

Image Orthicon

SEMICONDUCTIVE TARGET, S-20 RESPONSE

VERY HIGH SENSITIVITY
 VERY HIGH RESOLUTION

MAGNETIC FOCUS
 MAGNETIC DEFLECTION

For Extremely Low-Light-Level Black-and-White TV
 Pickup High-Resolution Pictures at 10^{-5} Foot-
 candle, and Useful Pictures at 10^{-6} Footcandle

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 pf

Spectral Response S-20

Wavelength of Maximum Response. . . . 4200 ± 500 angstroms

Photocathode, Semitransparent:

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 faceplate and pin 7 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 $2\frac{3}{8}"$

Deflecting Coil Cleveland Electronics,
 Part No.OY-1^a, or equivalent

Deflecting-Coil Length. 5"

Focusing Coil Cleveland Electronics,
 Part No.OF-2^a, or equivalent

Focusing Coil Length 10"

Alignment Coil. Cleveland Electronics,
 Part No.OA-3^a, or equivalent

Alignment-Coil Length $15\frac{1}{16}"$

Photocathode Distance Inside End of Focusing Coil . . . $1\frac{1}{2}"$

Socket. Cinch Part No.3M14^b, or equivalent

Operating Position. . The tube should 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 the base up makes an angle of less than 20° with the vertical.

Weight (Approx.). 1 lb 6 oz



Shoulder Base. Keyed Jumbo Annular 7-Pin

BOTTOM VIEW

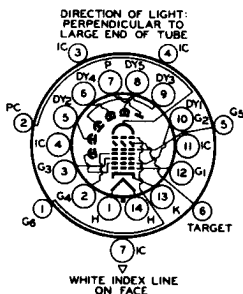
Pin 1 -Grid No.6
Pin 2 -Photocathode
Pin 3 -Do Not Use
Pin 4 -Do Not Use

Pin 5 -Grid No.5
Pin 6 -Target
Pin 7 -Do Not Use

End Base Small-Shell Diheptal 14-Pin (JEDEC No.814-45)

BOTTOM VIEW

Pin 1 -Heater
Pin 2 -Grid No.4
Pin 3 -Grid No.3
Pin 4 -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 -Do Not Use
Pin 12 -Grid No.1
Pin 13 -Cathode
Pin 14 -Heater



Maximum and Minimum Ratings, Absolute-Maximum Values:

PHOTOCATHODE:

Voltage. -550 max. volts
Illumination 50 max. fc

MAXIMUM OPERATING PHOTOCATHODE

ILLUMINATION 0.001 max. fc

OPERATING TEMPERATURE:

Any part of bulb 55 max. °C
Of bulb at large end of tube
(Target section) 0 min. °C

TEMPERATURE DIFFERENCE:

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

GRID-No.6 VOLTAGE -550 max. volts

TARGET VOLTAGE:

Positive value 4 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

VOLTAGE PER MULTIPLIER STAGE 350 max. volts

ANODE-SUPPLY VOLTAGE^c. 1350 max. volts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. . .	125 max.	volts
Heater positive with respect to cathode. . .	10 max.	volts

Typical Operating Values:^d

Photocathode Voltage (Image Focus).	-400 to -540	volts
Grid-No.6 Voltage (Accelerator)- (Approx. 75% photocathode voltage)	-300 to -405	volts
Target-Cutoff Voltage ^e	-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 ^f	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
Minimum Peak-to-Peak Blanking Voltage	5	volts
Field Strength at Center of Focusing Coil ^g	75	gausses
Field Strength of Alignment Coil	0 to 3	gausses

Performance Data:^h

With conditions shown under Typical Operating Values and with an illumination level on the photocathode of 0.00001 footcandle

Min. Typ. Max.

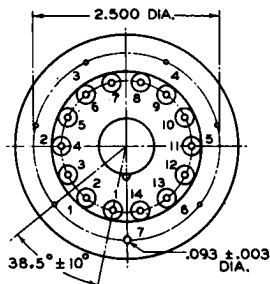
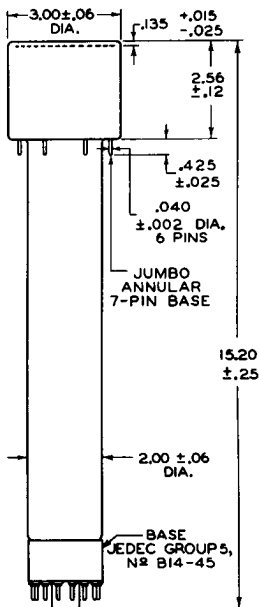
Cathode Radiant Sensitivity at 4200 angstroms.	-	0.073	-	a/w
Luminous Sensi- tivity.	120	170	-	$\mu\text{a/lm}$
Anode Current (DC).	-	0.3	-	μa
Signal-Output Current (Peak to Peak).	-	0.1	-	μa
Ratio of Peak-to- Peak Highlight Video-Signal Current to RMS Noise Current for Bandwidth of 4.5 Mc	-	3:1	-	
Limiting Hori- zontal Resolution	-	650	-	TV Lines



- ^a Made by Cleveland Electronics Inc., 1974 East 61st Street, Cleveland, Ohio.
- ^b Made by Cinch Manufacturing Company, 1026 South Homan Avenue, Chicago 24, Illinois.
- ^c Dynode voltage values are shown under *Typical Operating Values*.
- ^d With 7967 operated in properly adjusted RCA TK-31 camera.
- ^e Normal setting of target voltage is +2 volts from target cutoff. The target supply voltage should be adjustable from -3 to 5 volts.
- ^f Adjust to give the most uniformly shaded picture near maximum signal.
- ^g Direction of current should be such that a north-seeking pole is attracted to the image end of the focusing coil, with indicator located outside of and at the image end of the focusing coil.
- ^h With output from the 7967 coupled into a low-noise video amplifier.

**SPECTRAL-SENSITIVITY CHARACTERISTIC
OF PHOTSENSITIVE DEVICE HAVING S-20 Response
is shown at front of this Section**

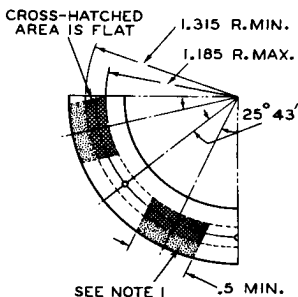




ENLARGED BOTTOM VIEW

92CM-8293R3

DIMENSIONS IN INCHES

DETAIL OF BOTTOM VIEW
OF JUMBO ANNULAR BASE

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

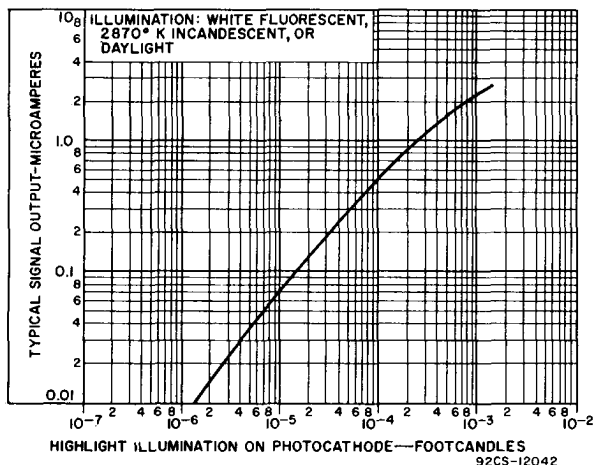
ANNULAR BASE GAUGE

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 $0.065" \pm 0.001"$ and one hole having diameter of $0.150" \pm 0.001"$. All holes have depth of $0.265" \pm 0.001"$. 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 $2.500" \pm 0.001"$.
- Seven stops having height of $0.187" \pm 0.001"$, 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 $0.126" \pm 0.001"$.
- Neck-cylinder clearance hole having diameter of $2.200" \pm 0.001"$.



BASIC LIGHT-TRANSFER CHARACTERISTIC



EFFECT OF PHOTOCATHODE ILLUMINATION ON LIMITING RESOLUTION OF TYPICAL 7967

ILLUMINATION: 2870° K INCANDESCENT, DAYLIGHT, OR WHITE
FLUORESCENT
BANDWIDTH OF SYSTEM = 9 Mc
TEMPERATURE OF IMAGE SECTION = 40° C

