



7513

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IMAGE ORTHICON

MAGNETIC FOCUS

MAGNETIC DEFLECTION

For color and high-quality black-and-white TV cameras

DATA

General:

Heater, for Unipotential Cathode:

Voltage (AC or DC) $6.3 \pm 10\%$ volts

Current at 6.3 volts. 0.6 amp

Direct Interelectrode Capacitance:

Anode to all other electrodes 12 μf

Maximum Target-to-Mesh Spacing. 0.0008 inch

Photocathode, Semitransparent:

Response. S-10

Wavelength of maximum response. 4500 ± 300 angstroms

Rectangular image (4 x 3 aspect ratio):

Useful size of. 1.8" max. diagonal

Note: 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.

Orientation of. . . Proper orientation is obtained when the vertical scan is essentially parallel to the plane passing through center of face-plate 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.

Focusing Method Magnetic

Deflection Method Magnetic

Overall Length. $15.20" \pm 0.25"$ Greatest Diameter of Bulb $3.00" \pm 0.06"$ Minimum Deflecting-Coil Inside Diameter $2\text{--}3/8"$

Deflecting-Coil Length. 5"

Focusing-Coil Length. 10"

Alignment Coil:

Length. $15/16"$

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

Photocathode Distance Inside End of Focusing Coil . . . $1/2"$ Operating Position. *See Operating Considerations*

Weight (Approx.). 1 lb 6 oz

Shoulder Base Keyed Jumbo Annular 7-Pin

BOTTOM VIEW[■]

Pin 1 - Grid No.6

Pin 5 - Grid No.5

Pin 2 - Photocathode

Pin 3 - Internal Connection—Do Not Use

Pin 6 - Target

Pin 4 - Internal Connection—Do Not Use

Pin 7 - Internal Connection—Do Not Use

[■] See basing diagram on next page.

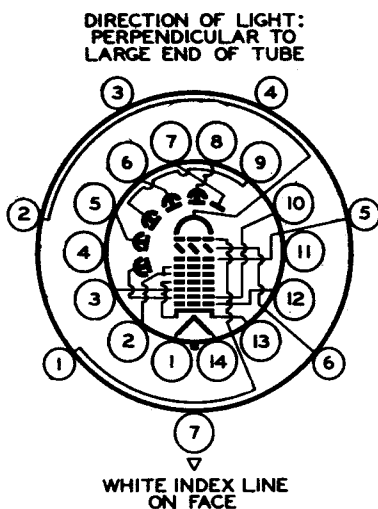


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End Base. Small-Shell Diheptal 14-Pin
(JEDEC Group 5, No.B14-45)
BOTTOM VIEW

- Pin 1-Heater
Pin 2-Grid No.4,
Field-Mesh Grid
Pin 3-Grid No.3
Pin 4-Internal Connec-
tion—Do Not Use
Pin 5-Dynode No.2
Pin 6-Dynode No.4
Pin 7-Anode
Pin 8-Dynode No.5
Pin 9-Dynode No.3
Pin 10-Dynode No.1,
Grid No.2
Pin 11-Internal Connec-
tion—Do Not Use
Pin 12-Grid No.1
Pin 13-Cathode,
Suppressor Grid
Pin 14-Heater



NOTE: In the tube symbol, the suppressor grid connected to the cathode, and the field-mesh grid connected to grid No.4, are intentionally without numbers to avoid upsetting industry practice of associating functional camera control knobs with specific grid numbers. For example, beam-focus control is generally associated with knob identified as G_4 (grid No.4).

Maximum and Minimum Ratings, Absolute-Maximum Values:

PHOTOCATHODE:

Voltage -550 max. volts
Illumination 50 max. fc

OPERATING TEMPERATURE:

Of any part of bulb 50 max. °C
Of bulb at large end of tube
(Image section) 35 min. °C

TEMPERATURE DIFFERENCE:

Between image section and any part
of bulb hotter than image section 5 max. °C

GRID-No.6 VOLTAGE -550 max. volts

TARGET VOLTAGE:

Positive value 10 max. volts
Negative value 10 max. volts

GRID-No.5 VOLTAGE 150 max. volts

GRID-No.4 VOLTAGE 300 max. volts

GRID-No.3 VOLTAGE 400 max. volts

GRID-No.2 & DYNODE-No.1 VOLTAGE 350 max. volts

GRID-No.1 VOLTAGE:

Negative-bias value 125 max. volts
Positive-bias value 0 max. volts



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PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	125 max.	volts
Heater positive with respect to cathode	10 max.	volts
ANODE-SUPPLY VOLTAGE*	1350 max.	volts
VOLTAGE PER MULTIPLIER STAGE.	350 max.	volts

Typical Operating Values:

Photocathode Voltage (Image focus)* . .	-400 to -540	volts
Grid-No.6 Voltage (Accelerator)—		
Approx. 65% of photocathode voltage .	-260 to -350	volts
Target-Cutoff Voltage*	-3 to +1	volts
Grid-No.5 Voltage (Decelerator)	0 to 125	volts
Grid-No.4 Voltage (Beam focus)*	140 to 180	volts
Grid-No.3 Voltage*	225 to 330	volts
Grid-No.2 & Dynode-No.1 Voltage	300	volts
Grid-No.1 Voltage for picture cutoff. .	-45 to -115	volts
Dynode-No.2 Voltage	600	volts
Dynode-No.3 Voltage	800	volts
Dynode-No.4 Voltage	1000	volts
Dynode-No.5 Voltage	1200	volts
Anode Voltage	1250	volts
Target-Temperature Range.	35 to 45	°C
Minimum Peak-to-Peak Blanking Voltage .	5	volts
Field Strength at Center		
of Focusing Coil [▲]	75	gausses
Field Strength of Alignment		
Coil (Approx.)	0 to 3	gausses

Performance Data:

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

Min. Average Max.

Cathode Radiant Sensitivity			
at 4500 angstroms	—	0.028	— $\mu\text{a}/\mu\text{w}$
Anode Current (DC)	—	30	— μa
Signal-Output Current			
(Peak to Peak)	5	—	38 μa
Ratio of Peak-to-Peak High-			
light Video-Signal Current			
to RMS Noise Current for			
Bandwidth of 4.5 Mc	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)**	28	35	— %



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- * Ratio of dynode voltages is shown under *Typical Operating Values*.
- ⊕ 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.
- Normal setting of target voltage is +2 volts from target cutoff. The target supply voltage should be adjustable from -3 to +5 volts.
- # Adjust to give the most uniformly shaded picture near maximum signal.
- ▲ 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.
- ** Measured with amplifier having flat frequency response.

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.

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.

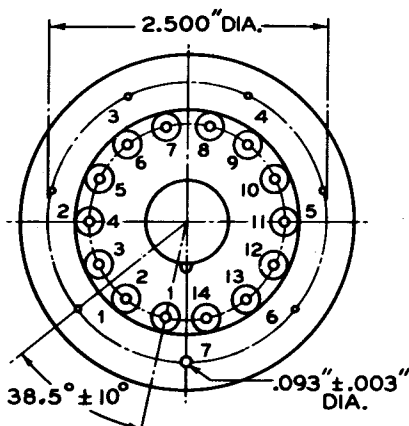
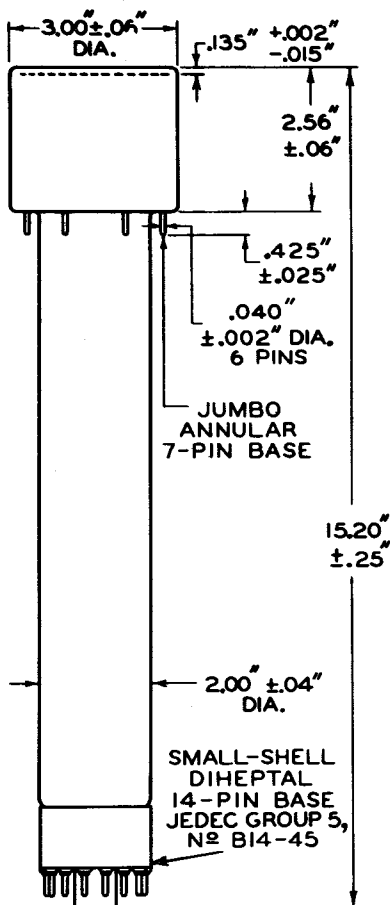
SPECTRAL-SENSITIVITY CHARACTERISTIC
of Photosensitive Device having S-10 Response
is shown at the front of this Section



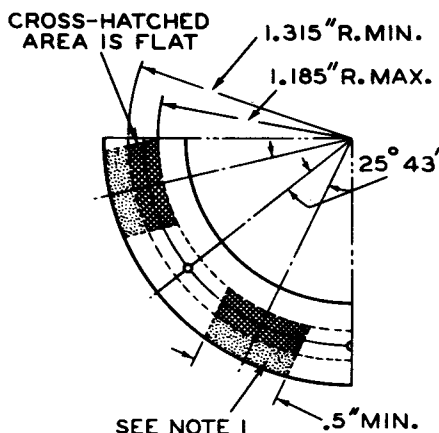
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ENLARGED BOTTOM VIEW

DETAIL OF BOTTOM VIEW OF JUMBO ANNULAR BASE

SEE NOTE 1

NOTE 1: DOTTED AREA IS FLAT OR EXTENDS TOWARD DIHEPTAL-BASE END OF TUBE BY 0.060 " MAX.

ANNULAR-BASE GAUGE

ANGULAR VARIATIONS BETWEEN PINS AS WELL AS ECCENTRICITY OF NECK CYLINDER WITH RESPECT TO PHOTOCATHODE CYLINDER ARE HELD TO TOLERANCES SUCH THAT PINS AND NECK CYLINDER WILL FIT FLAT-PLATE GAUGE WITH:

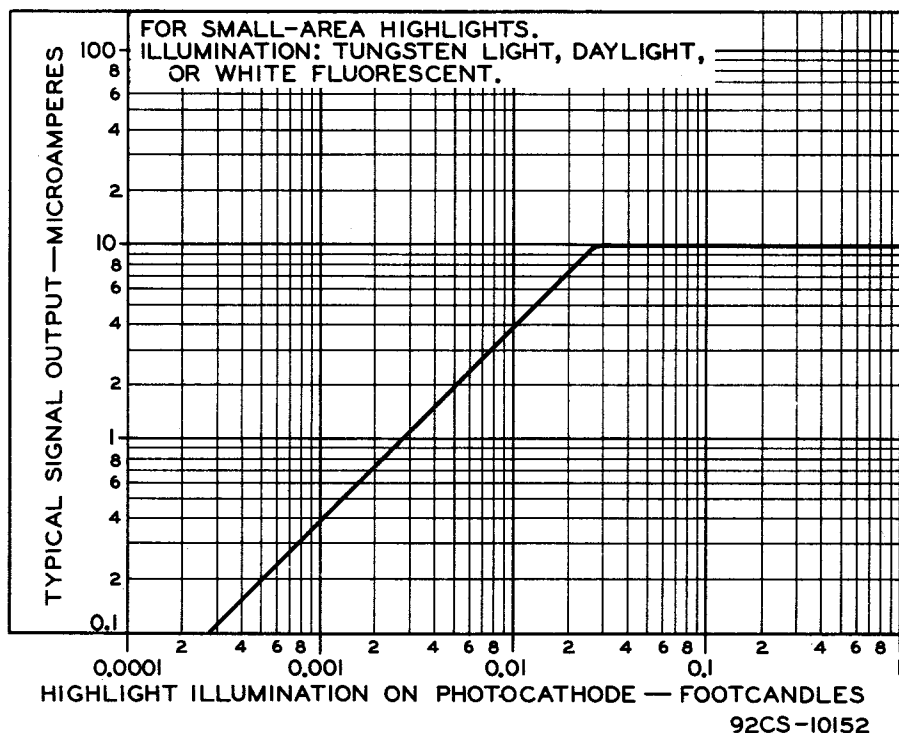
- SIX HOLES HAVING DIAMETER OF 0.065 " ± 0.001 " AND ONE HOLE HAVING DIAMETER OF 0.150 " ± 0.001 ". ALL HOLES HAVE DEPTH OF 0.265 " ± 0.001 ". THE SIX 0.065 " HOLES ARE ENLARGED BY 45° TAPER TO DEPTH OF 0.047 ". ALL HOLES ARE SPACED AT ANGLES OF $51^\circ 26' \pm 5'$ ON CIRCLE DIAMETER OF 2.500 " ± 0.001 ".
- SEVEN STOPS HAVING HEIGHT OF 0.187 " ± 0.001 ", CENTERED BETWEEN PIN HOLES, TO BEAR AGAINST FLAT AREAS OF BASE.
- RIM EXTENDING OUT A MINIMUM OF 0.125 " FROM 2.812 " DIAMETER AND HAVING HEIGHT OF 0.126 " ± 0.001 ".
- NECK-CYLINDER CLEARANCE HOLE HAVING DIAMETER OF 2.200 " ± 0.001 ".

92CM-10154R1

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BASIC LIGHT-TRANSFER CHARACTERISTIC**ELECTRON TUBE DIVISION**

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY