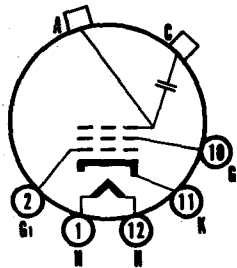
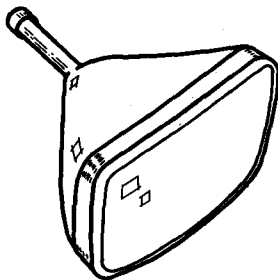


# SYLVANIA TYPE 21ACP4A/21AMP4A/21BSP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

|                             |                       |
|-----------------------------|-----------------------|
| 21" Direct Viewed           | Magnetic Deflection   |
| Rectangular Glass Type      | Magnetic Focus        |
| Gray Filter Glass           | Spherical Faceplate   |
| External Conductive Coating | Single Field Ion Trap |
| Aluminized Screen           |                       |



## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Magnetic          |
| Deflecting Method.....             | Magnetic          |
| Deflection Angles (approx.)        |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | Aluminized P4     |
| Fluorescence.....                  | White             |
| Persistence.....                   | Short to Medium   |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 74 Per cent       |

### ELECTRICAL DATA

|  |                              |
|--|------------------------------|
| Heater Voltage.....                          | 6.3 Volts                    |
| Heater Current.....                          | 0.6 ± 5% Amperes             |
| Direct Interelectrode Capacitances (approx.) |                              |
| Cathode to All Other Electrodes.....         | 5 μf                         |
| Grid No. 1 to All Other Electrodes.....      | 6 μf                         |
| External Conductive Coating to Anode.....    | 2500 μf Max.<br>2000 μf Min. |
| Ion Trap Magnet.....                         | External, Single Field Type  |

### MECHANICAL DATA

|   |                        |
|---|------------------------|
| Minimum Useful Screen Dimensions.....         | 19 1/4 x 15 1/4 Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21                  |
| Base (Small Shell Duodecal 5-Pin).....        | B5-57                  |
| Basing.....                                   | 12N                    |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|  |                  |
|--|------------------|
| Anode Voltage.....                           | 22,000 Volts d c |
| Grid No. 2 Voltage.....                      | 550 Volts d c    |
| Grid No. 1 Voltage.....                      |                  |
| Negative Bias Value.....                     | 155 Volts d c    |
| Negative Peak Value.....                     | 220 Volts        |
| Positive Bias Value.....                     | 0 Volts d c      |
| Positive Peak Value.....                     | 2 Volts          |
| Peak Heater-Cathode Voltage                  |                  |
| Heater Negative with Respect to Cathode      |                  |
| During Warm-up Period not to Exceed          |                  |
| 15 Seconds.....                              | 450 Volts        |
| After Equipment Warm-up Period.....          | 200 Volts        |
| Heater Positive with Respect to Cathode..... | 200 Volts        |

### TYPICAL OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....  | 16,000 Volts d c     |
| Grid No. 2 Voltage.....                                   | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>2</sup> ..... | -28 to -72 Volts d c |
| Focusing Coil Current <sup>2</sup> .....                  | 116 ± 15% Ma d c     |
| Ion Trap Magnet Strength (approx.).....                   | 33 ± 3 Gauss         |

## SYLVANIA PICTURE TUBES

Issued as a supplement to the manual in Sylvania News for February 1957

# 21ACP4A/21AMP4A/21BSP4

(Cont'd)

## CIRCUIT VALUES

Grid No. 1 Circuit Resistance..... 1.5 Megohms Max.

## NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
3. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a  $19\frac{1}{8} \times 15\frac{1}{8}$  inch picture area sharply focused at center of screen.

## WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

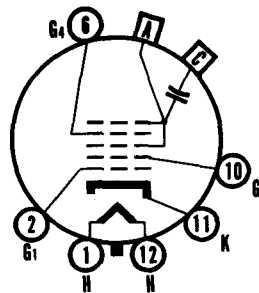
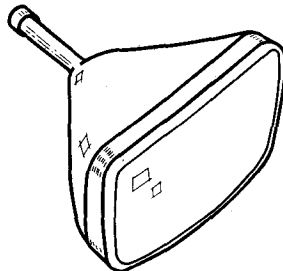
SYLVANIA PICTURE TUBES

# SYLVANIA TYPE 21BTP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

21" Direct Viewed                      Magnetic Deflection  
 Rectangular Glass Type              Electrostatic Focus  
 Gray Filter Glass                      Spherical Faceplate  
 External Conductive Coating      Single Field Ion Trap  
 Aluminized Screen



12-L

## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Electrostatic     |
| Deflection Method.....             | Magnetic          |
| Deflection Angles (approx.)        |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | Aluminized P4     |
| Fluorescence.....                  | White             |
| Persistence.....                   | Short to Medium   |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 74 Percent        |

### ELECTRICAL DATA

|   |                                |
|---|--------------------------------|
| Heater Voltage.....                                     | 6.3 Volts                      |
| Heater Current.....                                     | 0.6 ± 5% Ampere                |
| Heater Warm-up Time <sup>1</sup> .....                  | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.)            |                                |
| Cathode to All Other Electrodes.....                    | 5 μmf                          |
| Grid No. 1 to All Other Electrodes.....                 | 6 μmf                          |
| External Conductive Coating to Anode <sup>2</sup> ..... | 2500 μmf Max.<br>2000 μmf Min. |
| Ion Trap Magnet.....                                    | External, Single Field Type    |

### MECHANICAL DATA

|   |                        |
|---|------------------------|
| Minimum Useful Screen Dimensions.....         | 19 1/8 x 15 1/8 Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21                  |
| Base (Small Shell Duodecal 6-Pin).....        | B6-63                  |
| Basing.....                                   | 12L                    |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|  |                         |
|--|-------------------------|
| Anode Voltage.....                           | 22,000 Volts d c        |
| Grid No. 4 Voltage.....                      | -550 to +1100 Volts d c |
| Grid No. 2 Voltage.....                      | 550 Volts d c           |
| Grid No. 1 Voltage.....                      |                         |
| Negative Bias Value.....                     | 155 Volts d c           |
| Negative Peak Value.....                     | 220 Volts               |
| Positive Bias Value.....                     | 0 Volts d c             |
| Positive Peak Value.....                     | 2 Volts                 |
| Peak Heater-Cathode Voltage.....             |                         |
| Heater Negative with Respect to Cathode      |                         |
| During Warm-up Period not to Exceed          |                         |
| 15 Seconds.....                              | 450 Volts               |
| After Equipment Warm-up Period.....          | 200 Volts               |
| Heater Positive with Respect to Cathode..... | 200 Volts               |

## SYLVANIA PICTURE TUBES

Issued as a supplement to the manual in Sylvania News for June 1957

# 21BTP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS

|   |                       |
|---|-----------------------|
| Anode Voltage.....                          | 16,000 Volts d c      |
| Grid No. 4 Voltage for Focus.....           | -64 to +352 Volts d c |
| Grid No. 2 Voltage.....                     | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff..... | -28 to -72 Volts d c  |
| Ion Trap Magnet Strength.....               | 33 ± 3 Gaussses Min.  |

## CIRCUIT VALUES

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

## NOTES:

1. Heater warm-up time is the time required for the voltage across the heater terminals to increase to 5.0 volts in the JETEC test circuit, with E = 25 volts and series R = 31.5 ohms.
2. External conductive coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

## WARNING:

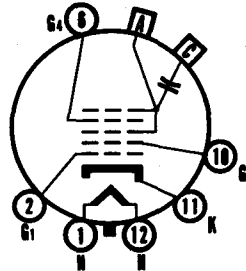
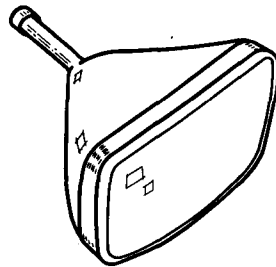
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21CBP4 21CBP4A

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

21" Direct Viewed      Magnetic Deflection  
 Rectangular Glass Type      Electronic Focus  
 Spherical Faceplate      No Ion Trap  
 Gray Filter Glass      External Conductive Coating  
 Aluminized Screen



12-L

## CHARACTERISTICS

### GENERAL DATA

|                                     |                   |
|-------------------------------------|-------------------|
| Focusing Method .....               | Electrostatic     |
| Deflection Method .....             | Magnetic          |
| Deflection Angles (approx.)         |                   |
| Horizontal .....                    | 85 Degrees        |
| Diagonal .....                      | 90 Degrees        |
| Phosphor .....                      | Aluminized P4     |
| Fluorescence .....                  | White             |
| Persistence .....                   | Short to Medium   |
| Faceplate .....                     | Gray Filter Glass |
| Light Transmittance (approx.) ..... | 74 Percent        |

### ELECTRICAL DATA

|   |                                |
|---|--------------------------------|
| Heater Voltage .....                                    | 6.3 Volts                      |
| Heater Current .....                                    | 0.6 ± 5% Ampere                |
| Heater Warm-up Time <sup>1</sup> .....                  | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.)            |                                |
| Cathode to All Other Electrodes .....                   | 5 μmf                          |
| Grid No. 1 to All Other Electrodes .....                | 6 μmf                          |
| External Conductive Coating to Anode <sup>2</sup> ..... | 2500 μmf Max.<br>2000 μmf Min. |

### MECHANICAL DATA

|  |                        |
|--|------------------------|
| Minimum Useful Screen Dimensions .....         | 19 1/8 x 15 1/8 Inches |
| Nominal Overall Length .....                   | 18 Inches              |
| Minimum Useful Screen Area .....               | 262 Square Inches      |
| Bulb Contact (Recessed Small Cavity Cap) ..... | J1-21                  |
| Base (Small Shell Duodecal 6-Pin) .....        | B6-63                  |
| Basing .....                                   | 12L                    |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|   |                         |
|---|-------------------------|
| Anode Voltage .....                           | 22,000 Volts d c        |
| Grid No. 4 Voltage (Focusing Electrode) ..... | -550 to +1100 Volts d c |
| Grid No. 2 Voltage .....                      | 550 Volts d c           |
| Grid No. 1 Voltage .....                      |                         |
| Negative Bias Value .....                     | 155 Volts d c           |
| Negative Peak Value .....                     | 220 Volts               |
| Positive Bias Value .....                     | 0 Volts d c             |
| Positive Peak Value .....                     | 2 Volts                 |
| Peak Heater-Cathode Voltage                   |                         |
| Heater Negative with Respect to Cathode       |                         |
| During Warm-up Period Not to Exceed           |                         |
| 15 Seconds .....                              | 450 Volts               |
| After Equipment Warm-up Period .....          | 200 Volts               |
| Heater Positive with Respect to Cathode ..... | 200 Volts               |

## SYLVANIA PICTURE TUBES

Issued as a supplement to the manual in Sylvania News for April, 1958

**SYLVANIA TYPE 21CBP4 (Cont'd)**  
**21CBP4A**

**TYPICAL OPERATING CONDITIONS**

|   |                       |
|---|-----------------------|
| Anode Voltage.....                          | 16,000 Volts d c      |
| Grid No. 4 Voltage.....                     | -50 to +350 Volts d c |
| Grid No. 2 Voltage.....                     | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff..... | -28 to -72 Volts d c  |

**CIRCUIT VALUES**

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

**NOTES:**

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of the rated heater voltage after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times the rated heater voltage divided by the rated heater current.
2. External conductive coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

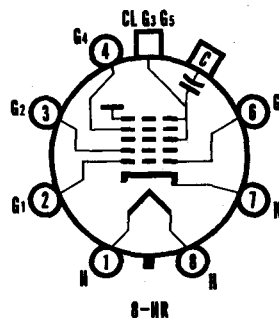
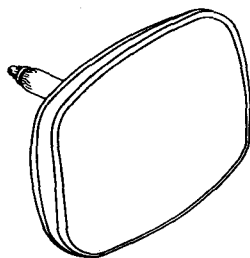
**WARNING:**

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21CEP4

## TELEVISION PICTURE TUBE

|                             |                          |
|-----------------------------|--------------------------|
| 21" Direct Viewed           | Aluminized Screen        |
| Very Short Length           | Electrostatic Focus      |
| Rectangular Glass Type      | 110° Magnetic Deflection |
| Spherical Faceplate         | 1 1/8" Neck Diameter     |
| Gray Filter Glass           | No Ion Trap              |
| External Conductive Coating |                          |



## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Electrostatic     |
| Deflecting Method.....             | Magnetic          |
| Deflection Angles (approx.)        |                   |
| Horizontal.....                    | 105 Degrees       |
| Diagonal.....                      | 110 Degrees       |
| Vertical.....                      | 87 Degrees        |
| Phosphor.....                      | Aluminized P4     |
| Fluorescence.....                  | White             |
| Persistence.....                   | Short to Medium   |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 74 Percent        |

### ELECTRICAL DATA

|   |                              |
|---|------------------------------|
| Heater Voltage.....                                     | 6.3 Volts                    |
| Heater Current.....                                     | 0.6 ± 5% Ampere              |
| Heater Warm-up Time <sup>1</sup> .....                  | 11 Seconds                   |
| Direct Interelectrode Capacitance (approx.)             |                              |
| Cathode to All Other Electrodes.....                    | 5 μf                         |
| Grid No. 1 to All Other Electrodes.....                 | 6 μf                         |
| External Conductive Coating to Anode <sup>2</sup> ..... | 2500 μf Max.<br>2000 μf Min. |

### MECHANICAL DATA

|  |                        |
|--|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured)..... | 19 1/8 x 15 1/4 Inches |
| Nominal Over-all Length.....                               | 14 1/2 Inches          |
| Minimum Useful Screen Area.....                            | 262 Square Inches      |
| Bulb.....  | J 171 H1 or Equivalent |
| Bulb Contact (Recessed Small Cavity Cap).....              | J1-21                  |
| Base.....  | B7-183                 |
| Basing.....  | 8HR                    |
| Weight (approx.).....                                      | 21 Pounds              |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|   |  |
|---|--|
| Anode Voltage <sup>3</sup> .....                | 19,800 Volts dc Max.<br>11,000 Volts dc Max. |
| Grid No. 4 Voltage<br>(Focusing Electrode)..... | -550 to +1100 Volts dc Max.                  |
| Grid No. 2 Voltage.....                         | 550 Volts dc Max.                            |
| Grid No. 1 Voltage                              |  |
| Negative Bias Value.....                        | 154 Volts dc Max.                            |
| Negative Peak Value.....                        | 220 Volts Max.                               |
| Positive Bias Value.....                        | 0 Volts dc Max.                              |
| Positive Peak Value.....                        | 2 Volts Max.                                 |

## SYLVANIA PICTURE TUBES

Issued as a supplement to the manual in Sylvania News for Nov.-Dec. 1957

## SYLVANIA TYPE 21CEP4 (Cont'd)

|   |                |
|---|----------------|
| Peak Heater-Cathode Voltage             |                |
| Heater Negative with Respect to Cathode |                |
| During Warm-up Period                   |                |
| Not to Exceed 15 Seconds                | 450 Volts Max. |
| After Equipment Warm-up Period          | 200 Volts Max. |
| Heater Positive with Respect to Cathode | 200 Volts Max. |

### TYPICAL OPERATING CONDITIONS

|  |                          |
|--|--------------------------|
| Anode Voltage                          | 16,000 Volts dc Max.     |
| Grid No. 4 Voltage for Focus           | 0 to 400 Volts dc Max.   |
| Grid No. 2 Voltage                     | 300 Volts dc Max.        |
| Grid No. 1 Voltage Required for Cutoff | -35 to -72 Volts dc Max. |

### CIRCUIT VALUES

|                               |                  |
|-------------------------------|------------------|
| Grid No. 1 Circuit Resistance | 1.5 Megohms Max. |
|-------------------------------|------------------|

### NOTES:

1. Heater Warm-up Time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times rated heater voltage divided by rated heater current.
2. External conductive coating must be grounded.
3. Operation outside the limits shown will impair the serviceability of the tube from the viewpoint of life and satisfactory performance.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

### WARNING:

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

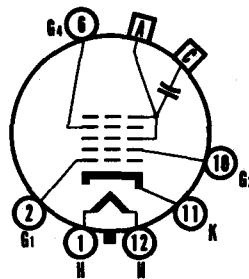
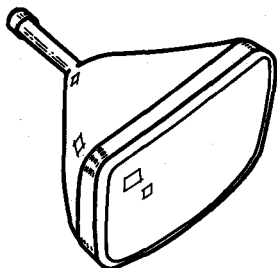


# SYLVANIA TYPE 21CMP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

|                        |                             |
|------------------------|-----------------------------|
| 21" Direct Viewed      | Magnetic Deflection         |
| Rectangular Glass Type | Electrostatic Focus         |
| Spherical Faceplate    | Single Field Ion Trap       |
| Gray Filter Glass      | External Conductive Coating |
| Aluminized Screen      |                             |



12-L

## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Electrostatic     |
| Deflection Method.....             | Magnetic          |
| Deflection Angles (approx.)        |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | Aluminized P4     |
| Fluorescence.....                  | White             |
| Persistence.....                   | Short to Medium   |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 74 Percent        |

### ELECTRICAL DATA

|   |                                |
|---|--------------------------------|
| Heater Voltage.....                                     | 6.3 Volts                      |
| Heater Current.....                                     | 0.6 ± 5% Ampere                |
| Heater Warm-up Time.....                                | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.)            |                                |
| Cathode to All Other Electrodes.....                    | 5 μmf                          |
| Grid No. 1 to All Other Electrodes.....                 | 6 μmf                          |
| External Conductive Coating to Anode <sup>2</sup> ..... | 2500 μmf Max.<br>2000 μmf Min. |
| Ion Trap Magnet.....                                    | External, Single Field Type    |

### MECHANICAL DATA

|  |                        |
|--|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured)..... | 19 1/8 x 15 1/8 Inches |
| Nominal Overall Length.....                                | 19 Inches              |
| Minimum Useful Screen Area.....                            | 262 Square Inches      |
| Bulb Contact (Recessed Small Cavity Cap).....              | J1-21                  |
| Base (Small Shell Duodecal 6-Pin).....                     | B6-63                  |
| Basing.....  | 12L                    |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|  |                         |
|--|-------------------------|
| Anode Voltage.....                           | 22,000 Volts d c        |
| Grid No. 4 Voltage (Focusing Electrode)..... | -550 to +1100 Volts d c |
| Grid No. 2 Voltage.....                      | 550 Volts d c           |
| Grid No. 1 Voltage.....                      |                         |
| Negative Bias Value.....                     | 155 Volts d c           |
| Negative Peak Value.....                     | 220 Volts               |
| Positive Bias Value.....                     | 0 Volts d c             |
| Positive Peak Value.....                     | 2 Volts                 |
| Peak Heater-Cathode Voltage                  |                         |
| Heater Negative with Respect to Cathode      |                         |
| During Warm-up Period Not to                 |                         |
| Exceed 15 Seconds.....                       | 450 Volts               |
| After Equipment Warm-up Period.....          | 200 Volts               |
| Heater Positive with Respect to Cathode..... | 200 Volts               |

SYLVANIA PICTURE TUBES

## SYLVANIA TYPE 21CMP4 (Cont'd)

### TYPICAL OPERATING CONDITIONS

|   |                       |
|---|-----------------------|
| Anode Voltage.....  | 16,000 Volts d c      |
| Grid No. 4 Voltage for Focus.....                         | -64 to +352 Volts d c |
| Grid No. 2 Voltage.....                                   | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff <sup>1</sup> ..... | -35 to -72 Volts d c  |
| Ion Trap Magnet Current (Average) <sup>4</sup> .....      | 30 Ma d c             |
| Field Strength of PM Ion Trap Magnet <sup>5</sup> .....   | 33 Gaussess Min.      |

### CIRCUIT VALUES

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

### NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times rated heater voltage divided by rated heater current.
2. External conductive coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
4. For JETEC Ion Trap Magnet No. 117 with pole pieces centered over Grid No. 2 on mount, and rotated for maximum brightness.
5. For typical PM ion trap magnet with field strength tolerance of  $\pm 3$  gaussess.

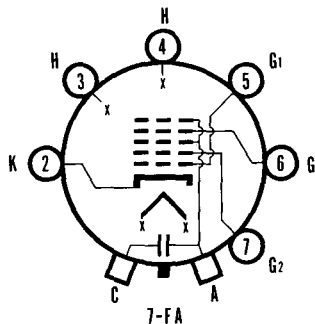
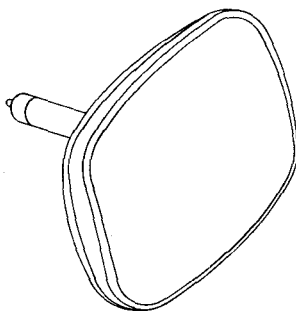
### WARNING:

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21CQP4

## TELEVISION PICTURE TUBE

|                             |                          |
|-----------------------------|--------------------------|
| 21" Direct Viewed           | Aluminized Screen        |
| Rectangular Glass Type      | Electrostatic Focus      |
| Lightweight Tube            | 110° Magnetic Deflection |
| Spherical Faceplate         | 1 1/8" Neck Diameter     |
| Gray Filter Glass           | No Ion Trap              |
| External Conductive Coating |                          |



## CHARACTERISTICS

### GENERAL DATA

|                               |                   |
|-------------------------------|-------------------|
| Focusing Method               | Electrostatic     |
| Deflection Method             | Magnetic          |
| Deflection Angles (approx.)   |                   |
| Horizontal                    | 105 Degrees       |
| Diagonal                      | 110 Degrees       |
| Vertical                      | 87 Degrees        |
| Phosphor                      | Aluminized P4     |
| Fluorescence                  | White             |
| Persistence                   | Short to Medium   |
| Faceplate                     | Gray Filter Glass |
| Light Transmittance (approx.) | 73 Percent        |

### ELECTRICAL DATA

|   |                                |
|---|--------------------------------|
| Heater Voltage                                    | 6.3 Volts                      |
| Heater Current                                    | 0.6 ± 5% Ampere                |
| Heater Warm-up Time <sup>1</sup>                  | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.)      |                                |
| Cathode to All Other Electrodes                   | 5 μμf                          |
| Grid No. 1 to All Other Electrodes                | 6 μμf                          |
| External Conductive Coating to Anode <sup>2</sup> | 2500 μμf Max.<br>2000 μμf Min. |

### MECHANICAL DATA

|   |                        |
|---|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured) | 19 1/8 x 15 1/8 Inches |
| Minimum Useful Screen Area                            | 262 Sq. Inches         |
| Bulb Contact (Recessed Small Cavity Cap)              | J1-21                  |
| Bulb  | C171 Exp. 19           |
| Base  | B6-1B5                 |
| Heating   | 7FA                    |
| Weight (approx.)                                      | 20 Pounds              |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|   |                         |
|---|-------------------------|
| Anode Voltage                           | 19,800 Volts d c        |
| Grid No. 4 Voltage (Focusing Electrode) | -550 to +1100 Volts d c |
| Grid No. 2 Voltage                      | 550 Volts d c           |
| Grid No. 1 Voltage                      |                         |
| Negative Bias Value                     | 154 Volts d c           |
| Negative Peak Value                     | 220 Volts               |
| Positive Bias Value                     | 0 Volts d c             |
| Positive Peak Value                     | 2 Volts                 |
| Peak Heater-Cathode Voltage             |                         |
| Heater Negative with Respect to Cathode |                         |
| During Warm-up Period not to Exceed     |                         |
| 15 Seconds                              | 450 Volts               |
| After Equipment Warm-up Period          | 200 Volts               |
| Heater Positive with Respect to Cathode | 200 Volts               |

## SYLVANIA PICTURE TUBES

# SYLVANIA TYPE 21CQP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS

|   |                       |
|---|-----------------------|
| Anode Voltage.....  | 16,000 Volts d c      |
| Grid No. 4 Voltage for Focus.....                         | -50 to +350 Volts d c |
| Grid No. 2 Voltage.....                                   | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff <sup>3</sup> ..... | -35 to -72 Volts d c  |

## CIRCUIT VALUES

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

## NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of the rated heater voltage after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with resistance equal to three (3) times the rated heater voltage divided by rated heater current.
2. External conductive coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

## WARNING:

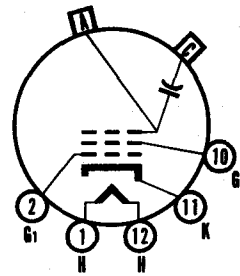
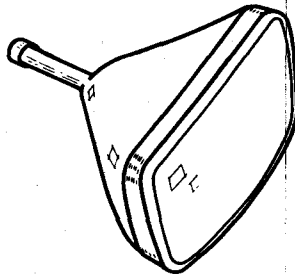
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21CUP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

|                        |                             |
|------------------------|-----------------------------|
| 21" Direct Viewed      | Magnetic Deflection         |
| Rectangular Glass Type | Magnetic Focus              |
| Spherical Faceplate    | Single Field Ion Trap       |
| Gray Filter Glass      | External Conductive Coating |
|                        | Aluminized Screen           |



12-N

## CHARACTERISTICS

### GENERAL DATA

|                                     |                   |
|-------------------------------------|-------------------|
| Focusing Method .....               | Magnetic          |
| Deflecting Method .....             | Magnetic          |
| Deflection Angles (approx.)         |                   |
| Horizontal .....                    | 85 Degrees        |
| Diagonal .....                      | 90 Degrees        |
| Phosphor .....                      | Aluminized P4     |
| Fluorescence .....                  | White             |
| Persistence .....                   | Short to Medium   |
| Faceplate .....                     | Gray Filter Glass |
| Light Transmittance (approx.) ..... | 74 Percent        |

### ELECTRICAL DATA

|   |                                |
|---|--------------------------------|
| Heater Voltage .....                                    | 6.3 Volts                      |
| Heater Current .....                                    | 0.6 ± 5% Amperes               |
| Heater Warm-up Time <sup>1</sup> .....                  | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.)            |                                |
| Cathode to All Other Electrodes .....                   | 5 μmf                          |
| Grid No. 1 to All Other Electrodes .....                | 6 μmf                          |
| External Conductive Coating to Anode <sup>2</sup> ..... | 2500 μmf Max.<br>2000 μmf Min. |
| Ion Trap Magnet .....                                   | External, Single Field Type    |

### MECHANICAL DATA

|   |                        |
|---|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured) ..... | 19 1/8 x 15 1/8 Inches |
| Nominal Overall Length .....                                | 20 Inches              |
| Minimum Useful Screen Area .....                            | 262 Square Inches      |
| Bulb Contact (Recessed Small Cavity Cap) .....              | J1-21                  |
| Base (Small Shell Duodecal 5-Pin) .....                     | B5-57                  |
| Basing .....  | 12N                    |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|   |                  |
|---|------------------|
| Anode Voltage .....                           | 22,000 Volts d c |
| Grid No. 2 Voltage .....                      | 550 Volts d c    |
| Grid No. 1 Voltage .....                      |                  |
| Negative Bias Value .....                     | 155 Volts d c    |
| Negative Peak Value .....                     | 220 Volts        |
| Positive Bias Value .....                     | 0 Volts d c      |
| Positive Peak Value .....                     | 2 Volts          |
| Peak Heater-Cathode Voltage                   |                  |
| Heater Negative with Respect to Cathode       |                  |
| During Warm-up Period Not to Exceed           |                  |
| 15 Seconds .....                              | 450 Volts        |
| After Equipment Warm-up Period .....          | 200 Volts        |
| Heater Positive with Respect to Cathode ..... | 200 Volts        |

## SYLVANIA TYPE 21CUP4 (Cont'd)

### TYPICAL OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....  | 16,000 Volts d c     |
| Grid No. 2 Voltage.....                                   | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>3</sup> ..... | -28 to -72 Volts d c |
| Focusing Coil Current <sup>4</sup> .....                  | 117 Ma d c           |
| Field Strength of PM Ion Trap Magnet <sup>5</sup> .....   | 40 Gaussess          |

### CIRCUIT VALUES

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

### NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times rated heater voltage divided by rated heater current.
2. External conductive coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
4. For JETEC focusing coil 109 or equivalent. Distance from yoke reference line to center of air gap to be  $3\frac{1}{4}$  inches (approx.).
5. For typical PM ion trap magnet with field strength tolerance of  $\pm 3$  gaussess.

### WARNING:

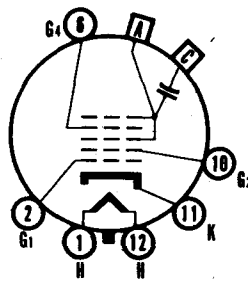
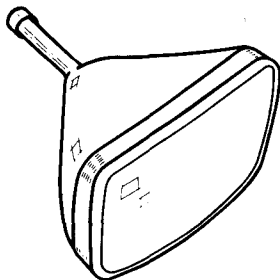
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21CXP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

|                        |                             |
|------------------------|-----------------------------|
| 21" Direct Viewed      | 90° Magnetic Deflection     |
| Rectangular Glass Type | Cathode Drive Design        |
| Spherical Faceplate    | Low Grid No. 2 Voltage      |
| Gray Filter Glass      | No Ion Trap                 |
| Aluminized Screen      | Short Neck Tube             |
| Electrostatic Focus    | External Conductive Coating |



12-L

## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Electrostatic     |
| Deflecting Method.....             | Magnetic          |
| Deflection Angles (approx.)        |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | Aluminized P4     |
| Fluorescence.....                  | White             |
| Persistence.....                   | Short to Medium   |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 74 Percent        |

### ELECTRICAL DATA

|   |                              |
|---|------------------------------|
| Heater Voltage.....                                     | 6.3 Volts                    |
| Heater Current.....                                     | 0.6 ± 5% Amperes             |
| Heater Warm-up Time <sup>1</sup> .....                  | 11 Seconds                   |
| Direct Interelectrode Capacitances (approx.)            |                              |
| Cathode to All Other Electrodes.....                    | 5 μf                         |
| Grid No. 1 to All Other Electrodes.....                 | 6 μf                         |
| External Conductive Coating to Anode <sup>2</sup> ..... | 2500 μf Max.<br>2000 μf Min. |

### MECHANICAL DATA

|  |                        |
|--|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured)..... | 19 1/8 x 15 1/8 Inches |
| Nominal Overall Length.....                                | 18 Inches              |
| Minimum Useful Screen Area.....                            | 262 Square Inches      |
| Bulb.....  | J171 D2 or J171 E1     |
| Bulb Contact (Recessed Small Cavity Cap).....              | J1-21                  |
| Base (Small Shell Duodecal 6-Pin).....                     | B6-63                  |
| Basing.....  | 12L                    |

## RATINGS

### MAXIMUM RATINGS<sup>2</sup> (Absolute Maximum Values)

|  |                        |
|--|------------------------|
| Anode Voltage.....                           | 22,000 Volts dc        |
| Grid No. 4 Voltage (Focusing Electrode)..... | -550 to +1100 Volts dc |
| Grid No. 2 to Grid No. 1 Voltage.....        | 70 Volts dc            |
| Cathode to Grid No. 1 Voltage                |                        |
| Positive Bias Value.....                     | 150 Volts              |
| Negative Peak Value.....                     | 0 Volts                |
| Peak Heater-Cathode Voltage                  |                        |
| Heater Negative with Respect to Cathode      |                        |
| During Warm-up Period                        |                        |
| Not to Exceed 15 Seconds.....                | 450 Volts              |
| After Equipment Warm-up Period.....          | 200 Volts              |
| Heater Positive with Respect to Cathode..... | 200 Volts              |

## SYLVANIA PICTURE TUBES

Issued as a supplement to the manual in Sylvania News for May, 1958

## SYLVANIA TYPE 21CXP4 (Cont'd)

### TYPICAL OPERATING CONDITIONS (Cathode Drive Service)

|  |                   |
|--|-------------------|
| Anode Voltage                              | 18,000 Volts dc   |
| Grid No. 4 to Grid No. 1 Voltage for Focus |                   |
| at 100 $\mu$ a Cathode Current             | 0 to 350 Volts dc |
| Grid No. 2 to Grid No. 1 Voltage           | 50 Volts dc       |
| Cathode to Grid No. 1 Voltage for Cutoff   | 35 to 50 Volts dc |

### CIRCUIT VALUES

|                               |                  |
|-------------------------------|------------------|
| Grid No. 1 Circuit Resistance | 1.5 Megohms Max. |
|-------------------------------|------------------|

### NOTES:

1. Heater Warm-Up Time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times rated heater voltage divided by rated heater current.
2. External conductive coating must be grounded.
3. This type is designed for cathode-drive service. Voltages shown are with respect to Grid No. 1 Voltage unless otherwise indicated.
4. For visual extinction of the undeflected focused spot. The cutoff voltage will change by approximately 2 percent with 1 kilovolt change of anode voltage.

### WARNING:

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.



## SYLVANIA TYPE 21CWP4 (Cont'd)

### TYPICAL OPERATING CONDITIONS

|   |                       |
|---|-----------------------|
| Anode Voltage.....  | 16,000 Volts d c      |
| Grid No. 4 Voltage for Focus.....                         | -64 to +352 Volts d c |
| Grid No. 2 Voltage.....                                   | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff <sup>3</sup> ..... | -28 to -72 Volts d c  |
| Field Strength of PM Ion Trap Magnet <sup>4</sup> .....   | 40 Gausses            |

### CIRCUIT VALUES

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

### NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times rated heater voltage divided by rated heater current.
2. External Conductive Coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
4. For typical PM Ion Trap Magnet with field strength tolerance of  $\pm 3$  gaussess.

### WARNING:

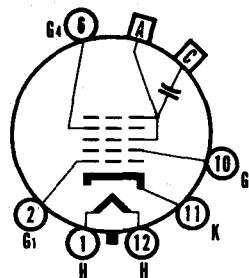
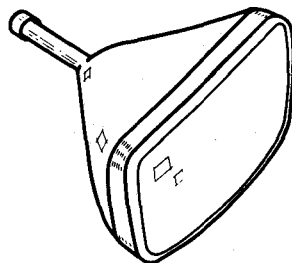
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21CWP4

Silver Screen "85"

## TELEVISION PICTURE TUBE

|                        |                             |
|------------------------|-----------------------------|
| 21" Direct Viewed      | Magnetic Deflection         |
| Rectangular Glass Type | Electrostatic Focus         |
| Spherical Faceplate    | Single Field Ion Trap       |
| Gray Filter Glass      | External Conductive Coating |
| Aluminized Screen      |                             |



12-1

## CHARACTERISTICS

### GENERAL DATA

|                               |                   |
|-------------------------------|-------------------|
| Focusing Method               | Electrostatic     |
| Deflection Method             | Magnetic          |
| Deflection Angle (approx.)    |                   |
| Horizontal                    | 85 Degrees        |
| Diagonal                      | 90 Degrees        |
| Phosphor                      | Aluminized P4     |
| Fluorescence                  | White             |
| Persistence                   | Short to Medium   |
| Faceplate                     | Gray Filter Glass |
| Light Transmittance (approx.) | 74 Percent        |

### ELECTRICAL DATA

|   |                                |
|---|--------------------------------|
| Heater Voltage                                    | 6.3 Volts                      |
| Heater Current                                    | 0.6 ± 5% Ampere                |
| Heater Warm-up Time <sup>1</sup>                  | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.)      |                                |
| Cathode to All Other Electrodes                   | 5 μμf                          |
| Grid No. 1 to All Other Electrodes                | 6 μμf                          |
| External Conductive Coating to Anode <sup>2</sup> | 2500 μμf Max.<br>2000 μμf Min. |
| Ion Trap Magnet                                   | External, Single Field Type    |

### MECHANICAL DATA

|   |                        |
|---|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured) | 19 1/8 x 15 1/8 Inches |
| Nominal Overall Length                                | 20 Inches              |
| Minimum Useful Screen Area                            | 262 Square Inches      |
| Bulb Type   | J171 D2 or J171 E1     |
| Bulb Contact (Recessed Small Cavity Cap)              | J1-21                  |
| Base (Small Shell Duodecal 6-Pin)                     | B6-63                  |
| Basing  | 12L                    |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

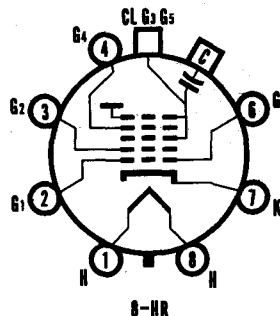
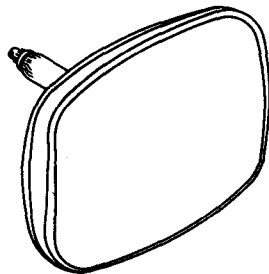
|   |                         |
|---|-------------------------|
| Anode Voltage                           | 22,000 Volts d c        |
| Grid No. 4 Voltage (Focusing Electrode) | -550 to +1100 Volts d c |
| Grid No. 2 Voltage                      | 550 Volts d c           |
| Grid No. 1 Voltage                      |                         |
| Negative Bias Value                     | 155 Volts d c           |
| Negative Peak Value                     | 220 Volts               |
| Positive Bias Value                     | 0 Volts d c             |
| Positive Peak Value                     | 2 Volts                 |
| Peak Heater-Cathode Voltage             |                         |
| Heater Negative with Respect to Cathode |                         |
| During Warm-up Period Not to Exceed     |                         |
| 15 Seconds                              | 450 Volts               |
| After Equipment Warm-up Period          | 200 Volts               |
| Heater Positive with Respect to Cathode | 200 Volts               |

# SYLVANIA TYPE 21DAP4

Silver Screen "85"

## TELEVISION PICTURE TUBE

|                             |                          |
|-----------------------------|--------------------------|
| 21" Direct Viewed           | Aluminized Screen        |
| Rectangular Glass Type      | Electrostatic Focus      |
| Lightweight Tube            | 110° Magnetic Deflection |
| Spherical Faceplate         | 1 1/8" Neck Diameter     |
| Gray Filter Glass           | No Ion Trap              |
| External Conductive Coating |                          |



## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Electrostatic     |
| Deflection Method.....             | Magnetic          |
| Deflection Angles (approx.)        |                   |
| Horizontal.....                    | 105 Degrees       |
| Diagonal.....                      | 110 Degrees       |
| Vertical.....                      | 87 Degrees        |
| Phosphor.....                      | Aluminized P4     |
| Fluorescence.....                  | White             |
| Persistence.....                   | Short to Medium   |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 73 Percent        |

### ELECTRICAL DATA

|   |                                |
|---|--------------------------------|
| Heater Voltage.....                                     | 6.3 Volts                      |
| Heater Current.....                                     | 0.6 ± 5% Ampere                |
| Heater Warm-up Time <sup>1</sup> .....                  | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.)            |                                |
| Cathode to All Other Electrodes.....                    | 5 μmf                          |
| Grid No. 1 to All Other Electrodes.....                 | 6 μmf                          |
| External Conductive Coating to Anode <sup>2</sup> ..... | 2500 μmf Max.<br>2000 μmf Min. |

### MECHANICAL DATA

|  |                        |
|--|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured)..... | 19 1/8 x 15 1/8 Inches |
| Nominal Overall Length.....                                | 14 1/2 Inches          |
| Minimum Useful Screen Area.....                            | 262 Sq. Inches         |
| Bulb Contact (Recessed Small Cavity Cap).....              | J1-21                  |
| Bulb.....  | J171-G1 or Equivalent  |
| Base.....  | B7-183                 |
| Basing.....  | 8HR                    |
| Weight (approx.).....                                      | 20 Pounds              |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|  |                         |
|--|-------------------------|
| Anode Voltage.....                           | 19,800 Volts d c        |
| Grid No. 4 Voltage (Focusing Electrode)..... | -550 to +1100 Volts d c |
| Grid No. 2 Voltage.....                      | 550 Volts d c           |
| Grid No. 1 Voltage.....                      |                         |
| Negative Bias Value.....                     | 154 Volts d c           |
| Negative Peak Value.....                     | 220 Volts               |
| Positive Bias Value.....                     | 0 Volts d c             |
| Positive Peak Value.....                     | 2 Volts                 |
| Peak Heater-Cathode Voltage.....             |                         |
| Heater Negative with Respect to Cathode      |                         |
| During Warm-up Period Not to                 |                         |
| Exceed 15 Seconds.....                       | 450 Volts               |
| After Equipment Warm-up Period.....          | 200 Volts               |
| Heater Positive with Respect to Cathode..... | 200 Volts               |

## SYLVANIA TYPE 21DAP4 (Cont'd)

### TYPICAL OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....                          | 16,000 Volts d c     |
| Grid No. 4 Voltage for Focus.....           | 0 to 400 Volts d c   |
| Grid No. 2 Voltage.....                     | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff..... | -35 to -72 Volts d c |

### CIRCUIT VALUES

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

### NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times rated heater voltage divided by rated heater current.
2. External conductive coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

### WARNING:

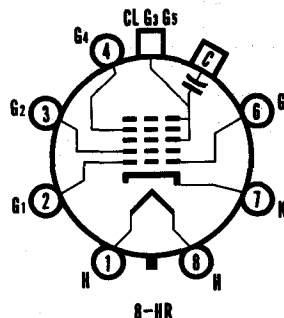
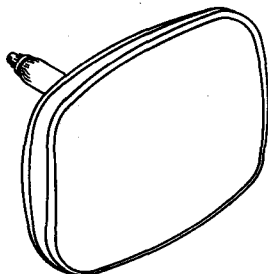
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21DEP4

## Silver Screen "85"

### TELEVISION PICTURE TUBE

|                             |                          |
|-----------------------------|--------------------------|
| 21" Direct Viewed           | Aluminized Screen        |
| Rectangular Glass Type      | Electrostatic Focus      |
| Lightweight Tube            | 110° Magnetic Deflection |
| Spherical Faceplate         | 1 1/8" Neck Diameter     |
| Gray Filter Glass           | No Ion Trap              |
| External Conductive Coating |                          |



### CHARACTERISTICS

#### GENERAL DATA

|                               |                   |
|-------------------------------|-------------------|
| Focusing Method               | Electrostatic     |
| Deflection Method             | Magnetic          |
| Deflection Angles (approx.)   |                   |
| Horizontal                    | 105 Degrees       |
| Diagonal                      | 110 Degrees       |
| Vertical                      | 87 Degrees        |
| Phosphor                      | Aluminized P4     |
| Fluorescence                  | White             |
| Persistence                   | Short to Medium   |
| Faceplate                     | Gray Filter Glass |
| Light Transmittance (approx.) | 76 Percent        |

#### ELECTRICAL DATA

|   |                                |
|---|--------------------------------|
| Heater Voltage                                    | 6.3 Volts                      |
| Heater Current                                    | 0.6 ± 5% Ampere                |
| Heater Warm-up Time <sup>1</sup>                  | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.)      |                                |
| Cathode to All Other Electrodes                   | 5 μmf                          |
| Grid No. 1 to All Other Electrodes                | 6 μmf                          |
| External Conductive Coating to Anode <sup>2</sup> | 2500 μmf Max.<br>2000 μmf Min. |

#### MECHANICAL DATA

|   |                        |
|---|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured) | 19 1/8 x 15 1/8 Inches |
| Nominal Overall Length                                | 14 1/8 Inches          |
| Minimum Useful Screen Area                            | 262 Sq. Inches         |
| Bulb Contact (Recessed Small Cavity Cap)              | J1-21                  |
| Bulb  | J171 G1 or Equivalent  |
| Base  | B7-183                 |
| Basing  | 8HR                    |
| Weight (approx.)                                      | 20 Pounds              |

### RATINGS

#### MAXIMUM RATINGS (Absolute Maximum Values)

|  |                         |
|--|-------------------------|
| Anode Voltage                                  | 19,800 Volts d c        |
| Grid No. 4 Voltage (Focusing Electrode)        | -550 to +1100 Volts d c |
| Grid No. 2 Voltage                             | 550 Volts d c           |
| Grid No. 1 Voltage                             |                         |
| Negative Bias Value                            | 154 Volts d c           |
| Negative Peak Value                            | 220 Volts               |
| Positive Bias Value                            | 0 Volts d c             |
| Positive Peak Value                            | 2 Volts                 |
| Peak Heater-Cathode Voltage                    |                         |
| Heater Negative with Respect to Cathode        |                         |
| During Warm-up Period Not to Exceed 15 Seconds | 450 Volts               |
| After Equipment Warm-up Period                 | 200 Volts               |
| Heater Positive with Respect to Cathode        | 200 Volts               |

## SYLVANIA TYPE 21DEP4 (Cont'd)

### TYPICAL OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....                          | 17,000 Volts d c     |
| Grid No. 4 Voltage for Focus.....           | 0 to 400 Volts d c   |
| Grid No. 2 Voltage.....                     | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff..... | -35 to -72 Volts d c |

### CIRCUIT VALUES

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

### NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of the rated heater voltage after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times the rated heater voltage divided by the rated heater current.
2. External conductive coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

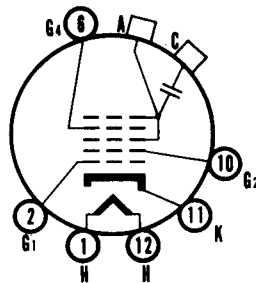
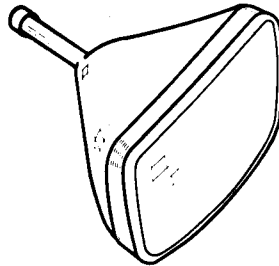
### WARNING:

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

**SYLVANIA TYPE 21FP4  
21FP4A  
Silver Screen "85" → 21FP4C**

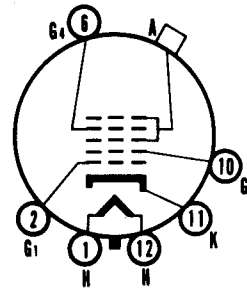
**TELEVISION PICTURE TUBE**

21" Direct Viewed                      Magnetic Deflection  
 Rectangular Glass Type              Electrostatic Focus  
 Gray Filter Glass                      Cylindrical Faceplate  
    Single Field Ion Trap  
 21FP4A has an External Conductive Coating  
 21FP4C has an External Conductive Coating and  
 an Aluminized Screen



12-L

21FP4A  
21FP4C



12-M

21FP4

**CHARACTERISTICS**

**GENERAL DATA**

|                                     |                   |
|-------------------------------------|-------------------|
| Focusing Method .....               | Electrostatic     |
| Deflecting Method .....             | Magnetic          |
| Deflecting Angle (approx.)          |                   |
| Horizontal .....                    | 65 Degrees        |
| Diagonal .....                      | 70 Degrees        |
| Phosphor .....                      | P4                |
| Fluorescence .....                  | White             |
| Persistence .....                   | Medium            |
| Faceplate .....                     | Gray Filter Glass |
| Light Transmittance (approx.) ..... | 72 Percent        |

**ELECTRICAL DATA**

|  |                             |
|--|-----------------------------|
| Heater Voltage .....                         | 6.3 Volts                   |
| Heater Current (approx.) .....               | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.) |                             |
| Cathode to All Other Electrodes .....        | 5 $\mu$ f                   |
| Grid No. 1 to All Other Electrodes .....     | 6 $\mu$ f                   |
| Ion Trap Magnet .....                        | External, Single Field Type |

**MECHANICAL DATA**

|  |  |
|--|--|
| Minimum Useful Screen Dimensions .....         | 19 $\frac{1}{4}$ x 13 $\frac{3}{8}$ Inches |
| Bulb Contact (Recessed Small Cavity Cap) ..... | J1-21                                      |
| Base (Small Shell Duodecal 6-Pin) .....        | B6-63                                      |
| Basing .....                                   | 12M  |

# 21FP4, 21FP4A, 21FP4C (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                         |
|--|-------------------------|
| Anode Voltage                                  | 18000 Volts d c         |
| Grid No. 4 Voltage (Focusing Electrode)        | -500 to +1000 Volts d c |
| Grid No. 2 Voltage                             | 500 Volts d c           |
| Grid No. 1 Voltage                             |                         |
| Negative Bias Value                            | 125 Volts d c           |
| Positive Bias Value                            | 0 Volts d c             |
| Positive Peak Value                            | 2 Volts                 |
| Peak Heater-Cathode Voltage                    |                         |
| Heater Negative with Respect to Cathode        |                         |
| During Warm-up Period Not to Exceed 15 Seconds | 410 Volts               |
| After Equipment Warm-up Period                 | 180 Volts               |
| Heater Positive with Respect to Cathode        | 180 Volts               |

### RECOMMENDED OPERATING CONDITIONS

|  |                       |
|--|-----------------------|
| Anode Voltage                          | 16000 Volts d c       |
| Grid No. 4 Voltage                     | -64 to +350 Volts d c |
| Grid No. 2 Voltage                     | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff | -28 to -72 Volts d c  |
| Ion Trap Magnet Strength (approx.)     | 35 Gauss              |

### CIRCUIT VALUES

|                               |                    |
|-------------------------------|--------------------|
| Grid No. 1 Circuit Resistance | 1.5 Megohms<br>Max |
|-------------------------------|--------------------|

### NOTE:

1. Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about 5 volts more negative.

### 21FP4A

The Sylvania Type 21FP4A is identical to Type 21FP4 except for having an external conductive coating, which must be grounded.

|  |             |
|--|-------------|
| External Conductive Coating to Anode Capacitance |             |
| Maximum  | 750 $\mu$ f |
| Minimum  | 500 $\mu$ f |
| Basing   | 12L         |

### 21FP4C

The Sylvania Type 21FP4C is identical to Type 21FP4 except for having an external conductive coating which must be grounded, and an aluminized screen.

|  |             |
|--|-------------|
| External Conductive Coating to Anode Capacitance |             |
| Maximum  | 750 $\mu$ f |
| Minimum  | 500 $\mu$ f |
| Basing   | 12L         |

### WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

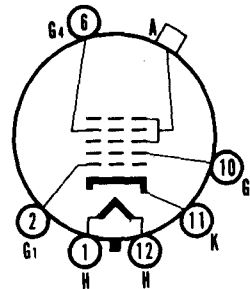
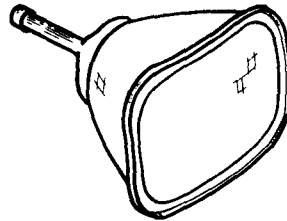


# SYLVANIA TYPE 21MP4

## TELEVISION PICTURE TUBE

21" Direct Viewed  
Rectangular Metal Type  
Gray Filter Glass  
Frosted Faceplate

Magnetic Deflection  
Electrostatic Focus  
Spherical Faceplate  
Single Field Ion Trap



12-M

## CHARACTERISTICS

### GENERAL DATA

|                               |                           |
|-------------------------------|---------------------------|
| Focusing Method               | Electrostatic             |
| Deflecting Method             | Magnetic                  |
| Deflecting Angle (approx.)    |                           |
| Horizontal                    | 66 Degrees                |
| Diagonal                      | 70 Degrees                |
| Phosphor                      | P4                        |
| Fluorescence                  | White                     |
| Persistence                   | Medium                    |
| Faceplate                     | Frosted Gray Filter Glass |
| Light Transmittance (approx.) | 66 Percent                |

### ELECTRICAL DATA

|  |                             |
|--|-----------------------------|
| Heater Voltage                               | 6.3 Volts                   |
| Heater Current (approx.)                     | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.) |                             |
| Cathode to All Other Electrodes              | 5 $\mu\mu\text{f}$          |
| Grid No. 1 to All Other Electrodes           | 6 $\mu\mu\text{f}$          |
| Ion Trap Magnet                              | External, Single Field Type |

### MECHANICAL DATA

|                                   |   |
|-----------------------------------|---|
| Minimum Useful Screen Dimensions  | 18 $\frac{1}{8}$ x 13 $\frac{1}{16}$ Inches |
| Bulb Contact                      | Metal Cone Lip                              |
| Base (Small Shell Duodecal 6-Pin) | B6-63                                       |
| Basing                            | 12M   |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                         |
|--|-------------------------|
| Anode Voltage                                  | 16000 Volts d c         |
| Grid No. 4 Voltage (Focusing Electrode)        | -500 to +1000 Volts d c |
| Grid No. 2 Voltage                             | 500 Volts d c           |
| Grid No. 1 Voltage                             |                         |
| Negative Bias Value                            | 125 Volts d c           |
| Positive Bias Value                            | 0 Volts d c             |
| Positive Peak Value                            | 2 Volts                 |
| Peak Heater-Cathode Voltage                    |                         |
| Heater Negative with Respect to Cathode        |                         |
| During Warm-up Period Not to Exceed 15 Seconds | 410 Volts               |
| After Equipment Warm-up Period                 | 180 Volts               |
| Heater Positive with Respect to Cathode        | 180 Volts               |

### RECOMMENDED OPERATING CONDITIONS

|   |                       |
|---|-----------------------|
| Anode Voltage                                       | 16000 Volts d c       |
| Grid No. 4 Voltage                                  | -64 to +350 Volts d c |
| Grid No. 2 Voltage                                  | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff <sup>1</sup> | -28 to -72 Volts d c  |
| Ion Trap Magnet Strength (approx.)                  | 30 Gauss              |

## 21MP4 (Cont'd)

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Megohms  
Max

### NOTE:

1. Visual extinction of undeflected focused spot.

### WARNING

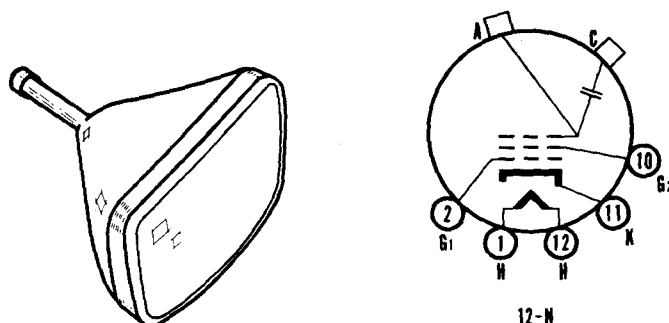
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 21WP4 Silver Screen "85" → 21WP4A

### TELEVISION PICTURE TUBE

|                             |                       |
|-----------------------------|-----------------------|
| 21" Direct Viewed           | Magnetic Deflection   |
| Rectangular Glass Type      | Magnetic Focus        |
| Gray Filter Glass           | Spherical Faceplate   |
| External Conductive Coating | Single Field Ion Trap |

21WP4A has an Aluminized Screen



### CHARACTERISTICS

#### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Magnetic          |
| Deflecting Method.....             | Magnetic          |
| Deflecting Angle (approx.)         |                   |
| Horizontal.....                    | 66 Degrees        |
| Diagonal.....                      | 70 Degrees        |
| Phosphor.....                      | P4                |
| Fluorescence.....                  | White             |
| Persistence.....                   | Medium            |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 72 Percent        |

#### ELECTRICAL DATA

|  |                             |
|--|-----------------------------|
| Heater Voltage.....                          | 6.3 Volts                   |
| Heater Current (approx.).....                | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.) |                             |
| Cathode to All Other Electrodes.....         | 5 $\mu$ f                   |
| Grid No. 1 to All Other Electrodes.....      | 6 $\mu$ f                   |
| External Conductive Coating to Anode.....    | 750 $\mu$ f Max             |
| Ion Trap Magnet.....                         | 500 $\mu$ f Min             |
|  | External, Single Field Type |

# 21WP4, 21WP4A (Cont'd)

## MECHANICAL DATA

|   |                              |
|---|------------------------------|
| Minimum Useful Screen Dimensions.....         | 17 x 12 $\frac{3}{4}$ Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21                        |
| Base (Small Shell Duodecal 5-Pin).....        | B5-57                        |
| Basing.....                                   | 12N                          |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|   |                 |
|---|-----------------|
| Anode Voltage.....  | 18000 Volts d c |
| Grid No. 2 Voltage.....   | 500 Volts d c   |
| Grid No. 1 Voltage.....   |                 |
| Negative Bias Value.....  | 125 Volts d c   |
| Positive Bias Value.....  | 0 Volts d c     |
| Positive Peak Value.....  | 2 Volts         |
| Peak Heater-Cathode Voltage.....  |                 |
| Heater Negative with Respect to Cathode<br>During Warm-up Period Not to<br>Exceed 15 Seconds..... | 410 Volts       |
| After Equipment Warm-up Period.....   | 180 Volts       |
| Heater Positive with Respect to Cathode.....  | 180 Volts       |

### RECOMMENDED OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....  | 16000 Volts d c      |
| Grid No. 2 Voltage.....                                   | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>2</sup> ..... | -28 to -72 Volts d c |
| Focusing Coil Current (approx.) <sup>3</sup> .....        | 100 +20% Ma d c      |
| Ion Trap Magnet Strength (approx.).....                   | 35 Gauss             |

### CIRCUIT VALUES

|                                    |                    |
|------------------------------------|--------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms<br>Max |
|------------------------------------|--------------------|

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
3. For JETEC focusing coil 109 or equivalent three and one quarter inches from reference line, bias adjusted to 30 foot lamberts on a 17 x 12 $\frac{3}{4}$  inch picture area.

## 21WP4A

The Sylvania Type 21WP4A is identical to Type 21WP4 except for having an aluminized screen.

## WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

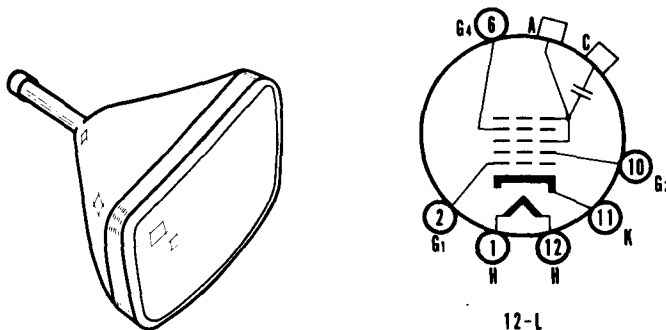
# SYLVANIA TYPE 21XP4

## Silver Screen "85" → 21XP4A

### TELEVISION PICTURE TUBE

|                             |                       |
|-----------------------------|-----------------------|
| 21" Direct Viewed           | Magnetic Deflection   |
| Rectangular Glass Type      | Electrostatic Focus   |
| Gray Filter Glass           | Spherical Faceplate   |
| External Conductive Coating | Single Field Ion Trap |

21XP4A has an Aluminized Screen



### CHARACTERISTICS

#### GENERAL DATA

|                                     |                   |
|-------------------------------------|-------------------|
| Focusing Method .....               | Electrostatic     |
| Deflecting Method .....             | Magnetic          |
| Deflecting Angle (approx.)          |                   |
| Horizontal .....                    | 66 Degrees        |
| Diagonal .....                      | 70 Degrees        |
| Phosphor .....                      | P4                |
| Fluorescence .....                  | White             |
| Persistence .....                   | Medium            |
| Faceplate .....                     | Gray Filter Glass |
| Light Transmittance (approx.) ..... | 72 Percent        |

#### ELECTRICAL DATA

|  |                             |
|--|-----------------------------|
| Heater Voltage .....                         | 6.3 Volts                   |
| Heater Current (approx.) .....               | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.) |                             |
| Cathode to All Other Electrodes .....        | 5 $\mu\mu\text{f}$          |
| Grid No. 1 to All Other Electrodes .....     | 6 $\mu\mu\text{f}$          |
| External Conductive Coating to Anode .....   | 750 $\mu\mu\text{f}$ Max    |
| Ion Trap Magnet .....                        | 500 $\mu\mu\text{f}$ Min    |
|  | External, Single Field Type |

#### MECHANICAL DATA

|  |                              |
|--|------------------------------|
| Minimum Useful Screen Dimensions .....         | 17 x 12 $\frac{3}{4}$ Inches |
| Bulb Contact (Recessed Small Cavity Cap) ..... | J1-21                        |
| Base (Small Shell Duodecal 6-Pin) .....        | B6-63                        |
| Basing .....                                   | 12L                          |

### RATINGS

#### MAXIMUM RATINGS (Design Center Values)

|   |                         |
|---|-------------------------|
| Anode Voltage .....                           | 18000 Volts d c         |
| Grid No. 4 Voltage (Focusing Electrode) ..... | -500 to +1000 Volts d c |
| Grid No. 2 Voltage .....                      | 500 Volts d c           |
| Grid No. 1 Voltage                            |                         |
| Negative Bias Value .....                     | 125 Volts d c           |
| Positive Bias Value .....                     | 0 Volts d c             |
| Positive Peak Value .....                     | 2 Volts                 |
| Peak Heater-Cathode Voltage                   |                         |
| Heater Negative with Respect to Cathode       |                         |
| During Warm-up Period Not to                  |                         |
| Exceed 15 Seconds .....                       | 410 Volts               |
| After Equipment Warm-up Period .....          | 180 Volts               |
| Heater Positive with Respect to Cathode ..... | 180 Volts               |

# 21XP4, 21XP4A (Cont'd)

## RECOMMENDED OPERATING CONDITIONS

|   |             |           |
|---|-------------|-----------|
| Anode Voltage.....                          | 16000       | Volts d c |
| Grid No. 4 Voltage.....                     | -64 to +352 | Volts d c |
| Grid No. 2 Voltage.....                     | 300         | Volts d c |
| Grid No. 1 Voltage Required for Cutoff..... | -28 to -72  | Volts d c |
| Ion Trap Magnet Strength (approx.).....     | 35          | Gausses   |

## CIRCUIT VALUES

|                                    |     |         |
|------------------------------------|-----|---------|
| Grid No. 1 Circuit Resistance..... | 1.5 | Megohms |
|                                    |     | Max     |

## NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

## 21XP4A

The Sylvania Type 21XP4A is identical to Type 21XP4 except for having an aluminized screen.

## WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

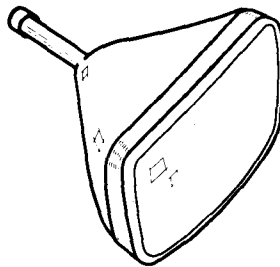
SYLVANIA TYPE 21ZP4  
21ZP4A  
**Silver Screen "85" → 21ZP4B**

## TELEVISION PICTURE TUBE

|                        |                     |
|------------------------|---------------------|
| 21" Direct Viewed      | Magnetic Deflection |
| Rectangular Glass Type | Magnetic Focus      |
| Gray Filter Glass      | Spherical Faceplate |

Single Field Ion Trap

21ZP4A has an External Conductive Coating  
21ZP4B has an External Conductive Coating and  
an Aluminized Screen



# 21ZP4, 21ZP4A, 21ZP4B (Cont'd)

## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Magnetic          |
| Deflecting Method.....             | Magnetic          |
| Deflecting Angle (approx.)         |                   |
| Horizontal.....                    | 65 Degrees        |
| Diagonal.....                      | 70 Degrees        |
| Vertical.....                      | 50 Degrees        |
| Phosphor.....                      | P4                |
| Fluorescence.....                  | White             |
| Persistence.....                   | Medium            |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 72 Percent        |

### ELECTRICAL DATA

|  |                             |
|--|-----------------------------|
| Heater Voltage.....                            | 6.3 Volts                   |
| Heater Current (approx.).....                  | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.)   |                             |
| Cathode to All Other Electrodes (approx.)..... | 5 $\mu\mu\text{f}$          |
| Grid No. 1 to All Other Electrodes.....        | 6 $\mu\mu\text{f}$          |
| Ion Trap Magnet.....                           | External, Single Field Type |

### MECHANICAL DATA

|   |   |
|---|---|
| Minimum Useful Screen Dimensions.....         | 19 $\frac{1}{8}$ x 14 $\frac{3}{16}$ Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21                                       |
| Base (Small Shell Duodecal 5-Pin).....        | B5-57                                       |
| Basing.....                                   | 12D   |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                 |
|--|-----------------|
| Anode Voltage.....                           | 18000 Volts d c |
| Grid No. 2 Voltage.....                      | 500 Volts d c   |
| Grid No. 1 Voltage.....                      |                 |
| Negative Bias Value.....                     | 125 Volts d c   |
| Positive Bias Value.....                     | 0 Volts d c     |
| Positive Peak Value.....                     | 2 Volts         |
| Peak Heater-Cathode Voltage                  |                 |
| Heater Negative with Respect to Cathode      |                 |
| During Warm-up Period Not to                 |                 |
| Exceed 15 Seconds.....                       | 410 Volts       |
| After Equipment Warm-up Period.....          | 180 Volts       |
| Heater Positive with Respect to Cathode..... | 180 Volts       |

### RECOMMENDED OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....  | 16000 Volts d c      |
| Grid No. 2 Voltage.....                                   | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>1</sup> ..... | -28 to -72 Volts d c |
| Focusing Coil Current (approx.) <sup>2</sup> .....        | 95 $\pm$ 20% Ma d c  |
| Ion Trap Magnet Strength (approx.).....                   | 35 Gaussses          |

### CIRCUIT VALUES

|                                    |             |
|------------------------------------|-------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms |
|                                    | Max         |

### NOTES:

1. Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about 5 volts more negative.
2. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 19 $\frac{1}{8}$  x 14 $\frac{3}{16}$  inch picture area.

### 21ZP4A

The Sylvania Type 21ZP4A is identical to Type 21ZP4 except for having an external conductive coating, which must be grounded.

|  |                      |
|--|----------------------|
| External Conductive Coating to Anode Capacitance |                      |
| Maximum.....                                     | 750 $\mu\mu\text{f}$ |
| Minimum.....                                     | 500 $\mu\mu\text{f}$ |
| Basing.....                                      | 12N                  |

### 21ZP4B

The Sylvania Type 21ZP4B is identical to Type 21ZP4 except for having an external conductive coating which must be grounded, and an aluminized screen.

|  |                      |
|--|----------------------|
| External Conductive Coating to Anode Capacitance |                      |
| Maximum.....                                     | 750 $\mu\mu\text{f}$ |
| Minimum.....                                     | 500 $\mu\mu\text{f}$ |
| Basing.....                                      | 12N                  |

### WARNING

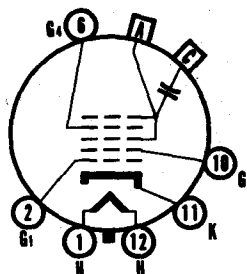
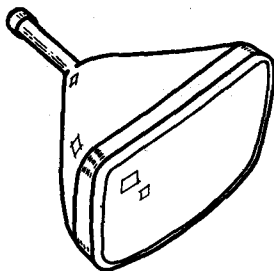
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 24AEP4

Silver Screen "85"

## TELEVISION PICTURE TUBE

|                        |                             |
|------------------------|-----------------------------|
| 24" Direct Viewed      | Electrostatic Focus         |
| Rectangular Glass Type | 90° Magnetic Deflection     |
| Spherical Faceplate    | Short Neck Tube             |
| Gray Filter Glass      | No Ion Trap                 |
| Aluminized Screen      | External Conductive Coating |



12-L

## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Electrostatic     |
| Deflection Method.....             | Magnetic          |
| Deflection Angles (approx.)        |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | Aluminized P4     |
| Fluorescence.....                  | White             |
| Persistence.....                   | Short to Medium   |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 74 Percent        |

### ELECTRICAL DATA

|  |                                |
|--|--------------------------------|
| Heater Voltage.....                          | 6.3 Volts                      |
| Heater Current.....                          | 0.6 ± 5% Amperes               |
| Heater Warm-up Time.....                     | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.) |                                |
| Cathode to All Other Electrodes.....         | 5 μmf                          |
| Grid No. 1 to All Other Electrodes.....      | 6 μmf                          |
| External Conductive Coating to Anode.....    | 2500 μmf Max.<br>2000 μmf Min. |

### MECHANICAL DATA

|  |                        |
|--|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured)..... | 21 1/4 x 16 3/8 Inches |
| Nominal Overall Length.....                                | 19 1/4 Inches          |
| Minimum Useful Screen Area.....                            | 332 Sq. Inches         |
| Bulb Contact (Recessed Small Cavity Cap).....              | J1-21                  |
| Base.....  | B6-63                  |
| Basing.....  | 12L                    |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|  |                         |
|--|-------------------------|
| Anode Voltage.....                           | 22,000 Volts d c        |
| Grid No. 4 Voltage (Focusing Electrode)..... | -550 to +1100 Volts d c |
| Grid No. 2 Voltage.....                      | 550 Volts d c           |
| Grid No. 1 Voltage.....                      |                         |
| Negative Bias Value.....                     | 155 Volts d c           |
| Negative Peak Value.....                     | 220 Volts               |
| Positive Bias Value.....                     | 0 Volts d c             |
| Positive Peak Value.....                     | 2 Volts                 |
| Peak Heater-Cathode Voltage.....             |                         |
| Heater Negative with Respect to Cathode      |                         |
| During Warm-up Period Not to                 |                         |
| Exceed 15 Seconds.....                       | 450 Volts               |
| After Equipment Warm-up Period.....          | 200 Volts               |
| Heater Positive with Respect to Cathode..... | 200 Volts               |

## SYLVANIA TYPE 24AEP4 (Cont'd)

### TYPICAL OPERATING CONDITIONS

|   |                       |
|---|-----------------------|
| Anode Voltage.....  | 18,000 Volts d c      |
| Grid No. 4 Voltage for Focus.....                         | -50 to +350 Volts d c |
| Grid No. 2 Voltage.....                                   | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff <sup>1</sup> ..... | -35 to -72 Volts d c  |

### CIRCUIT VALUES

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

### NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times rated heater voltage divided by rated heater current.
2. External conductive coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

### WARNING:

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

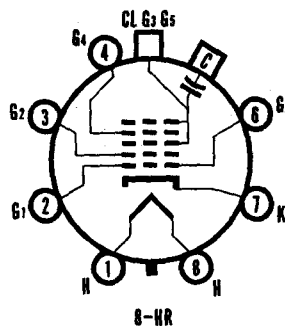
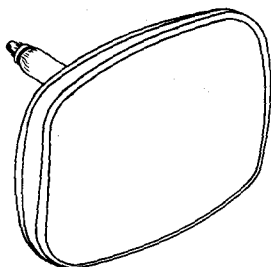


# SYLVANIA TYPE 24AHP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

|                             |                          |
|-----------------------------|--------------------------|
| 24" Direct Viewed           | Aluminized Screen        |
| Rectangular Glass Type      | Electrostatic Focus      |
| Lightweight Tube            | 110° Magnetic Deflection |
| Spherical Faceplate         | 1 1/8" Neck Diameter     |
| Gray Filter Glass           | No Ion Trap              |
| External Conductive Coating |                          |



## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Electrostatic     |
| Deflection Method.....             | Magnetic          |
| Deflection Angles (approx.)        |                   |
| Horizontal.....                    | 105 Degrees       |
| Diagonal.....                      | 110 Degrees       |
| Vertical.....                      | 87 Degrees        |
| Phosphor.....                      | Aluminized P4     |
| Fluorescence.....                  | White             |
| Persistence.....                   | Short to Medium   |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 76 Percent        |

### ELECTRICAL DATA

|   |                                |
|---|--------------------------------|
| Heater Voltage.....                                     | 6.3 Volts                      |
| Heater Current.....                                     | 0.6 ± 5% Ampere                |
| Heater Warm-up Time <sup>1</sup> .....                  | 11 Seconds                     |
| Direct Interelectrode Capacitances (approx.)            |                                |
| Cathode to All Other Electrodes.....                    | 5 μmf                          |
| Grid No. 1 to All Other Electrodes.....                 | 6 μmf                          |
| External Conductive Coating to Anode <sup>2</sup> ..... | 2500 μmf Max.<br>2000 μmf Min. |

### MECHANICAL DATA

|  |                        |
|--|------------------------|
| Minimum Useful Screen Dimensions<br>(Maximum Assured)..... | 21 1/4 x 16 1/4 Inches |
| Nominal Overall Length.....                                | 15 1/4 Inches          |
| Minimum Useful Screen Area.....                            | 332 Square Inches      |
| Bulb.....  | J192C1 or Equivalent   |
| Bulb Contact (Recessed Small Cavity Cap).....              | J1-21                  |
| Base.....  | B7-183                 |
| Basing.....  | 8HR                    |
| Weight (approx.).....                                      | 26 1/2 Pounds          |

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

|  |                         |
|--|-------------------------|
| Anode Voltage.....                           | 22,000 Volts d c        |
| Grid No. 4 Voltage (Focusing Electrode)..... | -550 to +1100 Volts d c |
| Grid No. 2 Voltage.....                      | 550 Volts d c           |
| Grid No. 1 Voltage.....                      |                         |
| Negative Bias Value.....                     | 154 Volts d c           |
| Negative Peak Value.....                     | 220 Volts               |
| Positive Bias Value.....                     | 0 Volts d c             |
| Positive Peak Value.....                     | 2 Volts                 |
| Peak Heater-Cathode Voltage.....             |                         |
| Heater Negative with Respect to Cathode      |                         |
| During Warm-up Period Not to                 |                         |
| Exceed 15 Seconds.....                       | 450 Volts               |
| After Equipment Warm-up Period.....          | 200 Volts               |
| Heater Positive with Respect to Cathode..... | 200 Volts               |

SYLVANIA PICTURE TUBES

## SYLVANIA TYPE 24AHP4 (Cont'd)

### TYPICAL OPERATING CONDITIONS

|   |                       |
|---|-----------------------|
| Anode Voltage.....                          | 16,000 Volts d c      |
| Grid No. 4 Voltage for Focus.....           | -50 to +350 Volts d c |
| Grid No. 2 Voltage.....                     | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff..... | -35 to -72 Volts d c  |

### CIRCUIT VALUES

|                                    |                  |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

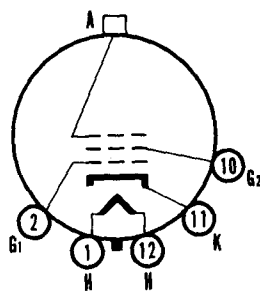
### NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of the rated heater voltage after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times the rated heater voltage divided by the rated heater current.
2. External conductive coating must be grounded.
3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

### WARNING:

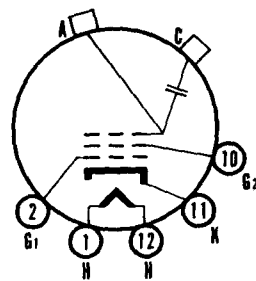
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## 21ZP4, 21ZP4A, 21ZP4B (Cont'd)



12-D

21ZP4



12-N

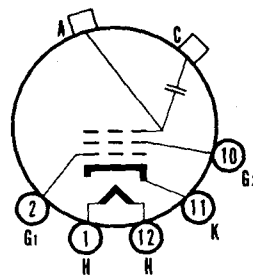
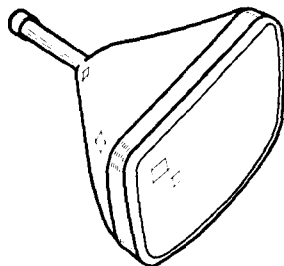
21ZP4A  
21ZP4B

### SYLVANIA TYPE 24CP4 Silver Screen "85" → 24CP4A

#### TELEVISION PICTURE TUBE

|                             |                       |
|-----------------------------|-----------------------|
| 24" Direct Viewed           | Magnetic Deflection   |
| Rectangular Glass Type      | Magnetic Focus        |
| Gray Filter Glass           | Spherical Faceplate   |
| External Conductive Coating | Single Field Ion Trap |

24CP4A has an Aluminized Screen



12-N

#### CHARACTERISTICS

##### GENERAL DATA

|                               |                   |
|-------------------------------|-------------------|
| Focusing Method               | Magnetic          |
| Deflecting Method             | Magnetic          |
| Deflecting Angle (approx.)    |                   |
| Horizontal                    | 85 Degrees        |
| Diagonal                      | 90 Degrees        |
| Phosphor                      | P4                |
| Fluorescence                  | White             |
| Persistence                   | Medium            |
| Faceplate                     | Gray Filter Glass |
| Light Transmittance (approx.) | 68 Percent        |

# 24CP4, 24CP4A (Cont'd)

## ELECTRICAL DATA

|   |                             |
|---|-----------------------------|
| Heater Voltage.....                                     | 6.3 Volts                   |
| Heater Current (approx.).....                           | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.)            |                             |
| Cathode to All Other Electrodes.....                    | 5 $\mu$ f                   |
| Grid No. 1 to All Other Electrodes.....                 | 6 $\mu$ f                   |
| External Conductive Coating to Anode <sup>1</sup> ..... | 750 $\mu$ f Max             |
| Ion Trap Magnet.....                                    | 500 $\mu$ f Min             |
|   | External, Single Field Type |

## MECHANICAL DATA

|   |                  |
|---|------------------|
| Minimum Useful Screen Dimensions.....         | 21¼ x 16¾ Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21            |
| Base (Small Shell Duodecal 5-Pin).....        | B5-57            |
| Basing.....                                   | 12N              |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                 |
|--|-----------------|
| Anode Voltage.....                           | 20000 Volts d c |
| Grid No. 2 Voltage.....                      | 500 Volts d c   |
| Grid No. 1 Voltage                           |                 |
| Negative Bias Value.....                     | 125 Volts d c   |
| Positive Bias Value.....                     | 0 Volts d c     |
| Positive Peak Value.....                     | 2 Volts         |
| Peak Heater-Cathode Voltage                  |                 |
| Heater Negative with Respect to Cathode      |                 |
| During Warm-up Period Not to                 |                 |
| Exceed 15 Seconds.....                       | 410 Volts       |
| After Equipment Warm-up Period.....          | 180 Volts       |
| Heater Positive with Respect to Cathode..... | 180 Volts       |

### RECOMMENDED OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....  | 18000 Volts d c      |
| Grid No. 2 Voltage.....                                   | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>2</sup> ..... | -28 to -72 Volts d c |
| Focusing Coil Current (approx.) <sup>3</sup> .....        | 125 $\pm$ 20% Ma d c |
| Ion Trap Magnet Strength (approx.).....                   | 40 Gauss             |

### CIRCUIT VALUES

|                                    |             |
|------------------------------------|-------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms |
|                                    | Max         |

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
3. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 21¼ x 16¾ inch picture area.

## 24CP4A

The Sylvania Type 24CP4A is identical to Type 24CP4 except it has an aluminumized screen.

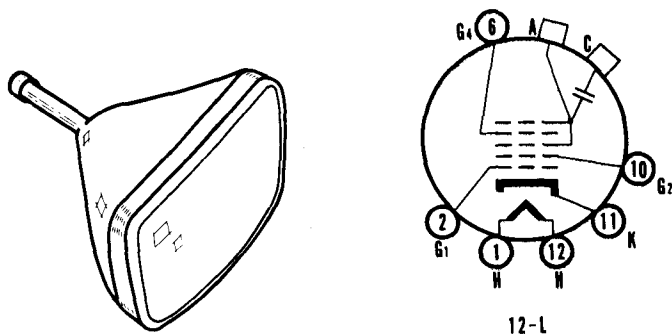
## WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 24DP4 Silver Screen "85" → 24DP4A

## TELEVISION PICTURE TUBE

|                                 |                       |
|---------------------------------|-----------------------|
| 24" Direct Viewed               | Magnetic Deflection   |
| Rectangular Glass Type          | Electrostatic Focus   |
| Gray Filter Glass               | Spherical Faceplate   |
| External Conductive Coating     | Single Field Ion Trap |
| 24DP4A has an Aluminized Screen |                       |



## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Electrostatic     |
| Deflecting Method.....             | Magnetic          |
| Deflecting Angle.....              |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | P4                |
| Fluorescence.....                  | White             |
| Persistence.....                   | Medium            |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 68 Percent        |

### ELECTRICAL DATA

|   |                             |
|---|-----------------------------|
| Heater Voltage.....                                     | 6.3 Volts                   |
| Heater Current (approx.).....                           | 0.6 Amperes                 |
| Direct Interelectrode Capacitances (approx.).....       |                             |
| Cathode to All Other Electrodes.....                    | 5 $\mu\mu\text{f}$          |
| Grid No. 1 to All Other Electrodes.....                 | 6 $\mu\mu\text{f}$          |
| External Conductive Coating to Anode <sup>1</sup> ..... | 750 $\mu\mu\text{f}$ Max    |
| Ion Trap Magnet.....                                    | 500 $\mu\mu\text{f}$ Min    |
|   | External, Single Field Type |

### MECHANICAL DATA

|   |  |
|---|--|
| Minimum Useful Screen Dimensions.....         | 21 $\frac{1}{4}$ x 16 $\frac{3}{4}$ Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21                                      |
| Base (Small Shell Duodecal 6-Pin).....        | B6-63                                      |
| Basing.....                                   | 12L  |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                         |
|--|-------------------------|
| Anode Voltage.....                           | 20000 Volts d c         |
| Grid No. 4 Voltage (Focusing Electrode)..... | -500 to +1000 Volts d c |
| Grid No. 2 Voltage.....                      | 500 Volts d c           |
| Grid No. 1 Voltage.....                      |                         |
| Negative Bias Value.....                     | 125 Volts d c           |
| Positive Bias Value.....                     | 0 Volts d c             |
| Positive Peak Value.....                     | 2 Volts                 |
| Peak Heater-Cathode Voltage.....             |                         |
| Heater Negative with Respect to Cathode      |                         |
| During Warm-up Period Not to                 |                         |
| Exceed 15 Seconds.....                       | 410 Volts               |
| After Equipment Warm-up Period.....          | 180 Volts               |
| Heater Positive with Respect to Cathode..... | 180 Volts               |

# 24DP4, 24DP4A (Cont'd)

## RECOMMENDED OPERATING CONDITIONS

|   |                       |
|---|-----------------------|
| Anode Voltage.....                          | 18000 Volts d c       |
| Grid No. 4 Voltage.....                     | -72 to +396 Volts d c |
| Grid No. 2 Voltage.....                     | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff..... | -28 to -72 Volts d c  |
| Ion Trap Magnet Strength (approx.).....     | 40 Gauss              |

## CIRCUIT VALUES

|                                    |                 |
|------------------------------------|-----------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max |
|------------------------------------|-----------------|

## NOTES:

- External conductive coating must be grounded.
- Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

## 24DP4A

The Sylvania Type 24DP4A is identical to the Type 24DP4 except it has an aluminized screen.

## WARNING

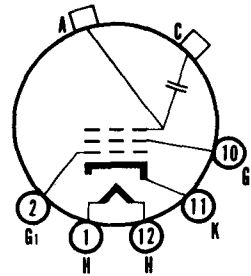
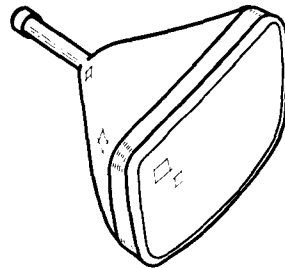
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 24VP4

**Silver Screen "85" → 24VP4A**

## TELEVISION PICTURE TUBE

|                                 |                       |
|---------------------------------|-----------------------|
| 24" Direct Viewed               | Magnetic Deflection   |
| Rectangular Glass Type          | Magnetic Focus        |
| Gray Filter Glass               | Spherical Faceplate   |
| External Conductive Coating     | Single Field Ion Trap |
| 24VP4A has an Aluminized Screen |                       |



## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Magnetic          |
| Deflecting Method.....             | Magnetic          |
| Deflecting Angle (approx.)         |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | P4                |
| Fluorescence.....                  | White             |
| Persistence.....                   | Medium            |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 68 Percent        |

# 24VP4, 24VP4A (Cont'd)

## ELECTRICAL DATA

|   |                             |
|---|-----------------------------|
| Heater Voltage.....                                     | 6.3 Volts                   |
| Heater Current (approx.).....                           | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.)            |                             |
| Cathode to All Other Electrodes.....                    | 5 $\mu\text{f}$             |
| Grid No. 1 to All Other Electrodes.....                 | 6 $\mu\text{f}$             |
| External Conductive Coating to Anode <sup>1</sup> ..... | 1500 $\mu\text{f}$ Max      |
| Ion Trap Magnet.....                                    | 750 $\mu\text{f}$ Min       |
|   | External, Single Field Type |

## MECHANICAL DATA

|   |   |
|---|---|
| Minimum Useful Screen Dimensions.....         | 21 $\frac{3}{8}$ x 16 $\frac{1}{16}$ Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21                                       |
| Base (Small Shell Duodecal 5-Pin).....        | B5-57                                       |
| Basing.....                                   | 12N   |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                 |
|--|-----------------|
| Anode Voltage.....                           | 22000 Volts d c |
| Grid No. 2 Voltage.....                      | 600 Volts d c   |
| Grid No. 1 Voltage                           |                 |
| Negative Bias Value.....                     | 125 Volts d c   |
| Positive Bias Value.....                     | 0 Volts d c     |
| Positive Peak Value.....                     | 2 Volts         |
| Peak Heater-Cathode Voltage                  |                 |
| Heater Negative with Respect to Cathode      |                 |
| During Warm-up Period Not to                 |                 |
| Exceed 15 Seconds.....                       | 410 Volts       |
| After Equipment Warm-up Period.....          | 180 Volts       |
| Heater Positive with Respect to Cathode..... | 180 Volts       |

### RECOMMENDED OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....  | 18000 Volts d c      |
| Grid No. 2 Voltage.....                                   | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>2</sup> ..... | -28 to -72 Volts d c |
| Focusing Coil Current (approx.) <sup>3</sup> .....        | 125 Ma d c           |
| Ion Trap Magnet Strength (approx.).....                   | 40 Gauss             |

### CIRCUIT VALUES

|                                    |             |
|------------------------------------|-------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms |
|                                    | Max         |

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
3. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 21 $\frac{3}{8}$  x 16 $\frac{1}{16}$  inch picture area.

## 24VP4A

The Sylvania Type 24VP4A is identical to the Type 24VP4 except for having an aluminized screen.

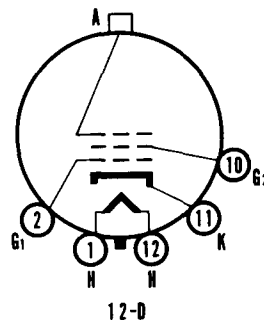
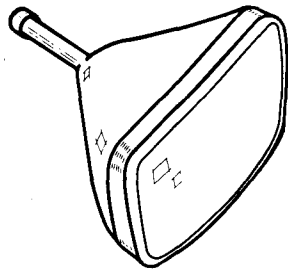
## WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 24XP4

## TELEVISION PICTURE TUBE

24" Direct Viewed                      Magnetic Deflection  
 Rectangular Glass Type              Magnetic Focus  
 Gray Filter Glass                      Spherical Faceplate  
 Single Field Ion Trap



## CHARACTERISTICS

### GENERAL DATA

|                               |                   |
|-------------------------------|-------------------|
| Focusing Method               | Magnetic          |
| Deflecting Method             | Magnetic          |
| Deflecting Angle (approx.)    |                   |
| Horizontal                    | 85 Degrees        |
| Diagonal                      | 90 Degrees        |
| Phosphor                      | P4                |
| Fluorescence                  | White             |
| Persistence                   | Medium            |
| Faceplate                     | Gray Filter Glass |
| Light Transmittance (approx.) | 68 Percent        |

### ELECTRICAL DATA

|  |                             |
|--|-----------------------------|
| Heater Voltage                               | 6.3 Volts                   |
| Heater Current (approx.)                     | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.) |                             |
| Cathode to All Other Electrodes              | 5 $\mu$ f                   |
| Grid No. 1 to All Other Electrodes           | 6 $\mu$ f                   |
| Ion Trap Magnet                              | External, Single Field Type |

### MECHANICAL DATA

|  |  |
|--|--|
| Minimum Useful Screen Dimensions         | 16 $\frac{3}{4}$ x 21 $\frac{1}{4}$ Inches |
| Bulb Contact (Recessed Small Cavity Cap) | J1-21                                      |
| Base (Small Shell Duodecal 5-Pin)        | B5-57                                      |
| Basing                                   | 12D  |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                 |
|--|-----------------|
| Anode Voltage                                  | 20000 Volts d c |
| Grid No. 2 Voltage                             | 500 Volts d c   |
| Grid No. 1 Voltage                             |                 |
| Negative Bias Value                            | 125 Volts d c   |
| Positive Bias Value                            | 0 Volts d c     |
| Positive Peak Value                            | 2 Volts         |
| Peak Heater-Cathode Voltage                    |                 |
| Heater Negative with Respect to Cathode        |                 |
| During Warm-up Period Not to Exceed 15 Seconds | 410 Volts       |
| After Equipment Warm-up Period                 | 180 Volts       |
| Heater Positive with Respect to Cathode        | 180 Volts       |

### RECOMMENDED OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage                                       | 18000 Volts d c      |
| Grid No. 2 Voltage                                  | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>1</sup> | -28 to -72 Volts d c |
| Focusing Coil Current (approx.) <sup>2</sup>        | 125 Ma d c           |
| Ion Trap Magnet Strength (approx.)                  | 40 Gauss             |



# 24XP4 (Cont'd)

## CIRCUIT VALUES

Grid No. 1 Circuit Resistance ..... 1.5 Megohms  
Max

## NOTES:

1. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
2. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 21¼ x 16¾ inch picture area.

## WARNING

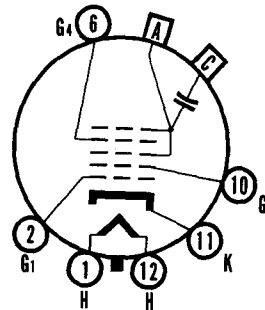
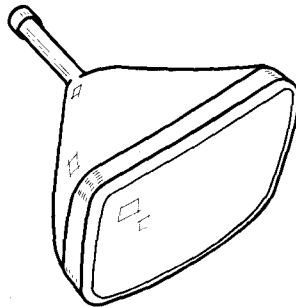
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 24YP4

*Silver Screen "85"*

### TELEVISION PICTURE TUBE

|                             |                       |
|-----------------------------|-----------------------|
| 24" Direct Viewed           | Magnetic Deflection   |
| Rectangular Glass Type      | Electrostatic Focus   |
| Gray Filter Glass           | Spherical Faceplate   |
| External Conductive Coating | Single Field Ion Trap |
| Aluminized Screen           |                       |



12-L

### CHARACTERISTICS

#### GENERAL DATA

|                                     |                   |
|-------------------------------------|-------------------|
| Focusing Method .....               | Electrostatic     |
| Deflecting Method .....             | Magnetic          |
| Deflecting Angle (approx.)          |                   |
| Horizontal .....                    | 85 Degrees        |
| Diagonal .....                      | 90 Degrees        |
| Phosphor .....                      | P4                |
| Fluorescence .....                  | White             |
| Persistence .....                   | Medium            |
| Faceplate .....                     | Gray Filter Glass |
| Light Transmittance (approx.) ..... | 68 Per cent       |

#### ELECTRICAL DATA

|  |                             |
|--|-----------------------------|
| Heater Voltage .....                         | 6.3 Volts                   |
| Heater Current (approx.) .....               | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.) |                             |
| Cathode to All Other Electrodes .....        | 5 µµf                       |
| Grid No. 1 to All Other Electrodes .....     | 6 µµf                       |
| External Conductive Coating to Anode! .....  | 1500 µµf Max.               |
|  | 1200 µµf Min.               |
| Ion Trap Magnet .....                        | External, Single Field Type |

# 24YP4 (Cont'd)

## MECHANICAL DATA

|   |           |        |
|---|-----------|--------|
| Minimum Useful Screen Dimensions.....         | 21½ x 16¾ | Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21     |        |
| Base (Small Shell Duodecal 6-Pin).....        | B6-63     |        |
| Basing.....                                   | 12L       |        |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |               |           |
|--|---------------|-----------|
| Anode Voltage.....                           | 20,000        | Volts d c |
| Grid No. 4 Voltage (Focusing Electrode)..... | -500 to +1000 | Volts d c |
| Grid No. 2 Voltage.....                      | 500           | Volts d c |
| Grid No. 1 Voltage.....                      |               |           |
| Negative Bias Value.....                     | 125           | Volts d c |
| Positive Bias Value.....                     | 0             | Volts d c |
| Positive Peak Value.....                     | 2             | Volts     |
| Peak Heater-Cathode Voltage:                 |               |           |
| Heater Negative with Respect to Cathode      |               |           |
| During Warm-up Period Not to                 |               |           |
| Exceed 15 Seconds.....                       | 410           | Volts     |
| After Equipment Warm-up Period.....          | 180           | Volts     |
| Heater Positive with Respect to Cathode..... | 180           | Volts     |

### RECOMMENDED OPERATING CONDITIONS

|   |             |           |
|---|-------------|-----------|
| Anode Voltage.....                          | 18,000      | Volts d c |
| Grid No. 4 Voltage.....                     | -72 to +396 | Volts d c |
| Grid No. 2 Voltage.....                     | 300         | Volts d c |
| Grid No. 1 Voltage Required for Cutoff..... | -28 to -72  | Volts d c |
| Ion Trap Magnet Strength (approx.).....     | 40          | Gausses   |

### CIRCUIT VALUES

|                                    |     |              |
|------------------------------------|-----|--------------|
| Grid No. 1 Circuit Resistance..... | 1.5 | Megohms Max. |
|------------------------------------|-----|--------------|

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

### WARNING:

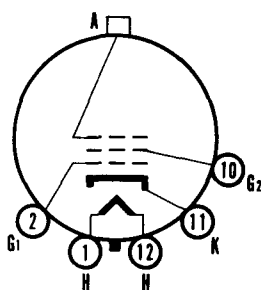
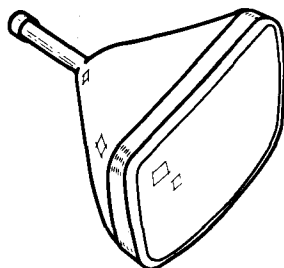
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 27EP4 27RP4

**Silver Screen "85"**

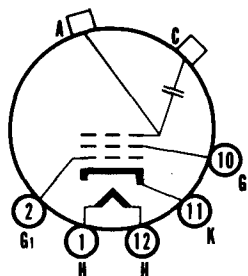
## TELEVISION PICTURE TUBE

27" Direct Viewed                      Magnetic Deflection  
 Rectangular Glass Type              Magnetic Focus  
 Gray Filter Glass                      Spherical Faceplate  
 Aluminized Screen                    Single Field Ion Trap  
 27RP4 has an External Conductive Coating



12-D

27EP4



12-N

27RP4

## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Magnetic          |
| Deflecting Method.....             | Magnetic          |
| Deflecting Angle (approx.)         |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | P4                |
| Fluorescence.....                  | White             |
| Persistence.....                   | Medium            |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 68 Percent        |

### ELECTRICAL DATA

|   |                             |
|---|-----------------------------|
| Heater Voltage.....                               | 6.3 Volts                   |
| Heater Current (approx.).....                     | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.)..... |                             |
| Cathode to All Other Electrodes.....              | 5 $\mu$ f                   |
| Grid No. 1 to All Other Electrodes.....           | 6 $\mu$ f                   |
| Ion Trap Magnet.....                              | External, Single Field Type |

# 27EP4, 27RP4 (Cont'd)

## MECHANICAL DATA

|   |                 |
|---|-----------------|
| Minimum Useful Screen Dimensions.....         | 24 x 18½ Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21           |
| Base (Small Shell Duodecal 5-Pin).....        | B5-57           |
| Basing.....                                   | 12D             |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                 |
|--|-----------------|
| Anode Voltage.....                                 | 20000 Volts d c |
| Grid No. 2 Voltage.....                            | 500 Volts d c   |
| Grid No. 1 Voltage.....                            |                 |
| Negative Bias Value.....                           | 125 Volts d c   |
| Positive Bias Value.....                           | 0 Volts d c     |
| Positive Peak Value.....                           | 2 Volts         |
| Peak Heater-Cathode Voltage.....                   |                 |
| Heater Negative with Respect to Cathode.....       |                 |
| During Warm-up Period Not to Exceed 15 Seconds.... | 410 Volts       |
| After Equipment Warm-up Period.....                | 180 Volts       |
| Heater Positive with Respect to Cathode.....       | 180 Volts       |

### RECOMMENDED OPERATING CONDITIONS

|  |                      |
|--|----------------------|
| Anode Voltage.....                                 | 20000 Volts d c      |
| Grid No. 2 Voltage.....                            | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff.....        | -28 to -72 Volts d c |
| Focusing Coil Current (approx.) <sup>2</sup> ..... | 125 ±20% Ma d c      |
| Ion Trap Magnet Strength (approx.).....            | 40 Gauss             |

### CIRCUIT VALUES

|                                    |                    |
|------------------------------------|--------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms<br>Max |
|------------------------------------|--------------------|

### NOTES:

1. Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about 5 volts more negative.
2. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 24 x 18½ inch picture area.

## 27RP4

The Sylvania Type 27RP4 is identical to Type 27EP4 except for having an external conductive coating which must be grounded.

|   |         |
|---|---------|
| External Conductive Coating to Anode Capacitance..... |         |
| Maximum.....  | 750 μμf |
| Minimum.....  | 500 μμf |
| Basing.....   | 12N     |

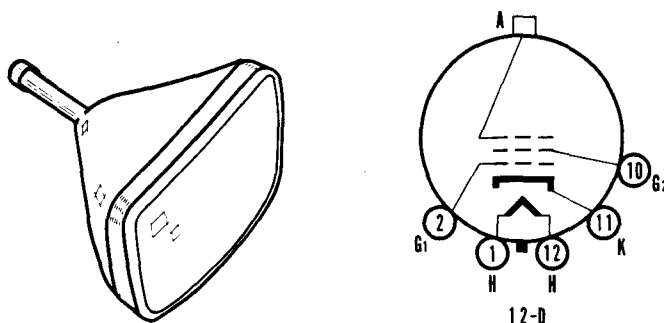
## WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 27GP4

## TELEVISION PICTURE TUBE

27" Direct Viewed  
 Rectangular Glass Type  
 Gray Filter Glass  
 Magnetic Deflection  
 Magnetic Focus  
 Spherical Faceplate  
 Single Field Ion Trap



## CHARACTERISTICS

### GENERAL DATA

|                               |                   |
|-------------------------------|-------------------|
| Focusing Method               | Magnetic          |
| Deflecting Method             | Magnetic          |
| Deflecting Angle (approx.)    |                   |
| Horizontal                    | 85 Degrees        |
| Diagonal                      | 90 Degrees        |
| Phosphor                      | P4                |
| Fluorescence                  | White             |
| Persistence                   | Medium            |
| Faceplate                     | Gray Filter Glass |
| Light Transmittance (approx.) | 68 Percent        |

### ELECTRICAL DATA

|  |                             |
|--|-----------------------------|
| Heater Voltage                               | 6.3 Volts                   |
| Heater Current (approx.)                     | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.) |                             |
| Cathode to All Other Electrodes              | 5 $\mu\mu\text{f}$          |
| Grid No. 1 to All Other Electrodes           | 6 $\mu\mu\text{f}$          |
| Ion Trap Magnet                              | External, Single Field Type |

### MECHANICAL DATA

|  |  |
|--|--|
| Minimum Useful Screen Dimensions         | 24 $\frac{1}{4}$ x 18 $\frac{1}{2}$ Inches |
| Bulb Contact (Recessed Small Cavity Cap) | J1-21                                      |
| Base (Small Shell Duodecal 5-Pin)        | B5-57                                      |
| Basing                                   | 12D  |

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                 |
|--|-----------------|
| Anode Voltage                                  | 22500 Volts d c |
| Grid No. 2 Voltage                             | 500 Volts d c   |
| Grid No. 1 Voltage                             |                 |
| Negative Bias Value                            | 125 Volts d c   |
| Positive Bias Value                            | 0 Volts d c     |
| Positive Peak Value                            | 2 Volts         |
| Peak Heater-Cathode Voltage                    |                 |
| Heater Negative with Respect to Cathode        |                 |
| During Warm-up Period Not to Exceed 15 Seconds | 410 Volts       |
| After Equipment Warm-up Period                 | 180 Volts       |
| Heater Positive with Respect to Cathode        | 180 Volts       |

### RECOMMENDED OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage                                       | 20000 Volts d c      |
| Grid No. 2 Voltage                                  | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>1</sup> | -28 to -72 Volts d c |
| Focusing Coil Current (approx.) <sup>2</sup>        | 125 $\pm$ 20% Ma d c |
| Ion Trap Magnet Strength (approx.)                  | 40 Gauss             |

### CIRCUIT VALUES

|                               |                    |
|-------------------------------|--------------------|
| Grid No. 1 Circuit Resistance | 1.5 Megohms<br>Max |
|-------------------------------|--------------------|

# 27GP4 (Cont'd)

## NOTES:

1. Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about 5 volts more negative.
2. For JETEC focusing coil No. 109 or equivalent 3 inches from reference line bias adjusted to 20 foot lamberts on a 24 $\frac{1}{4}$  x 18 $\frac{1}{2}$  inch picture area.

## WARNING

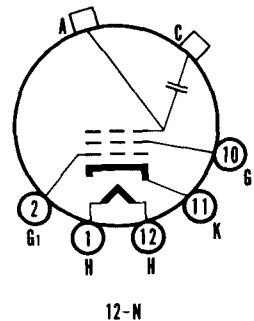
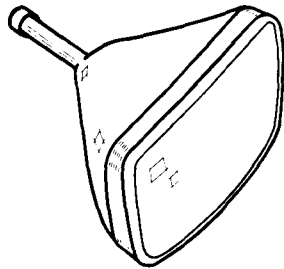
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 27LP4

**Silver Screen "85"**

### TELEVISION PICTURE TUBE

|                             |                       |
|-----------------------------|-----------------------|
| 27" Direct Viewed           | Magnetic Deflection   |
| Rectangular Glass Type      | Magnetic Focus        |
| Gray Filter Glass           | Spherical Faceplate   |
| External Conductive Coating | Single Field Ion Trap |
| Aluminized Screen           |                       |



### CHARACTERISTICS

#### GENERAL DATA

|                                 |                   |
|---------------------------------|-------------------|
| Focusing Method.....            | Magnetic          |
| Deflecting Method.....          | Magnetic          |
| Deflecting Angle (approx.)..... |                   |
| Horizontal.....                 | 85 Degrees        |
| Diagonal.....                   | 90 Degrees        |
| Phosphor.....                   | P4                |
| Fluorescence.....               | White             |
| Persistence.....                | Medium            |
| Faceplate.....                  | Gray Filter Glass |

#### ELECTRICAL DATA

|   |                             |
|---|-----------------------------|
| Heater Voltage.....                                     | 6.3 Volts                   |
| Heater Current (approx.).....                           | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.).....       |                             |
| Cathode to All Other Electrodes.....                    | 5.0 $\mu\mu\text{f}$        |
| Grid No. 1 to All Other Electrodes.....                 | 6.0 $\mu\mu\text{f}$        |
| External Conductive Coating to Anode <sup>1</sup> ..... | 400 $\mu\mu\text{f}$ Max    |
|   | 250 $\mu\mu\text{f}$ Min    |
| Ion Trap Magnet.....                                    | External, Single Field Type |

#### MECHANICAL DATA

|   |  |
|---|--|
| Minimum Useful Screen Dimensions.....         | 23 $\frac{1}{32}$ x 18 $\frac{1}{32}$ Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21  |
| Base (Small Shell Duodecal 5-Pin).....        | B5-57  |
| Basing.....                                   | 12N  |

# 27LP4 (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Design Center Values)

|  |                 |
|--|-----------------|
| Anode Voltage.....                                 | 22000 Volts d c |
| Grid No. 2 Voltage.....                            | 600 Volts d c   |
| Grid No. 1 Voltage.....                            |                 |
| Negative Bias Value.....                           | 125 Volts d c   |
| Positive Bias Value.....                           | 0 Volts d c     |
| Positive Peak Value.....                           | 2 Volts         |
| Peak Heater-Cathode Voltage.....                   |                 |
| Heater Negative with Respect to Cathode.....       |                 |
| During Warm-up Period Not to Exceed 15 Seconds.... | 410 Volts       |
| After Equipment Warm-up Period.....                | 180 Volts       |
| Heater Positive with Respect to Cathode.....       | 180 Volts       |

### RECOMMENDED OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....  | 20000 Volts d c      |
| Grid No. 2 Voltage.....                                   | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>2</sup> ..... | -28 to -72 Volts d c |
| Focusing Coil Current (approx.) <sup>3</sup> .....        | 148 Ma d c           |
| Ion Trap Magnet Strength (approx.).....                   | 40 Gauss             |

### CIRCUIT VALUES

|                                    |             |
|------------------------------------|-------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms |
|                                    | Max         |

### NOTES:

1. Conductive coating must be grounded.
2. Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about 5 volts more negative.
3. For JETEC focusing coil No. 109 or equivalent.

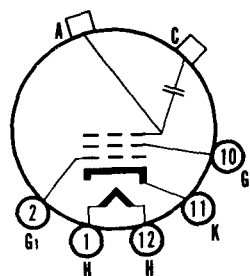
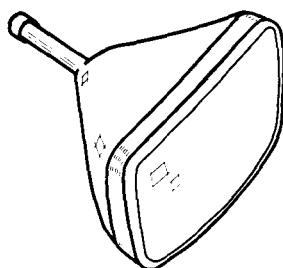
### WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 27NP4

### TELEVISION PICTURE TUBE

|                             |                       |
|-----------------------------|-----------------------|
| 27" Direct Viewed           | Magnetic Deflection   |
| Rectangular Glass Type      | Magnetic Focus        |
| Gray Filter Glass           | Spherical Faceplate   |
| External Conductive Coating | Single Field Ion Trap |



12-N

# 27NP4 (Cont'd)

## CHARACTERISTICS

### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Magnetic          |
| Deflecting Method.....             | Magnetic          |
| Deflecting Angle (approx.).....    |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | P4                |
| Fluorescence.....                  | White             |
| Persistence.....                   | Medium            |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 68 Percent        |

### ELECTRICAL DATA

|   |  |
|---|--|
| Heater Voltage.....                                     | 6.3 Volts                                      |
| Heater Current (approx.).....                           | 0.6 Amperes                                    |
| Direct Interelectrode Capacitances (approx.).....       |  |
| Cathode to All Other Electrodes.....                    | 5 $\mu\text{f}$                                |
| Grid No. 1 to All Other Electrodes.....                 | 6 $\mu\text{f}$                                |
| External Conductive Coating to Anode <sup>1</sup> ..... | 750 $\mu\text{f}$ Max<br>500 $\mu\text{f}$ Min |
| Ion Trap Magnet.....                                    | External, Single Field Type                    |

### MECHANICAL DATA

|   |                  |
|---|------------------|
| Minimum Useful Screen Dimensions.....         | 24¼ x 18½ Inches |
| Bulb Contact (Recessed Small Cavity Cap)..... | J1-21            |
| Base (Small Shell Duodecal 5-Pin).....        | B5-57            |
| Basing.....                                   | 12N              |

### RATINGS

#### MAXIMUM RATINGS (Design Center Values)

|   |                 |
|---|-----------------|
| Anode Voltage.....                                  | 18000 Volts d c |
| Grid No. 2 Voltage.....                             | 500 Volts d c   |
| Grid No. 1 Voltage.....                             |                 |
| Negative Bias Value.....                            | 125 Volts d c   |
| Positive Bias Value.....                            | 0 Volts d c     |
| Positive Peak Value.....                            | 2 Volts         |
| Peak Heater-Cathode Voltage.....                    |                 |
| Heater Negative with Respect to Cathode.....        |                 |
| During Warm-up Period Not to Exceed 15 Seconds..... | 410 Volts       |
| After Equipment Warm-up Period.....                 | 180 Volts       |
| Heater Positive with Respect to Cathode.....        | 180 Volts       |

#### RECOMMENDED OPERATING CONDITIONS

|   |                      |
|---|----------------------|
| Anode Voltage.....  | 16000 Volts d c      |
| Grid No. 2 Voltage.....                                   | 300 Volts d c        |
| Grid No. 1 Voltage Required for Cutoff <sup>2</sup> ..... | -28 to -72 Volts d c |
| Focusing Coil Current (approx.) <sup>3</sup> .....        | 95 $\pm$ 20% Ma d c  |
| Ion Trap Magnet Strength (approx.).....                   | 35 Gauss             |

#### CIRCUIT VALUES

|                                    |                    |
|------------------------------------|--------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms<br>Max |
|------------------------------------|--------------------|

#### NOTES:

1. Conductive coating must be grounded.
2. Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about 5 volts more negative.
3. For JETEC focusing coil 109 or equivalent 3 inches from reference line, bias adjusted to 20 foot lamberts on a 24¼ x 18½ inch picture area.

#### WARNING

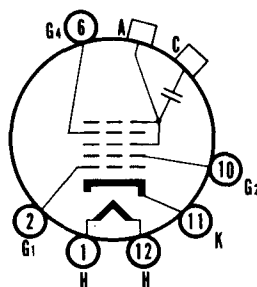
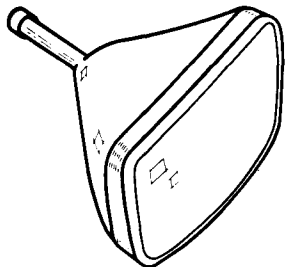
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.



# SYLVANIA TYPE 27SP4

## TELEVISION PICTURE TUBE

27" Direct Viewed Magnetic Deflection  
 Rectangular Glass Type Electrostatic Focus  
 Gray Filter Glass Spherical Faceplate  
 External Conductive Coating Single Field Ion Trap  
 Aluminized Screen



12-L

### CHARACTERISTICS

#### GENERAL DATA

|                                    |                   |
|------------------------------------|-------------------|
| Focusing Method.....               | Electrostatic     |
| Deflecting Method.....             | Magnetic          |
| Deflecting Angle (approx.)         |                   |
| Horizontal.....                    | 85 Degrees        |
| Diagonal.....                      | 90 Degrees        |
| Phosphor.....                      | P4                |
| Fluorescence.....                  | White             |
| Persistence.....                   | Medium            |
| Faceplate.....                     | Gray Filter Glass |
| Light Transmittance (approx.)..... | 68 Percent        |

#### ELECTRICAL DATA

|   |                             |
|---|-----------------------------|
| Heater Voltage.....                                     | 6.3 Volts                   |
| Heater Current (approx.).....                           | 0.6 Ampere                  |
| Direct Interelectrode Capacitances (approx.)            |                             |
| Cathode to All Other Electrodes.....                    | 5 $\mu\text{f}$             |
| Grid No. 1 to All Other Electrodes.....                 | 6 $\mu\text{f}$             |
| External Conductive Coating to Anode <sup>1</sup> ..... | 750 $\mu\text{f}$ Max       |
|   | 500 $\mu\text{f}$ Min       |
| Ion Trap Magnet.....                                    | External, Single Field Type |

#### MECHANICAL DATA

|  |                 |
|--|-----------------|
| Minimum Useful Screen Dimensions.....          | 24 x 18½ Inches |
| Bulb Contact, (Recessed Small Cavity Cap)..... | J1-21           |
| Base (Small Shell Duodecal 6-Pin).....         | B6-63           |
| Basing.....                                    | 12L             |

### RATINGS

#### MAXIMUM RATINGS (Design Center Values)

|  |                         |
|--|-------------------------|
| Anode Voltage.....                           | 20000 Volts d c         |
| Grid No. 4 Voltage (Focusing Electrode)..... | -500 to +1000 Volts d c |
| Grid No. 2 Voltage.....                      | 500 Volts d c           |
| Grid No. 1 Voltage                           |                         |
| Negative Bias Value.....                     | 125 Volts d c           |
| Positive Bias Value.....                     | 0 Volts d c             |
| Positive Peak Value.....                     | 2 Volts                 |
| Peak Heater-Cathode Voltage                  |                         |
| Heater Negative with Respect to Cathode      |                         |
| During Warm-up Period Not to                 |                         |
| Exceed 15 Seconds.....                       | 410 Volts               |
| After Equipment Warm-up Period.....          | 180 Volts               |
| Heater Positive with Respect to Cathode..... | 180 Volts               |

## 27SP4 (Cont'd)

### RECOMMENDED OPERATING CONDITIONS

|   |                       |
|---|-----------------------|
| Anode Voltage .....                                       | 18000 Volts d c       |
| Grid No. 4 Voltage.....                                   | -72 to +396 Volts d c |
| Grid No. 2 Voltage.....                                   | 300 Volts d c         |
| Grid No. 1 Voltage Required for Cutoff <sup>2</sup> ..... | -28 to -72 Volts d c  |
| Ion Trap Magnet Strength (approx.).....                   | 40 Gausses            |

### CIRCUIT VALUES

|                                    |                    |
|------------------------------------|--------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms<br>Max |
|------------------------------------|--------------------|

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about 5 volts more negative.

### WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.