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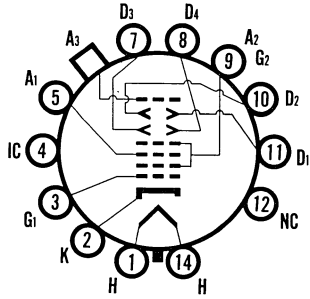
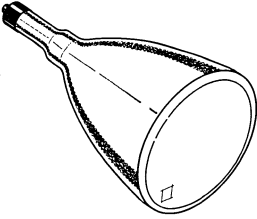
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condensed tube data page and the first picture tube page.)

# SYLVANIA TYPE SC-2558

## SPECIAL PURPOSE TUBE

12" Direct Viewed  
Round Glass Type  
Oscilloscope Tube

Electrostatic Deflection  
Electrostatic Focus  
Post Deflection Acceleration



14-J

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Electrostatic
Phosphor*.....	P7
Fluorescence.....	Blue-White
Phosphorescence.....	Yellow
Persistence.....	Long
Faceplate.....	Gray Filter Glass

\*In addition to the P7 screen shown, the SC-2558 can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	10 μmf
Grid No. 1 to All Other Electrodes.....	8 μmf
Between Deflecting Plates 1-2.....	4 μmf
Between Deflecting Plates 3-4.....	2 μmf
Deflecting Plate 1 to All Other Electrodes	
Except D2.....	8 μmf
Deflecting Plate 2 to All Other Electrodes	
Except D1.....	8 μmf
Deflecting Plate 3 to All Other Electrodes	
Except D4.....	6 μmf
Deflecting Plate 4 to All Other Electrodes	
Except D3.....	6 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	11 Inches
Over All Length.....	22 1/4 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14J
Weight (approx.).....	12 Pounds
J1-21 Contact Aligns with Trace D1D2.....	± 10 Degrees
J1-21 Contact Aligns with Pin No. 5.....	± 10 Degrees
Positive Voltage on D1 Deflects Beam	
Approx. Toward Pin No. 5	
Positive Voltage on D3 Deflects Beam	
Approx. Toward Pin No. 1	

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage.....	12,000 Volts d c
Anode No. 2 Voltage.....	6000 Volts d c
Anode No. 1 Voltage.....	2500 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	200 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	2 Volts

# SYLVANIA TYPE SC-2558 (Cont'd)

Peak Heater Cathode Voltage	
Heater Negative with Respect to Cathode.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts
Peak Voltage Between Anode No. 2 and Any Deflecting Plate .....	750 Volts
Ratio Post Accelerator Voltage to Anode Voltage..	2.3:1
Anode Input <sup>1</sup> .....	6 Watts

## TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage.....	10,000 Volts d c
Anode No. 2 Voltage.....	5000 Volts d c
*Anode No. 1 Voltage for Focus.....	1300 to 2200 Volts d c
*Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-60 to -100 Volts d c
Deflection Factor <sup>3</sup>	
*Deflecting Plates 1-2.....	105 to 145 Volts/Inch
*Deflecting Plates 3-4.....	80 to 115 Volts/Inch
Modulation <sup>4</sup> .....	30 Volts Max.
*Line Width "A" <sup>4</sup> .....	.5 MM
Focus Electrode Current <sup>4</sup> .....	-15 to +10 $\mu$ a d c
Spot Position, Undelected.....	Within 30 MM Sq.
Angle Between D1D2 and D3D4 Trace.....	90 $\pm$ 2 Degrees

## CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Resistance in Any Deflection Plate Circuit.....	5.0 Megohms Max.

## NOTES:

1. Anode input equals the product of anode No. 2 voltage and average anode No. 2 current.
2. For visual extinction of undeflected focused spot.
3. Deflection plates 1 and 2 are nearer the screen. Plates 3 and 4 are more sensitive and with post acceleration may produce less than full screen coverage.
4. Measured in accordance with MIL-E-1C specification at a post accelerator current (IA3) equal to 25  $\mu$ a.

## WARNING:

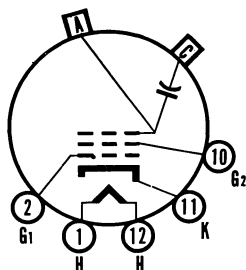
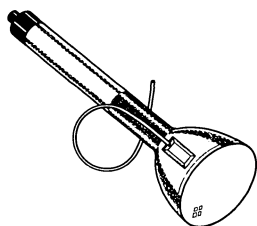
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE SC-2809

## SPECIAL PURPOSE TUBE

High Resolution Tube  
0.0008" Line Width  
Aluminized Screen  
Magnetic Deflection  
No Ion Trap

5" Flat, Optical Glass Faceplate  
Ext. Conductive Coating on Neck  
Clear Non-Browning Faceplate  
Extremely Fine Grain Screen  
Magnetic Focus



12-N

## DESCRIPTION

Sylvania Type SC-2809 is a 5-inch diameter Cathode-Ray Tube designed for high resolution photographic recording. Its electron-optical system and fine grain screen achieve very fine trace width with conventional focusing and deflection units and a simple beam-centering magnet. The tube has a flat, clear, non-browning optical glass faceplate for optimum photographic quality. An integral encapsulated high voltage connector is utilized to minimize corona at high altitude.

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflection Method.....	Magnetic
Deflection Angle (approx.).....	50 Degrees
Type*.....	SC-2809
Phosphor.....	Aluminized, Fine Grain P11
Fluorescence.....	Blue
Persistence.....	Short
Faceplate.....	Clear, Non-Browning Optical Glass

\*In addition to the type shown the SC-2809 can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes.....	10 μmf
Cathode to All Other Electrodes.....	5.5 μmf
External Conductive Coating to Anode.....	500 μmf Max. 100 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 1/4 Inches
Overall Length.....	16 3/8 ± 3/8 Inches
Bulb.....	C40 Exp. 14 or Equiv.
Anode Terminal.....	16", HV Cable, Corona Protected
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	25,000 Volts d c
Anode Current (Eg1 = 0 Volts).....	3.0 μa d c
Grid No. 2 Voltage.....	2500 Volts d c
Grid No. 2 Current (Eg1 = 0 Volts).....	2000 μa d c
Grid No. 1 Voltage	
Negative Bias Value.....	150 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode	
During Warm-up Period not to Exceed 15 Secs.	450 Volts
After Equipment Warm-up.....	165 Volts
Heater Positive with Respect to Cathode.....	165 Volts

# SYLVANIA TYPE SC-2809 (Cont'd)

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	20,000 Volts d c
Grid No. 2 Voltage.....	2000 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	100 Ma
Line Width <sup>3</sup> .....	0.0008 Inch

## CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
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## NOTES:

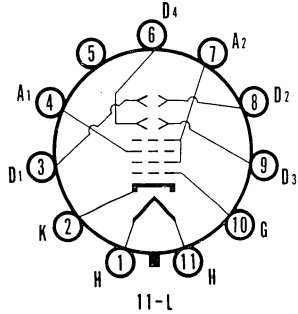
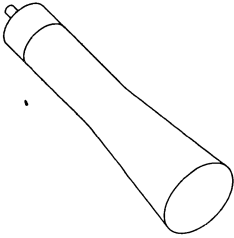
1. Visual extinction of undeflected focused spot.
2. For JEDEC focusing coil 106 or equivalent  $2\frac{1}{2}$ " from reference line.
3. Line width measured at  $2\ \mu\text{a}$  anode current by the shrinking raster method. Variable strength (0-10 gauss) beam centering magnet must be used for optimum line width.

# SYLVANIA TYPE 2AP1A 2AP-A\*

## SPECIAL PURPOSE TUBE

2" Direct Viewed  
Round Glass Type

Electrostatic Deflection  
Electrostatic Focus



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Electrostatic
Phosphor.....	P1
Fluorescence.....	Green
Persistence.....	Medium
Faceplate.....	Clear

\*In addition to the Type shown, the 2AP-A can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5.5 $\mu\text{mf}$
Grid to All Other Electrodes.....	8.0 $\mu\text{mf}$
Between Deflecting Plates 1-2 <sup>1</sup> .....	0.6 $\mu\text{mf}$
Between Deflecting Plates 3-4 <sup>1</sup> .....	1.1 $\mu\text{mf}$
Deflecting Plate 1 <sup>2</sup> to All Other Electrodes.....	8.5 $\mu\text{mf}$
Deflecting Plate 3 <sup>2</sup> to All Other Electrodes.....	9.0 $\mu\text{mf}$
Deflecting Plate 1 to All Other Electrodes Except D2.....	8.0 $\mu\text{mf}$
Deflecting Plate 2 <sup>2</sup> to All Other Electrodes Except D1.....	4.6 $\mu\text{mf}$
Deflecting Plate 3 to All Other Electrodes Except D4.....	7.5 $\mu\text{mf}$
Deflecting Plate 4 <sup>2</sup> to All Other Electrodes Except D3.....	6.0 $\mu\text{mf}$

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	1 $\frac{3}{4}$ Inches
Nominal Overall Length.....	7 $\frac{7}{16}$ Inches
Base.....	Small Shell Magnal 11-Pin
Basing.....	11L

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	1100 Volts d c
Anode No. 1 Voltage.....	550 Volts d c
Grid Voltage	
Negative Bias Value.....	125 Volts d c
Positive Bias Value.....	0 Volts d c
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	125 Volts
Heater Positive with Respect to Cathode.....	10 Volts
Peak Voltage Between Anode No. 2 and Any Deflection Plate.....	660 Volts

# SYLVANIA TYPE 2AP1A, 2AP-A\* (Cont'd)

## TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>3</sup> .....	1000 Volts d c
Anode No. 1 Voltage for Focus.....	137 to 300 Volts d c
Grid Voltage Required for Cutoff <sup>4</sup> .....	-30 to -90 Volts d c
Deflection Factor	
Deflecting Plates 1-2 <sup>5</sup> .....	204 to 256 Volts d c/Inch
Deflecting Plates 3-4 <sup>6</sup> .....	157 to 235 Volts d c/Inch

## CIRCUIT VALUES

Grid Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

## NOTES:

1. Deflecting Plate 1 is Pin No. 3.  
Deflecting Plate 2 is Pin No. 8.  
Deflecting Plate 3 is Pin No. 9.  
Deflecting Plate 4 is Pin No. 6.
2. With D1 Positive with Respect to D2, the spot is deflected toward Pin No. 4;  
with D3 Positive with Respect to D4, the spot is deflected toward Pin No. 1.
3. Brilliance and definition decrease with decreasing Anode No. 2 Voltage. In general, Anode No. 2 Voltage should not be less than 500 volts.
4. Visual extinction of undeflected focused spot.
5. Deflecting Plates 1-2 are nearer the screen.
6. Deflecting Plates 3-4 are nearer the base.

## 2AP1

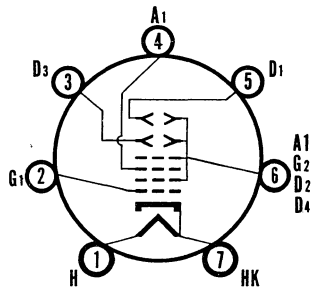
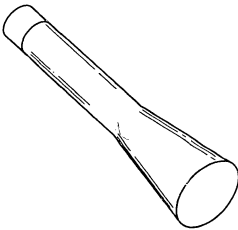
Sylvania Type 2AP1A replaces Type 2AP1.

# SYLVANIA TYPE 3AP1A 3AP-A\*

## SPECIAL PURPOSE TUBE

3" Direct Viewed  
Round Glass Type

Electrostatic Deflection  
Electrostatic Focus



7-CE

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Electrostatic
Phosphor.....	P1
Fluorescence.....	Green
Persistence.....	Medium
Faceplate.....	Clear

\*In addition to the type shown, the 3AP-A can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	2.5 Volts
Heater Current (approx.).....	2.1 Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes.....	9 $\mu$ f
Deflecting Plate 1 <sup>1</sup> to All Other Electrodes.....	8.5 $\mu$ f
Deflecting Plate 3 <sup>1</sup> to All Other Electrodes.....	6.5 $\mu$ f



# SYLVANIA TYPES 3ACP1A 3ACP-A\*

3" Direct Viewed

Round Glass Type

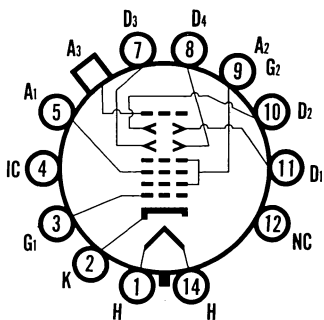
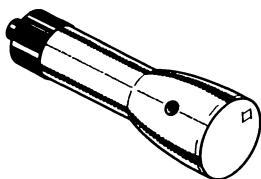
Electrostatic Deflection

Post Deflection Acceleration

Electrostatic Focus

Close Tolerances

Flat Face



14-J

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Electrostatic
Types*	Fluorescence Phosphorescence Persistence
3ACP1A.....	Green..... Medium
3ACP2A.....	Blue-Green..... Long
3ACP7A.....	Blue-White..... Long
3ACP11A.....	Blue..... Short
3ACP12A.....	Orange..... Medium Long
Faceplate.....	Flat, Clear

\*In addition to the types shown, the 3ACP-A can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Amperes
Direct Interelectrode Capacitances (Max.)	
Cathode to All Other Electrodes.....	4.2 μf
Grid to All Other Electrodes.....	5.5 μf
Between Deflecting Plates 1-2.....	2.1 μf
Between Deflecting Plates 3-4.....	1.5 μf
Deflecting Plate 1 to All Other Electrodes...	5.8 μf
Deflecting Plate 2 to All Other Electrodes...	5.8 μf
Deflecting Plate 3 to All Other Electrodes...	4.5 μf
Deflecting Plate 4 to All Other Electrodes...	4.5 μf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	2.68 Inches
Nominal Overall Length.....	10 Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Bulb.....	J24V
Base (Medium-Shell Diheptal 12-Pin).....	B12-37
Basing.....	14J
Base Alignment	
D1D2 trace aligns with Pin No. 5 and Tube Axis.....	± 10 Degrees
Positive Voltage on D1 deflects beam approx. toward Pin No. 5	
Positive Voltage on D3 deflects beam approx. toward Pin No. 2	
Angle Between Traces D1D2 and D3D4.....	90 ± 1 Degrees
Bulb Contact Alignment	
J1-22 contact aligns with D1D2 Trace.....	± 10 Degrees
J1-22 contact on same side as Pin No. 5	

# SYLVANIA TYPES 3ACP1A, 3ACP-A\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage.....	6600 Volts d c
Anode No. 2 Voltage.....	2200 Volts d c
Ratio Anode No. 3 to Anode No. 2 Voltage <sup>1</sup> ...	3.0
Anode No. 2 Input (Avg. except for 3ACP12A).....	6.0 Watts
Anode No. 1 Voltage (Focusing Electrode).....	1650 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode....	200 Volts
Heater Positive with Respect to Cathode....	200 Volts
Peak Voltage Between Anode No. 2 and	
Any Deflection Plate.....	600 Volts

### TYPICAL OPERATING CONDITIONS<sup>2</sup>

Anode No. 3 Voltage.....	4000 Volts d c
Anode No. 2 Voltage.....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	390 to 550 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>3</sup> .....	-45 to -75 Volts d c
Anode No. 3 Current <sup>4</sup> .....	500 $\mu$ a d c Min.
Cathode Current <sup>5</sup> .....	125 $\mu$ a d c Max.
Cathode Current <sup>6</sup> .....	600 $\mu$ a d c Max.
Deflection Factor	
Deflecting Plates 1-2.....	175 to 205 Volts d c/Inch
Deflecting Plates 3-4.....	138 to 158 Volts d c/Inch
Deflection Factor Uniformity <sup>7</sup> .....	2 Percent Max.
Pattern Distortion <sup>8</sup> .....	2 Percent Max.
Modulation at Anode No. 3 Current =	
25 $\mu$ Adc <sup>7</sup> .....	21 Volts d c Max.
Modulation at Anode No. 3 Current =	
200 $\mu$ Adc <sup>7</sup> (Except 3ACP12A).....	45 Volts d c Max.
Line Width "A" at Anode No. 3 Current =	
5 $\mu$ a (3ACP12A).....	.012 Inches Max.
Line Width "A" at Anode No. 3 Current =	
50 $\mu$ Adc <sup>7</sup> (Except 3ACP12A).....	.016 Inches Max.
Line Width "A" at Anode No. 3 Current =	
200 $\mu$ Adc <sup>7</sup> (Except 3ACP12A).....	.028 Inches Max.
Light Output at Anode No. 3 Current = 100 $\mu$ Adc <sup>9</sup>	
3ACP1A.....	80 Foot Lamberts Min.
3ACP11A.....	35 Foot Lamberts Min.
Spot Position (Focused and Undelected) <sup>10</sup> .....	Within a $\frac{3}{16}$ Inch Radius Circle

### CIRCUIT VALUES

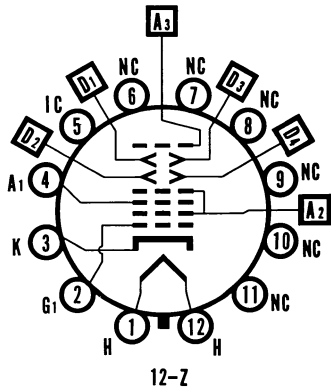
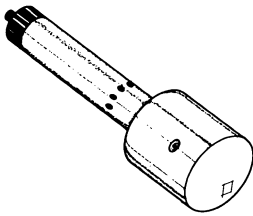
Grid Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>11</sup> .....	1.0 Megohms Max.

### NOTES:

1. These types are designed for optimum performance when operating at EB3/EB2 ratio of 2.0.
2. Type 3ACP12A can be severely and permanently damaged if current density is allowed to rise too high. Test and operate at minimum usable currents.
3. Visual extinction of undeflected focused spot.
4. At EG1 = 0 V d c.
5. At IB3 = 50  $\mu$ a d c.
6. At IB3 = 200  $\mu$ a d c.
7. Per MIL-E-1 specifications.
8. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.938 inch square, will fall within the area bounded by the 1.938 inch square and an inscribed 1.862 inch square.
9. Measured in accordance with MIL-E-1 specifications using a raster size of  $1\frac{1}{8} \times 1\frac{1}{8}$  inches. The P11 phosphor is measured with a photronic cell without eye correction.
10. Centered with respect to tube face and with tube shielded. Connect deflecting plates to Anode No. 2.
11. It is recommended that the deflecting electrode circuit resistance be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

# SYLVANIA TYPES 3ADP1 3ADP\*

3" Direct Viewed                      Electrostatic Focus  
 Round Glass Type                    Electrostatic Deflection  
 Flat, Clear Faceplate                Post Deflection Acceleration  
 Close Tolerances



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic		
Deflection Method.....	Electrostatic		
Types*	<b>3ADP1</b>	<b>3ADP2</b>	<b>3ADP7</b> <b>3ADP11</b>
Fluorescence.....	Green	Blue-Green	Blue-White    Blue
Phosphorescence.....		Green	Yellow
Persistence.....	Medium	Long	Long          Short
Faceplate.....	Flat, Clear		

\*In addition to the types shown, the 3ADP can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Amperes
Direct Interelectrode Capacitances	

	Min.	Max.
Cathode to All Other Electrodes.....	3.0	4.5 μμf
Grid No. 1 to All Other Electrodes.....	5.5	7.2 μμf
Between Deflecting Plates 1-2.....	1.4	2.0 μμf
Between Deflecting Plates 3-4.....	0.9	1.5 μμf
Deflecting Plate 1 to All Other Electrodes..	3.6	4.6 μμf
Deflecting Plate 2 to All Other Electrodes..	3.6	4.6 μμf
Deflecting Plate 3 to All Other Electrodes..	2.7	3.6 μμf
Deflecting Plate 4 to All Other Electrodes..	2.7	3.6 μμf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	2.63 Inches
Nominal Overall Length.....	10 Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Neck Contacts.....	J1-25
Base (Small Shell Duodecal 12-Pin).....	B12-43
Basing.....	12Z
Base Alignment	
D1-D2 Trace Aligns with Pin No. 5 and Tube Axis.....	± 10 Degrees
Positive Voltage on D1 Deflects Beam approx. toward Pin No. 5	
Positive Voltage on D3 Deflects Beam approx. toward Pin No. 2	
Angle Between Traces D1-D2 and D3-D4.....	90 ± 1 Degrees
Bulb Contact Alignment	
J1-22 Contact Aligns with D1-D2 Trace.....	± 10 Degrees
J1-22 Contact on same side as Pin No. 5	

# SYLVANIA TYPES 3ADP1, 3ADP\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage.....	6600 Volts d c
Anode No. 2 Voltage <sup>1</sup> .....	3300 Volts d c
Ratio of Anode No. 3 Voltage to Anode No. 2 Voltage.....	2 : 1
Anode No. 1 Voltage (Focusing Electrode).....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts
Peak Voltage Between Anode No. 2 and Any Deflecting Plate.....	600 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage.....	4000 Volts
Anode No. 2 Voltage.....	2000 Volts
Anode No. 1 Voltage for Focus.....	320 to 470 Volts
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-52 to -87 Volts
Deflection Factor	
Deflecting Plates 1-2.....	140 to 160 Volts d c/Inch
Deflecting Plates 3-4.....	61 to 70 Volts d c/Inch
Modulation @ Ib3 = 25 $\mu$ a <sup>3</sup> .....	38 Volts d c Max.
Line Width "A" @ Ib3 = 25 $\mu$ a <sup>3</sup> .....	.014 Inches Max.
Light Output @ Ib3 = 25 $\mu$ a <sup>4</sup>	
3ADP1 <sup>5</sup> .....	20 Ft. L. Min.
3ADP11 <sup>6</sup> .....	14 Ft. L. Min.
Deflection Factor Uniformity <sup>3</sup> .....	2 Percent Max.
Pattern Distortion.....	2 Percent Max.
Undelected Spot Position <sup>3</sup> .....	Within a 10 mm Square
Useful Scan	
D1-D2.....	$\pm$ 1.315 Inches From Tube Face Center or a Total 2.63 Inches Min.
D3-D4.....	$\pm$ 0.75 Inches From Tube Face Center or a Total 1.5 Inches Min.

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>9</sup> .....	1.0 Megohms Max.

### NOTES:

1. The product of the Anode No. 2 Voltage and the Average Anode No. 2 Current should be limited to 6.0 watts.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with MIL-E-1.
4. Using a raster size of 2 $\frac{1}{4}$  x 1 $\frac{1}{2}$  inches.
5. Using a No. 594 Photronic cell with Viscor filter (for eye correction).
6. Using a No. 594 Photronic cell without Viscor filter (without eye correction).
7. All edges of a raster, pattern adjusted so its widest points just touch the sides of 2.295 x 1.530 inch rectangle, will fall within the area bounded by the 2.295 x 1.530 inch rectangle and an inscribed 2.205 x 1.470 inch rectangle.
8. With the tube shielded and with all deflection plates connected to Anode No. 2. Limit square centered on tube face, sides parallel to deflection axes.
9. It is recommended that the deflecting electrode circuit resistances be approximately equal.

### 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 3AP1A, 3AP-A\* (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	2¾ Inches
Nominal Overall Length.....	11½ Inches
Bulb.....	J24C
Base (Medium 7-Pin).....	A7-13
Basing.....	7CE

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	1650 Volts d c
Anode No. 1 Voltage.....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	125 Volts d c
Positive Bias Value.....	0 Volts d c
Peak Voltage Between Anode No. 2 and Deflecting Plate D1 or D3.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>2</sup> .....	1500 Volts d c
Anode No. 1 Voltage.....	240 to 560 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>3</sup> .....	-25 to -75 Volts d c
Deflection Factor <sup>4,5</sup>	
Deflecting Plates 1-2 <sup>5</sup> .....	90 to 137 Volts d c/Inch
Deflecting Plates 3-4 <sup>7</sup> .....	88 to 130 Volts d c/Inch

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

### NOTES:

1. With D2 positive with respect to D1, the spot is deflected toward Pin No. 1. With D4 positive with respect to D3, the spot is deflected toward Pin No. 6.
2. Brilliance and definition decrease with decreasing Anode No. 2 Voltage. In general, Anode No. 2 Voltage should not be less than 1000 Volts.
3. Visual extinction of undeflected focused spot.
4. The plane through the tube axis and Pin 6 may vary from the trace produced by Deflecting Plates 3-4 by an angular tolerance measured about the tube axis; of 10 degrees.
5. Angle between D1-D2 trace and D3-D4 trace is 90° ± 3°.
6. Deflecting Plates 1-2 are nearer the screen.
7. Deflecting Plates 3-4 are nearer the base.

### 3AP1

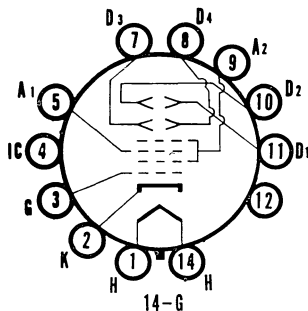
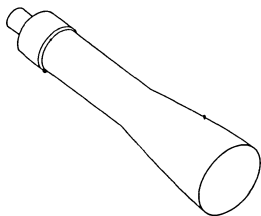
Sylvania Type 3AP1A replaces Type 3AP1.

# SYLVANIA TYPE 3BP1A 3BP-A\*

## SPECIAL PURPOSE TUBE

3" Direct Viewed  
Round Glass Type

Electrostatic Deflection  
Electrostatic Focus



# SYLVANIA TYPE 3BP1A, 3BP-A\* (Cont'd)

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Electrostatic
Phosphor.....	P1
Fluorescence.....	Green
Persistence.....	Medium
Faceplate.....	Clear

\*In addition to the type shown, the 3BP-A can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	8.0 $\mu\text{mf}$
Grid to All Other Electrodes.....	8.5 $\mu\text{mf}$
Between Deflecting Plates 1-2 <sup>1</sup> .....	2.0 $\mu\text{mf}$
Between Deflecting Plates 3-4 <sup>1</sup> .....	2.0 $\mu\text{mf}$
Deflecting Plate 1 <sup>2</sup> to All Other Electrodes.....	8.0 $\mu\text{mf}$
Deflecting Plate 3 <sup>2</sup> to All Other Electrodes.....	6.0 $\mu\text{mf}$
Deflecting Plate 1 to All Other Electrodes	
Except D2.....	6.0 $\mu\text{mf}$
Deflecting Plate 2 <sup>2</sup> to All Other Electrodes	
Except D1.....	5.0 $\mu\text{mf}$
Deflecting Plate 3 to All Other Electrodes	
Except D4.....	4.0 $\mu\text{mf}$
Deflecting Plate 4 <sup>2</sup> to All Other Electrodes	
Except D3.....	6.0 $\mu\text{mf}$

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	2 $\frac{3}{4}$ Inches
Nominal Overall Length.....	10 Inches
Base.....	Medium Shell Diheptal 12-Pin
Basing.....	14G

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	2200 Volts d c
Anode No. 1 Voltage.....	1100 Volts d c
Grid Voltage	
Negative Value.....	200 Volts d c
Positive Value.....	0 Volts d c
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	125 Volts
Heater Positive with Respect to Cathode.....	10 Volts
Peak Voltage Between Anode No. 2 and	
Any Deflection Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>3</sup> .....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	400 to 690 Volts d c
Grid Voltage Required for Cutoff <sup>4</sup> .....	-30 to -90 Volts d c
Deflection Factor	
Deflecting Plates 1-2 <sup>5</sup> .....	178 to 222 Volts d c/Inch
Deflecting Plates 3-4 <sup>6</sup> .....	118 to 178 Volts d c/Inch

### CIRCUIT VALUES

Grid Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

### NOTES:

1. Deflecting Plate 1 is Pin No. 11.  
Deflecting Plate 2 is Pin No. 10.  
Deflecting Plate 3 is Pin No. 7.  
Deflecting Plate 4 is Pin No. 8.
2. With D1 Positive with Respect to D2, the spot is deflected toward Pin No. 5.  
With D3 Positive with Respect to D4, the spot is deflected toward Pin No. 2.
3. Brilliance and definition decrease with decreasing Anode No. 2 Voltage. In general, Anode No. 2 Voltage should not be less than 1500 volts.
4. Visual extinction of undeflected focused spot.
5. Deflecting Plates 1-2 are nearer the screen.
6. Deflecting Plates 3-4 are nearer the base.

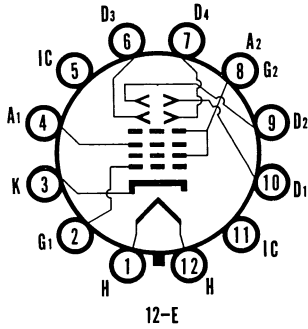
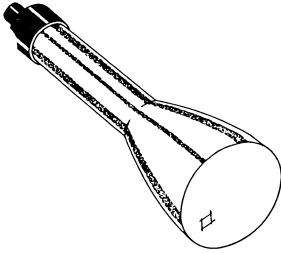
### 3BP1

Sylvania Type 3BP1A replaces Type 3BP1.

# SYLVANIA TYPES 3AQP1 3AQP\*

## SPECIAL PURPOSE TUBE

3" Direct Viewed	Electrostatic Focus
Round Glass Type	Electrostatic Deflection
Clear, Spherical Faceplate	High Deflection Sensitivity



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....			Electrostatic	
Deflection Method.....			Electrostatic	
Types*	<b>3AQP1</b>	<b>3AQP2</b>	<b>3AQP7</b>	<b>3AQP11</b>
Fluorescence.....	Green	Blue-Green	Blue-White	Blue
Phosphorescence.....		Green	Yellow	....
Persistence.....	Medium	Long	Long	Short
Faceplate.....			Clear, Spherical	

\*In addition to the types shown, the 3AQP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	4.3 μmf
Grid No. 1 to All Other Electrodes.....	7.5 μmf
Between Deflecting Plates 1-2.....	5.2 μmf
Between Deflecting Plates 3-4.....	7.0 μmf
Deflecting Plate 1 to All Other Electrodes.....	10.1 μmf
Deflecting Plate 2 to All Other Electrodes.....	7.5 μmf
Deflecting Plate 3 to All Other Electrodes.....	8.1 μmf
Deflecting Plate 4 to All Other Electrodes.....	9.2 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	2¾ Inches
Nominal Overall Length.....	9¼ Inches
Base (Small Shell Duodecal 12-Pin).....	B12-43
Basing.....	12E
Bulb.....	J24P1
Base Alignment	
D1-D2 Trace Aligns with Pin No. 4 and Tube Axis.....	± 10 Degrees
Positive Voltage on D1 Deflects Beam approx. Toward Pin No. 4	
Positive Voltage on D3 Deflects Beam approx. Toward Pin No. 1	
Angle Between D3-D4 and D1-D2 Traces.....	90 ± 1 Degrees
Weight (approx.).....	½ Pound

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	3000 Volts d c
Anode No. 2 Input.....	6.0 Watts
Anode No. 1 Voltage (Focusing Electrode).....	1200 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	2 Volts

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPES 3AQP1 (Cont'd) 3AQP\*

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	140 Volts
Heater Positive with Respect to Cathode	140 Volts
Peak Voltage Between Anode No. 2 and	
Any Deflection Plate	600 Volts

## TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>1</sup>	2000 Volts d c
Anode No. 1 Voltage for Focus	330 to 620 Volts d c
Grid Voltage Required for Cutoff <sup>2</sup>	-58 to -135 Volts d c
Deflection Factors	
Deflecting Plates 1-2 <sup>3</sup>	146 to 198 Volts d c/Inch
Deflecting Plates 3-4 <sup>4</sup>	52 to 70 Volts d c/Inch
Useful Scan	
D1-D2 <sup>5</sup>	2 3/4 Inches Min.
D3-D4 <sup>5</sup>	2 1/4 Inches Min.
Spot Position (Undelected, Focused) <sup>6</sup>	Within 12 MM Square

## CIRCUIT VALUES

Grid Circuit Resistance	1.5 Megohms Max.
Deflection Circuit Resistance <sup>7</sup>	1.0 Megohms Max.

## NOTES:

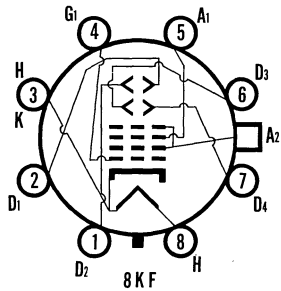
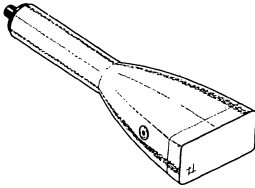
1. Operation of Type 3AQP7 at anode voltages of less than 1000 volts is not recommended.
2. Visual extinction of undeflected focused spot.
3. Deflecting Plates 1-2 are nearer the screen.
4. Deflecting Plates 3-4 are nearer the base.
5. Useful scan to be centered with respect to the tube face.
6. With the tube shielded and all deflection plates connected to anode No. 2. Limit square centered on tube face, with sides parallel to deflection axes.
7. The resistances in each deflecting plate circuit should be approximately equal.



# SYLVANIA TYPES 3ASP1 3ASP\*

## SPECIAL PURPOSE TUBE

1 1/2" x 3" Direct Viewed Electrostatic Deflection  
 Rectangular Glass Type Electrostatic Focus  
 Clear, Pressed Faceplate High Deflection Sensitivity



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Electrostatic
Types*	Fluorescence Phosphorescence Persistence
3ASP1.....	Green Green Medium
3ASP2.....	Blue-Green Green Long
3ASP11.....	Blue Short
Faceplate.....	Flat, Clear

\*In addition to the types shown, the 3ASP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 + 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes.....	4.5 μmf
Between Deflection Plates 1-2.....	2.0 μmf
Between Deflection Plates 3-4.....	2.5 μmf
Deflection Plate 1 to All Other Electrodes.....	6.5 μmf
Deflection Plate 2 to All Other Electrodes.....	6.0 μmf
Deflection Plate 3 to All Other Electrodes.....	5.5 μmf
Deflection Plate 4 to All Other Electrodes.....	5.5 μmf

### MECHANICAL DATA

Minimum Useful Screen Dimensions	
Horizontal.....	2 3/4 Inches
Vertical.....	1 1/8 Inches
Bulb.....	LEA 448 or Equiv.
Base.....	B8-218
Basing.....	8KF
Anode No. 2 Contact.....	J1-22
Base Alignment	
Pin No. 3 aligns with major axis of tube face within 10 degrees, and is on same side as anode contact (J1-22)	
Trace Alignment	
Positive Voltage on D1 (Pin No. 2) with respect to D2, (Pin No. 1) deflects spot approximately toward Pin No. 3.	
Positive Voltage on D3 (Pin No. 6) with respect to D4, (Pin No. 7) deflects spot approximately toward Pin No. 5.	
Angle between D1-D2 and D3-D4 traces.....	90 ± 1 Degree
Angle between D1-D2 and major axis of tube face.	0 ± 1 1/2 Degrees
Deflection Plates	
D1 and D2 are nearer to the tube face	
D3 and D4 are nearer the base	

# SYLVANIA TYPES 3ASPI, 3ASP\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	3000 Volts d c
Anode No. 2 Input.....	6.0 Watts
Anode No. 1 Voltage (Focusing Electrode).....	1200 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	140 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	2 Volts
Peak Voltage between Anode No. 2 and	
Any Deflection Plate.....	600 Volts
Altitude.....	35,000 Feet

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage.....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	400 to 700 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-40 to -70 Volts d c
Deflection Factors	
Deflection Plates 1-2.....	68 to 92 Volts d c/Inch
Deflection Plates 3-4.....	28 to 38 Volts d c/Inch
Spot Position (Undelected, Focused) <sup>2</sup> .....	Within a 15 mm Square
P1 Light Output <sup>4</sup> .....	20 Ft. L. Min.
Modulation <sup>5</sup> .....	38 Volts d c Max.
Line Width A <sup>6</sup> .....	0.65 mm Max.

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>3</sup> .....	1.0 Megohms Max.

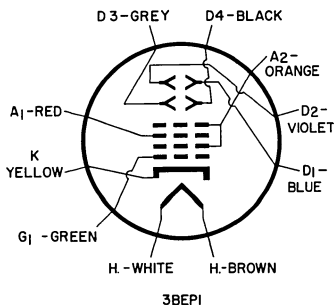
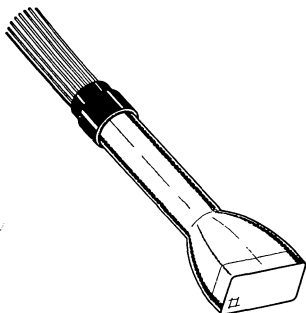
### NOTES:

1. Visual extinction of undeflected focused spot.
2. With the tube shielded and with the deflection plates connected to Anode No. 2. The square shall be centered on the tube face with its sides parallel to the deflection axis.
3. It is recommended that the deflecting electrode circuit resistances be approximately equal.
4. Raster size  $1\frac{1}{8}'' \times 1\frac{1}{16}''$ .
5. Measured at 20 Ft. L. on a raster  $1\frac{1}{8}'' \times 1\frac{1}{16}''$ .
6. Measured by compressed raster method starting with conditions of Note 5.

# SYLVANIA TYPES 3BEP1 3BEP-\*

## SPECIAL PURPOSE TUBE

1 1/2" X 3" Direct Viewed Electrostatic Deflection  
 Rectangular Glass Type Electrostatic Focus  
 High Quality, Clear, Encapsulated Base With  
 Pressed Faceplate Golor Coded Leads  
 Oscilloscope Tube



## DESCRIPTION

Sylvania 3BEP- is a compact, rectangular direct-view oscilloscope tube designed primarily for use in airborne equipment. It features a high quality, nearly flat pressed faceplate, and employs electrostatic focus and deflection. Its encapsulated leads permit operation at high altitude and it will withstand a wide range of temperatures.

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Electrostatic
Phosphor*.....	P1
Fluorescence.....	Green
Phosphorescence.....	.....
Persistence.....	Medium
Faceplate.....	Clear, Pressed Glass

\*In addition to the type shown, the 3BEP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μf
Grid No. 1 to All Other Electrodes.....	8 μf
Between Deflecting Plates 1-2.....	7 μf
Between Deflecting Plates 3-4.....	6 μf
Deflecting Plate 1 to All Other Electrodes.....	9 μf
Deflecting Plate 2 to All Other Electrodes.....	8 μf
Deflecting Plate 3 to All Other Electrodes.....	7 μf
Deflecting Plate 4 to All Other Electrodes.....	8 μf

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Horizontal.....	2 3/4 Inches
Vertical.....	1 1/2 Inches
Overall Length.....	9 1/8 Inches
Bulb.....	LEA 417 or Equivalent
Base.....	Encapsulated, Color Coded Leads
Trace Alignment with Bulb (See Diagram)	
D1-D2 Trace Aligns with Long Axis of Tube Face <sup>1</sup> .....	± 1.5 Degrees
Angle Between D1-D2 Trace and D3-D4 Trace... ..	90 ± 1 Degrees
Weight (approx.).....	3/4 Pound

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPES 3BEP1 (Cont'd) 3BEP-\*

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	3000 Volts d c
Anode No. 1 Voltage (Focusing Electrode).....	1200 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	140 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.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Altitude.....	70,000 Feet
Operating Temperature Range.....	-65 to +85 Degrees C

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage.....	1500 Volts d c
Anode No. 1 Voltage for Focus.....	247 to 465 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-43.5 to -101 Volts d c
Deflection Factors	
Deflecting Plates 1-2 <sup>3</sup> .....	109 to 149 Volts d c/Inch
Deflecting Plates 3-4 <sup>4</sup> .....	78 to 105 Volts d c/Inch
Spot Position (Focused, Undelected) <sup>5</sup> .....	Within a 7.5 mm Square

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Resistance in Any Deflecting Electrode Circuit <sup>6</sup> ...	1.0 Megohms Max.

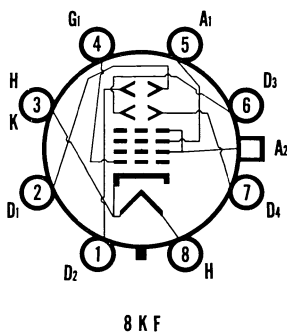
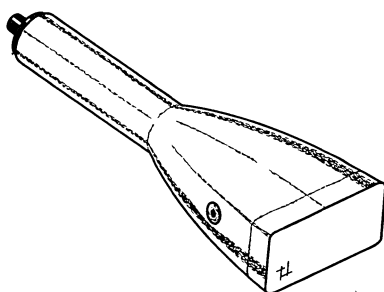
### NOTES:

1. The D1-D2 trace scanning through the geometric center of the tube face will be parallel to the long axis of the tube faces within the limits specified.
2. Visual extinction of undeflected focused spot.
3. Deflecting Plates 1 and 2 are nearer the screen and scan the major dimension of the screen.
4. Deflecting Plates 3 and 4 are nearer the base and scan the minor dimension of the screen.
5. With deflecting plates connected to Anode No. 2 and with tube shielded, the sides of the limit square will be parallel to the deflection axes.
6. It is recommended that the deflecting electrode circuit resistances be approximately equal.

# SYLVANIA TYPES 3BGP1 3BGP\*

## SPECIAL PURPOSE TUBE

Rectangular Glass Type    1½" x 3" Direct Viewed  
 Electrostatic Deflection    Electrostatic Focus  
 Clear, Pressed Faceplate    High Deflection Sensitivity  
 Very Low Heater Power



## DESCRIPTION

Sylvania 3BGP- is a compact, rectangular direct view oscilloscope tube designed for portable oscilloscope and radar applications. It features a high efficiency 1.5 v, 140 ma heater for battery economy and lightweight design. This low heater power design requires only 1/16 of the power necessary to operate a conventional 6.3 v, 600 ma heater.

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic		
Deflection Method.....	Electrostatic		
<b>Types*</b>	<b>Fluorescence</b>	<b>Phosphorescence</b>	<b>Persistence</b>
3BGP1.....	Green	.....	Medium
3BGP2.....	Blue-Green	Green	Long
3BGP7.....	Blue-White	Yellow	Long
3BGP11.....	Blue	.....	Short
Faceplate.....	Flat, Clear		

\*In addition to the types shown, the 3BGP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	1.5 Volts
Heater Current.....	0.140 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes.....	4.5 μf
Between Deflection Plates 1-2.....	2.0 μf
Between Deflection Plates 3-4.....	2.5 μf
Deflection Plate 1 to All Other Electrodes.....	6.5 μf
Deflection Plate 2 to All Other Electrodes.....	6.0 μf
Deflection Plate 3 to All Other Electrodes.....	5.5 μf
Deflection Plate 4 to All Other Electrodes.....	5.5 μf

### MECHANICAL DATA

Minimum Useful Screen Dimensions	
Horizontal.....	2¾ Inches
Vertical.....	1½ Inches
Overall Length.....	9⅞ Inches
Bulb.....	LEA 448 or Equiv.
Base.....	B8-181
Basing.....	8KF
Anode No. 2 Contact.....	J1-22
Base Alignment	
Pin No. 3 aligns with major axis of tube face within 10°, and is on same side as anode contact (J1-22)	

# SYLVANIA TYPES 3BGPI (Cont'd) 3BGP\*

**Trace Alignment**

Positive Voltage on D1 (Pin No. 2) with respect to D2, (Pin No. 1) deflects spot approximately toward Pin No. 3.	
Positive Voltage on D3 (Pin No. 6) with respect to D4, (Pin No. 7) deflects spot approximately toward Pin No. 5.	
Angle between D1-D2 and D3-D4 traces.....	90 ± 1 Degree
Angle between D1-D2 trace and major axis of tube face.....	0 ± 1½ Degrees
<b>Deflection Plates</b>	
D1 and D2 are nearer to the tube face	
D3 and D4 are nearer the base	

## RATINGS

**MAXIMUM RATINGS (Absolute Maximum Values)**

Anode No. 2 Voltage.....	2750 Volts d c
Anode No. 2 Input.....	6.0 Watts
Anode No. 1 Voltage (Focusing Electrode).....	1100 Volts d c
<b>Grid No. 1 Voltage</b>	
Negative Bias Value.....	200 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak-Value.....	2 Volts
<b>Peak Voltage between Anode No. 2 and Any Deflection Plate.....</b>	
	550 Volts
Altitude.....	35,000 Feet

**TYPICAL OPERATING CONDITIONS**

Anode No. 2 Voltage.....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	400 to 700 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-38 to -67½ Volts d c
<b>Deflection Factors</b>	
Deflection Plates 1-2.....	68 to 92 Volts d c/Inch
Deflection Plates 3-4.....	28 to 38 Volts d c/Inch
Spot Position (Undelected, Focused) <sup>2</sup> .....	Within a 15 mm Square
P1 Light Output <sup>4</sup> .....	20 Ft. L. Min.
Modulation <sup>5</sup> .....	38 Volts d c Max.
Line Width A.....	0.65 mm Max.

**CIRCUIT VALUES**

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>3</sup> .....	1.0 Megohms Max.

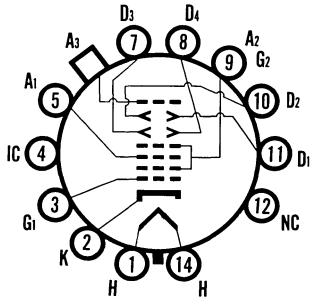
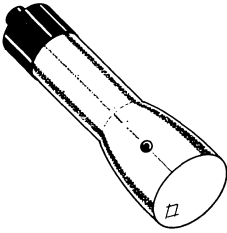
**NOTES:**

1. Visual extinction of undeflected focused spot.
2. With the tube shielded and with the deflection plates connected to Anode No. 2. The square shall be centered on the tube face with its sides parallel to the deflection axis.
3. It is recommended that the deflecting electrode circuit resistances be approximately equal.
4. Raster size 1½" x 1⅝".
5. Measured at 20 Ft. L. on a raster 1⅛" x 1⅝".
6. Measured by compressed raster method starting with conditions of Note 5.

# SYLVANIA TYPES 3BMP1 3BMP-

## SPECIAL PURPOSE TUBE

3" Direct Viewed	Post Deflection Acceleration
Round Glass Type	Very Low Heater Power
Electrostatic Deflection	Flat Face Plate
Electrostatic Focus	Close Tolerances



14-J

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....			Electrostatic
Deflection Method.....			Electrostatic
<b>Types*</b>	<b>Fluorescence</b>	<b>Phosphorescence</b>	<b>Persistence</b>
3BMP1.....	Green		Medium
3BMP2.....	Blue-Green	Green	Long
3BMP7.....	Blue-White	Yellow	Long
3BMP11.....	Blue		Short
3BMP12.....	Orange	Orange	Medium Long
Faceplate.....			Flat, Clear

\*In addition to the types shown, the 3BMP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	1.5 Volts
Heater Current.....	0.14 ± 10% Amperes
Direct Interelectrode Capacitances (Maximum)	
Cathode to All Other Electrodes.....	4.2 μf
Grid to All Other Electrodes.....	5.8 μf
Between Deflecting Plates 1-2.....	2.1 μf
Between Deflecting Plates 3-4.....	1.5 μf
Deflecting Plate 1 to All Other Electrodes.....	5.8 μf
Deflecting Plate 2 to All Other Electrodes.....	5.8 μf
Deflecting Plate 3 to All Other Electrodes.....	4.5 μf
Deflecting Plate 4 to All Other Electrodes.....	4.5 μf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	2.68 Inches
Overall Length.....	10 Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Bulb.....	J24V
Base (Medium-Shell Diheptal 12-Pin).....	B12-37
Basing.....	14J
Base Alignment	
D1-D2 trace aligns with Pin No. 5 and Tube Axis	± 10 Degrees
Positive Voltage on D1 deflects beam approx. toward Pin No. 5	
Positive Voltage on D3 deflects beam approx. toward Pin No. 2	
Angle between traces D1-D2 and D3-D4.....	90 ± 1 Degrees
Bulb Contact Alignment	
J1-22 contact aligns with D1-D2 trace.....	± 10 Degrees
J1-22 contact on same side as Pin No. 5	

# SYLVANIA TYPES 3BMP1, 3BMP (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage.....	6600 Volts d c
Anode No. 2 Voltage.....	2200 Volts d c
Ratio Anode No. 3 to Anode No. 2 Voltage <sup>1</sup> .....	3.0
Anode No. 2 Input (Av. except for 3BMP12) <sup>2</sup> .....	6.0 Watts
Anode No. 1 Voltage (Focusing Electrode).....	1500 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	200 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	50 Volts
Heater Positive with Respect to Cathode.....	0 Volts
Peak Voltage Between Anode No. 2 and	
Deflection Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS<sup>3</sup>

Anode No. 3 Voltage.....	4000 Volts d c
Anode No. 2 Voltage.....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	375 to 575 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>3</sup> .....	-45 to -75 Volts d c
Deflection Factor	
Deflecting Plates 1-2.....	180 to 220 Volts d c/Inch
Deflecting Plates 3-4.....	133 to 163 Volts d c/Inch
Deflection Factor Uniformity <sup>4</sup> .....	2 Percent Max.
Pattern Distortion <sup>5</sup> .....	2 Percent Max.
Modulation at Anode No. 3 Current = 25 $\mu$ Adc <sup>4</sup> ...	38 Volts d c Max.
Line Width "A" at Anode No. 3 Current = 25 $\mu$ Adc	.016 Inches Max.
Light Output at Anode No. 3 Current = 25 $\mu$ Adc <sup>6</sup>	
(3BMP1).....	20 Ft. Lam. Min.
Spot Position <sup>7</sup> .....	Within a 10 mm Square

### CIRCUIT VALUES

Grid Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>8</sup> .....	1.0 Megohms Max.

### NOTES:

1. These types are designed for optimum performance when operating at EB3/EB2 ratio of 2.0.
2. Type 3BMP12 can be severely and permanently damaged if current density is allowed to rise too high. Test and operate at minimum usable currents.
3. Visual extinction of undeflected focused spot.
4. Per MIL-E-1 specifications.
5. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.938 inch square, will fall within the area bounded by the 1.938 inch square and an inscribed 1.862 inch square.
6. Measured in accordance with MIL-E-1 specifications using a raster size of 1 $\frac{1}{8}$  x 1 $\frac{1}{8}$  inches.
7. With tubes magnetically shielded, deflecting plates connected to Anode No. 2, and spot focused. Limit square centered on tube face, with sides parallel to deflection axes.
8. It is recommended that the deflecting electrode circuit resistance be approximately equal. Higher resistance values up to five megohms may be used for low beam current operation.

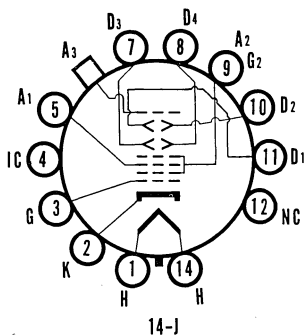
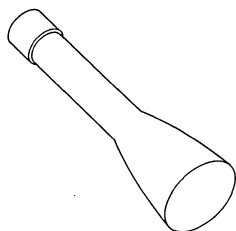


# SYLVANIA TYPE 3JP1 3JP\*

## SPECIAL PURPOSE TUBE

3" Direct Viewed  
Round Glass Type  
Post Deflection Accelerator

Electrostatic Deflection  
Electrostatic Focus



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....				Electrostatic
Deflecting Method.....				Electrostatic
Types*	<b>3JP1</b>	<b>3JP2</b>	<b>3JP7</b>	<b>3JP12</b>
Fluorescence.....	Green	Green	Blue-White	
Phosphorescence.....			Yellow	Orange
Persistence.....	Medium	Long	Long	Medium-Long
Faceplate.....				Clear

\*In addition to the types shown, the 3JP— can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	8 μmf
Grid No. 1 to All Other Electrodes.....	8 μmf
Between Deflecting Plates 1-2 <sup>1</sup> .....	2.5 μmf
Between Deflecting Plates 3-4 <sup>1</sup> .....	2 μmf
Deflecting Plate 1 <sup>1</sup> to All Other Electrodes.....	8 μmf
Deflecting Plate 2 <sup>1</sup> to All Other Electrodes.....	7 μmf
Deflecting Plate 3 <sup>1</sup> to All Other Electrodes.....	7 μmf
Deflecting Plate 4 <sup>1</sup> to All Other Electrodes.....	8 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	2¾ Inches
Nominal Overall Length.....	10 Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14J

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage.....	4400 Volts d c
Anode No. 2 Voltage.....	2200 Volts d c
Anode No. 1 Voltage.....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 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.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between Anode No. 2 and Any Deflecting Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage <sup>2</sup> .....	3000 Volts d c
Anode No. 2 Voltage <sup>3</sup> .....	1500 Volts d c
Anode No. 1 Voltage.....	300 to 515 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-22.5 to 67.5 Volts d c
Deflection Factor <sup>5</sup> a <sup>6</sup>	
Deflecting Plates 1-2 <sup>7</sup> .....	127-173 Volts d c/Inch
Deflecting Plates 3-4 <sup>8</sup> .....	94-128 Volts d c/Inch

# SYLVANIA TYPE 3JP1, 3JP\* (Cont'd)

## CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

## NOTES:

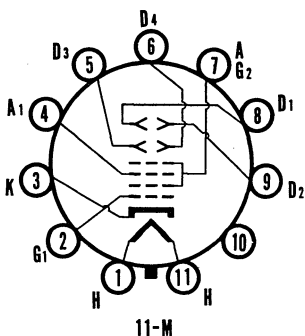
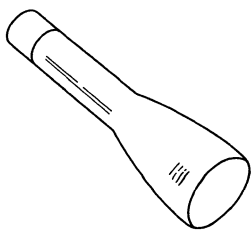
1. Positive voltage on Pin No. 1 will deflect spot approximately toward Pin No. 5.
2. Positive voltage on Pin No. 7 will deflect spot approximately toward Pin No. 2.
3. Anode No. 3 voltage should not be less than 3000 volts for high speed scanning.
4. Recommended minimum value of Anode No. 2 Voltage.
5. Visual extinction of undeflected focused spot.
6. The plane through the tube axis and each of the following items may vary from the trace produced by Deflecting Plates 1-2 by the following angular tolerances measured about the tube axis; Pin 5, 10 degrees; cap (on same side of tube as Pin 5) 10 degrees.
6. Angle between D1-D2 trace and D3-D4 trace is  $90^\circ \pm 3^\circ$ .
7. Deflecting Plates 1-2 are nearer the screen.
8. Deflecting Plates 3-4 are nearer the base.

# SYLVANIA TYPE 3KP1 3KP\*

## SPECIAL PURPOSE TUBE

3" Direct Viewed  
Electrostatic Focus

Round Glass Type  
Electrostatic Deflection



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....			Electrostatic	
Deflecting Method.....			Electrostatic	
Types*	<b>3KP1</b>	<b>3KP4</b>	<b>3KP7</b>	<b>3KP11</b>
Fluorescence.....	Green	White	Blue	Blue
Phosphorescence.....			Yellow	
Persistence.....	Medium	Short	Long	Short
Faceplate.....			Clear	

\*In addition to the types shown, the 3KP-can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	$0.6 \pm 5\%$ Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes.....	8 $\mu\mu\text{f}$
Between Deflecting Plates 1-2 <sup>1</sup> .....	2.5 $\mu\mu\text{f}$
Between Deflecting Plates 3-4 <sup>1</sup> .....	2.5 $\mu\mu\text{f}$
Deflecting Plate 1 <sup>1</sup> to All Other Electrodes.....	11 $\mu\mu\text{f}$
Deflecting Plate 2 <sup>1</sup> to All Other Electrodes.....	8 $\mu\mu\text{f}$
Deflecting Plate 3 <sup>1</sup> to All Other Electrodes.....	7 $\mu\mu\text{f}$
Deflecting Plate 4 <sup>1</sup> to All Other Electrodes.....	8 $\mu\mu\text{f}$

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	2 $\frac{3}{4}$ Inches
Nominal Overall Length.....	11 $\frac{1}{2}$ Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Base (Medium Shell Magnal 11-Pin).....	B11-66
Basing.....	11M
Mounting Position.....	Any

# SYLVANIA TYPE 3KP1, 3KP\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage <sup>2</sup> .....	2750 Volts d c
Anode No. 1 Voltage.....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 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.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between Anode No. 2 and Any Deflecting Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>3</sup> .....	2000 Volts d c
Anode No. 1 Voltage.....	320 to 600 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-38 to -90 Volts d c
Deflection Factor <sup>5, 6</sup>	
Deflecting Plates 1-2 <sup>7</sup> .....	100 to 136 Volts d c/Inch
Deflecting Plates 3-4 <sup>8</sup> .....	76 to 104 Volts d c/Inch

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Resistance in any Deflecting Electrode Circuit....	5.0 Megohms Max.

### NOTES:

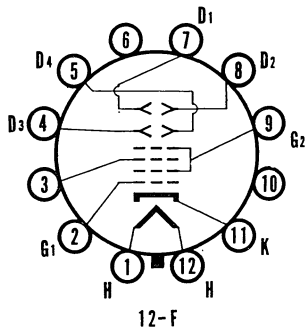
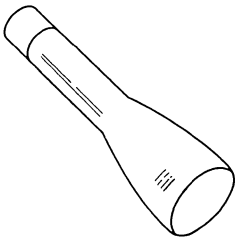
1. With D1 Positive with Respect to D2, the spot is deflected toward Pin 4. With D3 Positive with Respect to D4, the spot is deflected toward Pin 1.
2. Anode No. 2 power input should be limited to 6 watts.
3. Recommended minimum value of Anode No. 2 Voltage is 1000 volts for Type 3KP1. Recommended minimum value of Anode No. 2 Voltage is 1500 volts for Types 3KP4 and 3KP11.
4. Visual extinction of undeflected focused spot.
5. The angle between the trace produced by D3 and D4 and its intersection with the plane through the tube axis and Pin 1 does not exceed 10%.
6. Angle between D1-D2 trace and D3-D4 trace is  $90^\circ \pm 3^\circ$ .
7. Deflecting Plates 1-2 are nearer the screen.
8. Deflecting Plates 3-4 are nearer the base.

## SYLVANIA TYPE 3MP1 3MP\*

### SPECIAL PURPOSE TUBE

3" Direct Viewed  
Electrostatic Deflection

Round Glass Type  
Electrostatic Focus



### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Electrostatic
Phosphor.....	P1
Fluorescence.....	Green
Persistence.....	Medium
Faceplate.....	Clear

\*In addition to the type shown, the 3MP-can be supplied with several other screen phosphors.

# SYLVANIA TYPE 3MP1, 3MP\* (Cont'd)

## ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	2.2 $\mu\text{f}$
Grid to All Other Electrodes.....	10.3 $\mu\text{f}$
Between Deflecting Plates 1-2 <sup>1</sup> .....	1.3 $\mu\text{f}$
Between Deflecting Plates 3-4 <sup>1</sup> .....	1.2 $\mu\text{f}$
Deflecting Plate 1 <sup>2</sup> to All Other Electrodes	
Except D2.....	4.4 $\mu\text{f}$
Deflecting Plate 2 <sup>2</sup> to All Other Electrodes	
Except D1.....	5.6 $\mu\text{f}$
Deflecting Plate 3 <sup>2</sup> to All Other Electrodes	
Except D4.....	5.0 $\mu\text{f}$
Deflecting Plate 4 <sup>2</sup> to All Other Electrodes	
Except D3.....	4.5 $\mu\text{f}$

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	2 $\frac{3}{4}$ Inches
Nominal Overall Length.....	8 Inches
Base.....	Small Shell Duodecal 12-Pin
Basing.....	12F

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	2750 Volts d c
Anode No. 1 Voltage.....	1100 Volts d c
Grid Voltage	
Negative Bias Value.....	220 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.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between Anode No. 2 and	
Any Deflection Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>3</sup> .....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	400 to 700 Volts d c
Grid Voltage Required for Cutoff <sup>4</sup> .....	0 to -126 Volts d c
Deflection Factor	
Deflecting Plates 1-2 <sup>5</sup> .....	230 to 290 Volts d c/Inch
Deflecting Plates 3-4 <sup>6</sup> .....	220 to 280 Volts d c/Inch

### CIRCUIT VALUES

Grid Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

### NOTES:

- Deflecting Plate 1 is Pin No. 7.  
Deflecting Plate 2 is Pin No. 8.  
Deflecting Plate 3 is Pin No. 4.  
Deflecting Plate 4 is Pin No. 5.
- D1-D2 trace aligns with Pin No. 4 and tube axis  $\pm 10^\circ$ .  
Positive voltage on D1 deflects beam approximately toward Pin No. 4.  
Positive voltage on D3 deflects beam approximately toward Pin No. 1.
- Brilliance and definition decreases with decreasing Anode No. 2 Voltage.  
In general, Anode No. 2 Voltage should not be less than 1500 Volts.
- Visual extinction of undeflected focused spot.
- Deflecting Plates 1-2 are nearer the screen.
- Deflecting Plates 3-4 are nearer the base.

# SYLVANIA TYPES 3WP1 3WP\*

## SPECIAL PURPOSE TUBE

3" Direct Viewed

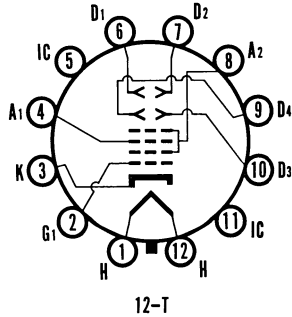
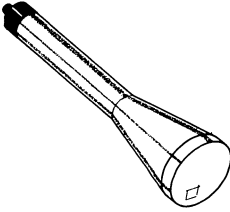
Electrostatic Deflection

Flat, Clear Faceplate

Round Glass Type

Electrostatic Focus

High Deflection Sensitivity



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....		Electrostatic
Deflection Method.....		Electrostatic
Types*	<b>3WP1</b>	<b>3WP2</b> <b>3WP11</b>
Fluorescence.....	Green	Blue-Green      Blue
Phosphorescence.....		Green      ...
Persistence.....	Medium	Long      Short
Faceplate.....		Flat, Clear

\*In addition to the types shown, the 3WP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Amperes
Direct Interelectrode Capacitances	

	Min.	Max.
Cathode to All Other Electrodes.....	3.0	5.7 μmf
Grid No. 1 to All Other Electrodes.....	4.6	8.7 μmf
Between Deflecting Plates 1-2.....	1.7	3.3 μmf
Between Deflecting Plates 3-4.....	1.0	2.0 μmf
Deflecting Plate 1 to All Other Electrodes		
Except D2.....	3.8	7.2 μmf
Deflecting Plate 2 to All Other Electrodes		
Except D1.....	3.8	7.2 μmf
Deflecting Plate 3 to All Other Electrodes		
Except D4.....	2.5	4.8 μmf
Deflecting Plate 4 to All Other Electrodes		
Except D3.....	2.5	4.8 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	2 3/4 Inches
Overall Length.....	11 1/2 Inches
Base (Small Shell Duodecal 12-Pin.....	B12-43
or Small Shell Duodecal 10-Pin).....	B10-75
Basing.....	12T
Base Alignment	
D1 and D2 Trace Aligns with Pin No. 3 and	
Tube Axis.....	± 10 Degrees
Angle Between D1-D2 and D3-D4 Traces.....	90 ± 1 Degree
Positive Voltage on D1 Deflects Beam approx.	
Toward Pin No. 3	
Positive Voltage on D3 Deflects Beam approx.	
Toward Pin No. 12	

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage <sup>1</sup> .....	2750 Volts d c
Anode No. 1 Voltage (Focusing Electrode).....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 Volts d c

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPES **3WP1** (Cont'd) **3WP\***

## RATINGS (cont'd)

Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater Cathode Voltage	
Heater Negative with Respect to Cathode.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts
Peak Voltage Between Anode No. 2 and Any Deflecting Plate.....	550 Volts

## TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage.....	1500 Volts d c
Anode No. 1 Voltage for Focus.....	247 to 465 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-45 to -75 Volts d c
Deflection Factor	
Deflecting Plates 1-2.....	62 to 76 Volts d c/Inch
Deflecting Plates 3-4.....	43 to 52 Volts d c/Inch
Modulation <sup>3</sup> (3WP1, at 7 Ft. L. Light Output).....	50 Volts Max.
Line Width A <sup>3</sup> (3WP1, at 7 Ft. L. Light Output)...	.026 Inches Max.
Deflection Factor Uniformity <sup>4</sup> .....	2 Percent Max.
Pattern Distortion at 75% of Useful Scan <sup>5</sup> .....	2½ Percent Max.
Spot Position (Focused, Undelected) <sup>6</sup> .....	Within a $\frac{3}{16}$ Inch Radius Circle
Useful Scan	
D1-D2 ± 1.25 Inches from Tube Face Center or a total of 2.50 Inches Min.	
D3-D4 ± 1.125 Inches from Tube Face Center or a total of 2.25 Inches Min.	

## CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>7</sup> .....	5.0 Megohms Max.

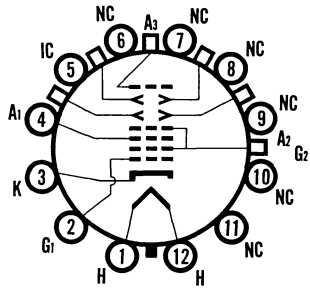
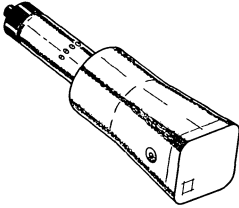
## NOTES:

1. The product of acceleration voltage and average acceleration current should be limited to 6.0 watts.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with MIL-E-1.
4. The deflection factors of 75% of useful scan and at 25% of useful scan shall not differ by more than the indicated value.
5. The edges of a raster pattern, whose mean dimensions are the indicated percentage of useful scan, shall not deviate from the mean dimensional rectangle by more than the specified amount.
6. Centered on the tube face with the tube shielded and with all deflection plates connected to anode No. 2.
7. It is recommended that the deflecting electrode circuit resistances be approximately equal.

# SYLVANIA TYPES 4MP1 4MP\*

## SPECIAL PURPOSE TUBE

Square Glass Type                      3½" x 3½" Direct Viewed  
 Electrostatic Focus                      Spherical Clear Faceplate  
 Electrostatic Deflection                      Post Deflection Acceleration  
 Deflection Plate Connectors on Neck Wall



12-Z

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic			
Deflection Method.....	Electrostatic			
Types*	<b>4MP1</b>	<b>4MP2</b>	<b>4MP7</b>	<b>4MP11</b>
Fluorescence.....	Green	Blue Green	Blue-White	Blue
Phosphorescence.....		Green	Yellow	
Persistence.....	Medium	Long	Long	Short
Faceplate.....	Spherical, Clear			

\*In addition to the types shown, the 4MP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances	
Cathode to All Other Electrodes.....	5.0 μmf
Grid No. 1 to All Other Electrodes.....	6.2 μmf
Between Deflecting Plates 1-2 <sup>11</sup> .....	2.7 μmf
Between Deflecting Plates 3-4 <sup>11</sup> .....	1.9 μmf
Deflecting Plate 1 to All Other Electrodes.....	5.8 μmf
Deflecting Plate 2 to All Other Electrodes.....	5.8 μmf
Deflecting Plate 3 to All Other Electrodes.....	4.3 μmf
Deflecting Plate 4 to All Other Electrodes.....	4.0 μmf

### MECHANICAL DATA

Minimum Useful Screen (Rounded Corners).....	2¾ x 2¾ Inches
Overall Length.....	13¾ Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Neck Contacts	
(Anode No. 2 and Deflection Plates).....	J1-25
Bulb.....	LEA 467 or Equivalent
Weight (approx.).....	1½ Pounds
Base (Small Shell Duodecal 12-Pin).....	B12-43
Basing.....	12Z
Base Alignment	
D1-D2 Trace Aligns with Pin No. 5 and Tube Axis.....	± 10 Degrees
Positive Voltage on D1 Deflects Beam approx. Toward Pin No. 5	
Positive Voltage on D3 Deflects Beam approx. Toward Pin No. 2	
Bulb Contact Alignment	
J1-22 Contact Aligns with D1-D2 Trace.....	± 10 Degrees
J1-22 Contact on Same Side as Pin No. 5	
Trace Alignment	
Angle Between D1-D2 and D3-D4 Trace.....	90 ± 1 Degrees
D1-D2 Trace Aligns with Bulb Wall.....	± 1.5 Degrees

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPES **4MP1** (Cont'd) **4MP\***

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Input.....	6.6 Watts
Anode No. 3 Voltage.....	6600 Volts d c
Anode No. 2 Voltage.....	3300 Volts d c
Ratio of Anode No. 3 Voltage to Anode No. 2 Voltage <sup>1</sup> .....	2 : 1
Anode No. 1 Voltage (Focusing Electrode).....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts
Peak Voltage Between Anode No. 2 and Any Deflecting Plate.....	600 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage.....	4000 Volts
Anode No. 2 Voltage.....	2000 Volts
Anode No. 1 Voltage for Focus.....	340 to 510 Volts
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-52 to -87 Volts
Deflection Factor	
Deflecting Plates 1-2.....	68 to 82 Volts d c/Inch
Deflecting Plates 3-4.....	42 to 52 Volts d c/Inch
Modulation at Ib3 = 25 $\mu$ a <sup>3</sup> .....	38 Volts d c Max.
Line Width "A" at Ib3 = 25 $\mu$ a <sup>3</sup> .....	.45 mm Max.
Line Width "B" at Ib3 = 25 $\mu$ a <sup>3</sup> .....	.65 mm Max.
Light Output at Ib3 = 25 $\mu$ a <sup>4</sup>	
4MP1 <sup>5</sup> .....	20 Ft. L. Min.
4MP11 <sup>6</sup> .....	14 Ft. L. Min.
Deflection Factor Uniformity <sup>3</sup> .....	2 Percent Max.
Pattern Distortion <sup>7</sup> .....	2 Percent Max.
Undelected Spot Position <sup>8</sup> .....	Within a 10 mm Square
Trace Distortion <sup>9</sup> .....	.02 Inch Max.
Useful Scan.....	2 $\frac{1}{8}$ Inches Min.

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>10</sup> .....	1.0 Megohms Max.

### NOTES:

1. This tube is designed for optimum performance when operated at an Eb3/Eb2 ratio of 2.0. Operation of other ratios of EB3/Eb2 may result in changes of deflection uniformity and pattern distortion.
2. Visual extinction of undeflected focused spot.
3. Measured in accordance with MIL-E-1.
4. Using a raster size of 2 $\frac{1}{4}$  x 2 $\frac{1}{4}$  inches.
5. Using a No. 594 Photronic cell with Viscor filter (for eye correction).
6. Using a No. 594 Photronic cell without Viscor filter (without eye correction).
7. All portions of a raster, pattern adjusted so its widest points just touch the sides of 2.295 x 2.295 inch square, will fall within the area bounded by the 2.295 x 2.295 inch square and an inscribed 2.205 x 2.205 inch square.
8. Centered with respect to the tube face and with the tube shielded. Connect free deflection electrodes to accelerator.
9. A 2 $\frac{1}{4}$  inch long trace which is deflected and focused  $\pm$  1 $\frac{1}{8}$  inch from center in both the horizontal and vertical directions, shall not deviate from straight lines by more than the indicated value.
10. It is recommended that the deflection electrode circuit resistances be approximately equal.
11. Deflecting plates D1 and D2 are nearer the screen while deflecting plates D3 and D4 are nearer the base.

### 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.

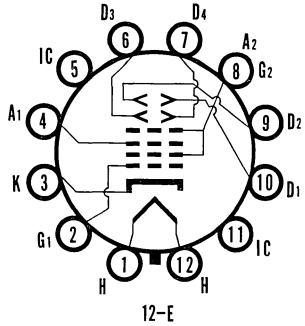
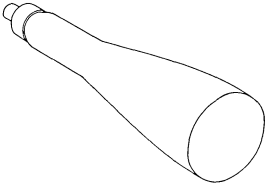


# SYLVANIA TYPE 3RP1 3RP\*

## SPECIAL PURPOSE TUBE

3" Direct Viewed  
Round Glass Type

Electrostatic Deflection  
Electrostatic Focus



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Electrostatic
Types*	<b>3RP1</b> <b>3RP4</b>
Fluorescence.....	Green      White
Phosphorescence.....	.....
Persistence.....	Medium      Short-Medium
Faceplate.....	Clear

\*In addition to the types shown, the 3RP—can be supplied with several other phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Grid to All Other Electrodes.....	8.5 μmf
Between Deflecting Plates 1-2.....	2.0 μmf
Between Deflecting Plates 3-4.....	2.0 μmf
Deflecting Plate 1 <sup>1</sup> to All Other Electrodes.....	11.0 μmf
Deflecting Plate 2 <sup>1</sup> to All Other Electrodes.....	8.0 μmf
Deflecting Plate 3 <sup>1</sup> to All Other Electrodes.....	7.0 μmf
Deflecting Plate 4 <sup>1</sup> to All Other Electrodes.....	8.0 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	2¾ Inches
Nominal Overall Length.....	9½ Inches
Base (Small-Shell Duodecal 10-Pin).....	B10-75
or (Small-Shell Duodecal 12-Pin).....	B12-43
Basing.....	12E

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	2750 Volts d c
Anode No. 1 Voltage.....	1100 Volts d c
Grid Voltage	
Negative Bias Value.....	220 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.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between Anode No. 2 and Any Deflection Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>2</sup> .....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	330 to 620 Volts d c
Maximum Grid Voltage Required for Cutoff <sup>3</sup> .....	-135 Volts d c
Deflection Factor <sup>4&amp;5</sup>	
Deflecting Plates 1-2 <sup>6</sup> .....	146 to 198 Volts d c/Inch
Deflecting Plates 3-4 <sup>7</sup> .....	104 to 140 Volts d c/Inch

# SYLVANIA TYPE 3RP1, 3RP\* (Cont'd)

## CIRCUIT VALUES

Grid Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

## NOTES:

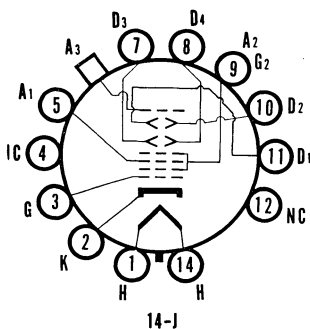
1. Positive voltage on Pin No. 10 will move spot approximately in direction of Pin No. 4. Positive voltage on Pin No. 6 will move spot approximately in direction of Pin No. 1.
2. Brilliance and definition decrease with decreasing Anode No. 2 Voltage. In general, Anode No. 2 Voltage should not be less than 1500 volts.
3. Visual extinction of undeflected focused spot.
4. Angle between trace produced by plates D1-D2 and the plane through the tube axis and Pin No. 4 does not exceed 10°.
5. Angle between D1-D2 trace and D3-D4 trace is 90° ± 30°.
6. Deflecting Plates 1-2 are nearer the screen.
7. Deflecting Plates 3-4 are nearer the base.

# SYLVANIA TYPE 5ABP1 5ABP\*

## SPECIAL PURPOSE TUBE

5" Direct Viewed  
Round Glass Type  
Flat Faceplate  
Clear Faceplate

Electrostatic Focus  
Electrostatic Deflection  
High Sensitivity  
Post Deflection Acceleration



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....						Electrostatic
Deflection Method.....						Electrostatic
Types*	5ABP1	5ABP2	5ABP4	5ABP7	5ABP11	
Fluorescence.....	Green	Blue-Green	White	Blue	Blue	
Phosphorescence.....	Green	Green		Yellow		
Persistence.....	Medium	Long	Medium	Long	Short	
Faceplate.....						Clear

\*In addition to the types shown, the 5ABP- can be supplied with several other screen phosphors.

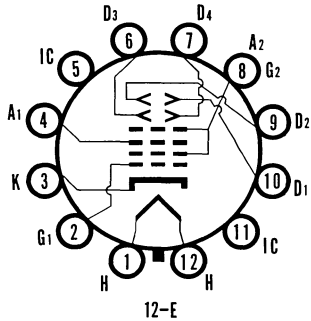
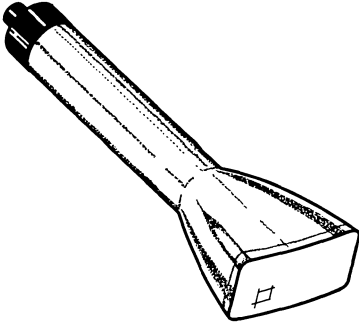
### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 Ampere
Direct Interelectrode Capacitances (Nominal)	
Cathode to All Other Electrodes.....	5.0 μmf
Grid No. 1 to All Other Electrodes.....	8.0 μmf
Between Deflecting Plates 1-2.....	2.5 μmf
Between Deflecting Plates 3-4.....	1.3 μmf
Deflecting Plate 1 <sup>1</sup> to All Other Electrodes.....	9.0 μmf
Deflecting Plate 2 <sup>1</sup> to All Other Electrodes.....	9.0 μmf
Deflecting Plate 3 <sup>1</sup> to All Other Electrodes.....	5.0 μmf
Deflecting Plate 4 <sup>1</sup> to All Other Electrodes.....	6.0 μmf

# SYLVANIA TYPES 3SP1 3SP\*

## SPECIAL PURPOSE TUBE

Oscilloscope Tube      1 1/2" x 3" Direct Viewed  
 Rectangular Glass Type      Electrostatic Deflection  
 Electrostatic Focus      Clear, Cylindrical Faceplate



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic		
Deflecting Method.....	Electrostatic		
<b>Types*</b>	<b>Fluorescence</b>	<b>Phosphorescence</b>	<b>Persistence</b>
3SP1.....	Green	.....	Medium
3SP2.....	Blue-Green	Green	Long
3SP4.....	White	.....	Short to Medium
3SP5.....	Blue	.....	Very Short
3SP7.....	Blue-White	Yellow	Long
3SP11.....	Blue	.....	Short
Faceplate.....	Clear, Cylindrical		

\*In addition to the types shown, the 3SP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μf
Grid No. 1 to All Other Electrodes.....	6.5 μf
Between Deflecting Plates 1-2.....	2 μf
Between Deflecting Plates 3-4.....	2 μf
Deflecting Plate 1 to All Other Electrodes.....	7.5 μf
Deflecting Plate 2 to All Other Electrodes.....	6.0 μf
Deflecting Plate 3 to All Other Electrodes.....	5.5 μf
Deflecting Plate 4 to All Other Electrodes.....	6.5 μf

### MECHANICAL DATA

Minimum Useful Screen Dimensions	
Horizontal.....	2 3/4 Inches
Vertical.....	1 1/2 Inches
Diagonal.....	3 Inches
Overall Length.....	9 1/8 Inches
Base (Small Shell Duodecal 12 Pin).....	B12-43
Basing.....	12E
Base Alignment	
The Plane through the Base Key and the Tube Axis aligns with Long Axis of Tube Face.....	± 10 Degrees
Trace Alignment <sup>1</sup>	
Angle Between D1-D2 trace and D3-D4 trace....	90 ± 1 Degrees
D1-D2 trace aligns with Long Axis of Tube Face <sup>2</sup> .....	± 1.5 Degrees
Positive Voltage on D1 deflects Beam approx. Toward Key	
Positive Voltage on D3 deflects Beam approx. Toward Pin No. 4	
Bulb.....	C26 Exp 6 or equivalent
Weight (approx.).....	3/4 Pound

# SYLVANIA TYPES 3SP1, 3SP\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	3000 Volts d c
Anode No. 1 Voltage (Focusing Electrode).....	1200 Volts d c
Anode No. 2 Input.....	6 Watts Max.
Grid No. 1 Voltage	
Negative Bias Value.....	200 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.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage between A2 and any Deflecting Plate..	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage.....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	330 to 620 Volts d c
Grid No. 1 Voltage for Cutoff <sup>3</sup> .....	-58 to -135 Volts d c
Deflection Factors	
Deflecting Plates 1-2.....	146 to 198 Volts d c/Inch
Deflecting Plates 3-4.....	104 to 140 Volts d c/Inch
Spot Position (Focused, Undelected) <sup>4</sup> .....	Within a 12 mm Square

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Resistance in Any Deflecting Plate Circuit <sup>5</sup> .....	1.0 Megohms Max.

### NOTES:

1. Deflecting plates 1 and 2 are nearer the screen, and scan the major dimension of the screen. Plates 3 and 4 are nearer the base, and scan the minor dimension of the screen.
2. The D1-D2 trace scanning through the geometric center of the tube face will be parallel to the long axis of the tube face, within the limits specified.
3. Visual extinction of undeflected focused spot.
4. With deflecting plates connected to Anode No. 2 and with tube shielded. The sides of the limit square will be parallel to the deflection axes.
5. It is recommended that the deflecting plate circuit resistances be approximately equal.

# SYLVANIA TYPE 5ABP1, 5ABP\* (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 <sup>9</sup> / <sub>16</sub> Inches
Nominal Overall Length.....	16 <sup>3</sup> / <sub>4</sub> Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Bulb.....	J42K
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14J
Base Alignment	

The plane through the tube axis and each of the following items may vary from the trace produced by D1 and D2 by the following angular tolerances (measured about the tube axis): Pin 5, 10 Degrees; side terminal (on same side of tube as Pin No. 5), 10 Degrees.

Angle between D1-D2 trace and D3-D4 trace is  $90 \pm 1.5$  Degrees.

Weight (Approx.).....	2 <sup>1</sup> / <sub>2</sub> Pounds
Mounting Position.....	Any

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage.....	6600 Volts d c
Anode No. 2 Voltage <sup>2</sup> .....	2860 Volts d c
Ratio of Anode No. 3 Voltage to Anode No. 2 Voltage.....	2.3:1
Anode No. 1 (Focus Electrode) Voltage.....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 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.....	140 Volts d c
Heater Positive with Respect to Cathode.....	140 Volts d c
Peak Voltage Between Anode No. 2 and Any Deflection Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage <sup>3</sup> .....	3000 Volts d c
Anode No. 2 Voltage <sup>4</sup> .....	1500 Volts d c
Anode No. 1 Voltage for Focus.....	300 to 515 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>5</sup> .....	-39 to -65 Volts d c
Deflection Factor <sup>6</sup>	
Deflecting Plates 1-2 <sup>7</sup> .....	40 to 54 Volts d c/Inch
Deflecting Plates 3-4 <sup>8</sup> .....	27 to 36 Volts d c/Inch

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>9</sup> .....	5 Megohms Max.

### NOTES:

- Deflecting Plate 1 is Pin No. 11.  
Deflecting Plate 2 is Pin No. 10.  
Deflecting Plate 3 is Pin No. 7.  
Deflecting Plate 4 is Pin No. 8.  
With D1 positive with respect to D2, the spot is deflected toward Pin No. 5.  
With D3 positive with respect to D4, the spot is deflected toward Pin No. 2.
- The product of the Anode No. 2 Voltage and the Average Anode No. 2 Current should be limited to 6 Watts.
- It is recommended that the Anode No. 3 voltage be not less than 3000 Volts for high-speed scanning.
- In general Anode No. 2 voltage should not be operated at less than 1500 Volts.
- Visual extinction of undeflected focused spot.
- The deflecting electrodes D3 and D4 are designed to have extra-high deflection sensitivity and consequently produce less than full-screen deflection. With post deflection acceleration, the length of deflection may be limited to 4 inches; without post-deflection acceleration, deflection to full screen diameter will ordinarily be obtained. These electrodes are, therefore, more suitable for the signal voltage than for the time base voltage.
- Deflecting Plates 1-2 are nearer the screen.
- Deflecting Plates 3-4 are nearer the base.
- It is recommended that the deflecting electrode resistances be approximately equal.

### WARNING:

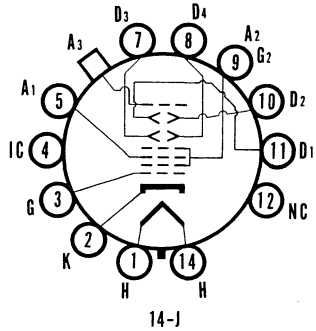
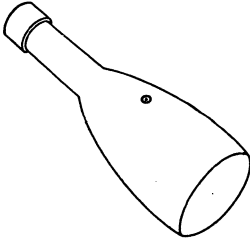
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 5ADP1 5ADP\*

## SPECIAL PURPOSE TUBE

5" Direct Viewed  
Round Glass Type  
Flat Faceplate

Clear Faceplate  
Electrostatic Focus  
Electrostatic Deflection



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic			
Deflection Method.....	Electrostatic			
Types*	<b>5ADP1</b>	<b>5ADP2</b>	<b>5ADP7</b>	<b>5ADP11</b>
Fluorescence.....	Green	Blue-Green	Blue	Blue
Phosphorescence.....		Green	Yellow	.....
Persistence.....	Medium	Long	Long	Short
Faceplate.....	Clear			

\*In addition to the types shown, the 5ADP— can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts	
Heater Current.....	0.6 ± 10% Ampere	
Direct Interelectrode Capacitances		
	<b>Min.</b>	<b>Max.</b>
Cathode to All Other Electrodes.....	3.1	5.8 μmf
Grid No. 1 to All Other Electrodes.....	4.2	7.9 μmf
Between Deflecting Plates 1-2.....	1.7	3.1 μmf
Between Deflecting Plates 3-4.....	0.7	1.3 μmf
Deflecting Plate 1 <sup>1</sup> to All Other Electrodes Except D2.....	2.7	6.1 μmf
Deflecting Plate 2 <sup>1</sup> to All Other Electrodes Except D1.....	2.7	6.1 μmf
Deflecting Plate 3 <sup>1</sup> to All Other Electrodes Except D4.....	2.1	4.0 μmf
Deflecting Plate 4 <sup>1</sup> to All Other Electrodes Except D3.....	2.1	5.0 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 1/2 Inches
Nominal Overall Length.....	16 3/4 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-22
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14J
Base Alignment	
D1-D2 trace aligns with Pin No. 5 and Tube Axis.....	± 10 Degrees
Positive Voltage on D1 deflects beam approx. toward Pin No. 5	
Positive Voltage on D3 deflects beam approx. toward Pin No. 2	
Angle Between traces D1-D2 and D3-D4.....	90 ± 1 Degrees
Bulb Contact Alignment	
J1-22 contact aligns with D1-D2.....	± 10 Degrees
J1-22 contact on same side as Pin No. 5	

# SYLVANIA TYPE 5ADP1, 5ADP\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage.....	6600 Volts d c
Anode No. 2 Voltage <sup>2</sup> .....	2860 Volts d c
Ratio of Anode No. 3 Voltage to Anode No. 2 Voltage.....	2.3 : 1
Anode No. 1 Voltage.....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 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.....	200 Volts d c
Heater Positive with Respect to Cathode.....	200 Volts d c
Peak Voltage Between Anode No. 2 and Any Deflection Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage.....	3000 Volts
Anode No. 2 Voltage.....	1500 Volts
Anode No. 1 Voltage for Focus.....	300 to 515 Volts
Grid No. 1 Voltage Required for Cutoff <sup>3</sup> .....	-34 to -56 Volts
Deflection Factor	
Deflecting Plates 1-2 <sup>4</sup> .....	40 to 50 Volts d c/Inch
Deflecting Plates 3-4 <sup>5</sup> .....	30.5 to 37.5 Volts d c/Inch
Modulation <sup>6</sup>	
with Anode No. 3 Current = 25 $\mu$ a.....	45 Volts Max.
Line Width <sup>6</sup>	
with Anode No. 3 Current = 25 $\mu$ a.....	.030 Inches Max.
P1 Light Output <sup>6</sup>	
with Anode No. 3 Current = 25 $\mu$ a.....	15 Ft. L. Min.
Deflection Factor Uniformity <sup>6</sup> .....	2 Percent Max.
Pattern Distortion with 75% Useful Scan <sup>7</sup> .....	2½ Percent Max.
Undelected Spot Position <sup>8</sup> .....	Within a 5/16 Inch Radius Circle
Useful Scan.....	± 2 Inches From Tube Face Center or a Total 4 Inches Min.

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>9</sup> .....	5 Megohms Max.

### NOTES:

1. Deflecting Plate 1 is Pin No. 11.  
Deflecting Plate 2 is Pin No. 10.  
Deflecting Plate 3 is Pin No. 7.  
Deflecting Plate 4 is Pin No. 8.
2. The product of the Anode No. 2 Voltage and the Average Anode No.2 Current should be limited to 6 watts.
3. Visual extinction of undeflected focused spot.
4. Deflecting Plates 1-2 are nearer the screen.
5. Deflecting Plates 3-4 are nearer the base.
6. Measured in accordance with MIL-E-1C.
7. All edges of a raster, pattern adjusted so its widest points just touch the sides of a 3.075 inch square, will fall within the area bounded by the 3.075 inch square and an inscribed 2.925 inch square.
8. Centered on tube face with the tube shielded and with all deflection plates connected to Anode No. 2.
9. It is recommended that the deflecting electrode circuit resistances be approximately equal.

### WARNING:

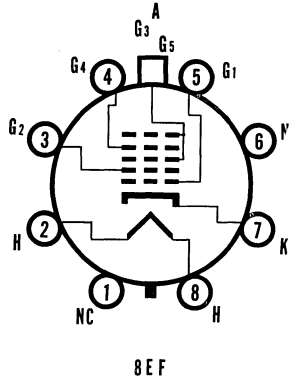
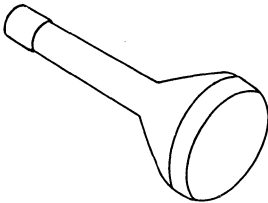
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 5AHP2A 5AHP-A\*

## SPECIAL PURPOSE TUBE

5" Direct Viewed  
Round Glass Type  
Magnetic Deflection

Electrostatic Focus  
High Resolution  
"A" Types Aluminized



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angle (approx.).....	53 Degrees
Types*	Fluorescence      Phosphorescence      Persistence
5AHP2.....	Blue-Green      Green      Long
5AHP2A.....	Blue-Green      Green      Long
5AHP4.....	White      White      Short-Med.
5AHP4A.....	White      White      Short-Med.
5AHP7.....	Blue      Yellow      Long
5AHP7A.....	Blue      Yellow      Long
5AHP14.....	Blue      Orange      Med. Long
5AHP14A.....	Blue      Orange      Med. Long
5AHP19.....	Orange      Orange      Long
5AHP19A.....	Orange      Orange      Long
5AHP25.....	Orange      Orange      Long
5AHP25A.....	Orange      Orange      Long
Faceplate.....	Clear

Types 5AHP2A, 5AHP4A, 5AHP7A, 5AHP14A, 5AHP19A and 5AHP25A have aluminized screens.

\*In addition to the types shown, the 5AHP- can be supplied with several other screen phosphors.

### 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

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 $\frac{1}{4}$ Inches
Nominal Overall Length.....	11 $\frac{1}{8}$ Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Base (Medium Shell Octal 8-Pin).....	B8-11 or B8-65
Basing.....	8EF
Bulb Contact Aligns with Pin No. 5.....	$\pm 10$ Degrees



# SYLVANIA TYPE 5AHP2A, 5AHP\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	11,000 Volts d c
Grid No. 4 (Focusing Electrode) Voltage.....	-550 to +1100 Volts d c
Grid No. 2 Voltage.....	770 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	200 Volts d c
Positive Bias Value <sup>1</sup> .....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>2</sup> .....	7000 Volts d c
Grid No. 4 Voltage for Focus <sup>3</sup> .....	0 to +250 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage <sup>4</sup> .....	-33 to -77 Volts d c
Line Width <sup>3,5</sup> .....	0.40 MM Max.

### CIRCUIT VALUES

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

### NOTES:

1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts. The screens of the 5AHP19, 5AHP19A, 5AHP25 and 5AHP25A can be permanently damaged should the current density be permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
2. Brilliance and definition decrease with decreasing anode voltage. In general, anode voltage should not be less than 4000 volts, except for the 5AHP19, 5AHP19A, 5AHP25 and 5AHP25A. For these types the anode voltage should not be less than 7000 volts.
3. With Eg1 adjusted for Ib = 100  $\mu$ a and beam focused for minimum width of individual lines at center of screen.
4. Visual extinction of undeflected focused spot.
5. Measured by compressed raster method, using a 35 to 105 line pattern.

### WARNING:

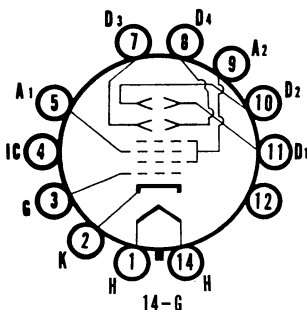
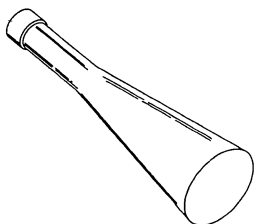
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 5AQP1 5AQP\*

## SPECIAL PURPOSE TUBE

5" Direct Viewed  
Round Glass Type  
Electrostatic Deflection

Electrostatic Focus  
Flat Face  
Clear Faceplate



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic			
Deflection Method.....	Electrostatic			
Types*	5AQP1	5AQP2	5AQP7	5AQP11
Fluorescence.....	Green	Blue-Green	Blue	Blue
Phosphorescence.....	Green	Green	Yellow	...
Persistence.....	Medium	Long	Long	Short
Faceplate.....	Clear			

\*In addition to the types shown, the 5AQP— can be supplied with several other screen phosphors.

# SYLVANIA TYPE 5AQP1, 5AQP\* (Cont'd)

## ELECTRICAL DATA

Heater Voltage.....		6.3 Volts
Heater Current.....		0.6 ± 10% Ampere
Direct Interelectrode Capacitances		
	<b>Min.</b>	<b>Max.</b>
Cathode to All Other Electrodes.....	2.7	5.0 μf
Grid No. 1 to All Other Electrodes.....	3.7	6.9 μf
Between Deflecting Plates 1-2 <sup>1</sup> .....	2.4	4.5 μf
Between Deflecting Plates 3-4 <sup>1</sup> .....	0.8	1.6 μf
Deflecting Plate 1 <sup>1</sup> to All Other Electrodes.....	5.0	9.3 μf
Deflecting Plate 2 <sup>1</sup> to All Other Electrodes.....	5.0	9.3 μf
Deflecting Plate 3 <sup>1</sup> to All Other Electrodes.....	3.3	6.3 μf
Deflecting Plate 4 <sup>1</sup> to All Other Electrodes.....	3.3	6.3 μf

## MECHANICAL DATA

Minimum Useful Screen Dimensions (Diameter)...	4½ Inches
Nominal Overall Length.....	16¾ Inches
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14G
Base Alignment	
D1-D2 trace aligns with Pin No. 5 and	
Tube Axis.....	± 10 Degrees
Angle Between D1-D2 and D3-D4 Traces.....	90 ± 1 Degree

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage <sup>2</sup> .....	4400 Volts d c
Anode No. 1 Voltage for Focus.....	1650 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 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.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts
Peak Voltage Between Anode No. 2 and Any Deflecting Plate.....	1320 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage.....	2500 Volts d c
Anode No. 1 Voltage for Focus.....	0 to 300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>3</sup> .....	-34 to -56 Volts d c
Deflection Factor <sup>4</sup>	
Deflecting Plates 1-2.....	40 to 50 Volts d c/Inch
Deflecting Plates 3-4.....	31.5 to 38.5 Volts d c/Inch
P1 Light Output <sup>5</sup> .....	15 Ft. L. Min.
Modulation <sup>5</sup> .....	40 Volts d c Max.
Line Width A <sup>5</sup> .....	.030 Inches Max.
Anode No. 2 Current <sup>5</sup> .....	400 μa d c Max.
Deflection Factor Uniformity <sup>6</sup> .....	1 Percent Max.
Pattern Distortion <sup>7</sup> .....	2 Percent Max.
Spot Position <sup>8</sup> .....	Within a 5/16 inch Radius Circle
Useful Scan.....	± 2 Inches From Tube Face
	Center—Total 4 x 4 Inches

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>9</sup> .....	1.0 Megohms Max.

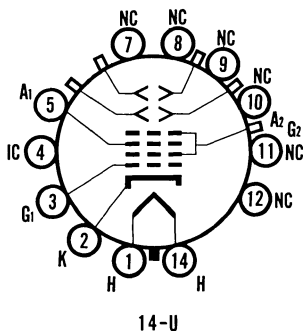
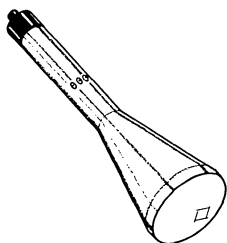
### NOTES:

1. Deflecting Plate 1 is Pin No. 11.  
Deflecting Plate 2 is Pin No. 10.  
Deflecting Plate 3 is Pin No. 7.  
Deflecting Plate 4 is Pin No. 8.
2. The product of acceleration voltage and average acceleration current should be limited to 6.0 watts.
3. Visual extinction of undeflected focused spot.
4. Positive voltage on D1 deflects beam approximately toward Pin No. 5.  
Positive voltage on D3 deflects beam approximately toward Pin No. 2.
5. At a grid drive to produce 15 Ft. L. on a raster size of 2 x 2 inches on P1 screen.
6. The deflection factors of 75% of useful scan and at 25% of useful scan shall not differ by more than the indicated value.
7. All edges of a raster pattern, adjusted so its widest points just touch the sides of a 3.075 inch square, will fall within the area bounded by the 3.075 inch square and an inscribed 2.925 inch square.
8. Centered on the tube face with the tube shielded and with all deflection plates connected to anode No. 2.
9. It is recommended that the deflecting electrode circuit resistances be approximately equal.

# SYLVANIA TYPES 5AMP1 5AMP\* 5AMP1A 5AMP-A\*

## SPECIAL PURPOSE TUBE

5" Direct Viewed	Electrostatic Focus
High Deflection Sensitivity	Close Tolerances
Electrostatic Deflection	Flat, Clear Faceplate
Round Glass Type	A2 and Deflection Plate Leads Brought out Neck



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Electrostatic
Types*	Fluorescence    Phosphorescence    Persistence
5AMP1.....	Green    .....    Medium
5AMP1A.....	Green    .....    Medium
5AMP2.....	Blue-Green    Green    Long
5AMP2A.....	Blue-Green    Green    Long
5AMP7.....	Blue-White    Yellow    Long
5AMP7A.....	Blue-Green    Yellow    Long
5AMP11.....	Blue    .....    Short
5AMP11A.....	Blue    .....    Short
Faceplate.....	Flat, Clear

\*In addition to the types shown, the 5AMP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances	<b>Min.</b> <b>Max.</b>
Cathode to All Other Electrodes.....	2.7    4.9 μmf
Grid No. 1 to All Other Electrodes.....	2.9    5.5 μmf
Between Deflecting Plates 1-2.....	2.1    3.9 μmf
Between Deflecting Plates 3-4.....	1.3    2.5 μmf
Deflecting Plate 1 to All Other Electrodes..	4.3    7.9 μmf
Deflecting Plate 2 to All Other Electrodes..	4.0    7.4 μmf
Deflecting Plate 3 to All Other Electrodes..	2.9    5.5 μmf
Deflecting Plate 4 to All Other Electrodes..	2.6    4.8 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 1/2 Inches
Overall Length.....	17 3/8 Inches
Neck Contacts (Small Ball Caps).....	J1-25
Bulb.....	J42P
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14U
Base Alignment	
D1-D2 Trace Aligns with Pin No. 5 and Tube Axis.....	± 10 Degrees

# SYLVANIA TYPES 5AMP1 (Cont'd)

## 5AMP\*

## 5AMP1A

## 5AMP-A\*

Positive Voltage on D1 Deflects Beam approx. Toward Pin No. 5	
Positive Voltage on D3 Deflects Beam approx. Toward Pin No. 2	
Angle Between D1-D2 Trace and D3-D4 Trace.....	90 ± 1 Degrees
Weight (approx.).....	2¼ Pounds

### RATINGS

#### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage <sup>1</sup> .....	6600 Volts d c
Anode No. 1 Voltage (Focusing Electrode).....	1650 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts
Peak Voltage Between Anode No. 2 and Any Deflection Plate.....	1320 Volts

#### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage.....	2500 Volts d c
Anode No. 1 Voltage for Focus.....	0 to 300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-34 to -56 Volts d c
Deflection Factors	
Deflecting Plates 1-2 <sup>3</sup> .....	40 to 50 Volts d c/Inch
Deflecting Plates 3-4 <sup>3</sup> .....	20 to 25 Volts d c/Inch
Deflection Factor Uniformity <sup>4</sup> .....	1 Percent Max.
Modulation <sup>5</sup> .....	45 Volts d c Max.
Line Width "A" <sup>5</sup> .....	.032 Inches Max.
Anode No. 2 Current <sup>5</sup> .....	800 µAdc Max.
Pattern Distortion at 75% Useful Scan <sup>1</sup> .....	2 Percent Max.
Spot Position (Undelected, Focused) <sup>1</sup> .....	Within a ⅙ Inch Radius Circle
Useful Scan	
D1-D2.....	± 2 Inches From Tube Face Center or a Total of 4 Inches Minimum
D3-D4.....	± 1.25 Inches From Tube Face Center or a Total of 2.5 Inches Minimum

#### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>3</sup> .....	1.0 Megohms Max.

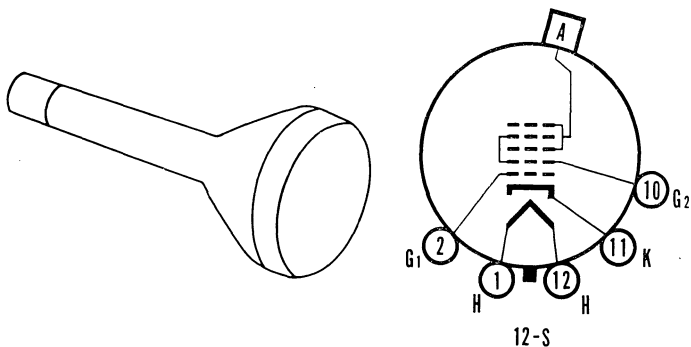
#### NOTES:

1. The product of the Anode No. 2 Voltage and Average Anode No. 2 Current should be limited to 6 watts.
2. Visual extinction of undeflected focused spot.
3. Deflection plates D1 and D2 are nearer the screen; deflecting plates D3 and D4 are nearer the base.
4. The deflection factor (for both D1-D2 and D3-D4 plate pairs, separately) for any deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
5. Measured in accordance with MIL-E-1 on a P1 screen at a brightness of 15 foot Lamberts on a 2" x 2" focused raster.
6. Raster pattern adjusted so widest points just touch the sides of a 1.912 x 3.060 inch rectangle will fall within the area bounded by the 1.912 x 3.060 inch rectangle and an inscribed 1.837 x 2.940 inch rectangle.
7. Limit circle centered on tube face, with the tube shielded and will all deflection plates connected to Anode No. 2. Under stable operating conditions the spot will not shift with changes in intensity by more than .025 inch.
8. It is recommended that the deflecting electrode circuit resistances be approximately equal.
9. Types 5AMP1A, 5AMP2A, 5AMP7A and 5AMP11A are identical to the 5AMP1, 2, 7, 11 except for the following:
  - (a) Angle between D3-D4 trace and D1-D2 trace—90° ± 0.8° Degrees
  - (b) Pattern distortion at 100% of useful scan: All portions of a raster pattern adjusted so its widest points just touch the sides of a 2.500 by 4.000 inch rectangle will fall within the area bounded by the 2.500 by 4.000 inch rectangle and inscribed 2.420 by 3.912 inch rectangle.

# SYLVANIA TYPE 5AXP4

## TELEVISION RECEIVER CHECK TUBE

5" Direct Viewed                      Magnetic Deflection  
 Round, Glass Type                  Self Focusing (Electrostatic)  
 No Ion Trap Required



### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Self Focusing (Electrostatic)
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	53 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	Clear Glass

#### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 Ampere
Direct Interelectrode Capacitances	
Cathode to All Other Electrodes.....	5 $\mu\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\mu\text{f}$

#### MECHANICAL DATA

Overall Length.....	$10\frac{5}{8} \pm \frac{3}{8}$ Inches
Maximum Diameter.....	$4\frac{1}{16} \pm \frac{3}{32}$ Inches
Minimum Useful Screen Diameter.....	$4\frac{1}{4}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12S

### RATINGS

#### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	19,800 Volts d c
Grid No. 2 (and Grid No. 4) Voltage.....	550 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	140 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 Not to Exceed 15 Seconds....	450 Volts
After Equipment Warm-up.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 2 (and Grid No. 4) Voltage.....	300 Volts d c
Grid No. 1 Voltage for Cutoff <sup>1</sup> .....	-28 to -72 Volts d c

#### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max
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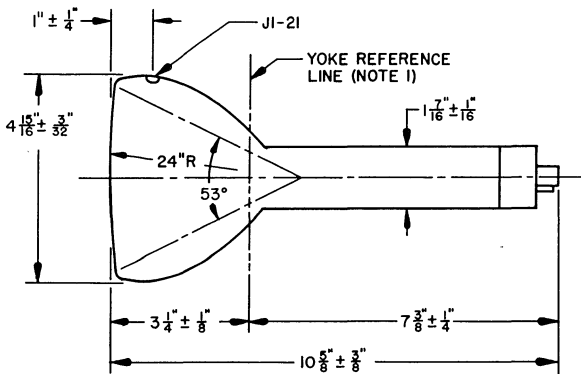
# 5AXP4 (Cont'd)

## NOTE:

1. Visual extinction of raster.

## 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.



S52032B

## DIAGRAM NOTES:

1. The yoke reference line is determined by the plane C-C of JETEC gauge 116 with the gauge resting against the bulb cone.
2. Anode contact (J1-21) aligns with vacant base pin position No. 6  $\pm$  30 degrees.

## APPLICATION NOTES

The 5AXP4 is a universal test picture tube which may be used in almost any electromagnetically deflected receiver, regardless of the deflection angle of the tube used in the set. When the Check Tube is used in a 90 degree deflection set, the picture will probably extend over the edges of the tube, but the visible portion of the picture will still enable checks to be made.

To save the serviceman's time and make the 5AXP4 a versatile "service tool" the following additional features are incorporated:

1. Automatic self focusing  
Convenient in servicing.
2. No ion trap necessary  
Saves time in servicing.
3. No external conductive coating  
Safety in repeated installation and removal.

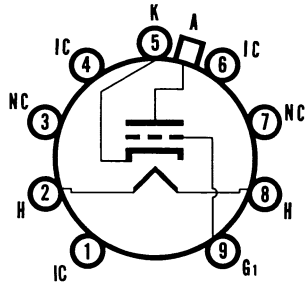
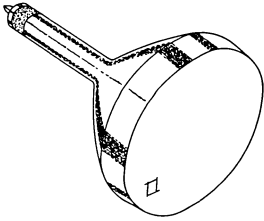
FINAL TOUCH-UP ADJUSTMENTS SHOULD ALWAYS BE MADE WITH THE REGULAR PICTURE TUBE INSTALLED IN THE TV SET.

Additional application information on Type 5AXP4 was published in SYLVANIA NEWS, Technical Section, February, 1955. Copies may be obtained from Sylvania Electric Products Inc., 1100 Main St., Buffalo 9, New York.

# SYLVANIA TYPES 5BCP1 5BCP\*

## SPECIAL PURPOSE TUBES

5" Direct Viewed                      Round Glass Type  
Magnetic Deflection                  Magnetic Focus  
 $\frac{7}{8}$ " Diameter Neck



9HD

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic			
Deflecting Method.....	Magnetic			
Deflection Angle (approx.).....	70 Degrees			
Types*	5BCP1	5BCP4	5BCP7	5BCP11
Fluorescence.....	Green	White	Blue	Blue
Phosphorescence.....			Yellow	.....
Persistence.....	Medium	Medium	Long	Short
Faceplate.....	Clear			

\*In addition to the types shown, the 5BCP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.3 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	3.7 μmf
Grid No. 1 to All Other Electrodes.....	3.5 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 1/4 Inches
Overall Length.....	7 Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Base.....	E9-37
Basing <sup>1</sup> .....	9HD
Bulb Contact Alignment	
Plane of J1-22 Contact Passes Halfway Between	
Pins No. 1 and No. 9.....	± 10 Degrees
J1-22 Contact on Same Side as Pins No. 1 and No. 9	

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	11,000 Volts d c
Anode Input.....	6 Watts
Grid No. 1 Voltage	
Negative Bias Value.....	220 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	2 Volts d c
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	8000 Volts d c
Grid No. 1 Voltage <sup>2</sup> .....	-25 to -75 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	56 to 84 Ma d c
Line Width "A" at I <sub>b</sub> = 200 μa <sup>4</sup> .....	.011 Inches Max.
Spot Position <sup>5</sup> .....	1/4 Inch

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPES 5BCP1 (Cont'd)

## 5BCP\*

### CIRCUIT VALUES

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

### NOTES:

1. A socket with a center opening to clear the tubulation should be used. Care should be taken in handling the tube to avoid damaging the exposed tubulation and bending the base pins.
2. Visual extinction of undeflected, focused spot.
3. For JETEC No. 127 focus coil, or equivalent, with the Grid No. 1 bias voltage adjusted to produce a beam current of 200  $\mu$ a. Distance from reference line to center of gap on focus coil shall be 2 inches.
4. Measured in accordance with MIL-E-1C.
5. The center of the undeflected, unfocused spot will fall within a circle of  $\frac{1}{4}$  inch radius concentric with the center of the tube face, with the tube shielded.

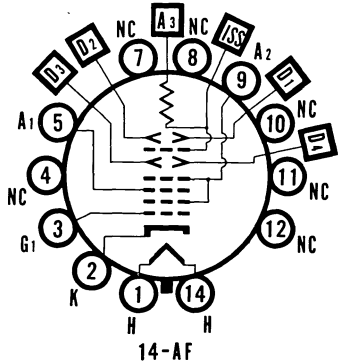
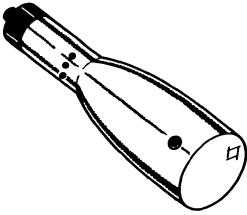
### WARNING:

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 TYPES 5BGP1 5BGP\*

- |                          |                             |
|--------------------------|-----------------------------|
| 5" Direct Viewed         | Electrostatic Focus         |
| Flat Faceplate           | High Deflection Sensitivity |
| Round Glass Type         | High Deflection Accuracy    |
| Electrostatic Deflection | Aluminized Screen           |
| Helical Resistor Post    | Deflection Acceleration     |



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....		Electrostatic	
Deflection Method.....		Electrostatic	
Phosphors.....		Aluminized	
Types*	Fluorescence	Phosphorescence	Persistence
5BGP1.....	Green	Green	Medium
5BGP2.....	Blue-Green	Green	Long
5BGP5.....	Blue	Yellow	Very Short
5BGP7.....	Blue-White	Yellow	Long
5BGP11.....	Blue	.....	Short
5BGP15.....	Blue-Green	.....	Extremely Short
Faceplate.....			Clear

\*In addition to the types shown, the 5BGP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	4.8 μf
Grid No. 1 to All Other Electrodes.....	6.7 μf
D1 to D2.....	1.8 μf
D3 to D4.....	1.3 μf
D1 to All Other Electrodes Except D2.....	3.3 μf
D2 to All Other Electrodes Except D1.....	3.3 μf
D3 to All Other Electrodes Except D4.....	2.7 μf
D4 to All Other Electrodes Except D3.....	2.7 μf
Post Accelerator Helix Resistance.....	200 to 600 Megohms

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4½ Inches
Nominal Overall Length.....	17¼ Inches
Anode No. 3 Contact (Recessed Small Cavity Cap).....	J1-21
Bulb (Modified).....	J42K
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14AF
Base Alignment	
D3-D4 Trace aligns with Pin No. 1.....	± 10 Degrees
Positive Voltage on D1 deflects beam approx. toward Pin No. 4	
Positive Voltage on D3 deflects beam approx. toward Pin No. 1	
Angle Between Traces D1-D2 and D3-D4.....	90 ± 1 Degrees
Bulb Contact Alignment	
J1-21 Contact Aligns with D1-D2 Trace.....	± 10 Degrees
J1-21 contact on same side as Pin No. 4	

# SYLVANIA TYPES 5BGPI, 5BGP\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Input	6 Watts Max.
Anode No. 3 Voltage	13,200 Volts d c
Isolation Shield Voltage	2300 Volts d c
Anode No. 2 Voltage	2200 Volts d c
Ratio of Anode No. 3 Voltage to Anode No. 2 Voltage	6 : 1 Maximum
Anode No. 1 (Focus Electrode) Voltage	880 Volts d c
Grid No. 1 Voltage	
Negative Bias Value	220 Volts d c
Positive Bias Value	0 Volts d c
Positive Peak Plate	2 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode	
During Warm-up Period Not to Exceed	
15 Seconds	200 Volts
After Equipment Warm-up Period	140 Volts
Heater Positive with Respect to Cathode	140 Volts
Peak Voltage Between Anode No. 2 and Any Deflection Plate	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage <sup>1</sup>	10,000 Volts d c
Isolation Shield Voltage <sup>2</sup>	1575 to 1700 Volts d c
Anode No. 2 Voltage <sup>3</sup>	1670 Volts d c
Anode No. 1 Voltage for Focus	180 to 590 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup>	-50 to -80 Volts d c
Deflection Factor <sup>5</sup>	
Deflection Plates 1-2	70 to 86 Volts d c/Inch
Deflection Plates 3-4	28.4 to 34.8 Volts d c/Inch
Pattern Distortion at 100% Useful Scan	1 Percent Max.
Undelected Spot Position <sup>7</sup> (Deviation from Center)	5 MM. Max.
Useful Scan	
D1-D2	10 cm.
D3-D4	6 cm.

### CIRCUIT VALUES

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

### NOTES:

1. It is recommended that the Anode No. 3 voltage be no less than 6000 volts for suitable light output.
2. The isolation shield and the lower end of the Post Accelerator helix are connected together within the tube. With the proper potential on this electrode combination, barrel and pin-cushion distortions are minimized.
3. Under the typical operating conditions listed the Anode No. 2 voltage is made variable from 1575 volts to 1850 volts to provide for astigmatism control. In order to maintain proper astigmatism adjustment as total cathode current is varied, it is recommended that the resistance in the Anode No. 2 circuit be limited to 12,500 ohms.
4. Visual extinction of undeflected focused spot.
5. If use is made of the full deflection capabilities of the tube, the deflection plates will intercept part of the electron beam near the edge of the scan; hence a low impedance deflection plate drive is desirable.
6. With a 6 x 10 cm rectangular raster centered on the face of the tube, the raster edges will not deviate from straight parallel lines by more than 1 mm total on the left and right edges, nor by more than 0.5 mm total at the top and bottom.
7. Connect deflection plates to Anode No. 2.

### 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 TYPES 5BHP1 5BHP\*

5" Direct Viewed

Flat Faceplate

Round Glass Type

Electrostatic Deflection

Electrostatic Focus

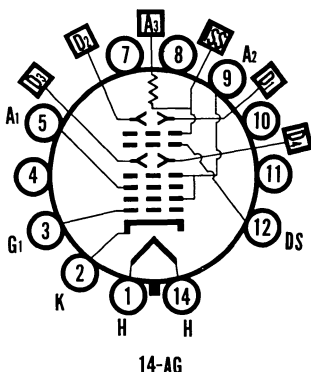
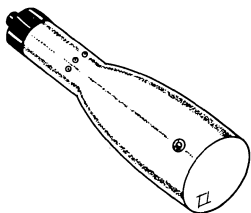
Helical Resistor Post-

Deflection Acceleration

High Deflection Sensitivity

High Deflection Accuracy

Aluminized Screen



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....			Electrostatic
Deflection Method.....			Electrostatic
Phosphors.....			Aluminized
Types*	Fluorescence	Phosphorescence	Persistence
5BHP1.....	Green		Medium
5BHP2.....	Blue-Green	Green	Long
5BHP5.....	Blue		Very Short
5BHP7.....	Blue-White	Yellow	Long
5BHP11.....	Blue		Short
5BHP15.....	Blue-Green		Extremely Short
Faceplate.....			Clear

\*In addition to the types shown, the 5BGP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	4.6 μμf
Grid No. 1 to All Other Electrodes.....	6.4 μμf
D1 to D2.....	1.9 μμf
D3 to D4.....	1.5 μμf
D1 to All Other Electrodes Except D2.....	3.5 μμf
D2 to All Other Electrodes Except D1.....	3.5 μμf
D3 to All Other Electrodes Except D4.....	2.8 μμf
D4 to All Other Electrodes Except D3.....	2.8 μμf
Post Accelerator Helix Resistance.....	200 to 600 Megohms

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 1/2 Inches
Nominal Overall Length.....	18 3/4 Inches
Anode No. 3 Contact (Recessed Small Cavity Cap).....	J1-21
Bulb (Modified).....	J42K
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14AG
Base Alignment	
D3-D4 Trace Aligns with Pin No. 1.....	± 10 Degrees
Positive Voltage on D1 Deflects Beam approx. toward Pin No. 4	
Positive Voltage on D3 Deflects Beam approx. toward Pin No. 1	
Angle Between Traces D1-D2 and D3-D4.....	90 ± 1 Degrees
Bulb Contact Alignment	
J1-21 Contact Aligns with D1-D2 Trace.....	± 10 Degrees
J1-21 Contact on same side as Pin No. 4	

# SYLVANIA TYPES 5BHP1, 5BHP\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Input.....	6 Watts
Anode No. 3 Voltage.....	13,200 Volts d c
Isolation Shield Voltage.....	2300 Volts d c
Deflection Plate Shield Voltage.....	2300 Volts d c
Anode No. 2 Voltage.....	2200 Volts d c
Ratio of Anode No. 3 Voltage to Anode No. 2 Voltage.....	6 : 1 Maximum
Anode No. 1 (Focus Electrode) Voltage.....	880 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Plate.....	2 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode During Warm-up Period Not to Exceed 15 Seconds.....	200 Volts
After Equipment Warm-up Period.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between Anode No. 2 and Any Deflection Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage <sup>1</sup> .....	10,000 Volts d c
Isolation Shield Voltage <sup>2</sup> .....	1575 to 1700 Volts d c
Deflection Plate Shield Voltage <sup>3</sup> .....	1575 to 1700 Volts d c
Anode No. 2 Voltage <sup>4</sup> .....	1670 Volts d c
Anode No. 1 Voltage for Focus.....	180 to 590 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>5</sup> .....	-50 to -80 Volts d c
Deflection Factors	
Deflection Plates 1-2.....	70 to 85 Volts d c/Inch
Deflection Plates 3-4.....	15 to 18.3 Volts d c/Inch
Pattern Distortion at 100% Useful Scan <sup>7</sup> .....	1.5 Percent Max.
Undelected Spot Position <sup>8</sup> (Deviation from Center).....	5 MM. Max.
Useful Scan	
D1-D2.....	10 cm.
D3-D4.....	4 cm.

### CIRCUIT VALUES

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

### NOTES:

1. It is recommended that the Anode No. 3 voltage be no less than 6,000 volts for suitable light output.
2. The isolation shield and the lower end of the post accelerator helix are connected together within the tube. With the proper potential on this electrode combination, barrel and pin-cushion distortions are minimized.
3. Adjustment of deflection plate shield voltage provides improved linearity of D3-D4 deflection by controlling the edge effect of D3-D4 plate field. In many applications Pin No. 12 may be connected externally to the isolation shield.
4. Under the typical operating conditions listed the Anode No. 2 voltage is made variable from 1575 volts to 1850 volts to provide for astigmatism control. In order to maintain proper astigmatism adjustment as total cathode current is varied, it is recommended that the resistance in the Anode No. 2 circuit be limited to 12,500 ohms.
5. Visual extinction of undeflected focused spot.
6. If use is made of the full deflection capabilities of the tube, the deflection plates will intercept part of the electron beam near the edge of the scan; hence a low impedance deflection plate drive is desirable.
7. With a 4 x 10 cm rectangular raster centered on the face of the tube, the raster edges will not deviate from straight parallel lines by more than 1 mm total on the left and right edges, nor by more than 0.5 mm total at the top and bottom.
8. Connect deflection plates to Anode No. 2.

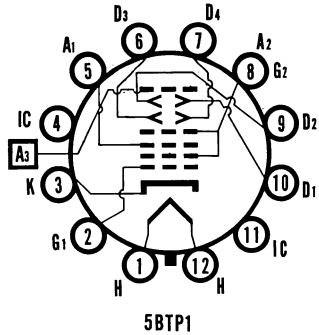
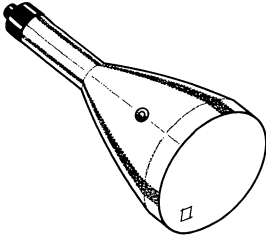
### WARNING:

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 TYPES 5BTP1 5BTP\*

## SPECIAL PURPOSE TUBE

Oscilloscope Tube	5'' Direct Viewed
Round Glass Type	High Deflection Sensitivity
Electrostatic Focus	Post Deflection Acceleration
Electrostatic Deflection	Flat Clear, Faceplate
	Short Length



## CHARACTERISTICS

### GENERAL DATA

Focusing Method	Electrostatic		
Deflection Method	Electrostatic		
Types*	5BTP1	5BTP2	5BTP7 5BTP11
Fluorescence	Green	Blue-Green	Blue-White Blue
Phosphorescence		Green	Yellow
Persistence	Medium	Long	Long Short
Faceplate	Clear, Flat		

\*In addition to the types shown, the 5BTP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	5.0 μmf
Grid No. 1 to All Other Electrodes	8.0 μmf
D1 to D2	2.0 μmf
D3 to D4	3.0 μmf
D1 to All Other Electrodes	10.5 μmf
D2 to All Other Electrodes	8.5 μmf
D3 to All Other Electrodes	8.5 μmf
D4 to All Other Electrodes	9.5 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter	4½ Inches
Overall Length	12 Inches
Bulb	LEA-407 or Equivalent
Bulb Contact (Recessed Small Ball Cap)	J1-22
Base (Small Shell Duodecal 12-Pin)	B12-43
Basing	(See Diagram)
Bulb Contact Alignment	
J1-22 Contact Aligns with D1-D2 Trace	± 10 Degrees
J1-22 Contact on Same Side as Pin No. 4	
Base Alignment	
D1-D2 Trace Aligns with Pin No. 4 and Tube Axis	0 ± 10 Degrees
Positive Voltage on D1 Reflects Beam approximately Toward Pin No. 4	
Positive Voltage on D3 Deflects Beam approximately Toward Pin No. 1	
Angle Between D3-D4 and D1-D2 Traces	90 ± 1 Degrees
Deflection Plates	
D1-D2 are Closer to Screen	
D3-D4 are Closer to Base	
Weight (approx.)	2 Pounds

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPES 5BTP1 (Cont'd) 5BTP\*

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Input.....	6 Watts
Anode No. 3 Voltage.....	4400 Volts d c
Anode No. 2 Voltage.....	2700 Volts d c
Ratio Anode No. 3 to Anode No. 2 Voltage.....	2:1 Max.
Anode No. 1 (Focusing Electrode).....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	140 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.....	450 Volts
After Equipment Warm-up Period.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between Anode No. 2 and	
Any Deflection Plate.....	600 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage.....	3000 Volts d c
Anode No. 2 Voltage.....	1500 Volts d c
Anode No. 1 Voltage for Focus.....	570 to 772 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-40 to -94 Volts d c
Deflection Factors	
Deflecting Plates D1-D2.....	81 to 109 Volts d c/Inch
Deflecting Plates D3-D4.....	43 to 58 Volts d c/Inch
Spot Position <sup>2</sup> .....	Within a 15 mm Square
Useful Scan	
D1-D2—Full Screen Coverage	
D3-D4—4 Inches—Centered with Respect to the Tube Face	

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance <sup>3</sup> .....	1.5 Megohms Max.

### NOTES:

1. Visual extinction of the undeflected focused spot.
2. With the tube shielded and with all deflection plates connected to Anode No. 2. Limit square centered on tube face with the sides parallel to deflection axis.
3. It is recommended that the deflecting electrode circuit resistances be approximately equal.

# SYLVANIA TYPE 5BNP16

## SPECIAL PURPOSE TUBE

5" Round Glass Type

Spherical Faceplate

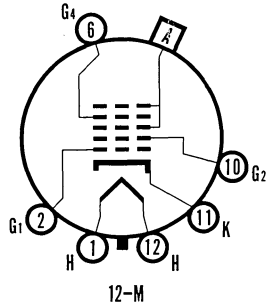
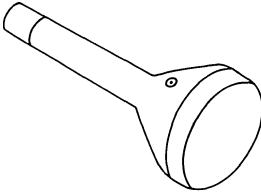
Clear Faceplate

Magnetic Deflection

Electrostatic Focus

No Ion Trap

Aluminized Screen



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angle (approx.).....	53 degrees
Phosphor.....	Aluminized P16
Fluorescence.....	Violet and near Ultra-Violet
Persistence.....	Extremely Short
Faceplate.....	Clear

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 $\mu$ fd
Grid No. 1 to All Other Electrodes.....	6 $\mu$ fd
Ion Trap.....	No Ion Trap Required

### MECHANICAL DATA

Minimum Useful Screen Diameter (Max. Assured).....	4 1/4 Inches
Nominal Overall Length.....	10 3/4 Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Base (Small Shell Duo Decal 6 Pin).....	B6-63
Basing.....	12M
Bulb.....	J39 1/2 L

## 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.....	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.....	14,000 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 for Cutoff.....	-28 to -72 Volts d c

### CIRCUIT VALUES

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

# SYLVANIA TYPE 5BNP16 (Cont'd)

**NOTE:**

1. Visual Extinction of Raster.

**WARNING:**

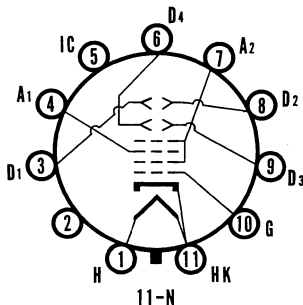
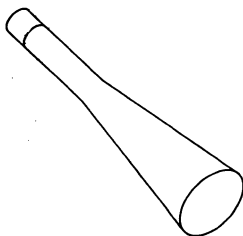
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 5BP1A 5BP-A\*

SPECIAL PURPOSE TUBE

5" Direct Viewed  
Round Glass Type

Electrostatic Deflection  
Electrostatic Focus



### CHARACTERISTICS

**GENERAL DATA**

Focusing Method.....	Electrostatic
Deflecting Method.....	Electrostatic
Phosphor.....	P1
Fluorescence.....	Green
Persistence.....	Medium
Faceplate.....	Clear

\*In addition to the type shown, the 5BP-A can be supplied with several other screen phosphors.

**ELECTRICAL DATA**

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes.....	8.0 $\mu\text{f}$
Between Deflecting Plates 1-2 <sup>1</sup> .....	1.3 $\mu\text{f}$
Between Deflecting Plates 3-4 <sup>1</sup> .....	1.2 $\mu\text{f}$
Deflecting Plate 1 to All Other Electrodes.....	9.5 $\mu\text{f}$
Deflecting Plate 3 to All Other Electrodes.....	12 $\mu\text{f}$
Deflecting Plate 1 <sup>2</sup> to All Other Electrodes	
Except D2.....	8.0 $\mu\text{f}$
Deflecting Plate 2 <sup>2</sup> to All Other Electrodes	
Except D1.....	7.5 $\mu\text{f}$
Deflecting Plate 3 <sup>2</sup> to All Other Electrodes	
Except D4.....	10 $\mu\text{f}$
Deflecting Plate 4 <sup>2</sup> to All Other Electrodes	
Except D3.....	7.5 $\mu\text{f}$

**MECHANICAL DATA**

Minimum Useful Screen Diameter.....	4 1/2 Inches
Nominal Overall Length.....	16 3/4 Inches
Base.....	Medium Shell Magnal 11 Pin
Basing.....	11 N



# SYLVANIA TYPE 5BP1A, 5BP-A\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	2200 Volts d c
Anode No. 1 Voltage.....	1100 Volts d c
Grid Voltage	
Negative Bias Value.....	125 Volts d c
Positive Bias Value.....	0 Volts d c
Peak Voltage Between Anode No. 2 and Any Deflection Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>3</sup> .....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	315 to 562 Volts d c
Grid Voltage Required for Cutoff <sup>4</sup> .....	-20 to -60 Volts d c
Deflection Factor	
Deflecting Plates 1-2 <sup>5</sup> .....	70 to 98 Volts d c/Inch
Deflecting Plates 3-4 <sup>6</sup> .....	63 to 90 Volts d c/Inch

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

### NOTES:

1. Deflecting Plate 1 is Pin No. 3.  
Deflecting Plate 2 is Pin No. 8.  
Deflecting Plate 3 is Pin No. 9.  
Deflecting Plate 4 is Pin No. 6.
2. With D1 positive with respect to D2, the spot is deflected toward Pin No. 4;  
with D3 positive with respect to D4, the spot is deflected toward Pin No. 1.
3. Brilliance and definition decrease with decreasing Anode No. 2 Voltage. In  
general, Anode No. 2 Voltage should not be less than 1500 volts.
4. Visual extinction of undeflected focused spot.
5. Deflecting Plates 1-2 are nearer the screen.
6. Deflecting Plates 3-4 are nearer the base.

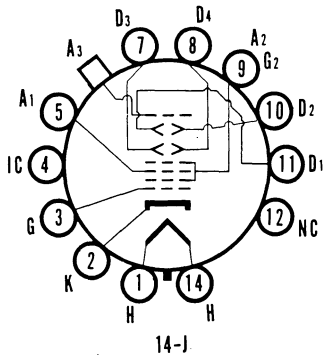
### 5BP1

Sylvania Type 5BP1A replaces Type 5BP1.

# SYLVANIA TYPE 5CPIA 5CP-A\*

## SPECIAL PURPOSE TUBE

- |                          |                             |
|--------------------------|-----------------------------|
| 5" Direct Viewed         | Electrostatic Focus         |
| Round Glass Type         | Post Deflection Accelerator |
| Electrostatic Deflection | Clear Faceplate             |



# SYLVANIA TYPE 5CP1A, 5CP-A\* (Cont'd)

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....				Electrostatic
Deflection Method.....				Electrostatic
Types*	5CP1A	5CP7A	5CP11A	5CP12
Fluorescence.....	Green	Blue	Blue	Orange
Phosphorescence.....		Yellow		
Persistence.....	Medium	Long	Short	Med.-Long
Faceplate.....				Clear

\*In addition to the Types shown, the 5CP-A can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	9 $\mu\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	8 $\mu\mu\text{f}$
Between Vertical Deflecting Plates.....	2 $\mu\mu\text{f}$
Between Horizontal Deflecting Plates.....	2 $\mu\mu\text{f}$
Deflecting Plate 1 to All Other Electrodes.....	9 $\mu\mu\text{f}$
Deflecting Plate 2 to All Other Electrodes.....	9 $\mu\mu\text{f}$
Deflecting Plate 3 to All Other Electrodes.....	7 $\mu\mu\text{f}$
Deflecting Plate 4 to All Other Electrodes.....	8 $\mu\mu\text{f}$

### MECHANICAL DATA

Minimum Useful Screen Dimension (Diameter)....	4 $\frac{1}{2}$ Inches
Nominal Overall Length.....	16 $\frac{3}{4}$ Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14J

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage.....	4400 Volts d c
Anode No. 2 Voltage.....	2200 Volts d c
Anode No. 1 Voltage.....	1100 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 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.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between Anode No. 2 And Any Deflecting Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage.....	4000 Volts d c
Anode No. 2 Voltage.....	2000 Volts d c
Anode No. 1 Voltage.....	375 to 690 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-30 to -90 Volts d c
Deflection Factor	
Vertical Plates <sup>2</sup> .....	92 Volts d c/Inch
Horizontal Plates <sup>3</sup> .....	78 Volts d c/Inch

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

### NOTES:

1. Visual extinction of undeflected focused spot.
2. Pins 10 and 11.
3. Pins 7 and 8.

### 5CP1

The Sylvania Type 5CP1A is a direct replacement for the Type 5CP1.

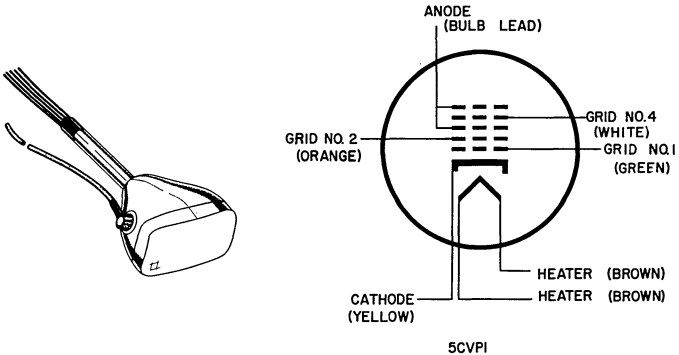
### 5CP7

The Sylvania Type 5CP7A is a direct replacement for the Type 5CP7.

# SYLVANIA TYPES 5CVP1 5CVP7 5CVP19

## SPECIAL PURPOSE TUBE

Indicator Tube  $2\frac{3}{4}'' \times 4\frac{3}{4}''$  Direct Viewed  
 Magnetic Deflection Rectangular Glass Type  
 Electrostatic Focus Encapsulated Leads  
 .840 O.D. Neck Diameter



## DESCRIPTION

Sylvania 5CVP- is a compact, rectangular, direct view cathode-ray tube designed primarily for use in airborne equipment. It features a high quality, nearly flat pressed faceplate, a high resolution electrostatic focus gun, 54 degree magnetic deflection, and neck diameter of .840 inches. Its encapsulated leads permit operation at high altitude, and it will withstand a wide range of temperatures.

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....		Electrostatic	
Deflection Method.....		Magnetic	
Deflection Angles (approx.)			
Horizontal.....		52 Degrees	
Vertical.....		27 Degrees	
Diagonal.....		54 Degrees	
Phosphor Types*			
Fluorescence.....	P1 Green	P7 Blue-White	P19 Orange
Phosphorescence.....		Yellow	Orange
Persistence.....	Medium	Long	Very Long
Faceplate.....		Spherical, Clear,	Pressed Glass

\*In addition to the types shown, the 5CVP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	$0.3 \pm 10\%$ Amperes
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes.....	12.0 $\mu\text{f}$
Cathode to All Other Electrodes.....	9.5 $\mu\text{f}$

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Horizontal.....	4 Inches
Vertical.....	2 Inches
Diagonal.....	$4\frac{1}{8}$ Inches
Area.....	7.4 Square Inches
Bulb.....	C39 Exp. 3 or Equivalent
Bulb Contact.....	Special Molded Lead
Base.....	Special Encapsulated Base with Color Coded Leads
Weight (approx.).....	$1\frac{1}{4}$ Pounds

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPES 5CVP1 (Cont'd) 5CVP7 5CVP19

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	4500 Volts d c
Anode Input.....	6 Watts
Grid No. 4 Voltage (Focusing Electrode).....	-500 to +1100 Volts d c
Grid No. 2 Voltage.....	550 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	165 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.....	180 Volts
Heater Positive with Respect to Cathode.....	180 Volts
Altitude.....	70,000 Feet
Operating Temperature Range.....	-65 to +85 Degrees C

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	4000 Volts d c
Grid No. 4 Voltage (Focusing Electrode) <sup>1</sup> .....	0 to +120 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage <sup>2</sup> .....	-15 to -45 Volts d c
Modulation <sup>3</sup> .....	15 Volts d c Max.
Line Width <sup>3</sup> .....	.006 Inches Max.

### NOTES:

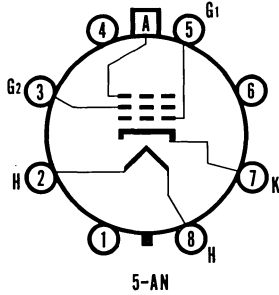
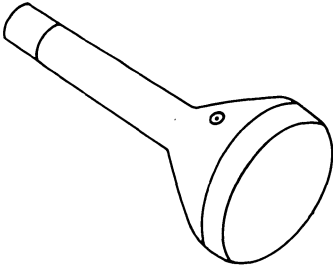
1. The horizontal deflection current is a triangular wave form of  $\frac{1}{4}$  cps at an amplitude sufficient to scan  $3\frac{3}{4}$  inches. The vertical deflection current is a saw tooth of  $\frac{1}{120}$  cps at an amplitude sufficient to scan  $1\frac{5}{8}$  inches. The control grid voltage is adjusted to produce a spot barely visible to dim lighting conditions. The beam is periodically unblanked to zero bias for a period of 500  $\mu$ secs at a repetition rate of 200-1000 pps. The focus electrode voltage for best focus under these pulsed conditions shall be as specified.
2. Visual extinction of undeflected focused spot.
3. Measured at a beam current of 10  $\mu$ a, and in accordance with MIL-E-1 specifications.

# SYLVANIA TYPE 5FP4A 5FP-A\*

## SPECIAL PURPOSE TUBE

5" Direct Viewed  
Round Glass Type

Magnetic Deflection  
Magnetic Focus



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....			Magnetic	
Deflecting Method.....			Magnetic	
Deflection Angle (approx.).....			53 Degrees	
Types*	<b>5FP4A</b>	<b>5FP7A</b>	<b>5FP11A</b>	<b>5FP14A</b>
Fluorescence.....	White	Blue-White	Blue	Blue
Phosphorescence.....	White	Yellow	Short	Orange
Persistence.....	Medium	Long		Med.-Long
Faceplate.....				Clear

\*In addition to the types shown, the 5FP-A can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μμf
Grid No. 1 to All Other Electrodes.....	8 μμf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 1/4 Inches
Nominal Overall Length.....	1 1/8 Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Base (Medium Shell Octal 8-Pin).....	B8-11, B8-65 or B5-80
Basing.....	5AN
Bulb.....	J39 1/2 LI

The plane through the tube axis and Pin No. 5 may vary from the plane through the tube axis and anode terminal by an angular tolerance (measured about the tube axis) of 10°. Anode terminal is on same side of tube as Pin No. 5.

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

	<b>5FP4A</b>	<b>5FP7A</b> <b>5FP11A</b> <b>5FP14A</b>
Anode Voltage <sup>1</sup> .....	8800	8800 Volts d c
Grid No. 2 Voltage.....	450	770 Volts d c
Grid No. 1 Voltage		
Negative Bias Value.....	140	200 Volts d c
Positive Bias Value.....	0	0 Volts d c
Positive Peak Value.....	2	2 Volts
Peak Heater-Cathode Voltage		
Heater Negative with Respect to Cathode... 165		200 Volts
Heater Positive with Respect to Cathode... 165		200 Volts

### TYPICAL OPERATING CONDITIONS

	<b>5FP4A</b>	<b>5FP7A</b> <b>5FP11A</b> <b>5FP14A</b>
Anode Voltage <sup>2</sup> .....	6,000	4,000 Volts d c
Grid No. 2 Voltage.....	250	250 Volts d c
Grid No. 1 Voltage <sup>3</sup> .....	-25 to -70	-25 to -70 Volts d c
Focusing Coil Current (approx.) <sup>4,5</sup> .....	120 ± 15%	96 ± 15% Ma d c
Spot Position (Undelected) <sup>5</sup> .....		9 mm

### CIRCUIT VALUES

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

# SYLVANIA TYPE 5FP4A, 5FP-A\* (Cont'd)

## NOTES:

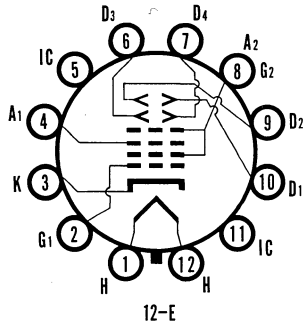
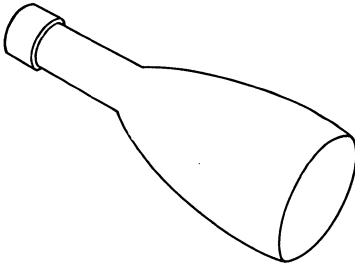
1. The product of the anode voltage and the average anode current should be limited to 6 watts.
2. Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 4,000 volts.
3. Visual extinction of undeflected focused spot.
4. This note applies to Type 5FP4A only. For specimen focusing coil similar to JETEC focusing coil No. 106 positioned with air gap toward cathode ray tube screen and center line of air gap  $3\frac{1}{4}$  inches from reference line. The indicated current is for condition with combined Grid No. 1 bias voltage and video-signal voltage adjusted to produce a highlight of 10 foot lamberts on a  $3\frac{7}{8} \times 2\frac{7}{8}$  inch picture area sharply focused at center of the screen.
5. This note applies to Types 5FP7A, 5FP11A, 5FP14A. For JETEC focus coil No. 106 or equivalent, with the Grid No. 1 voltage adjusted to produce an accelerator current of 200  $\mu$ amps and with distance from reference line to center of air gap equal to  $2\frac{3}{4}$  inches.
6. The center of the undeflected unfocused spot will fall within a circle of 9 mm radius concentric with the center of the tube face.

## SYLVANIA TYPE 5UP1 5UP\*

### SPECIAL PURPOSE TUBE

5" Direct Viewed  
Electrostatic Focus

Round Glass Type  
Electrostatic Deflection



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Electrostatic
Types*.....	<b>5UP1</b> <b>5UP7</b> <b>5UP11</b>
Fluorescence.....	Green      Blue-White      Blue
Phosphorescence.....	.....      Yellow      .....
Persistence.....	Medium      Long      Short
Faceplate.....	.....      Clear

\*In addition to the types shown, the 5UP can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	$0.6 \pm 10\%$ Ampere
Direct Interelectrode Capacitances (approx.)	
Grid to All Other Electrodes.....	8.0 $\mu$ f
Between Deflecting Plates 1-2.....	2.5 $\mu$ f
Between Deflecting Plates 3-4.....	2.5 $\mu$ f
Deflecting Plate 1 <sup>1</sup> to All Other Electrodes.....	11.0 $\mu$ f
Deflecting Plate 2 <sup>1</sup> to All Other Electrodes.....	8.0 $\mu$ f
Deflecting Plate 3 <sup>1</sup> to All Other Electrodes.....	7.0 $\mu$ f
Deflecting Plate 4 <sup>1</sup> to All Other Electrodes.....	8.0 $\mu$ f

# SYLVANIA TYPE 5UP1, 5UP\* (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	4½ Inches
Nominal Overall Length.....	14¾ Inches
Base (Small-Shell Duodecal 10-Pin).....	B10-75
or (Small-Shell Duodecal 12-Pin).....	B12-43
Basing.....	12E

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	2750 Volts d c
Anode No. 1 Voltage.....	1100 Volts d c
Grid Voltage	
Negative Bias Value.....	220 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.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between Anode No. 2 and Any Deflection Plate.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>2</sup> .....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	340 to 640 Volts d c
Maximum Grid Voltage Required for Cutoff <sup>3</sup> .....	-90 Volts d c
Deflection Factor <sup>4&amp;5</sup>	
Deflecting Plates 1-2 <sup>6</sup> .....	56 to 77 Volts d c/Inch
Deflecting Plates 3-4 <sup>7</sup> .....	46 to 62 Volts d c/Inch

### CIRCUIT VALUES

Grid Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

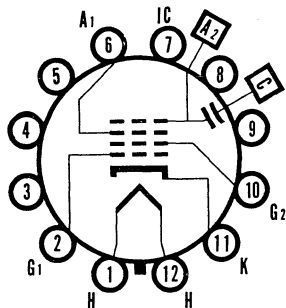
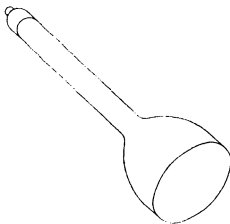
### NOTES:

- Positive voltage on Pin No. 10 will move spot approximately in direction of Pin No. 4. Positive voltage on Pin No. 6 will move spot approximately in direction of Pin No. 1.
- Brilliance and definition decrease with decreasing Anode No. 2 Voltage. In general, Anode No. 2 Voltage should not be less than 1000 volts for the Type 5UP1 and not less than 1500 volts for the Types 5UP7 and 5UP11.
- Visual extinction of undeflected focused spot.
- Angle between trace produced by plates D1-D2 and the plane through the tube axis and Pin No. 4 does not exceed 10°.
- Angle between D1-D2 trace and D3-D4 trace is 90° ± 30°.
- Deflecting Plates 1-2 are nearer the screen.
- Deflecting Plates 3-4 are nearer the base.

# SYLVANIA TYPE 5ZP15 5ZP\*

## SPECIAL PURPOSE TUBE

5" Round Glass Type	Acceleration Type Electrostatic Focus
Flat Faceplate	Clear, Non-Browning Faceplate
No Ion Trap	External Conductive Coating on Neck
Magnetic Deflection	External Insulating Coating on Bulb
	Aluminized Screen



12-C

# SYLVANIA TYPE 5ZP15, 5ZP\* (Cont'd)

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....		Electrostatic	
Deflection Method.....		Magnetic	
Deflection Angle (approx.).....		40 Degrees	
Types*	<b>5ZP15</b>	<b>5ZP16</b>	<b>5ZP24</b>
Fluorescence.....	Blue Green	Violet and Near Ultraviolet	Blue Green
Persistence.....	Extremely Short	Extremely Short	Extremely Short
Screen.....		Aluminized	
Faceplate.....		Clear, Non-Browning	

\*In addition to the types shown, the 5ZP— can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	8 μmf
External Conductive Neck Coating to Anode <sup>1</sup> ...	500 μmf Max. 100 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 $\frac{1}{4}$ Inches
Nominal Overall Length.....	14 $\frac{3}{8}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 7-Pin).....	B7-51
Basing.....	12C
Bulb Contact Aligns with Vacant Pin Position No. 3.....	± 10 Degrees

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	30,000 Volts d c
Anode No. 1 Voltage (Focusing Electrode).....	7700 Volts d c
Grid No. 2 Voltage.....	385 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	165 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.....	450 Volts
After Equipment Warm-up Period.....	165 Volts
Heater Positive with Respect to Cathode.....	165 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>2</sup> .....	27,000 Volts d c
Anode No. 1 Voltage for Focus at Ib = 15 μa.....	5550 to 7050 Volts d c
Grid No. 2 Voltage.....	200 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>3</sup> .....	-42 to -98 Volts d c
Anode Current.....	15 μa d c
Maximum Anode No. 1 Current at Ib = 15 μa....	25 μa d c
Grid No. 2 Current.....	-15 to +15 μa d c

### CIRCUIT VALUES

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

### NOTES:

1. External conductive neck coating must be grounded.
2. Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 20,000 volts.
3. Visual extinction of undeflected focused spot.

### WARNING:

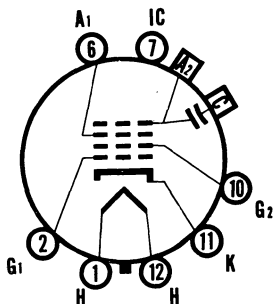
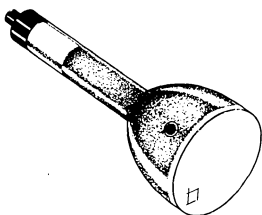
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.



# SYLVANIA TYPES 5WP11 5WP\*

## SPECIAL PURPOSE TUBE

5" Round Glass Type	No Ion Trap
Flat, Clear Faceplate	External Conductive Coating on Neck
Magnetic Deflection	External Insulating Coating on Bulb
Acceleration Type Electro- static Focus	Aluminized Screen



12-C

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angle (approx.).....	50 Degrees
Types*	5WP11
Fluorescence.....	Blue
Persistence.....	Short
Screen.....	Blue-Green
Faceplate.....	Extremely Short
	Aluminized
	Flat, Clear

\*In addition to the types shown, the 5WP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	7.5 μmf Max.
Ext. Conductive Neck Coating to Anode No. 2 <sup>1</sup> .....	500 μmf Max. 100 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 1/4 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 7-Pin).....	B7-51
Basing.....	12C
Bulb.....	C40 Exp. 14 or Equivalent

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Voltage.....	30,000 Volts d c
Anode No. 1 Voltage (Focusing Electrode).....	6600 Volts d c
Grid No. 2 Voltage.....	385 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	165 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.....	450 Volts
After Equipment Warm-up Period.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts

# SYLVANIA TYPES 5WP11, 5WP\* (Cont'd)

## TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage <sup>2</sup> .....	27,000 Volts d c
Anode No. 1 Voltage for Focus.....	4200 to 5400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	200 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-42 to -98 Volts d c
Anode No. 2 Current	
5WP11.....	20 $\mu$ a d c
5WP15.....	100 $\mu$ a d c
Maximum Anode No. 1 Current	
5WP11.....	25 $\mu$ a d c
5WP15.....	150 $\mu$ a d c
Grid No. 2 Current.....	-15 to +15 $\mu$ a d c

## CIRCUIT VALUES

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

## NOTES:

1. External conductive neck coating must be grounded.
2. Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 15,000 volts.
3. Subject to variation of  $\pm 40\%$  when Grid No. 1 Voltage cutoff is desired at the average cutoff value of -70 volts.
4. Visual extinction of undeflected focused spot.

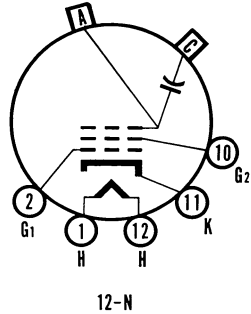
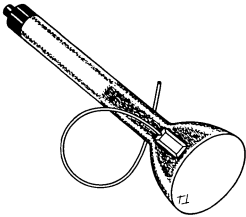
## WARNING:

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 SC-2782\*

## SPECIAL PURPOSE TUBE

High Resolution	Aluminized Screen
.001" Line Width	Magnetic Deflection
5-Inch, Flat, Optical Glass Faceplate	Magnetic Focus
Clear Non-Browning Faceplate	No Ion Trap
Extremely Fine Grain Screen	External Conductive Coating on Neck
External Insulating Coating on Bulb	



## DESCRIPTION

Sylvania Type SC-2782 is a 5-inch diameter Cathode-Ray Tube designed for high resolution photographic recording. Its electron-optical system and fine grain screen achieve very fine trace width with conventional focusing and deflection units and a simple beam-centering magnet. The tube has a flat, clear, non-browning optical glass faceplate for optimum photographic quality. An integral encapsulated high voltage connector is utilized to minimize corona at high altitude.

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflection Method.....	Magnetic
Deflection Angle (approx.).....	50 Degrees
Type*.....	SC-2782
Phosphor.....	Fine Grain P11, Aluminized
Fluorescence.....	Blue
Persistence.....	Short
Faceplate.....	Clear, Non-Browning Optical Glass

\*In addition to the type shown, the SC-2782 can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes.....	9 μmf
Cathode to All Other Electrodes.....	4.3 μmf
External Conductive Coating to Anode.....	500 μmf Max. 100 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	4 1/4 Inches
Overall Length.....	16 ± 3/8 Inches
Bulb.....	C40 Exp. 14 or Equivalent
Anode Terminal.....	16", HV Cable, Corona Protected
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	25,000 Volts d c
Grid No. 2 Voltage.....	2500 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	150 Volts d c

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# SYLVANIA TYPE SC-2782\* (Cont'd)

Positive Bias Value.....	0 Volts d c
Positive 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.....	165 Volts
Heater Positive with Respect to Cathode.....	165 Volts

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	20,000 Volts d c
Grid No. 2 Voltage.....	2000 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	100 Ma
Line Width <sup>3</sup> .....	0.001 Inch

## CIRCUIT VALUES

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

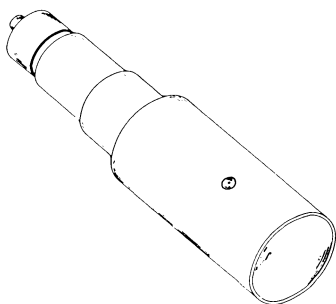
## NOTES:

1. Visual extinction of undeflected focused spot.
2. For JEDEC focusing coil 106 or equivalent 2½" from reference line.
3. Line width measured at 5 μa by the shrinking raster method. Variable strength (0-10 gauss) beam centering magnet must be used for optimum line width.

# SYLVANIA TYPE 6DP7 6DP\*

## SPECIAL PURPOSE TUBE

6" Direct Viewed	Electrostatic Focus
Flat Faceplate	Post Deflection Acceleration
Round Glass Type	High Deflection Sensitivity
Three Independent Guns	High Deflection Accuracy
Electrostatic Deflection	Aluminized Screen
25 Pin Base	



## CHARACTERISTICS

### GENERAL DATA<sup>1</sup>

Focusing Method.....	Electrostatic
Deflection Method.....	Electrostatic

Types*	Fluorescence	Phosphorescence	Persistence
6DP1.....	Green	.....	Medium
6DP2.....	Blue-Green	Green	Long
6DP7.....	Blue	Yellow	Long
6DP11.....	Blue	.....	Short
6DP14.....	Purple	Orange	Medium-Long
6DP19.....	Orange	Orange	Long
6DP25.....	Orange	Orange	Very Long
Faceplate.....			Clear

\*In addition to the types shown, the 6DP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (All Sections).....	1.50 to 1.98 Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	6.0 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes.....	6.5 $\mu\text{mf}$
D1 to D2.....	3.0 $\mu\text{mf}$
D3 to D4.....	2.0 $\mu\text{mf}$
D1 to All Other Electrodes.....	11.0 $\mu\text{mf}$
D2 to All Other Electrodes.....	11.0 $\mu\text{mf}$
D3 to All Other Electrodes.....	9.0 $\mu\text{mf}$
D4 to All Other Electrodes.....	9.0 $\mu\text{mf}$

### MECHANICAL DATA

Overall Length.....	$20\frac{1}{16} \pm \frac{3}{16}$ Inches
Minimum Useful Screen Diameter.....	$5\frac{5}{16}$ Inches
Bulb Contact (Recessed Small Ball).....	J1-22
Base 25 Pin.....	B25-139
Basing.....	See Diagram
Base Alignment	
Base Key Aligns with Bulb Contact.....	$\pm 10$ Degrees
Positive Voltage on D1 Deflects the Beam Approx. Toward Base Key	
Positive Voltage on D3 Deflects the Beam Approx. Toward Vacant Pin No. 23	
Bulb Contact Alignment	
Post-accelerator Contact Aligns with D1-D2 Trace of Gun "B".....	$\pm 3$ Degrees

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# SYLVANIA TYPE 6DP7, 6DP\* (Cont'd)

## Mechanical Data (cont'd)

Bulb Contact on Same Side as Base Key	
Trace Alignment	
D1-D2 Trace Aligns with D3-D4 Trace . . . . .	90 ± 2 Degrees
Corresponding Traces of Each Gun Align within ± 2 Degrees	

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage . . . . .	15,000 Volts d c
Anode No. 2 Voltage . . . . .	4500 Volts d c
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage <sup>2</sup> . . . . .	3.3 : 1 Maximum
Anode No. 1 Voltage for Focus . . . . .	1540 Volts d c
Grid No. 1 Voltage	
Negative Bias Value . . . . .	220 Volts d c
Positive Bias Value . . . . .	0 Volts d c
Positive Peak Value . . . . .	2 Volts
Peak Heater to Cathode Voltage	
Heater Negative with Respect to Cathode . . . . .	200 Volts
Heater Positive with Respect to Cathode . . . . .	200 Volts
Peak Voltage between Anode No. 2 and Any	
Any Deflection Plate . . . . .	600 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage . . . . .	12,000 Volts d c
Anode No. 2 Voltage . . . . .	4000 Volts d c
Anode No. 1 Voltage for Focus <sup>3</sup> . . . . .	950 to 1225 Volts d c
Grid No. 1 Voltage <sup>4</sup> . . . . .	-75 to -124 Volts d c
Modulation <sup>5</sup> . . . . .	35 Volts d c Max.
Line Width <sup>6</sup> A <sup>2</sup> . . . . .	.015 Max. Inches
Deflection Factors	
D1-D2 . . . . .	112 to 138 Volts d c/Inch
D3-D4 . . . . .	105 to 130 Volts d c/Inch
Deflection Factor Uniformity <sup>7</sup> . . . . .	5% Maximum
Undelected Spot Position <sup>8</sup> . . . . .	Within 15 MM Square
Useful Scan <sup>9</sup>	
D1-D2 . . . . .	4 Inches
D3-D4 . . . . .	4 Inches
Interaction Factor <sup>10</sup> . . . . .	6 x 10 <sup>-5</sup> Max. In./Volt
Pattern Distortion <sup>11</sup> & <sup>12</sup> . . . . .	
Anode No. 1 Focus Current	
With Ib3 = 50 μadc . . . . .	-10 to +5 μa d c
With Ec1 = 0 Volts . . . . .	-50 to +5 μa d c

### CIRCUIT VALUES

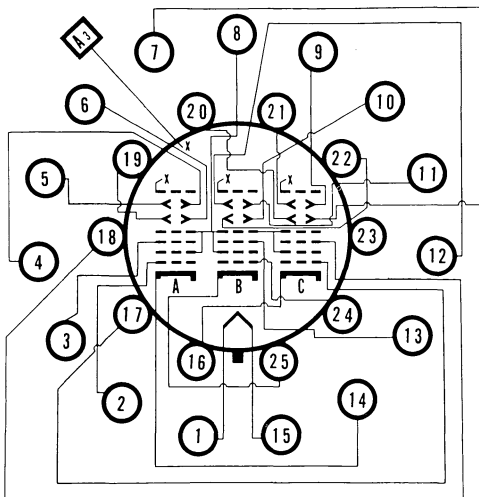
Grid No. 1 Circuit Resistance . . . . .	1.5 Meg. Max.
Deflection Circuit Resistance . . . . .	1.0 Meg. Max.

(It is recommended that the deflecting electrode circuit resistance be approximately equal. For low beam current conditions the resistance may be up to 5 megs.)

### NOTES:

1. Values are for each section unless otherwise specified.
2. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 3.0. Operation at other ratios may result in changes in deflection uniformity and pattern distortion.
3. At the specified operating condition, the focus voltage at Ib3 = 25 μadc shall be between 1000 and 1225 volts dc and at Ib3 = 50 μadc shall be between 975 and 1225 volts dc. Scanning pattern and focus as per reference 4.12.6.1 of MIL-E-1C.
4. Visual extinction of undeflected focused spot.
5. For an Ib3 = 25 μadc. The modulation factor at Ib3 = 50 μadc shall be 50 volts max.
6. For an Ib3 = 25 μadc measured in accordance with MIL-E-1C.
7. The deflection factor (for both D1-D2 and D3-D4 plate pairs separately) for a deflection of 75% of the minimum useful scan will not differ from the deflection factor at 25% of the minimum useful scan by more than the indicated value.
8. Centered with respect to the tube face and with the tube shielded.
9. Useful scan shall be ± 2 inches min. from tube face center.
10. The deflection of one beam when balanced dc voltages are applied to the deflection electrodes of another beam will not be greater than the specified value.
11. The total horizontal movement on the left or right ends of a 3" horizontal trace (centered with respect to the tube face) deflected vertically 1.5" above and below the center of the tube face shall not exceed 0.075". The D1-D2 trace shall be considered horizontal.
12. The total vertical movement of the upper or lower ends of a 3" vertical trace centered on the tube face, deflected horizontally 1.5" to the left and right of the center of the tube face shall not exceed 0.075". The D3-D4 trace shall be considered vertical.

# SYLVANIA TYPE 6DP7, 6DP\* (Cont'd)



## ELEMENTS COMMON TO ALL THREE GUNS

J1-22 (A3) Post Accelerator

Pin No. 8 Accelerator

Pins No. 1 & 15 Heater

## GUN A

Pin No.	Element
2	Grid No. 1
3	Focusing Electrode
4	Deflector D2
5	Deflector D1
6	Deflector D3
14	Cathode
19	Deflector D4

## GUN B

Pin No.	Element
10	Deflector D3
11	Deflector D2
12	Deflector D1
13	Focusing Electrode
22	Deflector D4
24	Grid No. 1
25	Cathode

## GUN C

Pin No.	Element
7	Deflector D3
9	Deflector D2
16	Cathode
17	Grid No. 1
18	Focusing Electrode
20	Deflector D4
21	Deflector D1

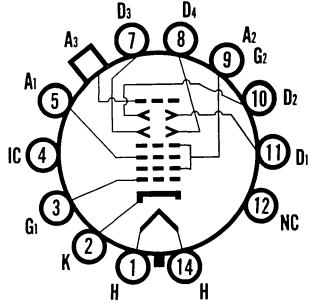
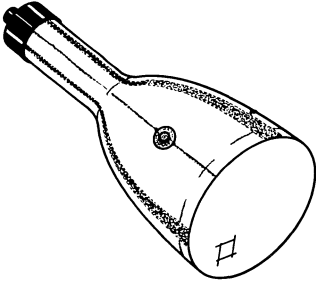




# SYLVANIA TYPES 7AEP1 7AEP\*

## SPECIAL PURPOSE TUBE

- |                          |                              |
|--------------------------|------------------------------|
| 7" Direct Viewed         | Electrostatic Focus          |
| Flat Faceplate           | Electrostatic Deflection     |
| Round Glass Type         | Post Deflection Acceleration |
| High Deflection Accuracy | High Deflection Sensitivity  |
| Close Tolerances         |                              |



14-J

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic			
Deflection Method.....	Electrostatic			
Types*	<b>7AEP1</b>	<b>7AEP2</b>	<b>7AEP7</b>	<b>7AEP11</b>
Fluorescence.....	Green	Blue-Green	Blue-White	Blue
Phosphorescence.....	.....	Green	Yellow	.....
Persistence.....	Medium	Long	Long	Short
Faceplate.....	Flat, Clear			

\*\*In addition to the types shown, the 7AEP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts	
Heater Current.....	0.6 ± 10% Amperes	
Direct Interelectrode Capacitances	<b>Min.</b>	<b>Max.</b>
Cathode to All Other Electrodes.....	2.9	4.5 μmf
Grid No. 1 to All Other Electrodes....	3.7	6.4 μmf
D1 to D2.....	1.7	2.7 μmf
D3 to D4.....	1.0	1.8 μmf
D1 to All Other Electrodes.....	5.4	7.6 μmf
D2 to All Other Electrodes.....	5.4	7.6 μmf
D3 to All Other Electrodes.....	3.4	5.5 μmf
D4 to All Other Electrodes.....	3.4	3.5 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	6 1/8 Inches
Nominal Overall Length.....	15 1/2 Inches
Anode No. 3 Contact (Recessed Small Ball Cap). Bulb.....	J1-22 J56 Y1
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14J
Base Alignment	
D1-D2 Trace Aligns with Pin No. 5 and Tube Axis.....	0 ± 10 Degrees
Positive Voltage on D1 Deflects Beam approx. Toward Pin No. 5	
Positive Voltage on D3 Deflects Beam approx. Toward Pin No. 2	
Trace Alignment	
Angle Between Traces D1-D2 and D3-D4.....	90 ± 1 Degrees
Bulb Contact Alignment	
J1-22 Contact Aligns with D1-D2 Trace.....	0 ± 10 Degrees
J1-22 Contact on Same Side as Pin No. 5	
Weight (Approx.).....	3 1/2 Pounds

SYLVANIA ELECTRONIC TUBES

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# SYLVANIA TYPES **7AEP1** (Cont'd) **7AEP\***

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 2 Input.....	6 Watts
Anode No. 3 Voltage.....	8800 Volts d c
Anode No. 2 Voltage.....	4400 Volts d c
Ratio of Anode No. 3 Voltage to Anode No. 2 Voltage <sup>1</sup> .....	2 : 1 Maximum
Anode No. 1 Voltage (Focusing Electrode).....	1375 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode....	200 Volts
Heater Positive with Respect to Cathode....	200 Volts
Peak Voltage Between Anode No. 2 and Any Deflection Plate.....	825 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage.....	4000 Volts d c
Anode No. 2 Voltage.....	2000 Volts d c
Anode No. 1 Voltage for Focus.....	380 to 620 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-45 to -75 Volts d c
Deflection Factors	
Deflection Plates 1-2 <sup>3</sup> .....	81 to 101 Volts d c/Inch
Deflection Plates 3-4 <sup>3</sup> .....	67 to 83 Volts d c/Inch
Pattern Distortion <sup>4</sup> .....	2½ Percent Max.
Spot Position <sup>5</sup> .....	Within a 15 MM. Square
Modulation (Ib3 = 25 µa) <sup>6</sup> .....	37 Volts d c Max.
Line Width "A" (Ib3 = 25 µa) <sup>6</sup> .....	.022 Inches Max.
Light Output (7AEP1, Ib3 = 25 µa) <sup>6</sup> .....	20 Ft. Lamberts Min.
Deflection Factor Uniformity <sup>6</sup> .....	3 Percent Max.
Focusing Electrode Current for Any Operating Condition.....	-15 to +10 µa

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Resistance in Any Deflecting Plate Circuit <sup>7</sup> .....	1.0 Megohms Max.

### NOTES:

1. This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.
2. Visual extinction of undeflected focused spot.
3. Deflecting plates 1-2 are nearer the screen. Deflecting plates 3-4 are nearer the base.
4. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 4.100 inch square will fall within the area bounded by the 4.100 inch square and an inscribed 3.900 inch square.
5. Centered on tube face, sides parallel to deflection axes. Tube to be magnetically shielded and deflecting plates connected to Anode No. 2.
6. Measured with accordance Mil-E-1 specs.
7. It is recommended that the deflecting plate circuit resistance be approximately equal. Higher resistance values up to five megohms may be used for low beam current operations.

### WARNING:

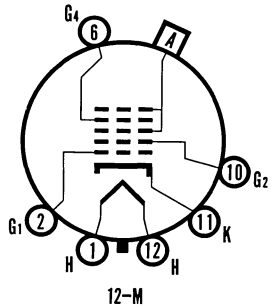
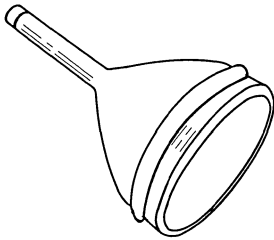
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 7ABP4 7ABP\*

## Special Purpose Tube

7" Direct Viewed  
Round Glass Type  
Electrostatic Focus

Magnetic Deflection  
High Resolution  
"A" Types Aluminized



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....Self Focusing (Electrostatic)  
Deflection Method.....Magnetic  
Deflection Angle (approx.).....50 Degrees

#### Types\*

	7ABP4	7ABP7A 7ABP7	7ABP14A 7ABP14	7ABP19A 7ABP19
Fluorescence.....	White	Blue-White	Purple	Orange
Phosphorescence.....	White	Yellow	Orange	Yellow
Persistence.....	Short-Med.	Long	Med.-Long	Long
Faceplate.....				Clear

Types 7ABP7A, 7ABP14A and 7ABP19A have aluminized screens.

\*In addition to the types shown, the 7ABP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....6.3 Volts  
Heater Current.....0.6 ± 5% Ampere  
Direct Interelectrode Capacitances (approx.)  
Cathode to All Other Electrodes.....5 μμf  
Grid No. 1 to All Other Electrodes.....6 μμf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....6 Inches  
Nominal Overall Length.....13¼ Inches  
Bulb Contact (Recessed Small Cavity Cap).....J1-21  
Base (Small Shell Duodecal 6-Pin).....B6-63  
Basing.....12M  
Bulb Contact Aligns with Pin No. 3.....± 10 Degrees

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....11,000 Volts d c  
Grid No. 4 (Focusing Electrode) Voltage.....-550 to +1100 Volts d c  
Grid No. 2 Voltage.....770 Volts d c  
Grid No. 1 Voltage  
Negative Bias Value.....200 Volts d c  
Positive Bias Value<sup>1</sup>.....0 Volts d c  
Positive Peak Value.....0 Volts  
Peak Heater-Cathode Voltage  
Heater Negative with Respect to Cathode.....200 Volts  
Heater Positive with Respect to Cathode.....200 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage<sup>2</sup>.....7000 Volts d c  
Grid No. 4 Voltage for Focus<sup>3</sup>.....0 to 250 Volts d c  
Grid No. 2 Voltage.....300 Volts d c  
Grid No. 1 Voltage<sup>4</sup>.....-28 to -72 Volts d c

### CIRCUIT VALUES

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

# SYLVANIA TYPE 7ABP4, 7ABP\* (Cont'd)

**NOTES:**

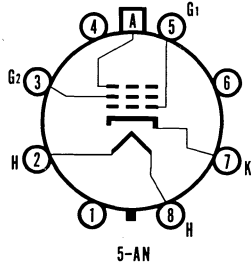
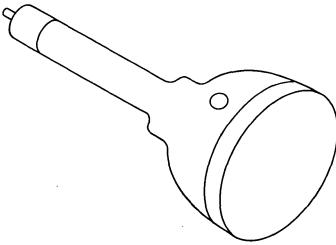
1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts. The screen of the 7ABP19 and 7ABP19A can be permanently damaged should the current density be permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
2. Brilliance and definition decrease with decreasing anode voltage. In general, anode voltage should not be less than 5000 volts, except for the 7ABP19 and 7ABP19A. For these types the anode voltage should not be less than 7000 volts.
3. With Eg1 adjusted for  $I_b = 100 \mu a$  and beam focused for minimum width of individual lines at center of screen.
4. Visual extinction of undeflected focused spot.

## SYLVANIA TYPE 7BP2A 7BP-A\*

**SPECIAL PURPOSE TUBE**

7" Direct Viewed  
Magnetic Focus

Round Glass Type  
Magnetic Deflection



### CHARACTERISTICS

**GENERAL DATA**

Focusing Method.....	Magnetic
Deflection Method.....	Magnetic
Deflection Angle (approx.).....	53 Degrees
Types*	<b>7BP2A</b> <b>7BP7A</b>
Fluorescence.....	Green      Blue
Phosphorescence.....	.....      Yellow
Persistence.....	Long      Long
Faceplate.....	Clear

\*In addition to the types shown, the 7BP-A can be supplied with several other screen phosphors.

**ELECTRICAL DATA**

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5.0 μmf
Grid No. 1 to All Other Electrodes.....	8.5 μmf
Grid No. 2 to All Other Electrodes.....	7.0 μmf

**MECHANICAL DATA**

Minimum Useful Screen Diameter.....	6 Inches
Bulb.....	J56R or Equivalent
Bulb Contact (Recessed Small Cavity Cap).....	J1-22
Base (Long Medium-Shell Octal 8-Pin).....	B8-65
or (Long Medium-Shell Octal 5-Pin).....	B5-80
Basing.....	5AN
Weight (approx.).....	3 Pounds

### RATINGS

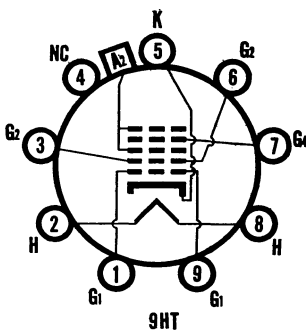
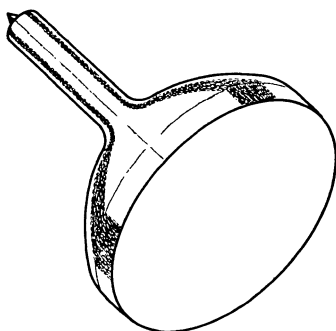
**MAXIMUM RATINGS (Absolute Maximum Values)**

Anode Voltage.....	8800 Volts d c
Grid No. 2 Voltage.....	770 Volts d c

# SYLVANIA TYPES 7AUP4 7AUP7

## SPECIAL PURPOSE TUBE

- |                     |                         |
|---------------------|-------------------------|
| 7" Direct Viewed    | Aluminized Screen       |
| Round Glass Type    | Electrostatic Focus     |
| Spherical Faceplate | Magnetic Deflection     |
| Clear Glass         | 7/8" Neck Diameter      |
| Short Length        | Monitor Tube (7AUP4)    |
|                     | Radar Indicator (7AUP7) |



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angle (approx.).....	70 Degrees
	<b>7AUP4</b>
Phosphor*.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Phosphorescence.....	.....
Faceplate.....	.....
	<b>7AUP7</b>
	Aluminized P7
	White
	Long
	Yellow-Green
	Spherical, Clear Glass

\*In addition to the types shown, the 7AUP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.3 ± 5% Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	7.0 μmf
Grid No. 1 to All Other Electrodes.....	9.0 μmf
Grid No. 2 to All Other Electrodes.....	7.0 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	6 Inches
Overall Length.....	8½ Inches Max.
Bulb.....	LEA 480 or Equivalent
Bulb Contact (Recessed Small Ball Cap).....	J1-22
Base <sup>1</sup> .....	E9-37
Basing.....	9HT
Weight (approx.).....	2¼ Pounds

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	11,000 Volts d c
Grid No. 4 Voltage (Focusing Electrode).....	1100 Volts d c
Grid No. 2 Voltage.....	770 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	155 Volts d c
Positive Bias Value.....	0 Volts d c
Positive 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 Warm-up Period.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

SYLVANIA ELECTRONIC TUBES

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# SYLVANIA TYPES 7AUP4, 7AUP7 (Cont'd)

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	8000 Volts d c Max.
Grid No. 4 Voltage for Focus <sup>2</sup> .....	0 to 300 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Spot Cutoff.....	-25 to -60 Volts d c
Line Width <sup>3</sup> .....	0.012 Inch

## CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Grid No. 2 Circuit Resistance <sup>4</sup> .....	10,000 Ohms Max.
Grid No. 4 Circuit Resistance <sup>4</sup> .....	10,000 Ohms Max.

## NOTES:

1. A socket with a center opening to clear the tubulation should be used. Care should be exercised to avoid danger to the tubulation.
2. With combined Grid No. 1 Bias Voltage and Video-Signal Voltage adjusted to give an anode current of 50  $\mu$ a on a 6" x 6" raster.
3. With an anode current of 50  $\mu$ a, typical line width at center of faceplate, using half amplitude points of light energy distribution of a single line is 0.012 inch.
4. Protective resistance in the Grid No. 2 and Grid No. 4 circuits is advisable to prevent damage to the tube.

## 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 7BP2A, 7BP-A\* (Cont'd)

## MAXIMUM RATINGS (Absolute Maximum Values) (Cont'd)

Grid No. 1 Voltage		
Negative Bias Value.....		200 Volts d c
Positive Bias Value <sup>1</sup> .....		0 Volts d c
Positive Peak Value.....		2 Volts
Peak Heater-Cathode Voltage		
Heater Negative with Respect to Cathode.....		140 Volts
Heater Positive with Respect to Cathode.....		140 Volts

## TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>2</sup> .....	4000	7000 Volts d c
Grid No. 2 Voltage.....	250	250 Volts d c
Grid No. 1 Voltage for Cutoff <sup>3</sup> .....	-25 to -70	-25 to -70 Volts d c
Focusing-Coil Current <sup>4</sup> .....	75 to 102	99 to 135 Ma d c
Spot Position.....		See Note 5

## CIRCUIT VALUES

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

## NOTES:

- At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
- Brilliance and definition decrease with decreasing anode voltage. In general, anode voltage should not be less than 4,000 volts.
- Visual extinction of undeflected focused spot.
- For JETEC Focusing Coil No. 106, or equivalent, with center line of air gap approximately 2¾ inches from reference line and total anode current of 200 microamperes.
- The center of the undeflected, unfocused spot will fall within a circle having 12 MM radius concentric with the center of the tube face.

## 7BP7

Sylvania Type 7BP7A replaces Type 7BP7.

## WARNING:

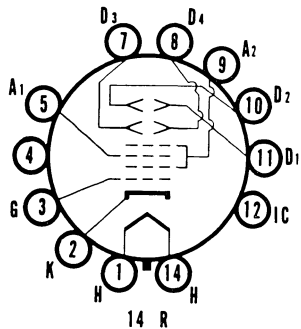
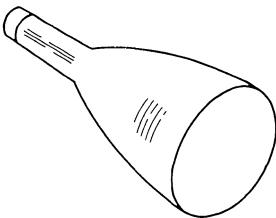
X-ray radiation shielding may be necessary to protect against danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 7JP1/7VP1 7JP\*

## SPECIAL PURPOSE TUBE

7" Direct Viewed  
Round Glass Type  
Clear Faceplate

Electrostatic Deflection  
Electrostatic Focus  
Spherical Faceplate



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....		Electrostatic	
Deflecting Method.....		Electrostatic	
Types*	<b>7JP1/7VP1</b>	<b>7JP4</b>	<b>7JP7</b>
Fluorescence.....	Green	White	Blue
Phosphorescence.....			Yellow
Persistence.....	Medium	Short	Long
Faceplate.....			Clear

\*In addition to the types shown, the 7JP- can be supplied with several other screen phosphors.

# 7JP1/7VP1, 7JP\* (Cont'd)

## ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5.0 $\mu\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	6.0 $\mu\mu\text{f}$
Between Vertical Deflecting Plates.....	3.0 $\mu\mu\text{f}$
Between Horizontal Deflecting Plates.....	2.0 $\mu\mu\text{f}$
Either Vertical Deflecting Plate to All Other Electrodes Except Other Vertical Plate.....	6.0 $\mu\mu\text{f}$
Either Horizontal Deflecting Plate to All Other Electrodes Except Other Horizontal Plate.....	5.0 $\mu\mu\text{f}$

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	6 Inches
Nominal Overall Length.....	14½ Inches
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14R

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	6600 Volts d c
Focusing Anode Voltage.....	3000 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 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... After Equipment Warm-up Period.....	450 Volts 140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between High Voltage Anode and Any Deflecting Plates.....	825 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	4000 Volts d c
Focusing Anode Voltage.....	1080-1600 Volts d c
Grid No. 1 Voltage Required for Cutoff.....	-112 Volts d c
Deflection Factor	
Vertical Plates <sup>2</sup> .....	124 to 164 Volts d c/Inch
Horizontal Plates <sup>3</sup> .....	100 to 136 Volts d c/Inch

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Deflection Circuit Resistance.....	5.0 Megohms Max.

### NOTES:

1. Visual extinction of undeflected focused spot.
2. Pins 10 and 11.
3. Pins 7 and 8.

The Type 7JP4 may be used as a direct replacement for Type 7GP4 provided no connections are made to the socket connections for Pins 4 and 12.

### 7JP7

The Type 7JP7 is identical to the Type 7JP4 except it has a screen diameter of 5½ inches.

## 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.



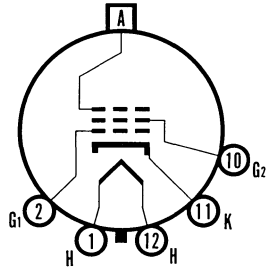
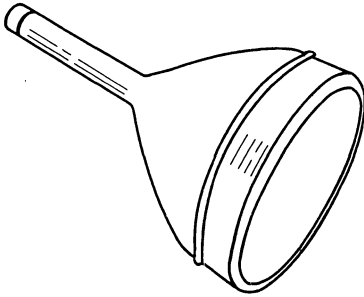
# SYLVANIA TYPE 7MP7 7MP\*

## SPECIAL PURPOSE TUBE

Radar Indicator  
7" Direct Viewed

Round Glass Type  
Magnetic Focus

Magnetic Deflection



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflection Method.....	Magnetic
Deflection Angle (approx.).....	50 Degrees
Types	7MP7      7MP14
Fluorescence.....	Blue      Purple
Phosphorescence.....	Yellow    Orange
Persistence.....	Long      Med.-Long
Faceplate.....	Clear

\*In addition to the types shown, the 7MP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (Approx.)	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	6 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	6 Inches
Nominal overall length.....	12¾ Inches
Bulb.....	J57½C or J57½D
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D
Weight (approx.).....	3½ Pounds

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	8800 Volts d c
Grid No. 2 Voltage.....	770 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	200 Volts d c
Positive Bias Value <sup>1</sup> .....	0 Volts d c
Positive Peak Value.....	2 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>2</sup> .....	4000	7000 Volts d c
Grid No. 2 Voltage.....	250	250 Volts d c
Grid No. 1 Voltage for Cutoff <sup>3</sup> .....	-27 to -63	-27 to -63 Volts d c
Focusing Coil Current.....	64 + 15%	85 ± 15% Ma
Spot Position.....		See Note 5

### CIRCUIT VALUES

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

# SYLVANIA TYPE 7MP7, 7MP\* (Cont'd)

## NOTES:

1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts.
2. Brilliance and definition decrease with decreasing anode voltage. In general, anode voltage should not be less than 4,000 volts.
3. Visual extinction of undeflected focused spot.
4. For JETEC Focusing Coil No. 109 positioned with air gap toward faceplate and center line of air gap  $2\frac{3}{4}$  inches from reference line and anode current of 200 microamperes.
5. The center of the undeflected unfocused spot will fall within a circle having a 12 MM radius concentric with the center of the tube face.

## WARNING:

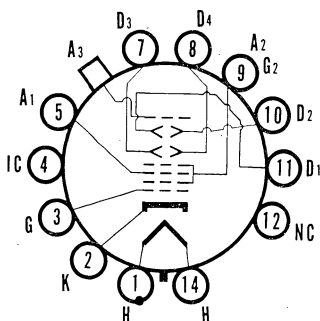
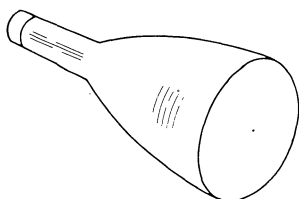
X-ray radiation shielding may be necessary to protect against danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 8CP1 8CP\*

## SPECIAL PURPOSE TUBE

8" Direct Viewed  
Round Glass Type  
Clear Faceplate

Electrostatic Deflection  
Electrostatic Focus  
Spherical Faceplate  
Post Deflection Acceleration



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....		Electrostatic	
Deflecting Method.....		Electrostatic	
Types*	<b>8CP1</b>	<b>8CP4</b>	<b>8CP7</b>
Fluorescence.....	Green	White	Blue
Phosphorescence.....			Yellow
Persistence.....	Medium	Short	Long
Faceplate.....		Clear	

\*In addition to the types shown, the 8CP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	10 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes.....	8 $\mu\text{mf}$
Between Vertical Deflecting Plates.....	4 $\mu\text{mf}$
Between Horizontal Deflecting Plates.....	2 $\mu\text{mf}$
Either Vertical Deflecting Plate to All Other Electrodes Except Other Vertical Plate.....	8 $\mu\text{mf}$
Either Horizontal Deflection Plate to All Other Electrodes Except Other Horizontal Plate.....	6 $\mu\text{mf}$

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	6 Inches
Nominal Overall Length.....	16 $\frac{1}{2}$ Inches
Bulb Contact (Recessed Small Ball).....	J1-22
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14J
Bulb Contact Aligns on Same Side as Pin No. 5	

# 8CP1, 8CP\* (Cont'd)

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage.....	6600 Volts d c
Anode No. 2 Voltage.....	6600 Volts d c
Anode No. 1 Voltage.....	2750 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	220 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.....	140 Volts
Heater Positive with Respect to Cathode.....	140 Volts
Peak Voltage Between Anode No. 2 and Any Deflecting Plates.....	550 Volts

### TYPICAL OPERATING CONDITIONS

Anode No. 3 Voltage.....	4000 Volts d c
Anode No. 2 Voltage.....	2000 Volts d c
Anode No. 1 Voltage.....	540 to 800 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-24 to -56 Volts d c
Deflection Factor	
Vertical Plates <sup>2</sup> .....	58 to 81 Volts d c/Inch
Horizontal Plates <sup>3</sup> .....	49 to 68 Volts d c/Inch

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max
Deflection Circuit Resistance.....	5.0 Megohms Max

### NOTES:

1. Visual extinction of undeflected focused spot.
2. Pins 10 and 11.
3. Pins 7 and 8.

### WARNING

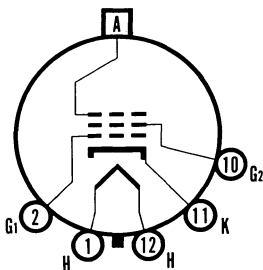
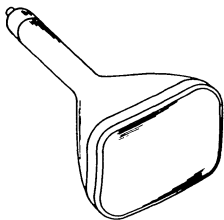
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 8FP4

### SPECIAL PURPOSE TUBE

8" Rectangular, All Glass  
Magnetic Focusing  
Aluminized Screen

Ion Trap  
90° Magnetic Deflection  
Gray Filter Glass



12-D

### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflection Angles (approx.)	
Vertical.....	68 Degrees
Horizontal.....	85 Degrees
Diagonal.....	90 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	80 Percent

# SYLVANIA TYPE 8FP4 (Cont'd)

## 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
Ion Trap Magnet.....	External, Single Field Typ

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	7 <sup>3</sup> / <sub>16</sub> x 5 <sup>3</sup> / <sub>8</sub> Inches
Nominal Overall Length.....	11 <sup>7</sup> / <sub>16</sub> Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D
Weight (approx.).....	2 <sup>1</sup> / <sub>4</sub> Pounds

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	19,800 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 (and Grid No. 4) Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-35 to -72 Volts d c
Focusing Coil Current <sup>3</sup> .....	125 ± 15% Ma 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 the time required for the voltage across the heater to reach 80% of its rated value after applying 4 times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times rated heater voltage divided by rated heater current.
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 No. 109 or equivalent, located with center of air gap 3" from reference line, bias adjusted for 20 ft. L on a 7<sup>3</sup>/<sub>16</sub>" x 5<sup>3</sup>/<sub>8</sub>" picture area, sharply focused at center of screen.
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 ±3 gaussess.

### WARNING:

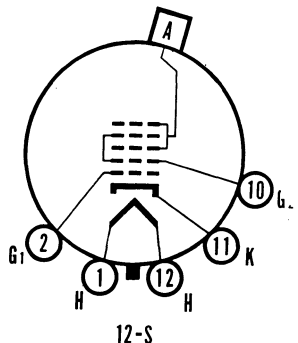
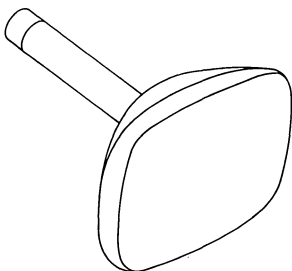
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 8XP4

## TELEVISION RECEIVER CHECK TUBE

8" Direct Viewed  
Rectangular Glass Type  
Gray Filter Glass

Magnetic Deflection  
Self Focusing (Electrostatic)  
No Ion Trap Required



# SYLVANIA TYPE 8XP4 (Cont'd)

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Self Focusing (Electrostatic)
Deflecting Method.....	Magnetic
Deflecting Angle (approx.)	
Vertical.....	68 Degrees
Horizontal.....	85 Degrees
Diagonal.....	90 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	80 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 Amperes
Direct Interelectrode Capacitances	
Cathode to All Other Electrodes.....	5 $\mu$ f
Grid No. 1 to All Other Electrodes.....	6 $\mu$ f

### MECHANICAL DATA

Overall Length.....	11 $\frac{7}{16}$ $\pm$ $\frac{5}{16}$ Inches
Minimum Useful Screen Dimensions.....	7 $\frac{3}{16}$ x 5 $\frac{3}{8}$ Inches
Bulb Contact (Recessed Small Cavity Cap.).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12S

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	22000 Volts d c
Grid No. 2 (and Grid No. 4) 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 Not to Exceed 15 Seconds...	450 Volts
After Equipment Warm-up.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	16000 Volts d c
Grid No. 2 (and Grid No. 4) 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
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### NOTES:

1. Visual extinction of raster.

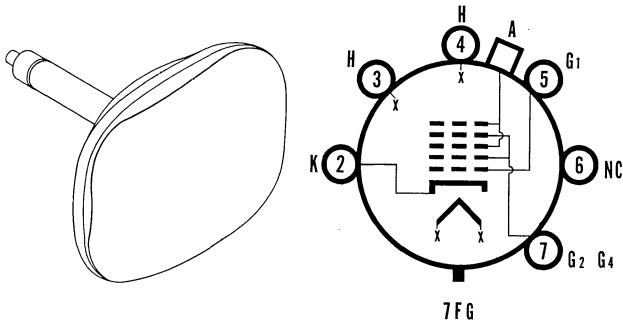
### WARNING

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 8YP4

## TELEVISION RECEIVER CHECK TUBE

8" Rectangular, All Glass No Ion Trap  
 Self Focusing 110° Magnetic Deflection  
 (Electrostatic) Gray Filter Glass



### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Self Focusing (Electrostatic)
Deflecting Method.....	Magnetic
Deflection Angles (approx.)	
Vertical.....	87 Degrees
Horizontal.....	105 Degrees
Diagonal.....	110 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	80 Percent

#### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	4 $\mu$ f
Grid No. 1 to All Other Electrodes.....	6 $\mu$ f

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	7½ x 5⅞ Inches
Nominal Overall Length.....	8⅛ Inches
Minimum Useful Screen Area.....	39 Sq. Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-185
Basing.....	7FG
Weight (approx.).....	2 Pounds
Bulb.....	C67½ Exp. 2 or Equivalent

### RATINGS

#### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	22,000 Volts dc
Grid No. 2 (and Grid No. 4) Voltage.....	550 Volts dc
Grid No. 1 Voltage	
Negative Bias Value.....	155 Volts dc
Negative Peak Value.....	220 Volts
Positive Bias Value.....	0 Volts dc
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 dc
Grid No. 2 (and Grid No. 4) Voltage.....	300 Volts dc
Grid No. 1 Voltage Required for Cutoff!.....	-35 to -72 Volts dc

#### CIRCUIT VALUES

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

#### NOTE:

1. Visual extinction of raster.

#### WARNING

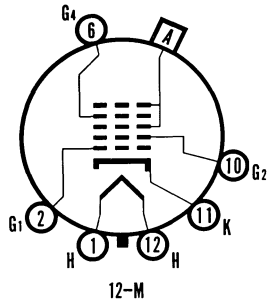
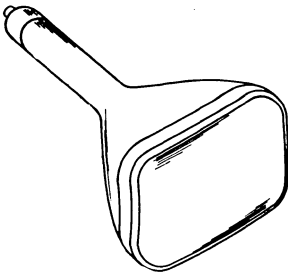
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 8KP4

## SPECIAL PURPOSE TUBE

### Television Monitor Tube

Electrostatic Focus                      No Ion Trap  
 8" Rectangular, All Glass              90° Magnetic Deflection  
 Aluminized Screen                      High Resolution  
     Gray Filter Glass



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angles (approx.)	
Vertical.....	68 Degrees
Horizontal.....	85 Degrees
Diagonal.....	90 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	80 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 10% Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	6.5 μmf

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	7 <sup>3</sup> / <sub>16</sub> x 5 <sup>3</sup> / <sub>8</sub> Inches
Nominal Overall Length.....	11 <sup>1</sup> / <sub>16</sub> Inches
Nominal Neck Length.....	8 Inches
Area.....	35.5 Square Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12M

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	18,000 Volts d c
Grid No 4 (Focusing Electrode) Voltage.....	800 Volts d c
Grid No. 2 Voltage.....	700 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	180 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.....	450 Volts
After Equipment Warm-up Period.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

# SYLVANIA TYPE 8KP4 (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.
------------------------------------	------------------

## NOTE:

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

## WARNING:

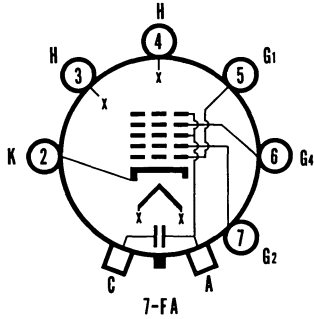
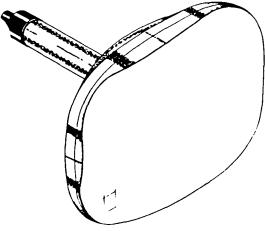
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.



# SYLVANIA TYPE 8LP4

## TELEVISION PICTURE TUBE

Electrostatic Focus	No Ion Trap
8" Rectangular, All Glass	110° Magnetic Deflection
Aluminized Screen	External Conductive Coating
Gray Filter Glass	6.3 Volts, 0.30 Amp. Heater



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angles (approx.)	
Vertical.....	87 Degrees
Horizontal.....	105 Degrees
Diagonal.....	110 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	80 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.30 ± 5% Ampere
Heater Warm-up Time <sup>1</sup> .....	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	4 μμf
Grid No. 1 to All Other Electrodes.....	6 μμf
External Conductive Coating to Anode <sup>2</sup> .....	400 μμf Max. 200 μμf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	5 7/8 Inches
Width.....	7 1/2 Inches
Diagonal.....	7 7/8 Inches
Area.....	39 Square Inches
Over All Length.....	8 5/16 Inches
Bulb.....	C67 1/2 Exp. 2 or Equivalent
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-185
Basing.....	7FA
Weight (approx.).....	2 Pounds

### 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 <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 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 five volts more negative.

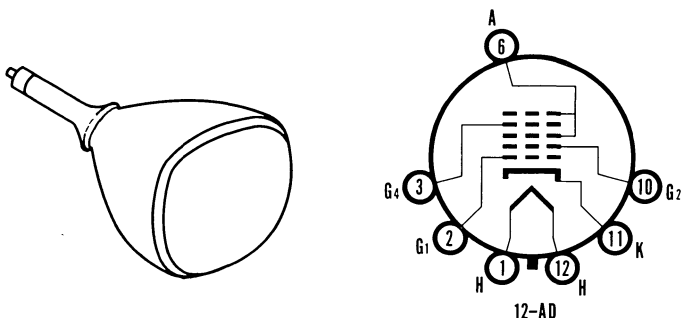
## SYLVANIA ELECTRONIC TUBES



# SYLVANIA TYPE 9QP4A

## TELEVISION PICTURE TUBE

9" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Electrostatic Focus
Spherical Faceplate	Single Field Ion Trap
Gray Filter Glass	Cathode Drive Design



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	61 Degrees
Diagonal.....	70 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	83 Percent

### ELECTRICAL DATA

Heater Voltage.....	4.7 Volts
Heater Current.....	0.3 ± 10% Ampere
Heater Warm-up Time <sup>1</sup> .....	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	6 μμf
Grid No. 1 to All Other Electrodes.....	4 μμf
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	7 <sup>11</sup> / <sub>16</sub> x 6 <sup>1</sup> / <sub>8</sub> Inches
Nominal Overall Length.....	12 <sup>3</sup> / <sub>4</sub> Inches
Minimum Useful Screen Area.....	43 Square Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 7-Pin).....	B7-179
Basing.....	12AD
Weight.....	3 <sup>1</sup> / <sub>2</sub> Pounds

### TYPICAL OPERATING CONDITIONS

<b>(Cathode Drive Service)<sup>2</sup></b>	
Anode Voltage.....	5500 Volts d c
Grid No. 4 Voltage for Focus.....	0 to 400 Volts d c
Grid No. 2 Voltage.....	200 Volts
Cathode Voltage Required for Cutoff <sup>3</sup> .....	+28 to +52 Volts d c
Ion Trap Magnet Current <sup>4</sup> .....	22 Ma d c
Field Strength of PM Ion Trap Magnet <sup>4</sup> .....	22 Gauss

### CIRCUIT VALUES

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

## SYLVANIA TYPE 9QP4A (Cont'd)

### 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. This type is designed for cathode-drive service. All voltages shown are positive with respect to Grid No. 1 Voltage, unless otherwise indicated.
3. Visual extinction of focused raster.
4. For JEDEC Ion Trap Magnet No. 117.

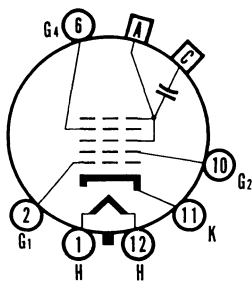
### WARNING:

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 10ABP4 10ABP4A 10ABP4B 10ABP4C

## TELEVISION PICTURE TUBE

10" Direct Viewed                      Magnetic Deflection  
 Rectangular Glass Type              Electrostatic Focus  
 Spherical Face Plate                  Single Field Ion Trap  
 External Conductive Coating



12-L

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....		Electrostatic
Deflection Method.....		Magnetic
Deflection Angle (approx.)		
Horizontal.....		85 Degrees
Diagonal.....		90 Degrees
	<b>10ABP4A*</b>	<b>10ABP4C*</b>
	<b>10ABP4</b>	<b>10ABP4B</b>
Phosphor.....	P4	P4
Fluorescence.....	White	White
Persistence.....	Medium	Medium
Faceplate.....	Clear	Gray Filter
Light Transmittance (approx.).....	91	81 Percent

\*Types 10ABP4A and 10ABP4C have aluminized screens.

### ELECTRICAL DATA

Heater Voltage.....		6.3 Volts
Heater Current.....	0.6 ± 5%	Amperes
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.....		850 μmf Max. 400 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	8 <sup>7</sup> / <sub>8</sub> x 6 <sup>9</sup> / <sub>16</sub>	Inches
Nominal Overall Length.....	11 <sup>1</sup> / <sub>8</sub>	Inches
Minimum Useful Screen Area.....	53 <sup>1</sup> / <sub>2</sub>	Square Inches
Bulb Contact.....	J1-21	
Base.....	B6-63	
Basing.....	12L	
Bulb Contact Alignment		
J1-21 Contact Aligns with Pin Position No. 6.....		± 30 Degrees
Weight.....		4.5 Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	7500 Volts d c
Grid No. 4 Voltage <sup>2</sup> .....	0 to 500 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage <sup>3</sup> .....	-38 to -62 Volts d c
Field Strength of PM Ion Trap Magnet <sup>4</sup> .....	32 Gaussess Min.

### CIRCUIT VALUES

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

# SYLVANIA TYPE 10ABP4, 10ABP4A, 10ABP4B, 10ABP4C (Cont'd)

## NOTES:

1. Grid No. 4 in this tube is the focus control electrode.
2. With the combined Grid No. 1 bias voltage and video signal adjusted to produce an anode current of 100  $\mu\text{a}$  on a  $8\frac{7}{8} \times 6\frac{1}{16}$  inch picture adjusted for best overall focus. For other anode voltages, the focus voltage will be from 0 percent to 5.5 percent.
3. Visual extinction of focused raster.
4. For the specimen PM ion trap magnet such as the Heppner Model No. E437 or equivalent, positioned to give maximum brightness for a given equipment application, the tolerance range for the strength of the PM ion magnet should be added to the minimum value. The maximum strength of the magnet should not exceed the specified minimum value by more than 6 gauss. This procedure will insure use of the PM ion trap magnet allowing adequate adjustment to permit satisfactory performance without loss of highlight brightness.

## 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.

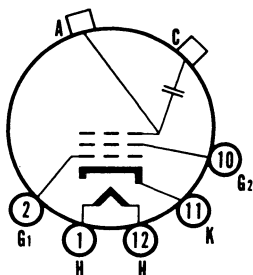
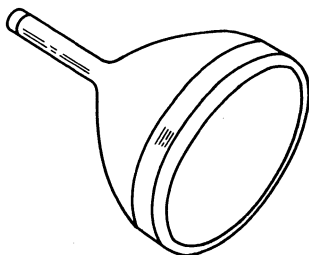
## SYLVANIA TYPE 10BP4 10BP4A

### TELEVISION PICTURE TUBE

10" Direct Viewed  
Round Glass Type  
External Conductive Coating  
Magnetic Deflection

Magnetic Focus  
Spherical Faceplate  
Double Field Ion Trap

10BP4 has a Clear Glass Faceplate  
10BP4A has Gray Filter Glass Faceplate



### CHARACTERISTICS

12-N

#### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle.....	50 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(10BP4) Clear (10BP4A) Gray

#### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5.0 $\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	6.0 $\mu\text{f}$
External Conductive Coating to Anode <sup>1</sup> .....	2500 $\mu\text{f}$ Max.
	500 $\mu\text{f}$ Min.
Ion Trap Magnet.....	External, Double Field Type

#### MECHANICAL DATA

Minimum Useful Screen Diameter.....	9 $\frac{1}{8}$ Inches
Nominal Overall Length.....	17 $\frac{3}{4}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N
Bulb Contact Aligns with Vacant Pin Position No. 3.....	$\pm 10$ Degrees

# 10BP4, 10BP4A (Cont'd)

## TYPICAL OPERATING CONDITIONS

Anode Voltage	9000 Volts d c
Grid No. 2 Voltage	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup>	-27 to -63 Volts d c
Focusing Coil Current (approx.) <sup>3</sup>	100 Ma d c
Ion Trap Magnet Strength (approx.)	35 Gauss

## NOTES:

- External conductive coating must be grounded.
- Visual extinction of undeflected focused spot.
- For JETEC focusing coil 106 or equivalent three and one quarter inches from reference line.

## 10BP4A

Sylvania 10BP4A is identical to Type 10BP4 except for having the gray filter glass faceplate.

## WARNING

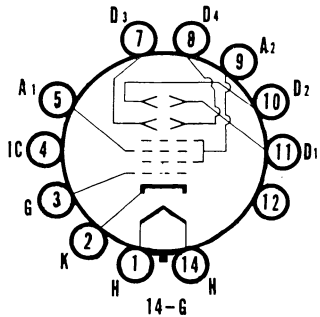
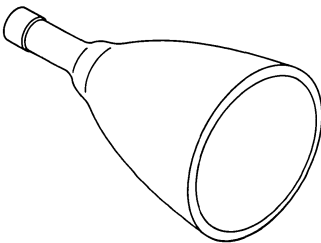
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 10HP4

## TELEVISION PICTURE TUBE

10" Direct Viewed  
Round Glass Type  
Clear Faceplate

Electrostatic Deflection  
Electrostatic Focus  
Spherical Faceplate



## CHARACTERISTICS

### GENERAL DATA

Focusing Method	Electrostatic
Deflecting Method	Electrostatic
Phosphor	P4
Fluorescence	White
Persistence	Medium
Faceplate	Clear

### ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current (approx.)	0.6 Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	9.5 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes	8.5 $\mu\text{mf}$
Between Vertical Deflecting Plates	3.5 $\mu\text{mf}$
Between Horizontal Deflecting Plates	2.0 $\mu\text{mf}$
Either Vertical Deflecting Plate to All Other Electrodes Except Other Vertical Plate	7.5 $\mu\text{mf}$
Either Horizontal Deflecting Plate to All Other Electrodes Except Other Horizontal Plate	6.0 $\mu\text{mf}$

# 10HP4 (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	8¾ Inches
Nominal Overall Length.....	19¼ Inches
Base (Medium Shell Diheptal 12-Pin).....	B12-37
Basing.....	14G

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	5000 Volts d c
Focusing Anode Voltage.....	1200 to 1800 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-60 to -140 Volts d c
Deflection Factor	
Vertical Plates <sup>2</sup> .....	130 Volts d c/Inch
Horizontal Plates <sup>3</sup> .....	100 Volts d c/Inch

## CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max
Deflection Circuit Resistance.....	5.0 Megohms Max

## NOTES:

1. Visual extinction of undeflected focused spot.
2. Pins 10 and 11.
3. Pins 7 and 8.

## 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 10MP4 10MP4A

## TELEVISION PICTURE TUBE

10" Direct Viewed

Magnetic Deflection

Round Glass Type

Magnetic Focus

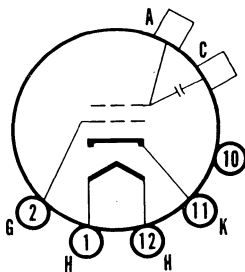
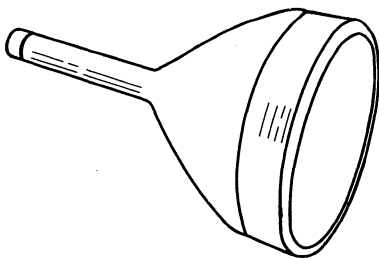
External Conductive Coating

Spherical Faceplate

10MP4 has a Clear Glass Faceplate

Double Field Ion Trap

10MP4A has a Gray Filter Glass Faceplate



12-G

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	52 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(10MP4) Clear (10MP4A) Gray
Light Transmittance (approx.).....	66 Percent

### ELECTRICAL DATA

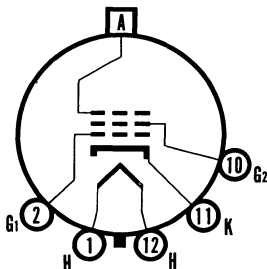
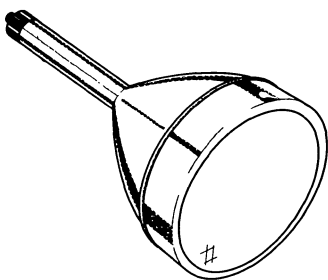
Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 µµf
Grid to All Other Electrodes.....	6 µµf
External Conductive Coating to Anode <sup>1</sup> .....	2500 µµf Max 500 µµf Min
Ion Trap Magnet.....	External, Double Field Type



# SYLVANIA TYPES 10KP7\* 10KP7A 10KP7B

## SPECIAL PURPOSE TUBE

10" Direct Viewed                      10KP7B, Aluminized Screen  
 Round Glass Type                      Magnetic Deflection  
 Spherical, Gray Faceplate          Magnetic Focus  
 10KP7A and 10KP7B, High Resolution



12-D

## CHARACTERISTICS

### GENERAL DATA

Focusing Method..... Magnetic  
 Deflecting Method..... Magnetic  
 Deflection Angle (approx.)..... 50 Degrees

#### Types\*

	10KP7 10KP7A	10KP7B
Fluorescence.....	Blue-White	Blue-White
Phosphorescence.....	Yellow	Yellow
Persistence.....	Long	Long
Screen.....	.....	Aluminized
Faceplate.....	Gray Filter Glass	Gray Filter Glass
Light Transmittance (approx.).....	77	77

\*In addition to the types shown, the 10KP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage..... 6.3 Volts  
 Heater Current.....  $0.6 \pm 10\%$  Ampere  
 Direct Interelectrode Capacitances (approx.)  
 Cathode to All Other Electrodes.....  $5 \mu\text{f}$   
 Grid No. 1 to All Other Electrodes.....  $8 \mu\text{f}$

### MECHANICAL DATA

Minimum Useful Screen Diameter..... 9 Inches  
 Nominal Overall Length.....  $17\frac{5}{8}$  Inches  
 Bulb Contact (Recessed Small Cavity Cap)..... J1-21  
 Bulb..... J84C or J84D  
 Base (Small-Shell Duodecal 5-Pin)..... B5-57  
 Basing..... 12D  
 Bulb Contact Aligns with Vacant Pin  
 Position No. 3.....  $\pm 10$  Degrees  
 Weight (approx.)..... 9 Pounds

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage  
 10KP7, 10KP7A..... 11,000 Volts d c  
 10KP7B..... 13,200 Volts d c  
 Grid No. 2 Voltage..... 770 Volts d c  
 Grid No. 1 Voltage  
 Negative Bias Value..... 200 Volts d c  
 Positive Bias Value..... 0 Volts d c  
 Positive Peak Value..... 2 Volts

# SYLVANIA TYPES 10KP7\*, 10KP7A, 10KP7B (Cont'd)

## Peak Heater Cathode Voltage

	10KP7	10KP7A	10KP7B
Heater Negative with Respect to Cathode.....	140	200	Volts
During Warm-up Period not to Exceed 15 Seconds.....			450 Volts
After Equipment Warm-up Period.....			200 Volts
Heater Positive with Respect to Cathode.....	140	200	200 Volts

## TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>1</sup> .....	9000 Volts d c
Grid No. 2 Voltage.....	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-27 to -63 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	112 ± 15% Ma d c
Line Width A <sup>4</sup> (10KP7A and 10KP7B).....	0.38 mm Max.

## MAXIMUM CIRCUIT VALUES

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

## NOTES:

1. Brilliance and definition decrease with decreasing Anode Voltage. In general, the Anode Voltage should not be less than 7000 volts for Type 10KP7B and not less than 5000 volts for Types 10KP7 and 10KP7A.
2. Visual extinction of focused spot.
3. For JEDEC focusing coil 106 or equivalent, center of air gap  $3\frac{1}{4}$  inches from Reference Line at an anode current of 200  $\mu$ a.
4. Measured in accordance with MIL-E-1, at an anode current of 200  $\mu$ a.

# 10MP4, 10MP4A (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	9 1/8 Inches
Nominal Overall Length.....	17 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12G

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	9000 Volts d c
Grid Voltage Required for Cutoff <sup>2</sup> .....	-27 to -63 Volts d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

## CIRCUIT VALUES

Grid Circuit Resistance.....	1.5 Megohms Max
------------------------------	--------------------

## NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.

## 10MP4A

The Sylvania Type 10MP4A is identical to Type 10MP4 except for having the gray filter glass faceplate.

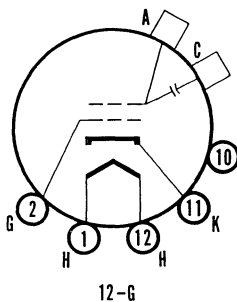
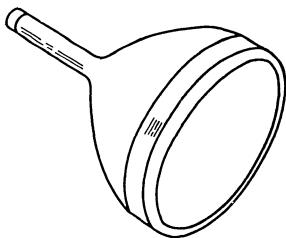
## WARNING

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 10NP11

## SPECIAL PURPOSE TUBE

10" Direct Viewed	Magnetic Deflection
Round Glass Type	Magnetic Focus
Aluminized Screen	External Conductive Coating
Triode Construction	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflection Angle (approx.).....	52 Degrees
Phosphor.....	P11
Fluorescence.....	Blue
Persistence.....	Short
Faceplate.....	Clear, or Gray Filter Glass
Light Transmittance (approx.).....	76 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	4 μμf
Grid No. 1 to All Other Electrodes.....	5 μμf
External Conductive Coating to Anode.....	1500 μμf Max. 500 μμf Min.

# SYLVANIA TYPE 10NP11 (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Diameter <sup>1</sup> .....	9 $\frac{1}{8}$ Inches
Nominal Overall Length.....	17 $\frac{5}{8}$ Inches
Bulb Contact (Recessed Small Ball Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12G
Bulb Contact Aligns with Pin Position No. 3 (Vacant)...	± 30 Degrees

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	27,500 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	385 Volts d c
Positive Bias Value.....	0 Volts d c
Positive Peak Value.....	2 Volts
Peak Heater Negative with Respect to Cathode	
During Warm-up Period not to Exceed 15 Seconds....	450 Volts
Heater Negative with Respect to Cathode.....	165 Volts
Heater Positive with Respect to Cathode.....	165 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	18,000 Volts d c
Grid No. 1 Voltage <sup>2</sup> .....	-65 to -125 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	110 Ma d c

### NOTES:

1. For film recording it is recommended that the pattern be confined within the 7 inch diameter circle centered on the tube face to minimize its curvature and to insure best screen quality.
2. Visual extinction of undeflected focused spot.
3. For JETEC focusing coil 109 or equivalent, with the distance from reference line to the center of the air gap equal to 3 $\frac{1}{4}$  inches.

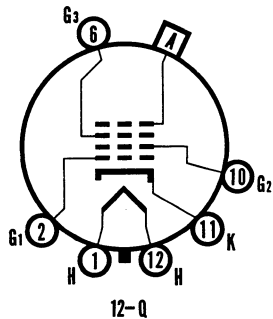
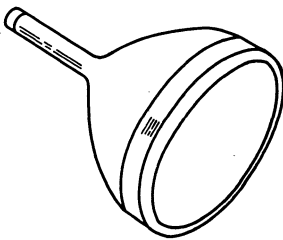
### WARNING:

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 10SP4

## SPECIAL PURPOSE TUBE

10" Direct Viewed	Aluminized Screen
Round Glass Type	Magnetic Deflection
Spherical Faceplate	No Ion Trap
Gray Filter Glass	Acceleration Type
Electrostatic Focus	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angle (approx.).....	50 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance.....	76 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	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 $\mu\mu\text{f}$

# SYLVANIA TYPE 1OSP4 (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	9 $\frac{1}{8}$ Inches
Nominal Overall Length.....	16 $\frac{5}{8}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12Q
Bulb Contact Aligns with Pin No. 6.....	$\pm 10$ Degrees

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	22,000 Volts d c
Grid No. 3 Voltage.....	3300 Volts d c
Grid No. 2 Voltage.....	450 Volts d c
Grid No. 1 Voltage.....	
Negative Bias Value.....	140 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.....	450 Volts
After Warm-up Period.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>1</sup> .....	14,000 Volts d c
Grid No. 3 Voltage for Focus with	
I <sub>b</sub> = 100 $\mu$ amps.....	1640 to 2225 Volts d c
Alignment Magnet Field Strength.....	0 to 8 Gausses
Grid No. 2 Voltage.....	200 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-18 to -48 Volts d c
Grid No. 3 Current at I <sub>b</sub> = 100 $\mu$ amps.....	25 $\mu$ a Max.

### CIRCUIT VALUES

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

### NOTES:

1. Brilliance and definition decrease with decreasing anode voltage. In general, anode voltage should not be less than 10,000 volts.
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.

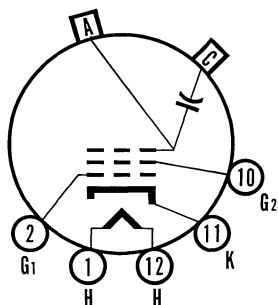
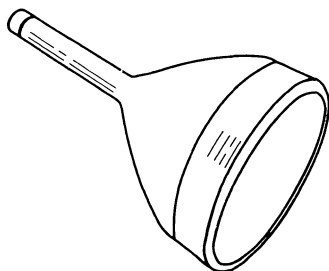
# SYLVANIA TYPE 10VP7 10VP\*

## SPECIAL PURPOSE TUBE

10" Round Glass Type  
Spherical Faceplate  
Clear Glass

Aluminized Screen  
Magnetic Deflection  
Magnetic Focus

External Conductive Coating



12-N

# SYLVANIA TYPE 10VP7, 10VP\* (Cont'd)

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflection Angle (approx.).....	50 Degrees

Types*	10VP7	10VP15
Fluorescence.....	Blue	Blue-Green
Phosphorescence.....	Yellow	.....
Persistence.....	Long	Extremely Short
Screen.....	Aluminized	
Faceplate.....	Clear Glass	

\*In addition to the type shown, the 10VP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% 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 <sup>1</sup> .....	2500 μμf Max. 500 μμf Min.

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	9 1/8 Inches
Nominal Overall Length.....	17 5/8 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N
Bulb.....	J84C or J84D
Weight.....	9 Pounds

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	13,200 Volts d c
Grid No. 2 Voltage.....	450 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	140 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.....	450 Volts
After Warm-up Period.....	154 Volts
Heater Positive with Respect to Cathode.....	154 Volts

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	11,000 Volts d c
Grid No. 2 Voltage.....	250 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> .....	110 Ma d c
Spot Position (Undelected).....	16 MM Max.

### CIRCUIT VALUES

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

### NOTES:

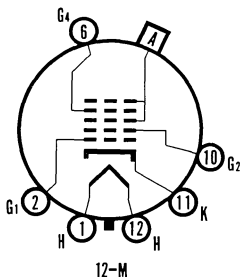
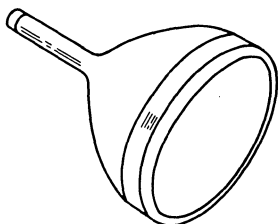
1. External Conductive Coating must be grounded.
2. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
3. For standard focus coil EIA No. 106 or equivalent, with the combined Grid No. 1 bias voltage and video-signal voltage adjusted to produce a highlight brightness of 40 foot-lamberts on a 6 inch by 8 inch picture area. Center of the air gap of the coil to reference line shall be 3/4 inches.

# SYLVANIA TYPE 10WP7 10WP\*

## SPECIAL PURPOSE TUBE

10" Direct Viewed  
Round Glass Type  
Electrostatic Focus

Spherical Faceplate  
Gray Filter Glass  
Magnetic Deflection



## CHARACTERISTICS

### GENERAL DATA

Focusing Method..... Electrostatic  
Deflection Method..... Magnetic  
Deflection Angle (approx.)..... 50 Degrees

Types*	10WP7A 10WP7	10WP14A 10WP14	10WP19A 10WP19
Fluorescence.....	Blue	Purple	Orange
Phosphorescence.....	Yellow	Yellow	Orange
Persistence.....	Long	Med.-Long	Long
Faceplate.....		Gray Filter Glass	
Light Transmittance.....		76 Percent	

\*In addition to the types shown, the 10WP- and 10WP-A can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage..... 6.3 Volts  
Heater Current..... 0.6 ± 10% Ampere  
Direct Interelectrode Capacitances (approx.)  
Cathode to All Other Electrodes..... 5 μmf  
Grid No. 1 to All Other Electrodes..... 6 μmf

### MECHANICAL DATA

Minimum Useful Screen Diameter..... 9 Inches  
Nominal Overall Length..... 16<sup>15</sup>/<sub>16</sub> Inches  
Bulb Contact (Recessed Small Cavity Cap)..... J1-21  
Base (Small Shell Duodecal 6-Pin)..... B6-63  
Basing..... 12M  
Bulb Contact Aligns with Vacant Pin  
Position No. 3..... ±10 Degrees

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage..... 13,200 Volts d c  
Grid No. 4 Voltage (Focusing Electrode)..... -550 to +1100 Volts d c  
Grid No. 2 Voltage..... 770 Volts d c  
Grid No. 1 Voltage  
Negative Bias Value..... 200 Volts d c  
Positive Bias Value<sup>1</sup>..... 0 Volts d c  
Positive Peak Value..... 0 Volts  
Peak Heater-Cathode Voltage  
Heater Negative with Respect to Cathode..... 200 Volts d c  
Heater Positive with Respect to Cathode..... 200 Volts d c

# SYLVANIA TYPE 10WP7, 10WP\* (Cont'd)

## TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>2</sup> .....	10,000 Volts d c
Grid No. 4 Voltage for Focus <sup>3</sup> .....	0 to 300 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage for Cutoff <sup>4</sup> .....	-28 to -72 Volts d c

## MAXIMUM CIRCUIT VALUE

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

## NOTES:

1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts. The screen of the 10WP19 or 10WP19A can be permanently damaged should the current density be permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
2. Brilliance and definition decrease with decreasing anode voltage. In general, anode voltage should not be less than 7,000 volts.
3. With  $E_{G1}$  adjusted for  $I_b=100$  microamperes,  $E_{G1}$  is adjusted for best overall focus of a 6" x 8" raster pattern.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that those values be about 5 volts more negative.

## WARNING:

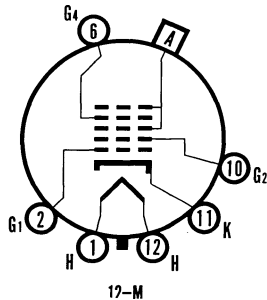
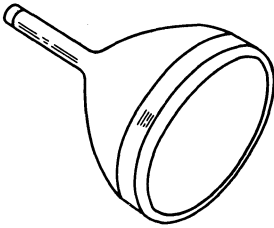
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 12ABP7A 12ABP-A\*

## SPECIAL PURPOSE TUBE

12" Direct Viewed  
Round Glass Type  
Electrostatic Focus

Spherical Faceplate  
Gray Filter Glass  
Magnetic Deflection



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angle (approx.).....	55 Degrees

Types*	12ABP7A 12ABP7	12ABP14A 12ABP14	12ABP19A 12ABP19
Fluorescence.....	Blue	Purple	Orange
Phosphorescence.....	Yellow	Yellow	Orange
Persistence.....	Long	Med.-Long	Long
Faceplate.....		Gray Filter Glass	
Light Transmittance.....		74 Percent	

Types 12ABP7A, 12ABP14A and 12ABP19A have aluminized screens.  
\*In addition to the types shown, the 12ABP- and 12ABP-A can be supplied with several other screen phosphors.



# SYLVANIA TYPE 12ABP7A, 12ABP-A\* (Cont'd)

## ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μμf
Grid No. 1 to All Other Electrodes.....	6 μμf

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	11 Inches
Nominal Overall Length.....	18 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12M
Bulb Contact Aligns with Vacant Pin Position No. 3.....	±10 Degrees

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage.....	13,200 Volts d c
Grid No. 4 Voltage (Focusing Electrode).....	-550 to 1100 Volts d c
Grid No. 2 Voltage.....	770 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	200 Volts d c
Positive Bias Value <sup>1</sup> .....	0 Volts d c
Positive Peak Value.....	0 Volts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode.....	200 Volts d c
Heater Positive with Respect to Cathode.....	200 Volts d c

### TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>2</sup> .....	10,000 Volts d c
Grid No. 4 Voltage for Focus <sup>3</sup> .....	0 to 300 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage for Cutoff <sup>4</sup> .....	-28 to -72 Volts d c
Alignment Magnet Field Strength <sup>5</sup> .....	0 to 4 Gaussess

### MAXIMUM CIRCUIT VALUES

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

### NOTES:

1. At or near this rating, the effective resistance of the anode supply should be adequate to limit the anode input power to 6 watts. The screen of the 12ABP19 or 12ABP19A can be permanently damaged should the current density be permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
2. Brilliance and definition decrease with decreasing anode voltage. In general, anode voltage should not be less than 8,000 volts.
3. With  $E_{g1}$  adjusted for  $I_b = 100$  microamperes,  $E_{g4}$  is adjusted for best overall focus of a  $7\frac{1}{2}'' \times 10''$  raster pattern.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
5. For optimum quality of the focused spot, use of a beam alignment magnet is recommended. It should be an adjustable magnet of the specified strength, located approximately  $5\frac{7}{16}''$  from the reference line.

### WARNING:

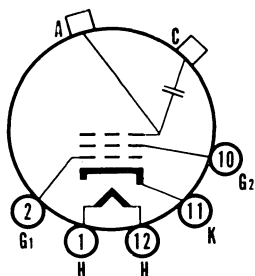
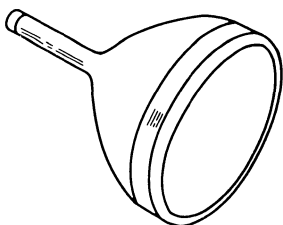
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the Manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 12KP4

## Silver Screen "85" → 12KP4A

### TELEVISION PICTURE TUBE

12" Direct Viewed Round Glass Type External Conductive Coating No Ion Trap Magnet Required 12KP4 has a Clear Glass Faceplate 12KP4A has a Gray Filter Glass Faceplate	Magnetic Deflection Magnetic Focus Spherical Faceplate Aluminized Screen
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12-N

### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	54 Degrees
Phosphor.....	Aluminized, P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(12KP4A) Gray (12KP4) Clear
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 $\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\text{f}$
External Conductive Coating to Anode <sup>1</sup> .....	2500 $\mu\text{f}$ Max. 500 $\mu\text{f}$ Min.

#### MECHANICAL DATA

Minimum Useful Screen Diameter.....	11 $\frac{1}{4}$ Inches
Nominal Overall Length.....	17 $\frac{5}{8}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	11000 Volts d c
Grid No. 2 Voltage.....	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-27 to -63 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	135 Ma d c

#### CIRCUIT VALUES

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

#### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.
3. For JETEC focusing coil 106 or equivalent three and one quarter inches from reference line, bias adjusted to 35 foot lamberts on a 7 $\frac{1}{2}$  x 10 inch picture area.

### 12KP4A

The Sylvania Type 12KP4A is identical to Type 12KP4 except for having the gray filter glass faceplate.

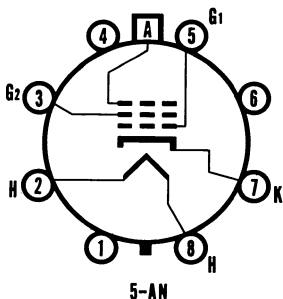
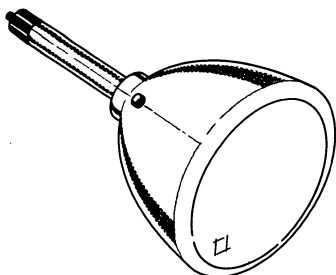
### WARNING

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 TYPES 12DP7A\* 12DP7C

## SPECIAL PURPOSE TUBE

12" Direct Viewed	Magnetic Focus
Round Glass Type	Gray Filter Glass Faceplate
Magnetic Deflection	Spherical Faceplate
12DP7C - Aluminized	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....			Magnetic
Deflection Method.....			Magnetic
Deflection Angle (approx.).....			50 Degrees
Types*	<b>12DP7A</b>	<b>12DP7C</b>	
Fluorescence.....	Blue-White	Blue-White	
Phosphorescence.....	Yellow	Yellow	
Persistence.....	Long	Long	
Faceplate.....	Clear or Gray	Gray	
Light Transmittance (approx.)			
Gray Faceplate.....	75	75	Percent
Screen.....	..	Aluminized	

\*In addition to the types shown, the 12DP- can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μf
Grid No. 1 to All Other Electrodes.....	8 μf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	10 Inches
Nominal Overall Length.....	19 5/8 Inches
Bulb.....	J96S or Equivalent
Bulb Contact (Medium Cap).....	C1-5
Base	
12DP7A (Long Medium Shell Octal 5 or 8-Pin)...	B5-80 or B8-65
12DP7C (Long Medium Shell 8-Pin).....	B8-65
Basing.....	5AN
Bulb Contact Alignment	
Anode Contact Aligns with Pin No. 5.....	± 10 Degrees
Weight (approx.).....	8 1/2 Pounds

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

	12DP7A	12DP7C
Anode Voltage.....	11,000	13,200 Volts d c
Grid No. 2 Voltage.....	770	770 Volts d c
Grid No. 1 Voltage		
Negative Bias Value.....	200	200 Volts d c
Positive Bias Value.....	0	0 Volts d c
Positive Peak Value.....	2	2 Volts
Peak Heater-Cathode Voltage		
Heater Negative with Respect to Cathode.....	140	200 Volts
Heater Positive with Respect to Cathode.....	140	200 Volts

# SYLVANIA TYPES 12DP7A\*, 12DP7C (Cont'd)

## TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>1</sup> .....	4000 Volts d c
Grid No. 2 Voltage.....	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-25 to -70 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	75 to 102 Ma d c
Line Width A, (12DP7C) <sup>4</sup> .....	0.50 mm Max.

## CIRCUIT VALUES

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

## NOTES:

1. Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 4000 volts.
2. Visual extinction of undeflected focused spot.
3. For JEDEC focusing coil No. 106 or equivalent with distance from the yoke reference line to center of air gap equal to  $4\frac{1}{8}$  inches.
4. Measured in accordance with MIL-E-1, at an anode current of 200  $\mu$ a.

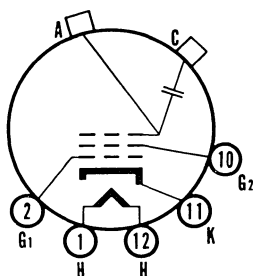
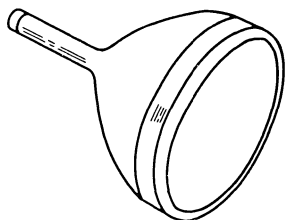
## WARNING:

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 12LP4 12LP4A

## TELEVISION PICTURE TUBE

12" Direct Viewed	Magnetic Deflection
Round Glass Type	Magnetic Focus
External Conductive Coating	Spherical Faceplate
12LP4 has a Clear Glass Faceplate	Double Field Ion Trap
12LP4A has a Gray Filter Glass Faceplate	



12-N

### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	54 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(12LP4) Clear (12LP4A) Gray

#### 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 <sup>1</sup> .....	3000 $\mu\mu\text{f}$ Max.
	750 $\mu\mu\text{f}$ Min.
Ion Trap Magnet.....	External, Double Field Type

#### MECHANICAL DATA

Minimum Useful Screen Diameter.....	11 Inches
Nominal Overall Length.....	18 $\frac{3}{4}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N
Bulb Contact Aligns with Vacant Pin Position No. 3.....	$\pm 10$ Degrees

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	11000 Volts d c
Grid No. 2 Voltage.....	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-27 to -63 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	110 Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

#### CIRCUIT VALUES

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

#### NOTES:

- External conductive coating must be grounded.
- Visual extinction of undeflected focused spot.
- For JETEC focusing coil 106 or equivalent three and one quarter inches from reference line, bias adjusted to 20 foot lamberts on a 7 $\frac{1}{2}$  x 10 inch picture area.

#### 12LP4A

The Sylvania Type 12LP4A is identical to Type 12LP4 except for having the gray filter glass faceplate.

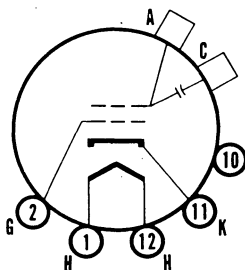
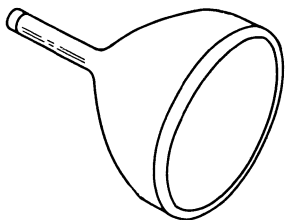
#### WARNING

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 12VP4 12VP4A

## TELEVISION PICTURE TUBE

12" Direct Viewed	Magnetic Deflection
Round Glass Type	Magnetic Focus
External Conductive Coating	Spherical Faceplate
12VP4 has a Clear Glass Faceplate	Double Field Ion Trap
12VP4A has a Gray Filter Glass Faceplate	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	55 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(12VP4) Clear (12VP4A) Gray
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 to All Other Electrodes.....	6 $\mu\mu\text{f}$
External Conductive Coating to Anode <sup>1</sup> .....	3000 $\mu\mu\text{f}$ Max. 750 $\mu\mu\text{f}$ Min.
Ion Trap Magnet.....	External, Double Field Type

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	11 Inches
Nominal Overall Length.....	18 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12G

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	11000 Volts d c
Grid Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

### CIRCUIT VALUES

Grid Circuit Resistance.....	1.5 Megohms Max.
------------------------------	---------------------

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.

### 12VP4A

The Sylvania Type 12VP4A is identical to Type 12VP4 except for having the gray filter glass faceplate.

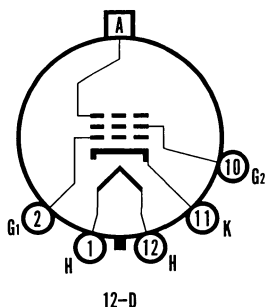
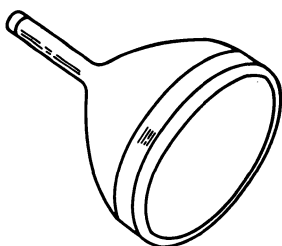
### WARNING

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 TYPES 12SP7 12SP7D 12SP-\*

## SPECIAL PURPOSE TUBE

12" Direct Viewed	Magnetic Deflection
Round Glass Type	Magnetic Focus
Spherical Faceplate	Aluminized Screen
Gray Filter Glass	(12SP7D)



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflection Method.....	Magnetic
Deflection Angle (approx.).....	54 Degrees
Phosphor*.....	P7
Fluorescence.....	Blue-White
Phosphorescence.....	Yellow
Persistence.....	Long
Faceplate.....	Gray Filter Glass
Light Transmittance—12SP7D.....	74 Percent
Light Transmittance—12SP7.....	66 Percent

\*In addition to the Type shown the 12SP- and 12SP-D can be supplied with several other screen phosphors.

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μμf
Grid No. 1 to All Other Electrodes—12SP7D.....	8 μμf
Grid No. 1 to All Other Electrodes—12SP7.....	6 μμf

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	11 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D
Bulb Contact Aligns with Pin No. 3.....	± 10 Degrees

## RATINGS

### MAXIMUM RATINGS (Absolute Maximum Values)

	12SP7	12SP7D
Anode Voltage.....	11,000	15,000 Volts d c
Grid No. 2 Voltage.....	450	770 Volts d c
Grid No. 1 Voltage		
Negative Bias Value.....	140	200 Volts d c
Positive Bias Value.....	0	0 Volts d c
Positive Peak Value.....	2	2 Volts
Peak Heater-Cathode Voltage		
Heater Neg. with Respect to Cathode..	150	200 Volts
Heater Pos. with Respect to Cathode..	150	200 Volts

# SYLVANIA TYPES 12SP7D, 12SP7 (Cont'd)

## TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>1</sup> .....	9000 Volts d c
Grid No. 2 Voltage.....	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-27 to -63 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	104 Ma d c
Line Width A <sup>4</sup> —12SP7D Only.....	0.38 mm Max.
Spot Position <sup>5</sup> —12SP7D Only.....	20 mm

## CIRCUIT VALUES

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

## NOTES:

1. Brightness and focus quality decrease with decreasing anode voltage. In general, the anode voltage should not be less than 4000 volts.
2. For visual extinction of undeflected focused spot.
3. For RETMA focusing coil No. 106 with distance from the yoke reference line to center of air gap equal to  $3\frac{1}{4}$  inches.
4. Measured by compressed raster method at an anode current at 200 micro-amperes.
5. The center of the undeflected, unfocused spot will fall within a circle of 20 mm radius concentric with the tube face.

## 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.

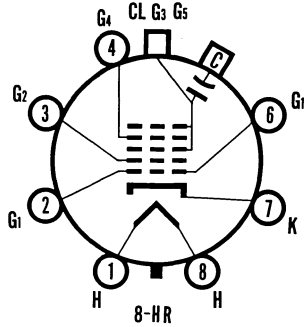
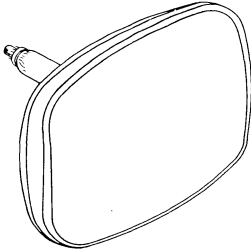


# SYLVANIA TYPE 14AJP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

14" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	110° Magnetic Deflection
Spherical Faceplate	Ion Trap Required
Gray Filter Glass	External Conductive Coating
Aluminized Screen	Short Neck
6.3 Volts at 600 Ma	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	105 Degrees
Diagonal.....	110 Degrees
Vertical.....	86 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	86 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 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> .....	850 μmf Max. 500 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height.....	9 <sup>7</sup> / <sub>8</sub> Inches
Width.....	12 <sup>3</sup> / <sub>8</sub> Inches
Diagonal.....	13 <sup>1</sup> / <sub>8</sub> Inches
Area.....	108 Square Inches
Neck Length.....	5 <sup>1</sup> / <sub>2</sub> ± <sup>3</sup> / <sub>16</sub> Inches
Overall Length.....	11 <sup>7</sup> / <sub>16</sub> ± <sup>3</sup> / <sub>8</sub> Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-183
Basing.....	8HR
Weight (approx.).....	7 <sup>1</sup> / <sub>2</sub> Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage <sup>3</sup> .....	9000 Volts d c
Grid No. 3 Voltage for Focus.....	-100 to +400 Volts d c
Grid No. 2 Voltage.....	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-24 to -64 Volts d c
Ion-Trap Field Intensity (Min.) <sup>5</sup> .....	29 Gauss

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 14AJP4 (Cont'd)

### 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. Brightness and focus quality decrease with decreasing anode voltage. In general, the anode voltage should not be less than 8000 volts.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
5. For a Heppner PM ion-trap magnet or equivalent located in optimum position and rotated to give maximum brightness.

### WARNING:

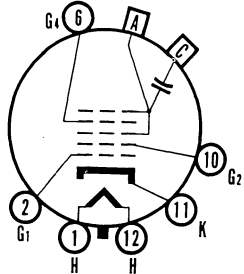
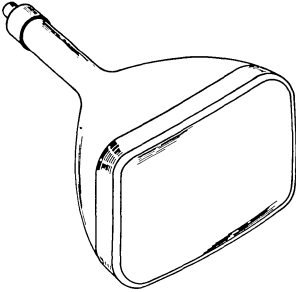
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 14BAP4

## SPECIAL PURPOSE TUBE

### Television Monitor Tube

14" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	No Ion Trap
Spherical Faceplate	High Resolution
Magnetic Deflection	Aluminized Screen
External Conductive Coating	



12-L

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	65 Degrees
Vertical.....	50 Degrees
Diagonal.....	70 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 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	6.5 μmf
External Conductive Coating to Anode <sup>1</sup> .....	2000 μmf Max. 750 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	11 1/2 x 8 3/4 Inches
Minimum Useful Screen Area.....	96 Square Inches
Overall Length.....	16 3/4 Inches
Neck Length.....	7 1/2 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Bulb.....	J109 1/2 A1 or J109 1/2 C1
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L
Weight (approx.).....	11 Pounds

## RATINGS

### MAXIMUM RATINGS (Design Maximum Values)

Anode Voltage.....	22,000 Volts d c
Grid No. 4 Voltage (Focusing Electrode).....	800 Volts d c
Grid No. 2 Voltage.....	700 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	180 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	

# SYLVANIA TYPE 14BAP4 (Cont'd)

15 Seconds.....	450 Volts
After Equipment Warm-up Period.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	18,000 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 <sup>2</sup> .....	-35 to -72 Volts d c

## 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.

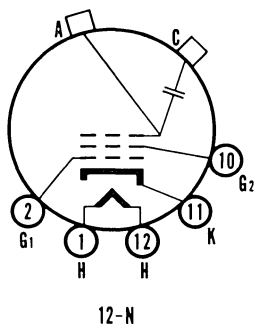
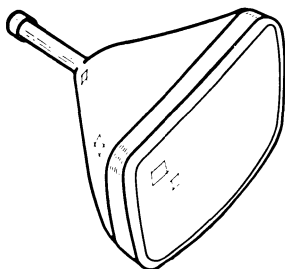
## WARNING:

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 14BP4/14CP4/14EP4

## TELEVISION PICTURE TUBE

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



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
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.).....	70 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> .....	2000 $\mu\text{f}$ Max. 750 $\mu\text{f}$ Min.
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	8 <sup>21</sup> / <sub>32</sub> x 11 <sup>1</sup> / <sub>16</sub> Inches
Nominal Overall Length.....	16 <sup>3</sup> / <sub>4</sub> Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	99 Ma d c
Ion Trap Magnet Strength (approx.).....	32 Gaussess

### CIRCUIT VALUES

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

### NOTES:

- External conductive coating must be grounded.
- Visual extinction of undeflected focused spot.
- For JETEC focusing coil 106 or equivalent three and one quarter inch from reference line, bias adjusted to 20 foot lamberts on a 8<sup>21</sup>/<sub>32</sub> x 11<sup>1</sup>/<sub>16</sub> inch picture area.

### WARNING

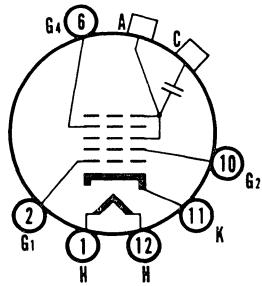
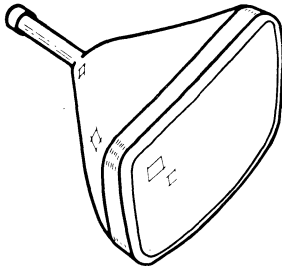
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 14GP4

## TELEVISION PICTURE TUBE

14" Direct Viewed  
 Rectangular Glass Type  
 Gray Filter Glass  
 External Conductive Coating

Magnetic Deflection  
 Electrostatic Focus  
 Spherical Faceplate  
 Single Field Ion Trap



12-L

### 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.).....	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 $\mu$ f
Grid No. 1 to All Other Electrodes.....	6 $\mu$ f
External Conductive Coating to Anode.....	2000 $\mu$ f Max.
	750 $\mu$ f Min.
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	8 $\frac{1}{2}$ x 11 $\frac{3}{8}$ Inches
Nominal Overall Length.....	16 $\frac{3}{16}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12000 Volts d c
Grid No. 4 Voltage.....	2170 to 2940 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff.....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

#### CIRCUIT VALUES

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

#### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.

#### WARNING

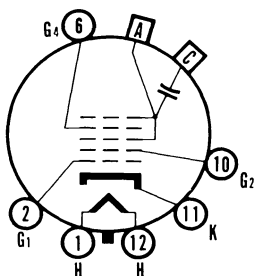
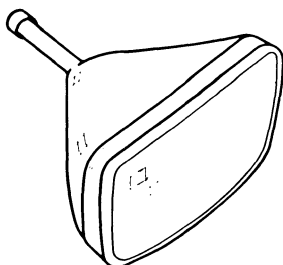
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 14NP4

## *Silver Screen "85" 14NP4A\**

### TELEVISION PICTURE TUBE

14" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	Single Field Ion Trap
Spherical Faceplate	External Conductive Coating
Gray Filter Glass	Aluminized Screen (14NP4A)
Magnetic Deflection	Non-Aluminized (14NP4)



12-L

### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	80 Degrees
Diagonal.....	90 Degrees
Phosphor.....	Aluminized P4 (14NP4A)
	Non-Aluminized P4 (14NP4)
	White
Fluorescence.....	Short to Medium
Persistence.....	Gray Filter Glass
Faceplate.....	78 Percent
Light Transmittance (approx.).....	

#### 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 μf
Grid No. 1 to All Other Electrodes.....	6 μf
External Conductive Coating to Anode <sup>2</sup> .....	1200 μf Max.
	800 μf Min.
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	12 <sup>1</sup> / <sub>16</sub> x 9 <sup>1</sup> / <sub>2</sub> Inches
Nominal Overall Length.....	14 <sup>3</sup> / <sub>16</sub> Inches
Minimum Useful Screen Area.....	104 Square Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Bulb.....	J112A1
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12,000 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> .....	-28 to -72 Volts d c
Field Strength of PM Ion Trap Magnet <sup>4</sup> .....	30 Gauss Min.

\*Supplied as Sylvania Silver Screen Type 14NP4A/14SP4.

# SYLVANIA TYPE 14NP4, 14NP4A\* (Cont'd)

## 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.
4. It is recommended that the magnet slug be located on the same side of the tube neck as Pin No. 6.

## 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.

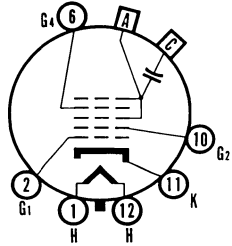
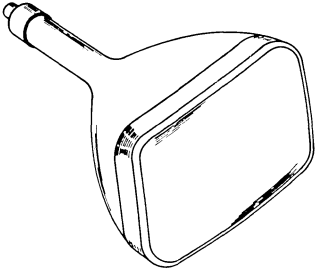


# SYLVANIA TYPE 14QP4

Silver Screen "85" → 14QP4A

## TELEVISION PICTURE TUBE

- |                             |                     |
|-----------------------------|---------------------|
| 14" Direct Viewed           | Magnetic Deflection |
| Rectangular Glass Type      | Electrostatic Focus |
| Gray Filter Glass           | Spherical Faceplate |
| External Conductive Coating | Single Ion Trap     |
- 14QP4A has an Aluminized Screen



12-L

## 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.).....	76 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 <sup>1</sup> .....	1000 $\mu\mu\text{f}$ Max.
Ion Trap Magnet.....	600 $\mu\mu\text{f}$ Min.
	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	11½ x 8⅝ Inches
Nominal Overall Length.....	16⅝ <sup>32</sup> Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	9000 Volts d c
Grid No. 4 Voltage.....	-50 to +250 Volts d c
Grid No. 2 Voltage.....	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-24 to -64 Volts d c
Ion Trap Magnet Current <sup>3</sup> (Average).....	24 Ma d c
Ion Trap Magnet Strength <sup>4</sup> (Min.).....	24 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.
3. For JETEC Magnet No. 117.
4. For PM Ion Trap Magnet.

### 14QP4A

The Sylvania Type 14QP4A is identical to Type 14QP4 except for having an aluminized screen.

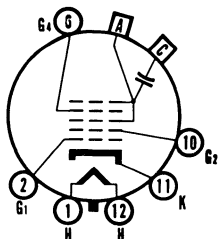
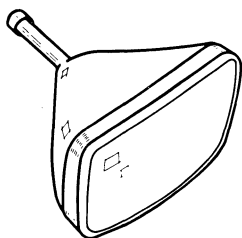
### WARNING:

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 14RP4 Silver Screen "85" → 14RP4A

## TELEVISION PICTURE TUBE

14" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Electrostatic Focus
Gray Filter Glass	Spherical Faceplate
External Conductive Coating	Single Field Ion Trap
14RP4A has Aluminized Screen	



12-L

### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Vertical.....	68 Degrees
Horizontal.....	85 Degrees
Diagonal.....	90 Degrees
Phosphor	
14RP4.....	P4
14RP4A.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	78 Percent

#### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.600 ± 5% Ampere
Direct Interelectrode Capacitance (approx.)	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	6 μmf
External Conductive Coating to Anode <sup>1</sup> .....	1200 μmf Max. 800 μmf Min.
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Overall Length.....	14 <sup>3</sup> / <sub>16</sub> ± 5/ <sub>16</sub> Inches
Minimum Useful Screen Dimensions.....	12 <sup>1</sup> / <sub>16</sub> x 9 <sup>1</sup> / <sub>2</sub> Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L
Weight (approx.).....	8.5 Pounds

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12,000 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>2</sup> .....	-26 to -70 Volts d c
Ion Trap Magnet Strength approx.....	40 ± 3 Gaussess Min.

#### CIRCUIT VALUES

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

#### 14RP4A

The Sylvania Type 14RP4A is identical to Type 14RP4 except it has an aluminized screen.

#### WARNING

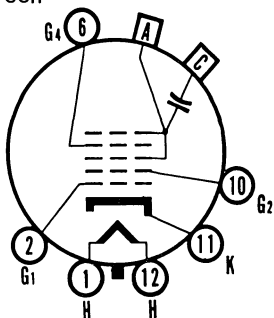
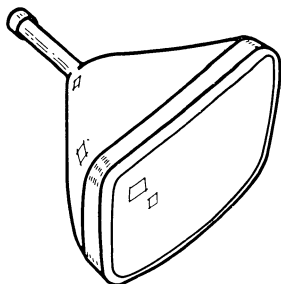
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 14SP4 \*

**Silver Screen "85"**

## TELEVISION PICTURE TUBE

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



### CHARACTERISTICS 12-L

#### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angle (approx.)	
Horizontal.....	85 Degrees
Diagonal.....	90 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	79 Percent

#### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\text{mf}$
External Conductive Coating to Anode <sup>1</sup> .....	1200 $\mu\text{mf}$ Max.
	900 $\mu\text{mf}$ Min.
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	12 $\frac{1}{16}$ x 9 $\frac{1}{2}$ Inches
Nominal Overall Length.....	14 $\frac{3}{4}$ Inches
Minimum Screen Area.....	104 Sq. Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12,000 Volts d c
Grid No. 4 Voltage.....	-48 to +264 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.).....	28 $\pm$ 3 Gauss

#### CIRCUIT VALUES

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

#### 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.

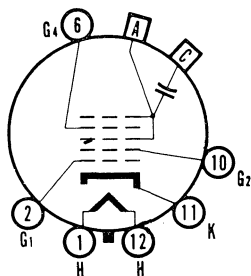
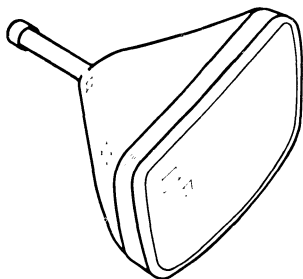
\*Supplied as Sylvania silver screen type 14NP4A/14SP4.

# SYLVANIA TYPE 14WP4 14ZP4

## TELEVISION PICTURE TUBE

14" Direct Viewed  
Rectangular Glass Type  
Spherical Faceplate  
Magnetic Deflection

Electrostatic Focus  
No Ion Trap  
External Conductive Coating  
Aluminized Screen



## 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.).....	78 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> .....	1200 μμf Max. 800 μμf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	12 <sup>1</sup> / <sub>16</sub> x 9 <sup>1</sup> / <sub>2</sub> Inches
Nominal Overall Length.....	13 <sup>3</sup> / <sub>16</sub> Inches
Minimum Useful Screen Area.....	104 Sq. Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63 or B6-203
Basing.....	12L

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12,000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 4 Voltage.....	-50 to +350 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>3</sup> .....	-28 to -72 Volts d c

### CIRCUIT VALUES

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

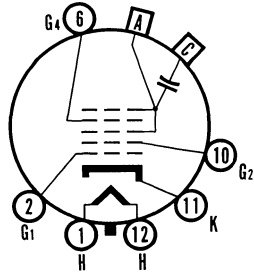
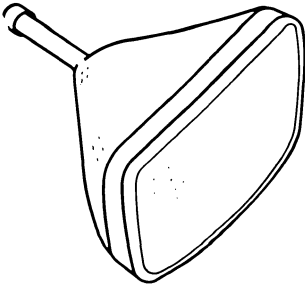
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 14XP4

## Silver Screen "85" → 14XP4A

### TELEVISION PICTURE TUBE

14" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Electrostatic Focus
Gray Filter Glass	Spherical Faceplate
External Conductive Coating	Single Field Ion Trap
450 Ma Heater Current	
14XP4A Has Aluminized Screen	



12-L

### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....  
 Deflection Method.....  
 Deflection Angle (approx.)  
   Horizontal.....  
   Diagonal.....  
 Phosphor  
   14 XP4.....  
   14 XP4A.....  
 Fluorescence.....  
 Persistence.....  
 Faceplate.....  
 Light Transmittance (approx.).....

Electrostatic  
 Magnetic  
  
 79 Degrees  
 85 Degrees

P4  
 Aluminized P4  
 White  
 Short to Medium  
 Gray Filter Glass  
 78 Percent

#### ELECTRICAL DATA

Heater Voltage.....  
 Heater Current.....  
 Direct Interelectrode Capacitance (approx.)  
   Cathode to All Other Electrodes.....  
   Grid No. 1 to All Other Electrodes.....  
   External Conductive Coating to Anode.....

6.3 Volts  
 0.450 ± 5% Ampere  
  
 5 μmf  
 6 μmf  
 1500 μmf Max.  
 1100 μmf Min.

Ion Trap Magnet.....

External, Single Field Type

#### MECHANICAL DATA

Overall Length.....  
 Minimum Useful Screen Dimensions.....  
 Bulb Contact (Recessed Small Cavity Cap).....  
 Base (Small Shell Duodecal 6-Pin).....  
 Basing.....

14<sup>3</sup>/<sub>16</sub> ± 5<sup>1</sup>/<sub>16</sub> Inches  
 12<sup>1</sup>/<sub>16</sub> x 9<sup>1</sup>/<sub>2</sub> Inches  
 J1-21  
 B6-63  
 12L

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....  
 Grid No. 4 Voltage for Focus.....  
 Grid No. 2 Voltage.....  
 Grid No. 1 Voltage Required for Cut-off<sup>2</sup>.....  
 Ion Trap Magnet Strength (approx.).....

12,000 Volts d c  
 -50 to +350 Volts d c  
 300 Volts d c  
 -28 to -72 Volts d c  
 30 ± 3 Gaussess Min.

#### 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.

#### 4XP4A

The Sylvania Type 14XP4A is identical to Type 14XP4 except it has an aluminized screen.

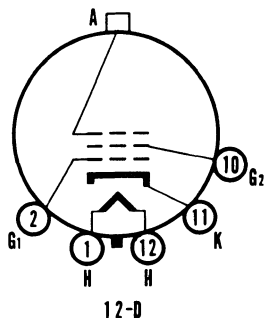
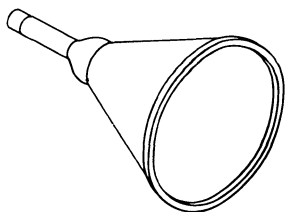
#### WARNING:

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 16AP4 16AP4A

## TELEVISION PICTURE TUBE

16" Direct Viewed	Magnetic Deflection
Round Metal Type	Magnetic Focus
Double Field Ion Trap	Spherical Faceplate
16AP4 has a Clear Glass Faceplate	
16AP4A has Gray Filter Glass Faceplate	



### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	53 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(16AP4) Clear (16AP4A) Gray

#### 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, Double Field Type

#### MECHANICAL DATA

Minimum Useful Screen Diameter.....	14 $\frac{3}{8}$ Inches
Nominal Overall Length (16AP4).....	22 $\frac{1}{4}$ Inches
(16AP4A).....	21 $\frac{1}{16}$ Inches
Bulb Contact.....	Metal Cone Lip
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	90 Ma d c
Ion Trap Magnet Current (approx.) <sup>3</sup> .....	200 Ma d c

#### CIRCUIT VALUES

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

#### NOTES:

1. Visual extinction of undeflected focused spot.
2. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 10 x 13 $\frac{1}{4}$  inch picture area.
3. For JETEC ion trap magnet 108 or equivalent.

#### WARNING

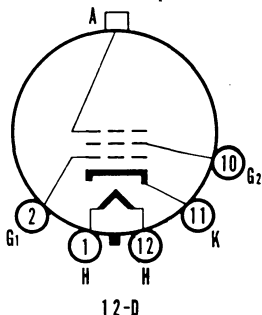
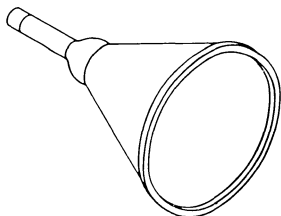
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 16EP4 16EP4A 16EP4B

## TELEVISION PICTURE TUBE

16" Direct Viewed	Magnetic Deflection
Round Metal Type	Magnetic Focus
Double Field Ion Trap	Spherical Faceplate

16EP4 has a Clear Glass Faceplate  
16EP4A has a Gray Filter Glass Faceplate  
16EP4B has a Frosted Gray Filter Glass Faceplate



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	60 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(16EP4) Clear (16EP4A) Gray (16EP4B) Gray, Frosted

### 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.....	7 $\mu\mu\text{f}$
Ion Trap Magnet.....	External, Double Field Type

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	14 $\frac{3}{8}$ Inches
Nominal Overall Length.....	19 $\frac{9}{16}$ Inches
Bulb Contact.....	Metal Cone Lip
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	105 Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gaussess

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max
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### NOTES:

1. Visual extinction of undeflected focused spot.
2. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 10 x 13 $\frac{1}{4}$  inch picture area.

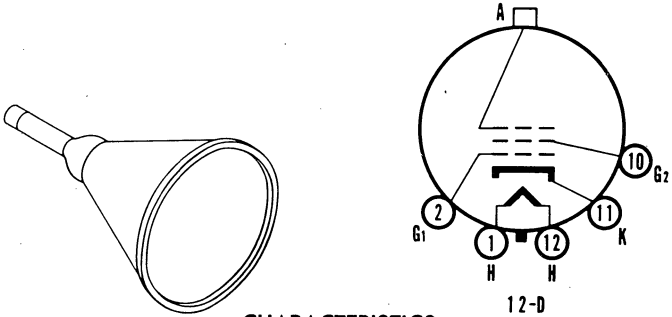
### WARNING

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 16GP4 16GP4A 16GP4B

## TELEVISION PICTURE TUBE

16" Direct Viewed	Magnetic Deflection
Round Metal Type	Magnetic Focus
Single Field Ion Trap	Spherical Faceplate
16GP4 has a Gray Filter Glass Faceplate	
16GP4A has Clear Glass Faceplate	
16GP4B has Frosted Gray Filter Glass Faceplate	



### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	70 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	16GP4) Gray (16GP4A) Clear (16GP4B) Gray, Frosted

#### 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 Diameter.....	14 $\frac{3}{8}$ Inches
Nominal Overall Length.....	17 $\frac{5}{16}$ Inches
Bulb Contact.....	Metal Cone Lip
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	100 Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

#### CIRCUIT VALUES

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

#### NOTES:

1. Visual extinction of undeflected focused spot.
2. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 10 x 13 $\frac{1}{2}$  inch picture area.

#### WARNING

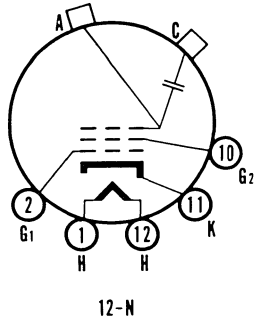
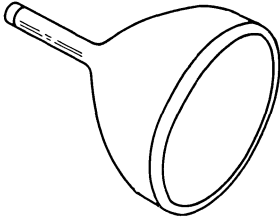
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.



# SYLVANIA TYPE 16JP4 16JP4A

## TELEVISION PICTURE TUBE

16" Direct Viewed	Magnetic Deflection
Round Glass Type	Magnetic Focus
External Conductive Coating	Spherical Faceplate
16JP4 has a Clear Glass Faceplate	Double Field Ion Trap
16JP4A has Gray Filter Glass Faceplate	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	70 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(16JP4) Clear (16JP4A) Gray
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 $\mu$ f
Grid No. 1 to All Other Electrodes.....	6 $\mu$ f
External Conductive Coating to Anode.....	2000 $\mu$ f Max
Ion Trap Magnet.....	750 $\mu$ f Min
	External, Double Field Type

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	15 Inches
Nominal Overall Length.....	20 $\frac{3}{4}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	11000 Volts d c
Grid No. 2 Voltage.....	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-27 to -63 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	115 Ma d c
Ion Trap Magnet Current (approx.) <sup>4</sup> .....	120 Ma d c

### CIRCUIT VALUES

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

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.
3. For JETEC focusing coil 106 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts.
4. For JETEC ion trap magnet 108 or equivalent.

### WARNING

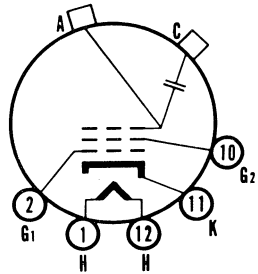
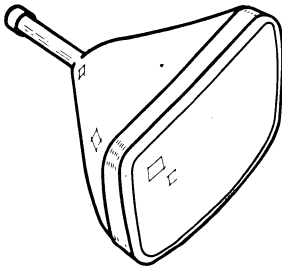
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 16KP4/16RP4

## Silver Screen "85" → 16KP4A/16RP4A

### TELEVISION PICTURE TUBE

16" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Magnetic Focus
Gray Filter Glass	Spherical Faceplate
External Conductive Coating	Single Field Ion Trap
16KP4A/16RP4A has an Aluminized Screen	



12-N

### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Magnetic
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.).....	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 $\mu\mu\text{f}$
External Conductive Coating to Anode <sup>1</sup> .....	1500 $\mu\mu\text{f}$ Max
Ion Trap Magnet.....	750 $\mu\mu\text{f}$ Min
	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	10 $\frac{1}{8}$ x 13 $\frac{1}{2}$ Inches
Nominal Overall Length.....	18 $\frac{3}{4}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	108 Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

#### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.
3. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 10 $\frac{1}{8}$  x 13 $\frac{1}{2}$  inch picture area.

### 16KP4A/16RP4A

The Sylvania Type 16KP4A/16RP4A is identical to the Type 16KP4/16RP4 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 16LP4 16LP4A/16ZP4

## TELEVISION PICTURE TUBE

16" Direct Viewed  
Round Glass Type  
External Conductive Coating

16LP4 has a Clear Glass Faceplate

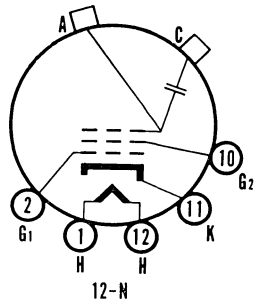
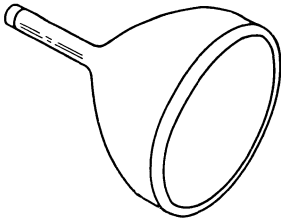
16LP4A/16ZP4 has a Gray Filter Glass Faceplate

Magnetic Deflection

Magnetic Focus

Spherical Faceplate

Double Field Ion Trap



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	52 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(16LP4) Clear (16LP4A) Gray
Light Transmittance (approx.).....	70 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\text{mf}$
External Conductive Coating to Anode <sup>1</sup> .....	2000 $\mu\text{mf}$ Max 750 $\mu\text{mf}$ Min
Ion Trap Magnet.....	External, Double Field Type

### MECHANICAL DATA

Minimum Useful Screen Diameter.....	14½ Inches
Nominal Overall Length.....	22¼ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	110 Ma d c
Ion Trap Magnet Current (approx.) <sup>4</sup> .....	120 Ma d c

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max
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### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.
3. For JETEC focusing coil 106 or equivalent three and one quarter inches from reference line, bias adjusted to 20 foot lamberts on a 14½ x 10¼ inch picture area.
4. For JETEC ion trap magnet 108 or equivalent.

### 16LP4A/16ZP4

The Sylvania Type 16LP4A/16ZP4 is identical to Type 16LP4 except for having a gray filter glass faceplate and an anode voltage rating of 16,000 volts.

### WARNING

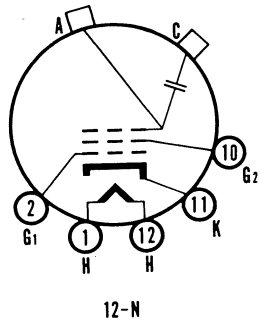
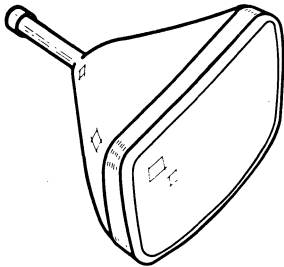
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 16TP4

## TELEVISION PICTURE TUBE

16" Direct Viewed  
 Rectangular Glass Type  
 Gray Filter Glass  
 External Conductive Coating

Magnetic Deflection  
 Magnetic Focus  
 Spherical Faceplate  
 Single Field Ion Trap



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
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.).....	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 $\mu\mu\text{f}$
External Conductive Coating to Anode <sup>1</sup> .....	2000 $\mu\mu\text{f}$ Max
	750 $\mu\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	10 $\frac{1}{8}$ x 13 $\frac{1}{2}$ Inches
Nominal Overall Length.....	18 $\frac{1}{8}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	100 Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

### CIRCUIT VALUES

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

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.
3. For JETEC focus coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 10 $\frac{1}{8}$  x 13 $\frac{1}{2}$  inch picture area.

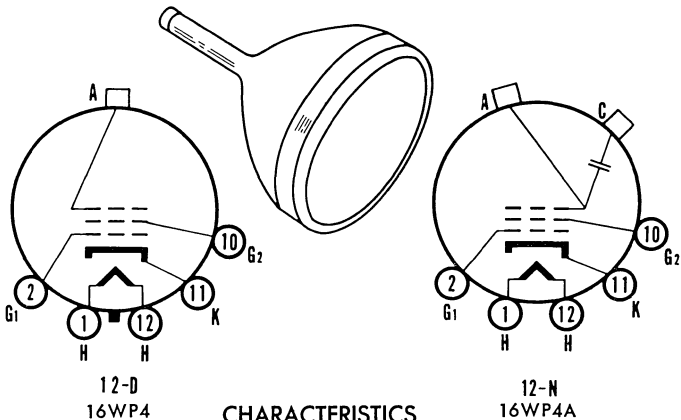
### WARNING

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 16WP4 16WP4A

## TELEVISION PICTURE TUBE

16" Direct Viewed	Magnetic Deflection
Round Glass Type	Magnetic Focus
Gray Filter Glass	Spherical Faceplate
Double Field Ion Trap	
16WP4A has an External Conductive Coating	



### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	70 Degrees
Phosphor	
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	70 Percent

#### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	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 $\mu\mu\text{f}$
Ion Trap Magnet.....	External, Double Field Type

#### MECHANICAL DATA

Minimum Useful Screen Diameter.....	14½ Inches
Nominal Overall Length.....	17¾ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12000 Volts d c
Grid No. 2 Voltage.....	250 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-27 to -63 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	110 Ma d c
Ion Trap Magnet Current (approx.) <sup>3</sup> .....	120 Ma d c

#### CIRCUIT VALUES

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

#### NOTES:

1. Visual extinction of undeflected focused spot.
2. For JETEC focusing coil 109 or equivalent three and one quarter inches from reference line, bias adjusted to 30 foot lamberts on a 14½ x 10¼ inch picture area.
3. For JETEC ion trap magnet 108 or equivalent.

#### 16WP4A

The Sylvania Type 16WP4A is identical to the Type 16WP4 except for the addition of an external conductive coating which should be grounded.

External Conductive Coating to Anode Capacitance	
Maximum.....	1500 $\mu\mu\text{f}$
Minimum.....	750 $\mu\mu\text{f}$
Basing.....	12N

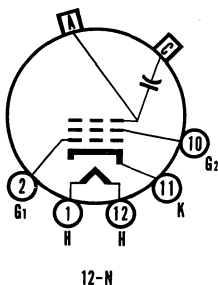
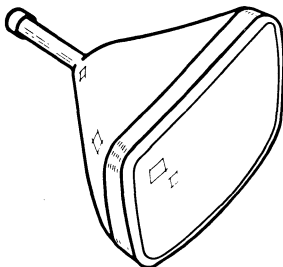
#### WARNING

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 17AP4

## TELEVISION PICTURE TUBE

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



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
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 $\mu\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\mu\text{f}$
External Conductive Coating to Anode <sup>1</sup> .....	2000 $\mu\mu\text{f}$ Max
	750 $\mu\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	10 $\frac{3}{4}$ x 14 $\frac{1}{4}$ Inches
Nominal Overall Length.....	18 $\frac{5}{8}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	12000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	115 Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gaussess

### CIRCUIT VALUES

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

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.
3. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 10 $\frac{3}{4}$  x 14 $\frac{1}{4}$  inch picture area.

### WARNING

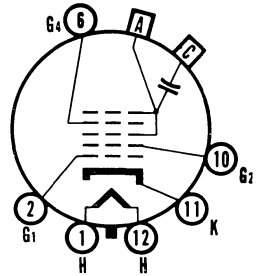
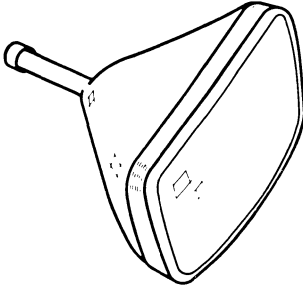
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPES 17ATP4/17AVP4

## Silver Screen "85" → 17ATP4A/17AVP4A

### TELEVISION PICTURE TUBE

17" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Electrostatic Focus
Gray Filter Glass	Spherical Faceplate
External Conductive Coating	Single Field Ion Trap
17ATP4A/17AVP4A has an Aluminized Screen	



12-L

### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angle (approx.)	
Horizontal.....	85 Degrees
Diagonal.....	90 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	71 Per cent

#### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 5% Ampere
Direct Interelectrode Capacitance (approx.)	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	6 μmf
External Conductive Coating to Anode <sup>1</sup> .....	1500 μmf Max.
	1000 μmf Min.
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	14 <sup>5</sup> / <sub>16</sub> x 11 <sup>1</sup> / <sub>8</sub> Inches
Nominal Overall Length.....	15 <sup>9</sup> / <sub>16</sub> Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage for Focus.....	-56 to +310 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.).....	30 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.

### 17ATP4A/17AVP4A

The Sylvania Type 17ATP4A/17AVP4A is identical to the Type 17ATP4/17AVP4 except for having an aluminized screen.

#### WARNING:

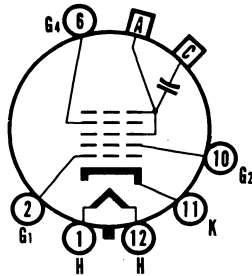
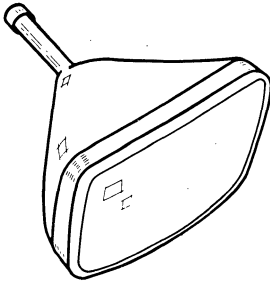
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17BJP4

"Silver Screen 85"

## TELEVISION PICTURE TUBE

17" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Electrostatic 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 Capacitance (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> .....	1500 μμf Max. 1000 μμf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	14 <sup>5</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>8</sub> Inches
Nominal Over-all Length.....	14 <sup>5</sup> / <sub>8</sub> Inches
Minimum Useful Screen Area.....	149 Square Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63 or B6-203
Basing.....	12L

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage.....	-50 to +300 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

### 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 17BP4

# 17BP4A/17JP4

**Silver Screen "85" → 17BP4B**

# 17BP4C

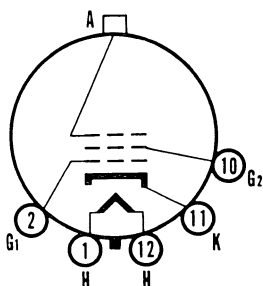
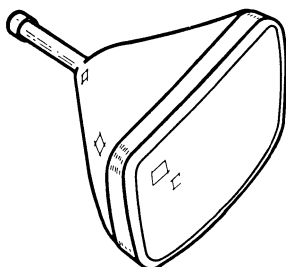
## TELEVISION PICTURE TUBE

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

17BP4A/17JP4 has an External Conductive Coating

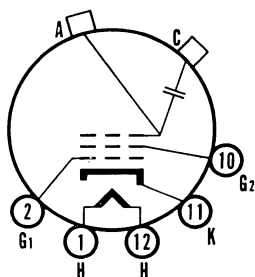
17BP4B has an External Conductive Coating and an Aluminized Screen

17BP4C has an External Conductive Coating and a Frosted Faceplate



12-D

17BP4



12-N

17BP4A/17JP4  
 17BP4B  
 17BP4C

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
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.).....	74 Percent

# 17BP4, 17BP4A/17JP4, 17BP4B, 17BP4C (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 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\text{mf}$
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	11 $\frac{1}{8}$ x 14 $\frac{5}{16}$ Inches
Nominal Overall Length.....	19 $\frac{1}{4}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing 17BP4.....	12D
Basing 17BP4A/17JP4, 17BP4B, 17BP4C.....	12N

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	110 Ma d c
Ion Trap Magnet Strength (approx.).....	30 Gauss

## CIRCUIT VALUES

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

## NOTES:

1. Visual extinction of undeflected focused spot.
2. For JETEC focusing coil 109 or equivalent three and one quarter inches from reference line, bias adjusted to 20 foot lamberts on a 10 $\frac{3}{4}$  x 14 $\frac{1}{4}$  inch picture area.

## 17BP4A/17JP4

The Sylvania Type 17BP4A/17JP4 is identical to the Type 17BP4 except for having an External Conductive Coating which must be grounded and an anode voltage rating of 18,000 volts.

External Conductive Coating to Anode Capacitance	
Maximum.....	1500 $\mu\text{mf}$
Minimum.....	750 $\mu\text{mf}$
Basing.....	12N

## 17BP4B

The Sylvania Type 17BP4B is identical to the Type 17BP4A/17JP4 except for having an aluminized screen and an anode voltage rating of 16,000 volts.

## 17BP4C

The Sylvania Type 17BP4C is identical to the Type 17BP4 except for having an External Conductive Coating which must be grounded and a frosted faceplate.

External Conductive Coating to Anode Capacitance	
Maximum.....	1500 $\mu\text{mf}$
Minimum.....	750 $\mu\text{mf}$
Basing.....	12N

## WARNING

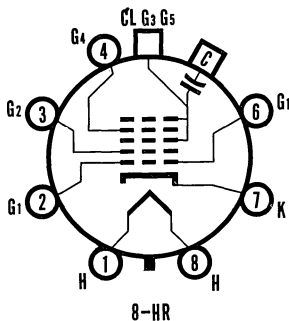
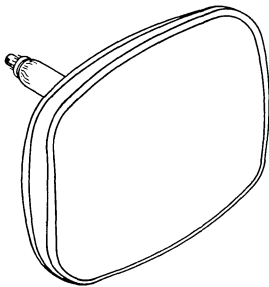
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17BRP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Aluminized Screen
Rectangular Glass Type	Electrostatic Focus
Lightweight Tube	110° Magnetic Deflection
Spherical Face Plate	1 1/8" Neck Diameter
Gray Filter Glass	Single Field 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.).....	77 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 μf
Grid No. 1 to All Other Electrodes.....	6 μf
External Conductive Coating to Anode <sup>2</sup> .....	1500 μf Max. 1000 μf Min.
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 3/4 x 11 11/16
Nominal Overall Length.....	12 9/16 Inches
Minimum Useful Screen Area.....	155 Sq. Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-183
Basing.....	8HR
Weight.....	10 1/3 Pounds Approx.

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage for Focus.....	0 to 500 Volts d c
Grid No. 4 Current.....	- 15 to +25 μa 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
Ion Trap Field Intensity <sup>4</sup> .....	37 Gaussess Min.

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Grid No. 2 Circuit Resistance.....	0.1 Megohm Min.
Grid No. 4 Circuit Resistance.....	0.1 Megohm Min.

# SYLVANIA TYPE 17BRP4 (Cont'd)

## 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 a Heppner PM ion trap magnet or equivalent located in optimum position and rotated to give maximum brightness.

## WARNING:

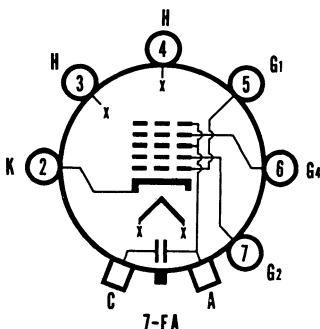
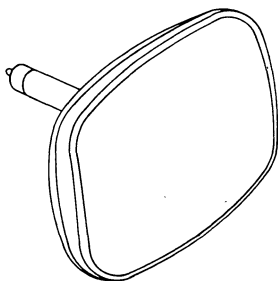
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17BVP4

## Silver Screen "85"

### TELEVISION PICTURE TUBE

- |                             |                          |
|-----------------------------|--------------------------|
| 17" Direct Viewed           | Aluminized Screen        |
| Rectangular Glass Type      | Electrostatic Focus      |
| Lightweight Tube            | 110° Magnetic Deflection |
| Spherical Faceplate         | 1 1/8" Neck Diameter     |
| Gray Filter Glass           | Single Field 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.).....	79 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> .....	1500 μmf Max.
	1000 μmf Min.
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	14 3/4 x 11 11/16 Inches
Nominal Overall Length.....	13 1/4 ± 3/16 Inches
Bulb.....	J132 1/2 A1
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-185
Basing.....	7FA
Weight (approx.).....	10 Pounds

# 17BVP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 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
Ion Trap Magnet Strength.....	33 ± 3 Gaussess 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.
3. 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.

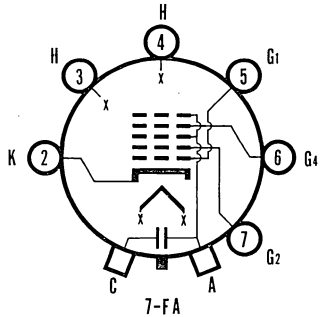
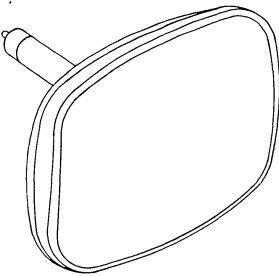
## WARNING

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 17BWP4 Silver Screen "85"

### TELEVISION PICTURE TUBE

17" 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.).....	79 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> .....	1500 μmf Max.
	1000 μmf Min.

# SYLVANIA TYPE 17BWP4 (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 $\frac{3}{4}$ x 11 $\frac{11}{16}$ Inches
Nominal Overall Length.....	12 $\frac{5}{16}$ Inches
Minimum Useful Screen Area.....	155 Sq. Inches
Bulb.....	J132 1/2A1
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-185
Basing.....	7FA
Weight (approx.).....	10 Pounds

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 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 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:

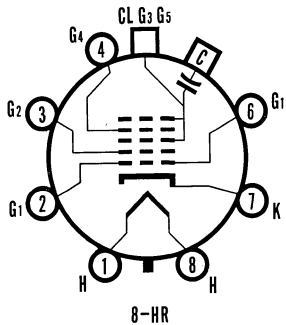
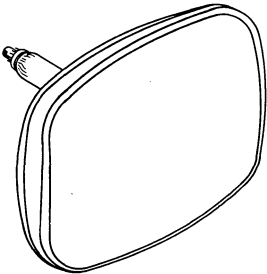
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPES 17BZP4, 17CTP4, 17CVP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Aluminized Screen
Rectangular Glass Type	Electrostatic Focus
Lightweight Tube	110° Magnetic Deflection
Spherical Faceplate	1 $\frac{1}{8}$ " Neck Diameter
Gray Filter Glass	No Ion Trap
External Conductive Coating	



# SYLVANIA TYPES 17BZP4, 17CTP4, 17CVP4 (Cont'd)

## 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.).....	77 Percent

### ELECTRICAL DATA

	17CTP4	17CVP4	17BZP4
Heater Voltage.....	6.3	6.3	6.3 Volts
Heater Current ( $\pm 5\%$ )...	0.45	0.3	0.6 Ampere
Heater Warm-up Time <sup>1</sup> ...	11	11	11 Seconds
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>2</sup> .....			1500 $\mu\mu\text{f}$ Max. 1000 $\mu\mu\text{f}$ Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 $\frac{3}{4}$ x 11 $\frac{1}{16}$ Inches
Nominal Overall Length.....	12 $\frac{9}{16}$ Inches
Minimum Useful Screen Area.....	155 Square Inches
Bulb.....	J132 $\frac{1}{2}$ A or J132 $\frac{1}{2}$ B or equivalent
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-183
Basing.....	8HR
Weight (approx.).....	10 Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 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 <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 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.

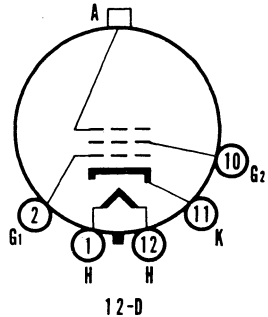
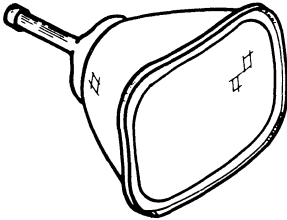
### WARNING:

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 17CP4

## TELEVISION PICTURE TUBE

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



## 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.....	Frosted Gray Filter Glass
Light Transmittance (approx.).....	66 Percent

### ELECTRICAL DATA

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

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	10 $\frac{1}{16}$ x 14 $\frac{3}{8}$ Inches
Nominal Overall Length.....	18 $\frac{5}{8}$ Inches
Bulb Contact.....	Metal Cone Lip
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	104 Ma d c
Ion Trap Magnet Strength (approx.).....	50 Gausses

### CIRCUIT VALUES

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

### NOTES:

1. Visual extinction of undeflected focused spot.
2. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 14 $\frac{3}{8}$  x 10 $\frac{1}{16}$  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.

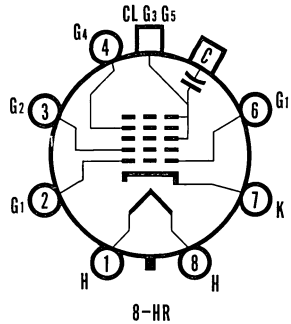
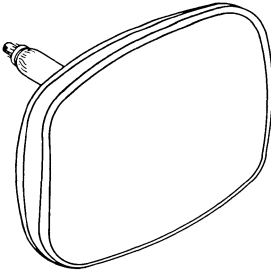


# SYLVANIA TYPE 17CAP4

## Silver Screen "85"

### TELEVISION PICTURE TUBE

17" 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.).....	79 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 μf
Grid No. 1 to All Other Electrodes.....	6 μf
External Conductive Coating to Anode <sup>2</sup> .....	1500 μf Max. 1000 μf Min.

#### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 3/4 x 11 11/16 Inches
Nominal Overall Length.....	12 3/16 Inches
Minimum Useful Screen Area.....	155 Sq. Inches
Bulb.....	J132 1/2 A1 or Equivalent
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-183
Basing.....	8HR
Weight.....	10 Pounds Approx.

#### TYPICAL OPERATING CONDITIONS

Anode.....	14,000 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 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.

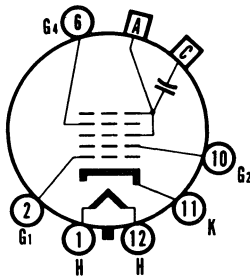
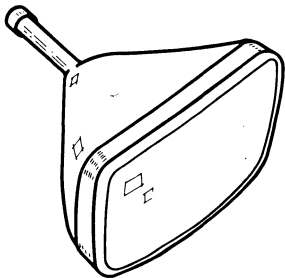
# SYLVANIA TYPES 17CFP4, 17CUP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed  
Rectangular Glass Type  
Lightweight Tube  
Spherical Faceplate  
Gray Filter Glass

Aluminized Screen  
Electrostatic Focus  
90° Magnetic Deflection  
No Ion Trap  
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.)	77 Percent

### ELECTRICAL DATA

	17CUP4	17CFP4
Heater Voltage	6.3	6.3 Volts
Heater Current ( $\pm 5\%$ )	0.3	0.6 Amperes
Heater Warm-up Time <sup>1</sup>	11	11 Seconds
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>2</sup>		1500 $\mu\text{f}$ Max. 1200 $\mu\text{f}$ Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	14 $\frac{3}{4}$ x 11 $\frac{1}{16}$ Inches
Nominal Overall Length	15 Inches
Minimum Useful Screen Area	155 Square Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (17CUP4)	B6-63 or B6-203
Base (17CFP4)	B6-63
Basing	12L
Weight (approx.)	10 $\frac{1}{2}$ Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage	14,000 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 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:

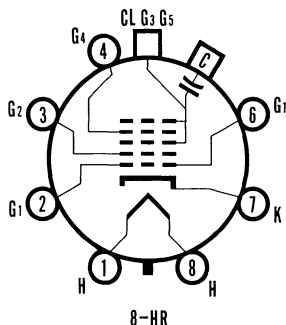
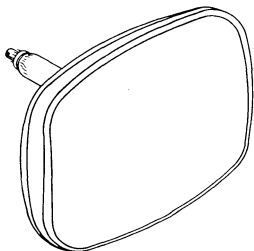
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17CKP4\*

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" 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.).....	77 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> .....	1500 μmf Max. 1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 3/4 x 11 11/16 Inches
Minimum Useful Screen Area.....	155 Square Inches
Nominal Overall Length.....	12 1/16 Inches
Bulb.....	J132 1/2 A1 or J132 1/2 B1
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-183
Basing.....	8HR
Weight (approx.).....	10 Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 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 <sup>3</sup> .....	-35 to -72 Volts d c

### CIRCUIT VALUES

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

\*Available as Sylvania Silver Screen Type 17BZP4/17CAP4/17CKP4

SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 17CKP4 (Cont'd)

### 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 17CLP4

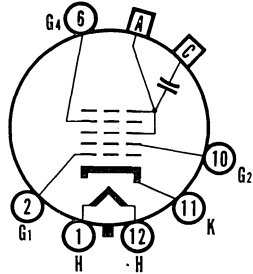
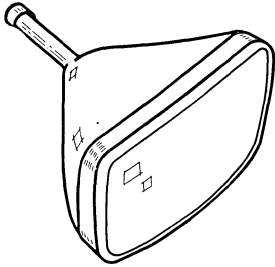
*Silver Screen "85"*

Television Picture Tube

17" Direct Viewed  
Rectangular Glass Type  
Spherical Faceplate  
Gray Filter Glass

Aluminized Screen  
Electrostatic Focus  
90° Magnetic Deflection  
Short Neck Tube

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% Ampere
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> .....	2300 μf Max. 1800 μf Min.
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 <sup>5</sup> / <sub>16</sub> x 11 <sup>1</sup> / <sub>8</sub> Inches
Nominal Overall Length.....	15 <sup>5</sup> / <sub>8</sub> Inches
Minimum Useful Screen Area.....	149 Sq. Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-63
Basing.....	12L

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage for Focus.....	-48 to +264 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
Ion Trap Magnet Strength (approx.).....	35 Gauss

### 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.

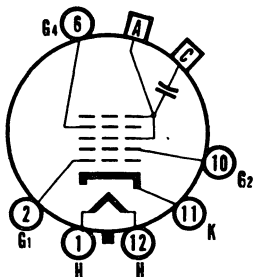
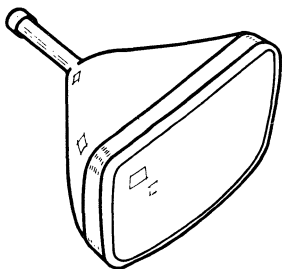
# SYLVANIA TYPE 17CNP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	90° Magnetic Deflection
Lightweight Tube	Short Neck Tube
Spherical Faceplate	No Ion Trap
Gray Filter Glass	External Conductive Coating
Aluminized Screen	Cathode Drive Design

Low Grid No. 2 Voltage



## CHARACTERISTICS

12-L

### 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.).....	77 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> .....	1500 μmf Max. 1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14¾ x 11½ Inches
Nominal Overall Length.....	15 Inches
Minimum Useful Screen Area.....	155 Square Inches
Bulb.....	J132½ C or Equivalent
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63 or B6-203
Basing.....	12L
Weight (approx.).....	10½ Pounds

### TYPICAL OPERATING CONDITIONS<sup>3</sup>

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage.....	50 Volts d c
Cathode Voltage Required for Cutoff <sup>4</sup> .....	35 to 50 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. This type is designed for cathode-drive service. All voltages shown are positive with respect to Grid No. 1 Voltage, unless otherwise indicated.
4. For visual extinction of focused raster. Extinction of stationary focused spot will require that these values increase approximately 5 volts.

### WARNING:

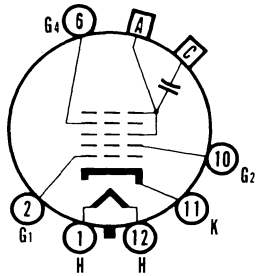
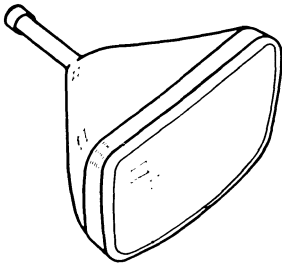
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17CRP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

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



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	0.45 ± 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>	2200 μmf Max. 1700 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions	14 <sup>5</sup> / <sub>16</sub> x 11 <sup>1</sup> / <sub>8</sub> Inches
Nominal Overall Length	14 <sup>5</sup> / <sub>8</sub> Inches
Minimum Useful Screen Area	149 Square Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 6-Pin)	B6-63 or B6-203
Basing	12L

### TYPICAL OPERATING CONDITIONS<sup>3</sup>

Anode Voltage	14,000 Volts d c
Grid No. 4 Voltage	0 to +350 Volts d c
Grid No. 2 Voltage	50 Volts d c
Cathode Voltage Required for Cutoff <sup>4</sup>	+30 to +50 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 17CRP4 (Cont'd)

### 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. This type is designed and rated for cathode-drive service. All voltages shown are positive with respect to Grid No. 1 voltage unless otherwise indicated.
4. For visual extinction of focused raster. Extinction of stationary focused spot will require that these values be increased approximately 5 volts.

### 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.

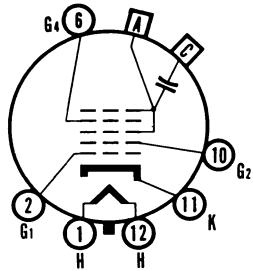
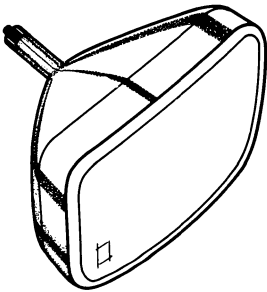


# SYLVANIA TYPE 17CYP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	4½" Neck Length
Spherical Faceplate	No Ion Trap
Gray Filter Glass	External Conductive Coating
Aluminized Screen	Lightweight Bulb
Electrostatic Focus	



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.).....	77 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 Capacitance (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> .....	1500 μmf Max. 1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	14¾ x 11¼ Inches
Minimum Useful Screen Area.....	155 Square Inches
Overall Length.....	14 Inches
Neck Length.....	4½ Inches
Bulb.....	J132½ C
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-203
Basing.....	12L
Weight (approx.).....	10 Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage.....	-50 to +350 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	450 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-39 to -105 Volts d c

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
Grid No. 2 Circuit Resistance <sup>5</sup> .....	10,000 Ohms
Grid No. 4 Circuit Resistance <sup>5</sup> .....	10,000 Ohms

SYLVANIA ELECTRONIC TUBES

111-5-7-60

# SYLVANIA TYPE 17CYP4 (Cont'd)

## 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. For best resolution, it is recommended that Grid No. 2 voltage be operated above 300 volts.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
5. Protective resistance in the Grid No. 2 and Grid No. 4 circuits is advisable to prevent damage to the tube.

## WARNING:

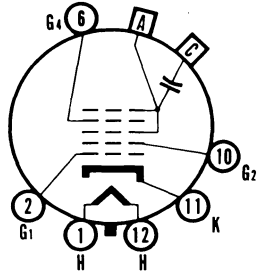
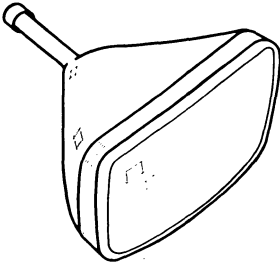
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17DCP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	No Ion Trap
Spherical Faceplate	External Conductive Coating
Gray Filter Glass	Aluminized Screen
Magnetic Deflection	6.3 Volt, 300 Ma Heater



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	$0.3 \pm 5\%$ Ampere
Heater Warm-up Time <sup>1</sup>	11 Seconds
Direct Interelectrode Capacitance (approx.)	
Cathode to All Other Electrodes	5 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes	6 $\mu\text{mf}$
External Conductive Coating to Anode <sup>2</sup>	1500 $\mu\text{mf}$ Max. 1000 $\mu\text{mf}$ Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions	$14\frac{5}{16} \times 11\frac{1}{8}$ Inches
Nominal Overall Length	$14\frac{3}{8}$ Inches
Minimum Useful Screen Area	149 Square Inches
Bulb	J133F or J133G
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell) Duodecal 6-Pin	B6-63 or B6-203
Basing	12L
Weight (approx.)	13 Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage	14,000 Volts d c
Grid No. 4 Voltage	-50 to +300 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.
-------------------------------	------------------

## SYLVANIA TYPE 17DCP4 (Cont'd)

### 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:

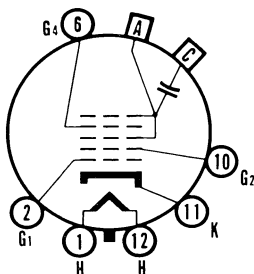
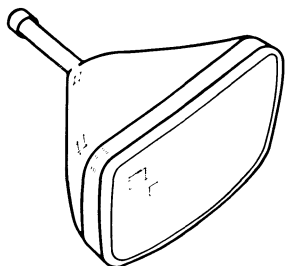
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17DJP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	Single Field Ion Trap
Spherical Faceplate	External Conductive Coating
Gray Filter Glass	Aluminized Screen
Magnetic Deflection	6.3 Volt, 300 Ma Heater



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.....	0.3 ± 5% Ampere
Heater Warm-up Time <sup>1</sup> .....	11 Seconds
Direct Interelectrode Capacitance (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> .....	1500 μmf Max.
	1000 μmf Min.
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	14 <sup>5</sup> / <sub>16</sub> x 11 <sup>1</sup> / <sub>8</sub> Inches
Nominal Overall Length.....	15 <sup>5</sup> / <sub>8</sub> Inches
Minimum Useful Screen Area.....	149 Square Inches
Bulb.....	J133F or J133G
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L
Weight (approx.).....	13 Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage.....	-50 to +300 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
Ion Trap Magnet Current (Avg.) <sup>4</sup> .....	28 Ma d c
Field Strength of PM Ion Trap Magnet <sup>5</sup> .....	31 Gauss Min.

### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max.
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SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 17DJP4 (Cont'd)

### NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80 percent 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 JEDEC Ion Trap Magnet No. 117, with pole pieces centered over Grid No. 2.
5. For typical PM Ion Trap Magnet with field strength tolerance of  $\pm 3$  gauss.

### WARNING:

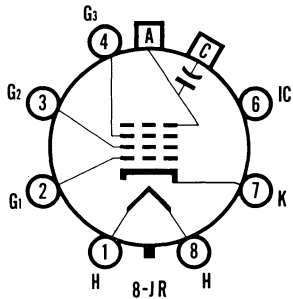
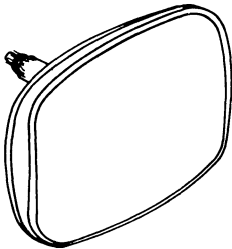
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17DKP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Tri-Potential Electrostatic Focus
Rectangular Glass Type	110° Magnetic Deflection
Spherical Faceplate	No Ion Trap
Gray Filter Glass	External Conductive Coating
Aluminized Screen	Short Neck



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Tri-Potential 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.).....	77 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 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> .....	1500 μmf Max. 1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height.....	11 <sup>1</sup> / <sub>16</sub> Inches
Width.....	14 <sup>3</sup> / <sub>4</sub> Inches
Diagonal.....	15 <sup>3</sup> / <sub>4</sub> Inches
Area.....	155 Square Inches
Neck Length.....	3 <sup>3</sup> / <sub>16</sub> ± <sup>1</sup> / <sub>16</sub> Inches
Nominal Overall Length.....	10 <sup>9</sup> / <sub>16</sub> Inches
Bulb.....	J132 <sup>1</sup> / <sub>2</sub> -A or J132 <sup>1</sup> / <sub>2</sub> -B
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JR
Weight (approx.).....	10 Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	14,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-43 to -78 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

# SYLVANIA TYPE 17DKP4 (Cont'd)

## 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. Brightness and resolution improve with increase in Grid No. 2 voltage. A minimum value of 400 volts is recommended.
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.

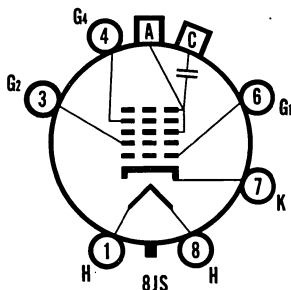
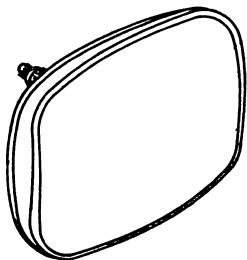


# SYLVANIA TYPE 17DLP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Aluminized Screen
Rectangular Glass Type	Electrostatic Focus
Spherical Faceplate	110° Magnetic Deflection
Gray Filter Glass	No Ion Trap
External Conductive Coating	
Short Neck	



## 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 ± 10% 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> .....	1500 μmf Max. 1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height.....	11 <sup>11</sup> / <sub>16</sub>
Width.....	14 <sup>3</sup> / <sub>4</sub>
Diagonal.....	15 <sup>3</sup> / <sub>4</sub>
Area.....	155 Square Inches
Neck Length.....	4 <sup>1</sup> / <sub>16</sub> + <sup>3</sup> / <sub>16</sub> - <sup>1</sup> / <sub>8</sub> Inches
Overall Length.....	11 <sup>3</sup> / <sub>16</sub> ± <sup>5</sup> / <sub>16</sub> Inches
Bulb.....	J132 <sup>1</sup> / <sub>2</sub> -A
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-226
Basing.....	8JS
Weight (approx.).....	10 <sup>1</sup> / <sub>3</sub> Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage <sup>3</sup> .....	17,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +500 Volts d c
Grid No. 2 Voltage.....	450 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-28 to -72 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

111-4-3-60

## SYLVANIA TYPE 17DLP4 (Cont'd)

### 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. Brightness and resolution improve with increase in the Anode Voltage. In general, a minimum value of 15,000 volts is recommended.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about five volts more negative.

### WARNING:

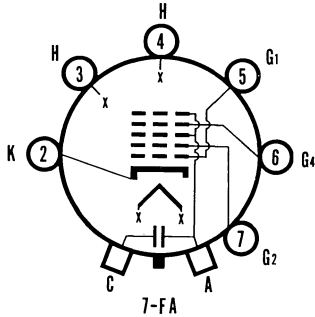
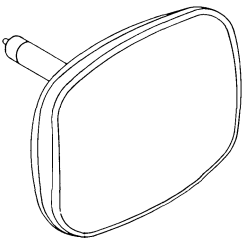
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17DQP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

- |                         |                             |
|-------------------------|-----------------------------|
| 17" Direct Viewed       | 110° Magnetic Deflection    |
| Rectangular Glass Type  | 1 1/8" Neck Diameter        |
| Spherical Faceplate     | No Ion Trap                 |
| Gray Filter Glass       | External Conductive Coating |
| Aluminized Screen       | Low Grid No. 2 Voltage      |
| Electrostatic Focus     | Cathode Drive Design        |
| 6.3 Volt, 450 ma heater |                             |



## 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.).....	77 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.45 ± 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> .....	1700 μf Max. 1200 μf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 3/4 x 11 1/8 Inches
Minimum Useful Screen Area.....	155 Square Inches
Nominal Overall Length.....	12 1/8 Inches
Neck Length.....	5 ± 1/8 Inches
Bulb.....	J132 1/2 A or J132 1/2 B
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-214
Basing.....	7FA
Weight (approx.).....	10 Pounds

### TYPICAL OPERATING CONDITIONS<sup>3</sup>

Anode Voltage.....	14,500 Volts d c
Grid No. 4 Voltage for Focus.....	-200 to +350 Volts d c
Grid No. 2 Voltage.....	50 Volts d c
Cathode Voltage Required for Cutoff <sup>5</sup> .....	35 to 50 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 17DQP4 (Cont'd)

### 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. All voltages shown are positive with respect to Grid No. 1 Voltage, unless otherwise indicated.
4. The focus electrode may be modulated to improve overall focus.
5. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be increased approximately 5 volts.

### WARNING:

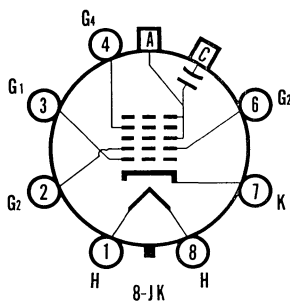
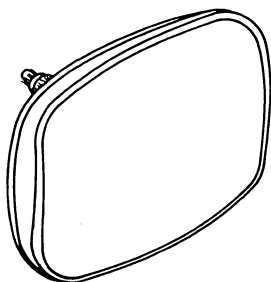
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17DRP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Aluminized Screen
Rectangular Glass Type	Electrostatic Focus
Spherical Faceplate	110° Magnetic Deflection
Gray Filter Glass	External Conductive Coating
Lightweight Tube	1 1/8" Neck Diameter
No Ion Trap	2.68 Volt, 450 Ma Heater
Extremely Short Tube	Internal Magnetic Shield <sup>1</sup>



## 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.).....	77 Percent

### ELECTRICAL DATA

Heater Voltage.....	2.68 Volts
Heater Current.....	0.450 ± 5% Ampere
Heater Warm-up Time <sup>2</sup> .....	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	3.65 μmf
Grid No. 1 to All Other Electrodes.....	4.15 μmf
External Conductive Coating to Anode <sup>3</sup> .....	1400 μmf Max. 900 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 3/4 x 11 1/16 Inches
Minimum Useful Screen Area.....	155 Square Inches
Overall Length.....	10 3/8 Inches
Neck Length.....	3 1/16 Inches
Bulb.....	J132 1/2 A
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JK
Weight (approx.).....	10 Pounds

SYLVANIA ELECTRONIC TUBES

111-5-7-60

# SYLVANIA TYPE 17DRP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS

### Grid Drive Service<sup>4</sup>

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage for Focus.....	+100 to +500 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>6</sup> .....	-35 to -72 Volts d c

### Cathode Drive Service<sup>5</sup>

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage for Focus.....	+150 to +550 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Cathode Voltage Required for Cutoff.....	+34 to +60 Volts d c

## CIRCUIT VALUES

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

## NOTES:

1. The tube incorporates internal magnetic shielding in the gun design so that deflecting yokes without special magnetic shields may be used.
2. 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.
3. External conductive coating must be grounded.
4. Voltage are positive with respect to cathode unless indicated otherwise.
5. Voltages are positive with respect to Grid No. 1 unless indicated otherwise.
6. Visual extinction of focused raster. For cutoff of the undeflected focused spot, the absolute value of the bias between cathode and grid will increase by about 5 volts.

## 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.

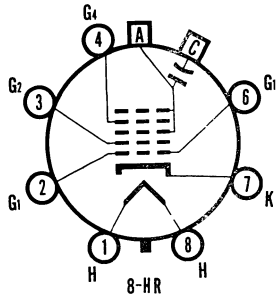
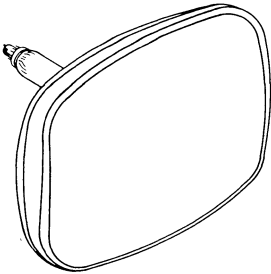
# SYLVANIA TYPE 17DSP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	110° Magnetic Deflection
Spherical Faceplate	No Ion Trap
Gray Filter Glass	External Conductive Coating
Aluminized Screen	4 1/8" Neck

Lightweight Tube



## 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.).....	78 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 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> .....	1500 μmf Max.
	1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 3/4 x 11 1/8 Inches
Minimum Useful Screen Area.....	155 Square Inches
Neck Length.....	4 1/8 Inches
Overall Length.....	11 1/4 Inches
Bulb.....	J132 1/2 A or J132 1/2 B
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8HR
Weight (approx.).....	10 Pounds

### TYPICAL OPERATING CONDITIONS

<b>Grid Drive Service<sup>3</sup></b>	
Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage for Focus.....	0 to 400 Volts d c
Grid No. 2 Voltage.....	400 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-45 to -90 Volts d c
<b>Cathode Drive Service<sup>5</sup></b>	
Anode Voltage.....	14,000 Volts
Grid No. 4 Voltage for Focus.....	0 to 400 Volts

SYLVANIA ELECTRONIC TUBES

111-5-7-60

# SYLVANIA TYPE 17DSP4 (Cont'd)

Grid No. 2 Voltage..... 450 Volts  
Cathode Voltage Required for Cutoff..... +46 to +85 Volts

## 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. Voltages are positive with respect to cathode unless indicated otherwise.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be increased about 5 volts.
5. Voltage are positive with respect to Grid No. 1 unless indicated otherwise.

## 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 of 16,000 volts, whichever is less.

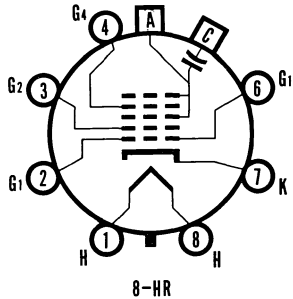
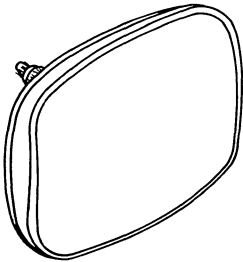


# SYLVANIA TYPE 17DTP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Aluminized Screen
Short Neck	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
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.).....	77 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 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> .....	1500 μmf Max. 1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	11 1/8 Inches
Width.....	14 3/4 Inches
Diagonal.....	15 3/4 Inches
Area.....	155 Square Inches
Neck Length.....	3 3/8 ± 1/8 Inches
Overall Length.....	10 3/4 ± 1/4 Inches
Bulb.....	J132 1/2-A or J132 1/2-B
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8HR
Weight (approx.).....	10 Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	14,000 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 <sup>3</sup> .....	-35 to -72 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPE 17DTP4 (Cont'd)

## 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 five 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.

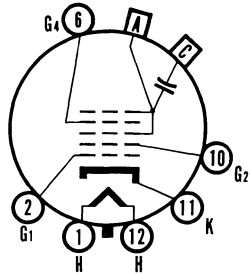
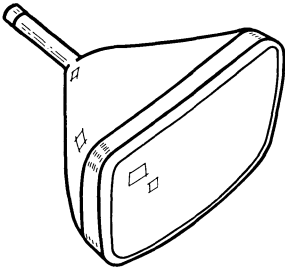
# SYLVANIA TYPE 17DWP4

## SPECIAL PURPOSE TUBE

### Television Monitor Tube

17" Direct Viewed  
 Rectangular Glass Type  
 Spherical Faceplate  
 Gray Filter Glass  
 Magnetic Deflection

Low Voltage Electrostatic Focus  
 No Ion Trap Required  
 External Conductive Coating  
 Aluminized Screen  
 High Resolutions



12-L

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflecting Angles (approx.)	
Vertical.....	50 Degrees
Horizontal.....	65 Degrees
Diagonal.....	70 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
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	6.5 μmf
External Conductive Coating to Anode!.....	1500 μmf Max. 750 μmf Min.

### MECHANICAL DATA

Maximum Useful Screen Dimensions.....	11 1/8 x 14 3/16 Inches
Overall Length.....	19 3/16 Inches
Neck Length.....	7 1/2 Inches
Minimum Useful Screen Area.....	149 Square Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Bulb.....	J133B or J133D
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 (Focusing Electrode) Voltage.....	-550 to +1100 Volts d c
Grid No. 2 Voltage.....	700 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	180 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	

# SYLVANIA TYPE 17DWP4 (Cont'd)

15 Seconds.....	450 Volts
After Equipment Warm-up Period.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

## TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	18,000 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. 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:

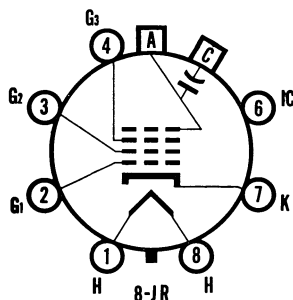
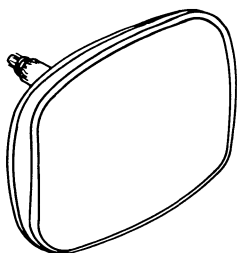
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17DXP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

17" Direct Viewed	Tri-Potential
Rectangular Glass Type	Electrostatic Focus
Spherical Faceplate	110° Magnetic Deflection
Gray Filter Glass	No Ion Trap
Aluminized Screen	External Conductive Coating
450 MA Heater	Short Neck



## CHARACTERISTICS

### GENERAL DATA

Focusing Method	Tri-Potential 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.)	77 Percent

### ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.45 ± 5% Ampere
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>	1500 μf Max. 1000 μf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height	11 <sup>9</sup> / <sub>16</sub> Inches
Width	14 <sup>3</sup> / <sub>4</sub> Inches
Diagonal	15 <sup>3</sup> / <sub>4</sub> Inches
Area	155 Square Inches
Neck Length	3 <sup>3</sup> / <sub>16</sub> ± 1/8 Inches
Overall Length	10 <sup>9</sup> / <sub>16</sub> ± 1/4 Inches
Bulb	J132 <sup>1</sup> / <sub>2</sub> -A or J132 <sup>1</sup> / <sub>2</sub> -B
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base	B7-208
Basing	8JR
Weight (approx.)	10 Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage	14,000 Volts d c
Grid No. 3 Voltage for Focus	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup>	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup>	-43 to -78 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

111-3-11-59

## SYLVANIA TYPE 17DXP4 (Cont'd)

### 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. Brightness and resolution improve with increase in Grid No. 2 voltage. A minimum value of 400 volts is recommended.
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 17CSP4

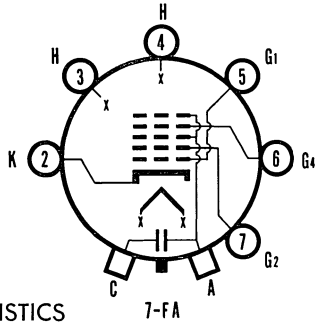
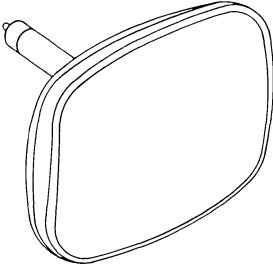
## Silver Screen "85"

### TELEVISION PICTURE TUBE

17" Direct Viewed  
 Rectangular Glass Type  
 Lightweight Tube  
 Spherical Faceplate  
 Gray Filter Glass

Aluminized Screen  
 Electrostatic Focus  
 110° Magnetic Deflection  
 1 1/8" Neck Diameter  
 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.).....	77 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> .....	1400 μmf Max. 900 μmf Min.

#### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 3/4 x 11 1/16 Inches
Nominal Overall Length.....	12 5/16 Inches
Minimum Useful Screen Area.....	155 Sq. Inches
Bulb.....	J132 1/2 A1 or J132 1/2 B1
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-185
Basing.....	7FA
Weight (approx.).....	10 Pounds

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14,000 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.
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#### 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 17DAP4

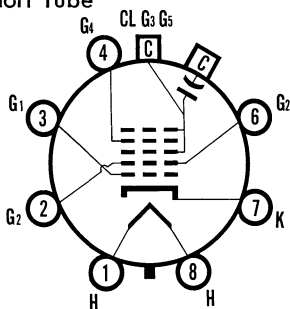
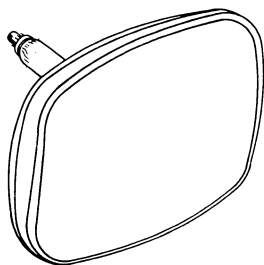
## Silver Screen "85"

### TELEVISION PICTURE TUBE

17" Direct Viewed  
 Rectangular Glass Type  
 Lightweight Tube  
 Spherical Faceplate  
 Gray Filter Glass  
 Aluminized Screen

Electrostatic Focus  
 110° Magnetic Deflection  
 1 1/8" Neck Diameter  
 Non Ion Trap  
 External Conductive Coating  
 2.68 Volt, 450 Ma Heater

Extremely Short Tube



### CHARACTERISTICS

8JK

#### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles	
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.).....	77 Percent

#### ELECTRICAL DATA

Heater Voltage.....	2.68 Volts
Heater Current.....	0.450 ± 5% Ampere
Heater Warm-up Time <sup>1</sup> .....	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	3.65 μmf
Grid No. 1 to All Other Electrodes.....	4.15 μmf
External Conductive Coating to Anode <sup>2</sup> .....	1400 μmf Max. 900 μmf Min.

#### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	14 3/4 x 11 1/16 Inches
Nominal Overall Length.....	10 1/16 Inches
Minimum Useful Screen Area.....	155 Sq. Inches
Bulb.....	J132 1/2 A or J132 1/2 B
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JK
Weight (approx.).....	10 Pounds

#### TYPICAL OPERATING CONDITIONS

##### Grid Drive Service<sup>3</sup>

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage for Focus.....	+100 to +500 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>5</sup> .....	-35 to -72 Volts d c

##### Cathode Drive Service<sup>4</sup>

Anode Voltage.....	14,000 Volts d c
Grid No. 4 Voltage for Focus.....	+150 to +550 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Cathode Voltage Required for Cutoff <sup>5</sup> .....	+34 to +60 Volts d c

#### CIRCUIT VALUES

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



# 17DAP4 (Cont'd)

## 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. Voltages are positive with respect to cathode unless indicated otherwise.
4. Voltages are positive with respect to Grid No. 1 unless indicated otherwise.
5. Visual extinction of focused raster. For cutoff of the undeflected focused spot, the absolute value of the bias between cathode and grid will increase by about 5 volts.

## WARNING:

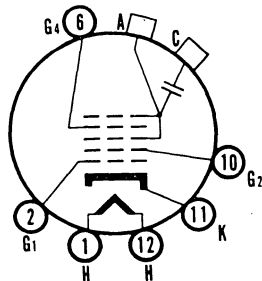
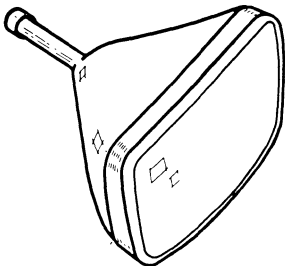
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 17FP4/17FP4A

### TELEVISION PICTURE TUBE

17" Direct Viewed  
Rectangular Glass Type  
Gray Filter Glass  
External Conductive Coating

Magnetic Deflection  
Electrostatic Focus  
Spherical Faceplate  
Single Field Ion Trap



12-L

## 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.).....	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 $\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\text{f}$
External Conductive Coating to Anode <sup>1</sup> .....	2000 $\mu\text{f}$ Max
	750 $\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	10 $\frac{3}{4}$ x 14 $\frac{1}{4}$ Inches
Nominal Overall Length.....	19 $\frac{1}{4}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	16000 Volts d c
Grid No. 3 Voltage.....	3100 to 4100 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

### CIRCUIT VALUES

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

# 17FP4/17FP4A (Cont'd)

## NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.

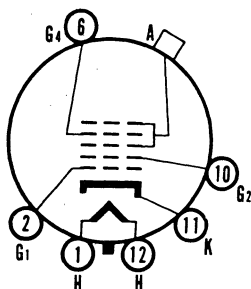
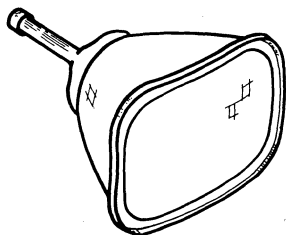
## WARNING

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 17GP4

### TELEVISION PICTURE TUBE

17" Direct Viewed	Magnetic Deflection
Rectangular Metal Type	Electrostatic Focus
Frosted Gray Filter Glass	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 $\mu$ f
Grid No. 1 to All Other Electrodes.....	6 $\mu$ f
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	14 $\frac{3}{8}$ x 10 $\frac{1}{16}$ Inches
Nominal Overall Length.....	18 $\frac{3}{16}$ Inches
Bulb Contact.....	Metal Cone Lip
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12M

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 4 Voltage.....	2670 to 3620 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff.....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	40 Gauss

### CIRCUIT VALUES

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

# 17GP4 (Cont'd)

**NOTE:**

1. Visual extinction of undeflected focused spot.

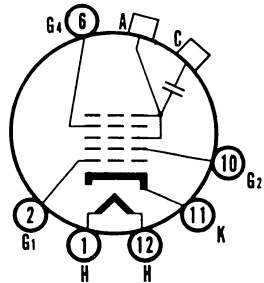
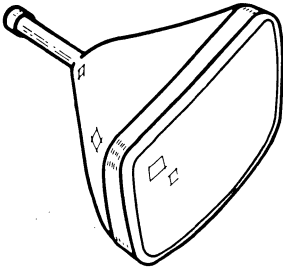
**WARNING**

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 17HP4/17RP4, 17HP4A**  
**Silver Screen "85" → 17HP4B/17RP4C**

**TELEVISION PICTURE TUBE**

- |  |                       |
|--|-----------------------|
| 17" Direct Viewed                      | Magnetic Deflection   |
| Rectangular Glass Type                 | Electrostatic Focus   |
| Gray Filter Glass                      | Spherical Faceplate   |
| External Conductive Coating            | Single Field Ion Trap |
| 17HP4A has a Frosted Faceplate         |                       |
| 17HP4B/17RP4C has an Aluminized Screen |                       |



**CHARACTERISTICS 12-L**

**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 μμf
Grid No. 1 to All Other Electrodes.....	6 μμf
External Conductive Coating to Anode <sup>1</sup> .....	1500 μμf Max
	750 μμf Min
Ion Trap Magnet.....	External, Single Field Type

**MECHANICAL DATA**

Minimum Useful Screen Dimensions.....	10¾ x 14¼ Inches
Nominal Overall Length.....	19¾ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

**TYPICAL OPERATING CONDITIONS**

Anode Voltage.....	14000 Volts d c
Grid No. 4 Voltage.....	-56 to +310 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Ion Trap Magnet Field Strength (approx.).....	30 Gauss

**CIRCUIT VALUES**

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

# 17HP4/17RP4, 17HP4A 17HP4B/17RP4C (Cont'd)

## 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.

## 17HP4A

The Sylvania Type 17HP4A is identical to Type 17HP4/17RP4 except for having a frosted faceplate.

## 17HP4B/17RP4C

The Sylvania Type 17HP4B/17RP4C is identical to Type 17HP4/17RP4 except for having an aluminized screen.

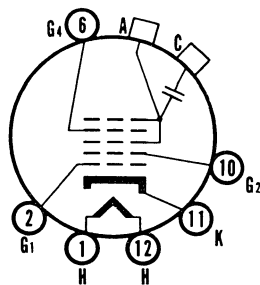
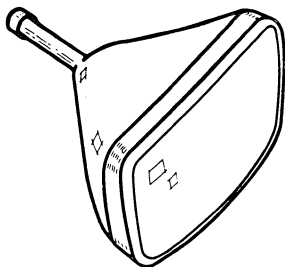
## WARNING

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 17LP4/17VP4 Silver Screen "85" → 17LP4A/17VP4B

### TELEVISION PICTURE TUBE

17" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Electrostatic Focus
Gray Filter Glass	Cylindrical Faceplate
External Conductive Coating	Single Field Ion Trap
17LP4A/17VP4B has an Aluminized Screen	



### 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 $\mu\text{f}$
Grid No. 1 to All Other Electrodes	6 $\mu\text{f}$
External Conductive Coating to Anode <sup>1</sup>	1500 $\mu\text{f}$ Max
	750 $\mu\text{f}$ Min
Ion Trap Magnet	External, Single Field Type

# 17LP4/17VP4 17LP4A/17VP4B (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	10 $\frac{3}{4}$ x 14 $\frac{1}{4}$ Inches
Nominal Overall Length.....	19 $\frac{3}{16}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 4 Voltage.....	-56 to +310 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	30 Gauss

## CIRCUIT VALUES

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

## NOTES:

- External conductive coating must be grounded.
- Visual extinction of undeflected focused spot.

## 17LP4A/17VP4B

The Sylvania Type 17LP4A/17VP4B is identical to the Type 17LP4/17VP4 except for having an aluminized screen.

## WARNING

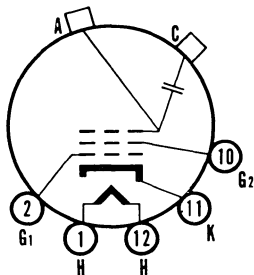
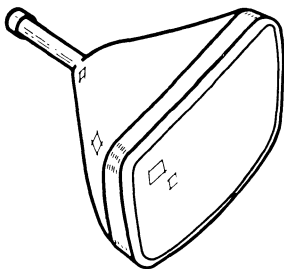
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 17QP4/17YP4 Silver Screen "85" → 17QP4A

## TELEVISION PICTURE TUBE

17" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Magnetic Focus
Gray Filter Glass	Cylindrical Faceplate
External Conductive Coating	Single Field Ion Trap

17QP4A has an Aluminized Screen



12-N

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Magnetic
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

# 17QP4/17YP4, 17QP4A (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 $\mu\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\mu\text{f}$
External Conductive Coating to Anode <sup>1</sup> .....	1500 $\mu\mu\text{f}$ Max
	750 $\mu\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	10 $\frac{3}{4}$ x 14 $\frac{1}{4}$ Inches
Nominal Overall Length.....	19 $\frac{3}{16}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.).....	95 Ma d c
Ion Trap Magnet Strength (approx.).....	30 Gauss

## CIRCUIT VALUES

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

## NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.
3. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 10 $\frac{3}{4}$  x 14 $\frac{1}{4}$  inch picture area.

## 17QP4A

The Sylvania Type 17QP4A is identical to the Type 17QP4/17YP4 except for having an aluminized screen.

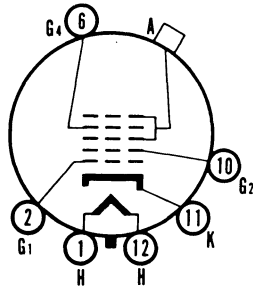
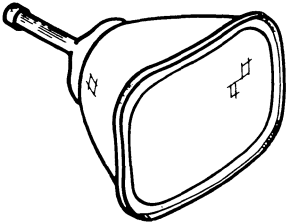
## WARNING

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 17TP4

## TELEVISION PICTURE TUBE

17" Direct Viewed	Magnetic Deflection
Rectangular Metal Type	Electrostatic Focus
Frosted Gray Filter Glass	Spherical Faceplate
Single Field Ion Trap	



## CHARACTERISTICS 12-M

### 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

# 17TP4 (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 $\mu\mu\text{f}$
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.....	14 $\frac{3}{8}$ x 10 $\frac{1}{16}$ Inches
Nominal Overall Length.....	18 $\frac{7}{8}$ Inches
Bulb Contact.....	Metal Cone Lip
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12M

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 4 Voltage.....	-55 to +300 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	45 Gauss

## 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 19AP4      19AP4C**  
**19AP4A      19AP4D**  
**19AP4B**

## TELEVISION PICTURE TUBE

19" Direct Viewed	Magnetic Deflection
Round Metal Type	Magnetic Focus
Single Field Ion Trap	Spherical Faceplate

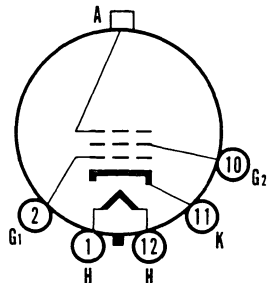
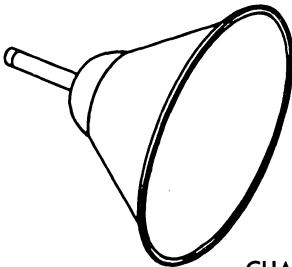
19AP4 has a Clear Glass Faceplate

19AP4A has a Gray Filter Glass Faceplate

19AP4B has a Frosted Gray Filter Glass Faceplate

19AP4C has a Frosted Gray Filter Glass Faceplate  
and an Aluminized Screen

19AP4D has a Frosted Faceplate



## CHARACTERISTICS

12-D

## GENERAL DATA

Focusing Method.....	Magnetic
Deflecting Method.....	Magnetic
Deflecting Angle (approx.).....	66 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	(19AP4) Clear (19AP4A) Gray (19AP4D) Frosted (19AP4B, 19AP4C) Gray, Frosted

# 19AP4, 19AP4A, 19AP4B, 19AP4C, 19AP4D (Cont'd)

## 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.....	7 $\mu\mu\text{f}$
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Diameter.....	17 $\frac{3}{8}$ Inches
Nominal Overall Length.....	21 $\frac{1}{2}$ Inches
Bulb Contact.....	Metal Cone Lip
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>1</sup> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	115 Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

## CIRCUIT VALUES

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

## NOTES:

1. Visual extinction of undeflected focused spot.
2. For JETEC focusing coil 106 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 15 $\frac{5}{8}$  x 11 $\frac{3}{4}$  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 20CP4/20DP4  
20CP4A/20DP4A**

**Silver Screen "85" → 20CP4B/20DP4B  
20CP4C**

**Silver Screen "85" → 20CP4D/20DP4C**

## TELEVISION PICTURE TUBE

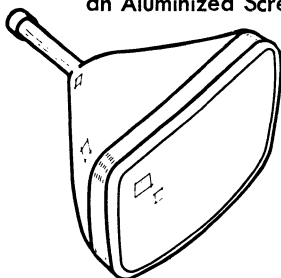
20" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Magnetic Focus
Gray Filter Glass	Spherical Faceplate
Single Field Ion Trap	

20CP4A/20DP4A has an External Conductive Coating

20CP4B/20DP4B has an Aluminized Screen

20CP4C has a Frosted Faceplate

20CP4D/20DP4C has an External Conductive Coating and an Aluminized Screen



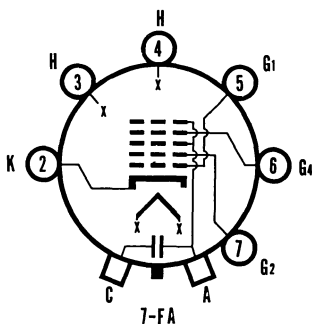
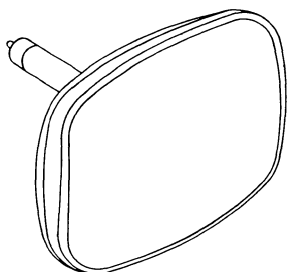


# SYLVANIA TYPE 19AJP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

19" Direct Viewed	Aluminized Screen
Rectangular Glass Type	Electrostatic Focus
Spherical Faceplate	114° Magnetic Deflection
Gray Filter Glass	External Conductive Coating
Low Grid No. 2 Voltage	1 1/8" Neck Diameter
No Ion Trap	6.3 Volt, 450 Ma Heater
Cathode Drive Design	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	101 Degrees
Diagonal.....	114 Degrees
Vertical.....	86 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	79 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.45 ± 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> .....	1500 μmf Max. 1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	12 Inches
Width.....	15 1/8 Inches
Diagonal.....	17 3/8 Inches
Minimum Useful Screen Area.....	172 Square Inches
Neck Length.....	4 1/8 ± 1/8 Inches
Overall Length.....	11 3/8 ± 1/4 Inches
Bulb.....	J149A
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-214
Basing.....	7FA
Weight (approx.).....	13 1/2 Pounds

### TYPICAL OPERATING CONDITIONS<sup>3</sup>

Anode Voltage.....	14,500 Volts d c
Grid No. 4 Voltage for Focus.....	0 to +500 Volts d c
Grid No. 2 Voltage.....	50 Volts d c
Cathode Voltage Required for Cutoff <sup>5</sup> .....	35 to 50 Volts d c

SYLVANIA ELECTRONIC TUBES

111-6-1-61

# SYLVANIA TYPE 19AJP4 (Cont'd)

## 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. All voltages shown are positive with respect to Grid No. 1 Voltage, unless otherwise indicated.
4. The focus electrode may be modulated to improve overall focus.
5. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be increased approximately 5 volts.

## WARNING:

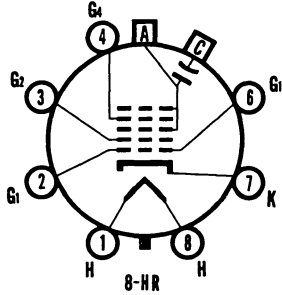
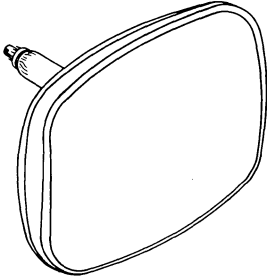
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 19ARP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

19" Direct Viewed	Electrostatic Focus
114° Magnetic Deflection	Rectangular Glass Type
Spherical Faceplate	Bonded Shield
Gray Filter Glass	Aluminized Screen
No Ion Trap	External Conductive Coating



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	102 Degrees
Diagonal.....	114 Degrees
Vertical.....	86 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.).....	44 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 5% Ampere
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> .....	1500 μf Max. 1000 μf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	12 <sup>1</sup> / <sub>16</sub> Inches
Width.....	15 <sup>5</sup> / <sub>16</sub> Inches
Diagonal.....	17 <sup>3</sup> / <sub>4</sub> Inches
Area.....	174 Square Inches
Neck Length.....	5 <sup>1</sup> / <sub>8</sub> ± <sup>1</sup> / <sub>8</sub> Inches
Overall Length.....	12 <sup>5</sup> / <sub>8</sub> ± <sup>1</sup> / <sub>8</sub> Inches
Bulb.....	C149 Exp. No. 5 or Equiv.
Safety Plate.....	FP159A
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8HR
Weight (approx.).....	18 <sup>1</sup> / <sub>2</sub> Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

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 <sup>3</sup> .....	-35 to -72 Volts d c

SYLVANIA ELECTRONIC TUBES

111-6-1-61

# SYLVANIA TYPE 19ARP4 (Cont'd)

## 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:

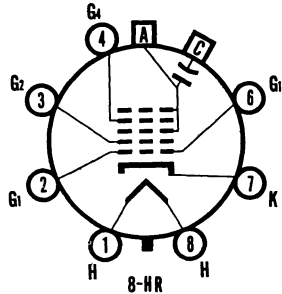
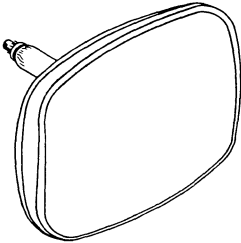
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 19ASP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

19" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	114° Magnetic Deflection
Spherical Faceplate	No Ion Trap
Gray Filter Glass	External Conductive Coating
Aluminized Screen	Bonded Shield
300 Ma Heater	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	102 Degrees
Diagonal.....	114 Degrees
Vertical.....	86 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.).....	44 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.30 ± 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> .....	1500 μmf Max. 1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	12 <sup>1</sup> / <sub>16</sub> Inches
Width.....	15 <sup>5</sup> / <sub>16</sub> Inches
Diagonal.....	17 <sup>3</sup> / <sub>4</sub> Inches
Area.....	174 Square Inches
Neck Length.....	5 <sup>1</sup> / <sub>8</sub> ± <sup>1</sup> / <sub>16</sub> Inches
Overall Length.....	12 <sup>5</sup> / <sub>8</sub> ± <sup>5</sup> / <sub>16</sub> Inches
Bulb.....	C149 Exp. No. 5 or Equiv.
Safety Plate.....	FP159A
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8HR
Weight (approx.).....	18 <sup>1</sup> / <sub>2</sub> Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

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 <sup>3</sup> .....	-35 to -72 Volts d c

SYLVANIA ELECTRONIC TUBES

111-6-1-61

# SYLVANIA TYPE 19ASP4 (Cont'd)

## 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:

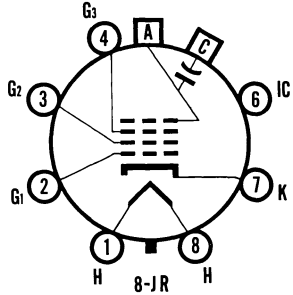
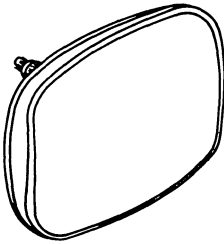
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 19ATP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

19" Direct Viewed	Rectangular Glass Type
Spherical Faceplate	Bonded Shield
Gray Filter Glass	Aluminized Screen
Tri-Potential Electrostatic Focus	No Ion Trap
External Conductive Coating	114° Magnetic Deflection



## CHARACTERISTICS

### GENERAL DATA

Focusing Method	Tri-Potential Electrostatic
Deflection Method	Magnetic
Deflection Angles (approx.)	
Horizontal	102 Degrees
Diagonal	114 Degrees
Vertical	86 Degrees
Phosphor	Aluminized P4
Fluorescence	White
Persistence	Short to Medium
Faceplate	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.)	44 Percent

### ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.60 ± 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>	1500 μmf Max. 1000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height	12 1/16 Inches
Width	15 3/16 Inches
Diagonal	17 3/4 Inches
Area	174 Square Inches
Neck Length	3 3/16 ± 1/8 Inches
Overall Length	11 1/16 ± 3/16 Inches
Bulb	C149 Exp. No. 5 or Equiv.
Safety Plate	FP159A
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base	B7-208
Basing	8JR
Weight (approx.)	18 1/2 Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage	16,000 Volts d c
Grid No. 3 Voltage for Focus	0 to +400 Volts d c
Grid No. 2 Voltage	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>3</sup>	-43 to -78 Volts d c

SYLVANIA ELECTRONIC TUBES

111-6-1-61

# SYLVANIA TYPE 19ATP4 (Cont'd)

## CIRCUIT VALUES

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

## NOTES:

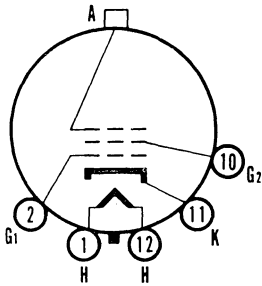
1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of the rated heater voltage after applying four (4) times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three (3) times the rated heater voltage 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:

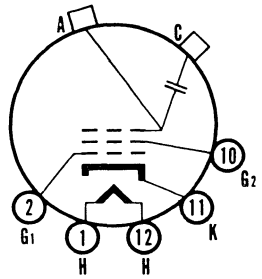
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.



# 20CP4/20DP4, 20CP4A/20DP4A, 20CP4B/20DP4B, 20CP4C, 20CP4D/20DP4C (Cont'd)



12-D



12-N

## 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.).....	73 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 $\mu\text{f}$
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	12 $\frac{3}{4}$ x 17 Inches
Nominal Overall Length.....	21 $\frac{1}{16}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing 20CP4/20DP4, 20CP4B/20DP4B, 20CP4C.....	12D
Basing 20CP4A/20DP4A, 20CP4D/20DP4C.....	12N

### TYPICAL 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> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	110 Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

### CIRCUIT VALUES

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

### NOTES

1. Visual extinction of undeflected focused spot.
2. For JEDEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 12 $\frac{3}{4}$  x 17 inch picture area.

## 20CP4A/20DP4A

The Sylvania Type 20CP4A/20DP4A is identical to the Type 20CP4/20DP4 except for having an external conductive coating which must be grounded.

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

## 20CP4B/20DP4B

The Sylvania Type 20CP4B/20DP4B is identical to the Type 20CP4/20DP4 except for having an aluminized screen.

## 20CP4C

The Sylvania Type 20CP4C is identical to the Type 20CP4 except for having a frosted faceplate.

# 20CP4/20DP4, 20CP4A/20DP4A, 20CP4B/20DP4B, 20CP4C, 20CP4D/20DP4C (Cont'd)

## 20CP4D/20DP4C

The Sylvania Type 20CP4D/20DP4C is identical to the Type 20CP4/20DP4 except for having an external conductive coating which must be grounded, and an aluminized screen.

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

### WARNING

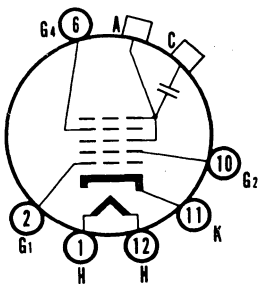
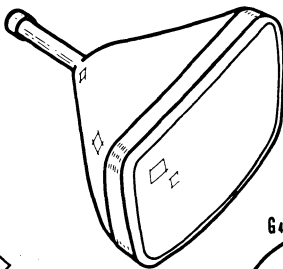
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 20HP4 20HP4A/20LP4/20MP4 20HP4B *Silver Screen "85"* → 20HP4C *Silver Screen "85"* → 20HP4D

### TELEVISION PICTURE TUBE

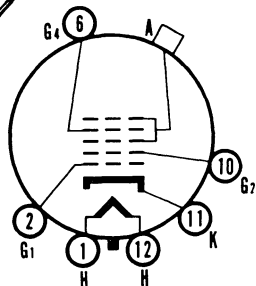
- 20" Direct Viewed
- Rectangular Glass Type
- Gray Filter Glass
- Magnetic Deflection
- Electrostatic Focus
- Spherical Faceplate
- Single Field Ion Trap

- 20HP4A/20LP4/20MP4 has an External Conductive Coating
- 20HP4B has a Frosted Faceplate
- 20HP4C has an Aluminized Screen
- 20HP4D has an External Conductive Coating and an Aluminized Screen



12-L

20HP4A/20LP4/20MP4  
20HP4D



12-M

20HP4  
20HP4B  
20HP4C

# 20HP4, 20HP4A/20LP4/20MP4 20HP4B, 20HP4C, 20HP4D (Cont'd)

## 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.).....	73 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.....	12 $\frac{3}{4}$ x 17 Inches
Nominal Overall Length.....	21 $\frac{3}{4}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing 20HP4, 20HP4B, 20HP4C.....	12M
Basing 20HP4A/20LP4/20MP4, 20HP4D.....	12L

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	14000 Volts d c
Grid No. 4 Voltage.....	-56 to +310 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff1.....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	30 Gauss

### CIRCUIT VALUES

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

### NOTE:

1. Visual extinction of undeflected focused spot.

### 20HP4A/20LP4/20MP4

The Sylvania Type 20HP4A/20LP4/20MP4 is identical to Type 20HP4 except for having an external conductive coating which must be grounded.

External Conductive Coating to Anode Capacitance	
Maximum.....	1500 $\mu$ f
Minimum.....	750 $\mu$ f
Basing.....	12L

### 20HP4B

The Sylvania Type 20HP4B is identical to Type 20HP4 except for having a frosted faceplate.

### 20HP4C

The Sylvania Type 20HP4C is identical to Type 20HP4 except for having an aluminized screen.

### 20HP4D

The Sylvania Type 20HP4D is identical to the Type 20HP4 except for having an external conductive coating which must be grounded, and an aluminized screen.

External Conductive Coating to Anode Capacitance	
Maximum.....	1500 $\mu$ f
Minimum.....	750 $\mu$ f
Basing.....	12L

### WARNING

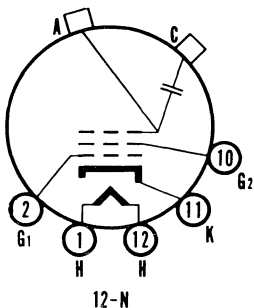
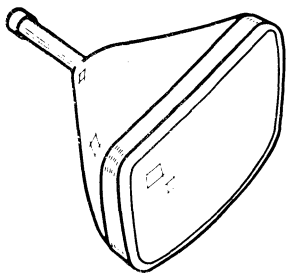
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

**SYLVANIA TYPE 21ACP4/21AMP4**  
**Silver Screen "85" → 21ACP4A/**  
**21AMP4A/21BSP4**

**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

21ACP4A/21AMP4A/21BSP4 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.).....	74 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 <sup>1</sup> .....	2500 $\mu$ f Max
	2000 $\mu$ f Min
Ion Trap Magnet.....	External, Single Field Type

**MECHANICAL DATA**

Minimum Useful Screen Dimensions.....	19 $\frac{1}{16}$ x 15 $\frac{1}{16}$ Inches
Nominal Overall Length.....	20 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

**TYPICAL 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> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	116 $\pm$ 15% Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

**CIRCUIT VALUES**

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

**NOTES:**

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.
3. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 19 $\frac{1}{8}$  x 15 inch picture area.

**21ACP4A/21AMP4A/21BSP4**

The Sylvania Type 21ACP4A/21AMP4A/21BSP4 is identical to the Type 21ACP4/21AMP4 except for having an aluminized screen.

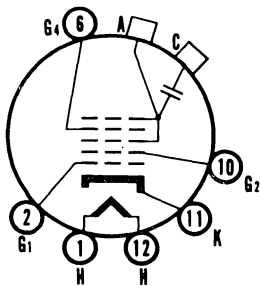
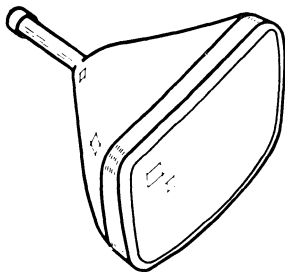
**WARNING**

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 21AFP4 21YP4 Silver Screen "85" → 21YP4A

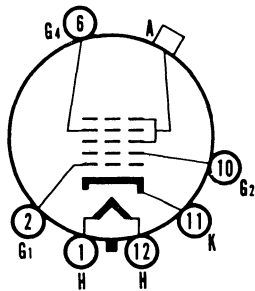
## TELEVISION PICTURE TUBE

21" Direct Viewed                      Magnetic Deflection  
 Rectangular Glass Type              Electrostatic Focus  
 Gray Filter Glass                      Spherical Faceplate  
    Single Field Ion Trap  
 21YP4 has an External Conductive Coating  
 21YP4A has an External Conductive Coating and  
    an Aluminized Screen



12-L

21YP4  
21YP4A



12-M

21AFP4

## 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 Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μμf
Grid No. 1 to All Other Electrodes.....	6 μμf
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	19 1/8 x 14 3/16 Inches
Nominal Overall Length.....	23 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12M

# 21AFP4, 21YP4, 21YP4A (Cont'd)

## TYPICAL 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 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.

## 21YP4

The Sylvania Type 21YP4 is identical to Type 21AFP4 except for having an external conductive coating, which must be grounded.

External Conductive Coating to Anode Capacitance	
Maximum	2500 $\mu\mu\text{f}$
Minimum	2000 $\mu\mu\text{f}$
Basing	12L

## 21YP4A

The Sylvania Type 21YP4A is identical to Type 21AFP4 except for having an external conductive coating which must be grounded, and an aluminized screen.

External Conductive Coating to Anode Capacitance	
Maximum	2500 $\mu\mu\text{f}$
Minimum	2000 $\mu\mu\text{f}$
Basing	12L

## WARNING

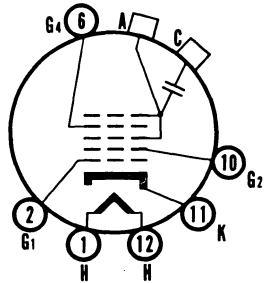
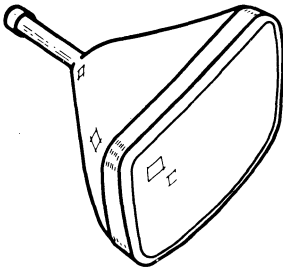
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPES 21ALP4, 21DVP4

**Silver Screen "85" → 21ALP4A/21ALP4B**

### 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 |
| 21DVP4, 21ALP4A/21ALP4B have Aluminized Screens |                       |



12-L

# 21ALP4, 21DVP4, 21ALP4A/21ALP4B (Cont'd)

## 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.).....	74 Percent

### ELECTRICAL DATA

	21DVP4	21ALP4 21ALP4A/21ALP4B
Heater Voltage.....	6.3	6.3 Volts
Heater Current ( $\pm 5\%$ ).....	0.3	0.6 Amperes
Direct Interelectrode Capacitances (approx.)		
Cathode to All Other Electrodes.....		5 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes.....		6 $\mu\text{mf}$
External Conductive Coating to Anode <sup>1</sup> .....		750 $\mu\text{mf}$ Max. 500 $\mu\text{mf}$ Min.
Ion Trap Magnet.....	External,	Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	19 $\frac{1}{8}$ x 15 Inches
Nominal Overall Length.....	20 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

### TYPICAL OPERATING CONDITIONS

	21DVP4	21ALP4 21ALP4A/21ALP4B
Anode Voltage.....	18,000	16,000 Volts d c
Grid No. 4 Voltage.....	0 to 400	-64 to +352 Volts d c
Grid No. 2 Voltage.....	300	300 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>2</sup> .....	-28 to -72	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	46	35 Gauss

### CIRCUIT VALUES

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

### NOTES:

- External conductive coating must be grounded.
- Visual extinction of undeflected focused spot.

### 21ALP4A/21ALP4B

The Sylvania Type 21ALP4A/21ALP4B is identical to the Type 21ALP4 except it has an aluminized screen and an anode voltage rating of 20,000 volts.

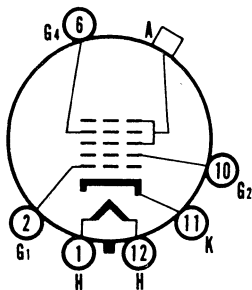
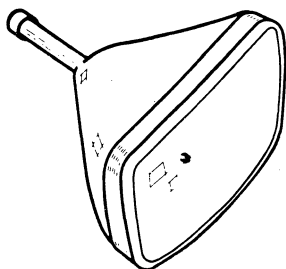
### WARNING

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 21ANP4 21ANP4A

## TELEVISION PICTURE TUBE

21" Direct Viewed                      Magnetic Deflection  
 Rectangular Glass Type              Electrostatic Focus  
 Gray Filter Glass                      Spherical Faceplate  
 Single Field Ion Trap  
 21ANP4A has an Aluminized Screen



12-M

## 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.).....	71 Percent

### ELECTRICAL DATA

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

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	19 $\frac{1}{8}$ x 15 Inches
Nominal Overall Length.....	20 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12M

### TYPICAL 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 Gauss

### 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.

## 21ANP4A

The Sylvania Type 21ANP4A is identical to the Type 21ANP4 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.

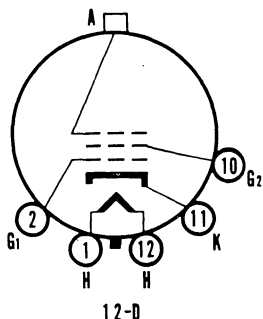
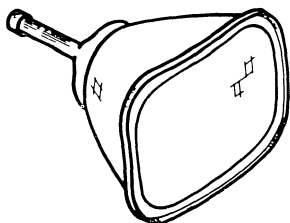


# SYLVANIA TYPE 21AP4

## TELEVISION PICTURE TUBE

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

Magnetic Deflection  
Magnetic Focus  
Spherical Faceplate  
Single Field Ion Trap



## 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.....	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 $\mu$ f
Grid No. 1 to All Other Electrodes.....	6 $\mu$ f
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	18 $\frac{1}{8}$ x 13 $\frac{1}{16}$ Inches
Nominal Overall Length.....	22 $\frac{5}{8}$ Inches
Bulb Contact.....	Metal Cone Lip
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

### TYPICAL 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> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>2</sup> .....	110 Ma d c
Ion Trap Magnet Strength (approx.).....	50 Gauss

### CIRCUIT VALUES

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

### NOTES:

1. Visual extinction of undeflected focused spot.
2. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on an 18 $\frac{1}{8}$  x 13 $\frac{1}{16}$  inch picture area.

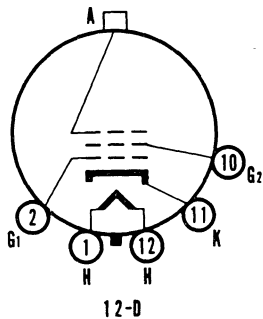
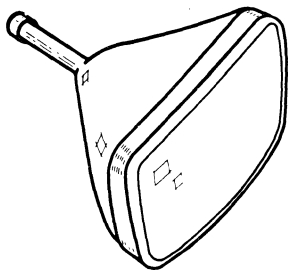
### WARNING

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 21AQP4 21AQP4A

## TELEVISION PICTURE TUBE

21" Direct Viewed  
Rectangular Glass Type  
Gray Filter Glass  
Magnetic Deflection  
Magnetic Focus  
Spherical Faceplate  
Single Field Ion Trap  
21AQP4A 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.).....	71 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 $\frac{1}{8}$ x 15 Inches
Nominal Overall Length.....	20 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

### TYPICAL 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 <sup>2</sup> .....	100 $\pm$ 20% Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

### 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 15 inch picture area.

## 21AQP4A

The Sylvania Type 21AQP4A is identical to the Type 21AQP4 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.

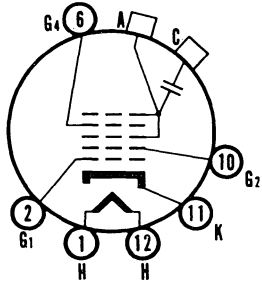
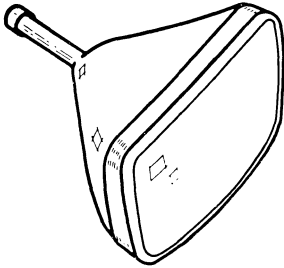
# SYLVANIA TYPE 21ATP4/21ATP4A

**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

21ATP4/21ATP4A has an 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.).....	71 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.....	1500 $\mu\mu\text{f}$ Max
	1200 $\mu\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	19 $\frac{1}{8}$ x 15 Inches
Nominal Overall Length.....	20 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

### TYPICAL 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 <sup>2</sup> .....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	35 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.

### WARNING

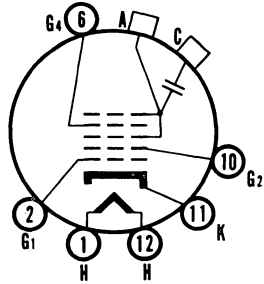
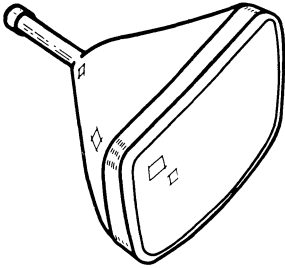
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21AUP4, 21AVP4

## Silver Screen "85" → 21AUP4A/ 21AUP4B/21AVP4A/21AVP4B

### 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
21AUP4A/21AUP4B/21AVP4A/21AVP4B has an Aluminized Screen	



12-L

### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angle	
Horizontal.....	67 Degrees
Diagonal.....	72 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	71 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> .....	2500 $\mu\text{f}$ Max
	2000 $\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	19 $\frac{1}{8}$ x 15 Inches
Nominal Overall Length.....	23 $\frac{1}{32}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

#### TYPICAL 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 <sup>2</sup> .....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

#### CIRCUIT VALUES

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

#### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.

# 21AUP4, 21AVP4, 21AUP4A/ 21AUP4B/21AVP4A/21AVP4B (Cont'd)

## 21AUP4A/21AUP4B/21AVP4A/21AVP4B

The Sylvania Type 21AUP4A/21AUP4B/21AVP4A/21AVP4B is identical to the 21AUP4, 21AVP4 except for having an aluminized screen and an anode voltage rating of 20000 volts.

### WARNING

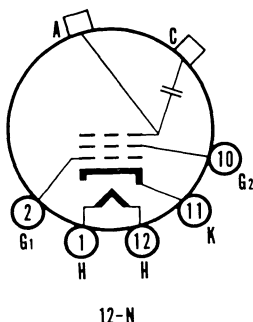
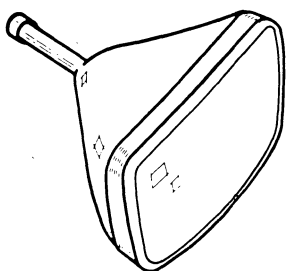
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 21AWP4

### 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
Deflecting Angle (approx.)	
Horizontal.....	67 Degrees
Diagonal.....	72 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	71 Percent

#### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Amperes
Direct Inerelectrode 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.....	2500 $\mu\text{f}$ Max
	2000 $\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	19 $\frac{1}{8}$ x 15 Inches
Nominal Overall Length.....	23 $\frac{1}{32}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

# 21AWP4 (Cont'd)

## TYPICAL 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>	108 ± 20% Ma d c
Ion Trap Magnet Strength (approx.)	35 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.
- For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 19 1/8 x 15 inch picture area sharply focused at center of screen.

## WARNING

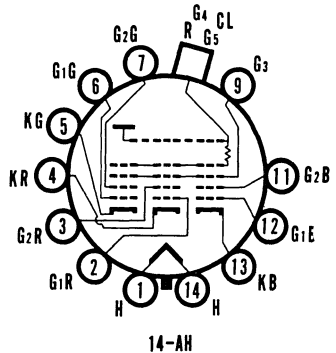
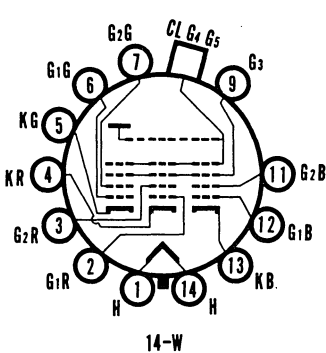
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21AXP22 21AXP22A

## COLOR TELEVISION PICTURE TUBE

21" Direct Viewed  
Round Metal Type  
Filter Glass  
Spherical Faceplate

Electrostatic Focus  
Magnetic Convergence  
Magnetic Deflection  
Three Electron-Gun Type



## CHARACTERISTICS

### GENERAL DATA

Focusing Method	Electrostatic
Deflecting Method	Magnetic
Converging Method	Magnetic
Deflecting Angles (approx.)	
Horizontal	70 Degrees
Vertical	55 Degrees
Phosphor, Blue-Green-Red Dots	P22
Persistence	Medium
Arrangement	Triangular groups each consisting of blue dot, green dot and red dot
Spacing Between Centers of Adjacent Dot Trios (approx.)	0.029 Inches
Faceplate, Spherical	Filter Glass
Light Transmittance (approx.)	77 Percent
Screen	Aluminized, Tri-color, Phosphor-dot Type

# 21AXP22, 21AXP22A (Cont'd)

## ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	1.8 ± 10% Amperes
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to any Guns to All Other Electrodes Except the No. 1 Grids of Other Two Guns.....	7 μmf
Cathode of Blue Gun + Cathode of Green Gun + Cathode of Red Gun to All Other Electrodes.....	16 μmf
Grid No. 3 (of Each Gun Ties Within Tube to No. 3 Grids of Other Two Guns) to All Other Electrodes..	9 μmf

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	19 $\frac{1}{16}$ x 15 $\frac{1}{4}$ Inches
Projected Screen Area.....	255 Sq. Inches
Anode <sup>1</sup> Terminal.....	Metal Shell Lip
Base (Small Shell Neodiheptal 12-Pin).....	B12-131
Basing	
21A XP22.....	14W
21A XP22A.....	14AH
Mounting Position (Base Pin 12 on Top).....	Blue Gun Up
Weight (approx.).....	28 Pounds
Tube Dimensions	
Maximum Overall Length.....	25 $\frac{5}{16}$ Inches
Diameter	
At Lip.....	20 $\frac{9}{16}$ ± $\frac{1}{8}$ Inches
At Flange (Max.).....	20 $\frac{15}{16}$ ± $\frac{3}{16}$ Inches

## RATINGS

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

### MAXIMUM RATINGS (Absolute Maximum Values)

Anode <sup>1</sup> -to-Cathode (Of Each Gun) Voltage.....	27,500 Volts Max.
Anode <sup>1</sup> Current (Average Each Gun) <sup>2</sup> .....	500 μa Max.
Grid No. 3-to-Cathode (Of Each Gun) Voltage.....	6600 Volts Max.
Grid No. 2-to-Cathode Voltage (Each Gun).....	880 Volts Max.
Grid No. 1-to-Cathode Voltage (Each Gun)	
Negative Bias Value.....	440 Volts Max.
Positive Bias Value.....	0 Volts Max.
Positive Peak Value.....	2 Volts Max.
Peak Heater-Cathode Voltage (Each Gun)	
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.

### EQUIPMENT DESIGN RANGES

(For Anode Voltage  $E_{c1k}$  (Each Gun) between 20,000<sup>3</sup> and 25,000 Volts)

Grid No. 3 (Focusing Electrode)-to-Cathode (Of Each Gun) Voltage.....	15.2% to 21.2% of $E_{c1k}$ Each Gun Volts
Grid No. 2-to-Cathode Voltage (Each Gun)	
When Circuit Design Utilizes Grid No. 1-to Cathode Voltage ( $E_{c1k}$ ) at Fixed Value for Raster Cutoff....	See Chart
Grid No. 1-to-Cathode Voltage (Each Gun)	
For Visual Extinction of Focused Raster when Circuit Design Utilizes Grid No. 2-to-Cathode Voltage ( $E_{c2k}$ ) at Fixed Value.....	See Chart
Variation in Raster Cutoff Between Guns In Any Tube.	± 21% of average of highest and lowest cutoff values
Maximum Grid No. 3 Current for Anode Current of 800 μa.....	75 μa
Grid No. 2 Current (Each Gun).....	-5 to +5 μa
Percentage of Total Anode Current Supplied by Each Gun to Produce Illuminant-C White:	
Red Gun.....	47 to 67 Percent
Blue Gun.....	11 to 24 Percent
Green Gun.....	20 to 33 Percent
Each Gun to Produce White of 8500° K:	
Red Gun.....	42 to 60 Percent
Blue Gun.....	12 to 27 Percent
Green Gun.....	23 to 38 Percent
Maximum Raster Shift in Any Direction from Screen Center <sup>4</sup>	
Maximum Compensation to be Provided by the following Components:	
Purifying Magnet.....	Raster shift of 1 Inch in any direction from screen center
Magnetic-Field Equalizer.....	Beam displacement with respect to phosphor dot at edge of screen
Tangential.....	± 0.0005 to ± 0.007 Inches
Radial.....	± 0.0005 to ± 0.005 Inches
Lateral-Converging Magnet: <sup>5 &amp; 6</sup>	
After adjustment has been made for color purity and dynamic convergence	
Maximum Shift of Blue Beam.....	± $\frac{1}{4}$ Inch
Maximum Shift of Red and Green Beams.....	± $\frac{1}{8}$ to ± $\frac{3}{8}$ Inch
Average of Maximum Shift of Red and Green Beams... Radial-Converging Magnet Assembly: <sup>5</sup>	± $\frac{1}{32}$ to ± $\frac{1}{32}$ Inch

# 21AXP22, 21AXP22A (Cont'd)

## Radial-Converging Magnet Assembly:<sup>5</sup>

For static convergence after adjustment has been made for optimum color purity and dynamic convergence (Each Beam).....

Shift of  $\pm \frac{1}{8}$  Inch

## For dynamic convergence<sup>7</sup>

Effected by mmf of approximately parabolic and/or sawtooth waveshape synchronized with scanning

### Horizontal:

#### Blue Pattern

Parabola Amplitude to provide<sup>8</sup>..... Shift of  $\frac{1}{4}$  to  $\frac{3}{8}$  Inch

Sawtooth Amplitude to provide<sup>9</sup>..... Shift of  $\pm 50\%$  of the shift caused by Parabola Amplitude

#### Red Pattern and Green Pattern

##### Parabola:

Amplitude to provide<sup>8</sup>..... Shift of  $\frac{1}{8}$  to  $\frac{3}{8}$  Inch

Ratio of red-pattern to green-pattern shift...  $\frac{1}{2}$  to 2

##### Sawtooth:

Amplitude for red-pattern to provide<sup>9</sup>..... Shift of  $-35\%$  to  $+85\%$  of the shift caused by Parabola Amplitude

Amplitude for green-pattern to provide<sup>9</sup>..... Shift of  $-85\%$  to  $+35\%$  of the shift caused by Parabola Amplitude

Difference between red-pattern shift and green-pattern shift ( $\text{Shift}_R - \text{Shift}_G$ )..... 0 to +100 Percent

### Vertical:

#### Blue Pattern

##### Parabola:

Amplitude to provide<sup>8</sup>..... Shift of 0 to  $\frac{1}{8}$  Inch

##### Sawtooth:

Amplitude to provide<sup>9</sup>..... Shift of 0 to  $\frac{1}{4}$  Inch

#### Red Pattern and Green Pattern

##### Parabola:

Amplitude to provide<sup>8</sup>..... Shift of  $\frac{1}{8}$  to  $\frac{3}{8}$  Inch

Ratio of red-pattern to green-pattern shift...  $\frac{1}{2}$  to 2

##### Sawtooth:

Amplitude to provide<sup>9</sup>..... Shift of  $-\frac{1}{8}$  to  $+\frac{3}{8}$  Inch

Difference between red-pattern shift and green-pattern shift ( $\text{Shift}_R - \text{Shift}_G$ )..... 0 to +100 Percent

## EXAMPLES OF USE DESIGN RANGES (For Anode Voltage of 25,000 Volts)

Grid No. 3 (Focusing Electrode)-to-Cathode (Of Each Gun) Voltage.....	3800 to 5300 Volts
Grid No. 2-to-Cathode Voltage (Each Gun)	
When Circuit Design Utilizes Grid No. 1-to-Cathode Voltage of -70 Volts for Raster Cutoff.....	130 to 370 Volts
Grid No. 1-to-Cathode Voltage (Each Gun)	
For Visual Extinction of Focused Raster When Circuit Design Utilizes Grid No. 2-to-Cathode Voltage of 200 Volts.....	-45 to -100 Volts

## LIMITING CIRCUIT VALUES

### High Voltage Circuits

In order to minimize the possibility of damage to the 21AXP22 caused by a momentary internal arc, it is recommended that the anode power supply and the Grid No. 3 power supply be of the limited-energy type with inherent regulation to limit the continuous short-circuit current to 50 milliamperes. In addition, to prevent cathode damage with resultant decrease in tube life, the effective resistance between the anode power supply output capacitor and the anode, and the effective resistance between Grid No. 3 power supply output capacitor and the Grid No. 3 electrode should be not less than 50,000 ohms. These resistances should be capable of withstanding the maximum instantaneous currents and voltages in their respective circuits. It is to be noted that the effectiveness of the resistance between the anode power supply output capacitor and the anode may be impaired if capacitance in excess of 750  $\mu\text{mf}$  is introduced between the tube and ground by the mounting arrangement of the tube.

For the 21AXP22A, the need for an external resistor between the anode power supply and the tube is eliminated by the addition of an internal neck coating which has a high resistance.

In equipment utilizing a well-regulated anode power supply, the Grid No. 1 circuit resistance should be limited to 7.5 megohms.

### Low Voltage Circuits

Grid No. 1 Circuit Resistance (Each Gun)..... 1.5 Megohms Max.  
When the cathode of each gun is not connected directly to the heater, the Grid No. 2-to-heater circuit, the Grid No. 1-to-heater circuit, and the cathode-to-heater circuit should each have an impedance such that their respective power sources in combination will not supply an instantaneous or continuous short-circuit current of more than 300 milliamperes total. Such current limitation will prevent heater burnout in case of a momentary internal arc within the tube.

When the cathode is connected directly to the heater, the Grid No. 2-to-heater circuit, and the Grid No. 1-to-heater circuit should each have an impedance such that their respective power sources in combination will not supply an instantaneous or continuous short-circuit current of more than 300 milliamperes total. Such current limitation will prevent heater burnout in case of a momentary internal arc within the tube.



# 21AXP22, 21AXP22A (Cont'd)

## NOTES:

1. The anode in a cathode-ray tube is the electrode to which is applied the highest d c voltage for accelerating the electrons in the beam prior to its deflection. In this tube the anode function is performed by Grid No. 4. Since Grid No. 4, Grid No. 5, and collector are connected together within the tube, they are collectively referred to simply as anode for convenience in presenting data.
2. A value of average anode current higher than 500 microamperes per gun will increase picture brightness but may impair resolution and shorten cathode life.
3. Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 20,000 volts.
4. Centering of the raster on the screen is accomplished by passing direct current of the required value through each pair of deflecting coils to compensate for raster shift resulting from adjustments for optimum convergence and color purity.
5. Shift is the movement of the regions of bar-or-dot generator pattern indicated in Notes 8 and 9.
6. The direction of movement of the red and green beam is opposite to that of the blue beam.
7. Indicated values apply when test yoke is used with 21AXP22A.
8. The parabola amplitude is determined by the average value of the shifts at the extremities of the respective horizontal and vertical axes of the screen with convergence of the three beams maintained at the center of the screen. An increase in amplitude should move the blue beam toward the top of the screen; and the red beam toward the lower left of the screen; and the green beam toward the lower right of the screen.
9. The sawtooth amplitude is determined by the difference between the shifts at the extremities of the respective horizontal and vertical axes of the screen. Positive amplitude indicates that the shift at the right or bottom of the screen is greater than the shift at the left or top of the screen.

## GENERAL INFORMATION

The Sylvania Type 21AXP22 and 21AXP22A are direct viewed, metal picture tubes for use in color television receivers.

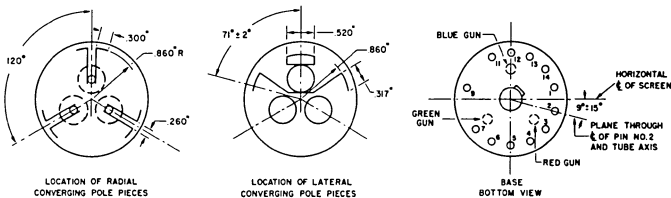
The 21AXP22A features an internal neck coating having high resistance which eliminates the need for an external resistor between the anode power supply and the tube to protect the tube against damage by a momentary internal arc. The resistance of the neck coating permits use of a tube insulating boot having an external conductive coating which with the metal envelope of the tube forms a supplementary filter capacitor.

**MAGNETIC-FIELD EQUALIZER ASSEMBLY.** Use of adjustable magnets located peripherally at the front end of the tube provides sectionalized magnetic fields to eliminate the need for a magnetic shield over the body of the tube and to permit compensation in localized areas for the effects of stray magnetic fields and of the earth's magnetic field on color purity.

**DEGAUSSING PROCEDURE.** For the 21AXP22 and 21AXP22A. After the tube and components are in place, and before voltages are applied to the receiver, a degaussing coil, consisting of about 425 turns of No. 20 enameled wire wound 12 inches in diameter and connected directly to a 115 V a c outlet, should be passed in front of the tube faceplate several times. It should be slowly withdrawn to a distance of about six feet and then turned on its axis 90 degrees before the current is turned off. For optimum performance, the above procedure must be repeated every time the tube or receiver is moved.

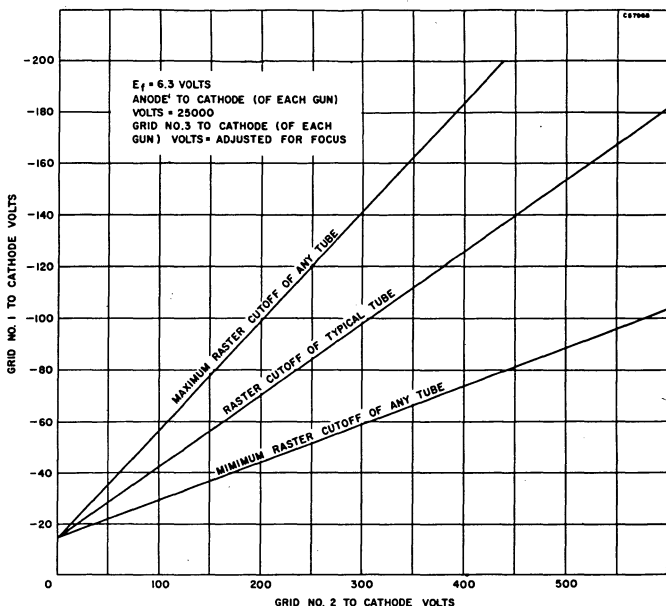
**X-RAY WARNING.** X-ray radiation is produced by the tube when it is operated at its normal anode voltage. The radiation is through the faceplate and is sufficient to require the adoption of safety measures. Simple shielding, such as that provided by a  $\frac{1}{4}$ -inch thickness of safety glass (lime), in front of the faceplate, should prove adequate to provide protection against personal injury from prolonged exposure at close range when the tube is operated at its maximum anode voltage rating.

When this tube is being serviced outside of the TV receiver cabinet, it should never be operated without providing adequate X-ray shielding in front of the faceplate. Because the anode voltage may rise above its maximum rated value for short periods during adjustment with increase in the amount of X-ray radiation, provision should be made for placing a  $\frac{3}{8}$  inch thickness of safety glass in front of the faceplate to avoid the hazard of X-ray radiation.



# 21AXP22, 21AXP22A (Cont'd)

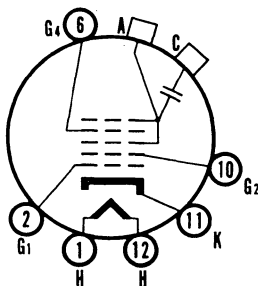
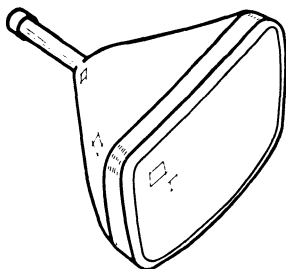
## GENERAL INFORMATION



## SYLVANIA TYPE 21AYP4

### 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 |



12-L

### 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

# 21AYP4 (Cont'd)

## 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> .....	2500 $\mu\mu\text{f}$ Max
	750 $\mu\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	17 $\frac{3}{8}$ x 13 $\frac{5}{8}$ Inches
Nominal Overall Length.....	22 $\frac{7}{16}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

## TYPICAL 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 <sup>2</sup> .....	-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.

## WARNING

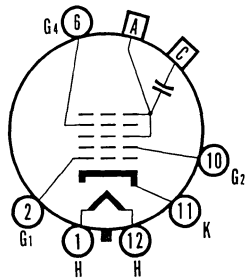
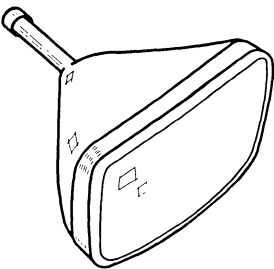
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 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

# 21BTP4 (Cont'd)

## 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.....	$0.6 \pm 5\%$ Ampere
Heater Warm-up Time <sup>1</sup> .....	11 Seconds
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>2</sup> .....	2500 $\mu\mu\text{f}$ Max 2000 $\mu\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	$19\frac{1}{16} \times 15\frac{1}{16}$ Inches
Nominal Overall Length.....	20 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

### 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
Ion Trap Magnet Strength.....	$33 \pm 3$ Gauss 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

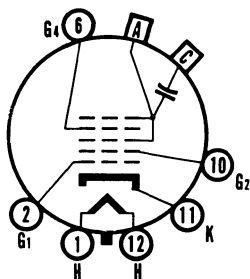
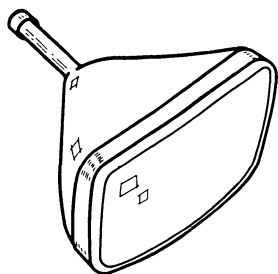
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPES 21CBP4/21CBP4A, 21DJP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

21" Direct Viewed	Magnetic Deflection
Rectangular Glass Type	Electrostatic 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

	21DJP4	21CBP4/21CBP4A
Heater Voltage	6.3	6.3 Volts
Heater Current ( $\pm 5\%$ )	0.3	0.6 Ampere
Heater Warm-up Time <sup>1</sup>	11	11 Seconds
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>2</sup>		2500 $\mu\mu\text{f}$ Max. 2000 $\mu\mu\text{f}$ Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions	19 $\frac{1}{16}$ x 15 $\frac{1}{16}$ 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 or B6-203
Basing	12L

### 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 <sup>3,4</sup>	-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.
4. 21DJP4 cutoff voltage range -35 to -72.

### WARNING:

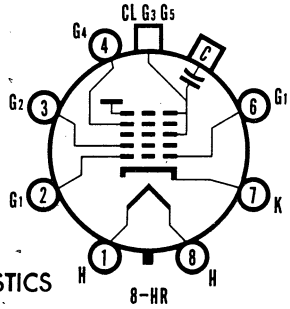
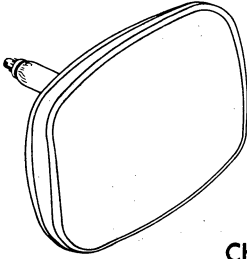
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21CEP4

*Silver Screen "85"*

## 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% Amperes
Heater Warm-up Time <sup>1</sup> .....	11 Seconds
Direct Interelectrode Capacitance (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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/16 x 15 1/16 Inches
Nominal Over-all Length.....	14 7/16 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

### 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 <sup>4</sup> .....	-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:

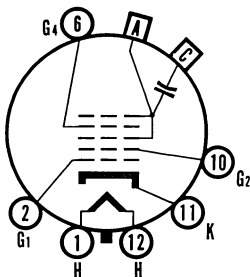
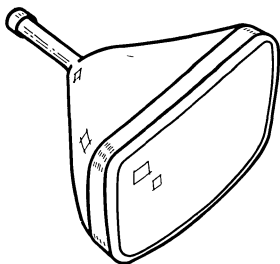
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# 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 <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. 2000 μμf Min.
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 <sup>1</sup> / <sub>16</sub> x 15 <sup>1</sup> / <sub>16</sub> 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

### 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> .....	-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.
------------------------------------	------------------

# SYLVANIA TYPE 21CMP4 (Cont'd)

## 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  $\pm 3$  gauss.

## WARNING:

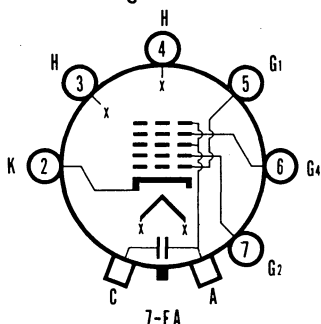
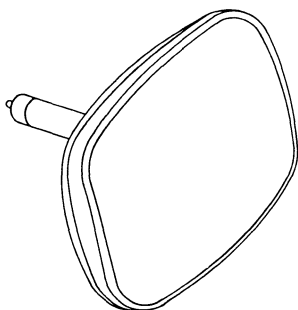
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21CQP4

*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 $\pm$ 5% Amperes
Heater Warm-up Time <sup>1</sup> .....	11 Seconds
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>2</sup> .....	2500 $\mu$ f Max. 2000 $\mu$ f Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/16 x 15 1/16 Inches
Nominal Overall Length.....	14 7/16 Inches
Minimum Useful Screen Area.....	262 Sq. Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Bulb.....	C171 Exp. 19
Base.....	B6-185
Basing.....	7FA
Weight (approx.).....	20 Pounds



# 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 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:

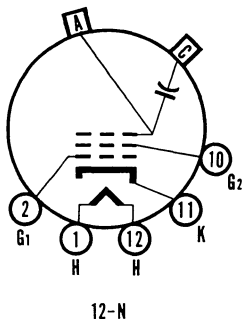
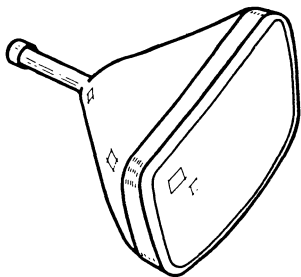
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 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	



## 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% 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. 2000 μmf Min.
Ion Trap Magnet.....	External, Single Field Type

# SYLVANIA TYPE 21CUP4 (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 $\frac{1}{16}$ x 15 $\frac{1}{16}$ 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

## 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 Gauss

## 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  $\pm 3$  gauss.

## WARNING:

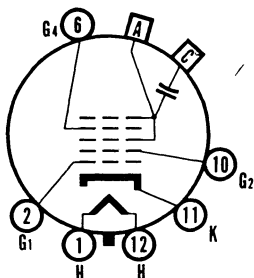
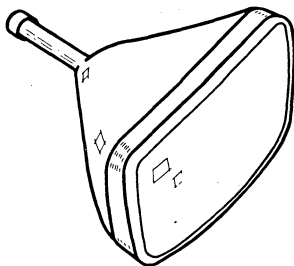
X-ray radiation shielding may be necessary to protect against possible danger or personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# 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-L

## 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

# SYLVANIA TYPE 21CWP4 (Cont'd)

## 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. 2000 μμf Min.
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 <sup>1</sup> / <sub>16</sub> x 15 <sup>1</sup> / <sub>16</sub> 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

## 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 Gauss

## 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 ± 3 gauss.

## WARNING:

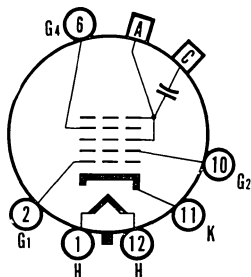
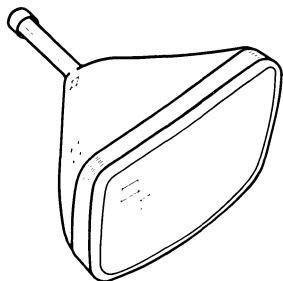
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# 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

# SYLVANIA TYPE 21CXP4 (Cont'd)

## 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 μmf
Grid No. 1 to All Other Electrodes.....	6 μmf
External Conductive Coating to Anode <sup>2</sup> .....	2500 μmf Max. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 <sup>1</sup> / <sub>16</sub> x 15 <sup>1</sup> / <sub>16</sub> 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 or B6-203
Basing.....	12L

### TYPICAL OPERATING CONDITIONS (Cathode Drive Service)

Anode Voltage.....	18,000 Volts dc
Grid No. 4 to Grid No. 1 Voltage for Focus at 100 μa 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 <sup>4</sup> .....	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:

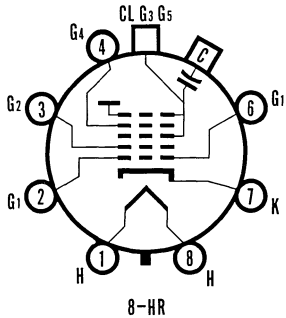
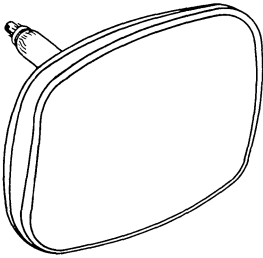
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPES 21DAP4, 21DHP4

*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.).....	74 Percent

### ELECTRICAL DATA

	21DHP4	21DAP4
Heater Voltage.....	6.3	6.3 Volts
Heater Current (±5%).....	0.45	0.6 Ampere
Heater Warm-up Time <sup>1</sup> .....	11	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. 2000 µmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/16 x 15 1/16 Inches
Nominal Overall Length.....	14 1/16 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

### 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 <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 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:

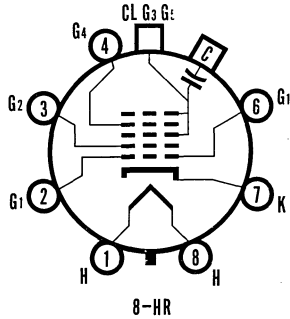
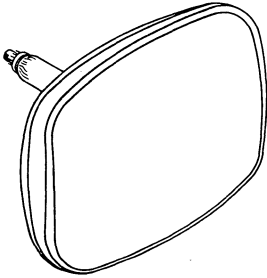
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# 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% Amperes
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. 2000 μμf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/16 x 15 1/16 Inches
Nominal Overall Length.....	14 3/16 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

### 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 <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 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:

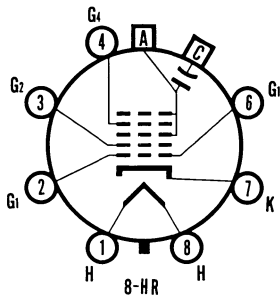
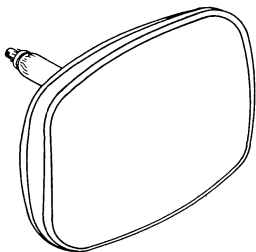
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21DEP4A

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

- |                             |                          |
|-----------------------------|--------------------------|
| 21" Direct Viewed           | Aluminized Screen        |
| Lightweight Tube            | 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
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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/16 x 15 1/16 Inches
Minimum Useful Screen Area.....	262 Square Inches
Overall Length.....	14 1/16 Inches
Neck Length.....	5 1/16 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Bulb.....	J171 G1 or Equivalent
Base.....	B7-183
Basing.....	8HR
Weight (approx.).....	20 Pounds

### 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 <sup>3</sup> .....	-35 to -72 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

111-5-7-60

## SYLVANIA TYPE 21DEP4A (Cont'd)

### 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.
4. Type 21DEP4A is identical to Type 21DEP4 except 21DEP4A has an anode voltage rating of 22,000 volts (Design Maximum) versus an anode voltage rating of 19,800 for Type 21DEP4.

### 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.

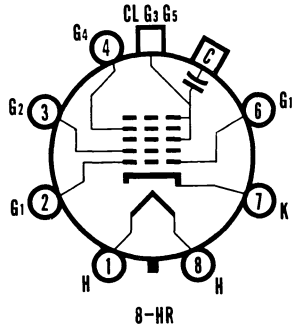
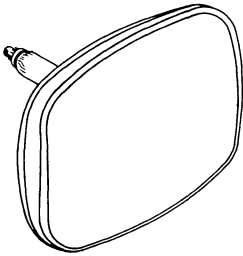


# SYLVANIA TYPE 21DKP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

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



## 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.....	0.30 ± 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. 1700 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/16 x 15 1/16 Inches
Nominal Overall Length.....	14 1/16 Inches
Minimum Useful Screen Area.....	262 Square Inches
Bulb.....	J171-G1 or Equivalent
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-183
Basing.....	8HR
Weight (approx.).....	20 Pounds

### 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 <sup>3</sup> .....	-35 to -72 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 21DKP4 (Cont'd)

### 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.

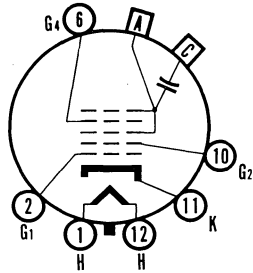
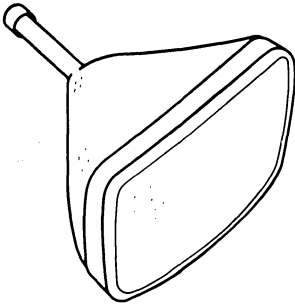
# SYLVANIA TYPE 21DLP4

## Silver Screen "85"

### TELEVISION PICTURE TUBE

21" Direct Viewed  
 Rectangular Glass Type  
 Spherical Faceplate  
 Gray Filter Glass  
 Electrostatic Focus

No Ion Trap  
 90° Magnetic Deflection  
 External Conductive Coating  
 Aluminized Screen  
 Short Neck Tube



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 μμf
Grid No. 1 to All Other Electrodes.....	6 μμf
External Conductive Coating to Anode <sup>2</sup> .....	2500 μμf Max. 2000 μμf Min.

#### MECHANICAL DATA

Minimum Useful Screen Dimensions	
(Maximum Assured).....	19 <sup>1</sup> / <sub>16</sub> x 15 <sup>1</sup> / <sub>16</sub> Inches
Minimum Useful Screen Area.....	262 Sq. Inches
Bulb.....	J171D or J171E
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63 or B6-203
Basing.....	12L
Weight (approx.).....	22 <sup>1</sup> / <sub>2</sub> Pounds

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	18,000 Volts d c
Grid No. 4 Voltage.....	0 to 400 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 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.

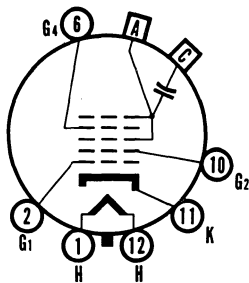
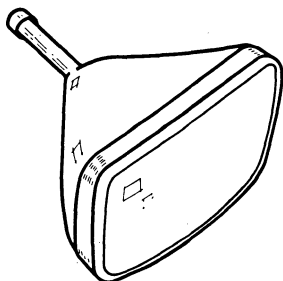
# SYLVANIA TYPE 21DQP4

Silver Screen "85"

## TELEVISION PICTURE TUBE

21" Direct Viewed  
Rectangular Glass Type  
Spherical Faceplate  
Gray Filter Glass  
Electrostatic Focus

No Ion Trap  
90° Magnetic Deflection  
External Conductive Coating  
Aluminized Screen  
5" Neck Length



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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/16 x 15 1/16 Inches
Nominal Overall Length.....	17 1/2 Inches
Minimum Useful Screen Area.....	262 Square Inches
Bulb.....	J171D or J171E
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63 or B6-203
Basing.....	12L
Weight (approx.).....	22 1/2 Pounds

### 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 <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 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:

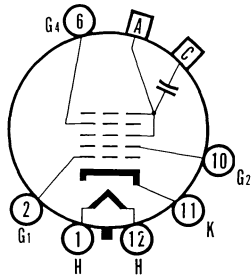
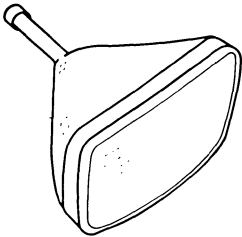
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21DQP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

21" Direct Viewed	No Ion Trap
Rectangular Glass Type	90° Magnetic Deflection
Spherical Faceplate	External Conductive Coating
Gray Filter Glass	Aluminized Screen
Electrostatic Focus	5 Inch Neck Length



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 μf
Grid No. 1 to All Other Electrodes.....	6 μf
External Conductive Coating to Anode <sup>2</sup> .....	2500 μf Max. 2000 μf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/16 x 15 1/16 Inches
Minimum Useful Screen Area.....	262 Square Inches
Nominal Overall Length.....	17 1/2 Inches
Bulb.....	J171D or J171E
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63 or B6-203
Basing.....	12L
Weight (approx.).....	22 1/2 Pounds

### 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 <sup>3</sup> .....	-35 to -72 Volts d c

### CIRCUIT VALUES

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

## SYLVANIA TYPE 21DQP4 (Cont'd)

### 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:

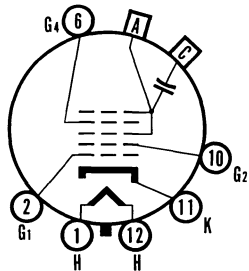
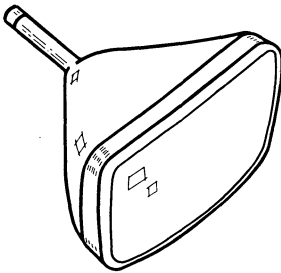
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21DSPA4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

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



12-L

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	85 Degrees
Diagonal.....	90 Degrees
Vertical.....	68 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/16 x 15 1/16 Inches
Minimum Useful Screen Area.....	262 Square Inches
Neck Length.....	5 1/2 Inches
Overall Length.....	18 Inches
Bulb.....	J171D or J171E
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63 or B6-203
Basing.....	12L
Weight.....	23 Pounds

### TYPICAL OPERATING CONDITIONS

#### Cathode Drive Service<sup>3</sup>

Anode Voltage.....	16,000 Volts d c
Grid No. 4 Voltage for Focus.....	0 to 400 Volts d c
Grid No. 2 Voltage.....	50 Volts d c
Cathode Voltage for Cutoff <sup>4</sup> .....	+32 to +47 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

111-5-7-60

## SYLVANIA TYPE 21DSP4 (Cont'd)

### 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. Voltages shown are with respect to Grid No. 1 Voltage unless otherwise indicated.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more positive.

### 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.

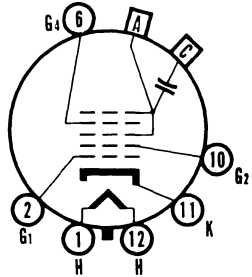
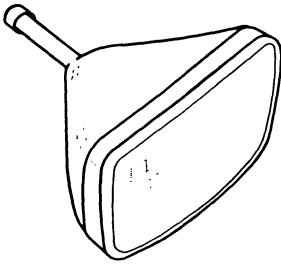


# SYLVANIA TYPE 21ENP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

21" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	Single Field Ion Trap
Spherical Faceplate	External Conductive Coating
Gray Filter Glass	Aluminized Screen
90° Magnetic Deflection	6.3 Volt, 300 Ma Heater



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.).....	75 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.30 ± 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. 2000 μμf Min.
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	19 1/8 x 15 1/8 Inches
Nominal Overall Length.....	19 Inches
Minimum Useful Screen Area.....	262 Square Inches
Bulb.....	J171D or J171E
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L
Weight (approx.).....	22 1/2 Pounds

### 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> .....	-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.
------------------------------------	------------------

SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 21ENP4 (Cont'd)

### 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.
4. For JEDEC 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  $\pm 3$  gauss.

### WARNING:

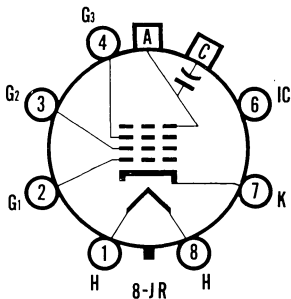
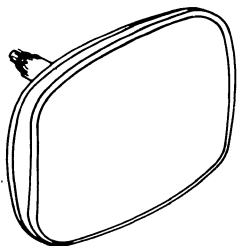
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21EQP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

21" Direct Viewed	Tri-Potential Electrostatic Focus
Rectangular Glass Type	110° Magnetic Deflection
Spherical Faceplate	No Ion Trap
Gray Filter Glass	External Conductive Coating
Aluminized Screen	Short Neck



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Tri-Potential 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.).....	75 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height.....	15 <sup>1</sup> / <sub>16</sub> Inches
Width.....	19 <sup>1</sup> / <sub>16</sub> Inches
Diagonal.....	20 <sup>1</sup> / <sub>4</sub> Inches
Area.....	262 Square Inches
Neck Length.....	3 <sup>3</sup> / <sub>16</sub> ± <sup>1</sup> / <sub>8</sub> Inches
Nominal Overall Length.....	12 <sup>2</sup> / <sub>16</sub> Inches
Bulb.....	J171H or J171J
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JR
Weight (approx.).....	21 Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	16,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-43 to -78 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 21EQP4 (Cont'd)

### 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. Brightness and resolution improve with increase in Grid No. 2 voltage. A minimum value of 400 volts is recommended.
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.

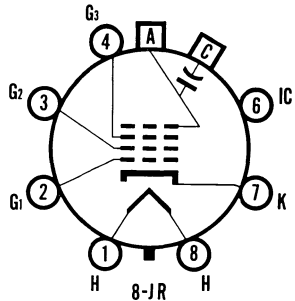
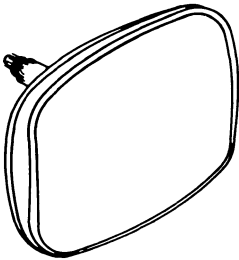
# SYLVANIA TYPE 21ERP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

21" Direct Viewed  
 Rectangular Glass Type  
 Spherical Faceplate  
 Integral Safety Plate  
 Gray Filter Glass  
 Frosted Face

Aluminized Screen  
 Tri-Potential Electrostatic Focus  
 110° Magnetic Deflection  
 No Ion Trap  
 External Conductive Coating  
 Short Neck



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Tri-Potential 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
Gray Filter Glass Safety Plate Laminated Directly to Face of Tube	
Light Transmittance of Faceplate Assembly (approx.).....	40 Percent
Safety Plate Surface Frosted to Reduce Specular Reflection	

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 5% Ampere
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> .....	2000 μf Max. 1500 μf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	15 1/16 Inches
Width.....	19 1/16 Inches
Diagonal.....	20 1/4 Inches
Area.....	262 Square Inches
Neck Length.....	3 3/16 ± 1/16 Inches
Overall Length.....	12 1/2 ± 1/16 Inches
Bulb.....	J171H or J171J
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JR
Weight (approx.).....	27 Pounds

SYLVANIA ELECTRONIC TUBES

# SYLVANIA TYPE 21ERP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	16,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-43 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. Brightness and resolution improve with increase in Grid No. 2 voltage. A minimum value of 400 volts is recommended.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

## WARNING:

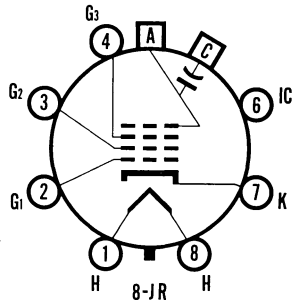
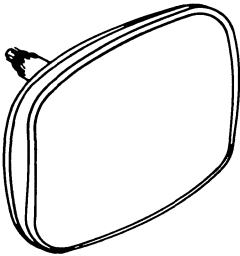
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21EXP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

21" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	110° Magnetic Deflection
Spherical Faceplate	No Ion Trap
Gray Filter Glass	External Conductive Coating
Aluminized Screen	Short Neck
Tri-Potential	6.3 Volt, 300 Ma Heater



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Tri-Potential 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.).....	75 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.30 ± 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	15 <sup>1</sup> / <sub>16</sub> Inches
Width.....	19 <sup>1</sup> / <sub>16</sub> Inches
Diagonal.....	20 <sup>1</sup> / <sub>4</sub> Inches
Area.....	262 Square Inches
Neck Length.....	3 <sup>3</sup> / <sub>16</sub> ± <sup>1</sup> / <sub>8</sub> Inches
Overall Length.....	12 <sup>3</sup> / <sub>16</sub> ± <sup>5</sup> / <sub>16</sub> Inches
Bulb.....	J171H or J171J
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JR
Weight (approx.).....	21 Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	16,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-43 to -78 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 21EXP4 (Cont'd)

### 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. Brightness and resolution improve with increase in Grid No. 2 voltage. A minimum value of 400 volts is recommended.
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.

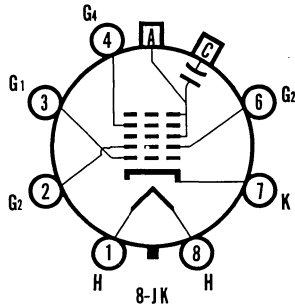
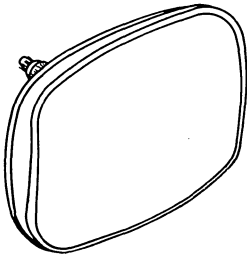


# SYLVANIA TYPE 21EVP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

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



## 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.)	75.5 Percent

### ELECTRICAL DATA

Heater Voltage	2.68 ± 10% Volts
Heater Current	0.45 Ampere
Heater Warm-up Time <sup>1</sup>	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	3.65 μmf
Grid No. 1 to All Other Electrodes	4.15 μmf
External Conductive Coating to Anode <sup>2</sup>	2000 μmf Max. 1500 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	19 1/16 x 15 1/16 Inches
Minimum Useful Screen Area	262 Square Inches
Neck Length	3 1/16 ± 1/16 Inches
Overall Length	12 5/16 ± 1/4 Inches
Bulb	J171-G1 or Equivalent
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base	B7-208
Basing	8JK

### TYPICAL OPERATING CONDITIONS

<b>Grid Drive Service</b>	
Anode Voltage	16,000 Volts d c
Grid No. 4 Voltage for Focus	+100 to +500 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

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPE 21EVP4 (Cont'd)

## Cathode Drive Service

Anode Voltage.....	16,000 Volts
Grid No. 4 Voltage for Focus.....	+150 to +550 Volts
Grid No. 2 Voltage.....	300 Volts
Grid No. 1 Voltage.....	0 Volts
Cathode Voltage.....	+34 to +60 Volts

## 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 five volts more negative.

## WARNING:

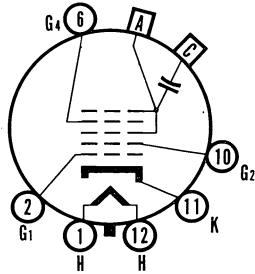
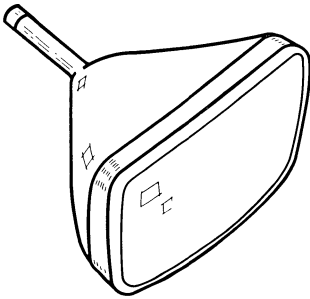
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 21EYP4

## SPECIAL PURPOSE TUBE

### Television Monitor Tube

21" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	No Ion Trap
Spherical Faceplate	High Resolution
Gray Filter Glass	Aluminized Screen
Magnetic Deflection	Low Voltage



12-L

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angle (approx.)	
Horizontal.....	67 Degrees
Diagonal.....	72 Degrees
Phosphor.....	P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	75 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 ± 10% Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	6.5 μmf

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	19 1/8 x 15 Inches
Minimum Useful Screen Area.....	262 Square Inches
Neck Length.....	7 1/2 Inches
Overall Length.....	23 1/32 Inches
Bulb.....	J171B1/F1
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

## RATINGS

### MAXIMUM RATINGS (Design Maximum Values)

Anode Voltage.....	22,000 Volts d c
Grid No. 4 (Focusing Electrode) Voltage.....	800 Volts d c
Grid No. 2 Voltage.....	700 Volts d c
Grid No. 1 Voltage	
Negative Bias Value.....	180 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.....	450 Volts
After Equipment Warm-up Period.....	200 Volts
Heater Positive with Respect to Cathode.....	200 Volts

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPE 21EYP4 (Cont'd)

## RECOMMENDED OPERATING CONDITIONS

Anode Voltage.....	18,000 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 <sup>1</sup> .....	-28 to -72 Volts d c

## CIRCUIT VALUES

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

## NOTE:

1. Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about five 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.

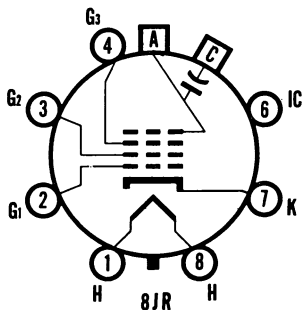
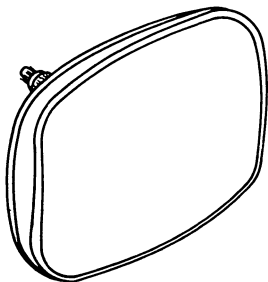
# SYLVANIA TYPE 21FAP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

21" Direct Viewed	Aluminized Screen
Rectangular Glass Type	Tri-Potential Electrostatic Focus
Spherical Faceplate	110° Magnetic Deflection
Gray Filter Glass	External Conductive Coating
Lightweight Tube	Short Neck

No Ion Trap



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Tri-Potential 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.....	0.60 ± 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height.....	15 1/16 Inches
Width.....	19 1/16 Inches
Diagonal.....	20 3/4 Inches
Area.....	262 Square Inches
Neck Length.....	3 9/16 ± 1/8 Inches
Overall Length.....	12 5/16 ± 5/16 Inches
Bulb.....	J171G or J171K
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JR
Weight (approx.).....	20 Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	16,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-43 to -78 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

111-4-3-60

## SYLVANIA TYPE 21FAP4 (Cont'd)

### 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. Brightness and resolution improve with increase in Grid No. 2 voltage. A minimum value of 400 volts is recommended.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about five volts more negative.

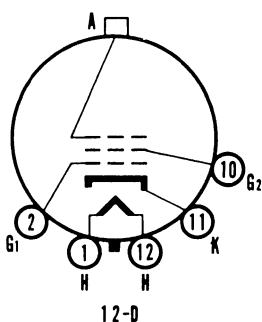
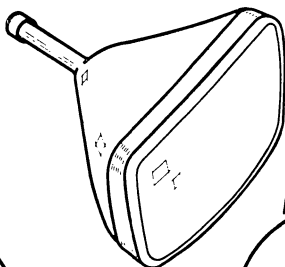
### WARNING:

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.

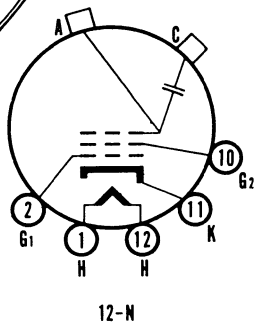
**SYLVANIA TYPE 21EP4**  
**21EP4A**  
**Silver Screen "85" → 21EP4B**

**TELEVISION PICTURE TUBE**

21" Direct Viewed                      Magnetic Deflection  
 Rectangular Glass Type              Magnetic Focus  
 Gray Filter Glass                      Cylindrical Faceplate  
    Single Field Ion Trap  
 21EP4A has an External Conductive Coating  
 21EP4B has an External Conductive Coating and  
    an Aluminized Screen



21EP4



21EP4A  
21EP4B

**CHARACTERISTICS**

**GENERAL DATA**

Focusing Method.....	Magnetic
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 $\mu\mu\text{f}$
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 13 $\frac{7}{8}$ Inches
Nominal Overall Length.....	23 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

# 21EP4, 21EP4A, 21EP4B (Cont'd)

## TYPICAL 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	Ma d c
Ion Trap Magnet Strength (approx.).....	35	Gausses

## 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 13 $\frac{7}{8}$  inch picture area.

## 21EP4A

The Sylvania Type 21EP4A is identical to Type 21EP4 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

## 21EP4B

The Sylvania 21EP4B is identical to Type 21EP4 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.

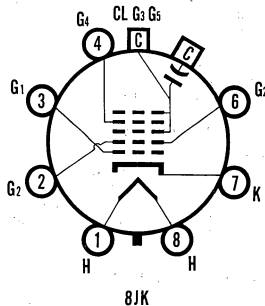
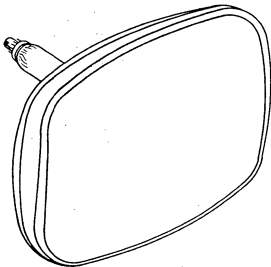
## SYLVANIA TYPE 21EP4 Silver Screen "85"

### TELEVISION PICTURE TUBE

21" Direct Viewed  
Rectangular Glass Type  
Lightweight Tube  
Spherical Faceplate  
Gray Filter Glass  
Aluminized Screen

Electrostatic Focus  
110° Magnetic Deflection  
1 $\frac{1}{8}$ " Neck Diameter  
No Ion Trap  
External Conductive Coating  
2.35 Volt, 600 Ma Heater

Extremely Short Tube



### CHARACTERISTICS

#### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic



# SYLVANIA TYPE 21EAP4 (Cont'd)

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.....	2.35 Volts
Heater Current.....	0.6 ± 10% Ampere
Heater Warm-up Time <sup>1</sup> .....	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	3.5 μμf
Grid No. 1 to All Other Electrodes.....	4.0 μμf
External Conductive Coating to Anode <sup>2</sup> .....	2000 μμf Max. 1500 μμf Min.

## MECHANICAL DATA

Minimum Useful Screen Dimensions	
(Maximum Assured).....	19 <sup>1</sup> / <sub>16</sub> x 15 <sup>1</sup> / <sub>16</sub> Inches
Nominal Overall Length.....	12 <sup>5</sup> / <sub>16</sub> Inches
Minimum Useful Screen Area.....	262 Sq. Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Bulb.....	J171G or J171K
Base.....	B7-208
Basing.....	8JK
Weight (approx.).....	20 Pounds

## TYPICAL OPERATING CONDITIONS

### Cathode Drive Service<sup>3</sup>

Anode Voltage.....	16,000 Volts d c
Grid No. 4 Voltage for Focus.....	150 to 550 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Cathode Voltage required for Cutoff <sup>5</sup> .....	+34 to +60 Volts d c

### Grid Drive Service<sup>4</sup>

Anode Voltage.....	16,000 Volts d c
Grid No. 4 Voltage for Focus.....	100 to 500 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage required for Cutoff <sup>5</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 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. Voltages are positive with respect to Grid No. 1 unless indicated otherwise.
4. Voltages are positive with respect to Cathode unless indicated otherwise.
5. Visual extinction of focused raster. For cutoff of the undeflected focused spot, the absolute value of the bias between cathode and grid will increase by about 5 volts.

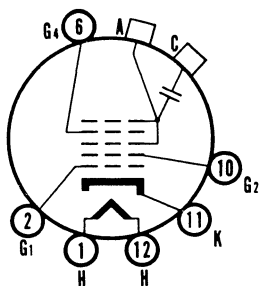
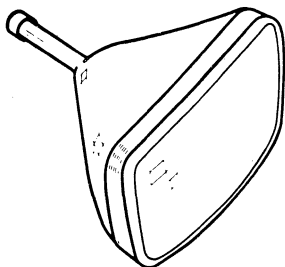
## WARNING:

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**

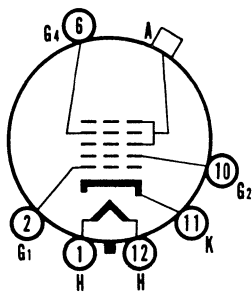
**TELEVISION PICTURE TUBE**

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 μμf
Grid No. 1 to All Other Electrodes.....	6 μμf
Ion Trap Magnet.....	External, Single Field Type

**MECHANICAL DATA**

Minimum Useful Screen Dimensions.....	19 1/8 x 13 7/8 Inches
Nominal Overall Length.....	23 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12M

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

## TYPICAL 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.).....	35	Gausses

## CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5	Megohms 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 $\mu\mu\text{f}$
Minimum.....	500 $\mu\mu\text{f}$
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 $\mu\mu\text{f}$
Minimum.....	500 $\mu\mu\text{f}$
Basing.....	12L

## WARNING

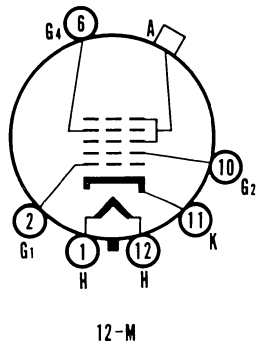
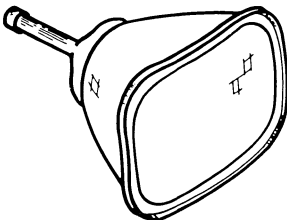
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# 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



## 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

# 21MP4 (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 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\text{mf}$
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	18 $\frac{1}{8}$ x 13 $\frac{1}{16}$ Inches
Nominal Overall Length.....	22 $\frac{1}{4}$ Inches
Bulb Contact.....	Metal Cone Lip
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12M

## TYPICAL 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

## CIRCUIT VALUES

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

## NOTE:

1. Visual extinction of undeflected focused spot.

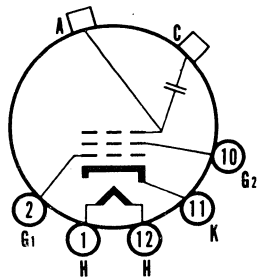
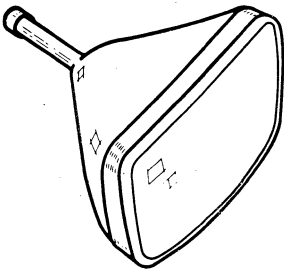
## WARNING

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	



12-N

## 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

# 21WP4, 21WP4A (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> .....	750 $\mu\text{f}$ Max
	500 $\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	17 x 12 $\frac{3}{4}$ Inches
Nominal Overall Length.....	22 $\frac{7}{16}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

## TYPICAL 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 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

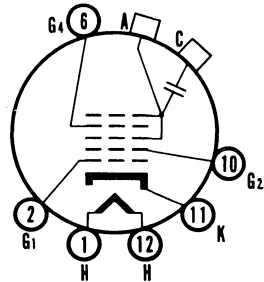
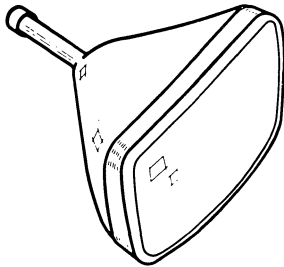
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# 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	



12-L

### 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 <sup>1</sup> .....	2500 $\mu\mu\text{f}$ Max
	2000 $\mu\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	17 x 12 $\frac{3}{4}$ Inches
Nominal Overall Length.....	22 $\frac{7}{16}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

#### TYPICAL 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 <sup>2</sup> .....	-28 to -72 Volts d c
Ion Trap Magnet Strength (approx.).....	35 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.

### 21XP4A

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

#### WARNING

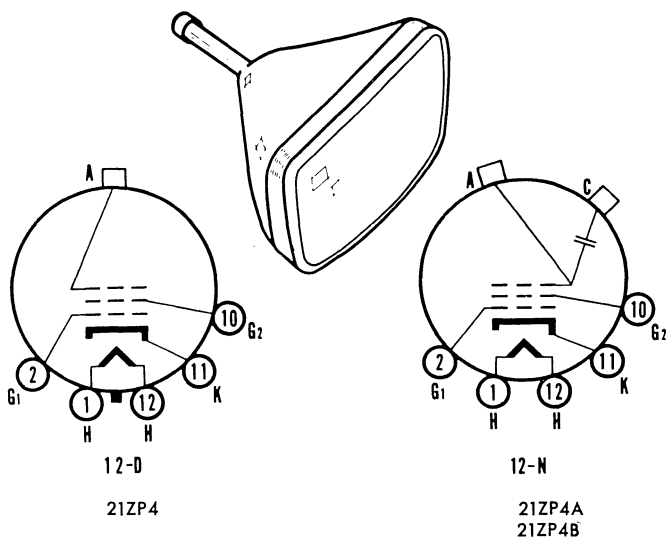
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

**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



**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 Amperes
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
Nominal Overall Length.....	23 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

**TYPICAL OPERATING CONDITIONS**

Anode Voltage.....	16000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff1.....	-28 to -72 Volts d c
Focusing Coil Current (approx.)2.....	.95 $\pm$ 20% Ma d c
Ion Trap Magnet Strength (approx.).....	35 Gauss

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

## 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  $19\frac{1}{8} \times 14\frac{3}{16}$  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.

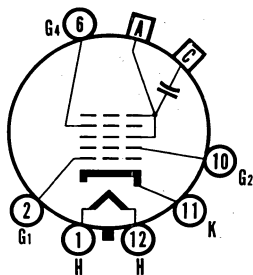
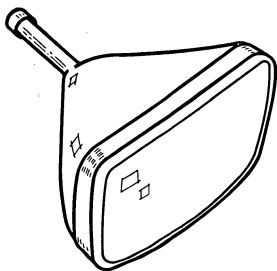
# SYLVANIA TYPES 24AEP4, 24ASP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

24" Direct Viewed  
Rectangular Glass Type  
Spherical Faceplate  
Gray Filter Glass  
Aluminized Screen

Electrostatic Focus  
90° Magnetic Deflection  
Short Neck Tube  
No Ion Trap  
External Conductive Coating



## 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

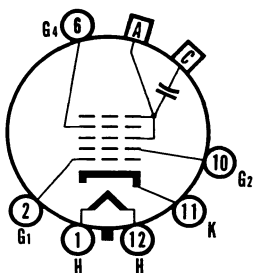
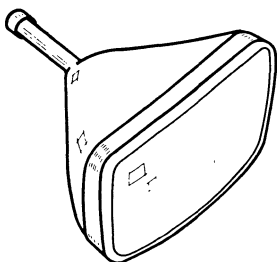


# SYLVANIA TYPE 23ACP4 23TP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

23" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	No Ion Trap
Spherical Faceplate	External Conductive Coating
Gray Filter Glass	Aluminized Screen
90° Magnetic Deflection	Bonded Shield



12-L

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)*	
Horizontal.....	76 Degrees
Diagonal.....	87 Degrees
Vertical.....	62 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.).....	40 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	15 1/4 Inches
Width.....	19 5/16 Inches
Diagonal.....	22 7/16 Inches
Area.....	282 Square Inches
Neck Length.....	5 1/2 ± 3/16 Inches
Overall Length.....	19 11/32 ± 7/16 Inches
Bulb.....	C187 Exp. No. 2
Safety Plate.....	FP198A or Equiv.
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-63
Basing.....	12L
Weight (approx.).....	35 Pounds

\* Diagonal Deflection Angle is equal to that of earlier registered 21" tubes generally known as 90 degree types. Horizontal and vertical deflection angles are less.

# SYLVANIA TYPES 23ACP4, 23TP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS (Grid Drive Service)

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 <sup>2</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 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:

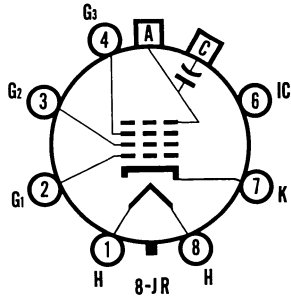
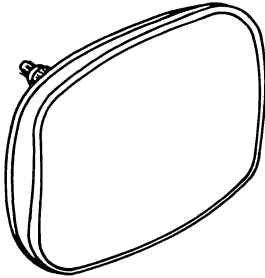
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 23AKP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

23" Direct Viewed	114° Magnetic Deflection
Rectangular Glass Type	Short Neck
Spherical Faceplate	No Ion Trap
Gray Filter Glass	External Conductive Coating
Aluminized Screen	Tri-Potential Electrostatic Focus



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Tri-Potential Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	102 Degrees
Diagonal.....	114 Degrees
Vertical.....	86 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	78 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	15 1/8 Inches
Width.....	19 1/4 Inches
Diagonal.....	22 3/8 Inches
Area.....	282 Square Inches
Neck Length.....	3 3/8 ± 1/8 Inches
Overall Length.....	12 3/8 ± 3/8 Inches
Bulb.....	J187B
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JR
Weight (approx.).....	25 Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	16,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-43 to -78 Volts d c

### CIRCUIT VALUES

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

SYLVANIA ELECTRONIC TUBES

111-6-1-61

## SYLVANIA TYPE 23AKP4 (Cont'd)

### 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. Brightness and resolution improve with increase in Grid No. 2 Voltage. A minimum value of 400 volts is recommended.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

### WARNING:

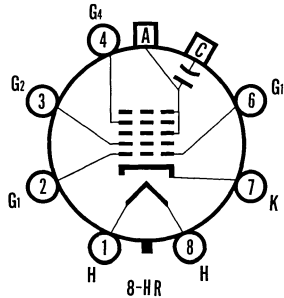
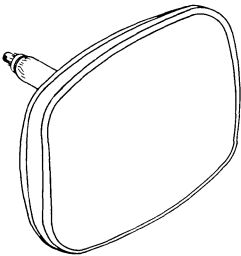
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 23CP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

23" Direct Viewed	No Ion Trap
Rectangular Glass Type	110° Magnetic Deflection
Spherical Faceplate	External Conductive Coating
Gray Filter Glass	Aluminized Screen
Electrostatic Focus	Bonded Shield



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	99 Degrees
Diagonal.....	110 Degrees
Vertical.....	82 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.).....	40 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height.....	15 1/4 Inches
Width.....	19 3/16 Inches
Diagonal.....	22 3/16 Inches
Area.....	282 Square Inches
Neck Length.....	5 1/8 ± 1/8 Inches
Overall Length.....	15 3/16 ± 3/8 Inches
Bulb.....	J187A or Equiv.
Safety Plate.....	FP198A or Equiv.
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8HR
Weight (approx.).....	32 1/2 Pounds

# SYLVANIA TYPE 23CP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS (Grid Drive Service)

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 <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 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:

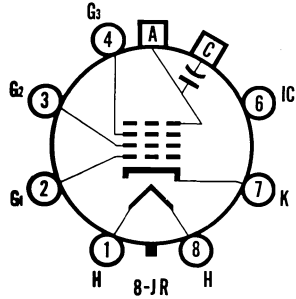
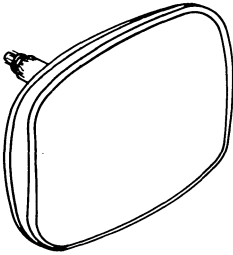
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 23DP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

23" Direct Viewed	Aluminized Screen
Rectangular Glass Type	Tri-Potential Electrostatic Focus
Spherical Faceplate	110° Magnetic Deflection
Gray Filter Glass	External Conductive Coating
Bonded Shield	Short Neck
No Ion Trap	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method	Tri-Potential Electrostatic
Deflection Method	Magnetic
Deflection Angles (approx.)	
Horizontal	99 Degrees
Diagonal	110 Degrees
Vertical	82 Degrees
Phosphor	Aluminized P4
Fluorescence	White
Persistence	Short to Medium
Faceplate	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.)	40 Percent

### ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.60 ± 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height	15¼ Inches
Width	19⅞ Inches
Diagonal	22⅞ Inches
Area	282 Square Inches
Neck Length	3⅞ ± ⅛ Inches
Overall Length	13⅜ ± ⅜ Inches
Bulb	J187A or Equiv.
Safety Plate	FP198A or Equiv.
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base	B7-208
Basing	8JR
Weight (approx.)	32½ Pounds

SYLVANIA ELECTRONIC TUBES

111-3-11-59

# SYLVANIA TYPE 23DP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	16,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-43 to -78 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. Brightness and resolution improve with increase in Grid No. 2 Voltage. A minimum value of 400 volts is recommended.
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.

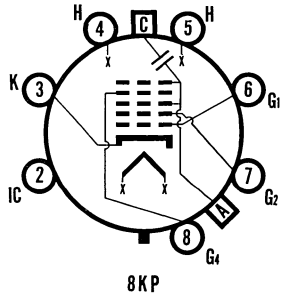
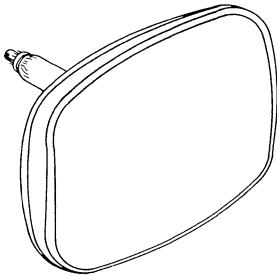


# SYLVANIA TYPE 23EP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

23" Direct Viewed	Rectangular Glass Type
Spherical FacePlate	Bonded Shield
Gray Filter Glass	Aluminized Screen
Neck Length 5 1/8"	Electrostatic Focus
110° Magnetic Deflection	No Ion Trap
External Conductive Coating	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	99 Degrees
Diagonal.....	110 Degrees
Vertical.....	82 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Grey Filter Glass Safety Plate Laminated	
Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly	
(approx.).....	40 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 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.
	1700 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions	
(Maximum Assured)	
Height.....	15 1/4 Inches
Width.....	19 5/16 Inches
Diagonal.....	22 5/16 Inches
Area.....	282 Square Inches
Neck Length.....	5 1/8 Inches
Overall Length.....	15 5/16 Inches
Bulb.....	J187A or Equivalent
Safety Plate.....	FP198A or Equivalent
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-219
Basing.....	8KP
Weight (approx.).....	32 1/2 Pounds

# SYLVANIA TYPE 23EP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS

### (Cathode Drive Service)<sup>3</sup>

Anode Voltage.....	16,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	50 Volts d c
Cathode Voltage Required for Cutoff <sup>4</sup> .....	+32 to +47 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. Voltages are positive with respect to Grid No. 1 unless indicated otherwise.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more positive.

## WARNING:

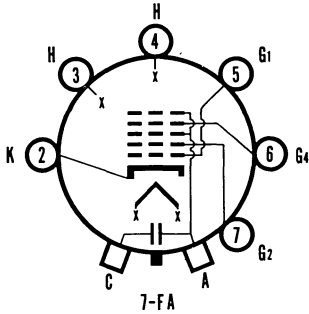
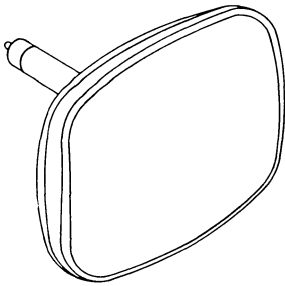
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 23JP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

Electrostatic Focus	Spherical Faceplate
23" Direct Viewed	Rectangular Glass Type
110° Magnetic Deflection	Bonded Shield
Gray Filter Glass	Aluminized Screen
No Ion Trap	External Conductive Coating
Low Grid No. 2 Voltage	6.3 Volt, 450 Ma Heater



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	99 Degrees
Diagonal.....	110 Degrees
Vertical.....	82 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.).....	40 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.45 ± 5% Ampere
Maximum Heater Voltage Range <sup>1</sup> .....	5.8 - 7.0 Volts
Heater Warm-up Time <sup>2</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>3</sup> .....	2500 μmf
	2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height.....	15 1/4 Inches
Width.....	19 5/16 Inches
Diagonal.....	22 5/16 Inches
Area.....	282 Square Inches
Neck Length.....	5 3/8 Inches
Overall Length.....	15 7/16 Inches
Bulb.....	J187A1 or Equiv.
Safety Plate.....	FP198A1 or Equiv.
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-214
Basing.....	7FA
Weight (approx.).....	32 1/2 Pounds

# SYLVANIA TYPE 23JP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS (Cathode Drive Service)<sup>4</sup>

Anode Voltage.....	16,000 Volts d c
Grid No. 4 Voltage for Focus <sup>5,6</sup> .....	250 Volts d c
Grid No. 2 Voltage.....	50 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>7</sup> .....	+35 to +50 Volts d c

## CIRCUIT VALUES

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

## NOTES:

1. Design-Maximum Values.
2. 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 (3) times the rated heater voltage divided by the rated heater current.
3. External conductive coating must be grounded.
4. Unless otherwise specified, voltages are positive and measured with respect to Grid No. 1.
5. With the combined Grid No. 1 bias voltage and video signal voltage adjusted to give an anode current of 50  $\mu$ a on a  $19\frac{3}{8} \times 15\frac{1}{4}$  pattern from an RCA 2F21 monoscope or equivalent.
6. Individual tubes will have satisfactory focus at some value between 0 and 500 volts.
7. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more positive.

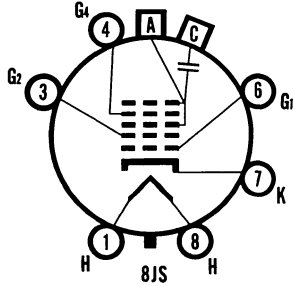
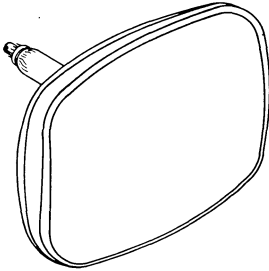
## WARNING:

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 TYPES 23KP4 23KP4A

## TELEVISION PICTURE TUBE

23" Direct Viewed	Aluminized Screen
No Ion Trap	Electrostatic Focus
Rectangular Glass Type	114° Magnetic Deflection
Spherical Faceplate	1 1/8" Neck Diameter
Gray Filter Glass	External Conductive Coating



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	102 Degrees
Diagonal.....	114 Degrees
Vertical.....	84 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 μμf
Grid No. 1 to All Other Electrodes.....	6 μμf
External Conductive Coating to Anode <sup>2</sup> .....	2500 μμf Max. 2000 μμf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	15 1/4 Inches
Width.....	19 1/4 Inches
Diagonal.....	22 1/16 Inches
Minimum Useful Screen Area.....	278 Square Inches
Neck Length.....	4 1/16 ± 3/16 Inches
Overall Length.....	13 3/16 ± 3/16 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-226
Basing.....	8JS

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

	23KP4	23KP4A
Anode Voltage.....	16,500	18,000 Volts d c
Grid No. 4 Voltage for Focus.....	0 to 500	0 to 500 Volts d c
Grid No. 2 Voltage.....	450	450 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>3</sup> .....	-28 to -72	-28 to -72 Volts d c

### CIRCUIT VALUES

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

## SYLVANIA TYPES 23KP4, 23KP4A (Cont'd)

### 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:

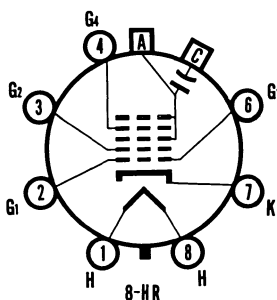
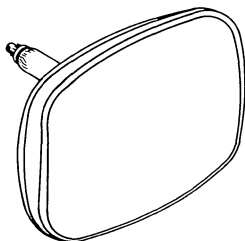
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPES 23MP4 23ALP4 23AMP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

Electrostatic Focus	Spherical Faceplate
23" Direct Viewed	Rectangular Glass Type
114° Magnetic Deflection	1 1/8" Neck Diameter
Gray Filter Glass	Aluminized Screen
No Ion Trap	External Conductive Coating
23MP4: EF = 6.3V @ 600 Ma.	23ALP4: EF = 6.3V @ 450 Ma.
23AMP4: EF = 6.3V @ 300 Ma.	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	100 Degrees
Diagonal.....	114 Degrees
Vertical.....	83 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Gray Filter Glass
Light Transmittance (approx.).....	75 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current	
23MP4.....	0.6 ± 5% Ampere
23ALP4.....	0.45 ± 5% Ampere
23AMP4.....	0.30 ± 5% Ampere
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. 1700 μf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	14 7/8 Inches
Width.....	19 1/16 Inches
Diagonal.....	22 1/4 Inches
Minimum Useful Screen Area.....	276 Square Inches
Neck Length.....	5 1/8 ± 1/8 Inches
Overall Length.....	14 3/8 ± 3/16 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Bulb.....	J187B
Base.....	B7-208
Basing.....	8HR
Weight (approx.).....	25 Pounds

SYLVANIA ELECTRONIC TUBES

111-6-1-61

# SYLVANIA TYPES 23MP4, 23ALP4, 23AMP4

(Continued)

## TYPICAL OPERATING CONDITIONS (Grid Drive Service)

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 <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 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.

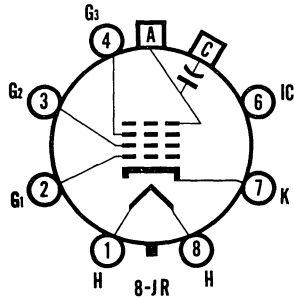
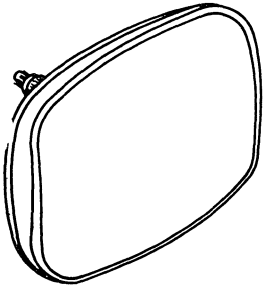


# SYLVANIA TYPE 23RP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

23" Direct Viewed	Electrostatic Focus
Rectangular Glass Type	110° Magnetic Deflection
Spherical Faceplate	No Ion Trap
Gray Filter Glass	External Conductive Coating
Aluminized Screen	Short Neck
Tri-Potential	6.3 Volt, 300 Ma Heater
	Bonded Shield



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Tri-Potential Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	99 Degrees
Diagonal.....	110 Degrees
Vertical.....	82 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.).....	40 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.30 ± 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	15 1/4 Inches
Width.....	19 5/16 Inches
Diagonal.....	22 3/8 Inches
Area.....	282 Square Inches
Neck Length.....	3 3/16 ± 1/8 Inches
Overall Length.....	13 5/8 ± 3/8 Inches
Bulb.....	J187A or Equiv.
Safety Plate.....	FP198A or Equiv.
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JR
Weight (approx.).....	32 1/2 Pounds

SYLVANIA ELECTRONIC TUBES

111-4-3-60

# SYLVANIA TYPE 23RP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	16,000 Volts d c
Grid No. 3 Voltage for Focus.....	0 to +400 Volts d c
Grid No. 2 Voltage <sup>3</sup> .....	500 Volts d c
Grid No. 1 Voltage Required for Cutoff <sup>4</sup> .....	-43 to -78 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. Brightness and resolution improve with increase in Grid No. 2 Voltage. minimum value of 400 volts is recommended.
4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about five volts more negative.

## WARNING:

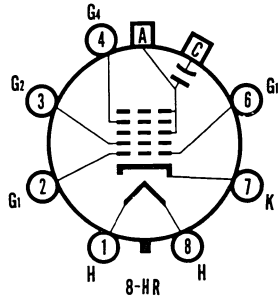
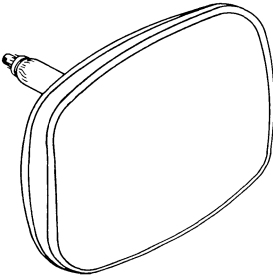
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 23SP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

23" Direct Viewed	Electrostatic Focus
110° Magnetic Deflection	Rectangular Glass Type
Spherical Faceplate	Bonded Shield
Gray Filter Glass	Aluminized Screen
No Ion Trap	External Conductive Coating
6.3 Volt, 300 Ma Heater	



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	99 Degrees
Diagonal.....	110 Degrees
Vertical.....	82 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.).....	40 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.30 ± 5% Ampera
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. 2000 μμf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height.....	15 1/4 Inches
Width.....	19 3/16 Inches
Diagonal.....	22 3/16 Inches
Area.....	282 Square Inches
Neck Length.....	5 1/8 ± 1/8 Inches
Overall Length.....	15 3/16 ± 3/8 Inches
Bulb.....	J187A or Equiv.
Safety Plate.....	FP198A or Equiv.
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8HR
Weight (approx.).....	32 1/2 Pounds

### TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage.....	16,000 Volts d c
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SYLVANIA ELECTRONIC TUBES

111-5-7-60

# SYLVANIA TYPE 23SP4 (Cont'd)

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 <sup>3</sup> .....	-35 to -72 Volts d c
<b>CIRCUIT VALUES</b>	
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.

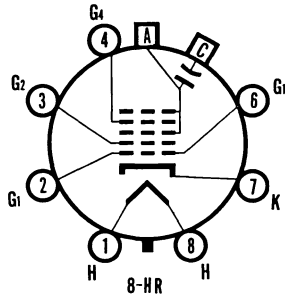
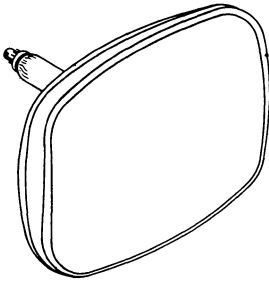
# SYLVANIA TYPE 23UP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

23" Direct Viewed	Electrostatic Focus
110° Magnetic Deflection	Rectangular Glass Type
Spherical Faceplate	Bonded Shield
Gray Filter Glass	Aluminized Screen
No Ion Trap	External Conductive Coating

6.3 Volt, 450 Ma Heater



## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	99 Degrees
Diagonal.....	110 Degrees
Vertical.....	82 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.).....	40 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.45 ± 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	
Height.....	15 1/4 Inches
Width.....	19 3/16 Inches
Diagonal.....	22 3/16 Inches
Area.....	282 Square Inches
Neck Length.....	5 1/8 ± 1/8 Inches
Overall Length.....	15 3/16 ± 3/8 Inches
Bulb.....	J187A or FP198A or Equiv.
Safety Plate.....	J1-21
Bulb Contact (Recessed Small Cavity Cap).....	B7-208
Base.....	8HR
Basing.....	32 1/2 Pounds
Weight (approx.).....	

SYLVANIA ELECTRONIC TUBES

111-5-7-60

# SYLVANIA TYPE 23UP4 (Cont'd)

## TYPICAL OPERATING CONDITIONS

### (Grid Drive Service)

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 <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 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:

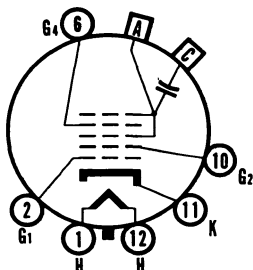
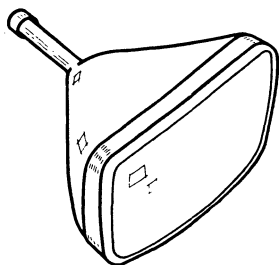
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPES 23XP4 23YP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

23XP4: Low Voltage	23YP4: High Voltage
23" Direct Viewed	Electrostatic Focus
92° Magnetic Deflection	Rectangular Glass Type
Spherical Faceplate	Bonded Shield
Gray Filter Glass	Aluminized Screen
No Ion Trap	External Conductive Coating



12-L

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflection Method.....	Magnetic
Deflection Angles (approx.)	
Horizontal.....	81 Degrees
Diagonal.....	92 Degrees
Vertical.....	66 Degrees
Phosphor.....	Aluminized P4
Fluorescence.....	White
Persistence.....	Short to Medium
Faceplate.....	Bonded Shield
(Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly (approx.).....	40 Percent

### ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.60 ± 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. 2000 μμf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Max. Assured)	
Height.....	15 1/4 Inches
Width.....	19 1/16 Inches
Diagonal.....	22 3/16 Inches
Area.....	282 Square Inches
Neck Length.....	5 1/2 ± 3/16 Inches
Overall Length.....	18 3/16 ± 1/16 Inches
Bulb.....	C187 Exp No. 6 or Equiv.
Safety Plate.....	FP198A or Equiv.
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-203
Basing.....	12L
Weight (approx.).....	34 1/2 Pounds

SYLVANIA ELECTRONIC TUBES

111-6-1-61

# SYLVANIA TYPES 23XP4, 23Y4 (Cont'd)

## TYPICAL OPERATING CONDITIONS (Grid Drive Service)

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 <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 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 TYPES 24AEP4, 24ASP4 (Cont'd)

## ELECTRICAL DATA

	24ASP4	24AEP4
Heater Voltage.....	6.3	6.3 Volts
Heater Current ( $\pm 5\%$ ).....	0.3	0.6 Ampere
Heater Warm-up Time <sup>1</sup> .....	11	11 Seconds
Direct Interelectrode Capacitances (approx.)		
Cathode to All Other Electrodes.....		5 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes.....		6 $\mu\text{mf}$
External Conductive Coating to Anode <sup>2</sup>	2500	2500 $\mu\text{mf}$ Max.
	1700	2000 $\mu\text{mf}$ Min.

## MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	21 $\frac{7}{16}$ x 16 $\frac{7}{8}$ Inches
Nominal Overall Length.....	19 $\frac{1}{8}$ Inches
Minimum Useful Screen Area.....	332 Sq. Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B6-63 or B6-203
Basing.....	12L

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	18,000 Volts d c
Grid No. 4 Voltage for Focus (24AEP4).....	-50 to +350 Volts d c
Grid No. 4 Voltage for Focus (24ASP4).....	0 to 400 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 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:

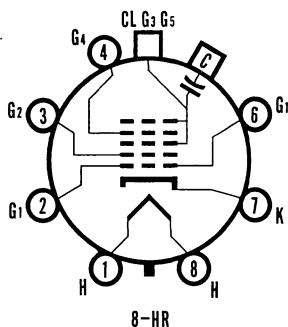
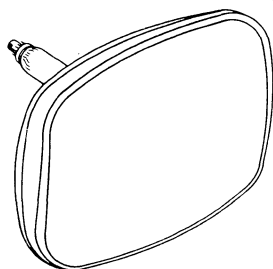
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPES 24AHP4, 24AXP4

## Silver Screen "85"

### TELEVISION PICTURE TUBE

24" Direct Viewed	Aluminized Screen
Rectangular Glass Type	Electrostatic Focus
Lightweight Tube	110° Magnetic Deflection
Spherical Faceplate	1 $\frac{1}{8}$ " Neck Diameter
Gray Filter Glass	No Ion Trap
External Conductive Coating	



# SYLVANIA TYPES 24AHP4, 24AXP4 (Cont'd)

## 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

	24AXP4	24AHP4
Heater Voltage.....	6.3	6.3 Volts
Heater Current ( $\pm 5\%$ ).....	0.3	0.6 Ampere
Heater Warm-up Time <sup>1</sup> .....		11 Seconds
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>2</sup> .....		2500 $\mu\text{f}$ Max. 1700 $\mu\text{f}$ Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured).....	21 $\frac{1}{16}$ x 16 $\frac{7}{8}$ Inches
Nominal Overall Length.....	15 $\frac{7}{8}$ 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 $\frac{1}{2}$ Pounds

### 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 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:

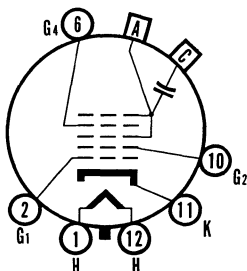
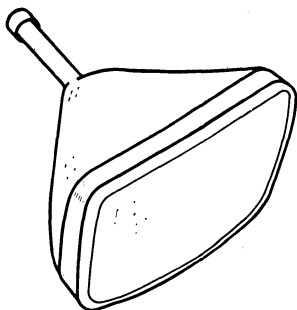
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 24AJP4

### TELEVISION PICTURE TUBE

24" Direct Viewed  
Rectangular Glass Type  
Spherical Faceplate  
Gray Filter Glass  
Aluminized Screen  
Electrostatic Focus

90° Magnetic Deflection  
Cathode Drive Design  
Low Grid No. 2 Voltage  
No Ion Trap  
Short Neck Tube  
External Conductive Coating



# SYLVANIA TYPE 24AJP4 (Cont'd)

## 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. 2000 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	21 $\frac{7}{16}$ x 16 $\frac{7}{8}$ Inches
Nominal Overall Length.....	19 $\frac{1}{8}$ Inches
Minimum Useful Screen Area.....	332 Sq. Inches
Bulb.....	J192A or J192B
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

### TYPICAL OPERATING CONDITIONS (Cathode Drive Service)<sup>3</sup>

Anode Voltage.....	18,000 Volts d c
Grid No. 4 Voltage for Focus.....	0 to 350 Volts d c
Grid No. 2 Voltage.....	50 Volts d c
Cathode Voltage for Cutoff <sup>4</sup> .....	35 to 50 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. This type is designed for cathode-drive service. Voltages shown are positive with respect to Grid No. 1 Voltage unless otherwise indicated.
4. For visual extinction of the undeflected focused spot.

### WARNING:

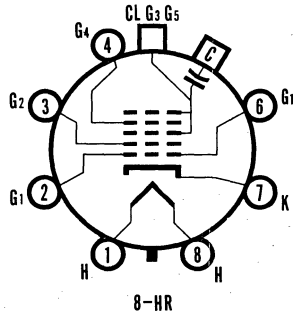
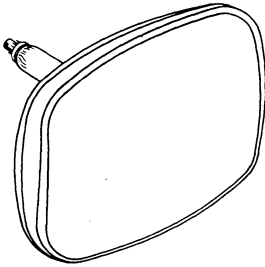
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

## SYLVANIA TYPE 24ALP4 *Silver Screen "85"*

### TELEVISION PICTURE TUBE

24" Direct Viewed	Aluminized Screen
Rectangular Glass Type	Electrostatic Focus
Lightweight Tube	110° Magnetic Deflection
Spherical Faceplate	1 $\frac{1}{8}$ " Neck Diameter
Gray Filter Glass	No Ion Trap
	External Conductive Coating

# SYLVANIA TYPE 24ALP4 (Cont'd)



## 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 μμf
Grid No. 1 to All Other Electrodes.....	6 μμf
External Conductive Coating to Anode <sup>2</sup> .....	2500 μμf Max. 2000 μμf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	217/16 x 167/8 Inches
Nominal Overall Length.....	157/8 Inches
Area.....	332 Sq. Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-183
Basing.....	8HR
Weight (approx.).....	27 Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	17,000 Volts d c
Grid No. 4 Voltage for Focus.....	0 to 500 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

### 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:

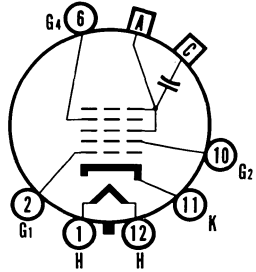
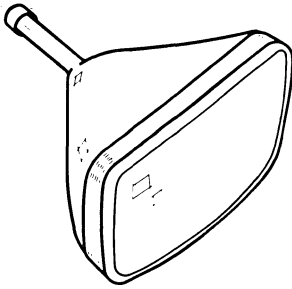
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 24ANP4

## Silver Screen "85"

### TELEVISION PICTURE TUBE

24" 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
Deflecting Method.....	Magnetic
Deflection Angle	
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. 1700 μmf Min.
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	21 <sup>7</sup> / <sub>16</sub> x 16 <sup>7</sup> / <sub>8</sub> Inches
Nominal Overall Length.....	20 <sup>7</sup> / <sub>8</sub> Inches
Minimum Useful Screen Area.....	332 Sq. Inches
Bulb.....	J192A or J192B
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

#### TYPICAL 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 <sup>3</sup> .....	-35 to -72 Volts d c
Ion Trap Magnet Current (Average) <sup>4</sup> .....	33 Ma d c
Field Strength of PM Ion Trap Magnet <sup>5</sup> .....	37 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 ±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.

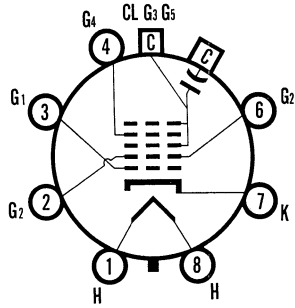
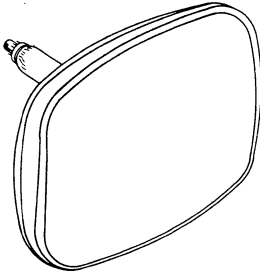
# SYLVANIA TYPE 24AVP4

## Silver Screen "85"

### TELEVISION PICTURE TUBE

24" Direct Viewed  
 Rectangular Glass Type  
 Short Tube  
 Spherical Faceplate  
 Gray Filter Glass  
 Aluminized Screen

Electrostatic Focus  
 110° Magnetic Deflection  
 1 1/8" Neck Diameter  
 No Ion Trap  
 External Conductive Coating  
 2.35 Volt, 600 Ma. Heater



8JK

### 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.....	2.35 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 μf
Grid No. 1 to All Other Electrodes.....	4 μf
External Conductive Coating to Anode <sup>2</sup> .....	2500 μf Max. 1700 μf Min.

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	217/16 x 167/8 Inches
Nominal Overall Length.....	1413/16 Inches
Area.....	332 Sq. Inches
Bulb.....	J192C or J192D
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base.....	B7-208
Basing.....	8JK
Weight (approx.).....	26 1/2 Pounds

#### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	16,000 Volts d c
Grid No. 4 Voltage for Focus.....	-100 to +300 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 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:

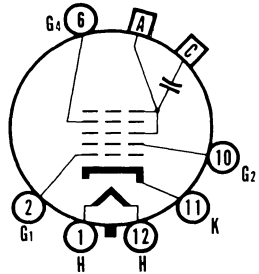
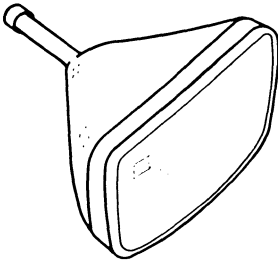
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# SYLVANIA TYPE 24AUP4

*Silver Screen "85"*

## TELEVISION PICTURE TUBE

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



12-L

## CHARACTERISTICS

### GENERAL DATA

Focusing Method.....	Electrostatic
Deflecting Method.....	Magnetic
Deflection Angle	
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. 1700 μmf Min.

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	21 7/16 x 16 7/8 Inches
Nominal Overall Length.....	18 1/8 Inches
Minimum Useful Screen Area.....	332 Square Inches
Bulb.....	J192A or J192B
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63 or B6-203
Basing.....	12L
Weight (approx.).....	32 1/2 Pounds

### TYPICAL OPERATING CONDITIONS

Anode Voltage.....	18,000 Volts d c
Grid No. 4 Voltage.....	-75 to +400 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.
------------------------------------	------------------

SYLVANIA ELECTRONIC TUBES

## SYLVANIA TYPE 24AUP4 (Cont'd)

### 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.

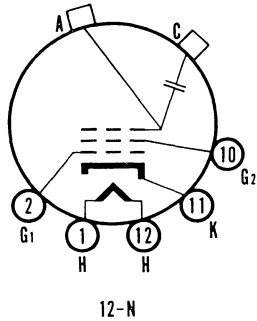
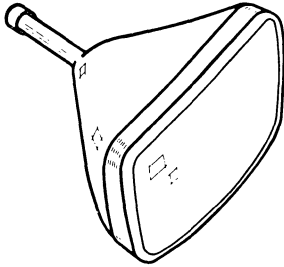


# SYLVANIA TYPE 24CP4, 24VP4 Silver Screen "85" → 24CP4A/24VP4A/ 24ADP4

## 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/24VP4A/24ADP4 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.).....	75 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 <sup>1</sup> .....	2500 $\mu$ f Max
	2000 $\mu$ f Min
Ion Trap Magnet.....	External, Single Field Type

### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	21 $\frac{7}{16}$ x 16 $\frac{7}{8}$ Inches
Nominal Overall Length.....	21 $\frac{1}{8}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

### TYPICAL 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> .....	-33 to -77 Volts d c
Focusing Coil Current (approx.) <sup>3</sup> .....	125 $\pm$ 20% Ma d c
Ion Trap Magnet Strength (approx.).....	36 Gauss

### CIRCUIT VALUES

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

### NOTES:

1. External conductive coating must be grounded.
2. Visual extinction of undeflected focused spot.
3. For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 21 $\frac{7}{16}$  x 16 $\frac{7}{8}$  inch picture area.

# 24CP4, 24VP4, 24CP4A/24VP4A/24ADP4 (Cont'd)

## 24CP4A/24VP4A/24ADP4

The Sylvania Type 24CP4A/24VP4A/24ADP4 is identical to Type 24CP4, except it has an aluminized screen and an anode voltage rating and grid No. 2 voltage rating of 22000 volts d c and 600 volts d c respectively.

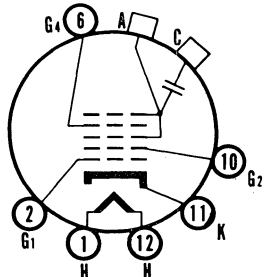
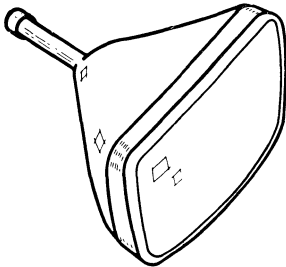
### WARNING

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/24YP4

### 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/24YP4 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 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 <sup>1</sup> .....	2500 $\mu\mu\text{f}$ Man
	2000 $\mu\mu\text{f}$ Mix
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

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

#### TYPICAL 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> .....	-33 to -77 Volts d c
Ion Trap Magnet Strength (approx.).....	40 Gauss

#### CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....	1.5 Megohms Max
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#### NOTES:

- External conductive coating must be grounded.
- Visual extinction of undeflected focused spot.

# 24DP4, 24DP4A/24YP4 (Cont'd)

## 24DP4A/24YP4

The Sylvania Type 24DP4A/24YP4 is identical to the Type 24DP4 except it has an aluminized screen.

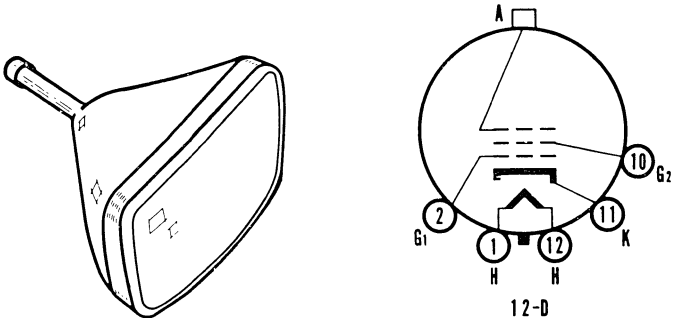
### WARNING

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 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 Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 $\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\text{f}$
Ion Trap Magnet.....	External, Single Field Type

#### MECHANICAL DATA

Minimum Useful Screen Dimensions.....	16 $\frac{3}{4}$ x 21 $\frac{1}{4}$ Inches
Nominal Overall Length.....	21 $\frac{1}{8}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

#### TYPICAL 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

#### 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 21 $\frac{1}{4}$  x 16 $\frac{3}{4}$  inch picture area.

# 24XP4 (Cont'd)

## 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.

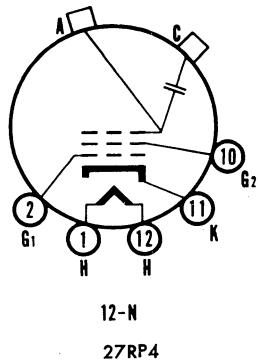
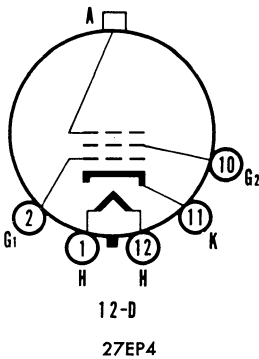
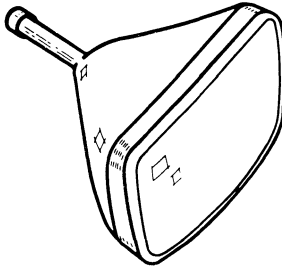
## SYLVANIA TYPE 27EP4 27RP4

**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



### 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 $\mu\mu\text{f}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\mu\text{f}$
Ion Trap Magnet.....	External, Single Field Type

# 27EP4, 27RP4 (Cont'd)

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	24 x 18½ Inches
Nominal Overall Length.....	23¼ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

## TYPICAL OPERATING CONDITIONS

Anode Voltage.....	20000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff¹.....	-28 to -72 Volts d c
Focusing Coil Current (approx.)².....	125 ±20% Ma d c
Ion Trap Magnet Strength (approx.).....	40 Gauss

## 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 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

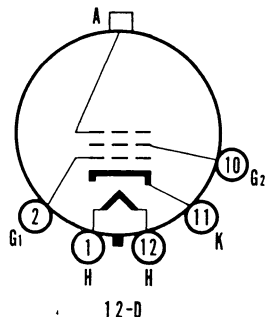
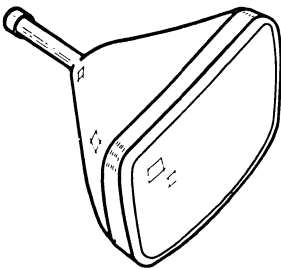
## WARNING

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	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

# SYLVANIA TYPE 27GP4 (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 $\mu\text{mf}$
Grid No. 1 to All Other Electrodes.....	6 $\mu\text{mf}$
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	24 $\frac{1}{4}$ x 18 $\frac{1}{2}$ Inches
Nominal Overall Length.....	23 $\frac{1}{16}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12D

## TYPICAL 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 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 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

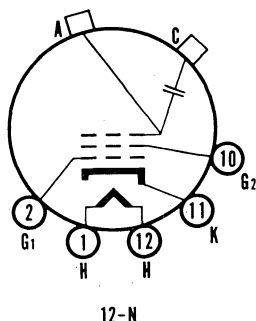
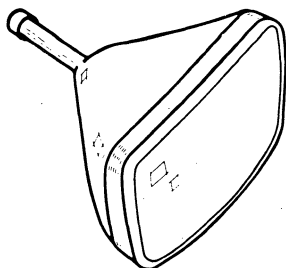
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

# 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

# 27LP4 (Cont'd)

## ELECTRICAL DATA

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

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	23 <sup>17</sup> / <sub>32</sub> x 18 <sup>15</sup> / <sub>32</sub> Inches
Nominal Overall Length.....	24 <sup>23</sup> / <sub>64</sub> Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

## TYPICAL 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.

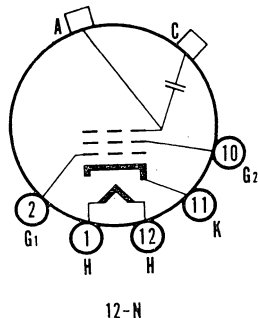
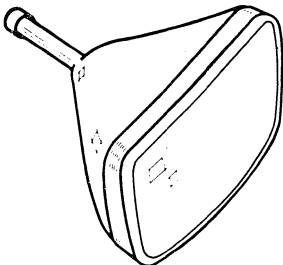
## WARNING

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



## 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

# 27NP4 (Cont'd)

## ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current (approx.).....	0.6 Ampere
Direct Inter-electrode 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> .....	2500 $\mu$ f Max
	2000 $\mu$ f Min
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	24 $\frac{1}{4}$ x 18 $\frac{1}{2}$ Inches
Nominal Overall Length.....	23 Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 5-Pin).....	B5-57
Basing.....	12N

## TYPICAL 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 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 24 $\frac{1}{4}$  x 18 $\frac{1}{2}$  inch picture area.

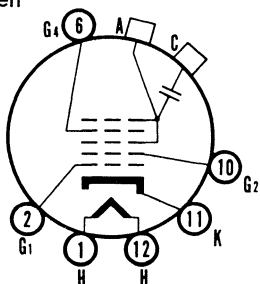
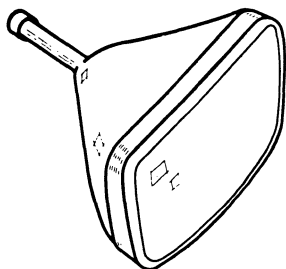
## WARNING

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 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



# 27SP4 (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 $\mu\mu\text{f}$
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
	500 $\mu\mu\text{f}$ Min
Ion Trap Magnet.....	External, Single Field Type

## MECHANICAL DATA

Minimum Useful Screen Dimensions.....	24 x 18 $\frac{1}{2}$ Inches
Nominal Overall Length.....	23 $\frac{1}{16}$ Inches
Bulb Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

## TYPICAL 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 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 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.

# "SILVER SCREEN 85" CROSS REFERENCE CHART

This cross reference chart is designed to tabulate the features of 35 types of "Silver Screen 85" Aluminized Television Picture Tubes which will replace 109 popular types. Only minor changes, if any, are required in making the replacement.

This Silver Screen 85 Type	Replace These Original Types	SILVER SCREEN 85 TYPES HAVE						Replacement Note See Below
		Ion Trap N-None S-Single	External Conductive Coating	Spherical Face Plate	Cylindrical Face Plate	Magnetic Focus	Electrostatic Focus	
12KP4A	12KP4 12KP4A 12QP4 12QP4A 12RP4	N	X	X		X		1 1 2 2 2
14QP4A	14QP4 14QP4A	S	X	X			X	1
14RP4A	14RP4 14RP4A	S	X	X			X	1
14XP4A	14XP4 14XP4A	S	X	X			X	1
16KP4A/- 16RP4A	16KP4 16KP4A 16QP4 16RP4 16RP4A 16TP4 16XP4	S	X	X		X		1 1 4 3 1 8 4
17ATP4A/- 17AVP4A	17ATP4 17ATP4A 17AVP4 17AVP4A	S	X	X			X	1 1 1 1
17BP4B	17BP4 17BP4A 17BP4B 17BP4C 17JP4	S	X	X		X		5 1 1 1 6
17BZP4	17BZP4 17CAP4 17CKP4	N	X	X			X	1
17HP4B/- 17RP4C	17HP4 17HP4A 17HP4B 17RP4 17RP4C	S	X	X			X	1 1 1 1 1
17LP4A/- 17VP4B	17LP4 17LP4A 17VP4 17VP4B	S	X		X		X	1 1 1 1
20CP4B/- 20DP4B	20CP4 20CP4B 20CP4C 20DP4 20DP4B	S		X		X		1 1 1 1 1 1
20CP4D/- 20DP4C	20CP4A 20CP4D 20DP4A 20DP4C	S	X	X		X		1 1 1 1
20HP4C	20HP4 20HP4B 20HP4C	S		X			X	1 1 1
20HP4D	20HP4A 20HP4D 20MP4 20LP4	S	X	X			X	1 1 1 1

## NOTES:—

- Usual Installation Adjustments.
- Ground Conductive Coating, Remove Ion Trap.
- Check Contact To Conductive Coating.
- Ground Conductive Coating, Change Ion Trap.
- Ground Conductive Coating.
- Do Not Exceed Voltage Rating.
- Add Filter Capacitor.
- If Physical Space Permits.

Chart Continued—Over

# "SILVER SCREEN 85" CROSS REFERENCE CHART

This cross reference chart is designed to tabulate the features of 35 types of "Silver Screen 85" Aluminized Television Picture Tubes which will replace 109 popular types. Only minor changes, if any, are required in making the replacement.

This Silver Screen 85 Type	Replace These Original Types	SILVER SCREEN 85 TYPES HAVE						Replacement Note See Below
		Ion Trap N-None S-Single	External Conductive Coating	Spherical Face Plate	Cylindrical Face Plate	Magnetic Focus	Electrostatic Focus	
21ACP4A/- 21AMP4A/- 21BSP4	21ACP4 21ACP4A 21AMP4 21AMP4A 21AQP4 21AQP4A 21BSP4	S	X	X		X		1 1 1 1 5 5 1
21ALP4A/- 21ALP4B	21ALP4 21ALP4A 21ALP4B 21ANP4 21ANP4A	S	X	X			X	1 1 1 5 5
21ATP4/- 21ATP4A	21ATP4 21ATP4A	S	X	X			X	1 1
21AUP4A/- 21AUP4B/- 21AVP4A/- 21AVP4B	21AUP4 21AUP4A 21AUP4B 21AVP4 21AVP4A 21AVP4B	S	X	X			X	1 1 1 1 1 1
21AWP4	21AWP4	S	X	X		X		1
21CBP4/- 21CBP4A	21CBP4 21CBP4A	N	X	X			X	1
21EP4B	21EP4 21EP4A 21EP4B	S	X		X	X		5 1 1
21FP4C	21FP4 21FP4A 21FP4C	S	X		X		X	5 1 1
21WP4A	21WP4 21WP4A	S	X	X		X		1 1
21XP4A	21ASP4 21AYP4 21XP4 21XP4A	S	X	X			X	5 1 1 1
21YP4A	21AFP4 21YP4 21YP4A	S	X	X			X	5 1 1
21ZP4B	21ZP4 21ZP4A 21ZP4B	S	X	X		X		5 1 1
24CP4A/- 24VP4A/- 24ADP4	24ADP4 24CP4 24CP4A 24QP4 24TP4 24XP4 24VP4 24VP4A	S	X	X		X		1 1 1 1 1 5 1 1
24DP4A/- 24YP4	24DP4 24DP4A 24YP4	S	X	X			X	1 1 1
27EP4	27EP4 27GP4 27NP4	S		X		X		1 1 7
27RP4	27GP4 27NP4 27RP4	S	X	X		X		5 1 1

## NOTES:—

1. Usual Installation Adjustments.
2. Ground Conductive Coating, Remove Ion Trap.
3. Check Contact To Conductive Coating.
4. Ground Conductive Coating, Change Ion Trap.
5. Ground Conductive Coating.
6. Do Not Exceed Voltage Rating.
7. Add Filter Capacitor.
8. If Physical Space Permits.

# INDUSTRIAL AND MILITARY C.R.T.'s

## LISTED BY APPLICATION

Type	Faceplate	Focus	Deflection	Deflection Angle	Anode Volts Kv Abs. Max.	Nominal Length (Inches)
<b>RADAR INDICATORS</b>						
3FP7A	C	Es	Es	..	4.4*	10
3JP7	C	Es	Es	..	4.4*	10
3JP12	C	Es	Es	..	4.4*	10
3KP7	C	Es	Es	..	2.75	11½
5ABP7	C	Es	Es	..	6.6*	16¾
5ADP7	C	Es	Es	..	6.6*	16¾
5AHP7	C	Es	Mag.	53	11.0	11⅞
5AHP7A	CA	Es	Mag.	53	11.0	11⅞
5AHP14	C	Es	Mag.	53	11.0	11⅞
5AHP14A	CA	Es	Mag.	53	11.0	11⅞
5AHP19	C	Es	Mag.	53	11.0	11⅞
5AHP19A	CA	Es	Mag.	53	11.0	11⅞
5AHP25A	CA	Es	Mag.	53	11.0	11⅞
5AQP7	C	Es	Es	..	4.4	16¾
5CP7A	C	Es	Es	..	4.4*	16¾
5CP12	C	Es	Es	..	4.4*	16¾
5FP7A	C	Mag.	Mag.	53	8.8	11⅞
5FP14	C	Mag.	Mag.	53	8.8	11⅞
5FP14A	C	Mag.	Mag.	53	8.8	11⅞
5UP7	C	Es	Es	..	2.75	14¾
6DP7	CA	Es	Es	..	15.0*	20⅙
6DP14	CA	Es	Es	..	15.0*	20⅙
6DP19	CA	Es	Es	..	15.0*	20⅙
6DP25	CA	Es	Es	..	15.0*	20⅙
7ABP7	C	Es	Mag.	50	11.0	13¼
7ABP7A	CA	Es	Mag.	50	11.0	13¼
7ABP14	C	Es	Mag.	50	11.0	13¼
7ABP14A	CA	Es	Mag.	50	11.0	13¼
7ABP19	C	Es	Mag.	50	11.0	13¼
7ABP19A	CA	Es	Mag.	50	11.0	13¼
7BP2A	C	Mag.	Mag.	53	8.8	13¼
7BP7A	C	Mag.	Mag.	53	8.8	13¼
7JP7	C	Es	Es	..	6.6	14½
7MP7	C	Mag.	Mag.	50	8.8	12¾
7MP14	C	Mag.	Mag.	50	8.8	12¾
8CP7	C	Es	Es	..	6.6*	16½
10KP7	T	Mag.	Mag.	50	11.0	17⅝

# INDUSTRIAL AND MILITARY C.R.T.'s Cont'd

## LISTED BY APPLICATION

Type	Faceplate	Focus	Deflection	Deflection Angle	Anode Volts Kv Abs. Max.	Nominal Length (Inches)
<b>RADAR INDICATORS</b>						
10KP7A	T	Mag.	Mag.	50	11.0	17 $\frac{5}{8}$
10VP7	CA	Mag.	Mag.	50	13.2	17 $\frac{5}{8}$
10WP7	T	Es	Mag.	50	13.2	16 $\frac{5}{16}$
10WP7A	TA	Es	Mag.	50	13.2	16 $\frac{5}{16}$
10WP14	T	Es	Mag.	50	13.2	16 $\frac{5}{16}$
10WP14A	TA	Es	Mag.	50	13.2	16 $\frac{5}{16}$
10WP19	T	Es	Mag.	50	13.2	16 $\frac{5}{16}$
10WP19A	TA	Es	Mag.	50	13.2	16 $\frac{5}{16}$
12ABP7	T	Es	Mag.	55	13.2	18
12ABP7A	TA	Es	Mag.	55	13.2	18
12ABP14	T	Es	Mag.	55	13.2	18
12ABP14A	TA	Es	Mag.	55	13.2	18
12ABP19	T	Es	Mag.	55	13.2	18
12ABP19A	TA	Es	Mag.	55	13.2	18
12DP7A	T	Mag.	Mag.	50	11.0	19 $\frac{5}{8}$
12DP7C	TA	Mag.	Mag.	50	13.2	19 $\frac{5}{8}$
12SP7	C	Mag.	Mag.	55	11.0	18 $\frac{3}{4}$
12SP7D	TA	Mag.	Mag.	54	15.0	18 $\frac{3}{4}$

### OSCILLOSCOPES

2AP1A	C	Es	Es	..	1.1	7 $\frac{7}{16}$
3AP1A	C	Es	Es	..	1.65	11 $\frac{1}{2}$
3BP1A	C	Es	Es	..	2.2	10
3JP1	C	Es	Es	..	4.4*	10
3JP2	C	Es	Es	..	4.4*	10
3KP1	C	Es	Es	..	2.75	11 $\frac{1}{2}$
3MP1	C	Es	Es	..	2.75	8
3RP1	C	Es	Es	..	2.75	9 $\frac{1}{8}$
3RP1A	C	Es	Es	..	2.75	9 $\frac{1}{8}$
5ABP1	C	Es	Es	..	6.6*	16 $\frac{3}{4}$
5ADP1	C	Es	Es	..	6.6*	16 $\frac{3}{4}$
5ADP2	C	Es	Es	..	6.6*	16 $\frac{3}{4}$
5AHP2	C	Es	Mag.	53	11.0	11 $\frac{1}{8}$
5AHP2A	CA	Es	Mag.	53	11.0	11 $\frac{1}{8}$
5AQP1	C	Es	Es	..	4.4	16 $\frac{3}{4}$
5AQP2	C	Es	Es	..	4.4	16 $\frac{3}{4}$
5BP1A	C	Es	Es	..	2.2	16 $\frac{3}{4}$
5CP1A	C	Es	Es	..	4.4*	16 $\frac{3}{4}$
5UP1	C	Es	Es	..	2.75	14 $\frac{3}{4}$
6DP1	CA	Es	Es	..	15.0*	20 $\frac{1}{16}$
6DP2	CA	Es	Es	..	15.0*	20 $\frac{1}{16}$
7JP1/7VP1	C	Es	Es	..	6.6	14 $\frac{1}{2}$
8CP1	C	Es	Es	..	6.6*	16 $\frac{1}{2}$
8CP2	C	Es	Es	..	6.6*	16 $\frac{1}{2}$

# INDUSTRIAL AND MILITARY C.R.T.'s Cont'd

## LISTED BY APPLICATION

Type	Faceplate	Focus	Deflection	Deflection Angle	Anode Volts Kv Abs. Max.	Nominal Length (Inches)
<b>VIDEO RECORDERS</b>						
3KP11	C	Es	Es	..	2.75	11½
5ABP11	C	Es	Es	..	6.6*	16¾
5ADP11	C	Es	Es	..	6.6*	16¾
5AQP11	C	Es	Es	..	4.4	16¾
5CP11A	C	Es	Es	..	4.4*	16¾
5FP11A	C	Mag.	Mag.	53	8.8	11⅞
5UP11	C	Es	Es	..	2.75	14¾
5WP11	C	Es	Mag.	50	30.0	11⅞
6DP11	CA	Es	Es	..	15.0*	20⅞
8CP5	C	Es	Es	..	6.6*	16½
8CP11	C	Es	Es	..	6.6*	16½
10NP11	A	Mag.	Mag.	52	27.5	17⅞
<b>INDUSTRIAL MONITORS</b>						
3KP4	C	Es	Es	..	2.75	11½
3RP4	C	Es	Es	..	2.75	9⅞
5ABP4	C	Es	Es	..	6.6*	16¾
5AHP4	C	Es	Mag.	53	11.0	11⅞
5AHP4A	CA	Es	Mag.	53	11.0	11⅞
5FP4A	C	Mag.	Mag.	53	8.8	11⅞
7ABP4	C	Es	Mag.	50	11.0	13¼
7JP4	C	Es	Es	..	6.6	14½
8CP4	C	Es	Es	..	6.6*	16½
8FP4	TA	Mag.	Mag.	90	19.8	11⅞
10SP4	TA	Es	Mag.	50	22.0	16⅞
<b>RECEIVER CHECK TUBES</b>						
5AXP4	C	Auto	Mag.	53	19.8	10⅞
8XP4	T	Auto	Mag.	90	22.0	11⅞
8YP4	T	Auto	Mag.	110	22.0	8⅞
<b>FLYING SPOT SCANNERS</b>						
3KP16	C	Es	Es	..	2.75	11½
5BNP16	CA	Es	Mag.	53	19.8	10⅞
5WP15	C	Es	Mag.	50	30.0	11⅞
5ZP15	CA	Es	Mag.	40	30.0	14⅞
5ZP16	CA	Es	Mag.	40	30.0	14⅞
5ZP24	CA	Es	Mag.	40	30.0	14⅞
10VP15	CA	Mag.	Mag.	50	13.2	17⅞

**NOTE:**

C = Clear

T = Tinted

A = Aluminized

\* = Post Accelerator Voltage

# PHOSPHOR CHARACTERISTICS

Designation	Color and Persistence	Usual Application
P1	Green Medium	General purpose oscilloscope
P2	Blue-Green Long	Special oscilloscopes and radar indicators
P3	Yellow-Green Medium	Obsolete
P4	White Medium	Television receivers
P5	Blue Very Short	Photographic recording of high speed traces in special oscilloscopes
P6	White Medium	Obsolete—Originally used in television receivers
P7	Blue-White Short Yellow Long	Radar indicators
P8	Obsolete	
P9	Obsolete	
P10	Dark Trace Very Long	Outside source of light is used for observation. Persistence from seconds to several months
P11	Blue Short	Oscilloscopes for visual or photographic observation
P12	Orange Long	Radar indicators
P13	Obsolete	
P14	Blue Short Red-Orange Long	Radar indicators
P15	Blue-Green and Ultraviolet Very Short	Television pick-up of photographs by flying spot scanning
P16	Violet and near Ultraviolet Extremely Short	Television pick-up of photographs by flying spot scanning
P17	Greenish-Yellow Short and Long Components	Cascade phosphor, combines P7 and P15 characteristics
P18	White Medium	Low frame rate television applications
P19	Yellow Medium Long	Radar indicators
P20	Yellow Short	
P21	Yellow-Orange Medium Long	
P22	Red-Blue-Green Medium	Three color phosphor dot pattern used in shadow mask color television picture tubes
P23	White Medium	Persistence similar to P4 as used in television
P24	White Short	Color flying spot scanner
P25	Orange Long	
P26	Yellow-Orange Very Long	
P27	Orange-Red Medium	
P28	Yellow-Green Long	





# "SILVER SCREEN 85" REPLACEMENT CHART

This chart shows how to replace 123 popular Picture Tubes with Sylvania "Silver Screen 85" Aluminized Picture Tubes. Only minor changes, if any, are required in making replacements.

"SILVER SCREEN 85" TYPE	REPLACES ORIGINAL TYPE	AFTER MAKING THE FOLLOWING CHANGES OR ADJUSTMENTS
<b>12KP4A</b>	12KP4	Usual Installation Adjustments
	12KP4A	Usual Installation Adjustments
	12QP4	Ground Conductive Coating, Remove Ion Trap
	12QP4A	Ground Conductive Coating, Remove Ion Trap
	12RP4	Ground Conductive Coating, Remove Ion Trap
<b>14CP4A</b>	14BP4	Usual Installation Adjustments
	14CP4	Usual Installation Adjustments
	14EP4	Usual Installation Adjustments
<b>14NP4A/ 14SP4</b>	14NP4	Usual Installation Adjustments
	14NP4A	Usual Installation Adjustments
	14SP4	Usual Installation Adjustments
<b>14QP4A</b>	14QP4	Usual Installation Adjustments
	14QP4A	Usual Installation Adjustments
	14HP4	Check Contact to Conductive Coating
<b>14RP4A</b>	14RP4	Check Contact to Conductive Coating
	14RP4A	Check Contact to Conductive Coating
<b>14XP4A</b>	14XP4	Check Contact to Conductive Coating
	14XP4A	Check Contact to Conductive Coating
<b>16KP4A/ 16RP4A</b>	16KP4	Usual Installation Adjustments
	16KP4A	Usual Installation Adjustments
	16QP4	Ground Conductive Coating, Change Ion Trap
	16RP4	Usual Installation Adjustments
	16RP4A	Usual Installation Adjustments
	16TP4	If Physical Space Permits
	16XP4	Ground Conductive Coating, Change Ion Trap
<b>17ATP4A/ 17AVP4A</b>	17ATP4	Usual Installation Adjustments
	17AVP4	Usual Installation Adjustments
	17ATP4A	Usual Installation Adjustments
	17AVP4A	Usual Installation Adjustments
<b>17BP4B</b>	17BP4	Ground Conductive Coating
	17BP4A	Usual Installation Adjustments
	17BP4B	Usual Installation Adjustments
	17BP4C	Usual Installation Adjustments
	17JP4	Do Not Exceed Voltage Rating
<b>17HP4B/ 17RP4C</b>	17HP4	Usual Installation Adjustments
	17HP4A	Usual Installation Adjustments
	17HP4B	Usual Installation Adjustments
	17RP4	Usual Installation Adjustments
	17RP4C	Usual Installation Adjustments
<b>17LP4A/ 17VP4B</b>	17LP4	Usual Installation Adjustments
	17LP4A	Usual Installation Adjustments
	17VP4	Usual Installation Adjustments
	17VP4B	Usual Installation Adjustments
	17KP4	Provide Focus Supply
	17KP4A	Provide Focus Supply
<b>17QP4A</b>	17QP4	Usual Installation Adjustments
	17UP4	Usual Installation Adjustments
	17YP4	Usual Installation Adjustments
	17SP4	Provide Focus Supply
	17QP4A	Usual Installation Adjustments
<b>20CP4B/ 20DP4B</b>	20CP4	Usual Installation Adjustments
	20CP4B	Usual Installation Adjustments
	20CP4C	Usual Installation Adjustments
	20DP4	Usual Installation Adjustments
	20DP4B	Usual Installation Adjustments
<b>20CP4D/ 20DP4C</b>	20CP4A	Usual Installation Adjustments
	20CP4D	Usual Installation Adjustments
	20DP4A	Usual Installation Adjustments
	20DP4C	Usual Installation Adjustments

In addition, any popular Aluminized Picture Tube may be replaced with a "Silver Screen 85" of the same type number.

(Replaces "Silver Screen 85" Cross Reference Chart presently filed at rear of Picture Tube Section.)

**SYLVANIA ELECTRONIC TUBES**

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# "SILVER SCREEN 85" REPLACEMENT CHART

"SILVER SCREEN 85" TYPE	REPLACES ORIGINAL TYPE	AFTER MAKING THE FOLLOWING CHANGES OR ADJUSTMENTS
<b>20HP4C</b>	20HP4	Usual Installation Adjustments
	20HP4B	Usual Installation Adjustments
	20HP4C	Usual Installation Adjustments
<b>20HP4D</b>	20HP4A	Usual Installation Adjustments
	20HP4D	Usual Installation Adjustments
	20MP4	Usual Installation Adjustments
	20LP4	Usual Installation Adjustments
<b>21ALP4A/B</b>	21ALP4	Usual Installation Adjustments
	21ALP4A	Usual Installation Adjustments
	21ALP4B	Usual Installation Adjustments
	21ANP4	Ground Conductive Coating
	21ANP4A	Ground Conductive Coating
<b>21AMP4A/ 21ACP4A/ 21BSP4</b>	21AMP4	Usual Installation Adjustments
	21AMP4A	Usual Installation Adjustments
	21ACP4	Usual Installation Adjustments
	21ACP4A	Usual Installation Adjustments
	21AQP4	Ground Conductive Coating
	21AQP4A	Ground Conductive Coating
	21BSP4	Usual Installation Adjustments
	21ATP4/A	Usual Installation Adjustments
<b>21AUP4A/ 21AUP4B/ 21AVP4A/ 21AVP4B</b>	21ATP4	Usual Installation Adjustments
	21ATP4A	Usual Installation Adjustments
	21AUP4	Usual Installation Adjustments
	21AUP4A	Usual Installation Adjustments
	21AUP4B	Usual Installation Adjustments
	21AVP4	Usual Installation Adjustments
	21AVP4A	Usual Installation Adjustments
	21AVP4B	Usual Installation Adjustments
<b>21EP4B</b>	21EP4	Ground Conductive Coating
	21EP4A	Usual Installation Adjustments
	21EP4B	Usual Installation Adjustments
<b>21FP4C</b>	21FP4	Usual Installation Adjustments
	21FP4A	Usual Installation Adjustments
	21FP4C	Usual Installation Adjustments
	21KP4	Provide Focus Supply
	21KP4A	Provide Focus Supply
<b>21WP4A</b>	21WP4	Usual Installation Adjustments
	21WP4A	Usual Installation Adjustments
<b>21XP4A</b>	21XP4	Usual Installation Adjustments
	21XP4A	Usual Installation Adjustments
	21AYP4	Usual Installation Adjustments
	21ASP4	Usual Installation Adjustments, Ground Cond. Coating
<b>21YP4A</b>	21YP4	Usual Installation Adjustments
	21YP4A	Usual Installation Adjustments
	21AFP4	Ground Conductive Coating
<b>21ZP4B</b>	21ZP4	Ground Conductive Coating
	21ZP4A	Usual Installation Adjustments
	21ZP4B	Usual Installation Adjustments
<b>24CP4A/ 24TP4/ 24VP4A/ 24ADP4</b>	24ADP4	Usual Installation Adjustments
	24CP4	Usual Installation Adjustments
	24CP4A	Usual Installation Adjustments
	24QP4	Usual Installation Adjustments
	24TP4	Usual Installation Adjustments
	24VP4	Usual Installation Adjustments
	24VP4A	Usual Installation Adjustments
	24XP4	Ground Conductive Coating
<b>24DP4A/ 24YP4</b>	24DP4	Usual Installation Adjustments
	24DP4A	Usual Installation Adjustments
	24YP4	Usual Installation Adjustments
<b>27EP4</b>	27EP4	Usual Installation Adjustments
	27GP4	Usual Installation Adjustments
	27NP4	Add Filter Capacitor
<b>27RP4</b>	27GP4	Ground Conductive Coating
	27NP4	Usual Installation Adjustments
	27RP4	Usual Installation Adjustments

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