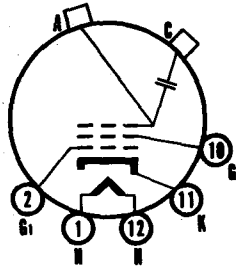
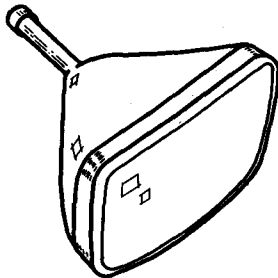


SYLVANIA TYPE 21ACP4A/21AMP4A/21BSP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



12-N

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

TYPICAL OPERATING CONDITIONS

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

SYLVANIA PICTURE TUBES

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

21ACP4A/21AMP4A/21BSP4

(Cont'd)

CIRCUIT VALUES

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

NOTES:

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

WARNING

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

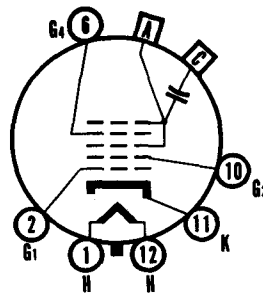
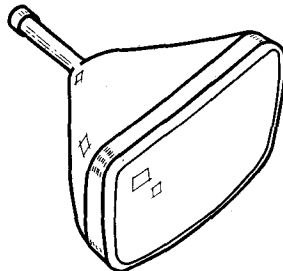
SYLVANIA PICTURE TUBES

SYLVANIA TYPE 21BTP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



12-L

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 5% Ampere
Heater Warm-up Time ¹	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 ²	2500 μmf Max. 2000 μmf Min.
Ion Trap Magnet.....	External, Single Field Type

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA PICTURE TUBES

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

21BTP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

WARNING:

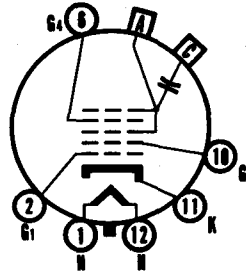
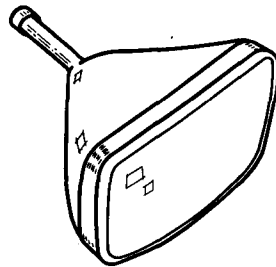
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 21CBP4 21CBP4A

Silver Screen "85"

TELEVISION PICTURE TUBE

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



12-L

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 5% Ampere
Heater Warm-up Time ¹	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 ²	2500 μmf Max. 2000 μmf Min.

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA PICTURE TUBES

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

SYLVANIA TYPE 21CBP4 (Cont'd)
21CBP4A

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

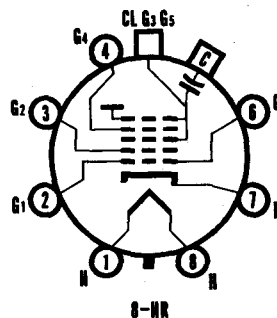
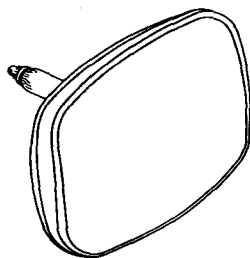
WARNING:

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

SYLVANIA TYPE 21CEP4

TELEVISION PICTURE TUBE

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



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA PICTURE TUBES

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

SYLVANIA TYPE 21CEP4 (Cont'd)

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

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

WARNING:

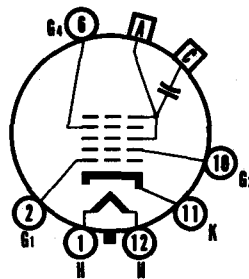
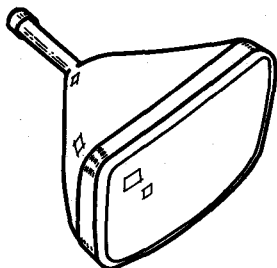
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 21CMP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



12-L

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 5% Ampere
Heater Warm-up Time.....	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes.....	5 μmf
Grid No. 1 to All Other Electrodes.....	6 μmf
External Conductive Coating to Anode ²	2500 μmf Max. 2000 μmf 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 Contact (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA PICTURE TUBES

SYLVANIA TYPE 21CMP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

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

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.
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.

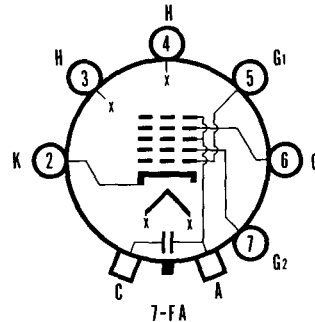
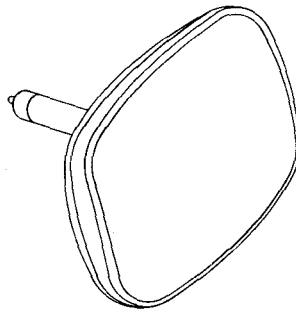
WARNING:

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 21CQP4

TELEVISION PICTURE TUBE

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



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 5% Ampere
Heater Warm-up Time ¹	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 ²	2500 μμf Max. 2000 μμf Min.

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA PICTURE TUBES

SYLVANIA TYPE 21CQP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

WARNING:

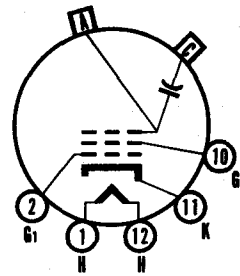
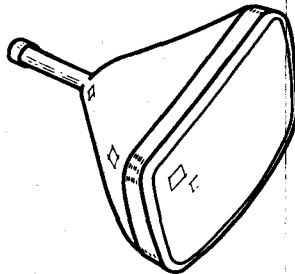
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 21CUP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



12-N

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 5% Amperes
Heater Warm-up Time ¹	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 ²	2500 μmf Max. 2000 μmf 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	20 Inches
Minimum Useful Screen Area	262 Square Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 5-Pin)	B5-57
Basing	12N

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA TYPE 21CUP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

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

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.
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 ± 3 gaussess.

WARNING:

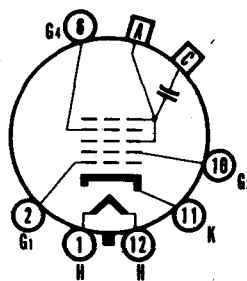
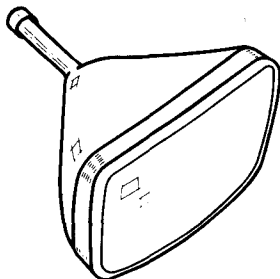
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 21CXP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



12-L

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 5% Amperes
Heater Warm-up Time ¹	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 ²	2500 μf Max. 2000 μf Min.

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS² (Absolute Maximum Values)

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

SYLVANIA PICTURE TUBES

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

SYLVANIA TYPE 21CXP4 (Cont'd)

TYPICAL OPERATING CONDITIONS (Cathode Drive Service)

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

CIRCUIT VALUES

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

NOTES:

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

WARNING:

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

SYLVANIA TYPE 21CWP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

WARNING:

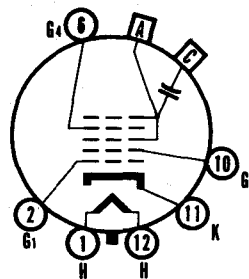
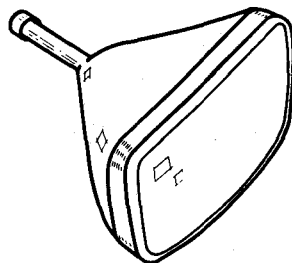
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 21CWP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



12-1

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 5% Ampere
Heater Warm-up Time ¹	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 ²	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	20 Inches
Minimum Useful Screen Area	262 Square Inches
Bulb Type	J171D2 or J171E1
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 6-Pin)	B6-63
Basing	12L

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

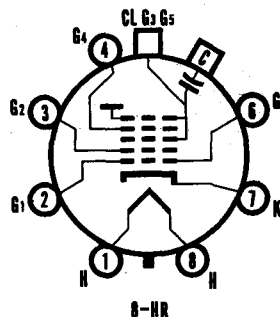
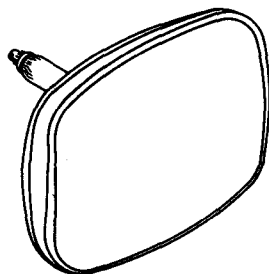
SYLVANIA PICTURE TUBES

SYLVANIA TYPE 21DAP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 5% Ampere
Heater Warm-up Time ¹	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 ²	2500 μmf Max. 2000 μmf Min.

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA TYPE 21DAP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

WARNING:

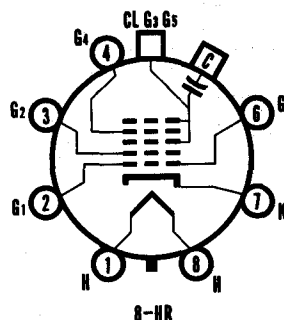
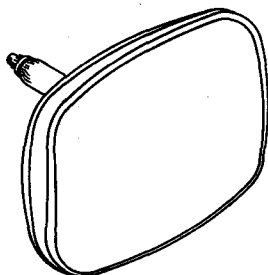
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 21DEP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 5% Ampere
Heater Warm-up Time ¹	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 ²	2500 μmf Max. 2000 μmf Min.

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA TYPE 21DEP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms 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 μ f
Minimum	500 μ 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 μ f
Minimum	500 μ f
Basing	12L

WARNING

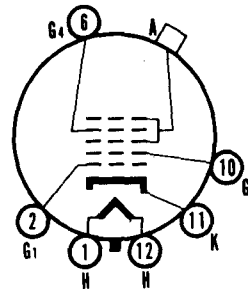
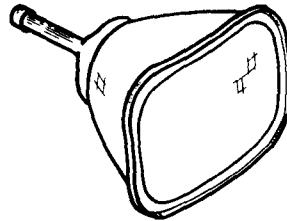
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 21MP4

TELEVISION PICTURE TUBE

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

Magnetic Deflection
Electrostatic Focus
Spherical Faceplate
Single Field Ion Trap



12-M

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

21MP4 (Cont'd)

CIRCUIT VALUES

Grid No. 1 Circuit Resistance 1.5 Megohms
Max

NOTE:

1. Visual extinction of undeflected focused spot.

WARNING

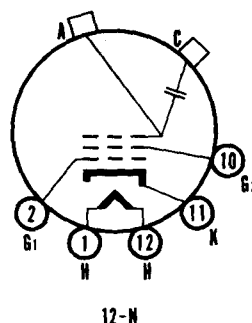
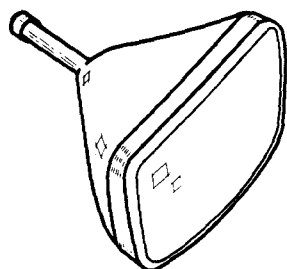
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

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

TELEVISION PICTURE TUBE

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

21WP4A has an Aluminized Screen



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

21WP4, 21WP4A (Cont'd)

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

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.
3. For JETEC focusing coil 109 or equivalent three and one quarter inches from reference line, bias adjusted to 30 foot lamberts on a 17 x 12 $\frac{3}{4}$ inch picture area.

21WP4A

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

WARNING

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

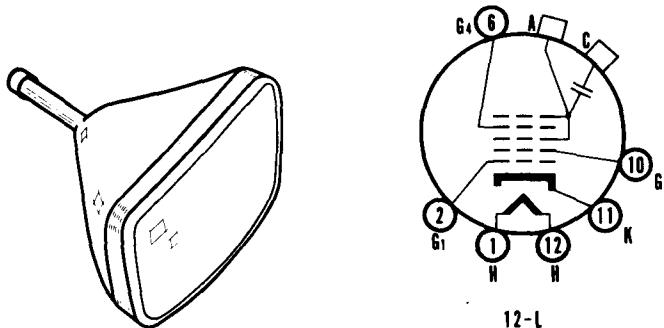
SYLVANIA TYPE 21XP4

Silver Screen "85" → 21XP4A

TELEVISION PICTURE TUBE

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

21XP4A has an Aluminized Screen



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

21XP4, 21XP4A (Cont'd)

RECOMMENDED OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

21XP4A

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

WARNING

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

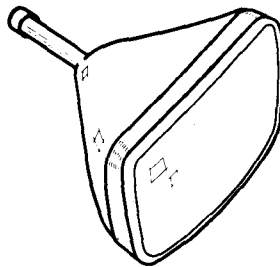
SYLVANIA TYPE 21ZP4
21ZP4A
Silver Screen "85" → 21ZP4B

TELEVISION PICTURE TUBE

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

Single Field Ion Trap

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



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

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

21ZP4A

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

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

21ZP4B

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

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

WARNING

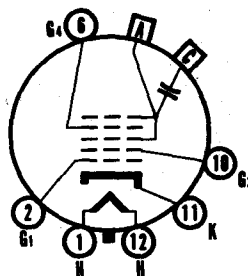
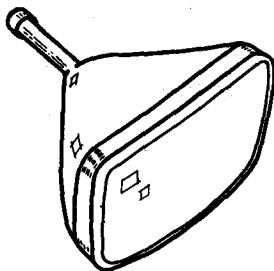
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 24AEP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



12-L

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA TYPE 24AEP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

WARNING:

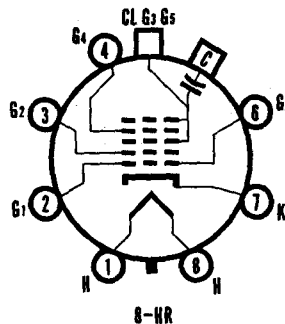
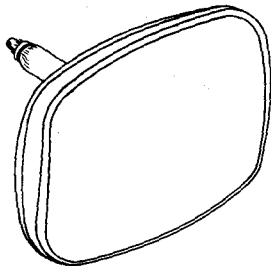
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 24AHP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

Heater Voltage.....	6.3 Volts
Heater Current.....	0.6 ± 5% Ampere
Heater Warm-up Time ¹	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 ²	2500 μmf Max. 2000 μmf Min.

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

SYLVANIA PICTURE TUBES

SYLVANIA TYPE 24AHP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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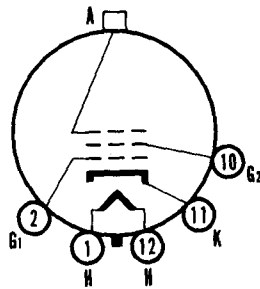
NOTES:

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

WARNING:

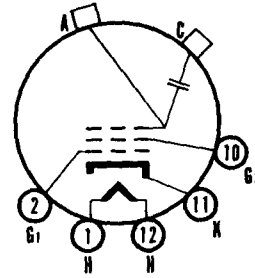
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

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



12-D

21ZP4



12-N

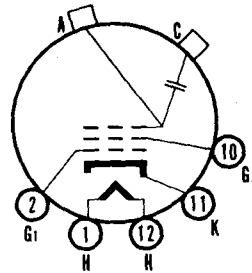
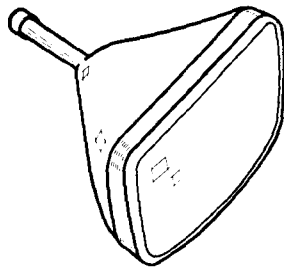
21ZP4A
21ZP4B

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

TELEVISION PICTURE TUBE

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

24CP4A has an Aluminized Screen



12-N

CHARACTERISTICS

GENERAL DATA

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

24CP4, 24CP4A (Cont'd)

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

24CP4A

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

WARNING

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

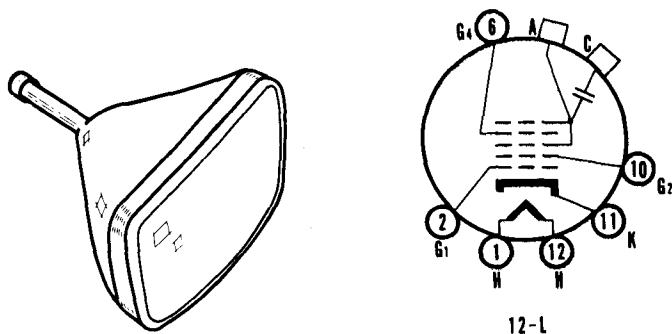
SYLVANIA TYPE 24DP4

Silver Screen "85" → 24DP4A

TELEVISION PICTURE TUBE

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

24DP4A has an Aluminized Screen



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

24DP4, 24DP4A (Cont'd)

RECOMMENDED OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

24DP4A

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

WARNING

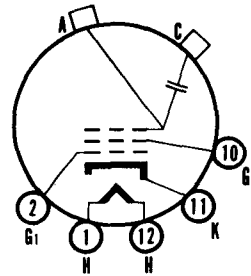
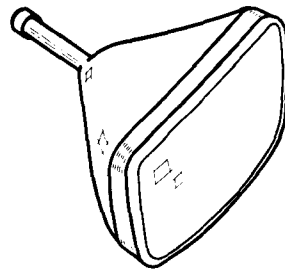
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 24VP4

Silver Screen "85" → 24VP4A

TELEVISION PICTURE TUBE

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



CHARACTERISTICS

GENERAL DATA

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

24VP4, 24VP4A (Cont'd)

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

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

24VP4A

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

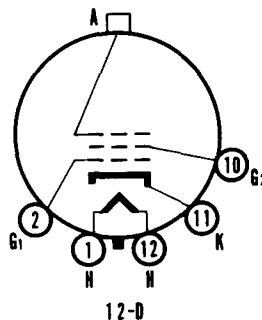
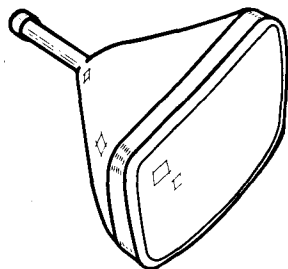
WARNING

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

SYLVANIA TYPE 24XP4

TELEVISION PICTURE TUBE

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



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

24XP4 (Cont'd)

CIRCUIT VALUES

Grid No. 1 Circuit Resistance 1.5 Megohms
Max

NOTES:

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

WARNING

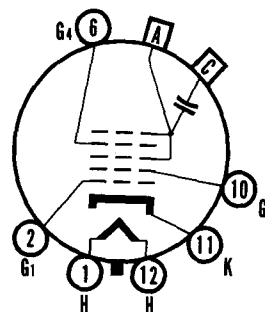
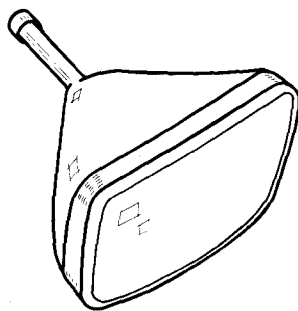
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 24YP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



12-L

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

24YP4 (Cont'd)

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

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.

WARNING:

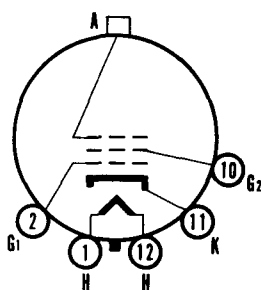
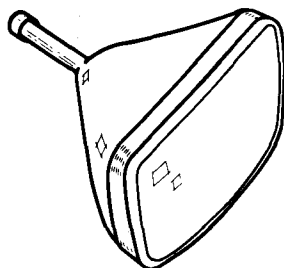
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 27EP4 27RP4

Silver Screen "85"

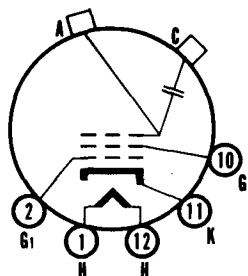
TELEVISION PICTURE TUBE

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



12-D

27EP4



12-N

27RP4

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

27EP4, 27RP4 (Cont'd)

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

Anode Voltage.....	20000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff.....	-28 to -72 Volts d c
Focusing Coil Current (approx.) ²	125 ±20% Ma 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:

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

27RP4

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

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

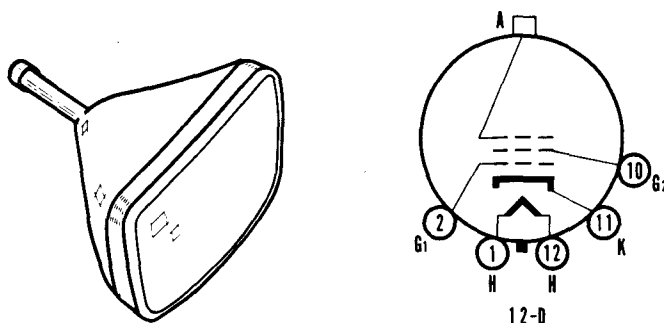
WARNING

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

SYLVANIA TYPE 27GP4

TELEVISION PICTURE TUBE

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



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms Max
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27GP4 (Cont'd)

NOTES:

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

WARNING

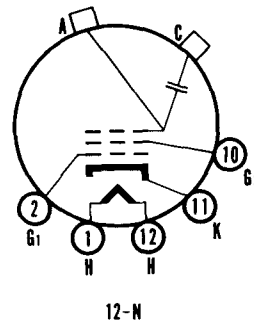
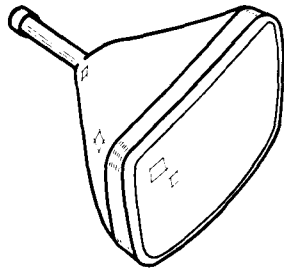
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 27LP4

Silver Screen "85"

TELEVISION PICTURE TUBE

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



CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

27LP4 (Cont'd)

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

Anode Voltage.....	20000 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff ²	-28 to -72 Volts d c
Focusing Coil Current (approx.) ³	148 Ma 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:

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.

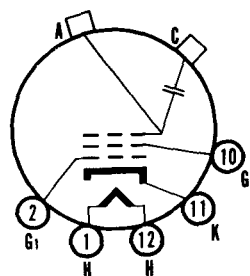
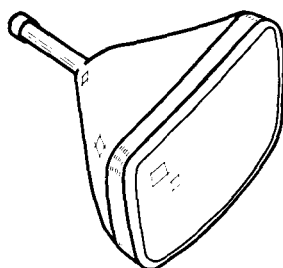
WARNING

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



27NP4 (Cont'd)

CHARACTERISTICS

GENERAL DATA

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

ELECTRICAL DATA

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

MECHANICAL DATA

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

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

RECOMMENDED OPERATING CONDITIONS

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

CIRCUIT VALUES

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

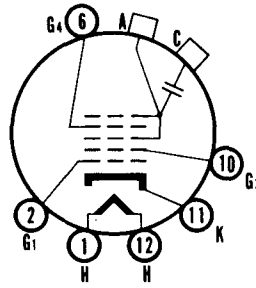
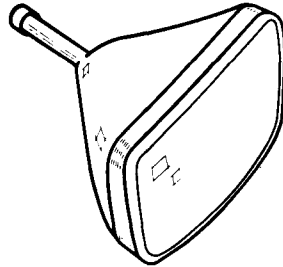
WARNING

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

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 ¹	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 18½ Inches
Bulb Contact, (Recessed Small Cavity Cap).....	J1-21
Base (Small Shell Duodecal 6-Pin).....	B6-63
Basing.....	12L

RATINGS

MAXIMUM RATINGS (Design Center Values)

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

27SP4 (Cont'd)

RECOMMENDED OPERATING CONDITIONS

Anode Voltage	18000 Volts d c
Grid No. 4 Voltage.....	-72 to +396 Volts d c
Grid No. 2 Voltage.....	300 Volts d c
Grid No. 1 Voltage Required for Cutoff ²	-28 to -72 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:

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.