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21WP4

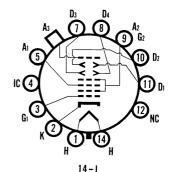
SYLVANIA TYPE SC-2558

SPECIAL PURPOSE TUBE

12" Direct Viewed Round Glass Type Oscilloscope Tube Electrostatic Deflection
Electrostatic Focus

Post Deflection Acceleration





GENERAL DATA

Focusing MethodDeflecting Method	Electrostatic Electrostatic
Phosphor*	
Fluorescence	
Phosphorescence	Yellow
Persistence	Long
Faceplate	Gray Filter Glass
Faceplate*In addition to the P7 screen shown, the SC-2558 can	be supplied with several
other screen phosphors.	• •

CHARACTERISTICS

ELECTRICAL DATA

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

MECHANICAL DATA

Minimum Useful Screen Diameter	11 Inches
Over All Length	221/4 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 Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and Any Deflecting Plate. Ratio Post Accelerator Voltage to Anode Voltage Anode Input ¹	200 750 2.3:1	Volts Volts Volts Watts	
TYPICAL OPERATING CONDITIONS			
Anode No. 3 Voltage	5000 1300 to 2200	Volts d c Volts d c Volts d c Volts d c	
* Deflecting Plates 1-2. * Deflecting Plates 3-4. Modulation*. * Line Width "A"*. Focus Electrode Current*. Spot Position, Undeflected.	80 to 115 30 .5 -15 to +10		
Angle Between D1D2 and D3D4 Trace	90 ± 2	Degrees	
CIRCUIT VALUES			
Grid No. 1 Circuit Resistance		Megohms Max. 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 μa.

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.

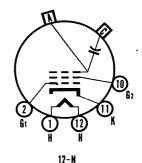
SYLVANIA TYPE SC-2809

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



GENERAL DATA



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.

Focusing Method. Deflection Method. Deflection Angle (approx.). Type* Phosphor AFluorescence. Persistence Faceplate. Vloadition to the type shown the SC-2809 can be supplied with several other screen phosphors.	Blue Short
ELECTRICAL DATA	
Heater Voltage0. Heater Current0. Direct Interelectrode Capacitances (approx.)	6.3 Volts .6 ± 10% Ampere
Grid No. 1 to All Other Electrodes	10 μμf
Cathode to All Other Electrodes External Conductive Coating to Anode	5.5 μμf
External Conductive Coating to Anode	500 μμf Max. 100 μμf Min.
MECHANICAL DATA	του μμι τιτιιι
Minimum Useful Screen Diameter	41/4 Inches
Overall Length	6% ± % Inches
Bulb.	C40 Exp. 14 or Equiv.
Anode Terminal	B5-57
Basing	12 N
•	
MAXIMUM RATINGS (Absolute Maximum Value	•
Anode Voltage	25,000 Volts d c
Grid No. 2 Voltage	3.0 μa d c 2500 Volts d c
Grid No. 2 Voltage	2000 ψοτίς d C
Grid No. 1 Voltage	2000 μα α 0
Negative_Bias Value	150 Volts d c
Positive Bias Value	0 Volts d c
Positive Peak ValuePeak Heater-Cathode Voltage	0 Volts
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 VoltageGrid No. 2 Voltage	2000 Volts d c
Grid No. 1 Voltage Required for Cutoff1	-33 to -77 Volts d c
Focusing Coil Current (approx.)2	100 Ma
Line Width3	0.0008 Inch

CIRCUIT VALUES

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

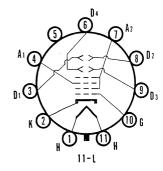
Visual extinction of undeflected focused spot.
 For JEDEC focusing coil 106 or equivalent 2½" from reference line.
 Line width measured at 2 μa anode current by the shrinking raster method. Variable strength (0-10 gauss) beam centering magnet must be used for optimum line width.

SYLVANIA TYPE 2AP1A 2AP-A*

SPECIAL PURPOSE TUBE

2" Direct Viewed Round Glass Type Electrostatic Deflection Electrostatic Focus





CHARACTERISTICS

GENERAL DATA	
	Electrostatic
Deflecting Method	Electrostatic
Phosphor	_P1
Fluorescence	Green
_ Persistence	Medium
Faceplate* In addition to the Type shown, the 2AP-A can be supplied	Clear
*In addition to the Type shown, the 2AP-A can be supplied screen phosphors.	with several other

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	•
Cathode to All Other Electrodes	5.5 μμf
Grid to All Other Electrodes	8.0 μμf
Between Deflecting Plates 1-21	$0.6 \mu \mu f$
Between Deflecting Plates 3-41	$1.1 \mu \mu f$
Deflecting Plate 12 to All Other Electrodes	8.5 μμf
Deflecting Plate 32 to All Other Electrodes	9.0 μμf
Deflecting Plate 1 to All Other Electrodes	• • • • • • • • • • • • • • • • • • • •
Except D2	$8.0~\mu\mu f$
Deflecting Plate 22 to All Other Electrodes	
Except D1	4.6 μμf
Deflecting Plate 3 to All Other Electrodes	
Except D4	7.5 μμf
Except D4 Deflecting Plate 4 ² to All Other Electrodes	
Except D3	$6.0~\mu\mu f$

MECHANICAL DATA

Minimum Useful Screen Diameter	1 3/4 Inches
Nominal Overall Length	7⅔ Inches
Base	Small Shell Magnal 11-Pin
Basing	11 L

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	
Any Deflection Plate	660 Volts	

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

TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage³	1000 to 300 to –90	Volts d c Volts d c Volts d c
Deflection Factor 204 Deflecting Plates 1-25 204 Deflecting Plates 3-46 157	to 256 to 235	Volts d c/Inch Volts d c/Inch

CIRCUIT VALUES

NOTES:

- OTES:

 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

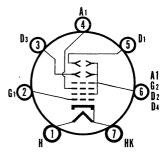
Sylvania Type 2AP1A replaces Type 2AP1.

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*In addition to the type shown, the 3AP-A can be supplied	Clear	
*In addition to the type shown, the 3AP-A can be supplied	with several of	t t

her screen phosphors.

ELECTRICAL DATA

Heater Voltage	2.5 Volts 2.1 Ampere
	Z.i Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes	9 μμf
Deflecting Plate 11 to All Other Electrodes	8.5 μμf
Deflecting Plate 31 to All Other Electrodes	$6.5 \mu\mu f$

SYLVANIA TYPES 3ACP1A 3ACP-A*

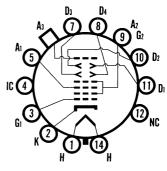
3" Direct Viewed Round Glass Type **Electrostatic Deflection**

Electrostatic Focus Close Tolerances Flat Face

Post Deflection Acceleration



GENERAL DATA



14 - 1

GENERAL DATA				
Focusing Method			Elect	rostatic
Deflection Method Types*			Elect	rostatic
Types*	Fluorescence	Phosphore	escence	Persistence
3ACP1A	Green			Medium
3ACP2A	Blue-Green	Gree	n	Long
3ACP7A	Blue-Green Blue-White	Yello	n ow	Long
3ACP11A				Short
3ACP12A	Orange	Oran		Medium Long
Faceplate	Orango	Olun	go	Flat. Clear
*In addition to the types	shown the 34	CP-A can	he sunn	
other screen phosphors.	01101111, 1110 07	101 /1 0411	ос опрр	nica with several
other coreen phoophers.				
ELECTRICAL DATA				
Heater Voltage			6.3 Vo	l+o
Heater Current				
Direct Interelectrode Capa	oitanasa (Mau)	U.O , ±	10% An	ipere
Cathode to All Other Ele	citances (iviax.)		40 6	
Grid to All Other Electro			4.2 μμf	
			5.5 μμf	
Between Deflecting Plate			2.1 μμί	
Between Deflecting Plate Deflecting Plate 1 to All	O45 Flacture		1.5 μμ	
			5.8 μμf	
Deflecting Plate 2 to All			5.8 μμf	
Deflecting Plate 3 to All	Other Electrodi	98	4.5 μμ	
Deflecting Plate 4 to All	Other Electrod	88	4.5 μμf	
MECHANICAL DATA				
				_
Minimum Useful Screen Di			2.68 Inc	
Nominal Overall Length			10 Inc	ches
Bulb Contact (Recessed Sn			J1-22	
Bulb			J24V	
Base (Medium-Shell Dihep			12-37	
Basing			14J	
Base Alignment				
D1D2 trace aligns with F				
Tube Axis			± 10 De	grees
Positive Voltage on Di				
approx, toward Pin				
Positive Voltage on D3	deriects beam			
approx. toward Pin				
Angle Between Traces D	ID2 and D3D4	90	± 1 De	grees
Bulb Contact Alignment	D1 D0 T		. 40 D	
J1-22 contact aligns with	ו Irace ויטוט		± 10 De	grees
J1-22 contact on same si	ue as rin No. 5			

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum	Values)	
Anode No. 3 Voltage	2200	Volts d c Volts d c
Anode No. 2 Input (Avg. except for 3ACP12A). Anode No. 1 Voltage (Focusing Electrode) Grid No. 1 Voltage	6.0	Watts Volts d c
Negative Bias Value	0	Volts d c Volts d c Volts
Heater Negative with Respect to Cathode Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and	200	Volts Volts
Any Deflection Plate	600	Volts
TYPICAL OPERATING CONDITIONS ²		
Anode No. 3 Voltage Anode No. 2 Voltage Anode No. 1 Voltage for Focus. Grid No. 1 Voltage Required for Cutoffs Anode No. 3 Currents Cathode Currents Cathode Currents Deflection Factor Deflecting Plates 1-2 Deflecting Plates 3-4 Deflection Factor Uniformity7 Pattern Distortions Modulation at Anode No. 3 Current = 25 µAdor 3.	-45 to -75 500 125 600 175 to 205 138 to 158 2	Volts d c µa d c Min. µa d c Max. µa d c Max. Volts d c/Inch Volts d c/Inch
Modulation at Anode No. 3 Current = 200 µAdc7 (Except 3ACP12A)		Volts d c Max.
Line Width "A" at Anode No. 3 Current = 5 µa (3ACP12A)		Inches Max.
50 µAdc ⁷ (Except 3ACP12A) Line Width "A" at Anode No. 3 Current =	.016	Inches Max.
200 μAdo? (Except 3ACP12A) Light Output at Anode No. 3 Current = 100 μAdo	.028	Inches Max.
3ACP1A. 3ACP11A. Spot Position (Focused and Undeflected) ¹⁰	80	Foot Lamberts Min. Foot Lamberts Min. Inch Radius Circle

CIRCUIT VALUES

1.5 Megohms Max. 1.0 Megohms Max.

NOTES:

- These types are designed for optimum performance when operating at EB3/EB2 ratio of 2.0.
 Type 3ACP12A can be severly and permanently damaged if current density is allowed to rise too high. Test and operate at minimum usable currents.
 Visual extinction of undeflected focused spot.

- Visual extinction of undeflected focused spot.
 At EG1 = 0 V dc.
 At IB3 = 50 μa d c.
 At IB3 = 200 μa d c.
 Per MIL-E-1 specifications.
 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.
 Measured in accordance with MIL-E-1 specifications using a raster size of 1% x 1% inches. The P11 phosphor is measured with a photronic cell without ever correction.
- eye correction.
- Centered with respect to tube face and with tube shielded. Connect deflecting plates to Anode No. 2.
 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.

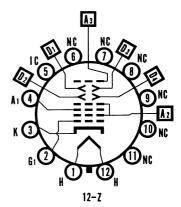
SYLVANIA TYPES 3ADP1 3ADP*

3" Direct Viewed Round Glass Type Electrostatic Focus **Electrostatic Deflection**

Flat, Clear Faceplate Post Deflection Acceleration

Close Tolerances





GENERAL DATA Focusing Method Deflection Method Types* Fluorescence Phosphorescence Persistence Faceplate *In addition to the types she screen phosphors.	3ADP1 Green E Medium	3ADP2 Blue-Green Green Long	Elec 3ADP7 Blue-Whi Yellow Long Flat	te Blue Short
ELECTRICAL DATA Heater Voltage Heater Current Direct Interelectrode Capaci		0.	6 ± 10%	
Cathode to All Other Elec Grid No. 1 to All Other El Between Deflecting Plates Between Deflecting Plates Deflecting Plate 1 to All O Deflecting Plate 2 to All O Deflecting Plate 3 to All O Deflecting Plate 4 to All O	ectrodes 1-2, 3-4 ther Electrod ther Electrod ther Electrod	5.5 1.4 0.9 es 3.6 es 3.6	Max. 4.5 7.2 2.0 1.5 4.6 4.6 3.6	µµf µµf µµf µµt µµf µµf
MECHANICAL DATA Minimum Useful Screen Dial Nominal Overall Length Bulb Contact (Recessed Sma Neck Contacts Base (Small Shell Duodecal 1 Basing Base Alignment D1-D2 Trace Aligns with I Tube Axis Positive Voltage on D1 De	II Ball Cap). 12-Pin) Pin No. 5 and		10 J1-22 J1-25 B12-43 12Z	Inches Inches Degrees
approx. toward Pin No. Positive Voltage on D3 De approx. toward Pin No. Angle Between Traces D1- Bulb Contact Alignment J1-22 Contact Aligns with J1-22 Contact on same side	eflects Beam 2 D2 and D3-D D1-D2 Trace	• • • • • • • •		Degrees Degrees

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage	6600 Volts d c
Anode No. 2 Voltage ¹	
Ratio of Anode No. 3 Voltage to Anode	3300 Voits a c
Hatto 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	
Positive Peak Value	
Peak Heater-Cathode Voltage	0 10113
Lister Marchine with Descript to Cathoda	200 Volts
Heater Negative with Respect to Cathode	
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. 3 Voltage	2000 Volte
Anode No. 1 Voltage for Focus	2000 Volta
Grid No. 1 Voltage Required for Cutoff ²	-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 @ lb3 = $25 \mu a^8 \dots$	38 Volts d c Max.
Line Width "A" @ $1b3 = 25 \mu a^3 \dots$.014 Inches Max.
Light Output @ lb3 = 25 μa4	
3ADP15	20 Ft. L. Min.
3ADP116	
Definition Factor Uniformity	O Parant Man
Deflection Factor Uniformity ³	2 Percent Max.
Pattern Distortion	2 Percent Max.
Undeflected Spot Position8	Within a 10 mm Square
Useful Scan	
D1-D2 ± 1.31	5 Inches From Tube Face
Center of	or a Total 2.63 Inches Min.
D3-D4 ± 0.79	5 Inches From Tube Face
Center	or a Total 1.5 Inches Min.
Out to 1	o. a 10tal 1.0 mones will.
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms Max.
Deflection Circuit Desistance	1.0 Magahma May

NOTES:

The product of the Anode No. 2 Voltage and the Average Anode No. 2 Current should be limited to 6.0 watts.
 Visual extinction of undeflected focused spot.

1.0 Megohms Max.

Deflection Circuit Resistance9.....

- Visual extinction of undeflected focused spot.
 Measured in accordance with MIL-E-1.
 Using a raster size of 2½ x 1½ inches.
 Using a No. 594 Photronic cell with Viscor filter (for eye correction).
 Using a No. 594 Photronic cell without Viscor filter (without eye correction).
 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.
 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.
 It is recommended that the deflecting electrode circuit resistances be approximately equal.
- mately equal.

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)

MECHAN	ICAL	DATA
--------	------	------

Minimum Useful Screen Diameter	23/4 Inches
Nominal Overall Length	11½ Inches
Bulb	J24C´¯
Base (Medium 7-Pin)	A7-13
Basing	7CE

RATINGS

MAXIMOM HATTINGS (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 ²	1500 Volts d.c.	

Anode No. 1 Voltage	240 to 560 Volts d c
Grid No. 1 Voltage Required for Cutoff3	-25 to -75 Volts d c
Deflection Factor 4,5	
Deflecting Plates 1-25	90 to 137 Volts d c/Inch
Deflecting Plates 3-47	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:

- 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.
 Brilliance and definition decrease with decreasing Anode No. 2 Voltage. In general, Anode No. 2 Voltage should not be less than 1000 Volts.
 Visual extinction of undeflected focused spot.
 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.
 Angle between D1-D2 trace and D3-D4 trace is 90° ± 3°.
 Deflecting Plates 1-2 are nearer the screen.
 Deflecting Plates 3-4 are nearer the base.

3AP1

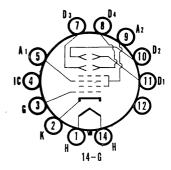
Sylvania Type 3AP1A replaces Type 3AP1.

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

Focusing Method. Deflection Method. Phosphor. Fluorescence. Persistence.	Electrostatic Electrostatic P1 Green Medium
Faceplate*In addition to the type shown, the 3BP-A can be suppli screen phosphors.	Clear ed with several other
ELECTRICAL DATA	
Heater Voltage	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes	8.0 μμf 8.5 μμf
Between Deflecting Plates 1-21	2.0 μμf 2.0 μμf
Deflecting Plate 12 to All Other Electrodes	8.0 μμt
Cathode to All Other Electrodes. Grid to All Other Electrodes. Between Deflecting Plates 1-2¹. Between Deflecting Plates 3-4¹. Deflecting Plate 1² to All Other Electrodes. Deflecting Plate 3² to All Other Electrodes. Deflecting Plate 1 to All Other Electrodes. Except D2.	6.0 μμf 6.0 μμf
Deflecting Plate 22 to All Other Electrodes	5.0 μμf
Except D1. Deflecting Plate 3 to All Other Electrodes Except D4.	• •
Deflecting Plate 42 to All Other Electrodes	4.0 μμf
Except D3	6.0 μμf
MECHANICAL DATA	20/1
Minimum Useful Screen Diameter	2¾ Inches 10 Inches Shell Diheptal 12-Pin 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 Positive Value	
Grid Voltage Negative Value. Positive Value. Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode	1100 Volts d c 200 Volts d c
Grid Voltage Negative Value Positive Value Peak Heater-Cathode Voltage	1100 Volts d c 200 Volts d c 0 Volts d c 125 Volts
Grid Voltage Negative Value Positive Value Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and	1100 Volts d c 200 Volts d c 0 Volts d c 125 Volts 10 Volts
Grid Voltage Negative Value. Positive Value. Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode. Heater Positive with Respect to Cathode. Peak Voltage Between Anode No. 2 and Any Deflection Plate. TYPICAL OPERATING CONDITIONS Anode No. 2 Voltage³ Anode No. 1 Voltage for Focus. Grid Voltage Required for Cutoff⁴. -30°	1100 Volts d c 200 Volts d c 0 Volts d c 125 Volts 10 Volts 550 Volts
Grid Voltage Negative Value. Positive Value. Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode. Heater Positive with Respect to Cathode. Peak Voltage Between Anode No. 2 and Any Deflection Plate. TYPICAL OPERATING CONDITIONS	1100 Volts d c 200 Volts d c 0 Volts d c 125 Volts 10 Volts 550 Volts 2000 Volts d c 10 690 Volts d c 10 -90 Volts d c 10 222 Volts d c/Inch
Grid Voltage Negative Value. Positive Value. Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode. Heater Positive with Respect to Cathode. Peak Voltage Between Anode No. 2 and Any Deflection Plate. TYPICAL OPERATING CONDITIONS Anode No. 2 Voltage³. Anode No. 1 Voltage for Focus. Orid Voltage Required for Cutoff⁴. Deflection Factor Deflection Factor Deflecting Plates 1-2⁵.	1100 Volts d c 200 Volts d c 0 Volts d c 125 Volts 10 Volts 550 Volts 2000 Volts d c 10 690 Volts d c 10 -90 Volts d c 10 178 Volts d c/Inch
Grid Voltage Negative Value. Positive Value. Positive Value. Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode. Heater Positive with Respect to Cathode. Peak Voltage Between Anode No. 2 and Any Deflection Plate. TYPICAL OPERATING CONDITIONS Anode No. 2 Voltage³. Anode No. 1 Voltage for Focus. Grid Voltage Required for Cutoff⁴. Deflection Factor Deflecting Plates 1-2°. Deflecting Plates 3-4°. CIRCUIT VALUES Grid Circuit Resistance.	1100 Volts d c 200 Volts d c 0 Volts d c 125 Volts 10 Volts 550 Volts 2000 Volts d c to 690 Volts d c to -90 Volts d c to 178 Volts d c/Inch 1.5 Megohms Max. 5.0 Megohms Max.

3BP1

Sylvania Type 3BP1A replaces Type 3BP1.

SYLVANIA TYPES 3AQP1 3AQP*

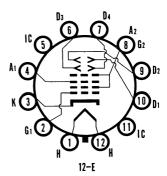
SPECIAL PURPOSE TUBE

3" Direct Viewed Round Glass Type

Clear, Spherical Faceplate High Deflection Sensitivity

Electrostatic Focus
Electrostatic Deflection
High Deflection Sensitivit





CHARACTERISTICS

		Electros	
		3AQP7	3AQP11
Green	Blue-Green	Blue-White	
	Green		
Medium			Short
	.,,,,		
shown, the S	BAQP- can be	supplied with	several other
	3AQP1 Green Medium	Green Blue-Green Green Medium Long	SAQP1 SAQP2 SAQP7

E 1	FCTD	ICAI	DATA

ELECTRICAL DATE.		
Heater Voltage		
Direct Interelectrode Capacitances (approx.)	-10 - 10 /0 .	po. o
Cathode to All Other Electrodes	4.3 μ	μf
Grid No. 1 to All Other Electrodes	7.5 µ	
Between Deflecting Plates 1-2	5.2 μ	
Between Deflecting Plates 3-4	7.0 µ	
Deflecting Plate 1 to All Other Electrodes	10.1 μ	
Deflecting Plate 2 to All Other Electrodes	7.5 µ	μf
Deflecting Plate 3 to All Other Electrodes	8.1 μ	μf
Deflecting Plate 4 to All Other Electrodes	9.2 μ	μf
MECHANICAL DATA		
Minimum Useful Screen Diameter	23/4	nches
Nominal Overall Length	9½ I	nches
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 [
Weight (approx.)	½ F	Pound

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

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

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. After Equipment Warm-up. Heater Positive with Respect to Cathode. Peak Voltage Between Anode No. 2 and Any Deflection Plate.	140 140	Volts Volts Volts
TYPICAL OPERATING CONDITIONS		
Anode No. 2 Voltage ¹ . Anode No. 1 Voltage for Focus. Grid Voltage Required for Cutoff ² . Deflection Factors Deflecting Plates 1-2 ³ . Deflecting Plates 3-4 ⁴ . Useful Scan D1-D2 ⁵ . D3-D4 ⁵ . Spot Position (Undeflected, Focused) ⁶ .	330 to 620 -58 to -135 146 to 198 52 to 70 234 214	Volts d c Volts d c Volts d c/Inch Volts d c/Inch Inches Min. Inches Min. MM Square
CIRCUIT VALUES Grid Circuit Resistance Deflection Circuit Resistance ⁷		Megohms Max. Megohms Max.
NOTES		

NOTES:

- OTES:

 1. Operation of Type 3AQP7 at anode voltages of less than 1000 volts is no-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

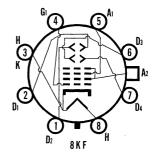
 $1\frac{1}{2}$ \times 3 $^{\prime\prime}$ Direct Viewed Rectangular Glass Type

Clear, Pressed Faceplate

Electrostatic Deflection Electrostatic Focus

High Deflection Sensitivity





CHARACTERISTICS

GENERAL BATTA			
Focusing Method			Electrostatic
Deflection Method			Electrostatic
Types*	Fluorescence	Phosphorescence	
3ASP1			Medium
3ASP2		Green	Long
3ASP11			Short
Faceplate			Flat, Clear
# 1		ACD b1:-	all contains and contains and and in

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

ELECTRICAL DATA

GENERAL DATA

Heater Voltage	6.3 Volts
Heater Current0.6 +	- 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes	4.5 μμf
Between Deflection Plates 1-2	$2.0 \mu \mu f$
Between Deflection Plates 3-4	$2.5 \mu\mu f$
Deflection Plate 1 to All Other Electrodes	$6.5 \mu\mu f$
Deflection Plate 2 to All Other Electrodes	$6.0~\mu\mu f$
Deflection Plate 3 to All Other Electrodes	5.5 μμf
Deflection Plate 4 to All Other Electrodes	$5.5 \mu\mu f$

м

Deflection Plate 3 to All Other Electrodes Deflection Plate 4 to All Other Electrodes	5.5 μμτ 5.5 μμf
MECHANICAL DATA	
Minimum Useful Screen Dimensions Horizontal	2¾ Inches
Vertical	11/8 Inches
Bulb	LEA 448 or Equiv.
BaseBasing	B8-218 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 ± 1½ Degrees
Deflection Plates	_ /2 /3
D1 and D2 are nearer to the tube face D3 and D4 are nearer the base	
Do and D4 are nearer the base	

SYLVANIA TYPES 3ASP1, 3ASP* (Cont'd)

RATINGS

MAXIMUM RATINGS (Absolute Maximum Valu	es)	
Anode No. 2 Voltage		Volts d c
Anode No. 2 Input		Watts
Anode No. 1 Voltage (Focusing Electrode)	1200	Volts d c
Grid No. 1 Voltage		
Negative Bias Value		Volts d c
Positive Bias Value		Volts d c
Positive Peak Value	2	Volts
Peak Voltage between Anode No. 2 and	600	M-11-
Any Deflection Plate		Volts
Altitude	35,000	reet
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 ¹	-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 (Undeflected, Focused)2	Within a	15 mm Square
P1 Light Output4		Ft. L. Min.
Modulation ⁵		Volts d c Max.
Line Width A6	0.65	mm Max.
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max.
Deflection Circuit Resistance ³		Megohms Max.
20.000.00.00.00.00.00.00.00.00.00.00.00.	1.0	ogoiiiio iriaki

NOTES:

- Visual extinction of undeflected focused spot.
 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.
 It is recommended that the deflecting electrode circuit resistances be approxi-
- mately equal.

 4. Raster size 1½" x 1½".

 5. Measured at 20 Ft. L. on a raster 1½" x 1½".

 6. Measured by compressed raster method starting with conditions of Note 5.

SYLVANIA TYPES 3BEP1 3BEP-*

SPECIAL PURPOSE TUBE

 $1\frac{1}{2}$ " imes 3" Direct Viewed Electrostatic Deflection Rectangular Glass Type High Quality, Clear, Pressed Faceplate

GENERAL DATA

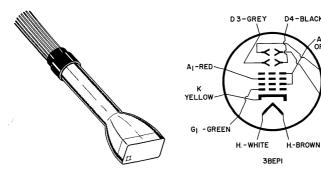
Electrostatic Focus Encapsulated Base With Golor Coded Leads

A2-ORANGE

-D2-VIOLET

BLUE

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.

GENERAL DATA	
Focusing Method Deflecting Method Phosphor* Fluorescence Phosphorescence Persistence Faceplate	P1 Green Medium Clear, Pressed Glass
*In addition to the type shown, the 3BEP- can be screen phosphors.	supplied with several other
ELECTRICAL DATA	
Heater Voltage Heater Current. Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes	$0.6 \pm 10\%$ Ampere $5 \mu \mu f$
Grid No. 1 to All Other Electrodes	8 μμf
Between Deflecting Plates 1-2	7 μμf
Between Deflecting Plates 3-4	6 μμf 9 μμf
Deflecting Plate 2 to All Other Electrodes	9 μμι 8 μμf
Deflecting Plate 3 to All Other Electrodes	7 μμf
Deflecting Plate 4 to All Other Electrodes	$8 \mu \mu f$
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum As	sured)
Horizontal	2¾ Inches
Vertical	1 1/8 Inches
Overall Length	9½ Inches LEA 417 or Equivalent
BaseEnca	nsulated. Color Coded Leads
Trace Alignment with Bulb (See Diagram)	pouration, color could Louds
D1-D2 Trace Aligns with Long Axis of	
Tube Face ¹	±1.5 Degrees
Angle Between D1-D2 Trace and D3-D4 Trace Weight (approx.)	90 ± 1 Degrees 3/4 Pound
**orgin (approx.)	74 i 0uilu

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)		
Anode No. 2 Voltage	00	Volts d c
Anode No. 1 Voltage (Focusing Electrode) 12	00	Volts d c
Grid No. 1 Voltage		
Negative_Bias Value 1		Volts d c
Positive Bias Value		Volts d c
Positive Peak Value	2	Volts
Peak Heater-Cathode Voltage		
		Volts
		Volts
		Feet
Operating Temperature Range65 to +	85	Degrees C
TYPICAL OPERATING CONDITIONS		
Anode No. 2 Voltage	იი	Volts d c
Anode No. 1 Voltage for Focus 247 to 4		
Grid No. 1 Voltage Required for Cutoff ² 43.5 to -1	01	Volts d c
Deflection Factors		
Deflecting Plates 1-23	49	Volts d c/Inch
		Volts d c/Inch
Spot Position (Focused, Undeflected)5 Within a	. 5	mm Square

CIRCUIT VALUES

BANKING DATINGS /Aboots

1.5 Megohms Max. 1.0 Megohms Max.

NOTES:

- 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.
 Visual extinction of undeflected focused spot.
 Deflecting Plates 1 and 2 are nearer the screen and scan the major dimension of the screen.
 Deflecting Plates 3 and 4 are nearer the base and scan the minor dimension

- of the screen.

 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.

 It is recommended that the deflecting electrode circuit resistances be approxi-
- mately equal.

SYLVANIA TYPES 3BGP1 3BGP*

SPECIAL PURPOSE TUBE

Rectangular Glass Type

1½" x 3" Direct Viewed

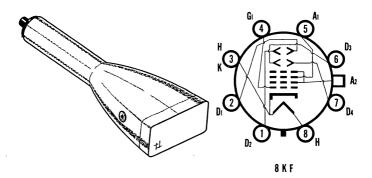
Electrostatic Deflection

Electrostatic Focus

Clear. Pressed Facealate

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 $\frac{1}{160}$ of the power necessary to operate a conventional 6.3 v, 600 ma heater.

	CHANAC	LINIOTICS	
GENERAL DATA			
Focusing Method Deflection Method.			Electrostatic Electrostatic
Types*	Fluorescence	Phosphorescence	Persistence Medium Long Long Short Flat, Clear ed with several other
3BGP1	Green		Medium
3BGP2	Blue-Green	Green	Long
3BGP11	Riue	Tellow	Short
Faceplate			Flat. Clear
*In addition to the screen phosphors.	types shown, the 3	BGP- can be suppli	ed with several other
ELECTRICAL DATA	١		
Heater Voltage			1.5 Valts
Heater Current			10% Ampere
Direct Interelectrode	e Capacitances (ap	prox.)	
	Other Electrodes.		4.5 μμf
	n Plates 1-2 n Plates 3-4		2.0 μμf
	to All Other Elect		2.5 μμf 6.5 μμf
Deflection Plate 2	to All Other Elect	rodes	6.0 μμf
	to All Other Elect		5.5 μμf
Deflection Plate 4	to All Other Elect	rodes	5.5 μμf
MECHANICAL DAT	Ά		
Minimum Useful Scr	reen Dimensions		
Horizontal			23/ Inches
			11/2 Inches
Overall Length			91/8 Inches
Bulb			48 or Equiv.
Base			8-181 8KF
Anode No. 2 Contac	+		J1-22
Base Alignment			,
Pin No. 3 aligns	with major axis o	f tube face	•
within 10°, and is	on same side as an	ode contact	
(J1-22)			

SYLVANIA TYPES 3BGP1 (Cont'd) 3BGP*

.66
ees

PATINGS

KATINGS		
MAXIMUM RATINGS (Absolute Maximum Val	lues)	
Anode No. 2 Voltage		Volts d c Watts
Anode No. 2 Input		Volts d c
Negative Bias Value		Volts d c Volts d c
Positive Peak-Value Peak Voltage between Andde No. 2 and Any		Volts
Deflection Plate	550 35,000	Volts Feet
TYPICAL OPERATING CONDITIONS		
Anode No. 2 Voltage	400 to 700	
Deflection Plates 1-2. Deflection Plates 3-4. Spot Position (Undeflected, Focused) ² . PI Light Output ⁴ .	28 to 38 Within a 15	Volts d c/Inch Volts d c/Inch mm Square Ft. L. Min.
Modulation ⁵ Line Width A	38	Volts d c Max. mm Max.
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance		Megohms Max. Megohms Max.

NOTES:

- Visual extinction of undeflected focused spot.
 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.
 It is recommended that the deflecting electrode circuit resistances be approximately acred.

- mately equal.

 4. Raster size 11/4" x 11/4".

 5. Measured at 20 Ft. L. on a raster 11/4" x 11/4".

 6. Measured by compressed raster method starting with conditions of Note 5.

SYLVANIA TYPES 3BMP1 3BMP-

SPECIAL PURPOSE TUBE

Round Glass Type Electrostatic Deflection

3" Direct Viewed

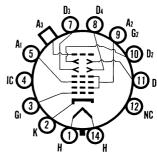
Electrostatic Focus

Post Deflection Acceleration

Very Low Heater Power Flat Face Plate

Close Tolerances





GENERAL DATA				
Focusing Method Deflection Method.			Floor	trostatic trostatic
3 RMP1	Green	Phosphorescence Green Yellow	•	Medium
3BMP2	Blue-Green	Green		Long
3BMP7	Blue-White	Yellow		Long
3BMP11	Blue			Short
3BMP12	Orange	Yellow Orange	M	ledium Long
3BMP11 3BMP12 Faceplate *In addition to the t		DMD b	Flat	, Clear
supplied with sever	al other screen ph	osphors.		
ELECTRICAL DATA	=			
Heater Voltage			1.5	Volts
Heater Current Direct Interelectrode			10%	Ampere
Cathode to All Ot	bor Floctrodes (IV	iaximum)	4.2	f
Grid to All Other	Electrodes		5.8	
Between Deflectin	g Plates 1-2		2.1	μμf
Between Deflectin	g Plates 3-4		1.5	
Deflecting Plate 1			5.8	
Deflecting Plate 2	to All Other Elec	trodes	5.8	
Deflecting Plate 3 Deflecting Plate 4			4.5 4.5	
MECHANICAL DAT			7.5	μμι
Minimum Useful Sci				Inches
Overall Length Bulb Contact (Reces	end Small Ball Ca	in)	J1-22	Inches
Bulb			J24V	
Base (Medium-Shell	Diheptal 12-Pin)		12-37	
Basing			14J	
Base Alignment		ad Tuba Auta		D
D1-D2 trace aligns	on D1 deflects be	na Tube Axis	± 10	Degrees
approx. towar	d Pin No. 5	Jani		
Positive Voltage	on D3 deflects be	eam		
approx. towar	d Pin No. 2			_
		3 - D4 90	± 1	Degrees
Bulb Contact Alignn J1-22 contact align	ilerit oo with D1_D2 tra	.00	± 10	Degrees
J1-22 contact ang	ame side as Pin N	lo. 5	± 10	Degrees
5. LE 3011ta0t 011 0	U uo 1 111 11			

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Val	ues)
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 ¹	3.0
Anode No. 2 Input (Av. except for 3BMP12)2	6.0 Watts
Anode No. 1 Voltage (Focusing Electrode)	1500 Volts d c
Grid No. 1 Voltage	1000 10110 0 0
Negative Bias Value	200 Volts d c
Positive Bias Value	
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 ²	
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 ³	-45 to -75 Volts d c
Deflection Factor	
Deflecting Plates 1-2	180 to 220 Volts d c/Inch
Deflecting Plates 3-4 Deflection Factor Uniformity4	133 to 163 Volts d c/Inch
Deflection Factor Uniformity4	2 Percent Max.
Pattern Distortion	2 Percent Max.
Modulation at Anode No. 3 Current = 25μ Adc4	
Line Width "A" at Anode No. 3 Current = 25µAdc	.016 Inches Max.
Light Output at Anode No. 3 Current = 25µAdc6	
(3BMP1)	20 Ft. Lam. Min.
Spot Position7	Within a 10 mm Square
OLDOUIT VALUES	•
CIRCUIT VALUES	
Grid Circuit Resistance	1.5 Megohms Max.
Deflection Circuit Resistance ⁸	1.0 Megohms Max.
	=

- These types are designed for optimum performance when operating at EB3/EB2 ratio of 2.0.
 Type 3BMP12 can be severely and permanently damaged if current density is allowed to rise too high. Test and operate at minimum usable currents.
 Visual extinction of undeflected focused spot.
 Per MIL-E-1 specifications.
 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.
 Measured in accordance with MIL-E-1 specifications using a raster size of 11% x 11% inches.
 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.
- deflection axes.
- 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.

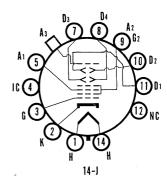
SYLVANIA TYPE 3JP1 3JP*

SPECIAL PURPOSE TUBE

3" Direct Viewed Round Glass Type Electrostatic Deflection Electrostatic Focus

Post Deflection Accelerator





GENERAL DATA					
Focusing Method			Floor	rostatic	
Deflecting Method. Types* Fluorescence. Phosphorescence. Persistence. Facenlate			Flect	rostatic	
Types*	3JP1	3JP2	3JP7	3JP12	
Fluorescence	Green	Green	Blue-White		
Phosphorescence			Yellow	Orange)
Persistence	Medium	Long	Long	Medium-L lear	.ong
Faceplate* In addition to the types sho					
screen phosphors.	wii, the sur	— can be s	supplied wit	ii severai u	LIIOI
ELECTRICAL DATA					
			6.2	Valla	
Heater Current (approx.)			0.3 0.6 + 10%	VOIIS Δmnore	
Heater Voltage Heater Current (approx.) Direct Interelectrode Capaci	tances (appro	x.)	0.0 1 1076	Ampere	
Cathode to All Other Elec	trodes		8	μμf	
Grid No. 1 to All Other E	lectrodes			μμf	
Between Deflecting Plates	1-21		2.5		
Between Deflecting Plates Deflecting Plate 1 ¹ to All	Other Floctro	dos	2	μμf μμf	
Deflecting Plate 2 ¹ to All	Other Flectro	des		μμί μμf	
Deflecting Plate 31 to All	Other Electro	des	7	μμf	
Deflecting Plate 41 to All	Other Electro	des	8	$\mu\mu$ f	
MECHANICAL DATA					
Minimum Useful Screen Dia	meter		23/4	Inches Inches	
Nominal Overall Length			10	Inches	
Bulb Contact (Recessed Sm	all Ball Cap).		J1-22 B12-37		
Base (Medium Shell Dihepta	ai 12-Piŋ)		B12-37		
Basing			140		
	RATING	S			
MAXIMUM RATINGS (Abs	solute Maxir	num Valu	ies)		
Anode No. 3 Voltage				Volts d c	
Anode No. 2 Voltage				Volts d c	
Anode No. 1 Voltage Grid No. 1 Voltage			1100	Volts d c	
Negative Rias Value			220	Volts d c	
Negative Bias Value Positive Bias Value				Volts d c	
Positive Peak Value			2	Volts	
Peak Heater-Cathode Voltag	je		140	V-11-	
Heater Negative with Res Heater Positive with Resp	pect to Catho	ge	140	Volts Volts	
Peak Voltage Between Anod	le No 2 and	10	140	VOILS	
Any Deflecting Plate			550	Volts	
TYPICAL OPERATING CO		• • • • • • • • • • • • • • • • • • • •			
			3000	Volts d.c	
Anode No. 2 Voltage ³			1500	Volts d c	
Anode No. 1 Voltage			300 to 515	Volts d c	
Anode No. 3 Voltage ² Anode No. 2 Voltage ³ Anode No. 1 Voltage Grid No. 1 Voltage Required	d for Cutoff4.	:	22.5 to 67.5	Volts d c	
Deflection Factor &					
Deflecting Plates 1-27 Deflecting Plates 3-48				Volts d c/Ir Volts d c/Ir	
Deficeting Flates 3=4°			37-120	* O1 to ti 0/ 11	

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

CIRCUIT VALUES

NOTES:

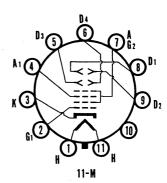
- Positive voltage on Pin No. 1 will deflect spot approximately toward Pin No. 5. Positive voltage on Pin No. 7 will deflect spot approximately toward Pin No. 2.
 Anode No. 3 voltage should not be less than 3000 volts for high speed scanning.
 Recommended minimum value of Anode No. 2 Voltage.
 Visual extinction of undeflected focused spot.
 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.
 Angle between D1-D2 trace and D3-D4 trace is 90° ± 3°.
 Deflecting Plates 1-2 are nearer the screen.
 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**





GENERAL DATA				
Focusing Method Deflecting Method				rostatic rostatic
Types* Fluorescence Phosphorescence		3KP4 White	3KP7 Blue Yellow	Blue
Persistence	Medium	Short	Long	Short
Faceplate* *In addition to the types sho screen phosphors.	own, the 3K	(P-can be su	ipplied wit	h several other
ELECTRICAL DATA				
Heater Voltage				Volts
Heater Current (approx.) Direct Interelectrode Capaci	itances (appr	ox.)	0.6 ± 5%	•
Grid No. 1 to All Other E				μμξ
Between Deflecting Plates			2.5	
Between Deflecting Plates Deflecting Plate 1 ¹ to All				μμf
Deflecting Plate 21 to All				μμf μμf
Deflecting Plate 31 to All			7	uuf
Deflecting Plate 41 to All				μμf
MECHANICAL DATA	- 11101			
Minimum Useful Screen Dia	meter		23/	Inches
Nominal Overall Length				Inches
Bulb Contact (Recessed Sma	ali Ball Cap)		J1-22	
Base (Medium Shell Magnal	l 11-Pin)		B11-66	
Basing			11 M	
Mounting Position			Any	

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Value	ues)	
Anode No. 2 Voltage ²	2750	Volts d c
Anode No. 1 Voltage	1100	Volts d c
Negative Bias Value		Volts d c
Positive Bias Value Positive Peak Value Peak Heater-Cathode Voltage		Volts
Heater Negative with Respect to Cathode		Volts
Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and	140	Volts
Any Deflecting Plate	550	Volts
TYPICAL OPERATING CONDITIONS		
Anode No. 2 Voltage ³		Volts d c
Anode No. 1 Voltage	320 to 600	
Grid No. 1 Voltage Required for Cutoff ⁴ Deflection Factor ⁵ . ⁶	−38 to −90	Volts d c
Deflecting Plates 1-27	100 to 136	Volts d c/Inch
Deflecting Plates 3-48	76 to 104	Volts d c/Inch
CIRCUIT VALUES		

Resistance in any Deflecting Electrode Circuit....

Grid No. 1 Circuit Resistance

- NOTES:

 - OTES:

 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° ± 3°.

 7. Deflecting Plates 1-2 are nearer the screen.

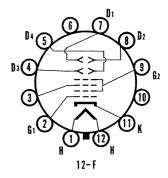
 8. Deflecting Plates 3-4 are nearer the base.

SYLVANIA TYPE 3MP1

SPECIAL PURPOSE TUBE

3" Direct Viewed **Electrostatic Deflection** Round Glass Type Electrostatic Focus





1.5 Megohms Max.

5.0 Megohms Max.

CHARACTERISTICS

GENERAL DATA Focusing Method. Electrostatic Deflecting Method..... Electrostatic P1 Phosphor.... Fluorescence..... Green Persistence..... Medium Faceplate. *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. Heater Current (approx.). Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid to All Other Electrodes. Between Deflecting Plates 1-2¹. Between Deflecting Plates 1-2¹. Deflecting Plate 1² to All Other Electrodes Except D2. Deflecting Plate 2² to All Other Electrodes Except D1. Deflecting Plate 3² to All Other Electrodes Except D4. Deflecting Plate 3² to All Other Electrodes Except D4. Deflecting Plate 4² to All Other Electrodes Except D3.	0.6 Ampere 2.2 μμf 10.3 μμf 1.3 μμf 1.2 μμf 4.4 μμf 5.6 μμf
MECHANICAL DATA Minimum Useful Screen Diameter. Nominal Overall Length. Base. Basing.	23/4 Inches 8 Inches Small Shell Duodecal 12-Pin 12F
RATINGS	
MAXIMUM RATINGS (Absolute Maximum Va	<u> -</u>
Anode No. 2 Voltage	2750 Volts d c 1100 Volts d c
Grid Voltage Negative Bias Value. Positive Bias Value. Positive Peak Value. Peak Heater-Cathode Voltage	220 Volts d c 0 Volts d c 2 Volts
Heater Negative with Respect to Cathode Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and	140 Volts
Any Deflection Plate	550 Volts
TYPICAL OPERATING CONDITIONS Anode No. 2 Voltage³	400 to 700 Volts d c
Deflecting Plates 1-2 ⁵	230 to 290 Volts d c/Inch 220 to 280 Volts d c/Inch
CIRCUIT VALUES Grid Circuit Resistance Deflection Circuit Resistance	1.5 Megohms Max. 5.0 Megohms Max.
NOTES:	
1. Deflecting Plate 1 is Pin No. 7. Deflecting Plate 2 is Pin No. 4. Deflecting Plate 3 is Pin No. 4. Deflecting Plate 4 is Pin No. 5. 2. DI-D2 trace aligns with Pin No. 4 and tube an Positive voltage on D1 deflects beam approxima Positive voltage on D3 deflects beam approxima 3. Brilliance and definition decreases with decrein general, Anode No. 2 Voltage should not be 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.	tely toward Pin No. 4.

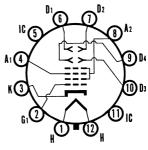
SYLVANIA TYPES 3WP1 3WP*

SPECIAL PURPOSE TUBE

3" Direct Viewed
Electrostatic Deflection
Flat, Clear Faceplate

Round Glass Type Electrostatic Focus High Deflection Sensitivity





12-T

Heater Voltage	Focusing Method. Deflection Method Types* Fluorescence. Phosphorescence. Persistence. Faceplate. *In addition to the types shown, screen phosphors.	Green Medium	Blue-G Gree Lor	ireen en Ia	Blue Short
Heater Current	ELECTRICAL DATA				
Cathode to All Other Electrodes. 3.0 5.7 μμf Grid No. 1 to All Other Electrodes 4.6 8.7 μμf Between Deflecting Plates 1-2 1.7 3.3 μμf Between Deflecting Plates 1-2 1.7 2.0 μμf Deflecting Plate 1 to All Other Electrodes Except D2 3.8 7.2 μμf Deflecting Plate 2 to All Other Electrodes Except D1 3.8 7.2 μμf Deflecting Plate 3 to All Other Electrodes Except D1 3.8 7.2 μμf Deflecting Plate 3 to All Other Electrodes Except D4 3.8 7.2 μμf Deflecting Plate 3 to All Other Electrodes Except D3 2.5 4.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 2.5 4.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 2.5 4.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 3.8 7.2 μμf Deflecting Plate 4 to All Other Electrodes Except D3 3.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 3.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 3.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 3.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 3.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 3.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 3.8 μμf Deflecting Plate 4 to All Other Electrodes Except D3 3.8 μμf Deflecting Deflecting D4 3 μμf Deflecting D4 3 μμf	Heater Current		0.6 ∃	± 10%	
Grid No. 1 to All Other Electrodes.	Cathode to All Other Flectrodes				uuf
Between Deflecting Plates 1-2.				8.7	μμf
Deflecting Plate 1 to All Other Electrodes				3.3	μμf
Except D1.	Deflecting Plate 1 to All Other E	Electrodes		2.0	μμf
Except D1.	Except D2	Electrodes	3.8	7.2	μμf
Except D4.	Except D1	lectrodes	3.8	7.2	$\mu\mu$ f
Except D3	Except D4		2.5	4.8	μμf
Minimum Useful Screen Diameter	Except D3		2.5	4.8	$\mu\mu$ f
Overall Length. 11½ Inches Base (Small Shell Duodecal 12-Pin. B12-43 or Small Shell Duodecal 10-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 Voltage¹ . 2750 Volts d c Anode No. 1 Voltage (Focusing Electrode). 1100 Volts d c Grid No. 1 Voltage	MECHANICAL DATA				
Basing	Overall LengthBase (Small Shell Duodecal 12-Pin		 1	11 ½ B12 - 43	Inches Inches
Base Ålignment D1 and D2 Trace Aligns with Pin No. 3 and Tube Axis					
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 Voltage¹	Base Älignment D1 and D2 Trace Aligns with Pi	n No. 3 and	I	+ 10	Degrees
Toward Pin No. 12 RATINGS MAXIMUM RATINGS (Absolute Maximum Values) Anode No. 2 Voltage¹	Positive Voltage on D1 Deflects Be Toward Pin No. 3	am approx.	g	0 ± 1	Degree
MAXIMUM RATINGS (Absolute Maximum Values) 2750 Volts d c Anode No. 2 Voltage! 2750 Volts d c Anode No. 1 Voltage (Focusing Electrode) 1100 Volts d c		am approx.			
Anode No. 2 Voltage ¹	RA	ATINGS			
Grid No. 1 Voltage	MAXIMUM RATINGS (Absolute	Maximum	Values)		
Grid No. 1 Voltage	Anode No. 2 Voltage ¹ Anode No. 1 Voltage (Focusing Ele	ectrode)			
	Grid No. 1 Voltage			220	Volts d c

SYLVANIA TYPES 3WP1 (Cont'd) $3WP^*$

RATI	NGS	(cont	d)

Positive Rias Value

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	
,			
YPICAL 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 ²			
Deflection Factor			
Deflecting Plates 1-2	62 to 76	Volts d c/Inch	
Deflecting Plates 3-4		Volts d c/Inch	
1. T.		14-11- 84	

0 Volts dic

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

MINOUIL TALUE			
	esistance esistance ⁷	Megohms Megohms	

NOTES:

- The product of acceleration voltage and average acceleration current should be limited to 6.0 watts.
 Visual extinction of undeflected focused spot.

- Visual extinction of undeflected focused spot.
 Measured in accordance with MIL-E-1.
 The deflection factors of 75% of useful scan and at 25% of useful scan shall not differ by more than the indicated value.
 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.
 Centered on the tube face with the tube shielded and with all deflection plates connected to anode No. 2.
 It is recommended that the deflecting electrode circuit resistances be approximately equal.
- mately equal.

SYLVANIA TYPES 4MP1 4MP*

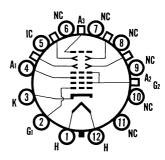
SPECIAL PURPOSE TUBE

Square Glass Type $3\frac{1}{2}$ " x $3\frac{1}{2}$ " Direct Viewed Electrostatic Focus Spherical Clear Faceplate Electrostatic Deflection Post Deflection Acceleration

Deflection Plate Connectors on Neck Wall



GENERAL DATA
Focusing Method....



12-Z

Electrostatic

Deflection Method			Elect	rostatic
Types*	4MP1	4MP2	4MP7	4MP11
Deflection Method Types* Fluorescence Phosphorescence Persistence	Green	Blue Green	Blue-White	e Blue
Phosphorescence		Green	Yellow	2,000
_ Persistence	Medium	Long	Long	Short
Faceplate* *In addition to the types	.,		Spheri	cal, Clear
*In addition to the types	snown, the	4MP- can be s	supplied wit	n several other
screen phosphors.				
ELECTRICAL DATA				
Heater Voltage			6.3	Volts
Heater Current			$0.6 \pm 10\%$	Ampere
Direct Interelectrode Cap				
Cathode to All Other E			5.0 /	
Grid No. 1 to All Other				μτ
Between Deflecting Pla Between Deflecting Pla	tes 1-211		2.7	
Deflecting Plate 1 to Al	LOs 3-4**		1.9 <i>j</i> 5.8 <i>j</i>	
Deflecting Plate 2 to Al				ιμι
Deflecting Plate 3 to Al	Other Elect	rodes	4.3	ιμι f
Deflecting Plate 4 to Al			4.0	ιμι f
Denoting Flate Fte 7th	Other Lice	10000	1.0 /	4441
MECHANICAL DATA				
Minimum Useful Screen (Rounded Co.	rnorel	21/8 x 21/8	Inches
Overall Length			1334	Inches
Bulb Contact (Recessed S	mall Ball Ca	n)	J1-22	
Neck Contacts	= 0	p,	0. 22	
(Anode No. 2 and Defle	ction Plates)		J1-25	
Bulb			LEA 467 c	r Equivalent
Weight (approx.)			1 ½ 1	Pounds
Base (Small Shell Duodec	al 12-Pin)		B12-43	
Basing			12Z	
Base Alignment				
D1-D2 Trace Aligns wit	th Pin No. 5			_
and Tube Axis			± 10	Degrees
Positive Voltage on D1		m		
approx. Toward Pin I Positive Voltage on D3	NO. 5	m		
approx. Toward Pin I		111		
Bulb Contact Alignment	NU. 2			
J1-22 Contact Aligns wi	th D1-D2 To	race	+ 10	Degrees
J1-22 Contact on Same	Side as Pin I	No. 5	± .0 .	- 09.000
Trace Alignment				
Angle Between D1-D2 a	and D3-D4 T	race	90 ± 1	Degrees
D1-D2 Trace Aligns wit	h Bulb Wall		±1.5	Degrees
=				-

SYLVANIA TYPES AMP1 (Cont'd) 4MP*

RATINGS

MAXIMUM RATINGS (Absolute Maximum Valu	ies)	
Anode No. 2 Input	6600 3300	Watts Volts d c Volts d c
Anode No. 2 Voltage ¹ . Anode No. 1 Voltage (Focusing Electrode) Grid No. 1 Voltage		Volts d c
Negative Bias Value. Positive Bias Value. Positive Peak Value. Peak Heater-Cathode Voltage	0	Volts d c Volts d c Volts
Heater Negative with Respect to Cathode Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and		Volts Volts
Any Deflecting Plate	600	Volts
Anode No. 3 Voltage Anode No. 2 Voltage Anode No. 1 Voltage for Focus Grid No. 1 Voltage Required for Cutoff ²	2000 340 to 510	Volts Volts
Deflection Factor Deflecting Plates 1-2. Deflecting Plates 3-4. Modulation at Ib3 = 25 μa³. Line Width "A" at Ib3 = 25 μa³. Line Width "β" at Ib3 = 25 μa³. Line Width "B" at Ib3 = 25 μa³.	42 to 52 38	Volts d c/Inch Volts d c/Inch Volts d c Max. mm Max. mm Max.
4MP15 4MP16 Deflection Factor Uniformity3 Pattern Distortion7 Undeflected Spot Position8 Trace Distortion9 Useful Scan	14 2 2 Within a 10 .02	Ft. L. Min. Ft. L. Min. Percent Max. Percent Max. mm Square Inch Max. Inches Min.
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance Deflection Circuit Resistance ¹⁰		Megohms Max Megohms Max

NOTES:

- NOTES:
 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.
 Visual extinction of undeflected focused spot.
 Measured in accordance with MIL-E-1.
 Using a raster size of 2½ x 2½ inches.
 Using a No. 594 Photronic cell with Viscor filter (for eye correction).
 Using a No. 594 Photronic cell without Viscor filter (without eye correction).
 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.
 Centered with respect to the tube face and with the tube shielded. Connect free deflection electrodes to accelerator.
 A 2¼ inch long trace which is deflected and focused ± 1½ inch from center in both the horizontal and vertical directions, shall not deviate from straight lines by more than the indicated value.
 It is recommended that the deflection electrode circuit resistances be approximately equal.
- mately equal.
- Deflecting plates D1 and D2 are nearer the screen while deflecting plates D3 and D4 are nearer the base.

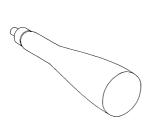
WARNING:

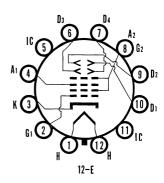
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 3RP1 3RP*

SPECIAL PURPOSE TUBE

3" Direct Viewed Round Glass Type Electrostatic Deflection Electrostatic Focus





GENERAL DATA		
Focusing Method Deflection Method Types* Fluorescence Phosphorescence		
Persistence. Faceplate. *In addition to the types shown, the 3RP—can be phosphors.	Medium	Short-Medium Clear th several other
ELECTRICAL DATA		
Heater Voltage Heater Current Direct Interelectrode Capacitances (approx.)		
Grid to All Other Electrodes	2.0	μμf μμf
Deflecting Plate 1 ¹ to All Other Electrodes Deflecting Plate 2 ¹ to All Other Electrodes Deflecting Plate 3 ¹ to All Other Electrodes Deflecting Plate 4 ¹ to All Other Electrodes	11.0 8.0 7.0 8.0	μμf
3	0.0	,
MECHANICAL DATA Minimum Useful Screen Diameter. Nominal Overall Length. Base (Small-Shell Duodecal 10-Pin). or (Small-Shell Duodecal 12-Pin). Basing.	23 <u>4</u> 91 <u>/8</u> B10-75 B12-43 12E	Inches Inches
RATINGS		
MAXIMUM RATINGS (Absolute Maximum Vali	ues)	
Anode No. 2 Voltage		Volts d c Volts d c
Negative Bias Value. Positive Bias Value. Positive Peak Value. Peak Heater-Cathode Voltage	0	Volts d c Volts d c Volts
Heater Negative with Respect to Cathode Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and		Volts Volts
Any Deflection Plate	550	Volts
TYPICAL OPERATING CONDITIONS		
Anode No. 2 Voltage ²	2000 330 to 620 -135	Volts d c Volts d c Volts d c
Deflecting Plates 1-26. Deflecting Plates 3-47.	146 to 198 104 to 140	Volts d c/Inch Volts d c/Inch

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

CIRCUIT VALUES

Grid Circuit Resistance	

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.
- 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.

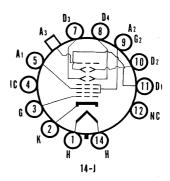
SYLVANIA TYPE 5ABP1 5ABP*

SPECIAL PURPOSE TUBE

5" Direct Viewed Round Glass Type Flat Faceplate Clear Faceplate

Electrostatic Focus **Electrostatic Deflection High Sensitivity** Post Deflection Acceleration





GENERAL DATA					
Focusing Method				Electrost	atic
Deflection Method				Electrost	
Types*	5ABP1	5ABP2	5ABP4	5ABP7	5ABP11
Fluorescence		Blue-Green	White	Blue	Blue
Phosphorescence.		Green		Yellow	
Persistence	Medium	Long	Medium	Long	Short
Faceplate				Clear	
*In addition to the ty	rpes shown	i, the 5ABP-c	an be supp	lied with se	everal other
screen phosphors.			• • •		

ELECTRICAL DATA	
ELECTRICAL DATA	
Heater Voltage	6.3 Volts
Heater Current	0.6 Ampere
Direct Interelectrode Capacitances (Nominal)	
Cathode to All Other Electrodes	$5.0 \mu \mu f$
Grid No. 1 to All Other Electrodes	8.0 μμf
Between Deflecting Plates 1-2	2.5 μμf
Between Deflecting Plates 3-4	$1.3 \mu\mu f$
Deflecting Plate 11 to All Other Electrodes	$9.0 \mu \mu f$
Deflecting Plate 21 to All Other Electrodes	9.0 μμ
Deflecting Plate 31 to All Other Electrodes	5.0 μμf
Deflecting Plate 41 to All Other Electrodes	6.0 µµf

SYLVANIA TYPES 3SP1 3SP*

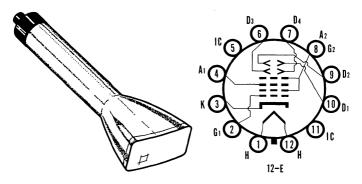
SPECIAL PURPOSE TUBE

Oscilloscope Tube Rectangular Glass Type

1½" x 3" Direct Viewed **Electrostatic Deflection** Clear, Cylindrical Faceplate

Electrostatic Focus

GENERAL DATA



CHARACTERISTICS

GENERAL DATA				
Focusing Method			Elec	trostatic
Deflecting Method Types*			Flec	trostatic
Types*	Fluorescence Green Blue-Green White Blue Blue-White	Phosphorese	ence l	Persistence
29P1	Groon	i iloopiloicoi		Medium
3SP1 3SP2	Disco Ossess			
35 2	Blue-Green	Green	٥.	Long
3SP4 3SP5 3SP7	White		Sho	ort to Medium
3SP5	Blue			Very Short
3SP7.	Blue-White	Yellow		Long
3SP11	Rive			Short
3SP11 Faceplate	Dide		Olaa	Cylindrical
racepiate				
*In addition to the	types snown, the	35P- can be s	appilea wi	in severai otne
screen phosphors.				
ELECTRICAL DATA	ı.			
Heaten Matters				M.H.
Heater Voltage			6.3	Volts
Heater Current			$0.6 \pm 10\%$	Ampere
Heater Current. Direct Interelectrode	Capacitances (ar	prox.)		•
Cathode to All Ot	her Flectrodes		5	μμf
Grid No. 1 to All	Other Flectrodes	• • • • • • • • • • •	6.5	f
Between Deflecting	a Blatas 1 2	· · · · · · · · · · · · · · · ·	0.5	μμι
Between Deliecting	g Plates 1-2			μμf
Between Deflecting	g Plates 3-4	, ,	2	μμf
Deflecting Plate 1	to All Other Elec	trodes	75	μμf
Deflecting Plate 2	to All Other Elec	trodes	6.0	иuf
Deflecting Plate 3	to All Other Flec	trodes	5.5	unf
Deflecting Plate 4	to All Other Flee	trodee	6.5	f
Donocting Flate 4	to All Other Elec	110063	0.5	μμι
MECHANICAL DATA				
Minimum Useful Scr	een Dimensions			
Horizontal			23/	Inches
Vertical			117	Inches Inches
			178	Inches
Diagonal		· · · · · · · · · · · · ·	. 3	Inches
Overall Length Base (Small Shell Du	<u>.</u>			Inches
Base (Small Shell Du	uodecal 12 Pin)		B12-43	
Basing			12E	
Base Alignment		• • • • • • • • • • • • • • • • • • • •		
The Plane through	the Base Key ar	d the Tube		
Auto alternative	LINE DASE KEY AL			D
	Long Axis of Tul	oe race	± 10	Degrees
Trace Alignment ¹				
Angle Between D1	-D2 trace and D3	B-D4 trace	90 ± 1	Degrees
D1-D2 trace aligns	s with Long Axis	of		-
Tube Face ²		-	+15	Degrees
Positive Voltage on	D1 deflects Ream	annroy		20g1000
Toward Key	Di donocio Deam	appron		
	Do deflecte Beere			
Positive Voltage on	DO DELIBORS BEAM	approx.		
Toward Pin No. 4				
Bulb			C26 Exp 6	or equivalent
Weight (approx.)			3/	Pound
2.3 (app. 2)			/4	

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)		Volts d c	
Anode No. 2 Input	6	Watts Ma	ıx.
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	to 620	Volts d c	
Grid No. 1 Voltage for Cutoff ³ 58 t	o -135	Volts d c	
Deflection Factors			
Deflecting Plates 1-2	to 198	Volts d c/	Inch
Deflecting Plates 3-4	to 140	Volts d c/	Inch
Spot Position (Focused, Undeflected)4With	in a 12	mm Squa	re
CIRCUIT VALUES			
Grid No. 1 Circuit Resistance	15	Megohms	May
Resistance in Any Deflecting Plate Circuit ⁵		Megohms	

NOTES:

- OTES:

 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	49/ ₁₆ Inches 163/ ₄ Inches J1-22 J42K B12-37 14J
BasingBase Alignment	14J

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.

21/2 Pounds

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

Anode No. 3 Voltage	6600 Volts d c
Anode No. 2 Voltage ²	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 ³	3000 Volts d c
Anode No. 2 Voltage4	1500 Volts d c
Anode No. 1 Voltage for Focus	300 to 515 Volts d c
Grid No. 1 Voltage Required for Cutoff5	−39 to −65 Volts d c
Deflection Factor ⁶	
Deflecting Plates 1-27	40 to 54 Volts d c/Inch
Deflecting Plates 3-48	27 to 36 Volte d c/Inch

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms Max. 5 Megohms Max.
Deflection Officult Hesistance	J Wiegomins Wax.

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.

- 2. The product of the Anode No. 2 Voltage and the Average Anode No. 2 Current should be limited to 6 Watts.
- 3. It is recommended that the Anode No. 3 voltage be not less than 3000 Volts for high-speed scanning.
- 4. In general Anode No. 2 voltage should not be operated at less than 1500 Volts.
- 5. Visual extinction of undeflected focused spot.
- 6. The deflecting electrodes D3 and D4 are designed to have extra-high deflec-The deflecting electrodes D3 and D4 are designed to have extra-nigh 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.
- 7. Deflecting Plates 1-2 are nearer the screen.
- 8. Deflecting Plates 3-4 are nearer the base.
- 9. 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.

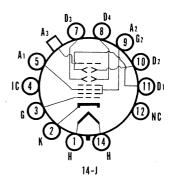
SYLVANIA TYPE 5ADP1 5ADP*

SPECIAL PURPOSE TUBE

5" Direct Viewed Round Glass Type Flat Faceplate Clear Faceplate Electrostatic Focus Electrostatic Deflection



GENERAL DATA
Focusing Method...



Electrostatic

CHARACTERISTICS

Deflection Method			Elec	trostatic
Types*	5ADP1	5ADP2	5ADP7	5ADP11
Fluorescence	Green	Blue-Green	Blue	Blue
Phosphorescence	G110011	Green	Yellow	
Paraiatanas	Madium	Lana	Long	Chart
Types* Fluorescence. Phosphorescence. Persistence. Faceplate. *In addition to the types sho	Medium	Long	Long	Short
raceplate		<u></u>		Jear
*In addition to the types sho	own, the SAD	P can be	supplied wi	ith several other
screen phosphors.				
ELECTRICAL DATA				
Hanton Walterna				Volts
Heater Voltage				
Heater Current		'	$0.6 \pm 10\%$	Ampere
Direct Interelectrode Capaci	itances			
		Min.	Max	K.
Cathode to All Other Elec			5.8	
Grid No. 1 to All Other E	lectrodes	4.2	7.9	иuf
Between Deflecting Plates			3.1	
Between Deflecting Plates			1.3	
Deflecting Plate 11 to All	Other		1.0	μμ.
Electrodes Except D2.	Other	2.7	6.1	
Deflecting Plate 21 to All	O	2.1	0.1	μμι
Deflecting Flate 2. to All	Other		0.4	
Electrodes Except D1.		2.7	6.1	μμτ
Deflecting Plate 31 to All	Other			_
Electrodes Except D4		2.1	4.0	μμf
Deflecting Plate 41 to All	Other			
Electrodes Except D3		2.1	5.0	uuf
•				• •
MECHANICAL DATA				
			417	
Minimum Useful Screen Dia			41/2	Inches
Nominal Overall Length				Inches
Bulb Contact (Recessed Sma	all Cavity Ca	p)	J1-22	
Base (Medium Shell Dihepta	al 12-Pin)		B12-37	
Basing			14J	
Base Alignment				
D1-D2 trace aligns with F	in No. 5 and			
Tube Axis			⊥ 10	Degrees
Positive Voltage on D1 de	flooto boom o		1 10	Degrees
	mecis beam a	pprox.		
toward Pin No. 5	.			
Positive Voltage on D3 de	riects beam a	pprox.		
toward Pin No. 2				_
Angle Between traces D1-	D2 and D3-E)4	90 ± 1	Degrees
Bulb Contact Alignment				
J1-22 contact aligns with	D1-D2		± 10	Degrees
J1-22 contact on same side	e as Pin No.	5		-

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)	
Anode No. 2 Voltage ²) Volts d c) Volts d c
Grid No. 1 Voltage	Volts d c
Positive Bias Value) Volts d c) Volts d c ? Volts
Heater Negative with Respect to Cathode 200) Volts d c) Volts d c
) Volts
TYPICAL OPERATING CONDITIONS	
Anode No. 2 Voltage	
	Volts d c/Inch Volts d c/Inch
	Volts Max.
with Anode No. 3 Current = $25 \mu a$	Inches Max.
with Anode No. 3 Current = 25 µa	ion Radius Circle
CIRCUIT VALUES	
	Megohms Max. Megohms Max.

NOTES:

- OTES:

 1. Deflecting Plate 1 is Pin No. 11.
 Deflecting Plate 2 is Pin No. 10.
 Deflecting Plate 3 is Pin No. 10.
 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
- Centered on tube face with the tube shielded and with all deflection plates connected to Anode No. 2.
 It is recommended that the deflecting electrode circuit resistances be approxi-
- mately 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.

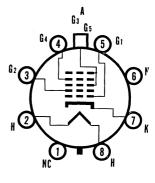
SYLVANIA TYPE 5AHP2A 5AHP-A*

SPECIAL PURPOSE TUBE

5" Direct Viewed Round Glass Type Magnetic Deflection

Electrostatic Focus High Resolution "A" Types Aluminized





8 E F

CHARACTERISTICS

GENERAL DATA

Focusing Method Deflecting Method Deflection Angle (approx.)			Electrostatic Magnetic 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
Facentate			Claar

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

6.3 Volts 0.6 Ampere
5 μμf
$6 \mu \mu f$
4¼ Inches
11½ Inches
B8-11 or B8-65
8EF
± 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) Voltage550 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 ¹	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 ²	7000	Volts d.c.	

Anode Voltage ²	7000 Volts d c
Grid No. 4 Voltage for Focus ³ 0 to	+250 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage ⁴	to -77 Volts d c
Line Width ^{3,5}	0.40 M ₋ M Max.

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. 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.
 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.
 With Est adjusted for Ib = 100 as and hear focused for minimum width of

3. With Eg1 adjusted for lb = 100 μ 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

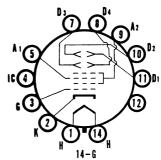
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 5AQP1

SPECIAL PURPOSE TUBE

5" Direct Viewed Round Glass Type **Electrostatic Deflection** Electrostatic Focus Flat Face Clear Faceplate





CHARACTERISTICS

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

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

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

ELECTRICAL DATA

Direct Interelectrode Capacitances	6.3 0.6 ± 10%	
Cathode to All Other Electrodes. 2.7 Grid No. 1 to All Other Electrodes. 3.7 Between Deflecting Plates 1-2! 2.4 Between Deflecting Plates 3-4! 0.8 Deflecting Plate 1 to All Other 0.8	Max 5.0 6.9 4.5 1.6	μμf μμf μμf
Electrodes	9.3	μμf
Electrodes 5.0 Deflecting Plate 3 ¹ to All Other	9.3	μμf
Deflecting Plate 4 ¹ to All Other	6.3	• •
Electrodes	6.3	μμτ
Minimum Useful Screen Dimensions (Diameter). Nominal Overall Length	B12-37 14G	Inches Inches Degrees Degree
RATINGS		3
MAXIMUM RATINGS (Absolute Maximum Valu	es)	
Anode No. 2 Voltage ²		Volts d c Volts d c
Grid No. 1 Voltage Negative Bias Value. Positive Bias Value. Positive Peak Value Peak Heater Cathode Voltage	0	Volts d c Volts d c Volts
Heater Negative with Respect to Cathode Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and Any Deflecting Plate	200	Volts Volts
TYPICAL OPERATING CONDITIONS		
Anode No. 2 Voltage	0 to 300 -34 to -56	
Deflecting Plates 1-2	.030 400 1 2 hin a 5 inc Inches Fr	Volts d c/Inch Volts d c/Inch Ft. L. Min. Volts d c Max. Inches Max. µa d c Max. Percent Max. Percent Max. h Radius Circle om Tube Face Il 4 x 4 Inches
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance Deflection Circuit Resistance ⁹	1.5 1.0	Megohms Max. 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 be limited to 6.0 watts. 3. Visual extinction of undeflected focused spot.	acceleration	current should

- Visual extinction of undeflected focused spot.
 Positive voltage on D1 deflects beam approximately toward Pin No. 5. Positive voltage on D3 deflects beam approximately toward Pin No. 2.
 At a grid drive to produce 15 Ft. L. on a raster size of 2 x 2 inches on P1 screen.
 The deflection factors of 75% of useful scan and at 25% of useful scan shall not differ by more than the indicated value.
 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.
 Centered on the tube face with the tube shielded and with all deflection plates
- 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

High Deflection Sensitivity

Electrostatic Deflection

Round Glass Type

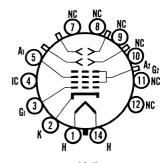
Electrostatic Focus Close Tolerances

Flat, Clear Faceplate

A2 and Deflection Plate Leads

Brought out Neck





14-U

CHARACTERISTICS

GENERAL DATA			
Focusing Method		E	lectrostatic
Deflection Method		E	lectrostatic
Types*		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 s screen phosphors.	hown, the 5AM	P- can be supplied	with several other
aurour prioapriora.			

ELECTRICAL DATA

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

MECHANICAL DATA

Minimum Useful Screen Diameter	4½ Inches
Overall Length	175% 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 Weight (approx.)	90 ± 1 2½	Degrees Pounds
RATINGS		
MAXIMUM RATINGS (Absolute Maximum Values))	
Anode No. 2 Voltage ¹		Volts d c Volts d c
Negative Blas Value	0	Volts d c Volts d c Volts
Heater Negative with Respect to Cathode Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and Any Deflection Plate	200	Volts Volts
TYPICAL OPERATING CONDITIONS		
Grid No. 1 Voltage Required for Cutoff ² 3 Deflection Factors	0 to 300	Volts d c Volts d c Volts d c
Deflecting Plates 1-23 Deflecting Plates 3-43 Deflection Factor Uniformity4 Modulation5 Line Width "A"5 Anode No. 2 Current5 Pattern Distortion at 75 % Useful Scan1 Spot Position (Undeflected, Focused)1. Within	20 to 25 1 45 .032 800 2	Volts d c/Inch Volts d c/Inch Percent Max. Volts d c Max. Inches Max. µAdc Max. Percent Max. ch Radius Circle
Useful Scan D1-D2 ±2 Inches F or a Total c	of 4 Inch	es Minimum
D3-D4± 1.25 Inches or a Total of		ibe Face Center hes Minimum

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms Max.
Deflection Circuit Resistance ⁸	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.

 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
- deflection factor for a deflection at 29% 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.
- 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.
 It is recommended that the deflecting electrode circuit resistances be approxi-

- T is recommended that the deflecting electrode circuit resistances be approximately equal.

 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.

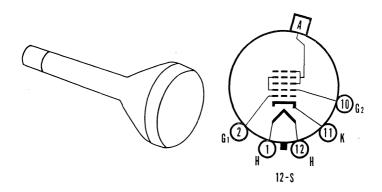
SYLVANIA TYPE 5AXP4

TELEVISION RECEIVER CHECK TUBE

Round, Glass Type

5" Direct Viewed Magnetic Deflection
Round Glass Type Self Focusing (Electro Self Focusing (Electrostatic)

No Ion Trap Required



CHARACTERISTICS

GENERAL DATA Focusing Method	Mā 53 E W Me	(Electrostatic) gnetic Jegrees P4 /hite dium r Glass
ELECTRICAL DATA Heater Voltage	0.6	Volts Ampere μμf μμf
MECHANICAL DATA Overall Length. Maximum Diameter. Minimum Useful Screen Diameter. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 5-Pin). Basing.	В	Inches In
RATINGS		
KATINGS		
MAXIMUM RATINGS (Absolute Maximum Va	•	
MAXIMUM RATINGS (Absolute Maximum Va Anode Voltage	•	Volts d c Volts d c
MAXIMUM RATINGS (Absolute Maximum Va	19,800 550 140 0	Volts d c Volts d c Volts d c Volts d c Volts d c Volts
MAXIMUM RATINGS (Absolute Maximum Va Anode Voltage Grid No. 2 (and Grid No. 4) Voltage Grid No. 1 Voltage Negative Bias Value Positive Bias Value Positive Peak Value	19,800 550 140 0 2 450 200	Volts d c Volts d c Volts d c
MAXIMUM RATINGS (Absolute Maximum Va Anode Voltage Grid No. 2 (and Grid No. 4) Voltage Grid No. 1 Voltage Negative Bias Value Positive Bias Value Positive Peak Value Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode During Warm-up Not to Exceed 15 Seconds. After Equipment Warm-up Heater Positive with Respect to Cathode TYPICAL OPERATING CONDITIONS Anode Voltage Grid No. 2 (and Grid No. 4) Voltage.	19,800 550 140 0 2 450 200 200	Volts d c Volts d c Volts d c Volts Volts Volts Volts Volts Volts Volts d c Volts d c
MAXIMUM RATINGS (Absolute Maximum Va Anode Voltage Grid No. 2 (and Grid No. 4) Voltage Grid No. 1 Voltage Negative Bias Value Positive Bias Value Positive Peak Value Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode During Warm-up Not to Exceed 15 Seconds After Equipment Warm-up Heater Positive with Respect to Cathode TYPICAL OPERATING CONDITIONS Anode Voltage	19,800 550 140 0 2 450 200 200	Volts d c Volts d c Volts d c Volts Volts Volts Volts Volts Volts Volts d c Volts d c

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.

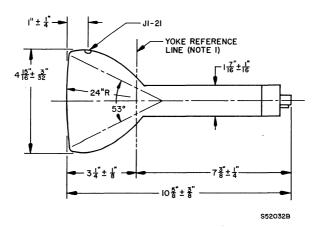


DIAGRAM NOTES:

- 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 ± 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

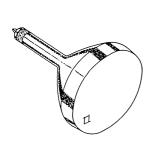
5" Direct Viewed

Round Glass Type

Magnetic Deflection

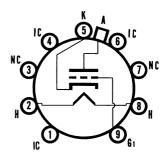
Magnetic Focus

1/8" Diameter Neck



GENERAL DATA

Spot Position5....



9 H D

1/4 Inch

CHARACTERISTICS

GENERAL DATA				
Focusing Method Deflecting Method Deflection Angle (approx.) Types* Fluorescence Phosphorescence Persistence.	5BCP1 Green Medium	5 BCP4 White Medium	Ma 70 5 BCP7 Blue Yellow Long	Short
Faceplate* *In addition to the types s screen phosphors.	hown, the 5	BCP- can be su	applied wi	th several other
ELECTRICAL DATA Heater Voltage Heater Current. Direct Interelectrode Capa Cathode to All Other Ele Grid No. 1 to All Other	citances (ap ectrodes	prox.)	6.3 3 ± 10% 3.7 3.5	μμf
MECHANICAL DATA Minimum Useful Screen D Overall Length Bulb Contact (Recessed Sr Base Bulb Contact Alignment Plane of J1-22 Contact F Pins No. 1 and No. 9, J1-22 Contact on Same S	nall Ball Cal	av Between	7 J1-22 E9-37 9HD	Inches Inches Degrees
	RATII	NGS		
Anode VoltageAnode Input			11,000	Volts d c Watts
Grid No. 1 Voltage Negative Bias Value Positive Bias Value Positive Peak Value Peak Heater-Cathode Volt			0	Volts d c Volts d c Volts d c
Heater Negative with Re Heater Positive with Re	espect to Ca	thode hode		Volts Volts
TYPICAL OPERATING C Anode Voltage Grid No. 1 Voltage ² Focusing Coil Current (apple Line Width "A" at I _b = 2	orox.)3,		-25 to -75 56 to 84	Inches Max.

SYLVANIA TYPES 5BCP1 (Cont'd) 5BCP*

CIRCUIT VALUES

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

NOTES:

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

should be taken in handling the tube to avoid darnaging 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 µa. 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 ¼ 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.

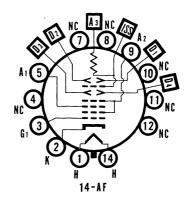
SYLVANIA TYPES 5BGP1 5BGP*

5" Direct Viewed Flat Faceplate Round Glass Type Electrostatic Deflection

Electrostatic Focus
High Deflection Sensitivity
High Deflection Accuracy
Aluminized Screen

Helical Resistor Post Deflection Acceleration





CHARACTERISTICS

5BGP1	Tluorescence Green Blue-Green Blue Blue-White Blue Blue	Phosphorescence Green Yellow	Medium Long Very Short Long Short Extremely Short Clear
Heater Voltage Heater Current Direct Interelectrode Capacit Cathode to All Other Elect Grid No. 1 to All Other Ele D1 to D2 D3 to D4 D1 to All Other Electrodes D2 to All Other Electrodes D3 to All Other Electrodes D4 to All Other Electrodes D4 to All Other Electrodes D4 to All Other Electrodes D5 to All Other Electrodes D6 to All Other Electrodes D6 to All Other Electrodes D7 to All Other Electrodes D8 to All Other Electrodes D9 to All Other Electrodes	ectrodes Except D2 Except D1 Except D4 Except D4	0.6 ± 10	5.3 Volts % Amperes 6.8 μμf 6.7 μμf 6.8 μμf 6.3 μμf 6.3 μμf 6.3 μμf 6.7 μμf 6.0 Megohms
MECHANICAL DATA Minimum Useful Screen Diar Nominal Overall Length Anode No. 3 Contact (Recessed Small Cavity Ca Bulb (Modified) Base (Medium Shell Diheptal Basing Base Alignment D3-D4 Trace aligns with P Positive Voltage on D1 c approx. toward Pin Nc Positive Voltage on D3 c approx. toward Pin Nc Angle Between Traces D1- Bulb Contact Alignment J1-21 contact Aligns with J1-21 contact on same side	in No. 1 deflects beam 0. 4 deflects beam 0. 1 D1 and D3-D	17 J1 J4: B12 14/ ±	K 37 37 AF 10 Degrees

SYLVANIA TYPES 5BGP1, 5BGP* (Cont'd)

RATINGS

MAXIMUM RATINGS (Absolute Maximum Val	ues)	
Anode No. 2 Input		Watts Max.
Anode No. 3 Voltage	13,200	Volts d c
Isolation Shield Voltage	2300	Volts d c
Anode No. 2 Voltage		Volts d c
Ratio of Anode No. 3 Voltage to Anode		
No 2 Voltage	6:1	Maximum
No. 2 VoltageAnode No. 1 (Focus Electrode) Voltage	880	Volts d c
Grid No. 1 Voltage	000	• 01 to a 0
Negative Bias Value	220	Volts d c
Positive Bias Value	- 0	Volts d c
Positive Peak Plate	ő	Volts
Peak Heater-Cathode Voltage	2	VOITS
Heater Negative with Respect to Cathode		
During Warm-up Period Not to Exceed		
15 Seconds	200	Volte
After Equipment Warm-up Period		Volts
Heater Positive with Respect to Cathode		Volts
Peak Voltage Between Anode No. 2 and	140	VUITS
Any Deflection Plate	550	Volts
Any Deflection Flate	550	VUITS
TYPICAL OPERATING CONDITIONS		
Anode No. 3 Voltage ¹	10.000	Volts d.c
Isolation Shield Voltage ²	1575 to 1700	Volte d c
Anode No. 2 Voltage ³		
Anode No. 1 Voltage for Focus		
Grid No. 1 Voltage Required for Cutoff ⁴	-50 to -80	
Deflection Factor ⁵	30 10 -00	Voits u c
Deflection Plates 1-2	70 to 86	Volts d c/Inch
Deflection Plates 3-4		
Pattern Distortion at 100% Useful Scan	20.4 10 34.0	Percent Max.
Undeflected Spot Position?		i dicent max.
(Deviation from Center)	5	MM. Max.
Useful Scan	3	IVIIVI. IVIAA.
D1-D2	10	cm.
D3-D4		cm.
DU-DT	0	····
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max.
did ito i dicait noodtanoo	1.5	mogomis max.

NOTES:

- 1. It is recommended that the Anode No. 3 voltage be no less than 6000 volts
- It is recommended that the Anode No. 3 voltage be no less than 6000 volts for suitable light output.
 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.
 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 chms. limited to 12,500 ohms.
- Visual extinction of undeflected focused spot.
 Visual extinction of undeflected focused spot.
 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.
 With a 6 x 10 cm rectangular raster centered on the face of the tube, the raster edges will not extend the scan of the state.
- 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:

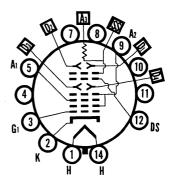
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

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





14-AG

CHARACTERISTICS

GENERAL DATA			
Focusing Method			ectrostatic
Deflection Method			ectrostatic
Phosphors		A	luminized
Types*	Fluorescence	Phosphorescence	Persistence
5BHP1	Green		Medium
5BHP2	Blue-Green	Green	Long
5BHP5	Blue	171711	Very Short
5BHP7	Blue-White		Long
5BHP11	Blue		Short
	Blue-Green		Extremely Short
Faceplate			Clear
*In addition to the types sh	own, the SBGF	- can be supplied	with several other
screen phosphors.			
ELECTRICAL DATA			
Heater Voltage			5.3 Volts
Heater Current			% Amperes
Direct Interelectrode Capac			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Cathode to All Other Elec			l.6 μμf
Grid No. 1 to All Other E			5.4 μμf
D1 to D2			.9 μμf
D3 to D4	<u></u> <u></u>		.5 μμf
D1 to All Other Electrode			3.5 μμf
D2 to All Other Electrode	es Except D1		3.5 μμf
D3 to All Other Electrode	s Except D4		2.8 μμf
D4 to All Other Electrode	es Except D3		2.8 μμf
Post Accelerator Helix Re	esistance	200 to 6	00 Megohms
MECHANICAL DATA			
Minimum Useful Screen Dia	omotor		½ Inches
Nominal Overall Length	ı III (10	1/4 Inches
Anode No. 3 Contact			74 THUIRS
(Recessed Small Cavity C	lan)	J1-	21
Rulh (Modified)	αρ)	J42	
Bulb (Modified) Base (Medium Shell Dihept	al 12-Pin).	B12-	
Basing		14/	
Base Alignment			
D3-D4 Trace Aligns with	Pin No. 1	±	10 Degrees
Positive Voltage on D1	Deflects Beam		•
approx. toward Pin N	No. 4		
Positive Voltage on D3	Deflects Beam		
approx. toward Pin N			
Angle Between Traces D1	1-D2 and D3-D	4 90 ±	1 Degrees
Bulb Contact Alignment	D4 D0 T		40 D
J1-21 Contact Aligns with	1 DI-D2 Trace.	,	10 Degrees
J1-21 Contact on same sid	je as Pin No. 4		

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Value		
Anode No. 2 Input		Watts
Anode No. 3 Voltage		Volts d c
Isolation Shield Voltage		Volts d c
Deflection Plate Shield Voltage	2300	Volts d c
Anode No. 2 Voltage	2200	Volts d c
Anode No. 2 Voltage		
No. 2 Voltage	6:1	Maximum
No. 2 Voltage		Volts d c
Grid No. 1 Voltage		
Negative Bias Value	220	Volts d c
Positive Bias Value		Volts d c
Positive Peak Plate		Volts
Peak Heater-Cathode Voltage	2-	Vorts
Heater Negative with Respect to Cathode		
During Warm-up Period Not to Exceed		
During Warm-up Feriod Not to Exceed	000	Volts
15 Seconds		
		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 ¹	10 000	Volte d o
Isolation Shield Voltage ² 157	75 to 1700	Volta d a
Deflection Plate Shield Voltage ³	5 to 1700	Volto d o
Anada Na O Valdanad	1670	Volta d a
Anode No. 2 Voltage4	10/0	Volts a c
Anode No. I Voltage for Focus	80 10 590	Volts d C
Grid No. 1 Voltage Required for Cutoff5	-50 to -80	voits a c
Deflection Factors Deflection Plates 1-2	70 4- 05	Value a a zi co
		Volts d c/Inch
Deflection Plates 3-4	15 to 18.3	Volts d c/Inch
Pattern Distortion at 100% Useful Scan7	1.5	Percent Max.
Undeflected Spot Position ⁸		
(Deviation from Center)	5	MM. Max.
Useful Scan		
D1-D2		cm.
D3-D4	4	cm.
CIRCUIT VALUES		

NOTES:

1. It is recommended that the Anode No. 3 voltage be no less than 6,000 volts

1.5 Megohms Max.

- It is recommended that the Anode No. 3 voltage be no less than 6,000 volts for suitable light output.
 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.
 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.
 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. limited to 12,500 ohms.

Grid No. 1 Circuit Resistance......

- 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

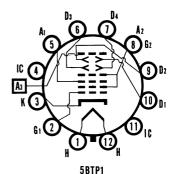
Post Deflection Acceleration

Electrostatic Deflection

Flat Clear, Faceplate

Short Length





CHARACTERISTICS

GENERAL	DATA
Focusing	Method

Deflection Method.....

Electrostatic Electrostatic 5BTP1 5BTP2 5BTP2 5BTP7
Blue-Green Blue-White Yellow 5BTP11

Types* 5BTP1
Fluorescence Green
Phosphorescence.
Persistence Medium Green

Blue

2 Pounds

rersistence..... Medium 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	10% Amperes
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	$5.0~\mu\mu f$
Grid No. 1 to All Other Electrodes	
D1 to D2	2.0 μμf
D3 to D4	$3.0 \mu\mu f$
D1 to All Other Electrodes	
D2 to All Other Electrodes	$8.5 \mu\mu f$
D3 to All Other Electrodes	$8.5 \mu\mu f$
D4 to All Other Electrodes	$9.5 \mu\mu f$

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	00 1 1 0
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	

SYLVANIA ELECTRONIC TUBES

Weight (approx.)....

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Valu	106)	
• • • • • • • • • • • • • • • • • • •		147 11
Anode No. 2 Input		Watts
Anode No. 3 Voltage		Volts d c
Anode No. 2 Voltage		Volts d c
Ratio Anode No. 3 to Anode No. 2 Voltage		Max.
Anode No. 1 (Focusing Electrode)	1100	Volts d c
Negative Bias Value	140	Volts d c
Positive Bias Value	170	Volts d c
Positive Peak Value	ŏ	Volts
Peak Heater-Cathode Voltage	_	V 0113
Heater Negative with Respect to Cathode		
During Warm-up Period Not to Exceed		
15 Seconde	450	Volts
15 Seconds	140	Volts
Heater Positive with Respect to Cathode	140	Volts
Peak Voltage Between Anode No. 2 and	140	VOITS
Any Deflection Plate	600	Volts
Any Deficution Flate	000	V 0113
TYPICAL OPERATING CONDITIONS		
Anode No. 3 Voltage	3000	Volts d c
Anode No. 2 Voltage		Volts d c
Anode No. 1 Voltage for Focus	570 to 772	Volte d c
Anode No. 1 Voltage for Focus	-40 to -94	Volte d c
Deflection Factors	10 10 51	VOITS G C
Deflecting Plates D1-D2	81 to 109	Volts d c/Inch
Deflecting Plates D3-D4	43 to 58	Volts d c/Inch
Spot Position ²		15 mm Square
Useful Scan	•••• a	To min oquaro
D1-D2—Full Screen Coverage		
D3-D4-4 Inches-Centered with Respect to the	Tube Face	
20 21 1 mondo como con morpost to mo		
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max.
Deflection Circuit Resistance ³		Megohms Max.
		go max

NOTES:

- Visual extinction of the undeflected focused spot.
 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.
 It is recommended that the deflecting electrode circuit resistances be approximately equal.

SYLVANIA TYPE 5BNP16

SPECIAL PURPOSE TUBE

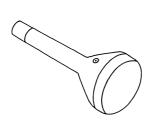
5" Round Glass Type Spherical Faceplate

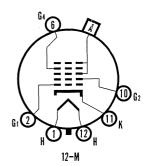
Magnetic Deflection
Electrostatic Focus

Clear Faceplate

No Ion Trap

Aluminized Screen





CHARACTERISTICS

GENERAL DAT	ГΔ

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

ELECTRICAL DATA

6.3 Volts
0.6 Amperes
·
5 μμfd
6 μμfd
No Ion Trap Required

MECHANICAL DATA

Minimum Useful Screen Diameter (Max. Assured)	4¼ Inches
Nominal Overall Length	105/8 Inches
Bulb Contact (Recessed Small Ball Cap)	J1-22
Base (Small Shell Duo Decal 6 Pin)	B6-63
Basing	· 12M
Bulb	J39⅓ 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		Volts	
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	
VEICAL OPERATING CONDITIONS			

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	
Grid No. 1 Voltage for Cutoffl	-28 to -72 Valte 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.

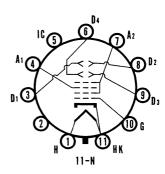
SYLVANIA TYPE 5BP1A 5BP-A*

SPECIAL PURPOSE TUBE

5" Direct Viewed Round Glass Type

Electrostatic Deflection Electrostatic Focus





CHARACTERISTICS

CHARACTERIOTICS	
GENERAL DATA	
Focusing Method	Electrostatic
Deflecting Method	Electrostatic
Phosphor	P1
Fluorescence	Green Medium
Persistence	
Faceplate* *In addition to the type shown, the 5BP-A can be supp screen phosphors.	olied with several other
ELECTRICAL DATA	
Heater Voltage	6.3 Volts
Heater Current (approx.)	0.6 Ampere
Grid No. 1 to All Other Electrodes	8.0 μμf

Heater Current (approx.)	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Grid No. 1 to All Other Electrodes	8.0 μμf
Between Deflecting Plates 1-21	1.3 μμf
Between Deflecting Plates 3-41	$1.2 \mu\mu f$
Deflecting Plate 1 to All Other Electrodes	9.5 μμf
Deflecting Plate 3 to All Other Electrodes	12 μμf
Deflecting Plate 12 to All Other Electrodes	
Except D2	8.0 μμf
Deflecting Plate 22 to All Other Electrodes	
Except D1	7.5 μμf
Except D1	
Except D4	10 μμf
Except D4 Deflecting Plate 4 ² to All Other Electrodes	• •
Except D3	7.5 μμf
• • • • • • • • • • • • • • • • • • • •	

MECHANICAL DATA

Minimum Useful Screen Diameter	4½ Inches
Nominal Overall Length	163/4 Inches
BaseMed	ium Shell Magnal 11 Pin
Basing	11 N

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

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)	
	Volts d c Volts d c
Negative Bias Value	Volts d c Volts d c
	Volts
TYPICAL OPERATING CONDITIONS	
Anode No. 2 Voltage ³	Volts d c
Deflecting Plates 1-25 70 to 98	Volts d c/Inch Volts d c/Inch
CIRCUIT VALUES	
	Megohms Max. Megohms Max.
NOTES:	
 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. With D1 positive with respect to D2, the spot is deflected to with D3 positive with respect to D4, the spot is deflected to 3. Brilliance and definition decrease with decreasing Anode No general, Anode No. 2 Voltage should not be less than 1500 voltages. Visual extinction of undeflected focused spot. Deflecting Plates 1-2 are nearer the screen. Deflecting Plates 3-4 are nearer the base. 	ward Pin No. 1. . 2 Voltage. In
Sylvania Type 5BP1A replaces Type 5BP1.	

SYLVANIA TYPE 5CPIA 5CP-A*

SPECIAL PURPOSE TUBE

5" Direct Viewed Round Glass Type

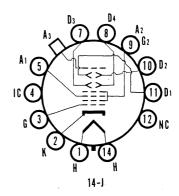
Electrostatic Deflection

Electrostatic Focus

Post Deflection Accelerator

Clear Faceplate





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

CHARACTERISTICS

Сп	AKACIEN	131163		
GENERAL DATA				
Focusing Method	5CP1A Green	5CP7A Blue	5CP11 Blue	e Orange
Phosphorescence	Medium	Long	Shor	
*In addition to the Types shown screen phosphors.	n, the 5CP-	A can be sup	plied w	ith several other
ELECTRICAL DATA Heater Voltage				Volts
Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitar Cathode to All Other Electro Grid No. 1 to All Other Electro Between Vertical Deflecting Between Horizontal Deflecting Deflecting Plate 1 to All Oth Deflecting Plate 2 to All Oth Deflecting Plate 3 to All Oth Deflecting Plate 4 to All Oth	trodes Plates ng Plates er Electrode er Electrode	Ss	9 8 2 2 9 9 7	Ampere µµf µµf µµf µµf µµf µµf µµf µµf µµf µ
MECHANICAL DATA	er Electrode	· · · · · · · · ·	0	μμι
Minimum Useful Screen Dime Nominal Overall Length Bulb Contact (Recessed Small Base (Medium Shell Diheptal Basing.	Ball Cap) 12-Pin)		41/2 163/4 J1-22 B12-37 140	Inches Inches 2 7 J
•	RATING	s		
MAXIMUM RATINGS (Absol		•)	
Anode No. 3 Voltage Anode No. 2 Voltage Anode No. 1 Voltage Grid No. 1. Voltage			2200	Volts d c Volts d c Volts d c
Negative Bias Value Positive Bias Value Positive Peak Value Peak Heater Cathode Voltage			0	Volts d c Volts d c Volts
Heater Negative with Respect Heater Positive with Respect Peak Voltage Between Anode N	t to Cathode	le)	140 140	Volts Volts
And Any Deflecting Plate			550	Volts
TYPICAL OPERATING CON	DITIONS			
Anode No. 3 Voltage Anode No. 2 Voltage. Anode No. 1 Voltage. Grid No. 1 Voltage Required fo Deflection Factor	r Cutoff ¹	375 30	4000 2000 to 690 to -90	Volts d c Volts d c Volts d c Volts d c
Vertical Plates ²			92	Volts d c/Inch Volts d c/Inch
CIRCUIT VALUES Grid No. 1 Circuit Resistance. Deflection Circuit Resistance.				Megohms Max. Megohms Max.

NOTES:

- Visual extinction of undeflected focused spot.
 Pins 10 and 11.
 Pins 7 and 8.

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

5CP7

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

SYLVANIA TYPES 5CVP1 5CVP7 5CVP19

SPECIAL PURPOSE TUBE

Indicator Tube

 $2\frac{3}{4}$ " x $4\frac{3}{4}$ " Direct Viewed

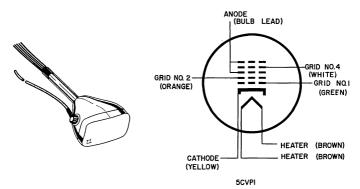
Magnetic Deflection

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

Electrostatic Magnetic
52 Degrees 27 Degrees 54 Degrees P7 P19
ue-White Orange Yellow Orange Long Very Long nerical, Clear, Pressed Glass supplied with several other
$0.3 \pm 10\%$ Amperes 12.0 $\mu\mu f$ 9.5 $\mu\mu f$
ured) 4 Inches 2 Inches 4 Inches 7.4 Square Inches 39 Exp. 3 or Equivalent Special Molded Lead pecial Encapsulated Base with Color Coded Leads 11/4 Pounds

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

RATINGS

4500 Volts d c

MAXIMUM RATINGS (Absolute Maximum Values) Anode Voltage....

Anode Input	ь	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	₄ 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
	65 to +85	Degrees C
TYPICAL OPERATING CONDITIONS		
Anode Voltage	4000	Volts d c
Grid No. 4 Voltage (Focusing Electrode)1	0 to +120	Volts d c
	300	
Grid No. 1 Voltage ²	-15 to -45	Volts d c
Modulation ³	15	Volts d c Max.
Line Width ³	.006	Inches Max.

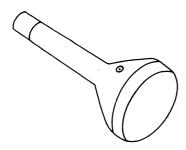
NOTES:

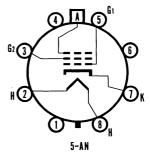
- 1. The horizontal deflection current is a triangular wave form of 1/4 cps at an The horizontal deflection current is a triangular wave form of ¼ cps at an amplitude sufficient to scan 3¾ inches. The vertical deflection current is a saw tooth of 1/120 cps at an amplitude sufficient to scan 1½ inches. 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 μsecs at a repetition rate of 200-1000 pps. The focus electrode voltage for best focus under these pulsed conditions shall be as specified.
 Visual extinction of undeflected focused spot.
 Measured at a beam current of 10 μa, 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			Mad	netic
Deflecting Method			Mag	netic
Deflection Angle (approx.)		53 D	egrees
Types*	5FP4A	5FP7A	5FP11A	5FP14A
Fluorescence		Blue-White	Blue	Blue
Phosphorescence		Yellow		Orange
Persistence	Medium	Long	Short	MedLong
Facantata			C	oor

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

ELECTRICAL DATA

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

MECHANICAL DATA

Minimum Useful Screen Diameter	41/4 Inches
Nominal Overall Length	11 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	J391/s L I
	/

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) 5FP7A

		5FP11A
	5FP4A	5FP14A
Anode Voltage ¹	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 Cathod	e., 165	200 Volts
Heater Positive with Respect to Cathode		200 Volts

TYPICAL OPERATING CONDITIONS

		5F P11A
	5FP4A	5FP14A
Anode Voltage ²	6,000	
Grid No. 2 Voltage		
Grid No. 1 Voltage ³	−25 to −70	-25 to -70 Volts d c
Focusing Coil Current (approx.)4,51	$20 \pm 15\%$	96 ± 15% Madc
Snot Position (Undeflected)5		9 mm

5FP7A

CIRCUIT VALUES

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

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

NOTES:

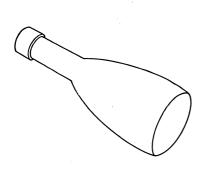
- The product of the anode voltage and the average anode current should be limited to 6 watts.
- Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 4,000 volts.
- 3. Visual extinction of undeflected focused spot
- 4. This note applies 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 3½, 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 3½ x 2½ 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 µamps and with distance from reference line to center of air gap equal to 2¾ inches.
- The center of the undeflected unfocused spot will fall within a circle of 9 mm radius concentric with the center of the tube face.

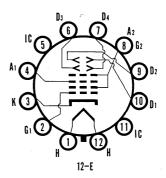
SYLVANIA TYPE 5UP1 5UP*

SPECIAL PURPOSE TUBE

5" Direct Viewed Electrostatic Focus

Round Glass Type Electrostatic Deflection





CHARACTERISTICS

GENERAL DATA

Focusing Method	
Types* 5UP1	5UP7 5UP11
Fluorescence Green	Blue-White Blue
Phosphorescence	Yellow
Persistence Mediur	
Faceplate	Clear

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

ELECTRICAL DATA

Heater Voltage	
Heater Current	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	
Grid to All Other Electrodes	8.0 µµf
Between Deflecting Plates 1-2	2.5 μμf
Between Deflecting Plates 3-4	2.5 µµf
Deflecting Plate 11 to All Other Electrodes	
Deflecting Plate 21 to All Other Electrodes	
Deflecting Plate 31 to All Other Electrodes	
Deflecting Plate 41 to All Other Electrodes	8.0 uuf

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	12 E

RATINGS

Ν

MAXIMUM RATINGS (Absolute Maximum Val	ues)
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 ²	2000 Volts d c
Anode No. 1 Voltage for Focus	340 to 640 Volts d c
Maximum Grid Voltage Required for Cutoff3	−90 Volts d c
Deflection Factories	

Deflecting Plates 1-26. Deflecting Plates 3-47. CIRCUIT VALUES

MOULT 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 tree produced by nates PL 22 and the place through the
- 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

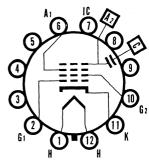
SPECIAL PURPOSE TUBE

5" Round Glass Type Flat Faceplate No Ion Trap Magnetic Deflection

Acceleration Type Electrostatic Focus Clear, Non-Browning Faceplate External Conductive Coating on Neck External Insulating Coating on Bulb

Aluminized Screen





56 to 77 Volts d c/Inch 46 to 62 Volts d c/Inch

12-C

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

CHARACTERISTICS

CHARACTERISTICS		
GENERAL DATA		
Deflection Method Deflection Angle (approx.)	Ma 40 I Near	
Persistence Extremely Extreme Short Short	ly	Extremely Short
ScreenClea FaceplateClea *In addition to the types shown, the 5ZP— can be supplie screen phosphors.	Alui r, No ed wi	minized on-Browning ith several other
ELECTRICAL DATA		
Heater Voltage	6.3 10%	Volts Ampere
Grid No. 1 to All Other Electrodes	. 8	μμι μμf
Grid No. 1 to All Other Electrodes External Conductive Neck Coating to Anode ¹	500	μμf Max. μμf Min.
MECHANICAL DATA		•
Nominal Overall Length Bulb Contact (Recessed Small Cavity Cap) J Base (Small Shell Duodecal 7-Pin) B Basing Bulb Contact Aligns with Vacant Pin	143/ ₈ 1-21 7-51 12C	Inches Inches Degrees
RATINGS		
MAXIMUM RATINGS (Absolute Maximum Values)		
Anode No. 2 Voltage	7700	Volts d c Volts d c Volts d c
	0	Volts d c Volts d c Volts
Heater Negative with Hespect to Cathode During Warm-up Period Not to Exceed 15 Seconds. After Equipment Warm-up Period	165	Volts Volts Volts
TYPICAL OPERATING CONDITIONS		
Anode Voltage ² . 27 Anode No. 1 Voltage for Focus at Ib = 15 μa. 5550 to Grid No. 2 Voltage42 to Anode Current. Maximum Anode Current to Grid No. 1 Current at Ib = 15 μa15 to Grid No. 2 Current15 to -15 to -1	200 -98 15 25	Volts d c Volts d c μa d c μa d c
CIRCUIT VALUES Grid No. 1 Circuit Resistance	1.5	Megohms Max.
NOTES:		

NOTES:

- External conductive neck coating must be grounded.
 Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 20,000 volts.
 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

SPECIAL PURPOSE TUBE

5" Round Glass Type Flat, Clear Faceplate Magnetic Deflection

Acceleration Type Electro- External Insulating Coating static Focus

No Ion Trap

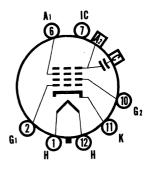
External Conductive Coating

on Neck

on Bulb

Aluminized Screen





12-C

CHARACTERISTICS

GENERAL DATA	
Focusing Method	Electrostatic
Deflection Method	Magnetic
Deflection Angle (approx.)	50 Degrees 5WP15
Types* 5WP11 Fluorescence	Blue-Green
Persistence	
Screen	Aluminized
Faceplate	
*In addition to the types shown, the 5WP- can be	
screen phosphors.	
ELECTRICAL DATA	
Heater Voltage	6.3 Volts
Heater Current	0.6 ± 10% Ampere
Direct Interelectrode Capacitances	
Cathode to All Other Electrodes	$5 \mu\mu f$
Grid No. 1 to All Other Electrodes Ext. Conductive Neck Coating to Anode No. 21.	7.5 μμf Max. 500 μμf Max.
Ext. Conductive Neck Coating to Anode No. 21.	100 μμι Max.
	100 μμι Ινιιιι.
MECHANICAL DATA	
Minimum Useful Screen Diameter	41/4 Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 7-Pin)	B7-51
Basing	12C
Bulb	,
MAXIMUM RATINGS (Absolute Maximum Val	
Anode No. 2 Voltage	30,000 Volts d c 6600 Volts d c
Anode No. 1 Voltage (Focusing Electrode) Grid No. 2 Voltage	385 Volts d c
Grid No. 1 Voltage	365 VOIIS G C
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	450.14.11
15 Seconds	450 Volts
After Equipment Warm-up Period Heater Positive with Respect to Cathode	140 Volts 140 Volts
meater rusitive with nespect to Cathode	140 VOITS

sylvania types 5WP11, $5WP^*$ (Cont'd)

TYPICAL OPERATING CONDITIONS

Anode No. 2 Voltage ²	27,000 Volts d c
Anode No. 1 Voltage for Focus	. 4200 to 5400 Volts d c
Grid No. 2 Voltage ³	200 Volts die
Grid No. 1 Voltage Required for Cutoff4	. −42 to −98 Volts d c
Anode No. 2 Current	
5WP11	
5WP15	. 100 μad c
Maximum Anode No. 1 Current	
5WP11	
5WP15	
Grid No. 2 Current	-15 to +15 μa d c

CIRCUIT VALUES

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

- External conductive neck coating must be grounded.
 Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 15,000 volts.
 Subject to variation of ±40% when Grid No. 1 Voltage cutoff is desired at the average cutoff value of -70 volts.
 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 .001" Line Width ,

5-Inch, Flat, Optical Glass

Faceplate

Clear Non-Browning Faceplate

Extremely Fine Grain Screen

Aluminized Screen
Magnetic Deflection

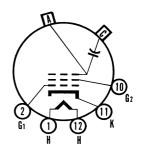
Magnetic Focus
No Ion Trap

External Conductive Coat-

ing on Neck

External Insulating Coating on Bulb





12-N

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

GF	NE	PΔ	DΔ	TA
GE	14 5	. ~~	 $\boldsymbol{\nu}$	

Focusing Method	Magnetic
Deflection Method	Magnetic
Deflection Angle (approx.)	50 Degrees
Type*	SC-2782
Phosphor	Fine Grain P11, Aluminized
Fluorescence	Blue
Persistence	
Faceplate	Non-Browning Optical Glass
*In addition to the type shown, the SC-2782 can be	supplied with several other
screen phosphors.	

ELECTRICAL DATA

Heater Current	0.6 ± 10% Ampere
Direct Interelectrode Capacitances (approx.)	_ /0 F
Grid No. 1 to All Other Electrodes	9 μμf
Cathode to All Other Electrodes	4.3 μμf
External Conductive Coating to Anode	500 μμf Max.
•	100 μμf Min.
MECHANICAL DATA	••
Minimum Useful Screen Diameter	41/4 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)	
Basing	12 N

Heater Voltage..... 6.3 Volts

MAXIMUM RATINGS (Absolute Maximum Values)

Anode VoltageGrid No. 2 Voltage	25,000 Volts d c 2500 Volts d c
Grid No. 1 Voltage	450 14 44
Negative Bias Value	150 Volts d c

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		Volts
Heater Positive with Respect to Cathode	165	Volts
TYPICAL OPERATING CONDITIONS		
Anode Voltage	20.000	Volts d c
Grid No. 2 Voltage		Volts d c
Grid No. 1 Voltage Required for Cutoff1		
Focusing Coil Current (approx.) ²	100	
I be Winter Current (approx.)		
Line Width³	0.001	inen
ALDALUE VALUE		
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max.

NOTES:

Visual extinction of undeflected focused spot.
 For JEDEC focusing coil 106 or equivalent 2½" from reference line.
 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

SPECIAL PURPOSE TUBE

6" Direct Viewed Flat Faceplate Round Glass Type

Three Independent Guns

Electrostatic Deflection

Electrostatic Focus

Post Deflection Acceleration High Deflection Sensitivity High Deflection Accuracy

Aluminized Screen

25 Pin Base



CHARACTERISTICS

GENERAL DATA			
Focusing Method Deflection Method			Electrostatic Electrostatic
Types*	Fluorescence	Phosphorescend	e Persistence
6DP1 6DP2 6DP7 6DP11 6DP14 6DP19 6DP25 Faceplate *In addition to the tyl screen phosphors.	Green Blue-Green Blue Blue Purple Orange Orange Des shown, the 6	Green Yellow Orange Orange Orange	Medium Long Long Short Medium-Long Long Very Long Clear
ELECTRICAL DATA			
Heater Voltage Heater Current (All Se Direct Interelectrode C Cathode to All Other Grid No. 1 to All Ot D1 to D2 D3 to D4 D1 to All Other Elec D2 to All Other Elec D3 to All Other Elec D4 to All Other Elec	ctions) apacitances (app Electrodes her Electrodes trodes trodes		6.3 Volts 1.98 Amperes 6.0 μμf 6.5 μμf 3.0 μμf 2.0 μμf 11.0 μμf 11.0 μμf 9.0 μμf
MECHANICAL DATA Overall Length. Minimum Useful Scree Bulb Contact (Recesse Base 25 Pin. Basing. Base Alignment Base Key Aligns wit Positive Voltage on Toward Base Key	d Small Ball) h Bulb Contact. D1 Deflects the E	B2	± 3/8 Inches 53/6 Inches J1-22 55-139 See Diagram ±10 Degrees
Positive Voltage on Toward Vacant Pi Bulb Contact Alignr Post-accelerator	D3 Deflects the E in No. 23 nent	with D1-D2	±3 Degrees

SYLVANIA ELECTRONIC TUBES

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

Mechanical Data (cont'd)

Bulb Contact on Same Side as Base Key Dispersion of the Darbard Trace Alignment
D1-D2 Trace Aligns with D3-D4 Trace.....
Corresponding Traces of Each Gun Align
within ± 2 Degrees 90 ± 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 ² .	3.3:1 Maximum
A I. Ni d. Maliana fau Tanana	1540 Valta d a

Ratio Anode No. 3 voltage Canada Canada No. 1 Voltage for Focus.
Grid No. 1 Voltage for Focus.
Grid No. 1 Voltage Negative Bias Value.
Positive Bias Value.
Positive Peak Value.
Peak Heater to Cathode Voltage
Heater Negative with Respect to Cathode.
Heater Positive with Respect to Cathode.
Peak Voltage between Anode No. 2 and Any
Any Deflection Plate. 220 Volts d c 0 Volts d c 2 Volts 200 Volts 200 Volts 600 Volts

TYPICAL OPERATING CONDITIONS

TPICAL OPERATING CONDITIONS		
Anode No. 3 Voltage	12,00	0 Volts d c
Anode No. 2 Voltage	400	O Volts d.c
Anode No. 1 Voltage for Focus ³	950 to 122	5 Volts d c
Grid No. 1 Voltage ⁴	−75 to −12	4 Volts d c
Modulation ⁵	3	5 Volts d c Max.
Line Width "A"6	01	5 Max. Inches
Deflection Factors		
D1-D2		
D3-D4	105 to 130	Volts d c/Inch
Deflection Factor Uniformity7	5%	Maximum
Undeflected Spot Position ⁸	Within 1	5 MM Square
Useful Scan ⁹		
D1-D2		1 Inches
D3-D4		4 Inches
Interaction Factor ¹⁰		⁵ Max. In./Volt
Pattern Distortion ¹¹ & ¹²		
Anode No. 1 Focus Current		
With Ib3 = $50 \mu adc$	10 to +	5 μa d c
With Ec1 = 0 Volts	50 to +	5 μa d c

CIRCUIT VALUES 1.5 Meg. Max. 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.)

èqual. NOTES:

Values are for each section unless otherwise specified.
 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

ratio of 3.9. Operation at other ratios may result in changes in deflection uniformity and pattern distortion. At the specified operating condition, the focus voltage at $1b3 = 25~\mu adc$ shall be between 1000 and 1225 volts dc and at $1b3 = 50~\mu adc$ shall be between 975 and 1225 volts dc. Scanning pattern and focus as per reference 4.12.6.1 of MIL-E-1C.

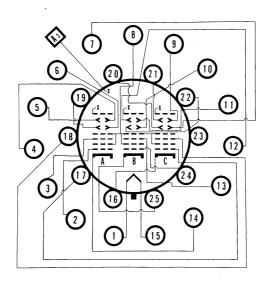
Visual extinction of undeflected focused spot.

5. For an Ib3 = 25 μ adc. The modulation factor at Ib3 = 50 μ adc shall be

- For all 103 = 25 μadc. The incomment of the property of the part value.

- 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 unper or lower ends of a 3" vertical trace.
- 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

EI D:



SYLVANIA TYPES 7AEP1 **7AEP***

SPECIAL PURPOSE TUBE

7" Direct Viewed Flat Faceplate

Round Glass Type

Electrostatic Focus

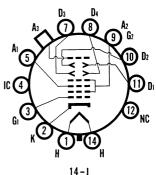
Electrostatic Deflection

Post Deflection Acceleration

High Deflection Accuracy High Deflection Sensitivity

Close Tolerances





B12-37

CHARACTERISTICS

GENERAL I	ATA
-----------	-----

Deflection Method			Electrost	
Types*	7AEP1	7AEP2	7AEP7	7AEP11
Fluorescence Phosphorescence		Blue-Green Green	Blue-White Yellow	Blue
Persistence	Medium	Long	Long Flat. Cl	Short
**In addition to the types screen phosphors.	shown, the	7AEP- can be	supplied with	several other

ELECTRICAL DATA

м

Heater Voltage	0.6	6.3 Volts ± 10 % Amperes
Direct Interelectrode Capacitances	Min.	Max.
Cathode to All Other Electrodes	2.9	4.5 μμf
Grid No. 1 to All Other Electrodes	3.7	6.4 μμf
D1 to D2	1.7	2.7 μμf
D3 to D4	1.0	1.8 μμf
D1 to All Other Electrodes	5.4	7.6 μμf
D2 to All Other Electrodes	5.4	7.6 µµf
D3 to All Other Electrodes	3.4	5.5 μμf
D4 to All Other Electrodes	3.4	3.5 μμf
IECHANICAL DATA		
Minimum Useful Screen Diameter		61/8 Inches
Nominal Overall Length		15 1/2 Inches
Anode No. 3 Contact (Recessed Small Bal	I Cap).	J1-22
Bulb		J56 Y1

Basing	14J
Base Alignment	
D1-D2 Trace Aligns with Pin No. 5	
and Tube Axis	0 ± 10 Degrees
Positive Voltage on D1 Deflects Beam	

Base (Medium Shell Diheptal 12-Pin).....

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....
Bulb Contact Alignment J1-22 Contact Aligns with D1-D2 Trace....
J1-22 Contact on Same Side as Pin No. 5
Weight (Approx.).... 90 ± 1 Degrees 0 ± 10 Degrees

3½ Pounds

SYLVANIA TYPES 7AEP1 (Cont'd) **7AFP***

RATINGS

KATINGS		
MAXIMUM RATINGS (Absolute Maximum V	alues)	
Anode No. 2 InputAnode No. 3 VoltageAnode No. 2 Voltage	8800	Watts Volts d c Volts d c
Anode No. 2 Voltage ¹	2:1 1375	Maximum Volts d c
Negative Bias Value Positive Bias Value Positive Peak Value Peak Heater-Cathode Voltage	0	Volts d c Volts d c Volts
Heater Negative with Respect to Cathode Heater Positive with Respect to Cathode Peak Voltage Between Anode No. 2 and	200 200	Volts Volts
Any Deflection Plate	825	Volts
Anode No. 3 Voltage. Anode No. 2 Voltage. Anode No. 1 Voltage for Focus. Grid No. 1 Voltage Required for Cutoff ² . Deflection Factors Deflection Plates 1-2 ³ . Deflection Plates 3-4 ³ . Pattern Distortion ⁴ . Spot Position ⁵ . Modulation (1b3 = 25 µa) ⁶ . Line Width "A" (1b3 = 25 µa) ⁶ . Light Output (7AEP1, 1b3 = 25 µa) ⁶ . Deflection Factor Uniformity ⁶ . Focusing Electrode Current for Any Operating Condition.	2000 380 to 620 -45 to -75 81 to 101 67 to 83 2½ Within a 37 .022 20 3	Volts d c Volts d c Volts d c/Inch Volts d c/Inch Percent Max, 15 MM. Square Volts d c Max, Inches Max, Ft. Lamberts Min. Percent Max.
CIRCUIT VALUES		

1.5 Megohms Max. 1.0 Megohms Max.

- 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.
 Visual extinction of undeflected focused spot.
 Deflecting plates 1-2 are nearer the screen. Deflecting plates 3-4 are nearer

- Deflecting plates 1-2 are nearer the screen. Deflecting plates 3-4 are nearer the base.
 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.
 Centered on tube face, sides parallel to deflection axes. Tube to be magnetically shielded and deflecting plates connected to Anode No. 2.
 Measured with accordance Mil-E-1 specs.
 It is recommended that the deflecting plate circuit resistance be approximately equal. Higher resistance values up to five megohms may be used for low bear current operations.

- beam current operations.

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.

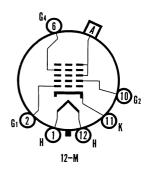
SYLVANIA TYPE 7ABP4 7ABP*

Special Purpose Tube

7" Direct Viewed Round Glass Type Electrostatic Focus

Magnetic Deflection High Resolution "A" Types Aluminized





CHARACTERISTICS

	HAKACII	EKISTICS			
GENERAL DATA					
Focusing Method Deflection Method Deflection Angle (approx.)		Self	Focusing M 50	g (Electros lagnetic Degrees	static)
Types*	7ABP4	7ABP7A 7ABP7	7 A D D 1 A	7AB	P19A P19
Fluorescence				Clear	inge low ing
Types 7ABP7A, 7ABP14A at *In addition to the types soreen phosphors.	shown, the	A nave alumini 7ABP- can be	zea scree supplied	ns. with seve	ral other
ELECTRICAL DATA					
Heater VoltageHeater CurrentDirect Interelectrode Capaci	tances (app	0. rox.)	6.3 6 ± 5%	Volts Ampere	
Cathode to All Other Elec Grid No. 1 to All Other E	trodes		5	μμf μμf	
MECHANICAL DATA					
Minimum Useful Screen Dia Nominal Overall Length Bulb Contact (Recessed Sma Base (Small Shell Duodecal	ull Cavity C 6-Pin)	ap)	13¼ J1-21 B6-63	Inches Inches	
Basing Bulb Contact Aligns with Pi	n No. 3		12M ± 10	Degrees	
	RATIN	GS			
MAXIMUM RATINGS (Ab					
Anode VoltageGrid No. 4 (Focusing Electro Grid No. 2 Voltage Grid No. 1 Voltage	ode) Voltage	e550 t	11,000 0 +1100 770	Volts d c Volts d c Volts d c	
Negative Bias Value Positive Bias Value ¹ Positive Peak Value			0	Volts d c Volts d c Volts	
Peak Heater-Cathode Voltag Heater Negative with Res Heater Positive with Resp	pect to Cath	node ode		Volts Volts	
TYPICAL OPERATING CO	NDITIONS	5			
Anode Voltage ² Grid No. 4 Voltage for Focu Grid No. 2 Voltage Grid No. 1 Voltage ⁴	3 ³		0 to 250 300	Volts d c	
CIRCUIT VALUES					
Grid No. 1 Circuit Resistanc	e		1.5	Megohms	Max.

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

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. The screen of the 7ABP19 and 7ABP19A can be permainently damaged should the current density be permitted to rise too high. To prevent burning, minimum beam current densities should be employed.
 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.

volts.

3. With Eg1 adjusted for Ib = $100~\mu a$ and beam focused for minimum width of individual lines at center of screen.

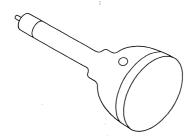
4. Visual extinction of undeflected focused spot.

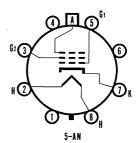
SYLVANIA TYPE 7BP2A $7BP-A^{2}$

SPECIAL PURPOSE TUBE

7" Direct Viewed Magnetic Focus

Round Glass Type Magnetic Deflection





CHARACTERISTICS

GF	NF	'RAI	_ DA	ТΔ

Focusing Method.....Deflection Method.....Deflection Angle (approx.)..... Magnetic Magnetic 53 Degrees 2A 7BP7A Types* Fluorescence.. 7BP2A Green Blue Phosphorescence..... Yellow Persistence..... Long Clear Faceplate. *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 Current0.6	± 10% Ampere
Direct Interelectrode Capacitances (approx.)	, ,
Cathode to All Other Electrodes	
Grid No. 1 to All Other Electrodes	8.5 μμf
Grid No. 2 to All Other Electrodes	$7.0 \mu\mu f$

MECHANICAL DATA

Minimum Useful Screen Diameter	
BulbJ56R or Equivale	ent
Bulb Contact (Recessed Small Cavity Cap). J1- Base (Long Medium-Shell Octal 8-Pin). B8 or (Long Medium-Shell Octal 5-Pin). B5	-22
Base (Long Medium-Shell Octal 8-Pin) B8	-65
or (Long Medium-Shell Octal 5-Pin) B5	-80
Basing 5	AN
Weight (approx.)	3 Pounds

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

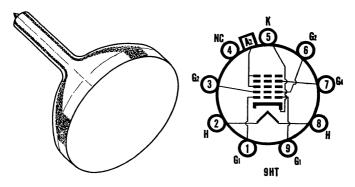
Anode Voltage	8800 Volts d c
Grid No. 2 Voltage	770 Volts d c

SYLVANIA TYPES 7AUP4 7AUP7

SPECIAL PURPOSE TUBE

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

Radar Indicator (7AUP7)



CHARACTERISTICS

CHARACIERISTICS	
GENERAL DATA	
Focusing Method	Electrostatic Magnetic 70 Degrees 7AUP7
Phosphor*	Aluminized P7 White Long Yellow-Green Spherical, Clear Glass
supplied with several other screen phosphors.	
ELECTRICAL DATA	
Heater VoltageHeater CurrentDirect Interelectrode Capacitances (approx.)	0.3 ± 5% Ampere
Cathode to All Other Electrodes	7.0 μμf
Grid No. 1 to All Other Electrodes	9.0 μμξ
Grid No. 2 to All Other Electrodes	7.0 μμf
MECHANICAL DATA	
Minimum Useful Screen Diameter Overall Length	6 Inches 8½ Inches Max. LEA 480 or Equivalent
BulbBulb Contact (Recessed Small Ball Cap) Base ¹	J1-22 E9-37
Basing	9HT 2¼ Pounds
Weight (approx.)	2% Founds
RATINGS	
MAXIMUM RATINGS (Absolute Maximum Valu	ies)
Anode Voltage	11,000 Volts d c 1100 Volts d c 770 Volts d c
Negative Bias Value Positive Bias Value Positive Bias Value Positive Peak Value Peak Heater-Cathode Voltage	155 Volts d c 0 Volts d c 0 Volts
Heater Negative with Respect to Cathode During Warm-up Period Not to Exceed 15 Seconds	450 Volts 200 Volts 200 Volts

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

TYPICAL OPERATING CONDITIONS

Anode Voltage	8000 Volts d c Max.
Grid No. 4 Voltage for Focus ²	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 ³	0.012 Inch

CIRCUIT VALUES

OILLOUIT TALOLO	
Grid No. 1 Circuit Resistance	1.5 Megohms Max.
Grid No. 2 Circuit Resistance4	10,000 Ohms Max.
Grid No. 4 Circuit Resistance4	10,000 Ohms Max.

NOTES:

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

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 Positive Bias Value!	200 Volts d c 0 Volts d c
Positive Peak Value	2 Volts 140 Volts
Heater Positive with Respect to Cathode	140 Volts

TYPICAL OPERATING CONDITIONS

Anode Voltage ²		7000 Volts d c
Grid No. 2 Voltage	250	
Grid No. 1 Voltage for Cutoff ³	−25 to −70	−25 to −70 Volts d c
Focusing-Coil Current4	75 to 102	99 to 135 Mad 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 2½ inches from reference line and total anode current of 200 microamperes.
- 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.

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.

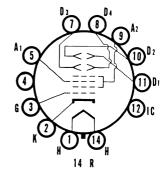
SYLVANIA TYPE 7JP1/7VP1

SPECIAL PURPOSE TUBE

7" Direct Viewed Round Glass Type Clear Faceplate

Electrostatic Deflection Electrostatic Focus Spherical Faceplate





CHARACTERISTICS

GENERAL DATA

Deflecting Method		Electro	
Types* Fluorescence		7JP4 White	7JP7 Blue
Phosphorescence	Medium	Short Cla	Yellow Long

^{*}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. Heater Current (approx.) Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. Between Vertical Deflecting Plates. Between Horizontal Deflecting Plates Either Vertical Deflecting Plate to All Other Electrodes Except Other Vertical Plate. Either Horizontal Deflecting Plate to All Other	6.3 Volts 0.6 Ampere 5.0 µµf 6.0 µµf 3.0 µµf 2.0 µµf 6.0 µµf
Electrodes Except Other Horizontal Plate	5.0 μμf
MECHANICAL DATA Minimum Useful Screen Diameter Nominal Overall Length Base (Medium Shell Diheptal 12-Pin) Basing	6 Inches 14½ Inches B12-37 14R
RATINGS	
MAXIMUM RATINGS (Absolute Maximum Values)	
Anode Voltage	6600 Volts d c 3000 Volts d c
Negative Bias Value Positive Bias Value Positive Peak Value Peak Heater-Cathode Voltage	220 Volts d c 0 Volts d c 2 Volts
Heater Negative with Respect to Cathode During Warm-up Period Not to Exceed 15 Seconds After Equipment Warm-up Period Heater Positive with Respect to Cathode Peak Voltage Between High Voltage Anode and	450 Volts 140 Volts 140 Volts
Any Deflecting Plates	825 Volts
TYPICAL OPERATING CONDITIONS	

TYPICAL OPERATING CONDITIONS

Anode Voltage	1080-1600	Volts d c Volts d c Volts d c
Vertical Plates ²		

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 $5 \frac{1}{2}$ 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.

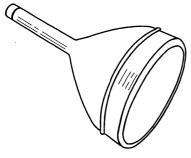
SYLVANIA TYPE 7MP7 7MP*

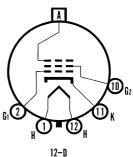
SPECIAL PURPOSE TUBE

Radar Indicator 7" Direct Viewed

Round Glass Type Magnetic Focus







CHARACTERISTICS

GENERAL DATA

Focusing Method Deflection Method. Deflection Angle (approx.)	Mag	netic netic grees
Types	7MP7	
Fluorescence	Blue	
Phosphorescence		Orange
Persistence	Long	MedLong
Faceplate		lear
*In addition to the types shown, the 7MP- can be su screen phosphors.	applied with	n several other

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current0.6	± 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	6 Inches
Nominal overall length	123/4 Inches
Bulb	r J571/sD
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 5-Pin)	B5-57
Basing	12D _
Weight (approx.)	31/2 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 Value1	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 ²	4000	7000 Volts d c
Grid No. 2 Voltage	250	250 Volts d c
Grid No. 1 Voltage for Cutoff ³	−27 to −63	-27 to −63 Volts d c
Focusing Coil Current		85 ± 15% Ma
Snot Position		See Note 5

CIRCUIT VALUES

Out a Na	1 Circuit Desistance	1 5 Magahma May

SYLVANIA TYPE $7MP7, 7MP^*$ (Cont'd)

NOTES:

- 1. At or near this rating, the effective resistance of the anode supply should be

- At or hear this rating, the effective resistance of the ahode 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. 109 positioned with air gap toward faceplate and center line of air gap 23/4 inches from reference line and anode current
 - of 200 microamperes.

 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

SPECIAL PURPOSE TUBE

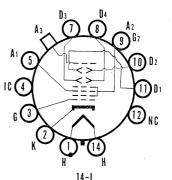
8" Direct Viewed Round Glass Type **Electrostatic Deflection Electrostatic Focus**

Clear Faceplate

Spherical Faceplate

Post Deflection Acceleration





CHARACTERISTICS

C	EN	JE	Λ	\mathbf{r}	Λ	т.	۸

Focusing Method		Electrostatic Electrostatic		
Types*	8CP1	8CP4	8CP7	
Fluorescence	Green	White	Blue	
Phosphorescence		á: · · .	Yellow	
Persistence	Medium	Short	Long	
Faceplate		Cle	ar	

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

ELECTRICAL DATA

Heater Voltage		Volts
Heater Current (approx.)	0.6	Ampere
Direct Interelectrode Capacitances (approx.)		•
Cathode to All Other Electrodes	10	$\mu\mu f$
Grid No. 1 to All Other Electrodes	8	μμf
Between Vertical Deflecting Plates		μμf
Between Horizontal Deflecting Plates	2	μμξ
Either Vertical Deflecting Plate to All Other		• •
Electrodes Except Other Vertical Plate	8	μμf
Either Horizontal Deflection Plate to All Other		
Electrodes Except Other Horizontal Plate	₽ 6	μμf

MECHANICAL DATA

Minimum Useful Screen Diameter	6 Inches
Nominal Overall Length	161/2 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 Valu	ues)	
Anode No. 3 Voltage	6600	Volts d c
Anode No. 2 Voltage		Volts d c
Anode No. 1 Voltage		Volts d c
Grid No. 1 Voltage	2,00	
Negative Bias Value	220	Volts d c
Positive Bias Value		Volts d c
Positive Peak Value		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 Cutoff1	-24 to -56	Volts d c
Deflection Factor		
Vertical Plates ²		Volts d c/Inch
Horizontal Plates3	49 to 68	Volts d c/Inch
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max
Deflection Circuit Resistance		Megohms Max
Denoction Official nesistance	5.0	iviogoninis iviax

NOTES:

- Visual extinction of undeflected focused spot.
 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

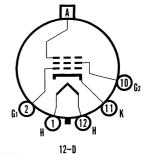
SPECIAL PURPOSE TUBE

8" Rectangular, All Glass Magnetic Focusing

Aluminized Screen

lon Trap 90° Magnetic Deflection **Gray Filter Glass**





CHARACTERISTICS

GENERAL DATA

Focusing Method......
Deflecting Method.....
Deflection Angles (approx.) Vertical..... Diagonal..... Phosphor... Fluorescence..... Persistence..... Faceplate. Light Transmittance (approx.).....

Magnetic Magnetic 68 Degrees 85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 80 Percent

SYLVANIA ELECTRONIC TUBES

SYLVANIA TYPE 8FP4 (Cont'd)

ELECTRICAL DATA		
Heater Voltage Heater Current Heater Warm-up Time! Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes	$0.6 \pm 5\%$ Ampere 11 Seconds $5~\mu\mu{ m f}$ $6~\mu\mu{ m f}$	
Ion Trap Magnet	External, Single Field Type	1
MECHANICAL DATA		
Minimum Useful Screen Dimensions. Nominal Overall Length. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 5-Pin). Basing. Weight (approx.).	117/ ₆ Inches J1-21 B5-57 12D	
RATINGS	• •	
MAXIMUM RATINGS (Absolute Maximum Val		
Anode Voltage Grid No. 2 Voltage Grid No. 1 Voltage	19,800 Volts d c 550 Volts d c	
Negative Bias Value. Negative Peak Value. Positive Bias Value. Positive Peak Value. Peak Heater-Cathode Voltage	220 Volts 0 Volts d c	
Heater Negative with Respect to Cathode During Warm-up Period not to Exceed		
15 Seconds	450 Volts 200 Volts 200 Volts	
TYPICAL OPERATING CONDITIONS		
Anode Voltage Grid No. 2 (and Grid No. 4) Voltage Grid No. 1 Voltage Required for Cutoff ² Focusing Coil Current ³ Ion Trap Magnet Current (average) ⁴ Field Strength of PM Ion Trap Magnet ⁵	16,000 Volts d c 300 Volts d c -35 to -72 Volts d c 25 ± 15% Ma d c 30 Ma d c 33 Gausses Min.	
CURCUIT VALUES		

CIRCUIT VALUES

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

NOTES:

- OTES:

 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 73/6" x 53/6" picture area sharply focused at center of screen.
- area, sharply focused at center of screen.

 For JETEC Ion Trap Magnet No. 117, with pole pieces centered over Grid No. 2 on mount and rotated for maximum brightness.

 For typical PM ion trap magnet with field strength tolerance of ±3 gausses.

WARNING:

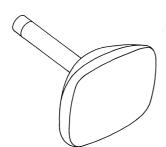
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

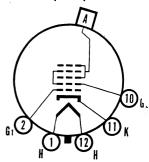
SYLVANIA TYPE 8XP4

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	Ma 68 85 90 W Short t Gray F	(Electrostatic) gnetic Degrees Degrees Pegrees P4 //hite o Medium ilter Glass Percent
ELECTRICAL DATA Heater Voltage	0.6	Volts Ampere μμf μμf
MECHANICAL DATA Overall Length. Minimum Useful Screen Dimensions. Bulb Contact (Recessed Small Cavity Cap.). Base (Small Shell Duodecal 5-Pin). Basing.	7¾6 x 5¾ J B	Inches Inches 1-21 5-57 128
RATINGS		
MAXIMUM RATINGS (Absolute Maximum Valu		
Anode Voltage		Volts d c Volts d c
Negative Bias Value Negative Peak Value Positive Bias Value Positive Peak Value Peak Heater-Cathode Voltage	220 0	Volts d c Volts Volts d c Volts
Heater Negative with Respect to Cathode During Warm-up Not to Exceed 15 Seconds After Equipment Warm-up Heater Positive with Respect to Cathode	200	Volts Volts Volts
TYPICAL OPERATING CONDITIONS		
Anode Voltage	16000 300 -28 to -72	Volts d c Volts d c Volts d c
CIRCUIT VALUES		

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.

1.5 Megohms Max

^{1.} Visual extinction of raster.

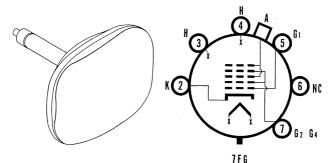
SYLVANIA TYPE 8YP4

TELEVISION RECEIVER CHECK TUBE

8" Rectangular, All Glass Self Focusing (Electrostatic)

GENERAL DATA

No Ion Trap 110° Magnetic Deflection Gray Filter Glass



CHARACTERISTICS

Focusing MethodSelf Foc Deflecting Method.	using (Elect Magnetic	rostatic)	
Deflection Angles (approx.) Vertical Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate	105	Degrees Degrees Degrees Medium	
Light Transmittance (approx.)		Percent	
ELECTRICAL DATA Heater Voltage	0.6	Volts Ampere μμf μμf	
MECHANICAL DATA			
Minimum Useful Screen Dimensions	J1-21 B6-185 7FG 2	nches Sq. Inches Pounds	
Bulb	C671/2	exp. 2 or Equival	ent
RATINGS			
MAXIMUM RATINGS (Absolute Maximum Valu	•	Volts dc	
Anode Voltage. Grid No. 2 (and Grid No. 4) Voltage Grid No. 1 Voltage		Volts de	
Grid No. 1 Voltage Negative Bias Value. Negative Peak Value. Positive Bias Value. Positive Peak Value. Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode	220 0	Volts dc Volts Volts dc Volts	
During Warm-up Period Not to Exceed 15 Seconds After Equipment Warm-up Period Heater Positive with Respect to Cathode	200	Volts Volts Volts	
TYPICAL OPERATING CONDITIONS			
Anode VoltageGrid No. 4) Grid No. 2 (and Grid No. 4) VoltageGrid No. 1 Voltage Required for Cutoff ¹	16,000 300 -35 to -72	Volts dc Volts dc Volts dc	
CIRCUIT VALUES			
Grid No. 1 Circuit Resistance	1.5	Megohms	Ма

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

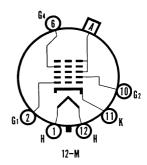
90° Magnetic Deflection

Aluminized Screen

High Resolution

Gray Filter Glass





CHARACTERISTICS

GENERAL DATA		
Focusing Method		rostatic gnetic
Vertical Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	85 90 Alumi W Short t Gray F	Degrees Degrees Degrees nized P4 /hite o Medium ilter Glass Percent
ELECTRICAL DATA		
Heater Voltage0.6 Heater Current0.6 Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes	0 ± 10%	μμf
MECHANICAL DATA		
Minimum Useful Screen Dimensions (Maximum Assured). Nominal Overall Length. Nominal Neck Length. Area. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 6-Pin). Basing.	8	Inches Inches Inches Square Inches
RATINGS		
MAXIMUM RATINGS (Absolute Maximum Value	s)	

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
riodia roomina mini rioopaa ta cameaan irrii	

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 VoltageGrid No. 1 Voltage Required for Cutoff ¹	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.
-------------------------------	------------------

NOTE:

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

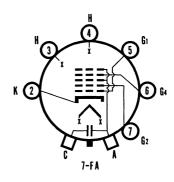
TELEVISION PICTURE TUBE

Electrostatic Focus 8" Rectangular, All Glass Aluminized Screen **Gray Filter Glass**

No Ion Trap 110° Magnetic Deflection **External Conductive Coating** 6.3 Volts, 0.30 Amp. Heater



GENERAL DATA



CHARACTERISTICS

GENERAL DATA	
Focusing Method	Electrostatic
Deflecting Method	Magnetic
Deflection Angles (approx.)	•
Vertical	87 Degrees
Horizontal	105 Degrees
Diagonal	110 Degrees
	Aluminized P4
Phosphor	White
Fluorescence	
Persistence	Short to Medium
Faceplate	Gray Filter Glass
Light Transmittance (approx.)	80 Percent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts
Heater Current 0.30	
Heater Current0.30 Heater Warm-up Time ¹	11 Seconds
Direct Interelectrode Capacitances (approx.)	11 Seconds
Cathode to All Other Electrodes	4
	4 μμf
Grid No. 1 to All Other Electrodes	$6 \mu \mu f$
External Conductive Coating to Anode ²	400 μμf Max.
	200 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Max. Assured)	
Height	5⅓ Inches
Width	7½ Inches
Diagonal	71/8 Inches
Area	39 Square Inches
	81/6 Inches
Over All Length	o716 inches
But O the Control of	£ Exp. 2 or Equivalent
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185 7FA
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185 7FA
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185 7FA 2 Pounds
Bulb Contact (Recessed Small Cavity Cap)BaseBasing. Weight (approx.)	J1-21 B6-185 7F A 2 Pounds
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185 7FA 2 Pounds 16,000 Volts d c to 400 Volts d c
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185 7FA 2 Pounds 16,000 Volts d c to 400 Volts d c 300 Volts d c
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185 7FA 2 Pounds 16,000 Volts d c to 400 Volts d c 300 Volts d c
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185 7FA 2 Pounds 16,000 Volts d c to 400 Volts d c 300 Volts d c
Bulb Contact (Recessed Small Cavity Cap)	J1-21 B6-185 7FA 2 Pounds 16,000 Volts d c to 400 Volts d c 300 Volts d c to -72 Volts d c
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B6-185 7FA 2 Pounds 16,000 Volts d c to 400 Volts d c 300 Volts d c

- 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

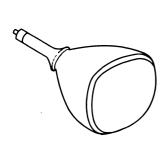


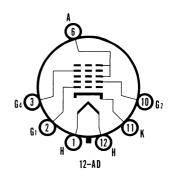
SYLVANIA TYPE 9QP4A

TELEVISION PICTURE TUBE

9" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass

Magnetic Deflection **Electrostatic Focus** Single Field Ion Trap Cathode Drive Design





CHARACTERISTICS	
GENERAL DATA Focusing Method Deflecting Method Deflection Angles (approx.) Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	Electrostatic Magnetic 61 Degrees 70 Degrees P4 White Short to Medium Gray Filter Glass 83 Percent
ELECTRICAL DATA Heater Voltage. Heater Current. Heater Warm-up Time! Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. lon Trap Magnet.	$0.3 \pm 10\%$ Ampere 11 Seconds $6 \mu \mu f$
MECHANICAL DATA Minimum Useful Screen Dimensions (Maximum Assured) Nominal Overall Length. Minimum Useful Screen Area Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 7-Pin). Basing. Weight.	7% x 6% Inches 12¾ Inches 43 Square Inches J1-21 B7-179 12AD 3½ Pounds
TYPICAL OPERATING CONDITIONS (Cathode Drive Service) ² Anode Voltage. Grid No. 4 Voltage for Focus. Grid No. 2 Voltage. Cathode Voltage Required for Cutoff ³ . Ion Trap Magnet Current ⁴ . Field Strength of PM Ion Trap Magnet ⁴ . CIRCUIT VALUES	5500 Volts d c 0 to 400 Volts d c 200 Volts +28 to +52 Volts d c 22 Ma d c 22 Gausses
Grid No. 1 Circuit Resistance	1.5 Megohms Max.

SYLVANIA TYPE 9QP4A (Cont'd)

NOTES:

- 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
- resistance equal to three (3) times 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

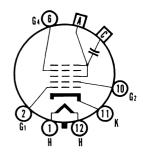
TELEVISION PICTURE TUBE

10" Direct Viewed Rectangular Glass Type Spherical Face Plate

Magnetic Deflection Electrostatic Focus Single Field Ion Trap

External Conductive Coating





12-L

CHARACTERISTICS

GENERAL DATA	
Focusing Method	. Electrostatic . Magnetic
Horizontal	. 85 Degrees . 90 Degrees 10ABP4C* 10ABP4B
Phosphor P4 Fluorescence White Persistence Medium Faceplate Clear Light Transmittance (approx.) 91 *Types 10ABP4A and 10ABP4C have aluminized screen	P4 White Medium Gray Filter 81 Percent
ELECTRICAL DATA	
Heater Voltage	
Cathode to All Other Electrodes	
Grid No. 1 to All Other Electrodes External Conductive Coating to Anode	
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum Assured). Nominal Overall Length. Minimum Useful Screen Area. Bulb Contact. Base. Basing. Bulb Contact Alignment	. 11 7/8 Inches . 53 1/2 Square Inches . J1-21 . B6-63
JI-21 Contact Aligns with Pin Position No. 6 Weight.	
TYPICAL OPERATING CONDITIONS	
Anode Voltage. Grid No. 4 Voltage ² . Grid No. 2 Voltage. Grid No. 1 Voltage ³ . Field Strength of PM Ion Trap Magnet ⁴ .	0 to 500 Volts d c 300 Volts d c -38 to -62 Volts d c
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms Max.

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

NOTES:

Grid No. 4 in this tube is the focus control electrode.
 With the combined Grid No. 1 bias voltage and video signal adjusted to produce an anode current of 100 μa on a 8% x 6% inch picture adjusted for best overall focus. For other anode voltages, the focus voltage will be from

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 gausses. This procedure will insure use of the PM ion trap magnet allowing adequate adjustment to permit satisfactory performance without loss of highlight brightness 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

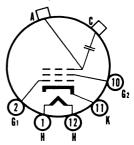
TELEVISION PICTURE TUBE

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





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91% Inches

GENERAL DATA	12-N
Focusing Method. Deflecting Method Deflecting Angle Phosphor. Fluorescence Persistence Faceplate	. Magnetic . 50 Degrees . P4 . White . Medium
ELECTRICAL DATA	
Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.)	. 0.6 Ampere
Cathode to All Other Électrodes	$6.0 \mu \mu f$
Ion Trap MagnetExternal	

MECHANICAL DATA

Minimum Useful Screen Diameter

Nominal Overall Length	175% 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	±10 Degrees

10BP4, 10BP4A (Cont'd)

TYPICAL OPERATING CONDITIONS

Anode Voltage	9000	Volts d c
Grid No. 2 Voltage		Volts d c
Grid No. 1 Voltage Required for Cutoff ² 27	ło −63	Volts d c
Focusing Coil Current (approx.)3	100	Ma dc
Ion Trap Magnet Strength (approx.)	35	Gausses

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

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.

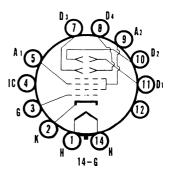
SYLVANIA TYPE 10HP4

TELEVISION PICTURE TUBE

10" Direct Viewed Round Glass Type Clear Faceplate

Electrostatic Deflection **Electrostatic Focus** Spherical Faceplate





CHARACTERISTICS

GENERAL DATA	
Focusing Method. Deflecting Method. Phosphor. Fluorescence Persistence Faceplate	Electrostatic Electrostatic P4 White Medium Clear
ELECTRICAL DATA	
Heater Voltage. Heater Current (approx.) Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes	9.5 μμf 8.5 μμf
Between Vertical Deflecting Plates Between Horizontal Deflecting Plates Either Vertical Deflecting Plate to	3.5 μμf 2.0 μμf
All Other Electrodes Except Other Vertical Plate Either Horizontal Deflecting Plate to	7.5 μμf
All Other Electrodes Except Other Horizontal Plate	6.0 uuf

10HP4 (Cont'd)

- · · · · · · · · · · · · · · · · · · ·
MECHANICAL DATAMinimum Useful Screen Diameter834 InchesNominal Overall Length1914 InchesBase (Medium Shell Diheptal 12-Pin)B12-37Basing14G
TYPICAL OPERATING CONDITIONS
Anode Voltage
CIRCUIT VALUES Grid No. 1 Circuit Resistance
NOTES: 1. Visual extinction of undeflected focused spot. 2. Pins 10 and 11. 3. Pins 7 and 8.

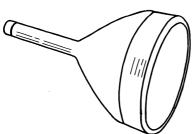
WARNING

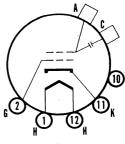
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

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





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	12 4
CHARACTERISTICS	
GENERAL DATA	
Focusing Method. Deflecting Method Deflecting Angle (approx.) Phosphor.	Magnetic Magnetic 52 Degrees P4
Fluorescence Persistence Faceplate	White Medium (10MP4) Clear (10MP4A) Gray
Light Transmittance (approx.)	66 Percent
ELECTRICAL DATA Heater Voltage. Heater Current (approx.) Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid to All Other Electrodes. External Conductive Coating to Anode! Ion Trap Magnet External,	6.3 Volts 0.6 Ampere 5 $\mu\mu f$ 6 $\mu\mu f$ 2500 $\mu\mu f$ Max 500 $\mu\mu f$ Min Double Field Type

SYLVANIA TYPES 10KP7* 10KP7A 10KP7B

SPECIAL PURPOSE TUBE

10" Direct Viewed

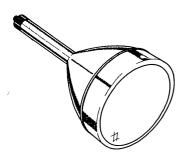
10KP7B, Aluminized Screen

Round Glass Type

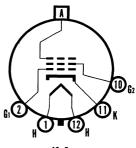
Magnetic Deflection

Spherical, Gray Faceplate Magnetic Focus

10KP7A and 10KP7B, High Resolution



GENERAL DATA



12-D

CHARACTERISTICS

Focusing Method Deflecting Method Deflection Angle (approx.)	Magnetic Magnetic 50 Degrees	
Types*	10KP7 10KP7A	10KP7B
Fluorescence. Phosphorescence Persistence. Screen	Blue-White Yellow Long Gray Filter	Blue-White Yellow Long Aluminized
FaceplateLight Transmittance (approx.)	Glass	Gray Filter Glass 77
*In addition to the types shown, the 10KP- can be screen phosphors.		• •
ELECTRICAL DATA		
Heater VoltageHeater CurrentDirect Interelectrode Capacitances (approx.)	0.6 ± 10%	•
Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes		μμf μμf
MECHANICAL DATA		
Minimum Useful Screen Diameter Nominal Overall LengthBulb Contact (Recessed Small Cavity Cap)	17 J1 - 21	Inches 5/8 Inches
Bulb. J Base (Small-Shell Duodecal 5-Pin). Basing. Bulb Contact Aligns with Vacant Pin	B5-57 12 D	
Position No. 3		Degrees Pounds
RATINGS		
MAXIMUM RATINGS (Absolute Maximum Val	ues)	
Anode Voltage 10 KP7, 10 KP7A. 10 KP7B. Grid No. 2 Voltage. Grid No. 1 Voltage Negative Bias Value.	13,200 770	Volts d c Volts d c Volts d c Volts d c
Positive Bias Value	0	Volts d c Volts

SYLVANIA 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 Heater Positive with Respect			200 Volts
to Cathode	140	200	200 Volts
TYPICAL OPERATING CONDIT			
Anode Voltage ¹			9000 Volts d c 250 Volts d c
Grid No. 1 Voltage Required for C	utoff ²	–27 1	to -63 Volts d c
Focusing Coil Current (approx.)3 Line Width A4 (10KP7A and 10KF	P7B)	112 ±	0.38 mm Max.
MAXIMUM CIRCUIT VALUES			
Grid No. 1 Circuit Resistance			1.5 Megohms Max.

NOTES:

- OTES:
 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 3½ inches from Reference Line at an anode current of 200 μa.
 4. Measured in accordance with MIL-E-1, at an anode current of 200 μa.

10MP4, 10MP4A (Cont'd)

MECHANICAL DATA

Minimum Useful Screen DiameterNominal Overall Length		Inches Inches
Bulb Contact (Recessed Small Cavity Cap)Base (Small Shell Duodecal 5-Pin)	J1-21	
Basing	12G	

TYPICAL OPERATING CONDITIONS

THICKE OF ENATING CONDITIONS		
Anode Voltage		Volts d c
Grid Voltage Required for Cutoff ² 27	to -63	Volts d c
Ion Trap Magnet Strength (approx.)	35	Gausses

CIRCUIT VALUES

Grid Circuit Resistance	hms Max

NOTES:

- External conductive coating must be grounded.
 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

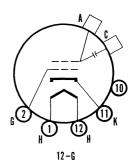
10" Direct Viewed Round Glass Type Aluminized Screen

Magnetic Deflection Magnetic Focus

External Conductive Coating

Triode Construction





CHARACTERISTICS

GENERAL DATA

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

FLECTRICAL DATA

Heater VoltageHeater Current	6.3 Volts 0.6 Ampere
	4 μμf 5 μμf
External Conductive Coating to Anode	1500 μμf Max. 500 μμf Min.

SYLVANIA TYPE 10NP11 (Cont'd)

MEG	CHA	NI	CA	L D	ATA

Minimum Useful Screen Diameter1	9½ Inches
Nominal Overall Length	175/8 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

DATINIOC

27,500	Volts d c
	Volts d c
	Volts d c
_	Volts
	Volts
	Volts
165	Volts
to -125	Volts d c Volts d c Ma d c
	385 0 2 450 165 165 18,000 to -125

- NOTES: 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.
 Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent, with the distance from reference line to the center of the air gap equal to 3½ 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

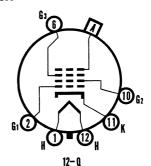
SPECIAL PURPOSE TUBE

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

GENERAL DATA	
Focusing Method	
Deflecting Method	
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 Amporo

E

0.6 Ampere

Heater Current
Direct Interelectrode Capacitances (approx.)
Cathode to All Other Electrodes
Grid No. 1 to All Other Electrodes. 5 μμf

SYLVANIA TYPE 10SP4 (Cont'd)

MECHANICAL DATA Minimum Useful Screen Diameter. Nominal Overall Length. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 6-Pin). Basing. Bulb Contact Aligns with Pin No. 6.	165% J1-21 B6-63 12Q	Inches Inches
RATINGS		•
MAXIMUM RATINGS (Absolute Maximum Values)		
Anode Voltage	3300	Volts d c Volts d c Volts d c
Negative Bias Value	0	Volts d c Volts d c Volts
15 Seconds	200	Volts Volts Volts
TYPICAL OPERATING CONDITIONS		
Grid No. 3 Voltage for Focus with Ib = 100 μamps1640 to	2225 0 to 8 200 to -48	Gausses

CIRCUIT VALUES

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

NOTES:

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

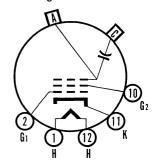
SPECIAL PURPOSE TUBE

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 Magnetic 50 Degrees
-----------------	------------------------------------

Types*	10 VP 7	10 VP 15
FluorescencePhosphorescence.	Blue Yellow	Blue-Green
Persistence	Long	Extremely Short
ScreenFaceplate	Aluminized 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 Anode1	2500 μμf Max.
	500 μμf Min.

MECHANICAL DATA

Minimum Useful Screen Diameter Nominal Overall Length	91/8 Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 5-Pin)	B5-57
Basing	12N
BulbJ84C o	
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	
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 V olts d c
Grid No. 2 Voltage	250 Volts d c
Grid No. 1 Voltage Required for Cutoff ²	−28 to −72 Volts d c
Focusing Coil Current (approx.)3	110 Mad c
Spot Position (Undeflected)	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 31/4 inches.

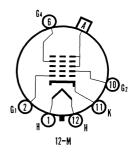
SYLVANIA TYPE 10WP7 10WP*

SPECIAL PURPOSE TUBE

10" Direct Viewed Round Glass Type Electrostatic Focus Spherical Faceplate Gray Filter Glass Magnetic Deflection



GENERAL DATA



CHARACTERISTICS

Focusing Method		M	trostatic agnetic Degrees
Types*	10WP7A 10WP7	10WP14 10WP14	
Fluorescence. Phosphorescence. Persistence. Faceplate. Light Transmittance. Types 10WP7A, 10WP14A, 10WP19A h	Long	MedLoi Gray F 76	Orange ng Long ilter Glass Percent
*In addition to the types shown, the 10 several other screen phosphors.	WP- and 1	0WP-A can	be supplied with
ELECTRICAL DATA			
Heater Voltage Heater Current. Direct Interelectrode Capacitances (appi Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes	rox.)	0.6 ± 10% 5	Volts Ampere μμf μμf
MECHANICAL DATA			
Minimum Useful Screen Diameter Nominal Overall Length Bulb Contact (Recessed Small Cavity C Base (Small Shell Duodecal 6-Pin) Basing Bulb Contact Aligns with Vacant Pin	ap)		Inches Inches
Position No. 3		±10	Degrees

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

Anode Voltage	-550 to +1100 Volts d c
Grid No. 1 Voltage	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Negative Bias Value	200 Volts d c
Positive Bias Value ¹	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 ²	10,000 Volts d c
Grid No. 4 Voltage for Focus ³	0 to 300 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage for Cutoff4	-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 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.
 Brilliance and definition decrease with decreasing anode voltage. In general, anode voltage should not be less than 7,000 volts.
 With E_{g1} adjusted for Ib=100 microamperes, E_{g3} is adjusted for best overall focus of a 6" x 8" raster pattern.
 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.

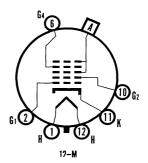
SYLVANIA TYPE 12ABP7A 12ABP-A

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	12ABP14A	12ABP19A
	12ABP7	12ABP14	12ABP19
FluorescencePhosphorescencePersistence	Blue	Purple	Orange
	Yellow	Yellow	Orange
	Long	MedLong	Long
FaceplateLight Transmittance			lter Glass 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	0.6 ±	6.3 Volts 10% Ampere
Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes		5 μμf 6 μμf

MECHANICAL DATA

Minimum Useful Screen Diameter	
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	
Grid No. 1 Voltage	
Negative Bias Value	200 Volts d c
Positive Bias Value ¹	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 ²	10,000 Volts d c
Grid No. 4 Voltage for Focus ³	0 to 300 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage for Cutoff4	-28 to -72 Volts d c
Alignment Magnet Field Strength ⁵	0 to 4 Gausses

MAXIMUM 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. 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.
- 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 lb = 100 microamperes, E $_{g4}$ is adjusted for best overall focus of a $7\frac{1}{2}''$ x 10'' raster pattern.
- 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 51/6" 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.

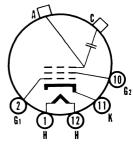
SYLVANIA TYPE 12KP4 Silver Screen "85"→12KP4A

TELEVISION PICTURE TUBE

12" Direct Viewed Round Glass Type **External Conductive Coating** No Ion Trap Magnet Required Magnetic Deflection Magnetic Focus Spherical Faceplate Aluminized Screen

12KP4 has a Clear Glass Faceplate 12KP4A has a Gray Filter Glass Faceplate





12-N

CHARACTERISTICS	
GENERAL DATA Focusing Method Deflecting Method Deflecting Angle (approx.) Phosphor. Fluorescence Persistence Faceplate	Magnetic Magnetic 54 Degrees Aluminized, P4 White Medium (12KP4A) Gray
Light Transmittance (approx.)	(12KP4) Clear 72 Percent
ELECTRICAL DATA Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes External Conductive Coating to Anode!	6.3 Volts 0.6 Ampere 5 μμf 6 μμf 2500 μμf Μαχ. 500 μμf Μίπ.
MECHANICAL DATA Minimum Useful Screen Diameter Nominal Overall Length Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 5-Pin) Basing.	111/4 Inches 175/6 Inches J1-21 B5-57 12N
TYPICAL OPERATING CONDITIONS Anode Voltage	11000 Volts d c 250 Volts d c to -63 Volts d c

Anode Voltage	11000		
Grid No. 2 Voltage	250	Volts	
Grid No. 1 Voltage Required for Cutoff ²	to -63		
Focusing Coil Current (approx.)3	135	Мa	d·c

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 35 foot lamberts on a 7½ 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

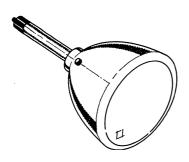
Round Glass Type

Gray Filter Glass Faceplate

Magnetic Deflection

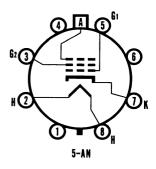
Spherical Faceplate

12DP7C - Aluminized



Focusing Method.....

GENERAL DATA



Magnetic

± 10 Degrees 8½ Pounds

CHARACTERISTICS

Deflection Method Deflection Angle (approx.). Types* Fluorescence Phosphorescence Persistence Faceplate Light Transmittance (approx.)	12DP7A Blue-White Yellow Long	12DP7C Blue-White Yellow Long	agnetic Degrees
Gray Faceplate	75 	75 Alumînized	Percent
'In addition to the types shown, the screen phosphors.	12DP- can be	supplied wi	th several other
ELECTRICAL DATA			
Heater Voltage	approx.)	0.6 ± 10%	Ampere μμf
	S	. 0	μμf
MECHANICAL DATA			
Minimum Useful Screen Diameter Nominal Overall Length Bulb Bulb Contact (Medium Cap) Base		. 19	Inches 5 Inches Equivalent
12DP7A (Long Medium Shell Oct. 12DP7C (Long Medium Shell 8-P Basing Bulb Contact Alignment	in)	B8-65	or B8-65
Anada Contact Aligne with Pin M	0.5	± 10	Dograge

RATINGS

MAXIMUM RATINGS (Absolute Maximum Values)

Anode Contact Aligns with Pin No. 5.....

Weight (approx.).....

	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 Cathodo	140	200	Volte

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

TYPICAL OPERATING CONDITIONS

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

CIRCUIT VALUES

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

NOTES:

- Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than 4000 volts.
 Visual extinction of undeflected focused spot.
 For JEDEC focusing coil No. 106 or equivalent with distance from the yoke reference line to center of air gap equal to 4½ inches.
 Measured in accordance with MIL-E-1, at an anode current of 200 µa.

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.

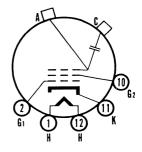
SYLVANIA TYPE 12LP4 12LP4A

TELEVISION PICTURE TUBE

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

12LP4A has a Gray Filter Glass Faceplate





12-N

1.5 Megohms Max.

CHARACTERISTICS

GENERAL DATA Focusing Method Deflecting Method Deflecting Angle (approx.) Phosphor Fluorescence Persistence Faceplate	Magnetic Magnetic 54 Degrees P4 White Medium (12LP4) Glear (12LP4A) Gray
ELECTRICAL DATA	(12LF4A) Gray
Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes External Conductive Coating to Anode	5 μμf 6 μμf 3000 μμf Max 750 μμf Min
Ion Trap MagnetExternal,	Double Field Type
MECHANICAL DATA Minimum Useful Screen Diameter. Nominal Overall Length. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 5-Pin). Basing. Bulb Contact Aligns with Vacant Pin Position No. 3.	11 Inches 1834 Inches J1-21 B5-57 12N ±10 Degrees
TYPICAL OPERATING CONDITIONS Anode Voltage	11000 Volts d c 250 Volts d c 7 to -63 Volts d c 110 Ma d c 35 Gausses

NOTES:

CIRCUIT VALUES

1. External conductive coating must be grounded.

Grid No. 1 Circuit Resistance.....

- 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 7½ 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 ELECTRONIC TUBES

SYLVANIA TYPE 12VP4 12VP4A

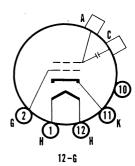
TELEVISION PICTURE TUBE

12" Direct Viewed Round Glass Type **External Conductive Coating** 12VP4 has a Clear Glass Faceplate

Magnetic Deflection Magnetic Focus Spherical Faceplate Double Field Ion Trap

12VP4A has a Gray Filter Glass Faceplate





CHARACTERISTICS

GENERAL DATA	
Focusing Method Deflecting Method. Deflecting Angle (approx.). Phosphor	Magnetic 55 Degrees
Persistence	White
FaceplateLight Transmittance (approx.)	(12VP4) Clear (12VP4A) Gray 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	$\mu\mu f$	
Grid to All Other Electrodes	6	$\mu\mu$ f	
External Conductive Coating to Anode1	3000	$\mu\mu f$ M	ax.
· ·	750	$\mu\mu f$ M	in.
Ion Trap MagnetExternal.	Double 1	Field Tv	pe

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 Cutoff233	to -77	Volts d c
Ion Trap Magnet Strength (approx.)	35	Gausses

CIRCUIT VALUES

Grid Circuit Resistance	1.5 Megohms
	⁻ Max.

NOTES:

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

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

WARNING

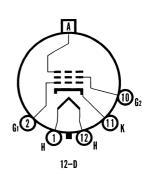
SYLVANIA TYPES 12SP7 12SP7D 12SP-*

SPECIAL PURPOSE TUBE

12" Direct Viewed Round Glass Type Spherical Faceplate **Gray Filter Glass**

Magnetic Deflection Magnetic Focus Aluminized Screen (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 Voltage0.6	
Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes—12SP7D Grid No. 1 to All Other Electrodes—12SP7	5 μμf 8 μμf 6 μμf
WECHANICAL DATA	
Minimum Useful Screen Diameter	11 Inches J1-21 B5-57
Basing	12D ± 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 ¹	9000 Volts d c
Grid No. 2 Voltage	250 Volts d c
Grid No. 1 Voltage Required for Cutoff ²	-27 to -63 Volts d c
Focusing Coil Current (approx.)3	104 Madc
Line Width A4—12SP7D Only	0.38 mm Max.
Spot Position5—12SP7D Only	20 mm

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

NOTES:

- Brightness and focus quality decrease with decreasing anode voltage. In general, the anode voltage should not be less than 4000 volts.
 For visual extinction of undeflected focused spot.
 For RETMA focusing coil No. 106 with distance from the yoke reference line to center of air gap equal to 3½ inches.
 Measured by compressed raster method at an anode current at 200 microampere.
- amperes
- The center of the undeflected, unfocused spot will fall within a circle of 20 mm radius concentric with the tube face.

SYLVANIA TYPE 14AJP4

Silver Screen "85"

TELEVISION PICTURE TUBE

14" Direct Viewed

Spherical Faceplate

Gray Filter Glass

Aluminized Screen

Electrostatic Focus

Rectangular Glass Type 110° Magnetic Deflection

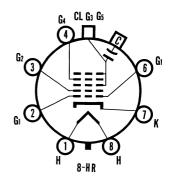
Ion Trap Required

External Conductive Coating

Short Neck

6.3 Volts at 600 Ma





CHARACTERISTICS

GENERAL DATA		
Focusing Method	Elect	rostatic
Deflection Method		anetic
Deflection Angles (approx.)		g
Horizontal	105	Degrees
Diagonal		Degrees
Vertical		Degrees
Phosphor		nized P4
Fluorescence		hite
Persistence	Short to	Medium
Faceplate	Grav F	Ilter Glass
Light Transmittance (approx.)		Percent
ELECTRICAL DATA		V 11
Heater Voltage		Volts
Heater Current	$0.60 \pm 5\%$	
Heater Warm-up Time1	11	Seconds
Direct Interelectrode Capacitances (approx.)	_	•
Cathode to All Other Electrodes		μμξ
Grid No. 1 to All Other Electrodes	9.50	$\mu\mu f$
External Conductive Coating to Anode2		μμf Max.
	500	μμf Min.
MECHANICAL DATA		
Minimum Useful Screen Dimensions		
(Maximum Assured)		
Height	91%	Inches
Width	123%	Inches Inches
Diagonal	131%	Inches
Area	108	Square Inches
Neck Length	$5\frac{1}{2} \pm \frac{3}{6}$ $11\frac{7}{6} \pm \frac{3}{8}$	Inches
Overall Length	$11\% \pm 3\%$	Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21	
Base	B7-183	
Basing	8HR	
Weight (approx.)	71/2	Pounds
TYPICAL OPERATING CONDITIONS		
	0000	Valta d a
Anode Voltage ³	100 to ±400	Volte d o
Grid No. 2 Voltage for 1 bous	250	Volts d c
Grid No. 2 Voltage	-24 to -64	Volte d o
Ion-Trap Field Intensity (Min.)5	27 10 -04	Gausses
	23	Gaussos .
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max.

SYLVANIA TYPE 14A IPA (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

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:

SYLVANIA TYPE 14BAP4

SPECIAL PURPOSE TUBE

Television Monitor Tube

14" Direct Viewed

Electrostatic Focus

Rectangular Glass Type

No Ion Trap

Spherical Faceplate

High Resolution

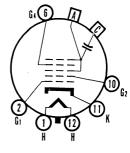
Magnetic Deflection

Aluminized Screen

External Conductive Coating



GENERAL DATA



12-L

CHARACTERISTICS

GENERAL DATA		
Focusing Method Deflection Method Deflection Angles (approx.)	Electrostatic Magnetic	
Horizontal Vertical Diagonal Phosphor Fluorescence Persistence	70 Degrees Aluminized P4 White Short to Medium	
Faceplate	Gray Filter Glass 76 Percent	
ELECTRICAL DATA		
Heater Voltage Heater Current Direct Interelectrode Capacitances (approx.)	0.6 ± 10% Ampere	
Cathode to All Other Electrodes	5 μμf	
Grid No. 1 to All Other Electrodes		
External Conductive Coating to Anode ¹	2000 μμf Max. 750 μμf Min.	
MECHANICAL DATA		
Minimum Useful Screen Dimensions. Minimum Useful Screen Area. Overall Length. Neck Length. Bulb Contact (Recessed Small Cavity Cap)	96 Square Inches 16¾ Inches 7½ Inches	
Bulb. Base (Small Shell Duodecal 6-Pin) Basing	J109½ A1 or J109½ C1 B6-63 12L	
Weight (approx.)	11 Pounds	
RATINGS		
MAXIMUM RATINGS (Design Maximum Value)	s)	
Anode Voltage	22,000 Volts d c	
Anode Voltage	800 Volts d c	
Grid No. 2 Voltage	700 Volts d c	
Negative Bias Value	180 Volts d c	
Positive Bias Value	0 Volts d c	
Positive Peak Value Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode During Warm-up Period Not to Exceed	2 Volts	

SYLVANIA TYPE 14BAP4 (Cont'd)

15 Seconds	200	Volts Volts 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. 2 Voltage	−35 to −72	Volts d c
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max.

NOTES:

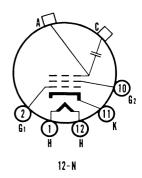
External conductive coating must be grounded.
 Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

SYLVANIA TYPE 14BP4/14CP4/14EP4

TELEVISION PICTURE TUBE

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





12N

CHARACTERISTICS

CHARACTERISTICS		
GENERAL DATA		
Focusing Method	Magnetic Magnetic	
Deflecting Angle (approx.) Horizontal	65 Degrees 70 Degrees P4	
Phosphor Fluorescence Persistence	White Medium	00
Faceplate Light Transmittance (approx.)	70 Percent	33
ELECTRICAL DATA		
Heater Voltage Heater Current (approx.). Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere	
Cathode to All Other Electrodes	5 μμf 6 μμf	
External Conductive Coating to Anode1	750 μμf N	ax. lin.
Ion Trap MagnetExternal	, Single Field Ty	рө
MECHANICAL DATA		
Minimum Useful Screen Dimensions	163/4 Inches J1-21	
Base (Small Shell Duodecal 5-Pin)	B5-57	

TYPICAL OPERATING CONDITIONS

Anode Voltage	12000 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage Required for Cutoff4	to -7/ Volts d c
Focusing Coil Current (approx.)3	99 Madc
Ion Trap Magnet Strength (approx.)	32 Gausses

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 82/12 x 111/16 inch picture area.

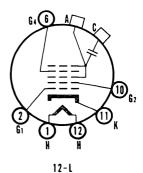
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SYLVANIA TYPE 14GP4

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





CHARACTERISTICS

C. 17 (10 (C. 12)(10))	
GENERAL DATA	
Focusing Method. Deflecting Method. Deflecting Angle (approx.)	Electrostatic Magnetic
Horizontal Diagonal Phosphor	65 Degrees 70 Degrees P4
Fluorescence Persistence Faceplate Light Transmittance (approx.)	White Medium Gray Filter Glass 66 Percent
ELECTRICAL DATA	
Heater Voltage. Heater Current (approx.). Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes	5 μμf 6 μμf 2000 μμf Max.
Ion Trap MagnetExternal,	750 μμ Min , Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions	2 x 113/ ₈ Inches 16 ¹³ / ₁₆ Inches J1-21 B6-63 12L
TYPICAL OPERATING CONDITIONS	
Anode Voltage	to 2940 Volts d c 300 Volts d c 3 to -77 Volts d c
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms Max.

NOTES:

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

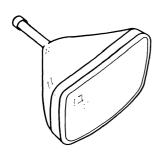
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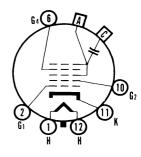
SYLVANIA TYPE 14NP4 Silver Screen "85" 14NP4A*

TELEVISION PICTURE TUBE

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

Electrostatic Focus Single Field Ion Trap **External Conductive Coating** Aluminized Screen (14NP4A) Non-Aluminized (14NP4)





12-L

CHARACTERISTICS

GENERAL DATA	
Focusing Method	Electrostatic Magnetic
Horizontal Diagonal Phosphor	90 Degrees
Fluorescence. Persistence Faceplate. Light Transmittance (approx.).	White Short to Medium Gray Filter Glass
ELECTRICAL DATA	
Heater Voltage Heater Current Heater Warm-up Time ¹ Direct Interelectrode Capacitances (approx.)	0.6 ± 5% Ampere 11 Seconds
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode ² Ion Trap Magnet.	6 μμf 1200 μμf Max. 800 μμf Min
	External, Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum Assured) Nominal Overall Length Minimum Useful Screen Area Bulb Contact (Recessed Small Cavity Cap) Bulb Base (Small Shell Duodecal 6-Pin) Basing	14% Inches 104 Square Inches J1-21 J112A1 B6-63
TYPICAL OPERATING CONDITIONS	
Anode Voltage Grid No. 4 Voltage for Focus. Grid No. 2 Voltage Grid No. 1 Voltage Required for Cutoff ³ . Field Strength of PM Ion Trap Magnet ⁴ .	-50 to +350 Volts d c 300 Volts d c -28 to -72 Volts d c 30 Gausses Min.
*Supplied as Sylvania Silver Screen Type 14NP4A/1	45P4.

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

WARNING:

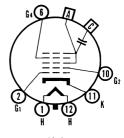
SYLVANIA TYPE 14QP4 Silver Screen "85" -> 14QP4A

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

14QP4A has an Aluminized Screen





12-L

CHARACTERISTICS		
GENERAL DATA		
Focusing Method Deflecting Method Deflecting Angle (approx.)		ostatic netic
Horizontal. Diagonal. Phosphor. Fluorescence. Persistance. Faceplate. Light Transmittance (approx.)	70 P4 Wr Med Gray Fil	Degrees Degrees nite dium ter Glass Percent
ELECTRICAL DATA		
Heater VoltageHeater Current (approx.)Direct Interelectrode Capacitances (approx.)		Volts Ampere
Cathode to All Other Electrodes	6	μμf μμf
External Conductive Coating to Anode!	600	μμf Max. μμf Min. gle Field Type
MECHANICAL DATA		
Minimum Useful Screen Dimensions Nominal Overall Length Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 6-Pin) Basing	11½ x 85/8 165/32 J1-21 B6-63 12L	
TYPICAL OPERATING CONDITIONS		
Anode Voltage. Grid No. 4 Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ² . Ion Trap Magnet Curront ³ (Average). Ion Trap Magnet Strength ⁴ (Min.)	-50 to+250 250 -24 to -64 24	Volts d c
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max.

NOTES:

- External conductive coating must be grounded.
 Visual extinction of focused raster.
 For JETEC Magnet No. 117.
 For PM Ion Trap Magnet.

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

WARNING:

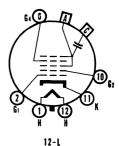
SYLVANIA TYPE 14RP4 Silver Screen "85"→14RP4A

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

14RP4A has Aluminized Screen





CHARACTERISTICS

CHARACTERISTICS		
GENERAL DATA		
Focusing Method Deflection Method Deflection Angles (approx.)		ostatic Inetic
Vertical. Horizontal. Diagonal. Phosphor	85	Degrees Degrees Degrees
14RP4 14RP4A Fluorescence Persistence Faceplate Light Transmittance (approx.)	Alumir W Short to Gray Fil	P4 nized P4 hite Medium Iter Glass Percent
ELECTRICAL DATA		
Heater Voltage Heater Current. Direct Interelectrode Capacitance (approx.) Cathode to All Other Electrodes.	$0.600 \pm 5\%$	Volts Ampere μμf
Grid No. 1 to All Other Electrodes External Conductive Coating to Anode!	6 1200	μμί μμί μμί Max. μμί Min.
Ion Trap Magnet		ngle Field Type
MECHANICAL DATA		
Overall Length. Minimum Useful Screen Dimensions. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 6-Pin) Basing.	143/16 ± 5/16 121/16 x 91/2 J1-21 B6-63 12L	
Weight (approx.)		Pounds
TYPICAL OPERATING CONDITIONS		
Anode Voltage Grid No. 4 Voltage for Focus Grid No. 2 Voltage	-50 to +350	Volts d c Volts d c Volts d c
Grid No. 1 Voltage Required for Cutoff ² Ion Trap Magnet Strength approx	-26 to -70	

CIRCUIT VALUES

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

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.

14RP4A

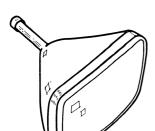
The Sylvania Type 14RP4A is identical to Type 14RP4 except it has an aluminized screen.

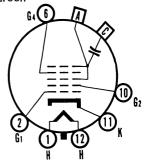
Silver Screen "85"

TELEVISION PICTURE TUBE

14" Direct Viewed Rectangular Glass Type **Gray Filter Glass** External Conductive Coating Single Field Ion Trap Aluminized Screen

Magnetic Deflection **Electrostatic Focus** Spherical Faceplate





CHARACTERISTICS

12-L

GENERAL DATA

Focusing Method Deflecting Method Deflection Angle (approx.)
Horizontal
Diagonal
Diagonal
Phosphor
Fluorescence
Persistence
Faceplate
Light Transmittance (approx.)
Light Transmittance (approx.)
LECTRICAL DATA

Ε

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	
External Conductive Coating to Anode1	1200 μμf Max.
3	900 μμf Min.
Ion Trap Magnet	External, Single Field Type
1-11 11 mp 111-g1141111111111111111111111111111111	

Electrostatic Magnetic 85 Degrees 90 Degrees

P4 White Medium Gray Filter Glass 79 Percent

6.3 Volts 0.6 Ampere

MECHANICAL DATA

WECHANICAL DATA	
Minimum Useful Screen Dimensions	121/16 x 91/2 Inches
Nominal Overall Length	
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 ²	−28 to −72 Volts d c
Ion Trap Magnet Strength (approx.)	28 ± 3 Gausses

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.

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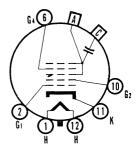
^{*}Supplied as Sylvania silver screen type 14NP4A/14SP4.

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

12-L

GENERAL DATA

Focusing Method	Electrostatic
Deflection Method	Magnetic
Deflection Angles (approx.)	o .
Horizontal	85 Degrees
_ Diagonal	90 Degrees
Phosphor	Aluminized P4
Fluorescence	White
Persistence	Short to Medium
Faceplate	Grav Filter Glass
Light Transmittance (approx.)	78 Percent

ELECTRICAL DATA

Heater Voltage Heater Current. Heater Warm-up Time¹. Direct Interelectrode Capacitances (approx.)	$0.6 \pm 5\%$ Ampere
Cathode to All Other Electrodes	5 μμ f
Grid No. 1 to All Other Electrodes	$6 \mu \mu f$
External Conductive Coating to Anode ²	1200 μμt Max.
	$800 \mu\mu f$ Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions	121/16 x 91/2	Inches
Nominal Overall Length	133/16	Inches
Minimum Useful Screen Area	104	Sq. Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21	•
Base (Small Shell Duodecal 6-Pin)	or B6-203	
Danie 2	101	

TYPICAL OPERATING CONDITIONS

Anode Voltage	12,000 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 4 Voltage5	0 to +350 Volts d c
Grid No. 1 Voltage Required for Cutoff3	−28 to −72 Volts d c

CIRCUIT VALUES

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

NOTES:

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

WARNING:

SYLVANIA TYPE 14XP4 Silver Screen "85"→ 14XP4A

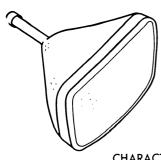
TELEVISION PICTURE TUBE

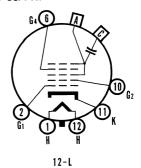
14" Direct Viewed Rectangular Glass Type **Gray Filter Glass** External Conductive Coating

Electrostatic Focus Spherical Faceplate Single Field Ion Trap

Magnetic Deflection

450 Ma Heater Current 14XP4A Has Aluminized Screen





CHARACTERISTICS

GENERAL DAT	ГΑ
-------------	----

Focusing Method	•
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 Anode1

6.3 Volts 0.450± 5% Ampere

5 μμf 6 μμf 1500 μμf Max. 1100 μμf Min. Ion Trap Magnet..... External, Single Field Type

MECHANICAL DATA

Overall Length	121/16 x 91/2 Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 6-Pin)	B6-63
Basing	12L

TYPICAL OPERATING CONDITIONS

Grid No. 2 VoltageGrid No. 1 Voltage Required for Cut-off ²	-50 to +350 V 300 V -28 to -72 V	olts d c olts d c olts d c
Ion Trap Magnet Strength (approx.)	30± 3 G	ausses Min.

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.

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

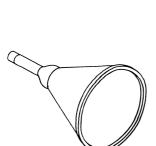
WARNING:

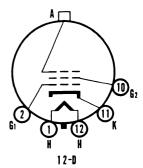
SYLVANIA TYPE 16AP4 16AP4A

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

ELECTRICAL DATA

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

MECHANICAL DATA

Minimum Useful Screen Diameter	
Nominal Overall Length (16AP4)	221/4 Inches
(16AP4A)	21½ Inches
Bulb Contact	Metal Cone Lip
Base (Small Shell Duodecal 5-Pin):	B5-57
Basing	12D

TYPICAL OPERATING CONDITIONS

Anode Voltage		
Grid No. 2 Voltage		
Grid No. 1 Voltage Required for Cutoff1	to -77	
Focusing Coil Current (approx.)2	90	Ma dc
Ion Trap Magnet Current (approx.)3	200	Ma dc

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms Max
	iviax

NOTES:

- Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 10 x 13¼ inch picture area.
 For JETEC ion trap magnet 108 or equivalent.

WARNING

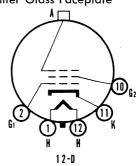
SYLVANIA TYPE 16EP4 16EP4A 16FP4B

TELEVISION PICTURE TUBE

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

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





CHARACTERISTICS

c	E NI	FD	ΛI	n	ΛТ	Λ

Focusing Method	
Deflecting Method	Magnetic
Deflecting Angle (approx.)	60 Degrees
Phosphor	P4
Fluorescence	White
Persistence	Medium
Faceplate	(16EP4) Clear
Faceplate	(16EP4A) Grav
(16FF	P4B) Gray, Frosted
(.02.	15) 414), 1100104

ELECTRICAL DATA

Heater Voltage. Heater Current (approx.)	6.3 Volts 0.6 Ampere
Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes	
Ion Trap Magnet External,	Double Field Type

MECHANICAL DATA

Minimum Useful Screen Diameter	
Nominal Overall Length	195/ 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 Cutoff1	to -77 Volts d c
Focusing Coil Current (approx.)2	105 Ma dc
Ion Trap Magnet Strength (approx.)	35 Gausses

CIRCUIT VALUES

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

NOTES:

Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 10 x 131/4 inch picture area.

WARNING

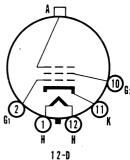
SYLVANIA TYPE 16GP4 16GP4A 16GP4B

TELEVISION PICTURE TUBE

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

16GP4 has a Gray Filter Glass Faceplate 16GP4A has Clear Glass Faceplate 16GP4B has Frosted Gray Filter Glass Faceplate





CHARACTERISTICS

CE	NE	DΛ	ם ו	ATA

Focusing Method		Magnetic
Deflecting Method		Magnetic
Deflecting Angle (approx.)		70 Degrees
Phosphor		P4
Fluorescence		White
Persistence		Medium
Faceplate		16GP4) Grav
		(16GP4Á) Clear
	(16GP	4B) Grav. Frosted

ELECTRICAL DATA

Heater Voltage	6.3 Volts 0.6 Ampere
Direct Interelectrode Capacitances (approx.)	•
Cathode to All Other Electrodes	5 սսք
Grid No. 1 to All Other Electrodes	6 µµf
Grid No. 1 to All Other Electrodes	Single Field Type

MECHANICAL DATA

Minimum Useful Screen Diameter	
Nominal Overall Length	175/ ₁₆ Inches
	Metal Cone Lip
Base (Small Shell Duodecal 5-Pin)	
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 ¹ 33	to –77 Volts d c
Focusing Coil Current (approx.)2	100 Madc
Ion Trap Magnet Strength (approx.)	35 Gausses

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms
	Max.

NOTES:

- Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 10 x 13½ inch picture area.

WARNING

SYLVANIA TYPE 16JP4 16 JP4A

TELEVISION PICTURE TUBE

16" Direct Viewed Round Glass Type

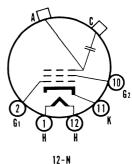
External Conductive Coating

16JP4 has a Clear Glass Faceplate

Magnetic Deflection Magnetic Focus Spherical Faceplate Double Field Ion Trap

16JP4A has Gray Filter Glass Faceplate





CHARACTERISTICS

GENERAL DATA	
Focusing Method. Deflecting Method. Deflecting Angle (approx.) Phosphor. Fluorescence Persistence. Faceplate	Magnetic Magnetic 70 Degrees P4 White Medium
Light Transmittance (approx.)	(16JP4) Clear (16JP4A) Gray 66 Percent
ELECTRICAL DATA	0.0.1/ //

Heater VoltageHeater Current (approx.)	6.3 Volts 0.6 Ampere
Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes	6 uuf
External Conductive Coating to Anodel	750f Min

MECHANICAL DATA

Minimum Useful Screen Diameter	15 Inches
Nominal Overall Length	203/4 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 ²	to -63	
Focusing Coil Current (approx.)3	115	
Ion Trap Magnet Current (approx.)4	120	Ma dc

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms
	- Max

NOTES:

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

WARNING

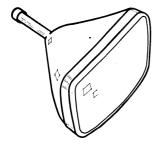
SYLVANIA TYPE 16KP4/16RP4 Silver Screen "85" -> 16KP4A/16RP4A

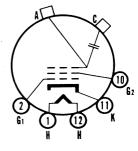
TELEVISION PICTURE TUBE

16" Direct Viewed Rectangular Glass Type **Gray Filter Glass**

External Conductive Coating 16KP4A/16RP4A has an Aluminized Screen

Magnetic Deflection Magnetic Focus Spherical Faceplate Single Field Ion Trap





12-N

CHARACTERISTICS	
GENERAL DATA	
Focusing Method. Deflecting Method. Deflecting Angle (approx.)	Magnetic Magnetic
Horizontal Diagonal Phosphor	65 Degrees 70 Degrees P4
Fluorescence Persistence Faceplate	White Medium
Light Transmittance (approx.)	66 Percent
ELECTRICAL DATA	
Heater Voltage. Heater Current (approx.). Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes External Conductive Coating to Anodel	5 μμf 6 μμf 1500 μμf Μax
Ion Trap MagnetExternal,	750 uuf Min
MECHANICAL DATA	
Minimum Useful Screen Dimensions	3 x 131/ ₂ Inches 183/ ₄ Inches J1-21 B5-57 12N
TYPICAL OPERATING CONDITIONS	

Anode Voltage	14000	Volts d c
Grid No. 2 Voltage	300	Volts d c
Grid No. 1 Voltage Required for Cutoff2	to -77	Volts d c
Focusing Coil Current (approx.)3	108	Ma dc
Ion Trap Magnet Strength (approx.)	35	Gausses

NOTES:

- External conductive coating must be grounded.
 Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 101/8 x 131/2 inch picture area.

16KP4A/16RP4A

The Sylvania Type 16KP4A/16RP4A is identical to the Type 16KP4/16RP4 except for having an aluminized screen.

WARNING

SYLVANIA TYPE 16LP4 16LP4A/16ZP4

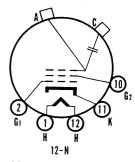
TELEVISION PICTURE TUBE

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



GENERAL DATA



CHARACTERISTICS

Focusing Method Deflecting Method Deflecting Angle (approx.) Phosphor Fluorescence Persistence Faceplate	Magnetic Magnetic 52 Degrees P4 White Medium (16LP4) Clear (16LP4A) Gray
Light Transmittance (approx.)	70 Percent
ELECTRICAL DATA	
Heater Voltage. Heater Gurrent (approx.). Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode!	5 μμf 6 μμf 2000 μμf Max 750 μμf Min
Ion Trap MagnetExternal,	750 μμf Min Double Field Type
MECHANICAL DATA Minimum Useful Screen Diameter Nominal Overall Length Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 5-Pin) Basing.	14½ Inches 22¼ Inches J1-21 B5-57 12N
TYPICAL OPERATING CONDITIONS	
Anode Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff233 Focusing Coil Current (approx.)3. Ion Trap Magnet Current (approx.)4.	12000 Volts d c 300 Volts d c 3 to -77 Volts d c 110 Ma d c 120 Ma d c
CIRCUIT VALUES Grid No. 1 Circuit Resistance	1.5 Megohms Max
NOTEC.	iviax

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 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

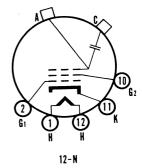
SYLVANIA TYPE 16TP4

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



GENERAL DATA



CHARACTERISTICS

Focusing Method. Deflecting Method Deflecting Angle (approx.)	Magnetic Magnetic
Horizontal Diagonal Phosphor	65 Degrees 70 Degrees P4
FluorescencePersistence	White Medium
FaceplateLight Transmittance (approx.)	Gray Filter Glass 66 Percent
ELECTRICAL DATA	6.3 Volts
Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.)	0.6 Ampere
Cathode to All Other Eelctrodes	5 μμf 6 μμf
External Conductive Coating to Anode!	2000 μμf Max 750 μμf Min Single Field Type
MECHANICAL DATA	, Single Fleid Type
Minimum Useful Screen Dimensions	181/8 Inches J1-21 B5-57
TYPICAL OPERATING CONDITIONS	10000 1/-11- 4 -
Anode Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ² —	300 Volts d c 33 to -77 Volts d c
Focusing Coil Current (approx.)3	100 Ma dc 35 Gausses
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 focus coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 101/8 x 131/2 inch picture area.

WARNING

SYLVANIA TYPE 16WP4 16WP4A

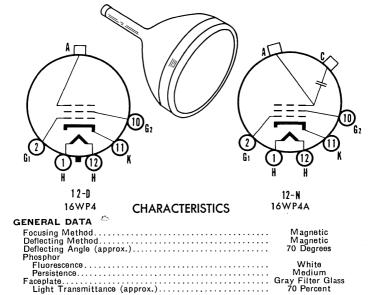
TELEVISION PICTURE TUBE

16" Direct Viewed Round Glass Type **Gray Filter Glass**

Magnetic Deflection Magnetic Focus Spherical Faceplate

Double Field Ion Trap

16WP4A has an External Conductive Coating



ELECTRICAL DATA

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

Ion Trap Magnet...... External, Double Field Type

MECHANICAL DATA

Minimum Useful Screen Diameter	
Nominal Overall Length	173/4 Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 5-Pin)	B5-57
Rasing	12D

TYPICAL OPERATING CONDITIONS

Anode Voltage	12000	Volts d c
Grid No. 2 Voltage	250	Volts d c
Grid No. 1 Voltage Required for Cutoff1	to -63	Volts d c
Focusing Coil Current (approx.)2	110	Ma dc
Ion Trap Magnet Current (approx.)3	120	Ma dc

CIRCUIT VALUES

Grid No. 1 Circuit	Resistance	1.5	Megohms Max

NOTES:

- 1. Visual extinction of undeflected focused spot.
- 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 μμf
Minimum	750 μμf
Basing	12 N

WARNING

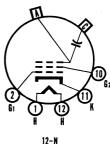
SYLVANIA TYPE 17APA

TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type **Gray Filter Glass** External Conductive Coating

Magnetic Deflection Magnetic Focus Spherical Faceplate Single Field Ion Trap





	12-N		
CHARACTERISTICS GENERAL DATA			
Focusing Method			
Deflecting Angle (approx.) Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)			
Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode!	0.6 Ampere 5 μμf 6 μμf		
Ion Trap Magnet	External, Single Field Type		
MECHANICAL DATA Minimum' Useful Screen Dimensions Nominal Overall Length. Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 5-Pin) Basing.			
TYPICAL OPERATING CONDITIONS			
Anode Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ² Focusing Coil Current (approx.) ³ Ion Trap Magnet Strength (approx.)			
CIRCUIT VALUES Grid No. 1 Circuit Resistance			

- NOTES:

 - External conductive coating must be grounded.
 Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 10¾ x 14¼ inch picture area.

WARNING

SYLVANIA TYPES 17ATP4/17AVP4 Silver Screen "85"→17ATP4A/17AVP4A

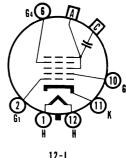
TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type **Gray Filter Glass**

External Conductive Coating 17ATP4A/17AVP4A has an Aluminized Screen

Magnetic Deflection Electrostatic Focus Spherical Faceplate Single Field Ion Trap





1.5 Megohms Max.

CHARACTERISTIC	۱۲-۲ د	
GENERAL DATA	O	
Focusing Method		rostatic gnetic
Horizontal	90	Degrees Degrees P4
Fluorescence	W	hite
Persistence Faceplate Light Transmittance (approx.)	Gray Fi	dium Iter Glass Per cent
ELECTRICAL DATA		
Heater Voltage Heater Current Direct Interelectrode Capacitance (approx.)	6.3 0.6± 5%	Volts Ampere
Cathode to All Other Electrodes	6 1500	μμf μμf μμf Max.
Ion Trap Magnet	1000	μμf Min.
MECHANICAL DATA		
Minimum Useful Screen Dimensions Nominal Overall Length. Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 6-Pin) Basing.	145% x 111% 15% J1-21 B6-63 12L	Inches Inches
TYPICAL OPERATING CONDITIONS		
Anode VoltageGrid No. 4 Voltage for FocusGrid No. 2 Voltage	-56 to +310 300	Volts d c
Grid No. 1 Voltage Required for Cutoff ² Ion Trap Magnet Strength (approx.)	−28 to −72 30	Volts d c Gausses

NOTES:

CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....

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:

SYLVANIA TYPE 17BJP4

"Silver Screen 85"

TELEVISION PICTURE TUBE

17" Direct Viewed

Magnetic Deflection

Rectangular Glass Type

Electrostatic Focus

Spherical Faceplate

No Ion Trap

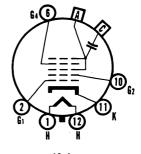
Gray Filter Glass

External Conductive Coating

Aluminized Screen



GENERAL DATA



12-L

CHARACTERISTICS

Focusing Method	Electrostatic
Deflection Method	Magnetic
Deflection Angles (approx.)	ū
Horizontal	85 Degrees
	90 Degrees
Diagonal	
Phosphor	Aluminized P4
Fluoresence	White
Persistence	Short to Medium
Faceplate	Gray Filter Glass
Light Transmittance (approx.)	74 Percent
Light Transmittanoo (approxi)	
ELECTRICAL DATA	
Heater Voltage	6.3 Volts
Heater Current	6 + 5% Amnere
Heater Warm-up Time1	11 Seconds
Direct Interelectrode Capacitance (approx.)	11 00001103
	e (
Cathode to All Other Electrodes	5 μμf
Grid No. 1 to All Other Electrodes	6 μμf
External Conductive Coating to Anode ²	1500 μμf Max.
	1000 μμf Min.
MECHANICAL DATA	••
Minimum Useful Screen Dimensions	4 v 1114 Inches
Nominal Over-all Length	145% Inches
Minimal Over-all Leligth	
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 Voltage50	to +300 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage Required for Cutoff ³ 2	8 to –72 Volts d c

CIRCUIT VALUES

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

NOTES:

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

WARNING:

SYLVANIA TYPE 17BP4 17BP4A/17JP4 Silver Screen "85"→17BP4B 17BP4C

TELEVISION PICTURE TUBE

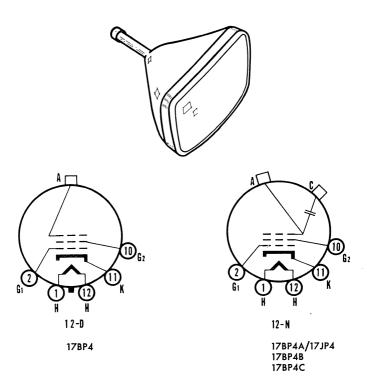
17" Direct Viewed Rectangular Glass Type Magnetic Focus Gray Filter Glass

Magnetic Deflection 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



CHARACTERISTICS

GENERAL DATA	
Focusing Method	Magnetic
Deflecting Method	Magnetic
Deflecting Angle (approx.)	-
Horizontal	65 Degrees
Diagonal	70 Degrees
Phosphor	P4
Fluorescence	
Persistence	Medium
Faceplate	Gray Filter Glass
Light Transmittance (approx.)	74 Percent

17BP4, 17BP4A/17JP4, 17BP4B, 17BP4C (Cont'd)

ELECTRICAL DATA Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes Ion Trap Magnet External,	6.3 Volts 0.6 Ampere 5 $\mu\mu f$ 6 $\mu\mu f$ Single Field Type
MECHANICAL DATA Minimum Useful Screen Dimensions	191/4 Inches J1-21
TYPICAL OPERATING CONDITIONS Anode Voltage	14000 Volts d c 300 Volts d c to -77 Volts d c 110 Ma d c 30 Gausses
CIRCUIT VALUES Grid No. 1 Circuit Resistance	1.5 Megohms
NOTES: 1. Visual extinction of undeflected focused spot. 2. For JETEC focusing coil 109 or equivalent three and one q reference line, bias adjusted to 20 foot lamberts on a 1034 ture 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 ևuf
_ Minimum	750 μμf
Basing	12 N

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 μμf
Minimum	750 µµf
Basing	12 N

WARNING

SYLVANIA TYPE 17BRP4

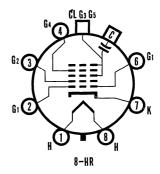
Silver Screen "85"

TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Face Plate Gray Filter Glass Aluminized Screen
Electrostatic Focus
110° Magnetic Deflection
1½" Neck Diameter
Single Field Ion Trap

External Conductive Coating





CHARACTERISTICS

GENERAL DATA		
Focusing MethodDeflection Method		trostatic agnetic
Deflection Angles (approx.) Horizontal Diagonal Vertical Phosphor Fluorescence Persistence S	110 87 Alum hort iray l	Degrees Degrees Degrees inized P4 White to Medium Fler Glass Percent
ELECTRICAL DATA	• •	
Heater Warm-up Time ¹	5% 11	Volts Ampere Seconds
	6 1500 1000	μμf μμf μμf Max. μμf Min.
Ion Trap MagnetExtern	al, Si	ngle Field Type
MECHANICAL DATA Minimum Useful Screen Dimensions		
(Maximum Assured)	12% 155 J1-21 7-183 8HR	Inches Sq. Inches Pounds Approx.
TYPICAL OPERATING CONDITIONS	, -	
Anode Voltage	500 +25 300 -72	Volts d c
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance. Grid No. 2 Circuit Resistance. Grid No. 4 Circuit Resistance.	0.1	Megohms Max. Megohm Min. Megohm Min.

SYLVANIA TYPE 17BRP4 (Cont'd)

NOTES:

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.
 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 a Heppner PM ion trap magnet or equivalent located in optimum position and rotated to give maximum brightness.

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"

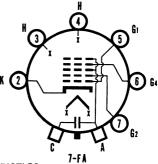
TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate **Gray Filter Glass**

Aluminized Screen **Electrostatic Focus** 110° Magnetic Deflection 11/8" Neck Diameter Single Field Ion Trap

External Conductive Coating





CHARACTERISTICS

G	:N	E	K/	L		DA		4							
- 1	Fo	cu	sin	g	٨	/let	ho	d.							
1	De	fle	cti	οr	1	Mε	th	00	t.						

Deflection Angles (approx.) Horizontal Diagonal Vertical Phosphor.. Fluorescence..... Persistence.....

105 Degrees 110 Degrees 87 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 79 Percent

Electrostatic Magnetic

ELECTRICAL DATA

Heater Voltage.

Heater Current.

Heater Warm-up Time!

Direct Interelectrode Capacitances (approx.)

Cathode to All Other Electrodes.

Grid No. 1 to All Other Electrodes.

External Conductive Coating to Anode².

Faceplate....Light Transmittance (approx.).....

6.3 Volts 0.6± 5% Ampere 11 Seconds

5 μμ

MECHANICAL DATA

Minimum Useful Screen Dimensions..... Nominal Overall Length..... Bulb. Bulb Contact (Recessed Small Cavity Cap)..... Base. Basing Weight (approx.)....

14¾ x 11½ Inches 13¼ ± ⅙ Inches J1321/2 A1 J1-21

B6-185 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 Cutoff3	−35 to −72	
Ion Trap Magnet Strength	33 ± 3	Gausses Min.

CIRCUIT VALUES

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

NOTES:

- 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.
 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 17BWP4

Silver Screen "85"

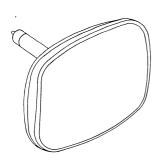
TELEVISION PICTURE TUBE

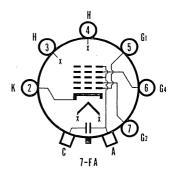
17" Direct Viewed Rectangular Glass Type Lightweight Tube

Spherical Faceplate Gray Filter Glass

Aluminized Screen Electrostatic Focus 110° Magnetic Deflection 1½" Neck Diameter No Ion Trap

External Conductive Coating





CHARACTERISTICS

0.1.1.1.10.12.1.10	
GENERAL DATA	
Focusing MethodDeflection MethodDeflection MethodDeflection Angles (approx.)	Electrostatic Magnetic
Horizontal Diagonal Uiagonal Prical Phosphor Fluorescence Persistence Faceplate	105 Degrees 110 Degrees 87 Degrees Aluminized P4 White Short to Medium Gray Filter Glass
Light Transmittance (approx.) ELECTRICAL DATA	79 Percent
Heater Voltage. Heater Current. Heater Warm-up Time! Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode ² .	$0.6 \pm 5\%$ Ampere 11 Seconds $5 \mu \mu f$ $6 \mu f$ 1500 μf Max. 1000 μf Min.

SYLVANIA TYPE 17BWP4 (Cont'd)

MECHANICAL DATA

Minimum Useful Screen Dimensions	
(Maximum Assured)	
Nominal Overal Length	12 5/6 Inches
Minimum Useful Screen Area	155 Sq. Inches
Bulb	J132 1/2A1
Bulb Contact (Recessed Small Cavity Cap)	
Base	B6-185
Basing	7FA
Weight (approx.)	

TYPICAL OPERATING CONDITIONS

Anode Voltage	14,000 Volts d c
Grid No. 4 Voltage for Focus	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:

- 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.
- 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

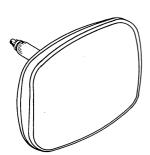
Silver Screen "85"

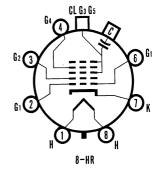
TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate Gray Filter Glass

Aluminized Screen
Electrostatic Focus
110° Magnetic Deflection
1½" Neck Diameter
No Ion Trap

External Conductive Coating





SYLVANIA TYPES 17BZP4, 17CTP4, 17CVP4 (Cont'd)

CHARACTERISTICS

CID (10 1C12)(1011C0	
GENERAL DATA	
Focusing Method Deflection Method Deflection Angles (approx.)	Electrostatic Magnetic
Horizontal Diagonal Vertical Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	105 Degrees 110 Degrees 87 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 77 Percent
ELECTRICAL DATA	450504
Heater Voltage	17BZP4 6.3 Volts 0.6 Ampere 11 Seconds 5 μμf 6 μμf
External Conductive Coating to Anode ²	1500 μμf Max. 1000 μμf Min.
Minimum Useful Screen Dimensions (Maximum Assured)	12% Inches 155 Square Inches
TYPICAL OPERATING CONDITIONS	
Anode Voltage. Grid No. 4 Voltage for Focus Grid No. 2 Voltage Grid No. 1 Voltage Required for Cutoff ³ –	14,000 Volts d c 0 to 400 Volts d c 300 Volts d c 35 to -72 Volts d c

CIRCUIT VALUES

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

1.5 Megohms Max.

Grid No. 1 Circuit Resistance.....

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:

SYLVANIA TYPE 17CP4

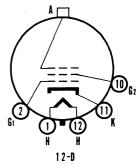
TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Metal Type Frosted Gray Filter Glass

Magnetic Deflection Magnetic Focus Spherical Faceplate

Single Field Ion Trap





CHARACTERISTICS

GENERAL	DATA
---------	------

Focusing MethodDeflecting Method	Magnetic Magnetic
Deflecting Angle (approx.)	-
Horizontal	66 Degrees
Horizontal Diagonal	70 Degrees
Phosphor	Ρď
Fluorescence	
Persistence	Medium
FaceplateFrosted	Gray Filter Glass
Light Transmittance (approx)	66 Percent

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current (approx.)	0.6 Ampere
Direct Interlectrode Capacitances (approx.)	
Cathode to All Other Electrodes	5 μμf
Grid No. 1 to All Other Electrodes	6 μμf
Grid No. 1 to All Other Electrodes	Single Field Type

MECHANICAL DATA

Minimum Useful Screen Dimensions	x 14% Inches
Nominal Overall Length	185/8 Inches
	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 Cutoff1	to77	
Focusing Coil Current (approx.)2	104	Ma dc
Ion Trap Magnet Strength (approx.)	50	Gausses

CIRCUIT VALUES

Grid No	. 1 Circuit Resistance	1.5 Megohms

NOTES:

- Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 14% x 101% inch picture area.

WARNING

SYLVANIA TYPE 17CAP4

Silver Screen "85"

TELEVISION PICTURE TUBE

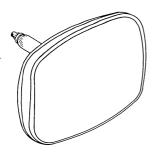
17" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate

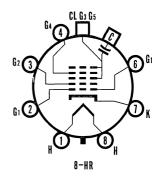
Gray Filter Glass

Aluminized Screen **Electrostatic Focus** 110° Magnetic Deflection

1½" Neck Diameter

No Ion Trap **External Conductive Coating**





1.5 Megohms Max.

CHARACTERISTICS

CHARACILRISTIC	J
GENERAL DATA	
Focusing Method	Electrostatic Magnetic
Horizontal Diagonal Vertical Phosphor	105 Degrees 110 Degrees 87 Degrees Aluminized P4
Fluorescence. Persistence. Faceplate. Light Transmittance (approx.).	White Short to Medium Gray Filter Glass 79 Percent
ELECTRICAL DATA	
Heater Voltage	$\begin{array}{c} \textbf{6.3 Volts} \\ \textbf{0.6} \ \pm \ \textbf{5\%} \ \ \textbf{Ampere} \\ \textbf{11 Seconds} \end{array}$
Cathode to All Other Electrodes	5 μμf 6 μμf 1500 μμf Max. 1000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum Assured). Nominal Overall Length. Minimum Useful Screen Area. Bulb.	14¾ x 11½ Inches 12½ Inches 155 Sq. Inches J132 ½ A1 or Equivalent
Bulb Contact (Recessed Small Cavity Cap) Base Basing. Weight.	J1-21 B7-183 8HR 10 Pounds Approx.
TYPICAL OPERATING CONDITIONS	
Anode Grid No. 4 Voltage for Focus Grid No. 2 Voltage Grid No. 1 Voltage Required for Cutoff ³ .	14,000 Volts d c -50 to +350 Volts d c 300 Volts d c -35 to -72 Volts d c

NOTES:

CIRCUIT VALUES

- 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.

Grid No. 1 Circuit Resistance.....

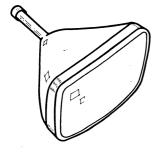
SYLVANIA TYPES 17CFP4, 17CUP4

Silver Screen "85"

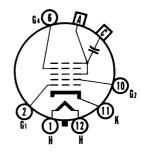
TELEVISION PICTURE TUBE

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**



GENERAL DATA Focusing Method....



12-L

Electrostatic

CHARACTERISTICS

Deflection Method Deflection Angles (approx.) Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	Mag 85 De 90 De Alumin Wr Short to Gray Fil	egrees egrees ized P4 nite Medium ter Glass
ELECTRICAL DATA		
	0.3 0.6 11 11 5 6 1500	Volts Ampere Seconds μμf μμf μμf Μαχ.
MECHANICAL DATA	1200	μμf Min.
Minimum Useful Screen Dimensions (Maximum Assured). Nominal Overall Length Minimum Useful Screen Area. Bulb Contact (Recessed Small Cavity Cap) Base (17CUP4). Base (17CFP4). Basing Weight (approx.).	155 J1-21 . B6-63 or B6-203 B6-63	Inches Square Inches
TYPICAL OPERATING CONDITIONS		
Anode Voltage. Grid No. 4 Voltage for Focus. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ³ .	50 to +350 300	Volts d c
CIRCUIT VALUES Grid No. 1 Circuit Resistance	1.5	Megohms Max

NOTES:

- 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.
- 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.

SYLVANIA TYPE 17CKP4*

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

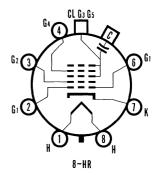
11/8" Neck Diameter

No Ion Trap

External Conductive Coating



GENERAL DATA



Focusing MethodDeflection Method		rostatic gnetic
Deflection Angles (approx.) Horizontal Diagonal Vertical Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.).	110 87 Alumi W Short to Gray Fi	Degrees Degrees Degrees nized P4 hite Medium lter Glass Percent
ELECTRICAL DATA Heater Voltage. Heater Current. Heater Warm-up Time! Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode ² .	0.6 ± 5% 11 5 6 1500	Volts Ampere Seconds μμf μμf μμf Max. μμf Min.
MECHANICAL DATA Minimum Useful Screen Dimensions (Maximum Assured). Minimum Useful Screen Area Nominal Overall Length. Bulb	14¾ x 11½ 155 12½ or J132½B1 J1-21 B7-183 8HR	
TYPICAL OPERATING CONDITIONS Anode Voltage Grid No. 4 Voltage for Focus Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ³	0 to 400	Volts d c Volts d c Volts d c Volts d c
CIRCUIT VALUES Grid No. 1 Circuit Resistance	1.5	Megohms Max

^{*}Available as Sylvania Silver Screen Type 17BZP4/17CAP4/17CKP4

SYLVANIA TYPE 17CKP4 (Cont'd)

NOTES:

- 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.
 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:

SYLVANIA TYPE 17CLP4

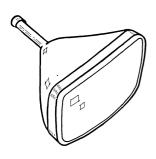
Silver Screen "85"

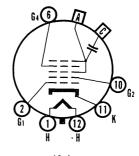
Television Picture Tube

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

1.5 Megohms Max.

CHARACTERISTICS

CHARACTERISTICS	
GENERAL DATA Focusing Method Deflection Method	Electrostatic Magnetic
Deflection Angles (approx.) Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent
ELECTRICAL DATA	
Heater Voltage Heater Current Heater Warm-up Time! Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 ± 5% Ampere 11 Seconds
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode ² Ion Trap Magnet	5 μμf 6 μμf 2300 μμf Max. 1800 μμf Min. External Single Field Type
Ton Trap Waynet	External, Single Field Type
/IECHANICAL DATA Minimum Useful Screen Dimensions	
(Maximum Assured). Nominal Overall Length. Minimum Useful Screen Area. Bulb Contact (Recessed Small Cavity Cap). Base. Basing.	145/6 x 111/4 Inches 155/6 Inches 149 Sq. 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 Cutoff ³ Ion Trap Magnet Strength (approx.)	-48 to +264 Volts d c 300 Volts d c -35 to -72 Volts d c
CIRCUIT VALUES	

NOTES:

- 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.

Grid No. 1 Circuit Resistance.....

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:

SYLVANIA TYPE 17CNP4

Silver Screen "85"

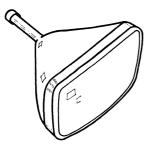
TELEVISION PICTURE TUBE

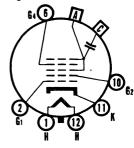
17" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate

Gray Filter Glass Aluminized Screen **Electrostatic Focus** 90° Magnetic Deflection Short Neck Tube No Ion Trap

External Conductive Coating Cathode Drive Design

Low Grid No. 2 Voltage





CHARACTERISTICS

12-L

GENERAL DATA

Focusing Method Deflection Method Deflection Angles (approx.)	
Horizontal	
Diagonal	
Fluorescence	
_ Persistence	
FaceplateLight Transmittance (approx.)	
Light Transmittance (approx.)	

Electrostatic Magnetic 85 Degrees 90 Degrees

Aluminized P4 White Short to Medium Gray Filter Glass 77 Percent

ELECTRICAL DATA

Bulb Contact (Recessed Small Cavity Cap)..... Base (Small Shell Duodecal 6-Pin).....

Heater Voltage.....

 $\begin{array}{c} \textbf{6.3 Volts} \\ \textbf{0.6} \, \pm \, \begin{array}{c} \textbf{6.3 Volts} \\ \textbf{5\% Ampere} \\ \textbf{11 Seconds} \end{array}$

5 μμf 6 μμf 1500 μμf Max. 1000 μμf Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions	
(Maximum Assured)	
Nominal Overall Length	

B6-63 or B6-203 12L 101/2 Pounds

TYPICAL OPERATING CONDITIONS3

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 Cutoff4	35 to 50 Volts d c

CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....

1.5 Megohms Max.

Basing

- 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:

SYLVANIA TYPE 17CRP4

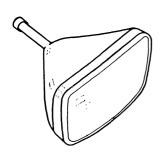
Silver Screen "85"

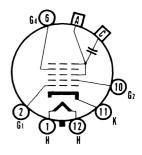
TELEVISION PICTURE TUBE

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 Deflection Angles (approx.)	Magnetic
Horizontal	85 Degrees
DiagonalPhosphor	90 Degrees Aluminized P4
FluorescencePersistence	White Short to Medium
FaceplateLight Transmittance (approx.)	Gray Filter Glass 74 Percent
	74 Fercent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts
Heater CurrentHeater Warm-up Time!	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	5 μμf 6 μμf
External Conductive Coating to Anode ²	2200 μμf Max.
	1700 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions	
Nominal Overall Length	145% Inches 149 Square Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 6-Pin)	
Basing	12L
TYPICAL OPERATING CONDITIONS	
Anode Voltage	14,000 Volts d c

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

 Grid No. 4 Voltage
 0 to +350 Volts d c

 Grid No. 2 Voltage
 50 Volts d c

 Cathode Voltage Required for Cutoff⁴
 +30 to +50 Volts d c

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.

SYLVANIA TYPE 17CYP4

Silver Screen "85"

TELEVISION PICTURE TUBE

17" Direct Viewed Magnetic Deflection Rectangular Glass Type 4½" Neck Length

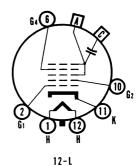
Spherical Faceplate No Ion Trap

Gray Filter Glass External Conductive Coating

Aluminized Screen Lightweight Bulb

Electrostatic Focus





	trostatic ignetic
90 Alum	Degrees Degrees inized P4 /hite
Short t Gray F	o Medium ilter Glass Percent
0.6 ± 5% 11 5 6 1500	Volts Ampere Seconds µµf µµf µµf Max. µµf Min.
1000	μμτ IVIII.
14 4½ J132½ C J1-21 B6-203 12L	Square Inches Inches Inches
,,,	· oundo
14,000 -50 to +350 450 -39 to -105	Volts d c Volts d c Volts d c Volts d c
1.5 10,000 10,000	
	Ma 85 90 Alum W Short t Gray F 77 6.3 0.6 ± 5% 150 1000 1434 x 11% 41/4 41/2 J1321/4 C 14 155 14 14 17 186-203 12L 10 14,000 -50 to +350 -39 to -105

SYLVANIA TYPE 17CYP4 (Cont'd)

NOTES:

 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.

- External conductive coating must be grounded.
 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 .

SYLVANIA TYPE 17DCP4

Silver Screen "85"

TELEVISION PICTURE TUBE

17" Direct Viewed

Rectangular Glass Type

Spherical Faceplate Gray Filter Glass

Magnetic Deflection

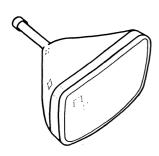
Electrostatic Focus

No Ion Trap

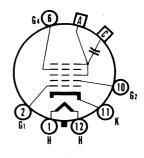
External Conductive Coating

Aluminized Screen

6.3 Volt, 300 Ma Heater



GENERAL DATA



12-L

GENERAL DATA	
Focusing Method Deflection Method Deflection Angles (approx.)	Electrostatic Magnetic
Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent
ELECTRICAL DATA	
Heater Voltage. Heater Current Heater Warm-up Time¹ Direct Interelectrode Capacitance (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes External Conductive Coating to Anode².	$\begin{array}{c} 6.3 \text{ Volts} \\ 0.3 \pm 5\% \text{ Ampere} \\ 11 \text{ Seconds} \\ 5 \mu\mu f \\ 6 \mu\mu f \\ 1500 \mu\mu f \text{ Max.} \\ 1000 \mu\mu f \text{ Min.} \\ \end{array}$
MECHANICAL DATA	
Minimum Useful Screen Dimensions. Nominal Overall Length. Minimum Useful Screen Area. Bulb. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 6-Pin). Base (Small Shell Duodecal 6-Pin). Befoliasing. Weight (approx.)	149 Square Inches F or J133G J1-21
TYPICAL OPERATING CONDITIONS	
Anode Voltage	300 Volts d c
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms Max.

SYLVANIA TYPE 17DCP4 (Cont'd)

NOTES:

- 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.
 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.

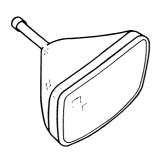
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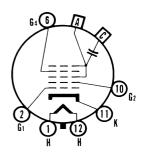
SYLVANIA TYPE 17DJP4

Silver Screen "85"

TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass Magnetic Deflection Electrostatic Focus
Single Field Ion Trap
External Conductive Coating
Aluminized Screen
6.3 Volt, 300 Ma Heater





12-L

GENERAL DATA	
Focusing Method Deflection Method Deflection Angles (approx.)	
Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent
ELECTRICAL DATA	
Heater Voltage Heater Current Heater Warm-up Time ¹ Direct Interelectrode Capacitance (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes	6.3 Volts 0.3 \pm 5% Ampere 11 Seconds $5 \mu \mu f$ $6 \mu \mu f$
External Conductive Coating to Anode ²	1500 μμf Max.
Ion Trap Magnet	1000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions	15½ Inches 149 Square Inches 3F or J133G J1-21 B6-63 12L
TYPICAL OPERATING CONDITIONS	
Anode Voltage. Grid No. 4 Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ³ . Ion Trap Magnet Current (Avg.) ⁴ . Field Strength of PM Ion Trap Magnet ⁵ .	-50 to +300 Volts d c 300 Volts d c -35 to -72 Volts d c
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms Max.

SYLVANIA TYPE 17D IP4 (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.
- neater 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 RM Ion Trap Magnet No. 117, with pole pieces.

5. For typical PM Ion Trap Magnet with field strength tolerance of ± 3 gausses.

WARNING:

SYLVANIA TYPE 17DKP4

Silver Screen "85"

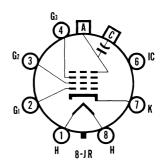
TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type Spherical Faceplate **Gray Filter Glass** Aluminized Screen

Tri-Potential Electrostatic Focus 110° Magnetic Deflection No Ion Trap

External Conductive Coating Short Neck





GENERAL DATA	
Focusing Method	Tri-Potential Electrostatic
Deflection Method	Magnetic
	wagneric
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
Light Transmittance (approx.)	77 Fercent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts
Heater Current	0.60 ± 5% Ampere
Heater Warm-up Time ¹	11 Seconds
Direct Interelectrode Capacitances (approx.)	11 Seconds
Cathode to All Other Electrodes	E 6
	5 μμ f
Grid No. 1 to All Other Electrodes	$6 \mu \mu f$
External Conductive Coating to Anode ²	1500 μμf Max.
	1000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum Ass	surad)
	341047
Hoight	
Height	11% Inches
Width	11116 Inches 1434 Inches
Width Diagonal	15¾ Inches
WidthDiagonalArea	15¾ Inches 155 Square Inches
Width Diagonal Area Neck Length	15¾ Inches 155 Square Inches
Width. Diagonal Area Neck Length Nominal Overall Length	15¾ Inches 155 Square Inches 3¼ ± ⅓ Inches 10¼ Inches
Width. Diagonal Area Neck Length Nominal Overall Length	15¾ Inches 155 Square Inches 3¼ ± ⅓ Inches 10¼ Inches
Width. Diagonal Area Neck Length Nominal Överall Length Bulb Bulb Contact (Recessed Small Cavity Cap)	15¾ Inches 155 Square Inches 3½ ± ¼ Inches 10½ Inches or J132½-B J1-21
Width. Diagonal Area Neck Length Nominal Overall Length	15¾ Inches 155 Square Inches 3½ ½ Inches 10¼ Inches or J132½-B J1-21 B7-208
Width. Diagonal Area Neck Length Nominal Överall Length Bulb Bulb Contact (Recessed Small Cavity Cap)	15¾ Inches 155 Square Inches 3 ½ ± ⅓ Inches 10⅓ Inches or J132½-B J1-21 B7-208 8JR
Width. Diagonal Area Neck Length Nominal Overall Length Bulb	15¾ Inches 155 Square Inches 3½ ½ Inches 10¼ Inches or J132½-B J1-21 B7-208
Width. Diagonal Area Neck Length Nominal Overall Length. Bulb J132½-A Bulb Contact (Recessed Small Cavity Cap) Base Basing. Weight (approx.)	15¾ Inches 155 Square Inches 3% ± ⅓ Inches 10% Inches or J132½-B J1-21 B7-208 8JR 10 Pounds
Width Diagonal Area Neck Length Nominal Overall Length Bulb Bulb Contact (Recessed Small Cavity Cap) Base Basing Weight (approx.) TYPICAL OPERATING CONDITIONS (Grid Dri	15¾ Inches 155 Square Inches 3 ½ ½ Inches 10½ Inches 07 J132½-B J1-21 B7-208 8JR 10 Pounds (ve Service)
Width. Diagonal Area Neck Length Nominal Overall Length. Bulb. Bulb Contact (Recessed Small Cavity Cap). Base Basing. Weight (approx.) TYPICAL OPERATING CONDITIONS (Grid Dri Anode Voltage	15¾ Inches 155 Square Inches 155 Square Inches 3 ½ Inches 10 ½ Inches 07 J132½-B J1-21 B7-208 8JR 10 Pounds (ve Service) 14,000 Volts d c
Width Diagonal Area Neck Length Nominal Overall Length Bulb Bulb Contact (Recessed Small Cavity Cap) Base Basing Weight (approx.) TYPICAL OPERATING CONDITIONS (Grid Dri Anode Voltage Grid No. 3 Voltage for Focus	15¾ Inches 155 Square Inches 155 Square Inches 3½ ± ⅓ Inches 10⅓ Inches or J132⅓-B J1-21 B7-208 8JR 10 Pounds ive Service) 14,000 Volts d c 0 to +400 Volts d c
Width. Diagonal Area Neck Length Nominal Overall Length Bulb Bulb Contact (Recessed Small Cavity Cap) Base Basing. Weight (approx.) TYPICAL OPERATING CONDITIONS (Grid Dri Anode Voltage Grid No. 3 Voltage for Focus	15¾ Inches 155 Square Inches 3 ½ Inches 10½ Inches or J132½-B J1-21 B7-208 8JR 10 Pounds ive Service) 14,000 Volts d c 500 Volts d c
Width. Diagonal Area Neck Length Nominal Overall Length Bulb Bulb Contact (Recessed Small Cavity Cap) Base Basing. Weight (approx.) TYPICAL OPERATING CONDITIONS (Grid Dri Anode Voltage Grid No. 3 Voltage for Focus	15¾ Inches 155 Square Inches 155 Square Inches 3½ ± ⅓ Inches 10⅓ Inches or J132⅓-B J1-21 B7-208 8JR 10 Pounds ive Service) 14,000 Volts d c 0 to +400 Volts d c
Width. Diagonal Area Neck Length Nominal Overall Length Bulb. Bulb Contact (Recessed Small Cavity Cap). Base Basing. Weight (approx.) TYPICAL OPERATING CONDITIONS (Grid Dri Anode Voltage Grid No. 3 Voltage for Focus Grid No. 2 Voltage ³ Grid No. 1 Voltage Required for Cutoff ⁴	15¾ Inches 155 Square Inches 3 ½ Inches 10½ Inches or J132½-B J1-21 B7-208 8JR 10 Pounds ive Service) 14,000 Volts d c 500 Volts d c
Width. Diagonal Area Neck Length Nominal Overall Length Bulb Bulb Contact (Recessed Small Cavity Cap) Base Basing. Weight (approx.) TYPICAL OPERATING CONDITIONS (Grid Dri Anode Voltage Grid No. 3 Voltage for Focus	15¾ Inches 155 Square Inches 3 ½ Inches 10½ Inches or J132½-B J1-21 B7-208 8JR 10 Pounds ive Service) 14,000 Volts d c 500 Volts d c

SYLVANIA TYPE 17DKP4 (Cont'd)

NOTES:

 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.

Rateu neater 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:

SYLVANIA TYPE 17DLP4

Silver Screen "85"

TELEVISION PICTURE TUBE

17" Direct Viewed

Aluminized Screen **Electrostatic Focus**

Rectangular Glass Type Spherical Faceplate

110° Magnetic Deflection

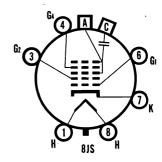
Gray Filter Glass

No Ion Trap

External Conductive Coating Short Neck



CIRCUIT VALUES



CHARACTERISTICS

GENERAL DATA	
Focusing MethodDeflection Method	Electrostatic Magnetic
Deflection Angles (approx.) Horizontal Diagonal Vertical Phosphor Fluorescence Persistence	105 Degrees 110 Degrees 87 Degrees Aluminized P4 White Short to Medium
FaceplateLight Transmittance (approx.)	Gray Filter Glass 76 Percent
ELECTRICAL DATA	
Heater Voltage. Heater Current. Heater Warm-up Time ¹ . Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 ± 10% Ampere 11 Seconds
Cathode to All Other Electrodes	5 μμf 6 μμf 1500 μμf Max. 1000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum Height. Width. Diagonal. Area. Neck Length. Overall Length. Bulb. Bulb Contact (Recessed Small Cavity Cap). Base. Basing. Weight (approx.)	1111/6 143/4 153/4 155 Square Inches
TYPICAL OPERATING CONDITIONS (Grid I	Orive Service)
Anode Voltage ³ . Grid No. 3 Voltage for Focus	17,000 Volts d c 0 to +500 Volts d c 450 Volts d c -28 to -72 Volts d c

SYLVANIA ELECTRONIC TUBES

1.5 Megohms Max.

Grid No. 1 Circuit Resistance.....

SYLVANIA TYPE 17DLP4 (Cont'd)

NOTES:

- 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.
- Evenue conductive coating into the grounded.
 Brightness and resolution improve with increase in the Anode Voltage. In general, a minimum value of 15,000 volts is recommended.
 Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about five volts more negative.

WARNING:

SYLVANIA TYPE 17DQP4

Silver Screen "85"

TELEVISION PICTURE TUBE

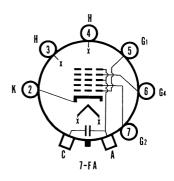
17" Direct Viewed 110° Magnetic Deflection Rectangular Glass Type 11/8" Neck Diameter

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. Deflection Method. Deflection Angles (approx.) Horizontal. Diagonal. Vertical. Phosphor. Fluorescence. Persistence. Faceplate. Light Transmittance (approx.).	Ma 105 110 87 Alumi W Short to Gray Fi	rostatic gnetic Degrees Degrees Degrees nized P4 'hite) Medium Ilter Glass Percent
ELECTRICAL DATA Heater Voltage. Heater Current. Heater Warm-up Time! Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode	0.45 ± 5% 11 5 6 1700	Volts Ampere Seconds μμf μμf μμf Max. μμf Min.
MECHANICAL DATA Minimum Useful Screen Dimensions (Maximum Assured). Minimum Useful Screen Area. Nominal Overall Length. Neck Length. Bulb Contact (Recessed Small Cavity Cap). Base Basing. Weight (approx.).	155 121/8 5 ± 1/8 A or J1321/8 J1-21 B6-214 7FA	Square Inches
TYPICAL OPERATING CONDITIONS ³ Anode Voltage. Grid No. 4 Voltage for Focus. Grid No. 2 Voltage. Cathode Voltage Required for Cutoff ⁵ .	200 to +350 50	Volts d c Volts d c Volts d c Volts d c
CIRCUIT VALUES Grid No. 1 Circuit Resistance	1.5	Megohms Max

SYLVANIA ELECTRONIC TUBES

SYLVANIA TYPE 17DQP4 (Cont'd)

NOTES:

OTES:

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.

SYLVANIA TYPE 17DRP4

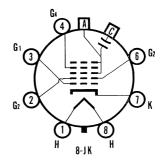
Silver Screen "85"

TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type Spherical Faceplate **Gray Filter Glass** Lightweight Tube No Ion Trap Extremely Short Tube

Aluminized Screen **Electrostatic Focus** 110° Magnetic Deflection **External Conductive Coating** 11/8" Neck Diameter 2.68 Volt, 450 Ma Heater Internal Magnetic Shield¹





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 VoltageHeater Current	0.450 ± 5% Ampere
Heater Warm-up Time ²	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	3.65 μμf
Grid No. 1 to All Other Electrodes	4.15 μμf
External Conductive Coating to Anode 3	
	900 uuf Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions	
(Maximum Assured)	
Minimum Useful Screen Area	155 Square Inches
Overall Length	10⅓ Inches
Neck Length	3½ Inches
Bulb	J132 ⅓ A
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base	B7-208
Basing	8J K
Weight (approx.)	10 Pounds

SYLVANIA TYPE 17DRP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

Grid Drive Service4		
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 Cutoff6	-35 to -72	Volts d c
Cathode Drive Service ⁵		
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.

- The tube incorporates internal magnetic shielding in the gun design so that deflecting yokes without special magnetic shields may be used.
 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

- 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:

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

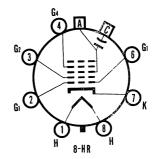
External Conductive Coating

Aluminized Screen

41/8" Neck

Lightweight Tube





CHARACTERISTICS

GE	N	E	R	ΑI	L	D	A٦	ГΑ

Focusing Method
Deflection Method
Deflection Angles (approx.) Horizontal..... Diagonal..... Vertical......... Phosphor.

Magnetic 105 Degrees 110 Degrees 87 Degrees

Electrostatic

Fluorescence..... Persistence.....

Aluminized P4 White Short to Medium Gray Filter Glass 78 Percent

ELECTRICAL DATA

Heater Voltage.
Heater Current.
Heater Warm-up Time¹
Direct Interelectrode Capacitances (approx.)
Cathode to All Other Electrodes.
Grid No. 1 to All Other Electrodes.
External Conductive Coating to Anode².

6.3 Volts 0.6 Ampere 11 Seconds

5 μμf 6 μμf 1500 μμf Max. 1000 μμf Min.

MECHANICAL DATA

 Minimum Useful Screen Dimensions (Maximum Assured).
 14¾ x 11½ Inches

 Minimum Useful Screen Area.
 155 Square Inches

 Neck Length.
 4½ Inches

 Overall Length.
 11¼ Inches

 Bulb
 J132½ A or J132½ B

 Bulb Contact (Recessed Small Cavity Cap).
 J1-21

 Base.....

Weight (approx.).....

B7-208 8HR 10 Pounds

TYPICAL OPERATING CONDITIONS

Minimum Useful Screen Dimensions

Grid Drive Service3

Basing

 Grid Drive Services
 14,000 Volts d c

 Anode Voltage
 0 to 400 Volts d c

 Grid No. 4 Voltage for Focus
 0 to 400 Volts d c

 Grid No. 1 Voltage
 400 Volts d c

 Grid No. 1 Voltage Required for Cutoff*
 -45 to -90 Volts d c

 Cathode Drive Service*
 14,000 Volts

 Grid No. 4 Voltage for Focus
 0 to 400 Volts

SYLVANIA TYPE 17DSP4 (Cont'd)

Cathode Voltage+46	450 Volts to +85 Volts
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms Max.

NOTES:

- 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:

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

11/8" Neck Diameter

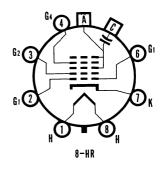
Gray Filter Glass

No Ion Trap

External Conductive Coating



GENERAL DATA



Esseries Mathed	F1	1
Focusing Method		trostatic
Deflection Method Deflection Angles (approx.)	IVI	agnetic
Horizontal	105	Degrees
Diagonal		Degrees
Vertical		Degrees
Phosphor		inized P4
Fluorescence		Vhite
Persistence	Short	to Medium
Faceplate	Gray F	ilter Glass
Light Transmittance (approx.)	77	Percent
ELECTRICAL DATA		
Heater Voltage	6.3	Volts
Heater Current0		
Heater Warm-up Time ¹		Seconds
Direct Interelectrode Capacitances (approx.)		
Cathode to All Other Electrodes	5	μμf
Grid No. 1 to All Other Electrodes		$\mu\mu$ f
External Conductive Coating to Anode ²		μμf Max.
	1000	μμf Min.
MECHANICAL DATA		
Minimum Useful Screen Dimensions (Max. Assured)		
Height	1111/6	Inches Inches
Width	1434	Inches
Diagonal	$15\frac{3}{4}$	Inches
Areā	155	Square Inches
Neck LengthOverall Length	$3\frac{5}{8} \pm \frac{1}{8}$	Inches
	10 34 ± 14	Inches
Bulb		or J132½-B
Bulb Contact (Recessed Small Cavity Cap)	J1-21 B7-208	
Base	8HR	
Basing		Pounds
		i outius
TYPICAL OPERATING CONDITIONS (Grid Driv	•	
Anode Voltage	14,000	Volts d c
Grid No. 4 Voltage for Focus		Volts d c
Grid No. 2 Voltage	300	Volts d c
Grid No. 1 Voltage Required for Cutoff ³	−35 to −72	voits a c
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max.

SYLVANIA TYPE 17DTP4 (Cont'd)

NOTES:

- 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
- a resistance equal to three (s) times 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.

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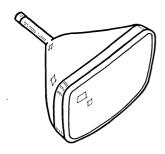
SYLVANIA TYPE 17DWP4

SPECIAL PURPOSE TUBE

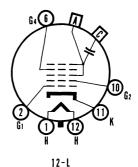
Television Monitor Tube

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**



GENERAL DATA



Heater Voltage	Focusing Method Deflecting Method Deflecting Angles (approx.) Vertical Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	Mag 50 65 70 Alumir W Short to Gray Fil	ostatic netic Degrees Degrees Degrees ized P4 hite Medium ter Glass Percent
Heater Voltage	FIFCTRICAL DATA		
MECHANICAL DATA Maximum Useful Screen Dimensions 11½ x 14½ Inches Overall Length 19½ Inches Neck Length 7½ Inches Minimum Useful Screen Area 149 Square Inches Bulb Contact (Recessed Small Cavity Cap) J1-21 Bulb 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 (Focusing Electrode) Voltage -550 to +1100 Volts d c Grid No. 2 Voltage 700 Volts d c Regative 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 2 Volts	Heater Voltage	0.6 ± 5% 5 6.5 1500	Ampere μμf μμf μμf Max.
Neck Length	MECHANICAL DATA	750	μμι ινιιιι.
MAXIMUM RATINGS (Absolute Maximum Values) Anode Voltage	Neck Length Minimum Useful Screen Area Bulb Contact (Recessed Small Cavity Cap) Bulb Base (Small Shell Duodecal 6-Pin)	7½ 149 J1-21 J133B or B6-63	Inches Square Inches J133D
Anode Voltage	RATINGS		
Anode Voltage	MAXIMUM RATINGS (Absolute Maximum Value	es)	
Heater Negative with Hespect to Cathode During Warm-up Period Not to Exceed	Anode Voltage Grid No. 4 (Focusing Electrode) Voltage550 Grid No. 2 Voltage Grid No. 1 Voltage Negative Bias Value Negative Peak Value Positive Bias Value Positive Peak Value Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode	22,000 to +1100 700 180 220 0	Volts d c Volts d c Volts Volts d c

SYLVANIA TYPE 17DWP4 (Cont'd)

TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage	18,000 Volts d c
GIIU INO. 4 VOITAGE TOT FOCUS	0 to 400 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage Required for Cutoff ²	−35 to −72 Volts d c

CURCULE VALUE

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:

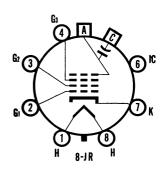
SYLVANIA TYPE 17DXP4

Silver Screen "85"

TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass Aluminized Screen 450 MA Heater Tri-Potential
Electrostatic Focus
110° Magnetic Deflection
No Ion Trap
External Conductive Coating
Short Neck





GENERAL DATA
Focusing Method
Deflection Method Magnetic
Deflection Angles (approx.)
Horizontal
Diagonal110 DegreesVertical87 Degrees
Phosphor
FluorescenceWhite
Persistence Short to Medium
Faceplate Gray Filter Glass
Light Transmittance (approx.)
ELECTRICAL DATA
Heater Voltage
Heater Current
Heater Warm-up Time ¹
Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes
Cathode to All Other Electrodes
External Conductive Coating to Anode ²
1000 μμf Min.
MECHANICAL DATA
Minimum Useful Screen Dimensions (Maximum Assured)
Height11116 Inches
Width
Diagonal 15¾ Inches Area 155 Square Inches
Neck Length 394 + 1/2 Inches
Neck Length
Bulb J132½-A or J132½-B
Bulb Contact (Recessed Small Cavity Cap) J1-21
Base
Basing
weight (approx.)
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 ³
Grid No. 1 Voltage Hequired for Gutoff ⁴ 43 to -78 Volts d c
CIRCUIT VALUES
Grid No. 1 Circuit Resistance
and not remain modern and max.

SYLVANIA TYPE 17DXP4 (Cont'd)

NOTES:

- 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

- 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:

Silver Screen "85"

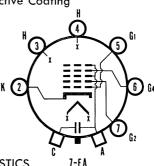
TELEVISION PICTURE TUBE

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 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

ELLO I MOAL DATA	
Heater Voltage	6.3 Volts
Heater Current	0.6· ± 5% Ampere
Heater Warm-up Time1	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	5 μμf
Grid No. 1 to All Other Electrodes	
External Conductive Coating to Anode ²	1400 μμf Max.
· ·	900 μμf Min.
MECHANICAL DATA	

Minimum Useful Screen Dimensions (Maximum Assured)14	13/4 x 1111/16 Inches
Nominal Overall Length	125/16 Inches
Minimum Useful Screen Area	155 Sq. Inches
BulbJ132½A1	
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 Cutoff3	-35 to -72 Volts d c

CIRCUIT VALUES

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

NOTES:

- 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.
- 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:

SYLVANIA TYPE 17DAP4

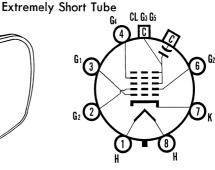
Silver Screen "85"

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





CHARACTERISTICS

8JK

•	GENERAL DATA Focusing Method Deflection Method Deflection Angles		trostatic agnetic
	Horizontal Diagonal Vertical Phosphor	110 87	Degrees Degrees Degrees inized P4
	Fluorescence. Persistence. Faceplate. Light Transmittance (approx.).	V Short t Gray F	Vhite o Medium ilter Glass Percent
ı	ELECTRICAL DATA		
	Heater Voltage	$0.450 \pm 5\%$	Volts Ampere Seconds
	Cathode to All Other Electrodes	3.65 4.15 1400	
	MECHANICAL DATA	900	$\mu\mu$ i iviin.
	Minimum Useful Screen Dimensions (Maximum Assured)	10 ¹ 1/ ₁₆ 155	Inches Inches Sq. Inches
	Basing Weight (approx.)		Pounds
•	TYPICAL OPERATING CONDITIONS		
	Grid Drive Service ³ Anode Voltage Grid No. 4 Voltage for Focus +1 Grid No. 2 Voltage Required for Cutoff ⁵ Cathode Drive Service ⁴	00 to +500 300	Volts d c Volts d c
	Anada Valtana	14.000	V-11

 Catnode Drive Service*
 14,000 Volts d c

 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 Cutoffs
 +34 to +60 Volts d c

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

17DAP4 (Cont'd)

NOTES:

- 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.

- 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.

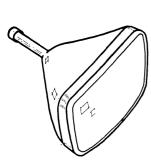
WARNING:

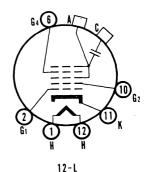
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

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





Max

CHARACTERISTICS

GENERAL DATA	
Focusing Method Deflecting Method Deflecting Angle (approx.)	Electrostatic Magnetic
Horizontal Diagonal Phosphor	70 Degrees
Fluorescence Persistence	White
FaceplateLight Transmittance (approx.)	
ELECTRICAL DATA	
Heater Voltage. Heater Current (approx.). Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes	
Grid No. 1 to All Other Electrodes External Conductive Coating to Anodel	
Ion Trap MagnetExterna	l, Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions	1 x 141/4 Inches 191/4 Inches J1-21 B6-63 12L
TYPICAL OPERATING CONDITIONS	
Anode Voltage	0 to 4100 Volts d c . 300 Volts d c 33 to -77 Volts d c
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	. 1.5 Megohms

17FP4/17FP4A (Cont'd)

NOTES:

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

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

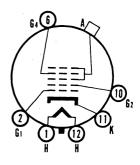
17" Direct Viewed Rectangular Metal Type Frosted Gray Filter Glass

Magnetic Deflection **Electrostatic Focus** Spherical Faceplate

Single Field Ion Trap



GENERAL DATA



12-M

Focusing Method Deflecting Method Deflecting Angle (approx.)	Electrostatic Magnetic
Horizontal Diagonal	66 Degrees 70 Degrees
Phosphor Fluorescence Persistence	P4 White Medium
FaceplateFrostec Light Transmittance (approx.)Frostec	Gray Filter Glass 66 Percent
ELECTRICAL DATA	
Heater Voltage. Heater Current (approx.). Direct Interlectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes	5 μμf 6 μμf
ion Trap WagnetExternal,	Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions	18 ¹⁵ / ₁₆ Inches
Bulb Contact Base (Small Shell Duodecal 6-Pin) Basing	Metal Cone Lip B6-63 12M
TYPICAL OPERATING CONDITIONS	,
Anode Voltage	14000 Valta da
Grid No. 4 Voltage	
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage Required for Cutoff ¹ 33 Ion Trap Magnet Strength (approx.)	to -77 Volts d c 40 Gausses
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 17HP4/17RP4,17HP4A Silver Screen "85" > 17HP4B/17RP4C

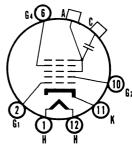
TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type **Gray Filter Glass**

Magnetic Deflection Electrostatic Focus Spherical Faceplate External Conductive Coating Single Field Ion Trap

17HP4A has a Frosted Faceplate 17HP4B/17RP4C has an Aluminized Screen





CHARACTERISTICS

12-L

1.5 Megohms

GENERAL DATA
Focusing Method. Electrostatic Deflecting Method. Magnetic Deflecting Angle (approx.)
Horizontal
Fluorescence P4 Fluorescence White Peristence 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
750 μμf Min Ion Trap MagnetExternal, Single Field Type
MECHANICAL DATA
Minimum Useful Screen Dimensions
TYPICAL OPERATING CONDITIONS
Anode Voltage 14000 Volts d c Grid No. 4 Voltage -56 tb+310 Volts d c Grid No. 2 Voltage 300 Volts d c Grid No. 1 Voltage Required for Cutoff² -33 to -77 Volts d c Ion Trap Magnet Field Strength (approx.) 30 Gausses
CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....

17HP4/17RP4, 17HP4A 17HP4B/17RP4C (Cont'd)

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.

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.

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

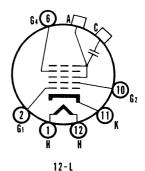
17" Direct Viewed Rectangular Glass Type

Gray Filter Glass External Conductive Coating 17LP4A/17VP4B has an Aluminized Screen

Magnetic Deflection Electrostatic Focus Cylindrical Faceplate

Single Field Ion Trap





CHARACTERISTICS

GENERAL DATA Electrostatic Magnetic Deflecting Angle (approx.) 65 Degrees Horizontal.... 70 Degrees Diagonal Phosphor White Fluorescence..... Persistence..... Medium Gray Filter Glass Faceplate Light Transmittance (approx.)..... **ELECTRICAL DATA** Heater Voltage... Heater Current (approx.) Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode! 6.3 Volts 0.6 Ampere Cathode to All Other Electrodes. 5 μμf Grid No. 1 to All Other Electrodes. 6 μμf External Conductive Coating to Anode! 1500 μμf Max 750 μμf Min Ion Trap Magnet External, Single Field Type

17LP4/17VP4 17LP4A/17VP4B (Cont'd)

MECHANICAL DATA

Minimum Useful Screen Dimensions	
Nominal Overall Length	19¾ ₁₆ Inches J1-21
Base (Small Shell Duodecal 6-Pin)	B6-63
Basing	12L -

TYPICAL OPERATING CONDITIONS

Anode Voltage	14000	Volts d c
Grid No. 4 Voltage56 to	+310	Volts of c
Grid No. 2 Voltage	300	Volts d c
Grid No. 1 Voltage Required for Cutoff ² 33	to -77	Volts d c
Ion Trap Magnet Strength (approx.)	30	Gausses

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.

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.

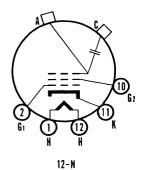
SYLVANIA TYPE 17QP4/17YP4 Silver Screen "85" -> 17QP4A

TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Glass Type

Gray Filter Glass External Conductive Coating 17QP4A has an Aluminized Screen

Magnetic Deflection Magnetic Focus Cylindrical Faceplate Single Field Ion Trap



CHARACTERISTICS

GENERAL DATA Focusing Method..... Magnetic Deflecting Method...... Deflecting Angle (approx.) Magnetic 65 Degrees 70 Degrees Fluorescence..... White Persistence Medium Faceplate. Gray Filter Glass 72 Percent Light Transmittance (approx.).....

17QP4/17YP4, 17QP4A (Cont'd)

ELEC	TRIC	AL	DATA
------	------	----	------

ELECTRICAL DATA				
Heater Voltage		6.3	Volts	
Heater Current (approx.)		0.6	Ampe	re
Direct Interelectrode Capacitances (approx.)				
Cathode to All Other Electrodes		5	$\mu\mu f$	
Grid No. 1 to All Other Electrodes			μμf	NA
External Conductive Coating to Anodel		1500		Max
		750	$\mu\mu^{\dagger}$	Min
Ion Trap Magnet	External,	Single	Field	lype
MECHANICAL DATA Minimum Useful Screen Dimensions Nominal Overall Length Bulb Contact (Recessed Small Cavity Cap)		x 14½ 19¾ J1-21	Inches	3
Base (Small Shell Duodecal 5-Pin)Basing		B5-57 12N		
TYPICAL OPERATING CONDITIONS				

Anode Voltage	4000	voits a c
		Volts d c
Grid No. 1 Voltage Required for Cutoff233 to	-77	Volts d c
Focusing Coil Current (approx.)		Ma dc
Ion Trap Magnet Strength (approx.)	30	Gausses
ton true magnet ottong m (approximation)		

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megonms Max
	iviax

NOTES:

- External conductive coating must be grounded.
 Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 10¾ x 14¼ 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.

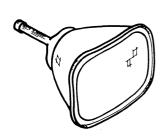
SYLVANIA TYPE 17TP4

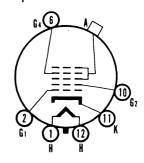
TELEVISION PICTURE TUBE

17" Direct Viewed Rectangular Metal Type Frosted Gray Filter Glass

Magnetic Deflection **Electrostatic Focus** Spherical Faceplate

Single Field Ion Trap





CHARACTERISTICS

12-M

GENERAL DATA

Focusing MethodDeflecting Method	Electrostatic Magnetic
Deflecting Angle (approx.)	=
Horizontal	66 Degrees
Diagonal	66 Degrees 70 Degrees
Phosphor	
Fluorescence	White
Persistence	
FaceplateFrosted	
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 μμf
Grid No. 1 to All Other Electrodes	
Ion Trap Magnet External,	Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions143/8	x 1011/16 Inches
Nominal Overall Length	187/a Inches
Bulb Contact	Metal Cone Lip
Base (Small Shell Duodecal 6-Pin)	B6-63
Basing	12M
Duging	
TYPICAL OPERATING CONDITIONS	

Anode Voltage	Volts d c
Grid No. 4 Voltage55 to +300	Volts d c
Grid No. 2 Voltage	Volts d c
Grid No. 1 Voltage Required for Cutoff1	Volts d c
Ion Trap Magnet Strength (approx.)	Gausses

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms Max
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NOTE:

1. Visual extinction of undeflected focused spot.

WARNING

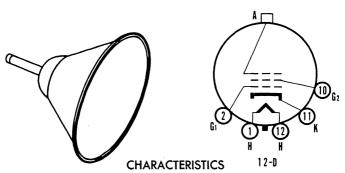
X-ray radiation, shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 19AP4 19AP4C 19AP4A 19AP4D 19AP4B

TELEVISION PICTURE TUBE

19" Direct Viewed Round Metal Type Single Field Ion Trap Magnetic Deflection Magnetic Focus 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



GENERAL DATA

rocusing wethou	wagnetic
Deflecting Method	Magnetic
Deflecting Angle (approx.)	66 Degrees
Phosphor	Pď
Fluorescence	White
Persistence	Medium

(19AP4) Clear (19AP4A) Gray (19AP4D) Frosted (19AP4B, 19AP4C) Gray, Frosted

19AP4, 19AP4A, 19AP4B, 19AP4C, 19AP4D (Cont'd)

	Heater Voltage Heater Current (approx.). Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
	Cathode to All Other Electrodes	5 μμf 7 μμf Single Field Type
	MECHANICAL DATA	eg.e r ieie r , pe
	Minimum Useful Screen Diameter. Nominal Overall Length. Bulb Contact. Base (Small Shell Duodecal 5-Pin). Basing.	173/ ₈ Inches 211/ ₂ Inches Metal Cone Lip B5-57 12D
	TYPICAL OPERATING CONDITIONS	
_	Anode Voltage	14000 Volts d c 300 Volts d c to -77 Volts d c 115 Ma d c 35 Gausses
	CIRCUIT VALUES	
	Grid No. 1 Circuit Resistance	1.5 Megohms

NOTES:

Visual extinction of undeflected focused spot.
 For JETEC focusing coil 106 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 15% x 11¾ inch picture area.

WARNING

ELECTRICAL DATA

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 Rectangular Glass Type **Gray Filter Glass**

Magnetic Deflection Magnetic Focus Spherical Faceplate Max

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

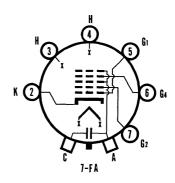
Silver Screen "85"

TELEVISION PICTURE TUBE

19" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass Low Grid No. 2 Voltage No Ion Trap Aluminized Screen
Electrostatic Focus
114° Magnetic Deflection
External Conductive Coating
1½" Neck Diameter
6.3 Volt, 450 Ma Heater

Cathode Drive Design





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		
FaceplateLight Transmittance (approx.)	Gray Filter Glass 79 Percent		
Light Transmittance (approx.)	79 Percent		
ELECTRICAL DATA			
Heater Voltage	6.3 Volts		
Heater Current	0.5 Volts		
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	1500 μμf Max.		
	1000 μμf Min.		
MECHANICAL DATA			
Minimum Useful Screen Dimensions (Max. Assured)			
Height	12 Inches		
Width	15½ Inches		
DiagonalMinimum Useful Screen Area	17% Inches		
Minimum Useful Screen Area	17% Inches 172 Square Inches		
Neck Length	41/8 ± 1/8 Inches		
Neck Length Overall LengthBulb	11% ± ¼ Inches		
BulbBulb Contact (Recessed Small Cavity Cap)	J1-21		
Base	B6-214		
Basing	7FA		
Weight (approx.)	13 1/2 Pounds		
violght (approxi)	10/21 001103		
TYPICAL OPERATING CONDITIONS ³			
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 Cutoff5	35 to 50 Volts d c		

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 re-sistance equal to three (3) times rated heater voltage divided by rated heater current.
- 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

114° Magnetic Deflection Rectangular Glass Type

Spherical Faceplate

Gray Filter Glass

No Ion Trap

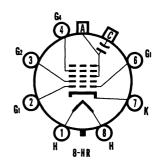
Electrostatic Focus

Bonded Shield

Aluminized Screen

External Conductive Coating





CHARACTERIOTICS		
GENERAL DATA		
Focusing Method	Fleo	trostatic
Deflection Method		agnetic
Deflection Angles (approx.)		
Horizontal		Degrees
Diagonal		Degrees
_ Vertical		Degrees
Phosphor		inized P4
FluorescencePersistence		Nhite to Medium
		led Shield
Faceplate	Done	ieu Ollielu
Directly to Face of Tube)		
Light Transmittance of Faceplate Assembly		
(approx.)	44	Percent
ELECTRICAL DATA		
Heater Voltage	6.3	Volts
Heater Current	$0.60 \pm 5\%$	Ampere
Heater Warm-up Time1	11	Seconds
Direct Interelectrode Capacitances (approx.)	_	•
Cathode to All Other Electrodes		$\mu\mu f$
External Conductive Coating to Anode ²	1500	μμf μμf Max.
External Conductive Coating to Anode	1000	μμι Min.
MECHANICAL DATA	1000	μμ
Minimum Useful Screen Dimensions (Max. Assured)		
Height	121/6	Inches
Width	15 %	Inches Inches
Diagonal	17 3/4	Inches
Area		Square Inches
Neck Length	$5\frac{1}{8} \pm \frac{1}{8}$	Inches
Overall Length	$12\% \pm \%$	Inches
Bulb	FP159A	No. 5 or Equiv.
Safety Plate	J1-21	
Base	B7-208	
Basing	8HR	
Weight (approx.)		Pounds
	/ 2	
TYPICAL OPERATING CONDITIONS (Grid Driv	e 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 Cutoff3	−35 to −72	Volts d c

SYLVANIA TYPE 19ARP4 (Cont'd)

CIRCUIT VALUES

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

NOTES:

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.
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 19ASP4

Silver Screen "85"

TELEVISION PICTURE TUBE

19" Direct Viewed Rectangular Glass Type

Spherical Faceplate

Gray Filter Glass

Aluminized Screen

Electrostatic Focus

114° Magnetic Deflection

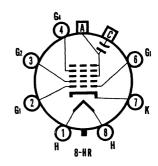
No Ion Trap

External Conductive Coating

Bonded Shield

300 Ma Heater





GENERAL DATA	
Focusing Method Deflection Method Deflection Angles (approx.)	Electrostatic Magnetic
Horizontal Diagonal Vertical Phosphor Fluorescence Persistence	102 Degrees 114 Degrees 86 Degrees Aluminized P4 White Short to Medium
Faceplate. (Gray Filter Glass Safety Plate Laminated Directly to Face of Tube) Light Transmittance of Faceplate Assembly (approx.)	Bonded Shield
	44 Fercent
ELECTRICAL DATA Heater Voltage	
Cathode to All Other Electrodes	5 μμf 6 μμf 1500 μμf Max. 1000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Max. Assured) Height. Width. Diagonal. Area. Neck Length. Overall Length. Safety Plate Bulb. Sulb.	12½ Inches 15½ Inches 17½ Inches 174 Square Inches ½ ± ½ Inches 49 Exp. No. 5 or Equiv. FP159A J1-21 B7-208 8HR 18½ Pounds
TYPICAL OPERATING CONDITIONS (Grid Drive Anode Voltage.	16,000 Volts d c to +400 Volts d c

SYLVANIA TYPE 19ASP4 (Cont'd)

CIRCUIT VALUES

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

NOTES:

- 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.
 External conductive coating must be arounded.
- 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 19ATP4

Silver Screen "85"

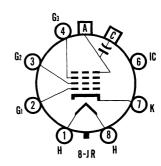
TELEVISION PICTURE TUBE

19" Direct Viewed Spherical Faceplate Gray Filter Glass Tri-Potential Electrostatic Focus No Ion Trap **External Conductive Coating**

Rectangular Glass Type Bonded Shield Aluminized Screen 114° Magnetic Deflection



GENERAL DATA



GENERAL DATA	
Focusing Method	
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
Faceplate	
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 Time1	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 Anode2	
	1000 μμf Min,
MECHANICAL DATA	1222
Minimum Useful Screen Dimensions (Max. Assured)	
Height	12 1/6 Inches
Width	
Diagonal	173/ Inches
Area	
Mode Longth	29/ ± 1/ Inches
Neck Length Overall Length Bulb	11 1/ ± 5/ Inches
Dulb	C140 Eve No 5 or Fauly
Cofety Dieto	FP159A
Safety PlateBulb Contact (Recessed Small Cavity Cap)	J1-21
Base	B7-208
Basing	
Weight (approx.)	
weight (approx.)	10 % Founds
TYPICAL OPERATING CONDITIONS (Grid Dri	ve Service)
•	· ·
Anode Voltage	0 to -1400 Volte do
Grid No. 2 Voltage	500 Volts d c
Grid No. 2 Voltage	
Gira 140. 1 Voltage nequired for Outoll's	- 43 to -10 Volts u.c

SYLVANIA TYPE 19ATP4 (Cont'd)

CIRCUIT VALUES

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

NOTES:

- 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.

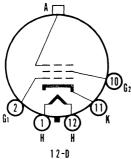
 2. External conductive coating must be grounded.

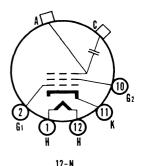
 3. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

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)





6.3 Volts

CHARACTERISTICS

GENERAL DATA	
Focusing Method	Magnetic
Deflecting Method	Magnetic
Deflecting Angle (approx.)	
Horizontal	
_ Diagonal	70 Degrees
Phosphor	P4
Fluorescence	
Persistence	
Faceplate	
Light Transmittance (approx.)	73 Percent

ELECTRICAL DATA Heater Voltage

Heater Current (approx.)	0.6 Ampere
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	
Grid No. 1 to All Other Electrodes	6 μμf _
Ion Tran Magnet External	. Sinale Field Type

MECHANICAL DATA

Minimum Useful Screen Dimensions1	23/4 x 17 Inches	
Nominal Overall Length	21½ 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		Volts d c
Grid No. 1 Voltage Required for Cutoff133	to -77	
Focusing Coil Current (approx.)2	110	Ma dc
Ion Trap Magnet Strength (approx.)	35	Gausses

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms Max
IOTES	iviax

NO

- Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 12¾ 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 μμf
_ Minimum	500 μμf
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 $20\,\text{CP4C}$ is identical to the Type $20\,\text{CP4}$ 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 μμf
Minimum	500 μμf
Basing	12N

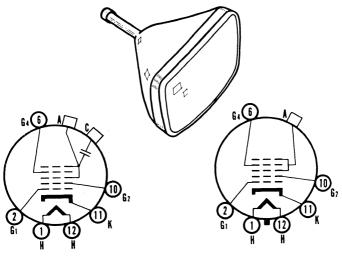
WARNING

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.

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

20HP4B 20HP4C

20HP4, 20HP4A/20LP4/20MP4 20HP4B, 20HP4C, 20HP4D (Cont'd)

CHARACTERISTICS

Electrostatic

Deflecting Method Deflecting Angle (approx.)	Magnetic
Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	
ELECTRICAL DATA	
Heater Voltage. Heater Current (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes	$\begin{array}{cc} 5 & \mu\mu f \\ 6 & \mu\mu f \end{array}$ Single Field Type
MECHANICAL DATA Minimum Useful Screen Dimensions 11: Nominal Overall Length Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 6-Pin) Basing 20HP4, 20HP4B, 20HP4C Basing 20HP4A/20LP4/20MP4, 20HP4D	J1-21 B6-63 12M
TYPICAL OPERATING CONDITIONS	
Anode Voltage. Grid No. 4 Voltage	to +310 Volts d c 300 Volts d c 3 to -77 Volts d c
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms Max

NOTE:

GENERAL DATA
Focusing Method...

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 μμf
_ Minimum	750 μμf
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 µµf
Minimum	750 µµf
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.

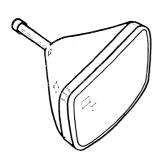
SYLVANIA TYPE 21ACP4/21AMP4 Silver Screen "85"→ 21ACP4A/ 21AMP4A/21BSP4

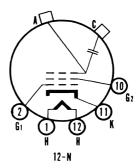
TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type

Gray Filter Glass External Conductive Coating

Magnetic Deflection Magnetic Focus Spherical Faceplate Single Field Ion Trap 21ACP4A/21AMP4A/21BSP4 has an Aluminized Screen





CHARACTERISTICS

Focusing Method. Deflecting Method. Magnetic Begres Bopgres Bopgres Population Population Population Faceplate. Gray Filter Glass Ty Percent ELECTRICAL DATA Heater Voltage Heater Voltage Heater Voltage Heater Current (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. Grid No. 1 to All Other Electrodes. Grid No. 1 to All Other Electrodes. Bopper MECHANICAL DATA Minimum Useful Screen Dimensions. Nominal Overall Length Bulb Contact (Recessed Small Cavity Cap) Bulb Contact (Recessed Small Cavity Cap) Bulb Contact (Recessed Small Cavity Cap) Basing. TYPICAL OPERATING CONDITIONS Anode Voltage Grid No. 1 Voltage Required for Cutoff ² Grid No. 2 Voltage Grid No. 1 Voltage Required for Cutoff ² Grid No. 35 Gausses	GENERAL DATA	
Horizontal 85 Degrees Diagonal 90 Degrees Phosphor P4 White P4 White P4 White P4 White P4 White P5 White P6 W	Deflecting Method	
Faceplate	Horizontal. Diagonal. Phosphor. Fluorescence.	90 Degrees P4 White
Heater Voltage Heater Current (approx.) Heater Current (approx.) Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode! Ion Trap Magnet. MECHANICAL DATA Minimum Useful Screen Dimensions. Nominal Overall Length. Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 5-Pin) B5-57 Basing. TYPICAL OPERATING CONDITIONS Anode Voltage. Grid No. 2 Voltage. Grid No. 2 Voltage. Grid No. 2 Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff² Grousing Coil Current (approx.)3. 116 ±15% Ma d c Focusing Coil Current (approx.)3. 116 ±15% Ma d c	Faceplate	Gray Filter Glass
Heater Current (approx.) 0.6 Ampere	ELECTRICAL DATA	
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode! Ion Trap Magnet. MECHANICAL DATA Minimum Useful Screen Dimensions. Nominal Overall Length. Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 5-Pin) TYPICAL OPERATING CONDITIONS Anode Voltage Grid No. 2 Voltage. Grid No. 2 Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ² Focusing Coil Current (approx.) ³ 116 ±15% Ma d c	Heater Current (approx.)	
Ion Trap Magnet	Cathode to All Other Electrodes	6 μμf 2500 μμf Max
Minimum Useful Screen Dimensions. 19% 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. 12N TYPICAL OPERATING CONDITIONS Anode Voltage. 16000 Volts d c Grid No. 2 Voltage. 300 Volts d c Grid No. 1 Voltage Required for Cutoff² -33 to -77 Volts d c Focusing Coil Current (approx.)³ 116 ±15% Ma d c	Ion Trap Magnet External	, Single Field Type
Nominal Overall Length	MECHANICAL DATA	
Anode Voltage 16000 Volts d c Grid No. 2 Voltage 300 Volts d c Grid No. 1 Voltage Required for Cutoff² -33 to -77 Volts d c Focusing Coil Current (approx.)³ 116 ±15% Ma d c	Minimum Useful Screen Dimensions	20 Inches J1-21 B5-57
Grid No. 2 Voltage 300 Volts d c Grid No. 1 Voltage Required for Cutoff² −33 to −77 Volts d c Focusing Coil Current (approx.)³ 116 ±15% Ma d c	TYPICAL OPERATING CONDITIONS	
	Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ² 3; Focusing Coil Current (approx.) ³ 116	300 Volts d c 3 to -77 Volts d c 5 ±15% Ma d c

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

NOTES:

- External conductive coating must be grounded.
 Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 20 foot lamberts on a 191/8 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

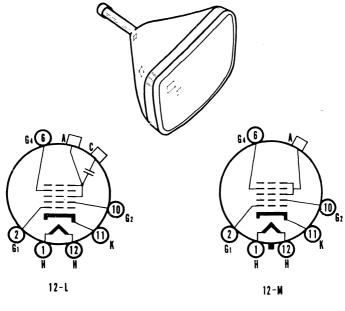
TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Gray Filter Glass

Magnetic Deflection Electrostatic Focus Spherical Faceplate

Single Field Ion Trap

21YP4 has an External Conductive Coating 21YP4A has an External Conductive Coating and an Aluminized Screen



21YP4 21YP4A

Basing...

21AFP4

GENERAL DATA	
Focusing Method	Electrostatic Magnetic
Horizontal Diagonal Phosphor. Fluorescence Persistence.	65 Degrees 70 Degrees P4 White Medium
Faceplate. Light Transmittance (approx.)	Gray Filter Glass 72 Percent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes Ion Trap Magnet External,	5 μμf 6 μμf Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions	

21AFP4, 21YP4, 21YP4A (Cont'd)

TYPICAL OPERATING CONDITIONS

Anode Voltage	16000	Valte d.c
Anodo Voitago	10000	VUITO U U
Grid No. 4 Voltage64 to	+350	Volts d c
Grid No. 2 Voltage	300	Volts d c
Grid No. 1 Voltage Required for Cutoff128	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. 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 21 YP4 is identical to Type 21 AFP4 except for having an external conductive coating, which must be grounded.

External Conductive Coating to Anode Capacitance	
Maximum	2500 μμf
Minimum	2000 μμf
Basing	12L

21YP4A

The Sylvania Type 21 YP4A is identical to Type 21 AFP4 except for having an external conductive coating which must be grounded, and an aluminized screen.

External Conductive Coating to Anode Capacitance	
Maximum	2500 μμf
_ Minimum	2000 μμf
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.

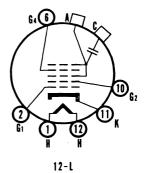
SYLVANIA TYPES 21ALP4, 21DVP4 Silver Screen "85" -> 21ALP4A/21ALP4B

TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type **Gray Filter Glass** External Conductive Coating Single Field Ion Trap

Magnetic Deflection **Electrostatic Focus** Spherical Faceplate 21DVP4, 21ALP4A/21ALP4B have Aluminized Screens





21ALP4, 21DVP4, 21ALP4A/21ALP4B (Cont'd)

CHARACTERISTICS

CHARACTERISTICS
GENERAL DATA
Focusing Method Electrostatic Deflecting Method Magnetic Deflecting Angle (approx.)
Horizontal
Fluorescence White Persistence Medium Faceplate Gray Filter Glass
Light Transmittance (approx.)
ELECTRICAL DATA
21ALP4 21DVP4 21ALP4A/21ALP4B
Heater Voltage 6.3 6.3 Volts
Heater Voltage
Cathode to All Other Électrodes
External Conductive Coating to Anode ¹
$500~\mu\mu f$ Min.
Ion Trap Magnet External, Single Field Type
MECHANICAL DATA
Minimum Useful Screen Dimensions. 191/6 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 21ALP4
Anode Voltage
CIRCUIT VALUES
Grid No. 1 Circuit Resistance
110

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.

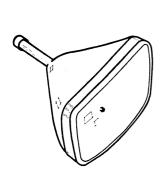
SYLVANIA TYPE 21ANP4 21ANP4A

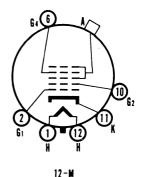
TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Gray Filter Glass

Magnetic Deflection Electrostatic Focus Spherical Faceplate

Single Field Ion Trap 21ANP4A has an Aluminized Screen





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CHARACTERISTICS

C. II (II) (C) E((O) (C)
GENERAL DATA
Focusing Method. Electrostatic Deflecting Method. Magnetic Deflecting Angle (approx,)
Horizontal
Persistence. Medium Faceplate. Gray Filter Glass Light Transmittance (approx.) 71 Percent
ELECTRICAL DATA
Heater Voltage
Cathode to All Other Electrodes
MECHANICAL DATA
Minimum Useful Screen Dimensions
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 Cutoff¹ -28 to -72 Volts d c Ion Trap Magnet Strength (approx.) 35 Gausses
CIRCUIT VALUES
Grid No. 1 Circuit Resistance
NOTES:

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

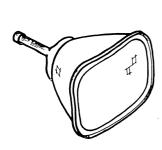
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

SYLVANIA TYPE 21AP4

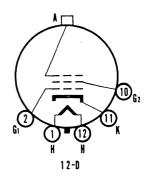
TELEVISION PICTURE TUBE

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

Magnetic Deflection Magnetic Focus Spherical Faceplate Single Field Ion Trap



GENERAL DATA Focusing Method....



Magnetic

1.5 Megohms

CHARACTERISTICS

Deflecting Method Deflecting Angle (approx.)	Magnetic
Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	66 Degrees 70 Degrees P4 White Medium Gray Filter Glass 66 Percent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes	$\begin{array}{cc} 5 & \mu\mu {\rm f} \\ 6 & \mu\mu {\rm f} \end{array}$ Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions	x 1311/ ₁₆ Inches 225/ ₈ Inches Metal Cone Lip B5-57 12D
TYPICAL OPERATING CONDITIONS	
Anode Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff!33 Focusing Coil Current (approx.) ² Ion Trap Magnet Strength (approx.).	16000 Volts d c 300 Volts d c to -77 Volts d c 110 Ma d c 50 Gausses

NOTES:

Grid No. 1 Circuit Resistance.....

Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on an 183/6 x 1315/6 inch picture area.

WARNING

CIRCUIT VALUES

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.

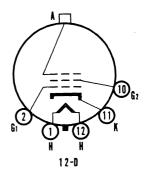
SYLVANIA TYPE 21AQP4 21AQP4A

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 Deflecting Method Deflecting Angle (approx.)	Magnetic Magnetic
Horizontal Diagonal Phosphor Fluorescence Persistence	85 Degrees 90 Degrees P4 White Medium Gray Filter Glass
Faceplate Light Transmittance (approx.)	71 Percent
ELECTRICAL DATA	
Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. Ion Trap Magnet	5 μμf 6 μμf Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions	11/8 x 15 Inches 20 Inches J1-21 B5-57 12D
TYPICAL OPERATING CONDITIONS	
Anode Voltage	300 Volts d c 3 to −72 Volts d c 0 ±20% Ma d c

CIRCUIT VALUES

Grid No	1 Circuit Resis	tance	1.5 Megohms

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 191/8 x 15 inch picture area.

21AQP4A

The Sylvania Type 21 AQP4A is identical to the Type 21 AQP4 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

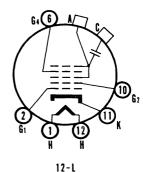
21" Direct Viewed Rectangular Glass Type **Gray Filter Glass**

External Conductive Coating

Magnetic Deflection **Electrostatic Focus** Spherical Faceplate Single Field Ion Trap

21ATP4/21ATP4A has an Aluminized Screen





Electrostatic Magnetic 85 Degrees

CHARACTERISTICS

GLITCHAL DATA		
Focusing Method	 	
Deflecting Method	 	
Deflecting Angle (app		
Horizontal	 	

90 Degrees Diagonal..... Phosphor.. White Fluorescence..... Medium Persistence.... Faceplate...

Light Transmittance (approx.)............

ELECTRICAL DATA Heater Voltage...
Heater Current (approx.).
Direct Interelectrode Capacitances (approx.)
Cathode to All Other Electrodes.
Grid No. 1 to All Other Electrodes.
External Conductive Coating to Anodet 6.3 Volts 0.6 Ampere 5 μμf 6 μμf 1500 μμf 1200 μμf Max

MECHANICAL DATA

GENERAL DATA

Minimum Useful Screen Dimensions19	1/8 x 15	Inches
Nominal Overall Length		Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21	
Base (Small Shell Duodecal 6-Pin)	B6-63	
Rasing	121	

TYPICAL OPERATING CONDITIONS

Anode Voltage	O Volts d c
Grid No. 4 Voltage64 to +35	2 Volts d c
Grid No. 2 Voltage	O Volts d c
Grid No. 1 Voltage Required for Cutoff233 to -7	7 Volts d c
Ion Trap Magnet Strength (approx.)	5 Gausses

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	.5 Megohms
-------------------------------	------------

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

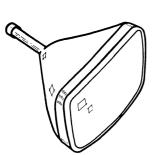
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less,

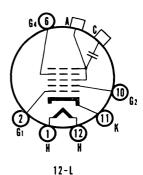
SYLVANIA TYPE 21AUP4, 21AVP4 Silver Screen "85"→21AUP4A/ 21AUP4B/21AVP4A/21AVP4B

TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Gray Filter Glass Magnetic Deflection Electrostatic Focus Spherical Faceplate Single Field Ion Tran

External Conductive Coating Single Field Ion Trap 21AUP4A/21AUP4B/21AVP4A/21AVP4B has an Aluminized Screen





Max

GENERAL DATA	
	ectrostatic Aagnetic
Horizontal 67 Diagonal 72	Degrees Degrees P4
	White Medium Filter Glass
	Percent
ELECTRICAL DATA	
Heater Current (approx.)0 Direct Interelectrode Capacitances (approx.)	.3 Volts .6 Ampere
Cathode to All Other Electrodes	5 μμf 6 μμf
200	00 μμf Max 00 μμf Min
Ion Trap MagnetExternal, Sing	e Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions	1/ ₃₂ Inches
Base (Small Shell Duodecal 6-Pin)	
TYPICAL OPERATING CONDITIONS	
Anode Voltage 1600 Grid No. 4 Voltage -64 to +3t Grid No. 2 Voltage 30 Grid No. 1 Voltage Required for Cutoff? -33 to -1	02 Volts d c 00 Volts d c 07 Volts d c
Ion Trap Magnet Strength (approx.)	5 Gausses
CIRCUIT VALUES Grid No. 1 Circuit Resistance	5 Megohms
and the contact th	May

- NOTES:
 - External conductive coating must be grounded.
 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 pe 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 Rectangular Glass Type Gray Filter Glass External Conductive Coating

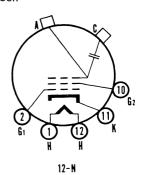
ss Type Magnetic Focus
s Spherical Faceplate
ive Coating Single Field Ion Trap
Aluminized Screen

Magnetic Deflection



GENERAL DATA

Basing . . .



Focusing Method	Magnetic Magnetic
Horizontal Diagonal Phosphor	67 Degrees 72 Degrees P4
Fluorescence Persistence Faceplate	White Medium 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 μμf
Grid No. 1 to All Other Electrodes External Conductive Coating to Anode1	6 μμf 2500 μμf Μαχ
External Conductive Coating to Anode	2000 μμf Min
Ion Trap MagnetExternal	
MECHANICAL DATA	
Minimum Useful Screen Dimensions	231/ ₃₂ Inches J1-21

21AWP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

Anode Voltage Grid No. 2 Voltage Grid No. 1 Voltage Required for Cutoff ² Focusing Coil Current (approx.) ³ Los Tran Magnet Strength (approx.) 108	300 to -72 ± 20%	Volts d c Volts d c Ma d c
Ion Trap Magnet Strength (approx.)	35	Gausses

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 191/8 x 15 inch picture area sharply focused teachers force. fooused 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

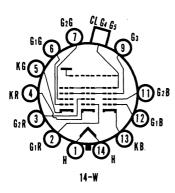
Round Metal Type

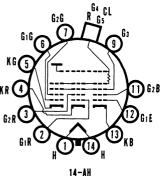
Filter Glass

Spherical Faceplate

Electrostatic Focus Magnetic Convergence Magnetic Deflection

Three Electron-Gun Type





CHARACTERISTICS

GENERAL DATA

Focusing Method	
Deflecting Method	Magnetic
Converging Method	Magnetic
Deflecting Angles (approx.)	. •
Horizontal	70 Degrees
Vertical	55 Degrees
Phosphor, Blue-Green-Red Dots	P22
Persistence	Medium
Arrangement	
	onsisting of blue dot,
	reen dot and red dot
Spacing Between Centers of Adjacent	

Dot Trios (approx.).
Faceplate, Spherical
Light Transmittance (approx.). .. 0.029 Inches
.. Filter Glass
.. 77 Percent
.. Aluminized, Tri-color,
Phosphor-dot Type Screen.....

21AXP22, 21AXP22A (Cont'd)

• • •	` ,
Heater Voltage. Heater Current (approx.)	1.8 ± 10% Amperes 7 μμf 16 μμf
MECHANICAL DATA Minimum Useful Screen Dimensions. Projected Screen Area. Anode¹ Terminal. Base (Small Shell Neodiheptal 12-Pin). Basing	255 Sq. Inches Metal Shell Lip B12-131
21 A XP22. 21 A XP22A. Mounting Position (Base Pin 12 on Top)	14AH Blue Gun Up
Maximum Overall Length Diameter At Lip At Flange (Max.)	
	$20\frac{15}{16} \pm \frac{5}{16}$ Inches
RATINGS	
Unless otherwise specified, voltage values a with respect to cathode of specified	re positive gun
MAXIMUM RATINGS (Absolute Maximum Values)	
Anode'-to-Cathode (Of Each Gun) Voltage Anode' Current (Average Each Gun)². Grid No. 3-to-Cathode (Of Each Gun) Voltage Grid No. 2-to-Cathode Voltage (Each Gun)	27,500 Volts Max. 500 μα Max. 6600 Volts Max.
Grid No. 2-to-Cathode Voltage (Each Gun). Negative Bias Value. Positive Bias Value.	440 Volts Max.
Positive Peak Value	2 Volts Max.
Heater Negative with Respect to Cathode During Warm-up Period not to Exceed 15 Seconds. After Equipment Warm-up Period. Heater Positive with Respect to Cathode	200 Volts Max.
EQUIPMENT DESIGN RANGES	
(For Anode Voltage Ec4k (Each Gun) between 20,000 Grid No. 3 (Focusing Electrode)-to-Cathode	03 and 25,000 Volts)
(Of Each Gun) Voltage	15.2% to 21.2% of Ec4k Each Gun Volts
Grid No. 2-to-Cathode Voltage (Each Gun) When Circuit Design Utilizes Grid No. 1-to Cathode Voltage (Ec.k) at Fixed Value for Raster Cutoff Grid No. 1-to-Cathode Voltage (Each Gun)	See Chart
For Visual Extinction of Focused Raster when Circuit Design Utilizes Grid No. 2-to-Cathode Voltage	
(Ec2k) at Fixed Value	See Chart ±21% of average of highest and lowest cutoff values
800 µa	75 μa
Grid No. 2 Current (Each Gun) Percentage of Total Anode Current Supplied by Each Gun to Produce Illuminant-C White: Red Gun	-5 to +5 μa 47 to 67 Percent
Blue Gun. Green Gun. Fach Gun to Produce White of 8500° K:	11 to 24 Percent 20 to 33 Percent
Red GunBlue Gun	42 to 60 Percent 12 to 27 Percent 23 to 38 Percent
Green Gun Maximum Raster Shift in Any Direction from Screen Cen Maximum Compensation to be Provided by the following (Purifying Magnet Rast	er shift of 1 Inch in anv
direc Magnetic-Field EqualizerBea respe	m displacement with ect to phosphor dot at edge of screen
Tangetial. ± 0.0 Radial. ± 0.0 Lateral-Converging Magnet:⁵ & ⁶	0005 to + 0.007 Inches
After adjustment has been made for color purity and dynamic convergence	
Maximum Shift of Blue Beam Maximum Shift of Red and Green Beams Average of Maximum Shift of Red and Green Beams Radial-Converging Magnet Assembly: ⁵	$\pm \frac{1}{8}$ to $\pm \frac{3}{8}$ Inch $\pm \frac{7}{32}$ to $\pm \frac{9}{32}$ Inch

21AXP22, 21AXP22A (Cont'd)

Radial-Converging Magnet Assembly: ⁵ For static convergence after adjustment has been may for optimum color purity and dynamic convergence (Each Beam)	ce Shift of $\pm \%$ Inch or ng
Parabola:	
Amplitude to provide ^s	½ to 2
Amplitude for red-pattern to provide ⁹ Shi	ift of -35% to +85% of the shift caused by Parabola Amplitude
Amplitude for green-pattern to provide9Shi	ift of -85% to +35% of the shift caused by Parabola Amplitude
$\begin{array}{ll} \text{Difference} & \text{between} & \text{red-pattern} & \text{shift} & \text{and} \\ \text{green-pattern shift} & (\text{Shift}_R - \text{Shift}_G), \dots, \\ \text{Vertical:} \\ \text{Blue, Pattern} \end{array}$	0 to +100 Percent
Parabola: Amplitude to provide ⁸	Shift of 0 to 1/8 Inch
Sawtooth: Amplitude to provide?	Shift of 0 to ¼ Inch
Parabola: Amplitude to provide ⁸ Ratio of red-pattern to green-pattern shift Sawtooth:	Shift of $\frac{1}{8}$ to $\frac{3}{8}$ Inch $\frac{1}{2}$ to 2
Amplitude to provide9Shit	ft of $-\frac{1}{8}$ to $+\frac{3}{8}$ Inch
Difference between red-pattern shift and green-pattern shift (Shift _R - Shift _G)	0 to +100 Percent
EXAMPLES OF USE DESIGN RANGES (For Anode \	/oltage of 25,000 Volts)
Grid No. 3 (Focusing Electrode)-to-Cathode (Of Each Gun) Voltage Grid No. 2-to-Cathode Voltage (Each Gun)	3800 to 5300 Volts
When Circuit Design Utilizes Grid No. 1-to- Cathode Voltage of -70 Volts for Raster Cutoff. Grid No. 1-to-Cathode Voltage (Each Gun) For Visual Extinction of Focused Raster When	130 to 370 Volts
For Visual Extinction of Focused Haster 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 21A XP22 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 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 μ m is introduced between the tube and ground by the mounting arrangement of the tube. For the 21 A XP22A, 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.

has a high resistance

In equipment utilizing a well-regulated anode power supply, the Grid No. circuit resistance should be limited to 7.5 megohms.

Low Voltage Circuits

Grid No. 1 Circuit Resistance (Each Gun)... 1.5 Megohms Max. 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:

- 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.
- the anode voltage should not be less than 20,000 volts.
- 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.
 Shift is the movement of the regions of bar-or-dot generator pattern indicated
- in Notes 8 and 9.
- The direction of movement of the red and green beam is opposite to that of the blue beam.
- the blue beam.
 Indicated values apply when test yoke is used with 21A XP22A.
 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.
- 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 21A XP22 and 21A XP22A are direct viewed, metal picture tubes for use in color television receivers.

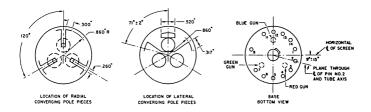
The 21A XP22A features an internal neck coating having high resistance which eliminates the need for an external resistor between the anode power supply and the tube to protect the tube against damage by a momentary internal arc. The resistance of the neck coating permits use of a tube insulating boot 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 21A XP22 and 21A XP22A. 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 received a very time the tube or received. repeated every time the tube or receiver is moved.

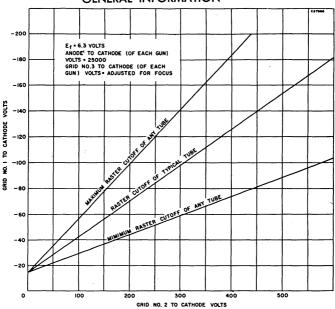
X-RAY WARNING. X-ray radiation is produced by the tube when it is operated at its normal anode voltage. The radiation is through the faceplate and is sufficient to require the adoption of safety measures. Simple shielding, such as that provided by a 14-inch thickness of safety glass (lime), in front 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 ¾ inch thickness of safety glass in front of the faceplate to avoid the hazard of X-ray radiation.



21AXP22, 21AXP22A (Cont'd)

GENERAL INFORMATION



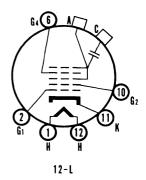
SYLVANIA TYPE 21AYP4

TELEVISION PICTURE TUBE

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

Magnetic Deflection Electrostatic Focus Spherical Faceplate Single Field Ion Trap





GENERAL DATA	
Focusing Method. Deflecting Method. Deflecting Angle (approx.)	Electrostatic Magnetic
HorizontalDiagonal	66 Degrees 70 Degrees
Phosphor Fluorescence Persistence	White
FaceplateLight Transmittance (approx.)	Gray Filter Glass

21AYP4 (Cont'd)

6.3 Volts 0.6 Ampere

ELECTRICAL DATA
Heater Voltage
Heater Current (approx.)
Direct Interelectrode Capacitances (approx.)

010 / tpo.re
5 μμf
6 μμf
2500 μμf Max
750 uuf Min
Single Field Type

MECHANICAL DATA

Minimum Useful Screen Dimensions173/8	
Nominal Overall Length	22½ Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 6-Pin)	B6-63
Basing	

TYPICAL OPERATING CONDITIONS

Anode Voltage	+352	Volts d c
Grid No. 2 Voltage	300	Volts d c
Ion Trap Magnet Strength (approx.)	35	Gausses

CIRCUIT VALUES

Grid No.	1 Circuit	Resistance	1.5 Megohms Max	
			iviax	

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.

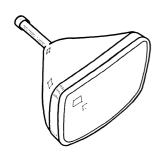
SYLVANIA TYPE 21BTP4

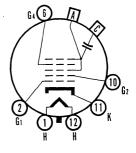
Silver Screen "85"

TELEVISION PICTURE TUBE

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

Magnetic Deflection **Electrostatic Focus** Spherical Faceplate Single Field Ion Trap Aluminized Screen





12-L

21BTP4 (Cont'd)

CHARACTERISTICS

GENERAL DATA	
Focusing Method Deflection Method Deflection Angles (approx.)	Electrostatic Magnetic
Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent
ELECTRICAL DATA	
Heater Voltage Heater Current. Heater Warm-up Time! Direct Interelectrode Capacitances (approx.)	$0.6 \pm 5\%$ Ampere 11 Seconds
Cathode to All Other Electrodes	5 μμf 6 μμf 2500 μμf Max 2000 μμf Min
Ion Trap Magnet	External, Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions Nominal Overall Length Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 6-Pin) Basing	191/ ₁₆ x 151/ ₁₆ Inches 20 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 Cutoff ³	16,000 Volts d c -64 to +352 Volts d c 300 Volts d c -28 to -72 Volts d c
Ion Trap Magnet Strength	33 ±3 Gausses Min
CIRCUIT VALUES	

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.

1.5 Megohms Max

Grid No. 1 Circuit Resistance.....

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, 21D JP4

Silver Screen "85"

TELEVISION PICTURE TUBE

21" Direct Viewed

Magnetic Deflection

Rectangular Glass Type

Electrostatic Focus

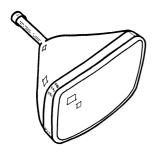
Spherical Faceplate

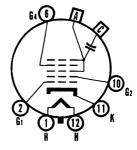
No Ion Trap

Gray Filter Glass

External Conductive Coating

Aluminized Screen





12-L

CHARACTERISTICS

c	EN	E	D.	ΛI	n	Δ.	TA

Focusing MethodDeflection MethodDeflection Angles (approx.)	
Horizontal	85 Degrees
Diagonal	90 Degrees
Phosphor	
Fluorescence	White
Persistence	Short to Medium
Faceplate	Gray Filter Glass
Light Transmittance (approx.)	74 Percent

ELECTRICAL DATA

	21 DJP4	21CBP4/21CBP4A
Heater Voltage	6.3	6.3 Volts
Heater Current (±5%)	0.3	0.6 Ampere
Heater Warm-up Time1	11	11 Seconds
Direct Interelectrode Capacitances (approx	.)	
Cathode to All Other Electrodes		$5 \mu \mu f$
Grid No. 1 to All Other Electrodes		6 μμf
External Conductive Coating to Anode2.		2500 μμf Max.
•		2000 $\mu\mu$ f Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions	x 15½16	Inches	
Nominal Overall Length	18	Inches	
Minimum Useful Screen Area	262	Square I	nches
Bulb Contact (Recessed Small Cavity Cap)	J1-21	•	
Base (Small Shell Duodecal 6-Pin)	B6-203		
Basing	12L		

TYPICAL OPERATING CONDITIONS

	6,000 Volts d c
Grid No. 4 Voltage	+350 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage Required for Cutoff ^{3,4} 28 t	o -72 Volts d c

CIRCUIT VALUES

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

NOTES:

- 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.
- Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.
 21 DJP4 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

Very Short Length

Rectangular Glass Type Spherical Faceplate

Gray Filter Glass

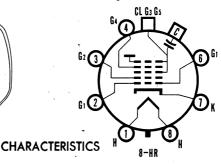
Aluminized Screen Electrostatic Focus

110° Magnetic Deflection

11/8" Neck Diameter

Glass No Ion Trap External Conductive Coating





GENERAL DATA

Focusing Method. Deflecting Method Deflection Angles (approx.)
Horizontal
Diagonal
Vertical
Phosphor
Fluorescence
Persistence
Faceplate
1 acopiato
Light Transmittance (approx.)

Electrostatic Magnetic

105 Degrees 110 Degrees 87 Degrees Aluminized P4 White hort to Medium

Short to Medium Gray Filter Glass 74 Percent

ELECTRICAL DATA

Heater Current	
Heater Warm-up Time ¹	
Direct Interelectrode Capacitance (approx.)	
Cathode to All Other Electrodes	
Grid No. 1 to All Other Electrodes	
External Conductive Coating to Anode ²	

Heater Voltage.....

 $\begin{array}{c} \textbf{6.3 Volts}\\ \textbf{0.6} \, \pm \, 5\% & \textbf{Ampere}\\ \textbf{11 Seconds} \end{array}$

5 μμf 6 μμf 2500 μμf Max. 2000 μμf Min.

MECHANICAL DATA

	ii Oseitti Stiteeti Diilletisitiis
(Ma	mum Assured)
Nomir	Over-all Length
Minim	n Useful Screen Area
Bulb.	
Bulb (ntact (Recessed Small Cavity Cap)
Base.	
Basing	
Weigh	approx.)
-	

19 1/6 x 15 1/6 Inches 14 1/6 Inches 262 Square Inches J 171 H1 or Equivalent J1-21

J1-21 B7-183 8HR 21 Pounds

TYPICAL OPERATING CONDITIONS

Minimum Useful Screen Dimensions

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 Cutoff4	-35 to -72 Volts dc Max.

CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....

1.5 Megohms Max.

NOTES:

- 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.
- Operation outside the limits shown will impair the serviceability of the tube from the viewpoint of life and satisfactory performance.
- 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

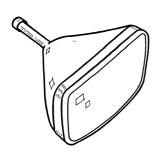
Silver Screen "85"

TELEVISION PICTURE TUBE

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

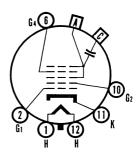
External Conductive Coating

Aluminized Screen



CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....



12-L

1.5 Megohms Max.

CHARACTERISTICS		
GENERAL DATA	Et a state	
Focusing MethodDeflection MethodDeflection Angles (approx.)	Electrostatic Magnetic	
Horizontal	85 Degrees 90 Degrees	
Phosphor Fluorescence	Aluminized P4 White	
PersistenceFaceplate	Short to Medium Gray Filter Glass	
Light Transmittance (approx.)	74 Percent	
ELECTRICAL DATA		
Heater VoltageHeater Current	6.3 Volts $0.6~\pm~5\%$ Ampere	
Heater Warm-up Time ¹	11 Seconds	
Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes	5 μμf 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). Nominal Overall Length. Minimum Useful Screen Area Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 6-Pin)	19 1/6 x 15 1/6 Inches 19 Inches 262 Square Inches J1-21 B6-63 12 L	
TYPICAL OPERATING CONDITIONS		
Anode Voltage. Grid No. 4 Voltage for Focus. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ^a . Ion Trap Magnet Current (Average) ⁴ . Field Strength of PM Ion Trap Magnet ^a .	16,000 Volts d c -64 to +352 Volts d c 300 Volts d c -35 to -72 Volts d c 30 Ma d c 33 Gausses Min.	

SYLVANIA TYPE 21CMP4 (Cont'd)

NOTES:

1. Heater warm-up time is defined as the time required for the voltage across the 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.
 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 Ion Trap Magnet No. 117 with pole pieces centered over Grid No. 2 on mount, and rotated for maximum brightness.
 For typical PM ion trap magnet with field strength tolerance of ±3 gausses.

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,

SYLVANIA TYPE 21CQP4

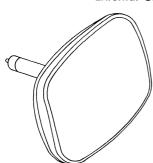
Silver Screen "85"

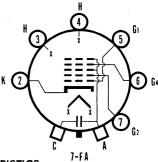
TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate **Gray Filter Glass**

Aluminized Screen Electrostatic Focus 110° Magnetic Deflection 11/8" Neck Diameter No Ion Trap

External Conductive Coating





CHARACTERISTICS

GEN	ERAL	DATA
-----	------	------

Deflection Method	
Deflection Angles (approx.)	
Horizontal	
Diagonal	
Vertical	
Phosphor	
Fluorescence	
Persistence	
Faceplate	

Focusing Method.....

Electrostatic Magnetic

105 Degrees 110 Degrees 87 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 73 Percent

ELECTRICAL DATA Haatar Valtaga

meater voitage	
Heater Current	0
Heater Warm-up Time ¹	
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	
Grid No. 1 to All Other Electrodes	
External Conductive Coating to Anode3	

6.3 Volts 0.6 ± 5% Ampere 11 Seconds

5 μμf 6 μμf 2500 μμf Max. 2000 μμf Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	191/16 x 151/16 Inches
Nominal Overall Length	14/ 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	
Weight (approx.)	20 Pounds

SYLVANIA TYPE 21CQP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

Anode VoltageGrid No. 4 Voltage for Focus	-50 to +350 Volts d c
Grid No. 2 Voltage	300 Volts d c -35 to -72 Volts d c
CIRCUIT VALUES	

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

NOTES:

- 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.
- 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"

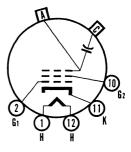
TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Spherical Faceplate **Gray Filter Glass**

Magnetic Deflection Magnetic Focus Single Field Ion Trap **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 Aluminized P4
Phosphor	
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 Current	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 Anode2	2500 μμf Max.
•	2000 μμf Min.
Ion Trap Magnet	External, Single Field Type

SYLVANIA TYPE 21CUP4 (Cont'd)

MECHANICAL DATA

Minimum Useful Screen Dimensions			
(Maximum Assured)191/6	x 151/6	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		
Rasing	12 N		

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 Current4	117 Madc
Field Strength of PM Ion Trap Magnet5	40 Gausses

CIRCUIT VALUES

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

NOTES:

- Heater warm-up time is defined as the time required for the voltage across theater 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.
 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. Distance from yoke reference line to center of air gap to be 3½ inches (approx.).
 For typical PM ion trap magnet with field strength tolerance of ± 3 gausses.

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

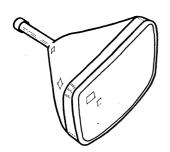
Silver Screen "85"

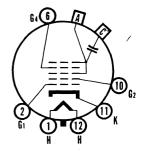
TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Spherical Faceplate **Gray Filter Glass**

Magnetic Deflection Electrostatic Focus Single Field Ion Trap **External Conductive Coating**

Aluminized Screen





12-L

CHARACTERISTICS

GENERAL DATA

Horizontal..... Diagonal..... Phosphor.. Fluorescence..... Persistence..... Faceplate Light Transmittance (approx.)......

Electrostatic Magnetic

85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent

SYLVANIA ELECTRONIC TUBES

SYLVANIA TYPE 21CWP4 (Cont'd)

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	0.6 + 5% Ampere
Heater Warm-up Time1	11 Seconds
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	5 μμ
Grid No. 1 to All Other Electrodes	6 μμf
External Conductive Coating to Anode ²	2500 μμf Max.
3	2000 μμf Min.
Ion Trap Magnet	

MECHANICAL DATA

Minimum Useful Screen Dimensions		
(Maximum Assured)		
Nominal Overall Length	20 Inches	
Minimum Useful Screen Area		S
Butb 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 ³	-28 to -72 Volts d c
Field Strength of PM Ion Trap Magnet4	40 Gausses

CIRCUIT VALUES

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

- 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.
 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 typical PM Ion Trap Magnet with field strength tolerance of ±3 gausses.

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

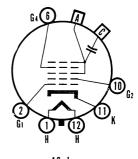
Silver Screen "85"

TELEVISION PICTURE TUBE

21" Direct Viewed 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 21CXP4 (Cont'd)

CHARACTERISTICS

GENERAL DATA Focusing Method Deflecting Method Deflection Angles (approx.) Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	Electrostatic Magnetic 85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent		
ELECTRICAL DATA			
Heater Voltage	$\begin{array}{c} \textbf{6.3 Volts} \\ \textbf{0.6} \pm 5\% & \textbf{Ampere} \\ \textbf{11 Seconds} \end{array}$		
Cathode to All Other Electrodes	5 μμf 6 μμf 2500 μμf Max. 2000 μμf Min.		
MECHANICAL DATA			
Minimum Useful Screen Dimensions (Maximum Assured). Nominal Overall Length. Minimum Useful Screen Area. Bulb. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 6-Pin). Basing.	18 Inches 262 Square Inches 2 or J171E1 J1-21		
TYPICAL OPERATING CONDITIONS (Cathode Drive Service)			
Anode Voltage	18,000 Volts dc		
at 100 µa Cathode Current	0 to 350 Volts dc		
Grid No. 2 to Grid No. 1 Voltage	50 Volts dc 35 to 50 Volts dc		
CIRCUIT VALUES			

Grid No. 1 Circuit Resistance..... NOTES:

 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.

1.5 Megohms Max.

- neater 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:

SYLVANIA TYPES 21DAP4, 21DHP4

Silver Screen "85"

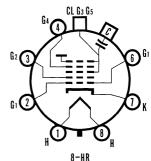
TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate **Gray Filter Glass**

Aluminized Screen Electrostatic Focus 110° Magnetic Deflection 11/8" Neck Diameter No Ion Trap

External Conductive Coating





CHARACTERISTICS

CEN	EDAL	DATA
GEN	ERAL	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

LECTITIONE DATA		
	21 DHP4	21 DAP4
Heater Voltage	6.3	6.3 Volts
Heater Current (±5%)	0.45	0.6 Ampere
Heater Warm-up Time1	11	11 Seconds
Direct Interelectrode Capacitances (appro	x.)	
Cathode to All Other Electrodes		$5 \mu \mu f$
Grid No. 1 to All Other Electrodes		$6 \mu \mu f$
External Conductive Coating to Anode ²		2500 μμf Max.
J		2000 μμf Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured)	19 1/2 x 15 1/2 Inches
(Waximum Assured)	13716 X 10716 11101100
Nominal Overall Length	14% Inches
Minimum Useful Screen Area	aca Ca Inches
Bulb Contact (Recessed Small Cavity Cap)	.11-21
	1474 04 5
Bulb	J171-G1 or Equivalent
Base	B7-183
	2
Basing	8HR
14 Control of the con	20 Pounds
Weight (approx.)	20 Pounds

TYPICAL OPERATING CONDITIONS

Anode Voltage	17,000 Volts d c
Grid No. 4 Voltage for Focus	u to 400 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage Required for Cutoff3	-35 to -72 Volts d c

CIRCUIT VALUES

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

- 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.

SYLVANIA TYPE 21DEP4

Silver Screen "85"

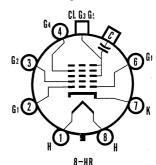
TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate Gray Filter Glass

Aluminized Screen
Electrostatic Focus
110° Magnetic Deflection
1½" Neck Diameter
No Ion Trap

External Conductive Coating





CHARACTERISTICS

GENERAL I	ΔΤΔ

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

ELECTRICAL DATA

Heater Voltage. Heater Current. Heater Warm-up Time! Direct Interelectrode Capacitances (approx.)	$0.6 \pm 5\%$ Ampere
Direct interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	5 <u>ս</u> աք
Grid No. 1 to All Other Electrodes	6 μμf
External Conductive Coating to Anode2	2500 μμf Max.
	2000 μμf Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions		
(Maximum Assured)	19 1/6 x 15 1/6	Inches
Nominal Overall Length	141/6	Inches
Minimum Useful Screen Area	262	Sa. 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 ³	-35 to -72 Volts d c

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms Max.

NOTES:

- 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:

SYLVANIA TYPE 21DEP4A

Silver Screen "85"

TELEVISION PICTURE TUBE

21" Direct Viewed

Lightweight Tube

Rectangular Glass Type Spherical Faceplate

Gray Filter Glass

Aluminized Screen Electrostatic Focus

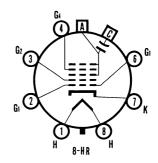
110° Magnetic Deflection

 $1\frac{1}{8}$ Neck Diameter

No Ion Trap

External Conductive Coating





CHARACTERISTICS

GENERAL DATA								
Focusing Method.								

Deflection Method
Deflection Angles (approx.)
Horizontal
Diagonal
Vertical
Phosphor
Fluorescence
Persistence
Faceplate
Light Transmittance (approx.)

Electrostatic Magnetic

105 Degrees 110 Degrees 87 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 76 Percent

ELECTRICAL DATA

Ticater voitage	
Heater Current	0.6
Heater Warm-up Time ¹	
Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	
Grid No. 1 to All Other Electrodes	
External Conductive Coating to Anode ²	

6.3 Volts ± 5% Ampere 11 Seconds

5 μμf 6 μμf 2500 μμf Max. 2000 μμf Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions	
(Maximum Assured)	Inches
Minimum Useful Screen Area	Square Inches
Overall Length	Inches
Neck Length	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 ³	-35 to -72 Volts d c

CIRCUIT VALUES

Grid No. 1 Circuit Resistance.....

1.5 Megohms Max.

SYLVANIA TYPE 21DEP4A (Cont'd)

NOTES:

- OTES:

 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:

SYLVANIA TYPE 21DKP4

Silver Screen "85"

TELEVISION PICTURE TUBE

21" Direct Viewed

Rectangular Glass Type

Lightweight Tube Spherical Faceplate

Gray Filter Glass

Electrostatic Focus

110° Magnetic Deflection

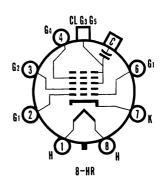
11/8" Neck Diameter

No Ion Trap

External Conductive Coating

Aluminized Screen





CHARACTERISTICS

GENERAL	DATA
Faguaina	Mathad

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

ELECTRICAL DATA

Heater Voltage. 6.3 Volts
Heater Current 0.30 \pm 5% Ampere
Heater Warm-up Time¹ 11 Seconds
Direct Interelectrode Capacitances (approx.)
Cathode to All Other Electrodes 5 $\mu\mu$ f
Grid No. 1 to All Other Electrodes 6 μ f
External Conductive Coating to Anode². 2500 μ f Min

Light Transmittance (approx.)......

6 μμf 2500 μμf Max. 1700 μμf Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions (Maximum Assured). 191/6 x 151/6 Inches
Nominal Overall Length. 141/6 Inches
Minimum Useful Screen Area 262 Square Inches J171-G1 or Equivalent Bulb Bulb Contact (Recessed Small Cavity Cap)..... J1-21 B7-183 Base....

8HR Basing. 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 Cutoff³
 -35 to -72 Volts d c

CIRCUIT VALUES

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

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.

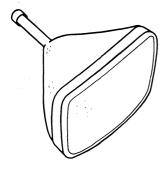
SYLVANIA TYPE 21DLP4

Silver Screen "85"

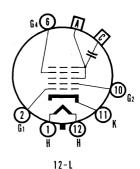
TELEVISION PICTURE TUBE

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



DATA



1.5 Megohms Max.

CHARACTERISTICS

GENERAL DATA		
Focusing Method		trostatic
Deflection Method	Ma	ıgnetic
Deflection Angles (approx.)	0.5	D
Horizontal		Degrees Degrees
DiagonalPhosphor		inized P4
Fluorescence		Vhite
Persistence		o Medium
Faceplate		ilter Glass
Light Transmittance (approx.)	74	Percent
ELECTRICAL DATA		
Heater Voltage	6.3	Volts
Heater Current	$0.6 \pm 5\%$	Ampere
Heater Warm-up Time1		Seconds
Direct Interelectrode Capacitances (approx.)		
Cathode to All Other Electrodes		μμξ
Grid No. 1 to All Other Electrodes		$\mu\mu$ f
External Conductive Coating to Anode ²		μμf Max. μμf Min.
MECHANICAL DATA	2000	$\mu\mu$ i wiin.
Minimum Useful Screen Dimensions		
(Maximum Assured)19	01/a v 151/a	Inches
Minimum Useful Screen Area	262	Sa Inches
Bulb. J171	D or J171E	04. 11101100
BulbJ171 Bulb Contact (Recessed Small Cavity Cap)	J1-21	
Base (Small Shell Duodecal 6-Pin)B6-63	3 or B6-203	
Basing	12L	
Weight (approx.)	221/2	Pounds
TYPICAL OPERATING CONDITIONS		
Anode Voltage		Volts d c
Grid No. 4 Voltage		Volts d c
Grid No. 2 Voltage		Volts d c
Grid No. 1 Voltage Required for Cutoff ³	−35 to −72	voits d c
CIRCUIT VALUES		

NOTES:

CENEDAL

- 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.

Grid No. 1 Circuit Resistance.....

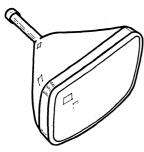
External conductive coating must be grounded.
 Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more negative.

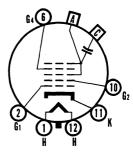
SYLVANIA TYPE 21DQP4

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





Electrostatic Magnetic 85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent

12-L CHARACTERISTICS

GENERAL DATA Focusing Method

Deflection Method
Deflection Angles (approx.)
Horizontal
Diagonal
Phosphor
Fluorescence
_ Persistence
FaceplateLight Transmittance (approx.)
Light Transmittance (approx.)

ELECTRICAL DATA

Heater Voltage	6.3 Volts
Heater Current	
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	
External Conductive Coating to Anode ²	2500 μμf Max.
-	2000 μμf Min.

MECHANICAL DATA

Minimum Userui Screen Dimensions	
(Maximum Assured)	19 1/6 x 15 1/6 Inches
Nominal Overall Length	
Minimum Useful Screen Area	
Bulb	J171 D or J171 E
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 6-Pin)	B6-63 or B6-203
Basing	12L
Weight (approx.)	22½ Pounds

TYPICAL OPERATING CONDITIONS

Anode Voltage	16,000 Volts d c
Grid No. 4 Voltage50	to +350 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage Required for Cutoff3	35 to −72 Volts d c

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	1.5 Megohms Ma:	x.
-------------------------------	-----------------	----

NOTES:

- 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.

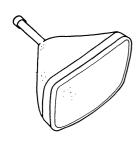
WARNING:

SYLVANIA TYPE 21DQP4

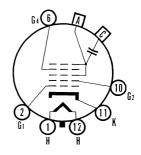
Silver Screen "85"

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 Inch Neck Length



GENERAL DATA



12-L

CHARACTERISTICS

Focusing Method	Electrostatic Magnetic			
Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent			
ELECTRICAL DATA				
Heater Voltage Heater Current Heater Warm-up Time ¹ Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes	6.3 Volts $0.6 \pm 5\% \text{ Ampere}$ 11 Seconds $5 \mu \mu \text{f}$			
Grid No. 1 to All Other Electrodes External Conductive Coating to Anode ²	6 μμf 2500 μμf Max. 2000 μμf Min.			
MECHANICAL DATA	.,			
Minimum Useful Screen Dimensions (Maximum Assured) Minimum Useful Screen Area Nominal Overall Length Bulb Bulb Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 6-Pin) Basing Weight (approx.)	262 Square Inches 17½ Inches 1D or J171É J1-21 63 or B6-203 12L			
TYPICAL OPERATING CONDITIONS				
Anode Voltage. Grid No. 4 Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff ³ .	16,000 Volts d c -50 to +350 Volts d c 300 Volts d c -35 to -72 Volts d c			
CIRCUIT VALUES				
Grid No. 1 Circuit Resistance	1.5 Megohms Max.			

SYLVANIA TYPE 21DQP4 (Cont'd)

NOTES:

- 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.
 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.

SYLVANIA TYPE 21DSP4

Silver Screen "85"

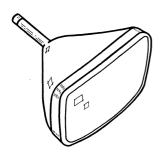
TELEVISION PICTURE TUBE

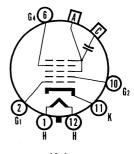
No Ion Trap

21" Direct Viewed Spherical Faceplate **Gray Filter Glass** 90° Magnetic Deflection Cathode Drive Design

Electrostatic Focus

Rectangular Glass Type External Conductive Coating Aluminized Screen Short Neck Tube Low Grid No. 2 Voltage





12-L

1.5 Megohms Max.

CHARACTERISTICS

GENERAL DATA			
Focusing Method		rostatic gnetic	
Deflection Angles (approx.) Horizontal Diagonal Vertical Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	90 68 Alumi W Short to Gray F	Degrees Degrees Degrees nized P4 /hite o Medium ilter Glass Percent	
ELECTRICAL DATA			
Heater Voltage. Heater Current. Heater Warm-up Time ¹ . Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes External Conductive Coating to Anode ² .	0.6 ± 5% 11 5 6 2500	Volts Ampere Seconds μμf μμf Max. μμf Min.	
MECHANICAL DATA	2000	μμι ινιτι.	
Minimum Useful Screen Dimensions (Maximum Assured). Minimum Useful Screen Area. Neck Length. Overall Length. Bulb. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 6-Pin). Basing. Weight.	5½ 18 J171 D or J1-21 B6-63 or 12L	Square Inches Inches Inches J171E	
TYPICAL OPERATING CONDITIONS			
Cathode Drive Service ³			
Anode Voltage Grid No. 4 Voltage for Focus Grid No. 2 Voltage Cathode Voltage	0 to 400 50	Volts d c Volts d c Volts d c Volts d c	
CIRCUIT VALUES			

Grid No. 1 Circuit Resistance.....

SYLVANIA TYPE 21DSP4 (Cont'd)

NOTES:

- 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.
 External conductive coating must be grounded.
 Voltages shown are with respect to Grid No. 1 Voltage unless otherwise

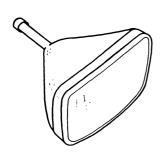
- 4. Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about 5 volts more positive.

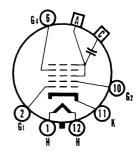
SYLVANIA TYPE 21ENP4

Silver Screen "85"

TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass 90° Magnetic Deflection Electrostatic Focus
Single Field Ion Trap
External Conductive Coating
Aluminized Screen
6.3 Volt, 300 Ma Heater





12-L

CHARACTERISTICS

GENERAL DATA	
Focusing Method Deflection Method Deflection Angles (approx.)	Electrostatic Magnetic
Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.).	85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 75 Percent
ELECTRICAL DATA	
Heater Voltage. 0.3 Heater Current. 0.3 Heater Warm-up Time! 0.3 Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. 0.3	11 Seconds
Grid No. 1 to All Other Electrodes	5 μμf 6 μμf 2500 μμf Max. 2000 μμf Min.
Ion Trap MagnetExte	ernal, Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum Assured)	19 Inches 262 Square Inches
Basing	12L 22½ Pounds
Basing	12Ĺ 22½ Pounds
Basing. Weight (approx.) TYPICAL OPERATING CONDITIONS Anode Voltage	12L 22½ Pounds 16,000 Volts d c to +352 Volts d c 300 Volts d c
Basing. Weight (approx.) TYPICAL OPERATING CONDITIONS Anode Voltage	12L 22½ Pounds 16,000 Volts d c to +352 Volts d c 300 Volts d c 55 to -72 Volts d c 30 Ma d c

SYLVANIA TYPE 21ENP4 (Cont'd)

NOTES:

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

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 ±3 gausses.

WARNING:

SYLVANIA TYPE 21EQP4

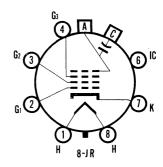
Silver Screen "85"

TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass Aluminized Screen

Tri-Potential Electrostatic Focus 110° Magnetic Deflection No Ion Trap External Conductive Coating Short Neck





CHARACTERISTICS

GENERAL DATA Focusing Method Deflection Method Deflection Angles (approx.)	
Horizontal Diagonal Vertical Phosphor Fluorescence Persistence	110 Degrees 87 Degrees Aluminized P4 White Short to Medium
Faceplate. Light Transmittance (approx.)	Gray Filter Glass 75 Percent
ELECTRICAL DATA Heater Voltage	6.3 Volts 0.60 ± 5% Ampere 11 Seconds
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode ²	5 μμf 6 μμf 2500 μμf Max. 2000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum As Height. Width. Diagonal. Area. Neck Length. Nominal Overall Length. Bulb. J17 Bulb Contact (Recessed Small Cavity Cap). Base. Basing. Weight (approx.)	15½ Inches 19½ Inches 20¼ Inches 20¼ Inches 262 Square Inches 12½ Inches 12½ Inches 71H or J171J J1-21 B7-208 8JR
TYPICAL OPERATING CONDITIONS (Grid Dr	•
Anode Voltage. Grid No. 3 Voltage for Focus. Grid No. 2 Voltage³. Grid No. 1 Voltage Required for Cutoff¹	16,000 Volts d c 0 to +400 Volts d c 500 Volts d c -43 to -78 Volts d c
CIRCUIT VALUES Grid No. 1 Circuit Resistance	1.5 Megohms Max.

SYLVANIA TYPE 21EQP4 (Cont'd)

NOTES:

- 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:

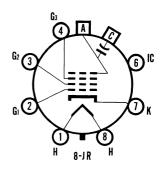
SYLVANIA TYPE 21ERP4

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 MethodDeflection Method	Tri-Potential Electrostatic Magnetic
Deflection Angles (approx.) Horizontal Diagonal Vertical Phosphor Fluorescence	105 Degrees 110 Degrees 87 Degrees Aluminized P4 White
Persistence	Short to Medium Gray Filter Glass
Light Transmittance of Faceplate Assembly (approx.)	40 Percent
ELECTRICAL DATA	
Heater Voltage	$0.60 \pm 5\%$ Ampere 11 Seconds $5 \mu \mu f$
Grid No. 1 to All Other Electrodes External Conductive Coating to Anode ²	6 μμf 2000 μμf Max. 1500 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Max. Assured) Height	H or J171J
Buib Contact (Hecessed Small Cavity Cap)	J1-21 B7-208 8J R 27 Pounds

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	
Grid No. 2 Voltage ³		Volts d c
Grid No. 1 Voltage Required for Cutoff4	-43 to -72	Volts d c

CIRCUIT VALUES

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

NOTES:

- 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:

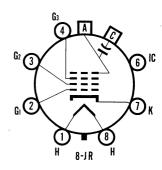
SYLVANIA TYPE 21EXP4

Silver Screen "85"

TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass Aluminized Screen Tri-Potential Electrostatic Focus
110° Magnetic Deflection
No Ion Trap
External Conductive Coating
Short Neck
6.3 Volt, 300 Ma Heater





CHARACTERISTICS

GENERAL DATA Focusing Method. Deflection Method. Deflection Angles (approx.)	Tri-Potential Electrostatic Magnetic
Horizontal Diagonal Vertical	105 Degrees 110 Degrees 87 Degrees
PhosphorFluorescence	Aluminized P4 White
PersistenceFaceplateLight Transmittance (approx.)	Short to Medium Gray Filter Glass 75 Percent
ELECTRICAL DATA Heater Voltage	6.3 Volts
Heater CurrentC Heater Warm-up Time ¹ Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes	5 μμf
Grid No. 1 to All Other Electrodes External Conductive Coating to Anode ²	6 μμf 2500 μμf Max. 2000 μμf Min.
MECHANICAL DATA	•
Minimum Useful Screen Dimensions (Max. Assured)	151/6 Inches
Width	19 1/6 Inches
Diagonal Area	2014 Inches 262 Square Inches
Neck Length Overall Length	3% ± 1/8 Inches
	12% ± % Inches Hor J171J
Bulb Contact (Recessed Small Cavity Cap) Base	J1-21 B7-208
Basing	8JR
Weight (approx.)	21 Pounds
TYPICAL OPERATING CONDITIONS (Grid Driv Anode Voltage	
Grid No. 3 Voltage for Focus	0 to +400 Volts d c
Grid No. 2 Voltage ³	500 Volts d c -43 to -78 Volts d c
CIRCUIT VALUES	4 5 1 4 1 4
Grid No. 1 Circuit Resistance	1.5 Megohms Max.

SYLVANIA TYPE 21EXP4 (Cont'd)

NOTES:

- 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

- 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:

SYLVANIA TYPE 21EVP4

Silver Screen "85"

TELEVISION PICTURE TUBE

21" Direct Viewed

110° Magnetic Deflection 11/2" Neck Diameter

Rectangular Glass Type Spherical Faceplate

No Ion Trap

Gray Filter Glass

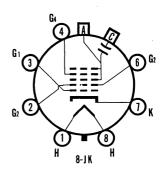
External Conductive Coating

Aluminized Screen Electrostatic Focus

Short Neck Lightweight Tube

450 Ma Heater





CHARACTERISTICS

GENERAL	DATA					
Focusing	Method.					

Deflection Method	
Deflection Angles (approx.)	
Horizontal	
Diagonal	
Vertical	
Phosphor	
Fluorescence	
Persistence	
Faceplate	
Light Transmittance (approx.)	

Electrostatic Magnetic

105 Degrees 110 Degrees 87 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 75.5 Percent

ELECTRICAL DATA

Heater Voltage
Heater Current
Heater Warm-up Time1
Direct Interelectrode Capacitances (approx.)
Cathode to All Other Electrodes
Grid No. 1 to All Other Electrodes
External Conductive Coating to Anode2

 $\begin{array}{cccc} \textbf{2.68} \, \pm & \textbf{10} \, \% & \textbf{Volts} \\ & \textbf{0.45} \, \, \textbf{Ampere} \\ & \textbf{11} \, \, \textbf{Seconds} \end{array}$

3.65 μμf 4.15 μμf 2000 μμf Max. 1500 μμf Min.

MECHANICAL DATA

Minimum Useful Screen Dimensions
(Maximum Assured)
Minimum Useful Screen Area
Neck Length
Overall Length
Bulb
Bulb Contact (Recessed Small Cavity Cap)
Base
Basing
•

19½ x 15½ Inches 262 Square Inches 3½ ± ½ Inches 12½ ± ¼ Inches J171-G1 or Equivalent J1-21 B7-208

8JK

TYPICAL OPERATING CONDITIONS

Grid Drive Service

Grid Drive Service		
Anode Voltage		Volts d c
Grid No. 4 Voltage for Focus+100	to +500	
Grid No. 2 Voltage		Volts d c
Grid No. 1 Voltage Required for Cutoff ³	35 to -72	Volts d c

SYLVANIA TYPE 21EVP4 (Cont'd)

Cathode Drive Service

Anode Voltage	16,000	
Grid No. 2 Voltage	300	Volts
Grid No. 1 Voltage		Volts
Cathode Voltage +34	4 to $+60^{\circ}$	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.

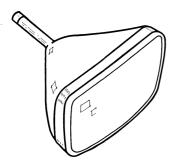
SYLVANIA TYPE 21EYP4

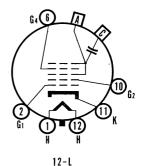
SPECIAL PURPOSE TUBE

Television Monitor Tube

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

Electrostatic Focus No Ion Trap **High Resolution** Aluminized Screen Low Voltage





GENERAL DATA		
Focusing Method Deflection Method Deflection Angle (approx.)		trostatic agnetic
Horizontal		Degrees Degrees
Fluorescence. Persistence. Faceplate. Light Transmittance (approx.)	Short Gray F	Vhite to Medium Filter Glass Percent
ELECTRICAL DATA		
Heater Voltage	6.3 0.6 ± 10 %	Volts Ampere
Cathode to All Other Electrodes	5 6.5	μμf μμf
MECHANICAL DATA		
Minimum Useful Screen Dimensions	262 7½ 23½	Inches Square Inches Inches Inches
Bulb. Bulb Contact (Recessed Small Cavity Cap) Base (Small Shell Duodecal 6-Pin). Basing.	171B1/F1 J1-21 B6-63 12L	
RATINGS		
MAXIMUM RATINGS (Design Maximum Values	•	
Anode Voltage. Grid No. 4 (Focusing Electrode) Voltage Grid No. 2 Voltage Grid No. 1 Voltage	800	Volts d c Volts d c Volts d c
Negative Bias Value. Positive Bias Value. Positive Peak Value.	0	Volts d c Volts d c Volts
Peak Heater-Cathode Voltage Heater Negative with Respect to Cathode During Warm-up Period Not to Exceed	450	
15 Seconds	200	Volts Volts Volts

CHARACTERISTICS

SYLVANIA ELECTRONIC TUBES

SYLVANIA TYPE 21EYP4 (Cont'd)

RECOMMENDED OPERATING CONDITIONS

Anode Voltage	18,000 Volts d c
Grid No. 4 Voltage for Focus	0 to 1,400 Volto d o
Grid No. 4 Voltage for Focus	O to T400 Voits a c
Grid No. 2 Voltage	300 Volts d.c.
Grid No. 1 Voltage Beautyed for Cutoff!	00 to 70 Valle d a
Grid No. 2 Voltage	-20 to -72 voits a c

CIRCUIT VALUES

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

NOTE

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

WARNING

SYLVANIA TYPE 21FAP4

Silver Screen "85"

TELEVISION PICTURE TUBE

21" Direct Viewed Aluminized Screen

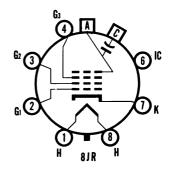
Rectangular Glass Type Tri-Potential Electrostatic Focus Spherical Faceplate 110° Magnetic Deflection

Gray Filter Glass External Conductive Coating

Lightweight Tube Short Neck

No Ion Trap





CHARACTERISTICS

GENERAL DATA	
Focusing Method Deflection Method Deflection Angles (approx.)	Tri-Potential Electrostatic Magnetic
Horizontal Diagonal Vertical Phosphor Fluorescence Persistence Faceplate	105 Degrees 110 Degrees 87 Degrees Aluminized P4 White Short to Medium Gray Filter Glass
Light Transmittance (approx.)	76 Percent
ELECTRICAL DATA	
Heater Voltage. Heater Current. Heater Warm-up Time ¹ . Direct Interelectrode Capacitances (approx.)	0.60 ± 5% Ampere 11 Seconds
Cathode to All Other Electrodes	5 μμf 6 μμf 2500 μμf Max. 2000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum Ass Height. Width. Diagonal. Area. Neck Length. Overall Length. Bulb. Bulb Contact (Recessed Small Cavity Cap). Base. Basing. Weight (approx.).	15½ Inches 19½ Inches 20½ Inches 262 Square Inches 3½ + ½ Inches
/mkh.au/	20.00

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 ³	500 Volts d c
Grid No. 1 Voltage Required for Cutoff4	-43 to -78 Volts d c

CIRCUIT VALUES

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

SYLVANIA TYPE 21FAP4 (Cont'd)

NOTES:

 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.

- External conductive coating must be grounded.
 Brightness and resolution improve with increase in Grid No. 2 voltage. A minimum value of 400 volts is recommended.
 Visual extinction of focused raster. Extinction of stationary focused spot will require that these values be about five volts more negative.

WARNING:

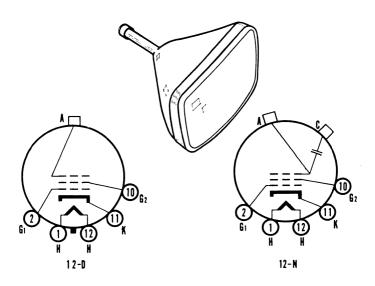
SYLVANIA TYPE 21EP4A 21EP4A Silver Screen "85"→21EP4B

TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Gray Filter Glass Magnetic Deflection Magnetic Focus 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 Magnetic
Deflecting Method	iviagnetic
Horizontal	65 Degrees 70 Degrees
Phosphor	P4
FluorescencePersistence	White Medium
Faceplate	Grav Filter Glass
Light Transmittance (approx.)	72 Percent

ELECTRICAL DATA

Heater Voltage		.3 Volts
Heater Current (approx.)	0	.6 Ampere
Direct Interelectrode Capacitances (appro-		
Cathode to All Other Electrodes		5 μμf
Grid No. 1 to All Other Electrodes		6 μμf
Ion Trap Magnet	External, Singl	le Field Type

MECHANICAL DATA

Minimum Useful Screen Dimensions	x 137/8	Inches
Nominal Overall Length		Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21	
Base (Small Shell Duodecal 5-Pin)	B5-57	
Basing		

21EP4, 21EP4A, 21EP4B (Cont'd)

TYPICAL OPERATING CONDITIONS

Anode Voltage		
Grid No. 2 Voltage	300	Volts d c
Grid No. 1 Voltage Required for Cutoff128	to -72	Volts d c
Focusing Coil Current (approx.)2	95	Ma dc
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 191/8 x 137/8 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 μμf
_ Minimum	500 μμf
Basing	12 N

21EP4B

The Sylvania 21 EP4B is identical to Type 21 EP4 except for having an external conductive coating which must be grounded, and an aluminized screen.

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

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 21EAP4

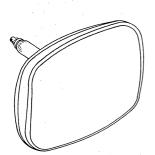
Silver Screen "85"

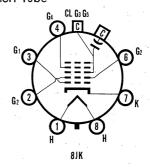
TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate **Gray Filter Glass** Aluminized Screen

Electrostatic Focus 110° Magnetic Deflection 11/8" 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. Diagonal Vertical Phosphor. Fluorescence Persistence Faceplate. Light Transmittance (approx.)	110 87 Alum V Short t Gray F	Degrees Degrees Degrees inized P4 Vhite o Medium ilter Glass Percent
ELECTRICAL DATA		
Heater VoltageHeater CurrentHeater Warm-up Time! Direct Interelectrode Capacitances (approx.)	0.6 ± 10% 11	Seconds
Cathode to All Other Electrodes	2000	μμτ μμf μμf Max. μμf Min.
MECHANICAL DATA	1000	μμι ινιιιι.
Minimum Useful Screen Dimensions (Maximum Assured). Nominal Overall Length Minimum Useful Screen Area Bulb Contact (Recessed Small Cavity Cap) Bulb J17 Base. Basing. Weight (approx.).	1215% 262 J1-21 1G or J171K B7-208 8JK	Inches Inches Sq. Inches
TYPICAL OPERATING CONDITIONS		
Cathode Drive Service ³		
Anode Voltage. Grid No. 4 Voltage for Focus. Grid No. 2 Voltage. Cathode Voltage required for Cutoff ⁵ .	150 to 550	Volts d c Volts d c Volts d c Volts d c
Grid Drive Service ⁴ Anode Voltage Grid No. 4 Voltage for Focus Grid No. 2 Voltage Grid No. 1 Voltage Grid No. 1 Voltage required for Cutoff ⁵	100 to 500 300	Volts d c
CIRCUIT VALUES		

Grid No. 1 Circuit Resistance..... NOTES:

 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.

1.5 Megohms Max.

- nie rated neater 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:

SYLVANIA TYPE 21FP4A 21FP4A Silver Screen "85" > 21FP4C

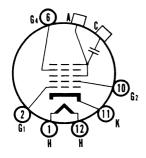
TELEVISION PICTURE TUBE

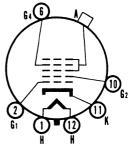
21" Direct Viewed Rectangular Glass Type Gray Filter Glass Magnetic Deflection Electrostatic Focus Cylindrical Faceplate

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. Deflecting Method. Deflecting Angle (approx.)	Electrostatic Magnetic
Horizontal Diagonal Phosphor	65 Degrees 70 Degrees P4
Flüorescence Persistence Faceplate	White Medium Gray Filter Glass
Light Transmittance (approx.)	72 Percent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. Ion Trap Magnet. External,	5 μμf 6 μμf Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions	3 x 137/8 Inches 23 Inches J1-21 B6-63 12 M

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

TYPICAL OPERATING CONDITIONS

Anode Voltage		
Grid No. 4 Voltage64		
Grid No. 2 Voltage	. 300	Volts d c
Grid No. 1 Voltage Required for Cutoff1	28 to -72	Volts d c
Ion Tran Magnet Strength (approx.)	35	Gausses

CIRCUIT VALUES

NOTE

 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 μμf
Minimum	500 μμf
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 µµf
_ Minimum	500 μμf
Basing	12L

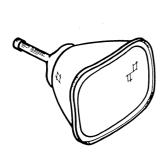
WARNING

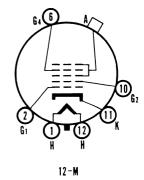
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

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.) 66 Degrees Horizontal 70 Degrees Plagonal 70 Degrees Phosphor P4 Fluorescence White Persistence Medium Faceplate Frosted 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 μμf	
Grid No. 1 to All Other Electrodes	6 μμf	
Ion Trap MagnetExternal,	Single Field Type	
MECHANICAL DATA		

Minimum Useful Screen Dimensions181/8 x	
Nominal Overall Length	221/4 Inches
Bulb Contact	
Base (Small Shell Duodecal 6-Pin)	B6-63
Basing	12 M

TYPICAL OPERATING CONDITIONS

Anode Voltage	
Grid No. 4 Voltage64 to +350	
Grid No. 2 Voltage	
Grid No. 1 Voltage Required for Cutoff128 to -72	Volts d c
Ion Trap Magnet Strength (approx.)	Gausses

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	
	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.

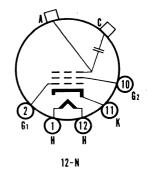
SYLVANIA TYPE 21WP4 Silver Screen "85"→21WP4A

TELEVISION PICTURE TUBE

21" Direct Viewed Rectangular Glass Type **Gray Filter Glass External Conductive Coating**

Magnetic Deflection Magnetic Focus Spherical Faceplate Single Field Ion Trap 21WP4A has an Aluminized Screen





CHARACTERISTICS

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

21WP4, 21WP4A (Cont'd)

ELECTRICAL DATA		
Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.)		Volts Ampere
Cathode to All Other Electrodes	6	μμf μμf μμf Μax
Ion Trap MagnetExternal,	500	иµf Min
MECHANICAL DATA		
Minimum Useful Screen Dimensions	x 123/4 227/ ₁₆ J1-21 B5-57 12N	Inches
TYPICAL OPERATING CONDITIONS		
Anode Voltage	300 to -72 +20%	Volts d c Volts d c Ma d c
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms

NOTES:

ELECTRICAL DATA

Max

 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 and one quarter inches from reference line, bias adjusted to 30 foot lamberts on a 17 x 12¾ inch picture area.

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

WARNING

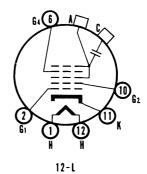
SYLVANIA TYPE 21XP4 Silver Screen "85"→21XP4A

TELEVISION PICTURE TUBE

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

21XP4A has an Aluminized Screen





CHARACTERISTICS

GENERAL DATA Focusing Method	Electrostatic Magnetic
Horizontal Diagonal Phosphor	66 Degrees 70 Degrees P4
Fluorescence	White Medium Gray Filter Glass 72 Percent
ELECTRICAL DATA	
Heater Voltage. Heater Current (approx.). Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes	5 μμf
Grid No. 1 to All Other Electrodes	6 μμf 2500 μμf Max
External Conductive Coating to Anode1	2500 μμf Max 2000 μμf Min
Ion Trap MagnetExternal,	
MECHANICAL DATA	_
Minimum Useful Screen Dimensions. 17 Nominal Overall Length. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 6-Pin). Basing.	7 x 123/4 Inches 227/ ₁₆ Inches J1-21 B6-63 12L
TYPICAL OPERATING CONDITIONS	
Anode Voltage	+352 Volts d c 300 Volts d c to -72 Volts d c
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms
NOTES:	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.

21XP4A

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

WARNING

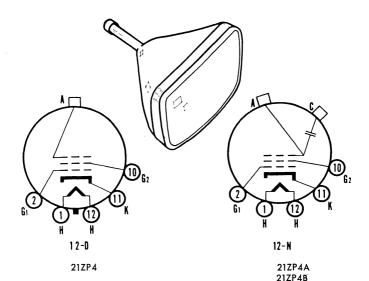
SYLVANIA TYPE 21ZP4 21ZP4A Silver Screen "85"→21ZP4B

TELEVISION PICTURE TUBE

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

Single Field Ion Trap

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



GENERAL DATA	
Focusing Method	
Deflecting Angle (approx.)	ss
ELECTRICAL DATA	
Heater Voltage 6.3 Volts Heater Current (approx.) 0.6 Ampere Direct Interelectrode Capacitances (approx.)	
Cathode to All Other Electrodes (approx.)	ре
MECHANICAL DATA	
Minimum Useful Screen Dimensions	
TYPICAL OPERATING CONDITIONS	
Anode Voltage 16000 Volts d Grid No. 2 Voltage 300 Volts d Grid No. 1 Voltage Required for Cutoff! -28 to -72 Volts d Focusing Coil Current (approx.)² 95 ±20% Ma d Ion Trap Magnet Strength (approx.) 35 Gausses	C

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

CIRCUIT VALUES

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

NOTES:

- Visual extinction of focused raster. Extinction of the 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 191/8 x 143/16 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 µµf
_ Minimum	500 µµf
Basing	12 N

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 μμf
Minimum	500 μμf
Basing	12 N

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,

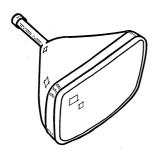
SYLVANIA TYPES 24AEP4, 24ASP4

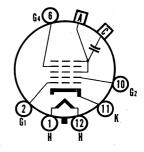
Silver Screen "85"

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**





12-L

CHARACTERISTICS

GENERAL DATA Focusing Method... Deflection Method..... Deflection Angles (approx.) Horizontal....... Diagonal... Phosphor. . Fluorescence..... Persistence.... Faceplate.....Light Transmittance (approx.).....

Electrostatic Magnetic

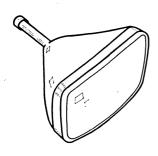
85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent

SYLVANIA TYPE 23ACP4 23TP4

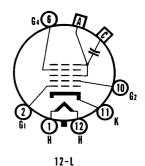
Silver Screen "85"

TELEVISION PICTURE TUBE

23" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass 90° Magnetic Deflection Electrostatic Focus No Ion Trap External Conductive Coating Aluminized Screen Bonded Shield



GENERAL DATA



Focusing Method Deflection Method* Deflection Angles (approx.)*	Electrostatic Magnetic
Horizontal Diagonal Vertical Phosphor Fluorescence	76 Degrees 87 Degrees 62 Degrees Aluminized P4 White
Persistence. Faceplate. (Gray Filter Glass Safety Plate Laminated Directly to Face of Tube) Light Transmittance of Faceplate Assembly	Short to Medium Bonded Shield
(approx.)	40 Percent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts
Heater Current0 Heater Warm-up Time ¹	.60 ± 5% Ampere 11 Seconds
Direct Interelectrode Capacitances (approx.)	11 Seconds
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	2000 μμι Ινιιιι.
Minimum Useful Screen Dimensions (Max. Assured)	
Height	15¼ Inches
Width	19 1/6 Inches
Diagonal	22 1 Inches
Area	282 Square Inches
Neck Length	5½ ± % 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 reg known as 90 degree types. Horizontal and vertical defl	istered 21" tubes generally ection 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 ³	−35 to −72	Volts d c

CIRCUIT VALUES

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

NOTES:

- 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:

SYLVANIA TYPE 23AKP4

Silver Screen "85"

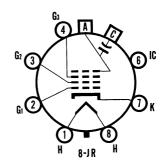
TELEVISION PICTURE TUBE

23" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass Aluminized Screen 114° Magnetic Deflection Short Neck

No Ion Trap

External Conductive Coating Tri-Potential Electrostatic Focus





GENERAL DATA			
Focusing Method	Tri-Potential Electrostatic Magnetic		
Horizontal Diagonal Vertical Phosphor Fluorescence	102 Degrees 114 Degrees 86 Degrees Aluminized P4 White		
Persistence	Short to Medium Gray Filter Glass 78 Percent		
ELECTRICAL DATA			
Heater Voltage	11 Seconds 5 μμf 6 μμf		
External Conductive Coating to Anode ²	2500 μμf Max.		
MECHANICAL DATA	2000 μμf Min.		
Minimum Useful Screen Dimensions (Max. Assured) Height. Width. Diagonal. Area. Neck Length. Overall Length. Bulb. Bulb Contact (Recessed Small Cavity Cap). Base. Basing. Weight (approx.).	15½ Inches 19½ Inches 22½ Inches 22½ Inches 3½ ± ⅓ Inches 12½ ± ⅓ Inches 112½ ± ⅓ Inches J127B J1-21 B7-208 8JR 25 Pounds		
TYPICAL OPERATING CONDITIONS (Grid Drive Service)			
Anode Voltage Grid No. 3 Voltage for Focus Grid No. 2 Voltage³ Grid No. 1 Voltage Required for Cutoff⁴	0 to +400 Volts d c		
CIRCUIT VALUES			
Grid No. 1 Circuit Resistance	1.5 Megohms Max.		

SYLVANIA TYPE 23AKP4 (Cont'd)

NOTES:

- 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
- 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:

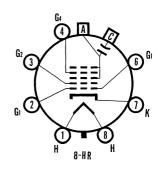
SYLVANIA TYPE 23CP4

Silver Screen "85"

TELEVISION PICTURE TUBE

23" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass Electrostatic Focus No lon Trap 110° Magnetic Deflection External Conductive Coating Aluminized Screen Bonded Shield





GENERAL DATA Focusing Method Deflection Method Deflection Angles (approx.)	Electrostatic Magnetic
Horizontal Diagonal Vertical Phosphor Fluorescence Persistence Faceplate (Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	99 Degrees 110 Degrees 82 Degrees Aluminized P4 White Short to Medium Bonded Shield
Light Transmittance of Faceplate Assembly (approx.)	40 Percent
Heater Voltage. Heater Current. Heater Warm-up Time¹ Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode².	0.60 \pm 5% Ampere 11 Seconds $5 \mu \mu f$ 6 $\mu \mu f$ 2500 $\mu \mu f$ Max. 2000 $\mu \mu f$ Min.
MECHANICAL DATA Minimum Useful Screen Dimensions (Maximum Assured) Height	15½ Inches
Width Diagonal Area Neck Length Overall Length Bulb Safety Plate Bulb Contact (Recessed Small Cavity Cap) Base Basing Weight (approx.)	19% Inches 22% Inches 22% Inches 282 Square Inches 51% ± 1% Inches 151% ± 3% Inches J187Å or Equiv. FP198Å or Equiv. J1-21 B7-208 8HR 32½ 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 ³	−35 to −72 Volts d c

CIRCUIT VALUES

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

NOTES:

- 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.
- 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:

SYLVANIA TYPE 23DP4

Silver Screen "85"

TELEVISION PICTURE TUBE

23" Direct Viewed Rectangular Glass Type Spherical Faceplate

Gray Filter Glass

Bonded Shield

Aluminized Screen

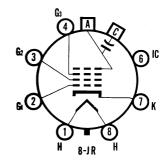
Tri-Potential Electrostatic Focus 110° Magnetic Deflection

External Conductive Coating

Short Neck

No Ion Trap





GENERAL DATA	
Focusing Method	ri-Potential Electrostatic Magnetic
Horizontal Diagonal Vertical Phosphor	99 Degrees 110 Degrees 82 Degrees Aluminized P4
Fluorescence. Persistence. Faceplate. (Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	White Short to Medium Bonded Shield
Light Transmittance of Faceplate Assembly (approx.).	40 Percent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts 60 ± 5% Ampere 11 Seconds
Cathode to All Other Electrodes	5 μμf 6 μμf 2500 μμf Max. 2000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Maximum Assured)	
Height Width Diagonal Area	15¼ Inches 19½ Inches 22½ Inches 282 Square Inches
Neck Length	3% ± 1% Inches 35% ± 3% Inches
Safety Plate. Bulb Contact (Recessed Small Cavity Cap) Base.	FP198A or Equiv. J1-21 B7-208
Basing. Weight (approx.).	8JR 32½ Pounds

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 Voltage³ 500 Volts d c Grid No. 1 Voltage Required for Cutoff⁴ -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
- 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:

SYLVANIA TYPE 23EP4

Silver Screen "85"

TELEVISION PICTURE TUBE

23" Direct Viewed

Rectangular Glass Type

Spherical FacePlate

Bonded Shield

Gray Filter Glass

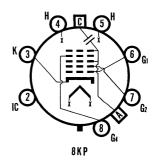
Aluminized Screen

Neck Length 5 1/8"

Electrostatic Focus

110° Magnetic Deflection No Ion Trap External Conductive Coating





GENERAL DATA Focusing Method Deflection Method Deflection Angles (approx.) Horizontal Diagonal Vertical Phosphor Fluorescence Persistence Faceplate (Gray Filter Glass Safety Plate Laminated Directly to Face of Tube) Light Transmittance of Faceplate Assembly	Electrostatic Magnetic 99 Degrees 110 Degrees 82 Degrees Aluminized P4 White Short to Medium Bonded Shield
(approx.)	40 Percent
ELECTRICAL DATA	
Heater Voltage Heater Current Heater Warm-up Time ¹ Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes External Conductive Coating to Anode ²	6.3 Volts $5\% \text{ Ampere}$ 11 Seconds $5 \mu \mu f$ $6 \mu \mu f$ $2500 \mu f \text{ Max.}$ $1700 \mu f \text{ Min.}$
MECHANICAL DATA	1700 μμι Ιντιπ.
Minimum Useful Screen Dimensions (Maximum Assured)	4517 bushin
Height Width Diagonal Area Neck Length Overall Length Bulb Safety Plate Bulb Contact (Recessed Small Cavity Cap). Base Base Basing Weight (approx.)	15¼ Inches 19½ Inches 22½ Inches 282 Square Inches 5½ Inches 15½ Inches 15% Inches 16 The Communication of Equivalent FP198A or Equivalent J1171 B7-219 8KP 32½ Pounds

SYLVANIA TYPE 23EP4 (Cont'd)

TYPICAL OPERATING CONDITIONS

(Cathode Drive Service) ³	
Anode Voltage	16,000 Volts d c
Grid No. 3 Voltage for Focus	0 to +400 Volts d c
Grid No. 2 Voltage ³	50 Volts d c
Cathode Voltage Required for Cutoff4	-32 to +47 Volts d c

CIRCUIT VALUES

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

NOTES:

- 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
- 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:

SYLVANIA TYPE 23JP4

Silver Screen "85"

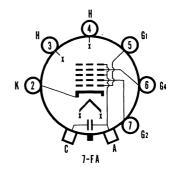
TELEVISION PICTURE TUBE

Electrostatic Focus 23" Direct Viewed 110° Magnetic Deflection **Gray Filter Glass** No Ion Trap

Spherical Faceplate Rectangular Glass Type **Bonded Shield** Aluminized Screen **External Conductive Coating** Low Grid No. 2 Voltage 6.3 Volt, 450 Ma Heater



GENERAL DATA



GENERAL DATA	
Focusing Method	Electrostatic Magnetic
Deflection Angles (approx.)	5
Horizontal	99 Degrees
Diagonal	110 Degrees
Vertical	82 Degrees Aluminized P4
PhosphorFluorescence	White
Persistence	Short to Medium
Faceplate	Bonded Shield
(Gray Filter Glass Safety Plate Laminated	Bonaca Omera
Directly to Face of Tube)	
Light Transmittance of Faceplate Assembly	_
(approx.)	40 Percent
ELECTRICAL DATA	
	0.0.1/-11-
Heater Voltage	6.3 Volts
Heater Current	0.45 ± 5% Ampere 5.8 - 7.0 Volts
Heater Warm-up Time ²	11 Seconds
Direct Interelectrode Capacitances (approx.)	11 Seconds
Cathode to All Other Electrodes	5 μμf
Grid No. 1 to All Other Electrodes	6 μμf
External Conductive Coating to Anode3	2500 μμf
	2000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions	
(Maximum Assured)	
Height	15¼ Inches 19½ Inches
Width	19% Inches
Diagonal	225 Inches
Area Neck Length	282 Square Inches
Overall Length	53/8 Inches 157/6 Inches
Bulb	J187A1 or Equiv.
Safety Plate	
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base	B6-214
Basing	7FA
Weight (approx.)	32 1/2 Pounds

SYLVANIA TYPE 23 IP4 (Cont'd)

TYPICAL OPERATING CONDITIONS (Cathode Drive Service)4

Anode Voltage	6,000	Volts d c
Grid No. 4 Voltage for Focus ⁵ , 6,	250	Voits d c
Grid No. 2 Voltage+35 to	50	Volts d c
Grid No. 1 Voltage Required for Cutoff7+35 to	+50	Volts d c
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance	1.5	Megohms Max.

NOTES:

- Design-Maximum Values.
 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. heater current.

 Sterenal conductive coating must be grounded.

 Unless otherwise specified, voltages are positive and measured with respect

- Unless otherwise specified, voltages are positive and measured with respect to Grid No. 1.
 With the combined Grid No. 1 bias voltage and video signal voltage adjusted to give an anode current of 50 μa on a 19 % x 15 ¼ pattern from an RCA 2F21 monoscope or equivalent.
 Individual tubes will have satisfactory focus at some value between 0 and 500 cm.
- 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:

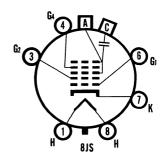
SYLVANIA TYPES 23KP4A

TELEVISION PICTURE TUBE

23" Direct Viewed No Ion Trap Rectangular Glass Type Spherical Faceplate Gray Filter Glass

Aluminized Screen
Electrostatic Focus
114° Magnetic Deflection
1½″ Neck Diameter
External Conductive Coating





Focusing Method	GENERAL DATA			
Horizontal 102 Degrees	Deflection Method			
Heater Voltage	Horizontal Diagonal Vertical Phosphor Fluorescence Persistence Faceplate	114 Degrees 84 Degrees Aluminized P4 White Short to Medium Gray Filter Glass		
Heater Current	ELECTRICAL DATA			
MECHANICAL DATA Minimum Useful Screen Dimensions (Max. Assured) Height 15½ Inches Width 19½ Inches Diagonal 22½ Inches Minimum Useful Screen Area 278 Square Inches Neck Length 4½ ± ¾ Inches Overall Length 13½ ± ½ Inches Bulb Contact (Recessed Small Cavity Cap) J1-21 Base B6-226 Basing B6-226 Basing Cgrid 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	Heater Voltage. Heater Current Heater Warm-up Time ¹ . Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes.	0.6 ± 5% Ampere 11 Seconds 5 μμf 6 6 μμf 2500 μμf Max.		
Minimum Useful Screen Dimensions (Max. Assured) Height	***************************************	2000 μμf Min.		
Base B6-226 Basing B6-226 Basing B6-226 Company B6-226 Basing B6-226 Company B6-226 Basing B6-26 Basing B6-26 Basing B6-26 Basing B6-26 Basing B6-26 Basi	Minimum Useful Screen Dimensions (Max. Assured) Height Width Diagonal. Minimum Useful Screen Area. Neck Length	15¼ Inches 19¼ Inches 22¼ Inches 278 Square Inches 4¼ + % Inches		
Anode Voltage	Base	B6-226		
Grid No. 4 Voltage for Focus 0 to 500 0 to 500 Volts d c Grid No. 2 Voltage				
Gird No. 1 Voltage Required for Outon - 20 to -72 -20 to -72 Volta d C	Grid No. 4 Voltage for Focus 0 to 500	0 to 500 Volts d c		
CIRCUIT VALUES Grid No. 1 Circuit Resistance		1.5 Megohms Max.		

SYLVANIA TYPES 23KP4, 23KP4A (Cont'd)

NOTES:

- 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:

SYLVANIA TYPES 23MP4 23ALP4 23AMP4

Silver Screen "85"

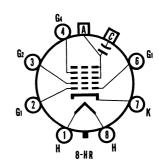
TELEVISION PICTURE TUBE

23AMP4: EF = 6.3V @ 300 Ma.

Electrostatic Focus 23" Direct Viewed 114° Magnetic Deflection 1½" Neck Diameter **Gray Filter Glass** No Ion Trap

Spherical Faceplate Rectangular Glass Type Aluminized Screen **External Conductive Coating** 23MP4: EF = 6.3V @ 600 Ma. 23ALP4: EF = 6.3V @ 450 Ma.





GENERAL DATA		
Focusing MethodDeflection Method		trostatic agnetic
Deflection Angles (approx.)	100	D
Horizontal Diagonal		Degrees Degrees
Vertical		Degrees
Phosphor		inized P4
Fluorescence		White
Persistence		to Medium
Faceplate		Filter Glass
Light Transmittance (approx.)	75	Percent
ELECTRICAL DATA		
Heater Voltage	6.3	Volts
Heater Current		
23MP4	0.6 ± 5%	Ampere
23 A L P 4	.40 ± 5%	Ampere
Heater Warm-up Time ¹	.30 ± 5%	Seconds
Direct Interelectrode Capacitances (approx.)		Occorras
Cathode to All Other Electrodes	5	$\mu\mu f$
Grid No. 1 to All Other Electrodes	6	μμf
External Conductive Coating to Anode ²		μμf Max.
	1700	μμf Min.
MECHANICAL DATA		
Minimum Useful Screen Dimensions (Max. Assured)		
Height	14 1/8	Inches
Width	19/16	Inches Inches
Diagonal		Square Inches
Neck Length	51/8 ± 1/8	Inches
Overall Length	143% + 5%	Inches
Bulb Contact (Recessed Small Cavity Cap)	" Jī-21	
Bulb	J187B	
Base	B7-208	
Basing	8HR	
Weight (approx.)	25	Pounds

SYLVANIA 23MP4, 23ALP4, 23AMP4 **TYPES**

(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 ³	-35 to -72 Volts d c

CIRCUIT VALUES

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

 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.

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:

SYLVANIA TYPE 23RP4

Silver Screen "85"

TELEVISION PICTURE TUBE

23" Direct Viewed Rectangular Glass Type

Spherical Faceplate Gray Filter Glass

Aluminized Screen
Tri-Potential

Electrostatic Focus

110° Magnetic Deflection

No Ion Trap

External Conductive Coating

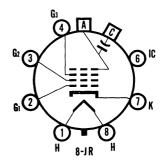
Short Neck

6.3 Volt, 300 Ma Heater

Bonded Shield



GENERAL DATA



GENERAL DATA	
Focusing Method. Deflection Method. Deflection Method.	Tri-Potential Electrostatic Magnetic
Deflection Angles (approx.) Horizontal Diagonal Vertical Phosphor Fluorescence Persistence Faceplate (Gray Filter Glass Safety Plate Laminated	99 Degrees 110 Degrees 82 Degrees Aluminized P4 White Short to Medium Bonded Shield
Directly to Face of Tube) Light Transmittance of Faceplate Assembly (approx.)	40 Percent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts $0.30 \pm 5\%$ Ampere 11 Seconds $5 \mu \mu f$ $6 \mu \mu f$
External Conductive Coating to Anode ²	2500 μμf Max. 2000 μμf Min.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Max. Assured) Height Width Diagonal Area Neck Length Overall Length Bulb Safety Plate Bulb Contact (Recessed Small Cavity Cap) Base Base Basing Weight (approx.)	15½ Inches 19½ Inches 22½ Inches 22½ Inches 3½ ± ½ Inches 13½ ± ½ Inches J187A or Equiv. FP198A or Equiv. J1-21 B7-208 8JR 32½ Pounds

SYLVANIA TYPE 23RP4 (Cont'd)

TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage	16.000 Volts d c
Grid No. 3 Voltage for Focus	
Grid No. 2 Voltage ³	500 Volts d c
Grid No. 1 Voltage Required for Cutoff4	-43 to -78 Volts d c

CIRCUIT VALUES

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

NOTES:

- 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:

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

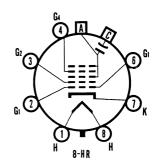
Aluminized Screen

No Ion Trap

External Conductive Coating

6.3 Volt, 300 Ma Heater





CHARACTERISTICS

GENERAL DATA	
Focusing Method. Deflection Method Deflection Angles (approx.)	Electrostatic Magnetic
Horizontal Diagonal Vertical	99 Degrees 110 Degrees 82 Degrees Aluminized P4
Phosphor Fluorescence Persistence Faceplate (Gray Filter Glass Safety Plate Laminated	White Short to Medium Bonded Shield
Directly to Face of Tube) Light Transmittance of Faceplate Assembly (approx.)	40 Percent
ELECTRICAL DATA	6.3 Volts
Heater Voltage. Heater Current	
Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes External Conductive Coating to Anode ²	5 μμf 6 μμf 2500 μμf Max.
MERCHANICAL DATA	2000 $\mu\mu$ f Min.

MECHANICAL DATA Minimum Useful Screen Dimensions

William Oseral Octeen Dinignstons		
(Maximum Assured)		
Height	151/4 Inches	
Width	19 % Inches	
Diagonal	22% Inches	
Area	282 Square	Inches
Neck Length		
Overall Length		
Bulb		
Safety PlateFP198		
Bulb Contact (Recessed Small Cavity Cap)		
	7-208	
	8HR	
Weight (approx.)	32 1/2 Pounds	j

TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltage..... 16,000 Volts d c

SYLVANIA TYPE 23SP4 (Cont'd)

Grid No. 4 Voltage for Focus	0 to +400 Volts d c 300 Volts d c -35 to -72 Volts d c
Grid No. 1 Circuit Resistance	1.5 Megohms Max.

NOTES:

- 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:

SYLVANIA TYPE 23UP4

Silver Screen "85"

TELEVISION PICTURE TUBE

23" Direct Viewed

Electrostatic Focus

110° Magnetic Deflection Rectangular Glass Type

Spherical Faceplate

Bonded Shield

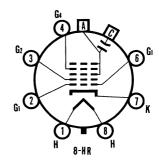
Gray Filter Glass

No Ion Trap

Aluminized Screen **External Conductive Coating**

6.3 Volt, 450 Ma Heater





GENERAL DATA	
Focusing Method Deflection Method Deflection Angles (approx.)	
Horizontal Diagonal Vertical Phosphor Fluorescence	110 Degrees 82 Degrees Aluminized P4
Persistence Faceplate (Gray Filter Glass Safety Plate Laminated Directly to Face of Tube) Light Transmittance of Faceplate Assembly	
(approx.)	40 Percent
ELECTRICAL DATA	
Heater Voltage Heater Current. Heater Warm-up Time ¹ . Direct Interelectrode Capacitances (approx.)	0.45 ± 5% Ampere 11 Seconds
Cathode to All Other Electrodes	6 μμf
MECHANICAL DATA	• •
Minimum Useful Screen Dimensions (Maximum Assured)	
Height. Width Diagonal Area	19 1/6 Inches 22 1/6 Inches
Neck LengthOverall Length	. 5½ ± ½ Inches . 15½ ± ¾ Inches
Safety Plate	FP198A or Equiv.
Bulb Contact (Recessed Small Cavity Cap) Base	. B7-208
Weight (approx.)	

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 Cutoff3	-35 to -72 Volts d c

CIRCUIT VALUES

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

NOTES:

- 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.
- 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:

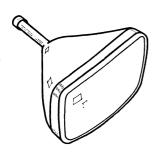
SYLVANIA TYPES 23XP4 23YP4

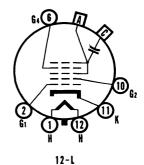
Silver Screen "85"

TELEVISION PICTURE TUBE

23XP4: Low Voltage 23" Direct Viewed 92° Magnetic Deflection Spherical Faceplate **Gray Filter Glass** No Ion Trap

23YP4: High Voltage **Electrostatic Focus** Rectangular Glass Type **Bonded Shield** Aluminized Screen **External Conductive Coating**





GENERAL DATA	
Focusing Method Deflection Method Deflection Angles (approx.)	Electrostatic Magnetic
Horizontal Diagonal Vertical Phosphor Fluorescence Persistence Faceplate (Gray Filter Glass Safety Plate Laminated Directly to Face of Tube)	81 Degrees 92 Degrees 66 Degrees Aluminized P4 White Short to Medium Bonded Shield
Light Transmittance of Faceplate Assembly (approx.)	40 Percent
ELECTRICAL DATA	
Heater Voltage Heater Current Heater Warm-up Time¹ Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode².	6.3 Volts 0.60 ± 5% Ampere 11 Seconds 5 \(\mu_h \text{f} \) 6 \(\mu_h \text{f} \) 2500 \(\mu_h \text{f} \) 2000 \(\mu_h \text{f} \) Max.
MECHANICAL DATA	
Minimum Useful Screen Dimensions (Max. Assured) Height Width. Diagonal. Area. Neck Length. Overall Length. Bulb Safety Plate. Bulb Contact (Recessed Small Cavity Cap). Base. Basing.	15¼ Inches 19 % Inches 22 % Inches 22 % Inches 282 Square Inches 5½ ± % Inches 18 ½ ± ½ Inches C187 Exp No. 6 or Equiv FP198A or Equiv. J1-21 B6-203 12L
Weight (approx.)	

SYLVANIA TYPES 23XP4, 23Y4 (Cont'd)

TYPICAL OPERATING CONDITIONS (Grid Drive Service)

Anode Voltag	e				Volts d c
Grid No. 4 Vo	oltage for Focus			0 to +400	
Grid No. 2 Vo	oltage			300	Volts d c
Grid No. 1 V	oltage Required for	Cutoff ³ .		-35 to -72	Volts d c

CIRCUIT VALUES

	. O	4 - 14 1 14
Grid No.	1 Circuit Resistance	1.5 Megohms Max.

NOTES:

- 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.
- 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:

SYLVANIA TYPES 24AEP4, 24ASP4 (Cont'd)

ELECTRICAL DATA	244604	040 = 7	-4
11 1 1/1	24ASP4	24AEF	
Heater Voltage	6.3		Volts
Heater Voltage Heater Current (±5%)	0.3		Ampere
Heater Warm-up Time ¹ Direct Interelectrode Capacitances (approx	.)	11	Seconds
Cathode to All Other Electrodes		5	$\mu\mu f$
Grid No. 1 to All Other Electrodes			μμf
	24ASP4	24AEF	
External Conductive Coating to Anode ²	2500		μμf Max.
Enternal conductive coating to /mode	1700		μμf Min.
MECHANICAL DATA	1700	2000	μμι ινιιι.
Minimum Useful Screen Dimensions			
(Maximum Assured)	217	6 x 1676	Inches
Nominal Overall Length	21/	101/	Inches
Minimum Useful Screen Area		1378	Ca Lashas
Dulb Contact (Description Area		332	Sq. Inches
Bulb Contact (Recessed Small Cavity Cap)		J1-21	
Base			
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 +0 400	Volte d c
Grid No. 2 Voltage for 1 oods (2 mol 4)		200	Volta d c
Grid No. 2 VoltageGrid No. 1 Voltage Required for Cutoff3		300	Volts d C
Grid No. 1 Voltage Required for Cutoffs		35 10 -72	voits a c
CIRCUIT VALUES			
Grid No. 1 Circuit Resistance		1.5	Megohms Max.

NOTES:

- 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

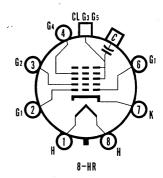
24" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate **Gray Filter Glass**

Aluminized Screen Electrostatic Focus 110° Magnetic Deflection 11/8" Neck Diameter

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 Volte

Heater Voltage	6.3	6.3 Volts
Heater Current (±5%)	0.3	0.6 Ampere
Heater Warm-up Time1		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.
		1700 μμf Min.

MECHANICAL DATA Minimum Hasful Careen Dimensions

Minimum Oserui Screen Dimensions	
(Maximum Assured)	21 1/6 x 16 1/8 Inches
Nominal Overall Length	15% Inches
Minimum Useful Screen Area	332 Square Inches
Bulb	J192C1 or Equivalent
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base	
Basing	
Weight (approx.)	26½ Pounds

TYPICAL OPERATING CONDITIONS

Anode Voltage	16,000 Volts d c
Grid No. 4 Voltage for Focus50	to +350 Volts d c
Grid No. 2 Voltage	300 Volts d c
Grid No. 1 Voltage Required for Cutoff33	5 to -72 Volts d c

CIRCUIT VALUES

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

NOTES:

- 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.
- 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.

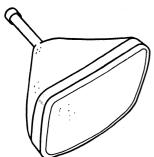
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

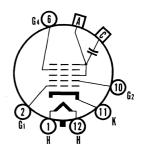
SYLVANIA TYPE 24AJP4

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 MethodDeflection Method	Electrostatic Magnetic
Deflection Angles (approx.) Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	85 Degrees 90 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 74 Percent
ELECTRICAL DATA	
Heater Voltage. Heater Current. Heater Warm-up Time¹. Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 ± 5% Ampere 11 Seconds
Cathode to All Other Electrodes	5 μμf 6 μμf 2500 μμf Max. 2000 μμf Min.
MECHANICAL DATA	, ,,,
Minimum Useful Screen Dimensions Nominal Overall Length Minimum Useful Screen Area Bulb J19: Bulb Contact (Recessed Small Cavity Cap)	19½ Inches 332 Sa. Inches
Base (Small Shell Duodecal 6-Pin)Basing	B6-63 12L
TYPICAL OPERATING CONDITIONS (Cathod	e Drive Service) ³
Anode Voltage Grid No. 4 Voltage for Focus Grid No. 2 Voltage Cathode Voltage for Cutoff ⁴	18,000 Volts d c 0 to 350 Volts d c 50 Volts d c 35 to 50 Volts d c
CIRCUIT VALUES	25 15 55 15116 4 0
Grid No. 1 Circuit Resistance	1.5 Megohms Max.
NOTES:	

- 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.

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"

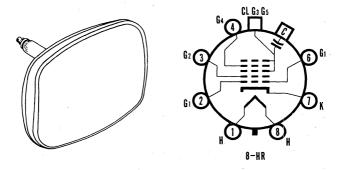
TELEVISION PICTURE TUBE

24" Direct Viewed Rectangular Glass Type Lightweight Tube Spherical Faceplate **Gray Filter Glass**

Aluminized Screen Electrostatic Focus 110° Magnetic Deflection 11/8 " Neck Diameter No Ion Trap

External Conductive Coating

SYLVANIA TYPE 24ALP4 (Cont'd)



CHARACTERISTICS

GENERAL DATA			
Focusing MethodDeflection Method		trostatic ignetic	
Deflection Angles (approx.)	105	D	
Horizontal Diagonal		Degrees Degrees	
Vertical		Degrees	
Phosphor		inized P4	
Fluorescence		Vhite	
PersistenceFaceplate		o Medium ilter Glass	
Light Transmittance (approx.)		Percent	
ELECTRICAL DATA		* * * *	
Heater Voltage	6.3	Volts	
Heater Current	$0.6 \pm 5\%$		
Heater Warm-up Time¹ Direct Interelectrode Capacitances (approx.)	. 11	Seconds	
Cathode to All Other Electrodes	5	$\mu\mu$ f	
Grid No. 1 to All Other Electrodes		μμf :	
External Conductive Coating to Anode ²		μμf Max.	
	2000	μμf Min.	
MECHANICAL DATA			
Minimum Useful Screen Dimensions	217/16 x 167/8	Inches	
Nominal Overall Length	157/8		
AreaBulb Contact (Recessed Small Cavity Cap)	J1-21	Sq. Inches	
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 Volts d c	
Grid No. 2 Voltage	-28 to -72		
Gira ito, i voitago rioquirou foi Outon	20 10 12	• Oito a o	

Grid No. 1 Circuit Resistance..... NOTES:

CIRCUIT VALUES

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.

1.5 Megohms Max.

- 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:

SYLVANIA TYPE 24ANP4

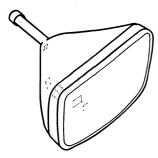
Silver Screen "85"

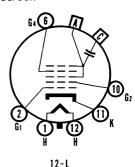
TELEVISION PICTURE TUBE

24" Direct Viewed Rectangular Glass Type Spherical Faceplate Gray Filter Glass

Magnetic Deflection **Electrostatic Focus** Single Field Ion Trap External Conductive Coating

Aluminized Screen





edium Glass

CHARACTERISTICS

GENERAL DATA

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

Heater Voltage	6.3 Volts
Heater Current	0.6 ± 5% Ampere
Heater Warm-up Time1	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.
	1700 μμf Min.
Ion Trap Magnet	External, Single Field Type

MECHANICAL DATA

Minimum Useful Screen Dimensions	201/ ₈ 332 2A or J192B J1-21 B6-63	Inches
Base (Small Shell Duodecal 6-Pin) Basing		

TYPICAL OPERATING CONDITIONS

Anode Voltage		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 Cutoff3	-35 to -72	Volts d c
Ion Trap Magnet Current (Average)4		Madc
Field Strength of PM Ion Trap Magnets	37	Gausses 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 resist-ance 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 twice PM incorporate with field strength tolerance of +3 gausses.
- 5. For typical PM ion trap magnet with field strength tolerance of ± 3 gausses.

WARNING:

SYLVANIA TYPE 24AVP4

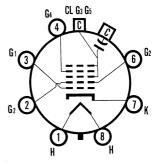
Silver Screen "85"

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





CHARACTERISTICS

8JK

Focusing Method	
Deflection Method	
Deflection Angles (approx.)	
Horizontal	
Diagonal	
Vertical	
Phosphor	
Fluorescence	
Persistence	
Faceplate	
Light Transmittance (approx.)	
3 (

Magnetic 105 Degrees 110 Degrees 87 Degrees Aluminized P4 White Short to Medium Gray Filter Glass 76 Percent

Electrostatic

ELECTRICAL DATA

GENERAL DATA

Heater Voltage. Heater Current. Heater Warm-up Time!	0.6 ± 5% Ampere
Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode ²	

MECHANICAL DATA

Minimum Useful Screen Dimensions	
Nominal Overall Length	
Area	332 Sq. Inches
BulbJ19	2C or J192D
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base	B7-208
Basing	8JK
Weight (approx.)	261/2 Pounds

TYPICAL OPERATING CONDITIONS

Anode Voltage	16,000 Volts d c
Grid No. 4 Voltage for Focus	00 to +300 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:	

Ν

- 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.

 External conductive continue must be grounded.
- 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:

SYLVANIA TYPE 24AUP4

Silver Screen "85"

TELEVISION PICTURE TUBE

24" Direct Viewed

Rectangular Glass Type

Spherical Faceplate Gray Filter Glass

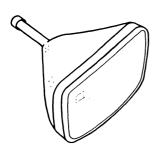
Magnetic Deflection

Electrostatic Focus

No Ion Trap

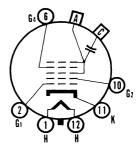
External Conductive Coating

Aluminized Screen Short Neck Tube



GENERAL DATA

CIRCUIT VALUES



12-L

1.5 Megohms Max.

CHARACTERISTICS

Focusing Method. Deflecting Method Deflection Angle		trostatic ignetic
Horizontal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	90 Alumi W Short t Gray F	Degrees Degrees inized P4 /hite o Medium ilter Glass Percent
ELECTRICAL DATA		
Heater Voltage. Heater Current. Heater Warm-up Time ¹ . Direct Interelectrode Capacitances (approx.)	0.6 ± 5% 11	Seconds
Cathode to All Other Electrodes	6 2500	μμf μμf μμf Max. μμf Min.
MECHANICAL DATA		
Base (Small Shell Duodecal 6-Pin)	18½ 332 A or J192B J1-21 3 or B6-203 12L	Inches Inches Square Inches
Weight (approx.)	32 1/2	Founds
TYPICAL OPERATING CONDITIONS		
Anode Voltage7 Grid No. 4 Voltage7 Grid No. 2 Voltage Grid No. 1 Voltage Required for Cutoff ³	5 to +400 300	Volts d c

Grid No. 1 Circuit Resistance....

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.

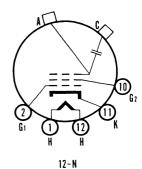
WARNING:

SYLVANIA TYPE 24CP4, 24VP4 Silver Screen "85" $\rightarrow 24CP4A/24VP4A/$ **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

CHARACIERISTICS	,		
GENERAL DATA			
Focusing MethodDeflecting Method		Magnetio Magnetio	
Deflecting Angle (approx.) Horizontal. Diagonal. Phosphor.		85 Degree 90 Degree P4	
Fluorescence Persistence Faceplate		White Medium	
Light Transmittance (approx.)		75 Percen	t
ELECTRICAL DATA			
Heater VoltageHeater Current (approx.)Direct Interelectrode Capacitances (approx.)		6.3 Volts 0.6 Amp	
Cathode to All Other Electrodes		5 μμf 6 μμf 2500 μμf	Max
Ion Trap Magnet	External,	2000 μμf Single Field	Min Type
MECHANICAL DATA			
Minimum Haaful Saraan Dimansians	217/a v 167	4 Inches	

Minimum Useful Screen Dimensions	217/6 x 167/8 Inches
Nominal Overall Length	211/8 Inches
Bulb Contact (Recessed Small Cavity Cap)	J1-21
Base (Small Shell Duodecal 5-Pin)	B5-57
Basing	

TYPICAL OPERATING CONDITIONS

Anode Voltage 1	8000	Volts d c
Grid No. 2 Voltage	300	Volts d c
Grid No. 1 Voltage Required for Cutoff ²	-77	Volts d c
Focusing Coil Current (approx.)3125 ±	20%	Ma dc
Ion Trap Magnet Strength (approx.)	36	Gausses

CIRCUIT VALUES

Grid No. 1 Circuit Resistance	
	Max

NOTES:

- External conductive coating must be grounded.
 Visual extinction of undeflected focused spot.
 For JETEC focusing coil 109 or equivalent three inches from reference line, bias adjusted to 30 foot lamberts on a 21% x 16% 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

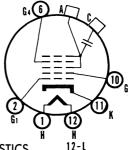
24" Direct Viewed Rectangular Glass Type **Gray Filter Glass**

Electrostatic Focus Spherical Faceplate Single Field Ion Trap

Magnetic Deflection

External Conductive Coating 24DP4A/24YP4 has an Aluminized Screen





CHARACTERISTICS

ENERAL DATA	
Focusing Method	Electrostatic Magnetic
Deflecting Angle	
Horizontal	85 Degrees
Diagonal	90 Degrees
Phosphor	. P4
Fluorescence	White
Persistence	Medium
	Cray Eiltor Class

68 Percent

ELECTRICAL DATA

GENERAL DATA Focusing Method.....

F	Heater Voltage		Volts	
- 1	Heater Current (approx.)	0.6	Amp	ər e
[Direct Interelectrode Capacitances (approx.)			
	Cathode to All Other Electrodes			
	Grid No. 1 to All Other Electrodes			
	External Conductive Coating to Anode1	2500	$\mu\mu f$	Man
	-	2000	$\mu\mu f$	Mix
- 1	on Trap MagnetExternal,	Single	Field	Туре

Light Transmittance (approx.).....

MECHANICAL DATA

Minimum Useful Screen Dimensions	x 163/4 Inches
Nominal Overall Length	211/8 Inches
	J1-2Ĭ
Base (Small Shell Duodecal 6-Pin)	B6-63
Basing	12L

TYPICAL OPERATING CONDITIONS

Anode Voltage	8000	Volts d c
Grid No. 4 Voltage72 to -	+396	Volts d c
Grid No. 2 Voltage	300	Volts d c
Grid No. 1 Voltage Required for Cutoff233 to		
Ion Trap Magnet Strength (approx.)	40	Gausses

CIRCUIT VALUES

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

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.

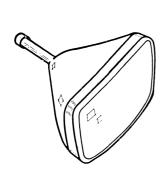
SYLVANIA TYPE 24XP4

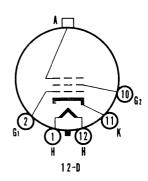
TELEVISION PICTURE TUBE

24" Direct Viewed Rectangular Glass Type **Gray Filter Glass**

Magnetic Deflection Magnetic Focus Spherical Faceplate

Single Field Ion Trap





CHARACTERISTICS

GENERAL DATA Focusing Method. Deflecting Method Deflecting Angle (approx.)	Magnetic Magnetic
Horizontal Diagonal Diagonal Phosphor Fluorescence Persistence Faceplate Light Transmittance (approx.)	85 Degrees 90 Degrees P4 White Medium Gray Filter Glass 68 Percent
ELECTRICAL DATA	
Heater Voltage	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes	5 μμf 6 μμf , Single Field Type
MECHANICAL DATA	
Minimum Useful Screen Dimensions	x 211/4 Inches 211/8 Inches J1-21 B5-57 12D
TYPICAL OPERATING CONDITIONS	
Anode Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff!2 Focusing Coil Current (approx.)². Ion Trap Magnet Strength (approx.)	300 Volts d c 8 to -72 Volts d c 125 Ma d c
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms

NOTES:

- 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 21¼ x 16¾ 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.

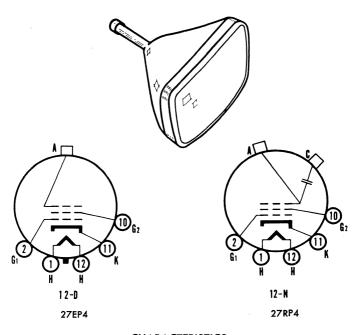
SYLVANIA TYPE 27EP4 27RP4

Silver Screen "85"

TELEVISION PICTURE TUBE

27" Direct Viewed Rectangular Glass Type **Gray Filter Glass** Aluminized Screen

Magnetic Deflection Magnetic Focus Spherical Faceplate Single Field Ion Trap 27RP4 has an External Conductive Coating



CHARACTERISTICS

GENERAL DATA

Focusing Method	Magnetic
Deflecting Method	Magnetic
Deflecting Angle (approx.)	9
Horizontal	85 Degrees
Diagonal	90 Degrees
Phosphor	P4
Fluorescence	White
Persistence	Medium
Faceplate	Gray Filter Glass
Light Transmittance (approx.)	68 Percent
ELECTRICAL DATA	
	00.14.11
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 MagnetExternal	, Single Field Type

27EP4, 27RP4 (Cont'd)

MECHANICAL DATA

Minimum Useful Screen Dimensions24	x 181/2 Inches
Nominal Overall Length	231/ ₁₆ Inches
	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		Volts d c
Grid No. 1 Votage Required for Cutoff128	to -72	Volts d c
Focusing Coil Current (approx.)2125	$\pm 20\%$	Ma dc
Ion Trap Magnet Strength (approx.)	40	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 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	12 N

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

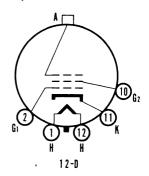
TELEVISION PICTURE TUBE

Single Field Ion Trap

27" Direct Viewed Rectangular Glass Type **Gray Filter Glass**

Magnetic Deflection Magnetic Focus Spherical Faceplate





CHARACTERISTICS

GENERAL DATA Focusing Method..... Magnetic Deflecting Method...... Deflecting Angle (approx.) Magnetic 85 Degrees 90 Degrees P4 Horizontal.... Diagonal Phosphor Persistence. White Medium

SYLVANIA TYPE 27GP4 (Cont'd)

ELECTRICAL DATA		
Heater Voltage. Heater Current (approx.) Direct Interelectrode Capacitances (approx.) Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. Ion Trap Magnet. External,	0.6 5 6	Volts Ampere μμf μμf Field Type
MECHANICAL DATA Minimum Useful Screen Dimensions	23½ J1-21	
TYPICAL OPERATING CONDITIONS Anode Voltage. Grid No. 2 Voltage. Grid No. 1 Voltage Required for Cutoff1. Focusing Coil Current (approx.)2. Ion Trap Magnet Strength (approx.).	300 to -72 ±20%	Volts d c Volts d c Ma d c
CIRCUIT VALUES Grid No. 1 Circuit Resistance		Megohms

NOTES:

Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about 5 volts more negative.
 For JETEC focusing coil No. 109 or equivalent 3 inches from reference line bias adjusted to 20 foot lamberts on a 241/4 x 181/2 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.

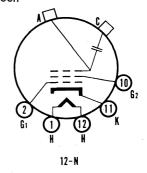
SYLVANIA TYPE 27LP4

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





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CHARACTERISTICS

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

27LP4 (Cont'd)

ELECTRICAL DATA

ELLOT MORE DATA		
Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.)		Volts Ampere
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes External Conductive Coating to Anode!	5.0 6.0 400	μμf μμf Max
Ion Trap MagnetExternal,	250 Single	
MECHANICAL DATA Minimum Useful Screen Dimensions		Inches
TYPICAL OPERATING CONDITIONS		
Anode Voltage. Grid No. 2 Voltage Grid No. 1 Voltage Required for Cutoff ² 28 Focusing Coil Current (approx.) ³ Ion Trap Magnet Strength (approx.)	300 to -72 148	Volts d c Volts d c Volts d c Ma d c Gausses
CIRCUIT VALUES		
Grid No. 1 Circuit Resistance		Megohms

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

WARNING

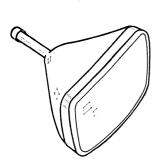
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

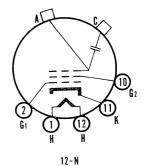
SYLVANIA TYPE 27NP4

TELEVISION PICTURE TUBE

27" Direct Viewed Rectangular Glass Type **Gray Filter Glass** External Conductive Coating

Magnetic Deflection Magnetic Focus Spherical Faceplate Single Field Ion Trap Max





GENERAL DATA

LIVERIAL DATA	
Focusing Method	Magnetic Magnetic
Deflecting Angle (approx.)	•
Horizontal	85 Degrees
Diagonal	90 Degrees
Phosphor	P4
Fluorescence	
Persistence	Medium
Faceplate G	
Light Transmittance (approx.)	

27NP4 (Cont'd)

	CAI		

ELECTRICAL DATA	
Heater Voltage Heater Current (approx.) Direct Interelectrode Capacitances (approx.)	6.3 Volts 0.6 Ampere
Cathode to All Other Electrodes. Grid No. 1 to All Other Electrodes. External Conductive Coating to Anode!	5 μμf 6 μμf 2500 μμf Μαχ
Ion Trap MagnetExternal,	2000 μμf Min
MECHANICAL DATA	
Minimum Useful Screen Dimensions. 241/4 Nominal Overall Length. Bulb Contact (Recessed Small Cavity Cap). Base (Small Shell Duodecal 5-Pin). Basing.	x 18½ Inches 23 Inches J1-21 B5-57 12N
TYPICAL OPERATING CONDITIONS	
Anode Voltage	300 Volts d c to −72 Volts d c ±20% Ma d c
CIRCUIT VALUES	
Grid No. 1 Circuit Resistance	1.5 Megohms Max

NOTES:

Conductive coating must be grounded.
 Visual extinction of focused raster. Extinction of the stationary focused spot will require that these values be about 5 volts more negative.
 For JETEC focusing coil 109 or equivalent 3 inches from reference line, bias adjusted to 20 foot lamberts on a 24½ x 18½ inch picture area.

WARNING

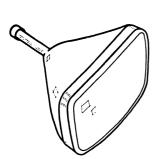
X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

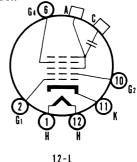
SYLVANIA TYPE 27SP4

TELEVISION PICTURE TUBE

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

Aluminized Screen





GENERAL DATA Focusing Method..... Electrostatic Focusing Method. Deflecting Method. Deflecting Angle (approx.) Horizontal. Diagonal Phosphor. Fluorescence. Possible to the second Processence. Magnetic 85 Degrees 90 Degrees P4 White Medium Persistence..... Gray Filter Glass Faceplate. Light Transmittance (approx.).......

CHARACTERISTICS

27SP4 (Cont'd)

ELECTRICAL DATA

Heater Voltage Heater Current (approx.)		Volts	
Direct Interelectrode Capacitances (approx.)	0.0	Amp	910
Cathode to All Other Electrodes	5	uuf	
Grid No. 1 to All Other Electrodes	6	μμf	
External Conductive Coating to Anode1	750	μμf	Max
Ion Trap MagnetExternal,	500	$\mu\mu f$	_Min
Ion Trap Magnet External,	Single	Field	lype

MECHANICAL DATA

Minimum Useful Screen Dimensions24	
Nominal Overall Length	231/ 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	
Grid No. 4 Voltage72 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

NOTES:

External conductive coating must be grounded.
 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.

T 1.		s						
This Silver Screen 85 Type	Replace These Original Types	lon Trap N-None S-Single	External Conduc- tive Coating	Spher- ical Face Plate	Cylin- drical Face Plate	Mag- netic Focus	Electro- static Focus	Replace- ment Note See Below
12KP4A	12KP4 12KP4A 12QP4 12QP4A 12RP4	N	х	х		X		1 1 2 2 2 2
14QP4A	14QP4 14QP4A	S	Х	Х			Х	1
14RP4A	14RP4 14RP4A	S	Х	Х			Х	1
14XP4A	14XP4 14XP4A	S	Х	Х			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			х	1 1 1 1
17BP4B	17BP4 17BP4A 17BP4B 17BP4C 17JP4	S	х	х		Х		5 1 1 1 1 6
17BZP4	17BZP4 17CAP4 17CKP4	N	х	х	i		х	1
17HP4B/- 17RP4C	17HP4 17HP4A 17HP4B 17RP4 17RP4C	s	х	х			х	1 1 1 1 1
17LP4A/- 17VP4B	17LP4 17LP4A 17VP4 17VP4B	S	х		х		х	1 1 1 1
20CP4B/- 20DP4B	20CP4 20CP4B 20CP4C 20DP4 20DP4B	S		х		х		1 1 1 1
20CP4D/- 20DP4C	20CP4A 20CP4D 20DP4A 20DP4C	S	Х	Х		Х		1 1 1 1
20HP4C	20HP4 20HP4B 20HP4C	S		х			X	1 1 1
20HP4D	20HP4A 20HP4D 20MP4 20LP4	S	х	х			х	1 1 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.
 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.

		SILVER SCREEN 85 TYPES HAVE						
This Silver Screen 85 Type	Replace These Original Types	Ion Trap N-None S-Single	External Conduc- tive Coating	Spher- ical Face Plate	Cylin- drical Face Plate	Mag- netic Focus	Electro- static Focus	Replace- ment Note See Below
21ACP4A/- 21AMP4A/- 21BSP4	21ACP4 21ACP4A 21AMP4 21AMP4A 21AQP4 21AQP4A 21BSP4	S	х	х		х		1 1 1 1 5 5
21ALP4A/- 21ALP4B	21ALP4 21ALP4A 21ALP4B 21ANP4 21ANP4A	S	х	х			х	1 1 1 5 5
21ATP4/- 21ATP4A	21ATP4 21ATP4A	S	Х	Х			Х	1 1
21AUP4A/- 21AUP4B/- 21AVP4A/- 21AVP4B	21AUP4 21AUP4A 21AUP4B 21AVP4 21AVP4A 21AVP4B	S	Х	Х			Х	1 1 1 1 1 1
21AWP4	21AWP4	S	Х	X		Х		1
21CBP4/- 21CBP4A	21CBP4 21CBP4A	N	X	X			X	1
21EP4B	21EP4 21EP4A 21EP4B	S	х		Х	х		5 1 1
21FP4C	21FP4 21FP4A 21FP4C	S	х		х		Х	5 1 1
21WP4A	21WP4 21WP4A	S	Х	Х		Х		1
21XP4A	21ASP4 21AYP4 21XP4 21XP4A	S	х	Х			Х	5 1 1 1
21YP4A	21AFP4 21YP4 21YP4A	S	х	х			Х	5 1 1
21ZP4B	21ZP4 21ZP4A 21ZP4B	S	Х	Х		X		5 1 1
24CP4A/- 24VP4A/- 24ADP4	24ADP4 24CP4 24CP4A 24QP4 24TP4 24XP4 24VP4 24VP4	S	Х	x		х		1 1 1 1 1 5 1
24DP4A/- 24YP4	24DP4 24DP4A 24YP4	S	Х	Х			Х	1 1 1
27EP4	27EP4 27GP4 27NP4	S		х		х		1 1 7
27RP4	27GP4 27NP4 27RP4	S	х	х		Х		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

Туре	Faceplate	Focus	Deflection	Deflection Angle	Anode Volts Kv Abs. Max.	Nominal Length (Inches)		
	RADAR INDICATORS							
3FP7A	С	Es	Es		4.4*	10		
3JP7	С	Es	Es		4.4*	10		
3JP12	С	Es	Es		4.4*	10		
3KP7	С	Es	Es		2.75	111/2		
5ABP7	С	Es	Es		6.6*	163/4		
5ADP7	С	Es	Es		6.6*	163/4		
5AHP7	С	Es	Mag.	53	11.0	111/8		
5AHP7A	CA	Es	Mag.	53	11.0	111/8		
5AHP14	С	Es	Mag.	53	11.0	111/8		
5AHP14A	CA	Es	Mag.	53	11.0	111/8		
5AHP19	С	Es	Mag.	53	11.0	111/8		
5AHP19A	CA	Es	Mag.	53	11.0	111/8		
5AHP25A	CA	Es	Mag.	53	11.0	111/8		
5AQP7	С	Es	Es		4.4	163/4		
5CP7A	С	Es	Es		4.4*	163/4		
5CP12	С	Es	Es	••	4.4*	163/4		
5FP7A	С	Mag.	Mag.	53	8.8	111/8		
5FP14	С	Mag.	Mag.	53	8.8	111/8		
5FP14A	С	Mag.	Mag.	53	8.8	111/8		
5UP7	C	Es	Es	••	2.75	143/4		
6DP7	CA	Es	Es		15.0*	201/16		
6DP14	CA	Es	Es	• •	15.0*	201/16		
6DP19	CA	Es	Es		15.0*	201/16		
6DP25	CA	Es	Es		15.0*	201/16		
7ABP7	С	Es	Mag.	50	11.0	131/4		
7ABP7A	CA	Es	Mag.	50	11.0	131/4		
7ABP14	С	Es	Mag.	50	11.0	131/4		
7ABP14A	CA	Es	Mag.	50	11.0	131/4		
7ABP19	С	Es	Mag.	50	11.0	131/4		
7ABP19A	CA	Es	Mag.	50	11.0	131/4		
7BP2A	С	Mag.	Mag.	53	8.8	131/4		
7BP7A	С	Mag.	Mag.	53	8.8	131/4		
7JP7	С	Es	Es		6.6	141/2		
7MP7	С	Mag.	Mag.	50	8.8	123/4		
7MP14	c	Mag.	Mag.					
		_		50	8.8	123/4		
8CP7	C 	Es	Es		6.6*	161/2		
10KP7	Т	Mag.	Mag.	50	11.0	175/8		

INDUSTRIAL AND MILITARY C.R.T.'s Cont'd LISTED BY APPLICATION

Anode

					Anode Volts	Nominal
				Deflection	Kv Abs.	Length
Туре	Faceplate	Focus	Deflection	Angle	Max.	(Inches)
		RADA	R INDICA	TORS		
10KP7A	Т	Mag.	Mag.	50	11.0	175/8
10 V P7	CA	Mag.	Mag.	50	13.2	175/8
10WP7	Т	Es	Mag.	50	13.2	1615/16
10WP7A	TA	Es	Mag.	50	13.2	1615/16
10WP14	Т	Es	Mag.	50	13.2	1615/16
10WP14A	TA	Es	Mag.	50	13.2	1615/16
10WP19	Т	Es	Mag.	50	13.2	1615/16
10WP19A	TA	Es	Mag.	50	13.2	1615/16
12ABP7	Т	Es	Mag.	55	13.2	18
12ABP7A	TA	Es	Mag.	55	13.2	18
12ABP14	Т	Es	Mag.	55	13.2	18
12ABP14A	TA	Es	Mag.	55	13.2	18
12ABP19	Т	Es	Mag.	55	13.2	18
12ABP19A	TA	Es	Mag.	55	13.2	18
12DP7A	T	Mag.	Mag.	50	11.0	195⁄8
12DP7C	TA	Mag.	Mag.	50	13.2	195/8
12SP7	С	Mag.	Mag.	- 55	11.0	183/4
12SP7D	TA	Mag.	Mag.	54	15.0	183/4
		oso	CILLOSCOF	PES		
2AP1A	С	Es	Es	• •	1.1	77/16
3AP1A	С	Es	Es	• •	1.65	111/2
3BP1A	С	Es	Es		2.2	10
3JP1	С	Es	Es	• •	4.4*	10
3JP2	С	Es	Es	• •	4.4*	10
3KP1	С	Es	Es	••	2.75	111/2
3MP1	С	Es	Es	••	2.75	8
3RP1	С	Es	Es		2.75	91/8
3RP1A	С	Es	Es	••	2.75	91/8
5ABP1	С	Es	Es	• •	6.6*	163/4
5ADP1	С	Es	Es	• •	6.6*	163/4
5ADP2	С	Es	Es	• •	6.6*	163/4
5AHP2	С	Es	Mag.	53	11.0	111/8
5AHP2A	CA	Es	Mag.	53	11.0	111/8
5AQP1	С	Es	Es	• •	4.4	163/4
5AQP2	С	Es	Es	• •	4.4	163/4
5BP1A	С	Es	Es	• •	2.2	163/4
5CP1A	С	Es	Es	• •	4.4*	163/4
5UP1	С	Es -	Es 	••	2.75	143/4
6DP1	CA	Es -	Es -	• •	15.0*	201/16
6DP2	CA	Es	Es	••	15.0*	201/16
7JP1/7VP1	С	Es –	Es –	• •	6.6	141/2
8CP1	С	Es -	Es –	••	6.6*	161/2
8CP2	С	Es	Es	• •	6.6*	161/2

INDUSTRIAL AND MILITARY C.R.T.'s Cont'd LISTED BY APPLICATION

Туре	Faceplate	Focus	Deflection	Deflection Angle	Anode Volts Kv Abs. Max.	Nominal Length (Inches)
		VIDE	O RECORE	ERS		
3KP11	С	Es	Es		2.75	111/2
5ABP11	С,	Es	Es		6.6*	163/4
5ADP11	С	Es	Es		6.6*	$16\frac{3}{4}$
5AQP11	С	Es	Es		4.4	$16\frac{3}{4}$
5CP11A	С	Es	Es		4.4*	163/4
5FP11A	С	Mag.	Mag.	53	8.8	111/8
5UP11	С	Es	Es		2.75	143/4
5WP11	С	Es	Mag.	50	30.0	117/16
6DP11	CA	Es	Es		15.0*	201/16
8CP5	С	Es	Es		6.6*	161/2
8CP11	С	Es	Es		6.6*	161/2
10NP11	A	Mag.	Mag.	52	27.5	175/8
		INDUST	RIAL MON	NITORS		
3KP4	С	Es	Es		2.75	111/2
3RP4	c	Es	Es		2.75	91/8
5ABP4	c	Es	Es	••	6.6*	163/4
5 AHP4	C	Es	Mag.	53	11.0	111/8
5AHP4A	CA	Es	Mag.	53	11.0	111/8
5FP4A	С	Mag.	Mag.	53	8.8	111/8
7ABP4	C	Es	Mag.	50	11.0	131/4
7JP4	С	Es	Es		6.6	141/2
8CP4	С	Es	Es		6.6*	161/2
8FP4	TA	Mag.	Mag.	90	19.8	117/16
10SP4	TA	Es	Mag.	50	22.0	165/8
	ı	RECEIVI	ER CHECK	TUBES		
5A XP4	С	Auto	Mag.	53	19.8	105/8
8XP4	Т	Auto	Mag.	90	22.0	117/16
8YP4	T	Auto	Mag.	110	22.0	811/16
	1	FLYING	SPOT SCA	ANNERS		
3KP16	С	Es	Es		2.75	111/2
5BNP16	CA	Es	Mag.	53	19.8	105/8
5WP15	С	Es	Mag.	50	30.0	117/16
5ZP15	CA	Es	Mag.	40	30.0	143/8
5ZP16	CA	Es	Mag.	40	30.0	143/8
5ZP24	CA	Es	Mag.	40	30.0	$14\frac{3}{8}$
10VP15	CA	Mag.	Mag.	50	13.2	175/8

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 re- ceivers
P7	Blue-White Short Yellow Long	Radar indicators
P8	Obsolete	
P9	Obsolete	
P10	Dark Trace Very Long	Outside source of light is used for observa- tion. 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.

are required in m	REPLACES	AFTER MAKING THE
"SILVER SCREEN	ORIGINAL	FOLLOWING CHANGES OR
85" TYPE		
	TYPE	ADJUSTMENTS
	12KP4 12KP4A	Usual Installation Adjustments Usual Installation Adjustments
12KP4A	12QP4	Ground Conductive Coating, Remove Ion Trap
IZRF 4 A	12QP4A	Ground Conductive Coating, Remove Ion Trap
	12RP4	Ground Conductive Coating, Remove Ion Trap
	14BP4	Usual Installation Adjustments
14CP4A	14CP4	Usual Installation Adjustments
1 101 IN	14EP4	Usual Installation Adjustments
14NP4A/	14NP4	Usual Installation Adjustments
	14NP4A	Usual Installation Adjustments
14SP4	14SP4	Usual Installation Adjustments
	14QP4	Usual Installation Adjustments
14QP4A	14QP4A	Usual Installation Adjustments
	14HP4	Check Contact to Conductive Coating
14RP4A	14RP4 14RP4A	Check Contact to Conductive Coating Check Contact to Conductive Coating
	14KP4A 14XP4	Check Contact to Conductive Coating
14XP4A	14XP4A	Check Contact to Conductive Coating
	16KP4	Usual Installation Adjustments
	16KP4A	Usual Installation Adjustments
14VDAA/	16QP4	Ground Conductive Coating, Change Ion Trap
16KP4A/	16RP4	Usual Installation Adjustments
16RP4A	16RP4A	Usual Installation Adjustments
	16TP4	If Physical Space Permits
	16XP4	Ground Conductive Coating, Change Ion Trap
17ATD4A /	17ATP4	Usual Installation Adjustments
17ATP4A/	17AVP4	Usual Installation Adjustments
17AVP4A	17ATP4A	Usual Installation Adjustments
	17AVP4A 17BP4	Usual Installation Adjustments
	17BP4A	Ground Conductive Coating Usual Installation Adjustments
17BP4B	17BP4B	Usual Installation Adjustments
17 DT 40	17BP4C	Usual Installation Adjustments
	17 JP4	Do Not Exceed Voltage Rating
	17HP4	Usual Installation Adjustments
17HP4B/	17HP4A	Usual Installation Adjustments
	17HP4B	Usual Installation Adjustments
17RP4C	17RP4	Usual Installation Adjustments
	17RP4C	Usual Installation Adjustments
	17LP4	Usual Installation Adjustments
17LP4A/	17LP4A 17VP4	Usual Installation Adjustments Usual Installation Adjustments
	17VP4 17VP4B	Usual Installation Adjustments
17VP4B	17KP4	Provide Focus Supply
	17KP4A	Provide Focus Supply
	17QP4	Usual Installation Adjustments
	17UP4	Usual Installation Adjustments
17QP4A	17YP4	Usual Installation Adjustments
	17SP4	Provide Focus Supply
	17QP4A	Usual Installation Adjustments Usual Installation Adjustments
20CP4B/	20CP4	Usual Installation Adjustments
	20CP4B	Usual Installation Adjustments
20DP4B	20CP4C	Usual Installation Adjustments
ZUDL4R	20DP4 20DP4B	Usual Installation Adjustments
	20CP4A	Usual Installation Adjustments Usual Installation Adjustments
20CP4D/ 20DP4C	20CP4A 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.)

"SILVER SCREEN 85" REPLACEMENT CHART

JILVEN 3	CILLIA	OS ILLI ENCEMENT CHAIR
"SILVER SCREEN	REPLACES	AFTER MAKING THE
	ORIGINAL	FOLLOWING CHANGES OR
85" TYPE	TYPE	ADJUSTMENTS
	20HP4	Usual Installation Adjustments
20HP4C	20HP4B	Usual Installation Adjustments
ZUIII'TC	20HP4C	Usual Installation Adjustments
	20HP4A	Usual Installation Adjustments
00117.47	20HP4D	Usual Installation Adjustments
20HP4D	20MP4	Usual Installation Adjustments
	20LP4	Usual Installation Adjustments
	21 ALP4	Usual Installation Adjustments
	21 ALP4A	Usual Installation Adjustments
21ALP4A/B	21 ALP4B	Usual Installation Adjustments
	21 ANP4	Ground Conductive Coating
	21 ANP4A	Ground Conductive Coating
	21 AMP4	Usual Installation Adjustments
07.1.1.D.4.1	21 AMP4A	Usual Installation Adjustments
21AMP4A/	21 ACP4	Usual Installation Adjustments
21ACP4A/	21 ACP4A	Usual Installation Adjustments
•	21 AQP4	Ground Conductive Coating
21BSP4	21 AQP4A	Ground Conductive Coating
	21BSP4	Usual Installation Adjustments
OLATD# /A	21 ATP4	Usual Installation Adjustments
21ATP4/A	21 ATP4A	Usual Installation Adjustments
21AUP4A/	21 AUP4	Usual Installation Adjustments
	21 AUP4A	Usual Installation Adjustments
21AUP4B/	21 AUP4B	Usual Installation Adjustments
21AVP4A/	21 AVP4	Usual Installation Adjustments
21AVP4B	21AVP4A	Usual Installation Adjustments
ZIATETO	21 A VP4B	Usual Installation Adjustments
011040	21EP4	Ground Conductive Coating
21EP4B	21EP4A	Usual Installation Adjustments
	21 EP4B 21 FP4	Usual Installation Adjustments Usual Installation Adjustments
21FP4C	21FP4A	Usual Installation Adjustments
	21FP4C	Usual Installation Adjustments
	21KP4	Provide Focus Supply
	21KP4A	Provide Focus Supply
OTWID 4 A	21WP4	Usual Installation Adjustments
21WP4A	21WP4A	Usual Installation Adjustments
	21 XP4	Usual Installation Adjustments
21XP4A	21XP4A	Usual Installation Adjustments
	21 A YP4	Usual Installation Adjustments
	21 ASP4	Usual Installation Adjustments, Ground Cond. Coating
A.1.	21 YP4	Usual Installation Adjustments
21YP4A	21 YP4A	Usual Installation Adjustments
	21 AFP4	Ground Conductive Coating
017040	21ZP4	Ground Conductive Coating
21ZP4B	21ZP4A	Usual Installation Adjustments
	21ZP4B 24ADP4	Usual Installation Adjustments
0.445.11	24ADP4 24CP4	Usual Installation Adjustments
24CP4A/	24CP4 24CP4A	Usual Installation Adjustments Usual Installation Adjustments
24TP4/	24CP4A 24QP4	Usual Installation Adjustments
	24GP4 24TP4	Usual Installation Adjustments
24VP4A/	24VP4	Usual Installation Adjustments
24ADP4	24VP4A	Usual Installation Adjustments
	24XP4	Ground Conductive Coating
040044 /	24DP4	Usual Installation Adjustments
24DP4A/	24DP4A	Usual Installation Adjustments
24YP4	24YP4	Usual Installation Adjustments
	27EP4	Usual Installation Adjustments
27EP4	27GP4	Usual Installation Adjustments
4/ LI T	27NP4	Add Filter Capacitor
	27GP4	Ground Conductive Coating
27RP4	27NP4	Usual Installation Adjustments
4/ Ní 7	27RP4	Usual Installation Adjustments
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