |
| Anode No. 1 (Focusing) Voltage .....           | 250 to 475 Volts |
| Maximum Grid Voltage Required for Cutoff ..... | -70 Volts        |
| Deflection Factors                             |                  |
| Deflecting Plates D1D2 {approx.} .....         | 49 Volts DC/Inch |
| Deflecting Plates D3D4 {approx.} .....         | 39 Volts DC/Inch |



## OUTLINE DRAWING



OUTER CONTACTS ON NECK  
INNER CONTACTS ON BASE



SECTION A-A

Brilliance and definition decrease with decreasing Anode No. 2 voltage. In general, Anode No. 2 voltage should not be less than 1000 volts. Angle between trace produced by plates D1-D2 and the plane through the tube axis and Pin. No. 4 does not exceed 10°. (Deflecting Plates 1-2 are nearer the screen.)

## 7AZP24 CATHODE RAY TUBE

The Continental 7AZP24 is a seven-inch, magnetically focused and deflected, cathode ray tube intended primarily for use in television flying-spot scanners where strong light output, high resolution, and an optically perfect faceplate are required. The faceplate of the 7AZP24 is carefully manufactured of non-browning glass to conform to a uniform standard of curvature and thickness. An accelerating potential of 30,000 volts produces a small spot size for very high resolution. Other screen phosphors may be obtained upon request.

### GENERAL CHARACTERISTICS

#### Electrical Data

|                                                 |                    |
|-------------------------------------------------|--------------------|
| Heater Voltage                                  | 6.3 Volts          |
| Heater Current                                  | 0.6±10% Amperes    |
| Focusing Method                                 | Magnetic           |
| Deflecting Method                               | Magnetic           |
| No-Ion-Trap Gun                                 | No Magnet Required |
| Deflection Angle, approximate                   | 57 Degrees         |
| Direct Interelectrode Capacitances, approximate |                    |
| Cathode to All Other Electrodes                 | 5 uuf              |
| Grid No. 1 to All Other Electrodes              | 7 uuf              |
| External Conductive Coating to Anode            |                    |
| Maximum                                         | 700 uuf            |
| Minimum                                         | 300 uuf            |

#### Optical Data

|              |                 |
|--------------|-----------------|
| Screen       | P24 Aluminized  |
| Fluorescence | Light Green     |
| Persistence  | Extremely Short |

#### Mechanical Data

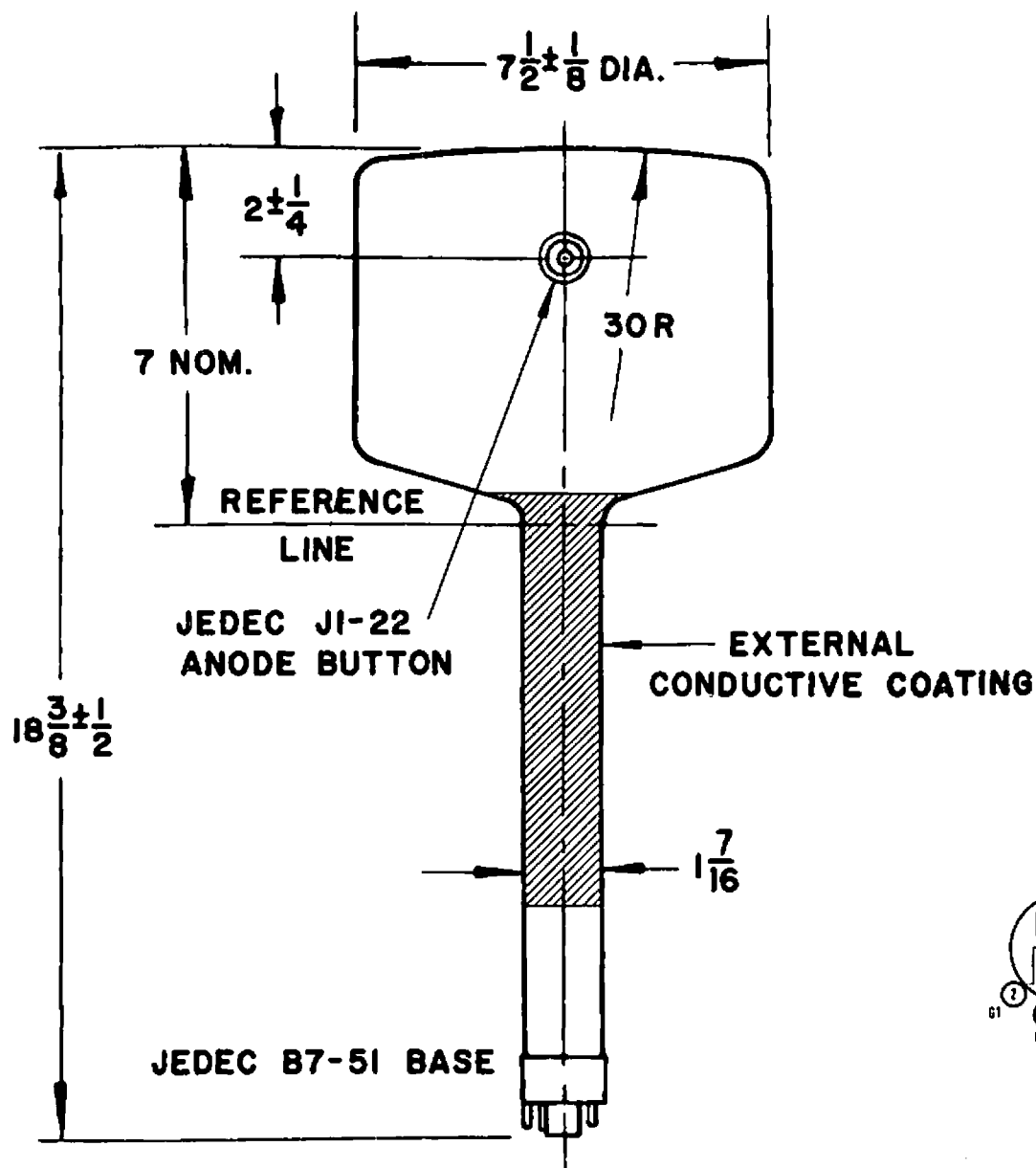
|                                |                                             |
|--------------------------------|---------------------------------------------|
| Over-all Length                | 18-3/8±1/2 Inches                           |
| Minimum Useful Screen Diameter |                                             |
| (Maximum Assured)              | 6.0 Inches                                  |
| Greatest Diameter of Bulb      | 7-1/2±1/8 Inches                            |
| Neck Length                    | 11-3/8 Inches                               |
| Bulb Contact                   | JEDEC No. J1-22                             |
| Base                           | Small Shell Duodecal 7-pin, JEDEC No. B7-51 |
| Basing                         | JEDEC Designation 12D                       |

#### Maximum Ratings (Absolute Maximum Ratings)

|                                           |                   |
|-------------------------------------------|-------------------|
| Anode Voltage                             | 30,000 Max. Volts |
| Grid No. 2 Voltage                        | 410 Max. Volts    |
| Grid No. 1 Voltage, Bias Value Range (DC) | -200 to 0 Volts   |
| Peak Heater-Cathode Voltage:              |                   |
| Heater negative with respect to cathode   | 125 Max. Volts    |
| Heater positive with respect to cathode   | 125 Max. Volts    |

#### Typical Operating Conditions

|                                             |                        |
|---------------------------------------------|------------------------|
| Anode Voltage                               | 27,000 to 30,000 Volts |
| Grid No. 2 Voltage                          | 300 Volts              |
| Grid No. 1 Voltage for Visual Extinction of |                        |
| Undelected, Focused Spot                    | -30 to -90 Volts       |

**OUTLINE DRAWING**


Note 1. Grid No. 3 is internally connected to the anode and is referred to herein as anode. When operating the tube at recommended anode voltages X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range.

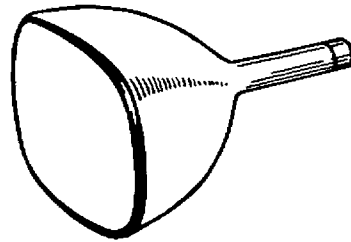
Note 2. Continuous operation at high heater to cathode voltage is not recommended.

Note 3. The anode contact aligns with vacant pin position no. 3  $\pm 10^\circ$ .

Note 4. External conductive coating must be grounded.

## ELECTRICAL DATA

|                                                  |                   |
|--------------------------------------------------|-------------------|
| Deflecting Method .....                          | Magnetic          |
| Focusing Method .....                            | Magnetic          |
| Deflection Angles, approximate                   |                   |
| Horizontal .....                                 | 65 Degrees        |
| Vertical .....                                   | 50 Degrees        |
| Diagonal .....                                   | 70 Degrees        |
| Direct Interelectrode Capacitances               |                   |
| Cathode to all other electrodes, approximate.... | 5 $\mu$ f         |
| Grid #1 to all other electrodes, approximate.... | 6 $\mu$ f         |
| External Conductive Coating to Anode .....       | 1500 max. $\mu$ f |
|                                                  | 750 min. $\mu$ f  |
| Heater Current at 6.3 volts .....                | 600 + 10% Ma      |
| Faceplate                                        |                   |
| Light Transmission, Approximate .....            | 72 percent        |



Low Anode Voltage  
Non-Ion Trap  
Aluminized  
High Resolution  
Magnetic Deflection  
Magnetic Focus

| Phosphor        | P1     | P2    | P4     | P7     | P11   | P12       | P19       | P25       |
|-----------------|--------|-------|--------|--------|-------|-----------|-----------|-----------|
| Fluorescence    | Green  | Green | White  | Blue   | Blue  | Orange    | Orange    | Orange    |
| Phosphorescence | —      | Green | —      | Yellow | —     | Orange    | Orange    | Orange    |
| Persistence     | Medium | Long  | Medium | Long   | Short | Med. Long | Very Long | Very Long |

## MECHANICAL DATA

|                                                             |                                               |
|-------------------------------------------------------------|-----------------------------------------------|
| Overall Length .....                                        | 19 $\frac{3}{16}$ $\pm$ $\frac{1}{16}$ Inches |
| Greatest Diameter of Tube .....                             | 16 $\frac{5}{16}$ $\pm$ $\frac{1}{16}$ Inches |
| Greatest Dimensions of Tube                                 |                                               |
| Diagonal .....                                              | 16 $\frac{5}{16}$ $\pm$ $\frac{1}{16}$ Inches |
| Width .....                                                 | 15 $\frac{5}{16}$ $\pm$ $\frac{1}{16}$ Inches |
| Height .....                                                | 12 $\frac{1}{4}$ $\pm$ $\frac{1}{16}$ Inches  |
| Minimum Useful Screen Dimensions (Projected)                |                                               |
| Diagonal .....                                              | 15 $\frac{5}{16}$ Inches                      |
| Horizontal axis .....                                       | 14 $\frac{1}{4}$ Inches                       |
| Vertical axis .....                                         | 10 $\frac{1}{4}$ Inches                       |
| Neck Length .....                                           | 7 $\frac{1}{2}$ $\pm$ $\frac{3}{16}$ Inches   |
| Bulb Contact .....                                          | J1-21                                         |
| Base .....                                                  | B5-57                                         |
| Basing .....                                                | 12N                                           |
| Bulb Contact Alignment                                      |                                               |
| J1-21 contact aligns with pin position #6 $\pm$ 30 Degrees  |                                               |
| Base Alignment                                              |                                               |
| Pin #6 aligns with horizontal picture axis $\pm$ 30 Degrees |                                               |

## RATINGS (Continued)

|                                         |           |
|-----------------------------------------|-----------|
| Maximum Heater-Cathode Voltage          |           |
| Heater negative with respect to cathode |           |
| During warm-up period not to exceed 15  |           |
| 15 seconds .....                        | 410 Volts |
| After equipment warm-up period.....     | 180 Volts |

## TYPICAL OPERATING CONDITIONS

### GRID DRIVE SERVICE

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

|                                      |                     |
|--------------------------------------|---------------------|
| Anode Voltage .....                  | 5000 Volts DC       |
| Grid #2 Voltage .....                | 300 Volts DC        |
| Grid #1 Voltage (Note 1) .....       | -28 to -72 Volts DC |
| Focusing Coil Current (Note 2) ..... | 60 Ma DC            |

## RATINGS

### (Design Maximum System)

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

|                                   |              |
|-----------------------------------|--------------|
| Maximum Anode Voltage .....       | 9000 Volts   |
| Minimum Anode Voltage .....       | 5000 Volts   |
| Maximum Grid #2 Voltage.....      | 500 Volts    |
| Grid #1 Voltage                   |              |
| Maximum Negative Value .....      | 140 Volts DC |
| Maximum Negative Peak Value ..... | 200 Volts    |
| Maximum Positive Value .....      | 0 Volts DC   |
| Maximum Positive Peak Value ..... | 2 Volts      |

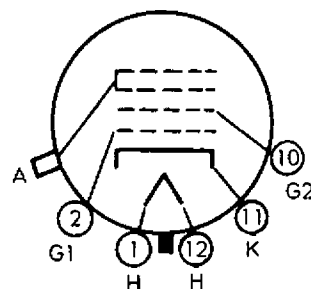
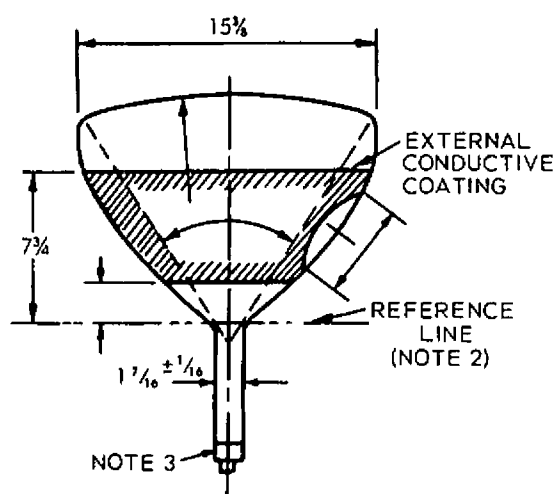
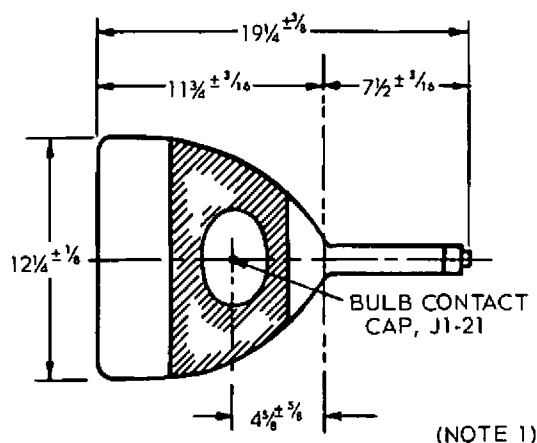
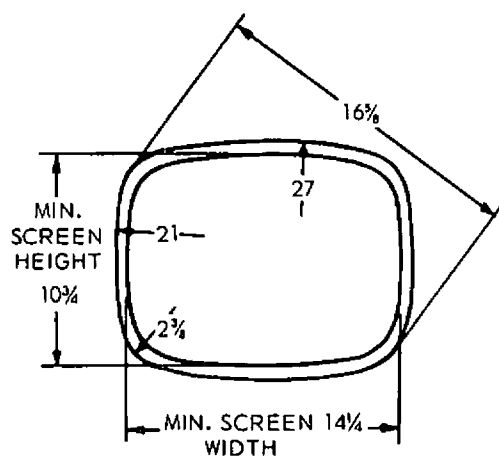
## MAXIMUM CIRCUIT VALUES

|                                         |             |
|-----------------------------------------|-------------|
| Maximum Grid #1 Circuit Resistance..... | 1.5 Megohms |
|-----------------------------------------|-------------|

## BASE CONNECTIONS

### Pin Connections

|                 |                     |
|-----------------|---------------------|
| Pin 1 : Heater  | Pin 11: Cathode     |
| Pin 2 : Grid #1 | Pin 12: Heater      |
| Pin 10: Grid #2 | Bulb Contact: Anode |



PIN 1: Heater  
PIN 2: Grid #1  
CAP: Anode  
PIN 10: Grid #2  
PIN 11: Cathode  
PIN 12: Heater

**NOTE 1:** The plane through the tube axis and Pin No. 6 may vary from the plane through the tube axis and cap by angular tolerance (measured about the tube axis) of  $\pm 30^\circ$ . Cap is on same side as Pin No. 6

**NOTE 2:** With tube neck inserted through flared end of reference-line gauge (JETEC No. 110) 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 1/2".

## ELECTRICAL DATA

|                                                  |                  |
|--------------------------------------------------|------------------|
| Deflecting Method.....                           | Magnetic         |
| Focusing Method.....                             | Magnetic         |
| Deflection Angles, Approximate                   |                  |
| Horizontal.....                                  | 65 Degrees       |
| Vertical.....                                    | 50 Degrees       |
| Diagonal.....                                    | 70 Degrees       |
| Direct Interelectrode Capacitances               |                  |
| Cathode to all other electrodes, approximate.... | 5 $\mu$ f        |
| Grid #1 to all other electrodes, approximate.... | 6 $\mu$ f        |
| External Conductive Coating to Anode.....        | 750 $\mu$ f      |
|                                                  | 500 $\mu$ f      |
| Heater Current at 6.3 volts.....                 | 600 $\pm$ 10% Ma |

## OPTICAL DATA

|                                                 |            |
|-------------------------------------------------|------------|
| Phosphor Number.....                            | P7         |
| Light Transmittance at Center, Approximate..... | 66 Percent |

## MECHANICAL DATA

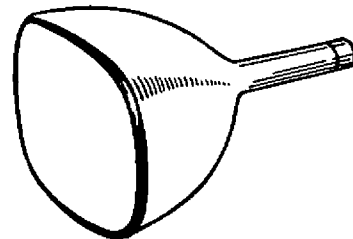
|                                                             |                                               |
|-------------------------------------------------------------|-----------------------------------------------|
| Overall Length.....                                         | 23 $\pm$ $\frac{1}{8}$ Inches                 |
| Greatest Dimensions of Tube                                 |                                               |
| Diagonal.....                                               | 21 $\frac{7}{32}$ $\pm$ $\frac{3}{16}$ Inches |
| Width.....                                                  | 21 $\frac{1}{4}$ $\pm$ $\frac{3}{16}$ Inches  |
| Height.....                                                 | 15 $\frac{1}{16}$ $\pm$ $\frac{3}{16}$ Inches |
| Neck Length.....                                            | 7 $\frac{1}{2}$ $\pm$ $\frac{3}{16}$ Inches   |
| Bulb.....                                                   | J170-Al                                       |
| Bulb Contact.....                                           | J1-21                                         |
| Base.....                                                   | B5-57                                         |
| Basing.....                                                 | 12N                                           |
| Bulb Contact Alignment                                      |                                               |
| J1-21 contact aligns with pin position #6 $\pm$ 30 Degrees  |                                               |
| Base Alignment                                              |                                               |
| Pin #6 aligns with horizontal picture axis $\pm$ 30 Degrees |                                               |

## RATINGS

### (Design Maximum System)

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

|                                  |              |
|----------------------------------|--------------|
| Maximum Anode Voltage.....       | 9000 Volts   |
| Minimum Anode Voltage.....       | 5000 Volts   |
| Maximum Grid #2 Voltage.....     | 500 Volts    |
| Grid #1 Voltage                  |              |
| Maximum Negative Value.....      | 140 Volts DC |
| Maximum Negative Peak.....       | 200 Volts    |
| Maximum Positive Value.....      | 0 Volts DC   |
| Maximum Positive Peak Value..... | 2 Volts      |



Low Anode Voltage

Non-Ion Trap

Aluminized

High Resolution

Magnetic Deflection

Magnetic Focus

## TYPICAL OPERATING CONDITIONS

### GRID DRIVE SERVICE

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

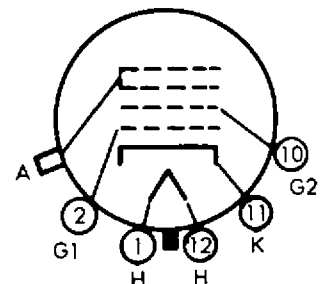
|                                     |                     |
|-------------------------------------|---------------------|
| Anode Voltage.....                  | 5000 Volts DC       |
| Grid #2 Voltage.....                | 300 Volts DC        |
| Grid #1 Voltage (Note 1).....       | -28 to -72 Volts DC |
| Focusing Coil Current (Note 2)..... | 95 Ma DC            |

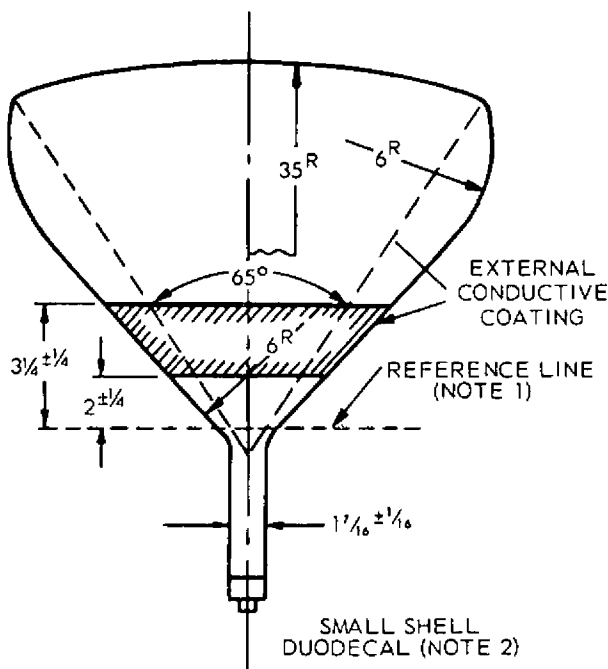
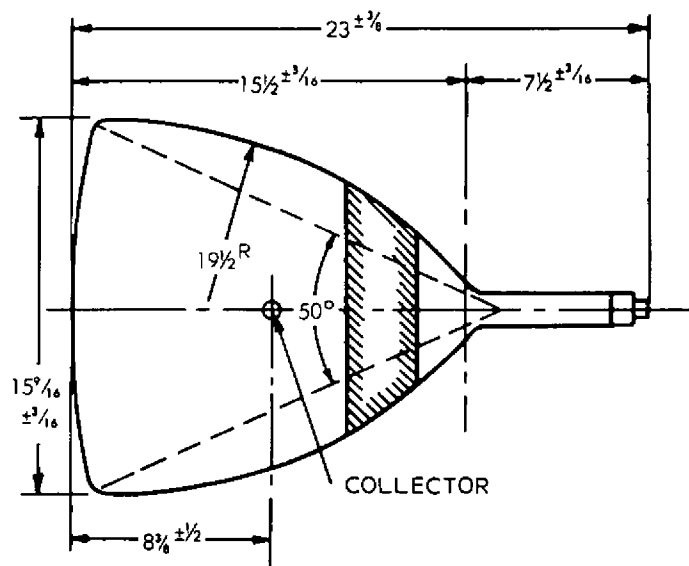
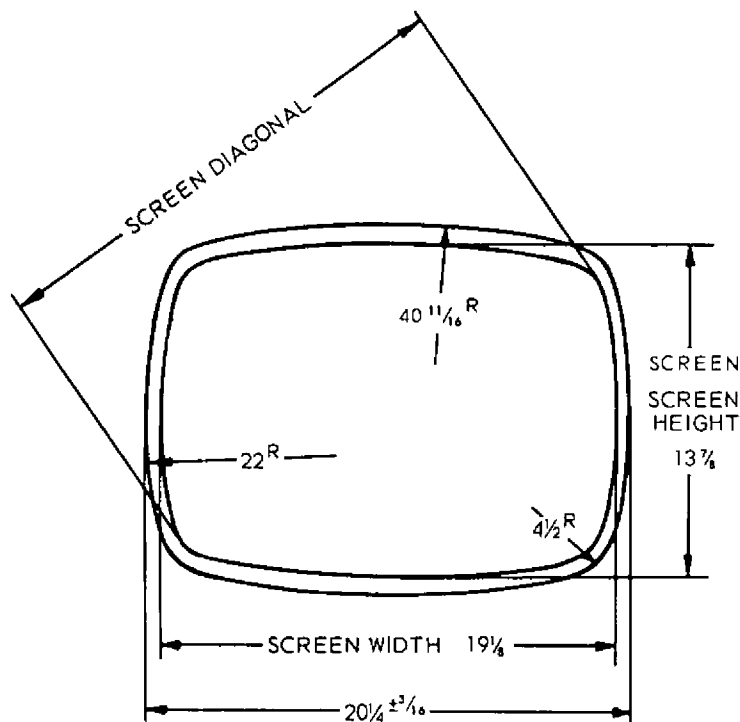
## MAXIMUM CIRCUIT VALUES

|                                         |             |
|-----------------------------------------|-------------|
| Maximum Grid #1 Circuit Resistance..... | 1.5 Megohms |
|-----------------------------------------|-------------|

## BASE CONNECTIONS

Pin 1 : Heater  
Pin 2 : Grid #1  
Pin 10: Grid #2  
Pin 11: Cathode  
Pin 12: Heater  
Bulb Contact: Anode





**NOTE 1:** With tube neck inserted through flared end of reference line gauge (JETEC No. 110) and with tube seated in gauge, the reference line is determined by the inter-section of the plane CS' of the gauge with the glass funnel.

**NOTE 2:** Socket for the 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".

SECURITY CLASSIFICATION  
Unclassified

Reservation No. 5528  
Reservation Date Aug. 20, 1946

Registration No. \_\_\_\_\_  
Registration Date \_\_\_\_\_

TYPE 5528

THYRATRON

GENERAL CHARACTERISTICS

- (a) Xenon-filled  
(b) 1 control grid

ELECTRICAL

|                                                          |                   |
|----------------------------------------------------------|-------------------|
| (c) Filament or Cathode                                  | Oxide coated      |
| Voltage                                                  | <u>2.5</u> Volts  |
| Current                                                  | <u>21</u> Amps.   |
| Heating Time                                             | <u>60</u> Sec.    |
| Approximate Tube Voltage Drop                            | <u>12</u> Volts   |
| Approximate Deionization Time                            | <u>*</u>          |
| (g) Grid Characteristics with all returns to center tap. |                   |
| Critical Grid Voltage at rated voltage                   | <u>-2</u> Volts   |
| " " " " " " 100 volts                                    | <u>-0.5</u> Volts |
| Critical Anode Voltage at 13 volts                       | <u>75</u> Volts   |

MECHANICAL

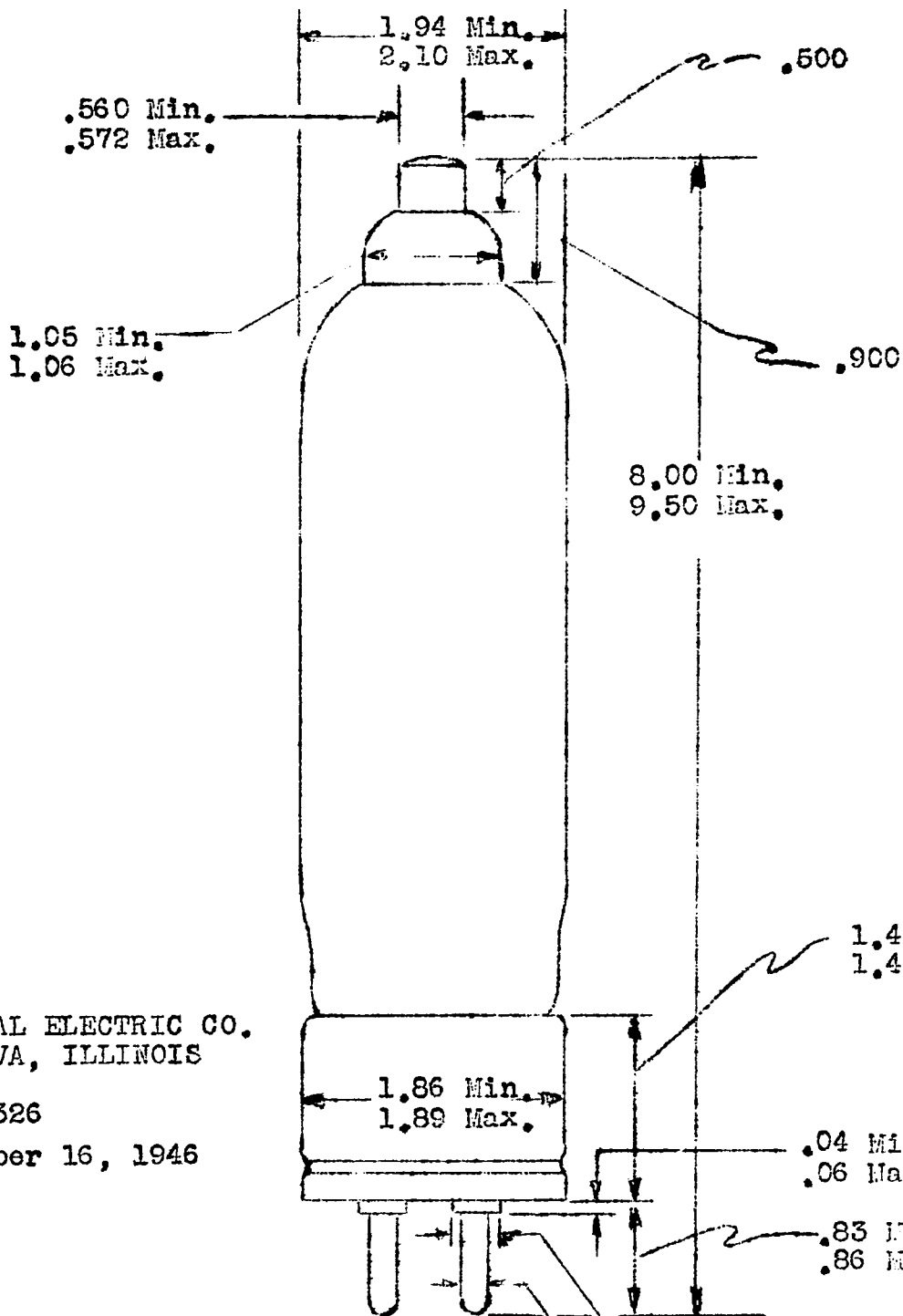
|                                |                                      |
|--------------------------------|--------------------------------------|
| (d) Type of cooling            | <u>Convection</u>                    |
| (e) Temperature Limits         | <u>-50 to 170</u>                    |
| Mounting position              | <u>Upright, base down</u>            |
| (f) Base                       | <u>See drawing</u>                   |
| (f) Cap                        | <u>See drawing</u>                   |
| (f) Base Connections           | <u>See drawing</u>                   |
| (i) Maximum Overall Dimensions |                                      |
| Length                         | <u>9<math>\frac{1}{2}</math></u> IN. |
| Diameter                       | <u>2.1</u> IN.                       |

MAXIMUM RATINGS

|                                  |                  |
|----------------------------------|------------------|
| Peak Inverse Voltage             | <u>500</u> Volts |
| Peak Forward Voltage             | <u>350</u> Volts |
| Peak Anode Current               | <u>77</u> Amps.  |
| Average Anode Current            | <u>6.4</u> Amps. |
| Averaging Time for Anode Current | <u>15</u> Sec.   |

Sponsor CONTINENTAL ELECTRIC COMPANY  
Date September 16, 1946 By John H. Hutchings

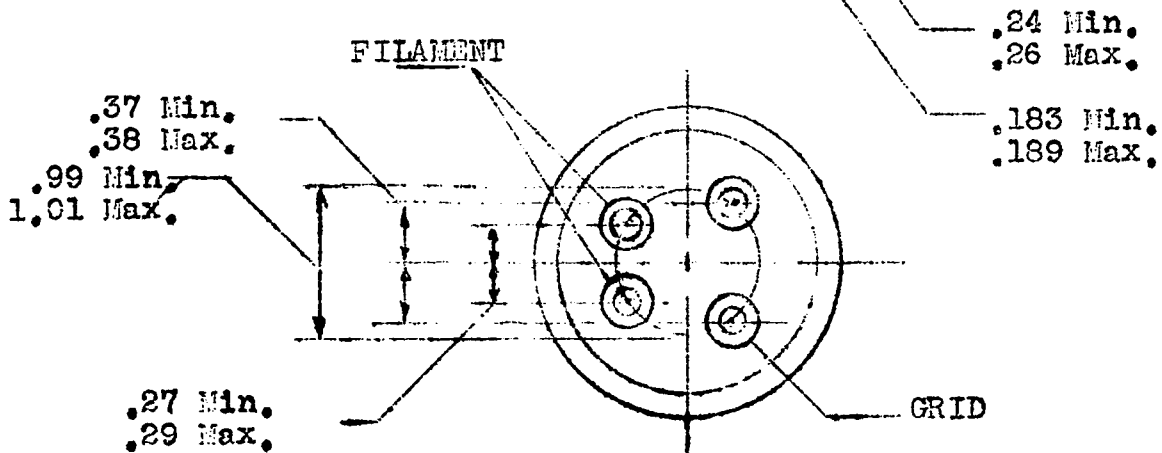
\*Operation should be satisfactory in a half-wave, grid controlled rectifier test at 125 vac, 2800 cps, 5 amps d.c., resistance load.



CONTINENTAL ELECTRIC CO.  
GENEVA, ILLINOIS

CE-326

September 16, 1946



sponsor: Continental Electric Co.

JULY 10, 1947

**GAS FILLED PHOTOTUBES**

5612; 5613; 5614; 5615; 5616; 5617

ELECTRICAL DATA

Spectral Response .....S4  
 Luminous Sensitivity at 100 volts ..... 0 cycles  
 (Light source temperature 2870°K; 1 megohm series  
 resistance; one week after seasoning)

| Type    | 5612 | 5613 | 5614 | 5615 | 5616 | 5617 |            |
|---------|------|------|------|------|------|------|------------|
| Minimum | 90   | 180  | 90   | 180  | 80   | 160  | μamp/lumen |
| Bogle   | 135  | 240  | 135  | 240  | 110  | 220  | μamp/lumen |
| Maximum | 180  | 300  | 180  | 300  | 160  | 280  | μamp/lumen |

Wavelength of the most useful maximum in the spectral  
 distribution curve..... 4,000 ± 500 Å

Sensitivity of Maximum Response

| Type | 5612  | 5613  | 5614  | 5615  | 5616 | 5617 |            |
|------|-------|-------|-------|-------|------|------|------------|
|      | 0.125 | 0.220 | 0.125 | 0.220 | 0.10 | 0.20 | μamp/μwatt |

Dark Current at 100 volts .....0.050 μamp  
 Gas Amplification .....5.5

MECHANICAL DATAWindow Dimensions

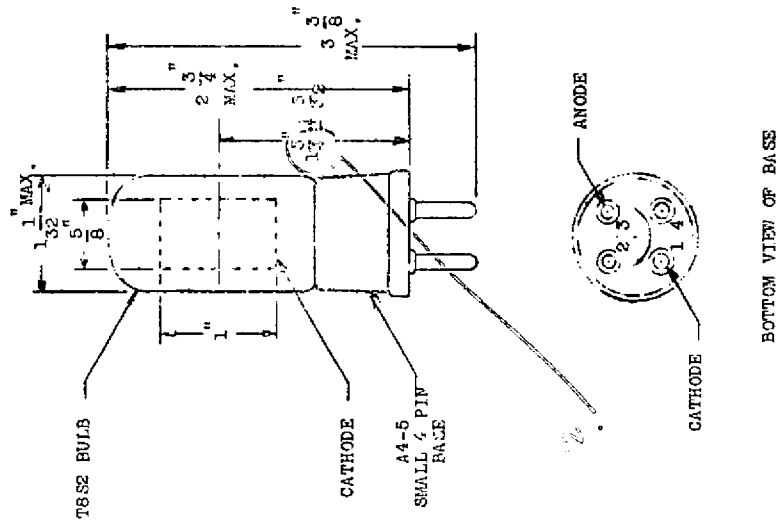
| Type                           | 5612     | 5613     | 5614     | 5615     | 5616   | 5617   |
|--------------------------------|----------|----------|----------|----------|--------|--------|
| Width                          | 1 1/16"  | 1 1/16"  | 1 1/16"  | 1 1/16"  | 5/8"   | 5/8"   |
| Height                         | 1 5/8"   | 1 5/8"   | 1 5/8"   | 1 5/8"   | 1"     | 1"     |
| Seated Ht. to<br>Window Centre | 2 31/32" | 2 31/32" | 2 21/32" | 2 21/32" | 1 3/4" | 1 3/4" |

| Basing | -- | -- | 2J | 2J | 2J | 2J |
|--------|----|----|----|----|----|----|
|--------|----|----|----|----|----|----|

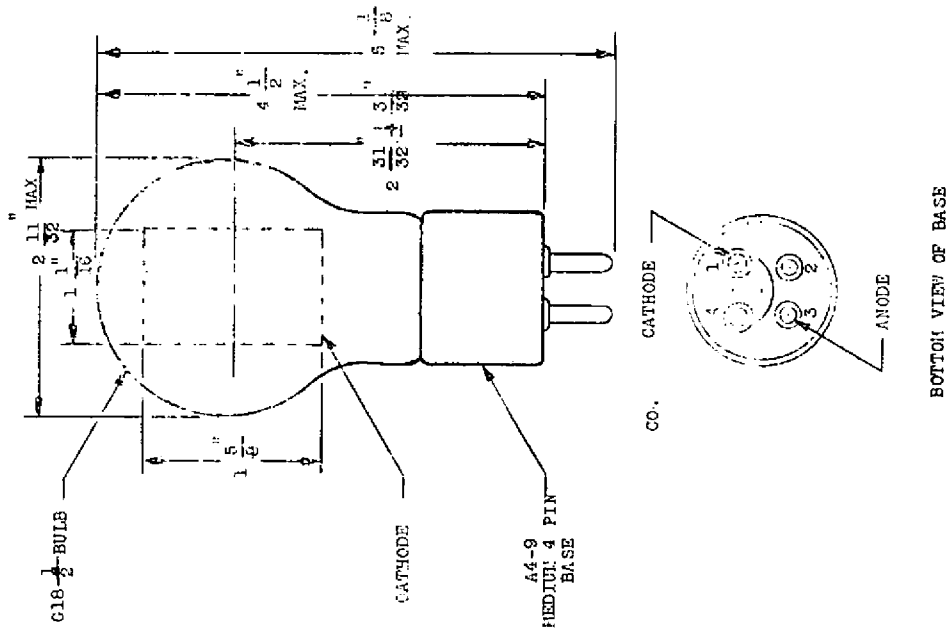
MAXIMUM RATINGS

| Type                         | 5612 | 5613 | 5614 | 5615 | 5616 | 5617 |                      |
|------------------------------|------|------|------|------|------|------|----------------------|
| Anode voltage(dc or peak ac) | 110  | 110  | 110  | 110  | 100  | 100  | volts                |
| Average cathode current      | 10   | 10   | 10   | 10   | 4    | 4    | μamp                 |
| Peak cathode Current Density | 100  | 100  | 100  | 100  | 100  | 100  | μamp/in <sup>2</sup> |
| Ambient Temperature          | 75   | 75   | 75   | 75   | 75   | 75   | °C.                  |

TYPES 5616, 5617



TYPES 5614, 5615



TYPES 5612, 5613

