



# 12SP7

## OSCILLOGRAPH TUBE

Magnetic Focus  
Magnetic Deflection

Long-Persistence Screen  
54° Deflection Angle

12-9/16" Max. Diameter  
19-1/8" Max. Length

RCA-12SP7 is a 12-inch, directly viewed cathode-ray tube of the magnetic-focus and magnetic-deflection type intended primarily for use in radar indicator service, but it is also useful in general oscillographic applications where a temporary record of electrical phenomena is desired. It utilizes a long-persistence, cascade (two-layer) phosphor which exhibits bluish fluorescence of short persistence and greenish-yellow phosphorescence which persists for several minutes.

The face plate of the 12SP7 is made of Filterglass to provide increased trace contrast and has so slight a curvature that it is almost a flat surface. Therefore, it provides a large useful screen surface in relation to bulb diameter. This large, essentially flat surface facilitates the use of an external, transparent, calibrated scale.

The Filterglass face plate incorporates a neutral light-absorbing material which reduces ambient-light reflections from the phosphor and reflections within the face plate itself in a very much higher ratio than it reduces the directly viewed light of the trace. As a result, improved contrast is obtained.

The electron gun employed in the 12SP7 features a limiting aperture at the end of the electron gun to produce a sharper, rounder spot on the screen, especially when the tube is operated at high beam current, and hence provides greater effective resolution. Because of this feature, the 12SP7 is especially useful in those applications where pulse-modulated operation requires high grid-No.1 drive and resultant high beam current.

### Maximum Ratings, Design-Center Values:

ANODE VOLTAGE. . . . .	10000 max.	volts
GRID-NO.2 VOLTAGE:		
Positive value (DC or Peak AC) . . . . .	410 max.	volts
Negative value (DC or Peak AC) . . . . .	180 max.	volts
GRID-NO.1 VOLTAGE:		
Negative bias value. . . . .	180 max.	volts
Positive bias value# . . . . .	0 max.	volts
Positive peak value. . . . .	2 max.	volts
PEAK GRID-NO.1 DRIVE FROM CUTOFF . . . . .	65 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode . . . . .	125 max.	volts
Heater positive with respect to cathode . . . . .	125 max.	volts

### Typical Operation:

Anode Voltage* . . . . .	9000	volts
Grid-No.2 Voltage. . . . .	250	volts
Grid-No.1 Voltage for Visual Extinction of Undelected Focused Spot. . . . .	-27 to -63	volts
Grid-No.2 Current. . . . .	-15 to +15	μamp
Focusing-Coil Current (DC)** . . . . .	107 ± 10%	ma
Spot Position. . . . .	##	

### Maximum Circuit Values:

Grid-No.1-Circuit Resistance . . . . .	1.5 max.	megohms
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- \* 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, the anode voltage should not be less than 8000 volts.
- \*\* For specimen focusing coil similar to JETEC No.106 with air gap toward tube face, centerline of air gap 3-1/4" from Reference Line (see *Outline Drawing*), and total anode current of 200 microamperes.
- ## The center of the undeflected, unfocused spot will fall within a circle having 18-mm radius concentric with the center of the tube face.

## OPERATING CONSIDERATIONS

The *maximum ratings* in the tabulated data for the 12SP7 are working design-center maximums established according to the standard design-center system of rating electron tubes. Tubes so rated will give satisfactory performance in equipment designed so that these maximum ratings will not be exceeded when the equipment is operated from ac or dc power-line supplies whose normal voltage including normal variations falls within ± 10 per cent of line-center voltage value of 117 volts.

When operated at or below the maximum ratings shown in the tabulated data, *the 12SP7 does not produce any harmful x-ray radiation.* All types of cathode-ray tubes may be operated at voltages (if ratings permit) up to 16 kilovolts (absolute value) without personal injury on prolonged exposure at close range. Above 16 kilovolts, special shielding precautions for x-ray radiation may be necessary.

## DATA

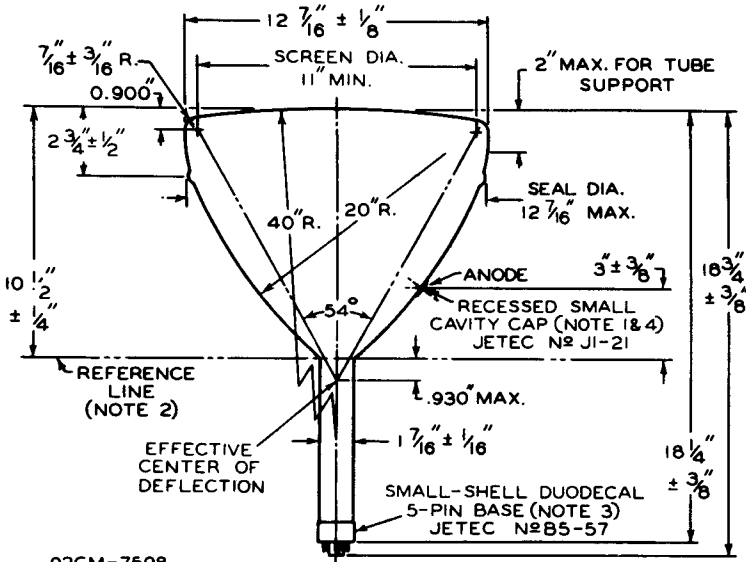
### General:

Heater, for Unipotential Cathode:		
Voltage (AC or DC) . . . . .	6.3	volts
Current. . . . .	0.6	ampere
Direct Interelectrode Capacitances:		
Grid No.1 to All Other Electrodes. . . . .	6	μμf
Cathode to All Other Electrodes. . . . .	5	μμf
Face Plate (With about 66% light transmission) . . . . .	Filterglass	
Phosphor . . . . .	No.7	
Fluorescence . . . . .	Blue	
Phosphorescence. . . . .	Greenish-Yellow	
Persistence. . . . .	Long	
Focusing Method. . . . .	Magnetic	
Deflection Method. . . . .	Magnetic	
Deflection Angle (Approx.) . . . . .	54°	
Overall Length . . . . .	18-3/4" ± 3/8"	
Greatest Diameter of Bulb. . . . .	12-7/16" ± 1/8"	
Minimum Useful Screen Diameter . . . . .	11"	
Cap. . . . . Recessed Small Cavity (JETEC NO.J1-21)		
Base . . . . . Small-Shell Duodecal 5-Pin (JETEC NO.B5-57)		



Location of the deflecting yoke and focusing coil or magnet on neck of the tube must be within a distance of 4-1/4 inches from the Reference Line (see Outline Drawing).

### DIMENSIONAL OUTLINE



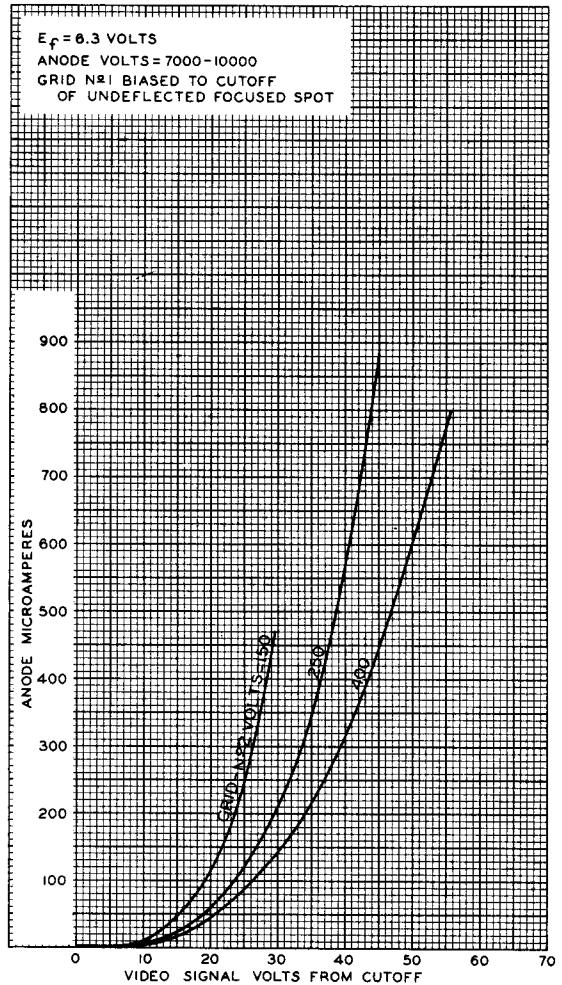
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**NOTE 1:** THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No. 3 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ANODE TERMINAL BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF  $\pm 10^\circ$ . ANODE TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No. 3.

**NOTE 2:** REFERENCE LINE IS DETERMINED BY POSITION WHERE REFERENCE-LINE GAUGE (JETEC No. 112) 1.500" + .003" -.000" I.D. AND 2" LONG WILL REST ON BULB CONE.

**NOTE 3:** SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING DIAMETER OF 1-7/8".

**NOTE 4:** TUBE SUPPORT MUST BE KEPT AT LEAST 2" AWAY FROM ANODE CAP.

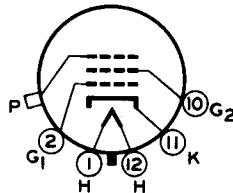


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Average Grid-Drive Characteristics of Type 12SP7.

### SOCKET CONNECTIONS Bottom View

PIN 1: HEATER  
PIN 2: GRID No. 1  
PIN 10: GRID No. 2



PIN 11: CATHODE  
PIN 12: HEATER  
CAP: ANODE

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