

## Image Orthicon

MAGNETIC FOCUS

S-10 RESPONSE

MAGNETIC DEFLECTION

For Color and High-Quality Black-and-White TV Cameras

## GENERAL

## Heater, for Unipotential Cathode

Voltage (AC or DC) . . . . .	6.3 ± 10%	V
Current at 6.3 V. . . . .	0.600	A

## Direct Interelectrode Capacitance

Anode to all other electrodes . . . . .	12	pF
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Maximum Target-to-Mesh Spacing . . . . . 0.0008 in

## Photocathode, Semitransparent

Response. . . . . S-10

Wavelength of maximum response. . . . . 4500 ± 300 angstroms

Retangular image (4 x 3 aspect ratio):<sup>a</sup>Useful size<sup>b</sup> . . . . . 1.8-inch max diagonal

Focusing Method . . . . . Magnetic

Deflection Method . . . . . Magnetic

Overall Length. . . . . 15.2 ± 0.25 in

Greatest Diameter of Bulb . . . . . 3.00 ± 0.06 in

Minimum Deflecting-Coil Inside Diameter . . . . . 2-3/8 in

Deflecting-Coil Length. . . . . 5 in

Focusing-Coil Length. . . . . 10 in

## Alignment Coil

Length. . . . . .15/16 in

Position on neck. . . . . Centerline of coil located 8.5 inches from the flat area of the jumbo annular base

Photocathode Distance Inside End of Focusing Coil . . . . . 1/2 in

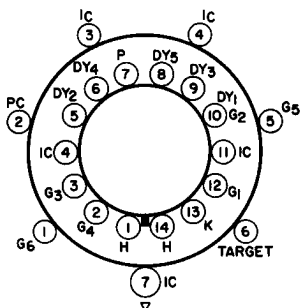
Operating Position. . . . . See *Operating Considerations*

Weight (Approx.). . . . . 1 lb 6 oz

## TERMINAL DIAGRAM (Bottom View)

Shoulder Base: Keyed Jumbo Annular 7-Pin

- Pin 1 - Grid No.6
- Pin 2 - Photocathode
- Pin 3 - Do Not Use
- Pin 4 - Do Not Use
- Pin 5 - Grid No.5
- Pin 6 - Target
- Pin 7 - Do Not Use



Direction of Light: Perpendicular to large End of Tube



## End Base: Small-Shell Diheptal 14-Pin (JEDEC No. B14-45)

Pin 1 - Heater	Pin 8 - Dynode No. 5
Pin 2 - Grid No. 4	Pin 9 - Dynode No. 3
Pin 3 - Grid No. 3	Pin 10 - Dynode No. 1, Grid No. 2
Pin 4 - Do Not Use	Pin 11 - Do Not Use
Pin 5 - Dynode No. 2	Pin 12 - Grid No. 1
Pin 6 - Dynode No. 4	Pin 13 - Cathode
Pin 7 - Anode	Pin 14 - Heater

## ABSOLUTE-MAXIMUM RATINGS

<b>Photocathode</b>		
Voltage . . . . .	-550	V
Illumination . . . . .	50	fc
<b>Operating Temperature</b>		
Of any part of bulb . . . . .	50	°C
Of bulb at large end of tube (Image section). . . . .	35 min	°C
<b>Temperature Difference.</b> . . . . .	5	°C
Between image section and any part of bulb hotter than image section. . . . .		
<b>Grid-No. 6 Voltage</b> . . . . .	-550	V
<b>Target Voltage</b>		
Positive value. . . . .	10	V
Negative value. . . . .	10	V
<b>Grid-No. 5 Voltage</b> . . . . .	150	V
<b>Grid-No. 4 Voltage</b> . . . . .	300	V
<b>Grid-No. 3 Voltage</b> . . . . .	400	V
<b>Grid-No. 2 &amp; Dynode-No. 1 Voltage</b> . . . . .	350	V
<b>Grid-No. 1 Voltage</b>		
Negative-bias value . . . . .	125	V
Positive-bias value . . . . .	0	V
<b>Peak Heater-Cathode Voltage</b>		
Heater negative with respect to cathode . . . . .	125	V
Heater positive with respect to cathode . . . . .	10	V
<b>Anode-Supply Voltage<sup>c</sup></b> . . . . .	1350	V
<b>Voltage Per Multiplier Stage.</b> . . . . .	350	V

## TYPICAL OPERATING VALUES

<b>Photocathode Voltage (Image focus)<sup>d</sup></b> . . . . .	-400 to -540	V
<b>Grid-No. 6 Voltage (Accelerator)—</b>		
Approx. 65% of photocathode voltage. . . . .	-260 to -350	V
<b>Target-Cutoff Voltage<sup>e</sup>.</b> . . . . .	-3 to 1	V
<b>Grid-No. 5 Voltage (Decelerator)</b> . . . . .	0 to 125	V
<b>Grid-No. 4 Voltage (Beam focus)<sup>d</sup></b> . . . . .	140 to 180	V
<b>Grid-No. 3 Voltage<sup>f</sup>.</b> . . . . .	225 to 330	V
<b>Grid-No. 2 &amp; Dynode-No. 1 Voltage</b> . . . . .	300	V
<b>Grid-No. 1 Voltage for Picture Cutoff.</b> . . . . .	-45 to -115	V
<b>Dynode-No. 2 Voltage</b> . . . . .	600	V
<b>Dynode-No. 3 Voltage</b> . . . . .	800	V
<b>Dynode-No. 4 Voltage</b> . . . . .	1000	V
<b>Dynode-No. 5 Voltage</b> . . . . .	1200	V
<b>Anode Voltage</b> . . . . .	1250	V
<b>Target-Temperature Range.</b> . . . . .	35 to 45	°C



Minimum Peak-to-Peak Blanking Voltage . . . . .	5	V
Field Strength at Center of Focusing Coil <sup>a</sup> . . . . .	75	G
Field Strength of Alignment Coil (Approx.). . . . .	0 to 3	G

## PERFORMANCE DATA

*With conditions shown under Typical Operating Values and with picture highlights at the "knee" of the light-transfer characteristic*

	Min	Typ	Max	
Cathode Radiant Sensitivity				
at 4500 angstroms. . . . .	-	0.028	-	$\mu\text{A}/\mu\text{W}$
Anode Current (DC). . . . .	-	30	-	$\mu\text{A}$
Signal-Output Current (Peak to Peak)	5	-	38	$\mu\text{A}$
Ratio of Peak-to-Peak Highlight				
Video-Signal Current to RMS Noise				
Current for Bandwidth of 4.5 Mc/s.	40:1	55:1	-	
Photocathode Illumination at 2870°K				
Required to Reach "Knee" of Light-				
Transfer Characteristic. . . . .	-	0.028	0.04	fc
Amplitude Response at 400 TV Lines				
per Picture Height (Per cent of				
large-area black to large-area				
white) <sup>h</sup> . . . . .	38	55	-	% ←

<sup>a</sup> Proper orientation is obtained when the vertical scan is essentially parallel to the plane passing through center of faceplate and pin 7 of the shoulder base. The horizontal and vertical scan should start at the corner of the raster nearest pin 6 of the shoulder base.

<sup>b</sup> The size of the optical image focused on the photocathode should be adjusted so that its maximum diagonal does not exceed the specified value. The corresponding electron image on the target should have a size such that the corners of the rectangle just touch the target ring.

<sup>c</sup> Ratio of dynode voltages is shown under *Typical Operating Values*.

<sup>d</sup> Direction of current should be such that a north-seeking pole is attracted to the image end of the focusing coil, with the indicator located outside of and at the image end of the focusing coil.

<sup>e</sup> Normal setting of target voltage is +2 volts from target cutoff. The target supply voltage should be adjustable from -3 volts to +5 volts.

<sup>f</sup> Adjust to give the most uniformly shaded picture near maximum signal.

<sup>g</sup> Within this range, the actual focusing-voltage value will not differ by more than 2% from that for any other tube when all other operating conditions are held constant, i.e., when different tubes are operated in the same camera with the same deflecting yoke, with fixed focusing-field current, with grid-No.6 voltage at a fixed percentage of the photocathode voltage, and with all other voltages held constant.

<sup>h</sup> Measured with amplifier having flat frequency responses.

## OPERATING CONSIDERATIONS

The *operating position* of the 7513 should preferably be such that any loose particles in the neck of the tube will not fall down and strike or become lodged on the target. Therefore, it is recommended that the tube never be operated in a vertical position with the Diheptal-base end up nor in any other position where the axis of the tube with base up makes an angle of less than 20° with the vertical.

*Resolution* in excess of 500 lines at the center of the picture can be produced by the 7513.

← Indicates a change.



To utilize the resolution capability of the 7513 in the horizontal direction with the standard scanning rate of 525 lines, it is necessary to use a video amplifier having a bandwidth of at least 6 megacycles.

**SPECTRAL-SENSITIVITY CHARACTERISTIC**  
of Photosensitive Device having S-10 Response  
is shown at the front of this Section

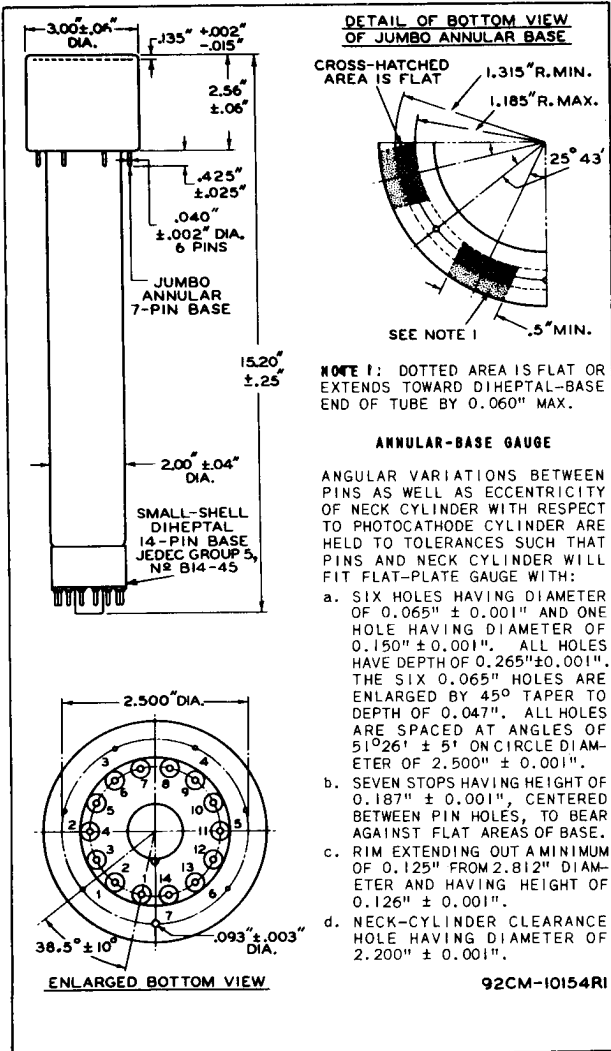




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## IMAGE ORTHICON

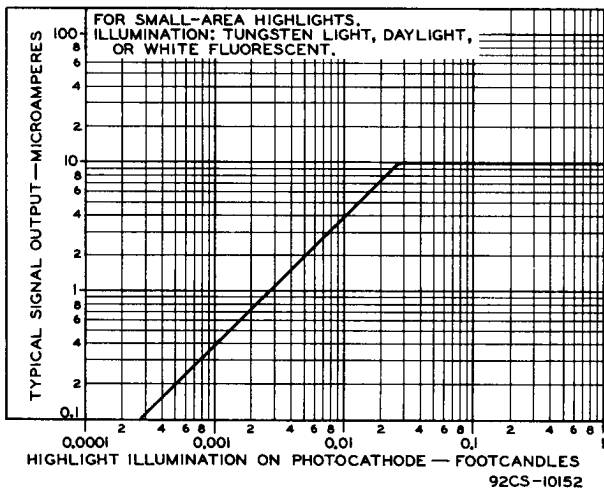


7513



7513

## BASIC LIGHT-TRANSFER CHARACTERISTIC



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY