7198

IMAGE ORTHICON

MAGNETIC FOCUS — MAGNETIC DEFLECTION

Shock and vibration resistant
For use under adverse environmental conditions

DATA

General:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.6	amp
Direct Interelectrode Capacitance:		
Anode to all other electrodes	12	μμf
Wavelength of Maximum Response	4500 ± 300	angstroms
Photocathode, Semitransparent:		
Response		S-10
Rectangular image (4 x 3 or 3 x 4 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 or horizontal 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" ± 0.25"
Greatest Diameter of Bulb	3.00" ± 0.06"
Minimum Deflecting-Coil Inside Diameter	2.38"
Deflecting-Coil Length	5"
Focusing-Coil Length	10"
Alignment-Coil Length	0.94"
Photocathode Distance Inside End of Focusing Coil	0.50"
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 2 – Photocathode
Pin 3 – Internal Connection—Do Not Use
Pin 4 – Internal Connection—Do Not Use
Pin 5 – Grid No.5
Pin 6 – Target
Pin 7 – Internal Connection—Do Not Use

■ See basing diagram on next page.

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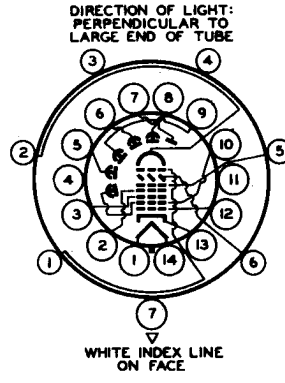
IMAGE ORTHICON

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

Pin 1 – Heater
Pin 2 – Grid No.4
Pin 3 – Grid No.3
Pin 4 – Internal Connection—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 Connection—Do Not Use
Pin 12 – Grid No.1
Pin 13 – Cathode
Pin 14 – Heater



Maximum and Minimum Ratings, *Absolute-Maximum Values:*

PHOTOCATHODE:		
Voltage	−650 max.	volts
Illumination.	50 max.	fc
OPERATING TEMPERATURE:		
Of any part of bulb	71 max.	°C
Of bulb at large end of tube (Image section)	20 min.	°C
TEMPERATURE DIFFERENCE:		
Between image section and any part of bulb hotter than image section . .	7.5 max.	°C
STORAGE-TEMPERATURE RANGE	−65 to +71	°C
GRID-No.6 VOLTAGE	−650 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	400 max.	volts
GRID-No.1 VOLTAGE:		
Negative-bias value	125 max.	volts
Positive-bias value	0 max.	volts
DYNODE-No.2-TO-DYNODE-No.1 VOLTAGE. . . .	350 max.	volts
DYNODE-No.3-TO-DYNODE-No.2 VOLTAGE. . . .	350 max.	volts
DYNODE-No.4-TO-DYNODE-No.3 VOLTAGE. . . .	680 max.	volts
DYNODE-No.5-TO-DYNODE-No.4 VOLTAGE. . . .	350 max.	volts
ANODE-TO-DYNODE-No.5 VOLTAGE.	100 max.	volts
ANODE SUPPLY VOLTAGE*	1850 max.	volts

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IMAGE ORTHICON

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:

Photocathode Voltage (Image focus) . .	-400 to -600	volts
Grid-No.6 Voltage (Accelerator)— Approx. 75% of photocathode voltage .	-300 to -450	volts
Target-Cutoff Voltage●	-3 to +1	volts
Grid-No.5 Voltage (Decelerator). . . .	0 to 125	volts
Grid-No.4 Voltage (Beam focus)	130 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 altitude up to 60,000 feet (unless otherwise noted)

Cathode Radiant Sensitivity at 4500 angstroms.	0.028 μa/μw
Anode Current (DC)—For Highlight Illumination on Photocathode at 0.01 footcandle.	30 μa
Signal-Output Current (Peak to peak)	*See Curve*
Ratio of Peak-to-Peak Video-Signal Current to RMS Noise Current for Bandwidth of 9 Mc.	*See Curve*
Center Square-Wave Amplitude Response**.	*See Curves*

Vibration Tests. These tests are performed on a sample lot of tubes from each production run with highlight illumination on photocathode of 0.003 footcandle. Tubes and their associated components# are vibrated on apparatus providing dynamic conditions similar to those described in MIL-E-5272A□, paragraph 4.7.1.

Resonance. Tubes and associated components# are vibrated (per the method of MIL-E-5272A□, paragraph 4.7.1.1) at 25° C and at vibration accelerations not exceeding 10 g in each of three mutually perpendicular axes for 3 hours or one million cycles, whichever is less. After vibration,

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IMAGE ORTHICON

the center resolution of the tubes will be at least 525 lines as determined with an RETMA Resolution Chart, or equivalent, with not more than 0.003-footcandle highlight illumination on the photocathode.

Cycling. Tubes and associated components[#] are vibrated (per the method of MIL-E-5272A[□], paragraph 4.7.1.2 pertaining to specimen without vibration isolators) in each of three mutually perpendicular axes at 25° C and at vibration accelerations not exceeding 5 g. One survey cycle is made for each axis. The cycle has a duration of one hour during which time the frequency is varied from 5 to 500 and back to 5 cycles per second. During this test, the tubes will maintain center resolution of at least 350 lines as determined with an RETMA Resolution Chart, or equivalent, with not more than 0.003-footcandle highlight illumination on the photocathode. After vibration the center resolution, determined under the same conditions as above, will be at least 525 lines.

Shock Tests. These tests are performed on a sample lot of tubes from each production run with no voltages applied to the tubes. Tubes alone are subjected in these tests (per the method of MIL-E-5272A[□], paragraph 4.15.2.1) to 12 impact shocks of 30 g, each shock impulse having a time duration of 11 ± 1 milliseconds. The intensity is within ± 10 per cent as measured with a filter having a bandwidth of 0.2 to 250 cycles per second. The maximum g is reached in approximately 5-1/2 milliseconds. The shock is applied in the following directions: a) vertically, perpendicular to longitudinal axis, 3 shocks in each direction; b) horizontally, perpendicular to longitudinal axis, 3 shocks in each direction. After shock tests, the tubes are operable and will have resolution of at least 525 lines as determined with an RETMA Resolution Chart, or equivalent, with not more than 0.003-footcandle highlight illumination on the photocathode.

Temperature-Humidity Tests. These tests are performed on a sample lot of tubes from each production run and with no voltages applied to the tubes. The tubes are subjected (per MIL-E-005272B(USAF)[●], paragraph 4.4.1, Procedure I) to relative humidities up to and including 95 per cent at temperatures up to and including +71° C. Following this test the tubes are operative, and there will be no picture streaking or other evidence of arcing when operated under the following conditions: grid-No.1 voltage adjusted for cutoff; photocathode voltage = -650 volts; grid-No.6 voltage = -650 volts; dynode-No.2 voltage = 700 volts; dynode-No.3 voltage varied from 780 to 1050 volts; dynode-No.4 voltage = 1400 volts; dynode-No.5 voltage = 1750 volts; and anode voltage = 1850 volts. In addition, the leakage resistance

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IMAGE ORTHICON

determined separately between each of six specific Diheptal-base pins (pins 5,6,7,8,9, and 10) and the 13 other Diheptal-base pins tied together and grounded will be greater than 500 megohms when a voltage of 350 volts is applied between that specific pin and the others.

* Ratio of dynode voltages is shown under *Typical Operating Values.*

● 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 produce maximum signal.

♦ 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.

** Measured with amplifier having flat frequency response.

\# Tube sockets and components assembly which consists of the deflecting coils, focusing coil, and alignment coil.

□ 1 January 1956.

● 5 June 1957.

OPERATING CONSIDERATIONS

The *operating position* of the 7198 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 capability of 7198 is in excess of 600 TV lines.

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

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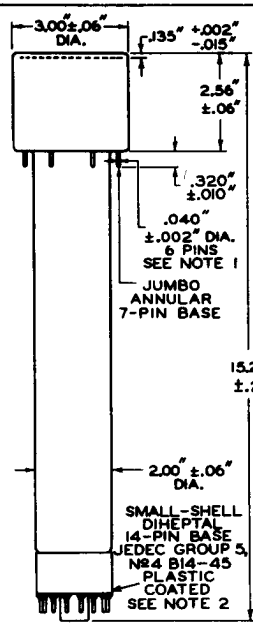
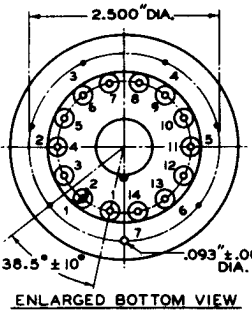
IMAGE ORTHICON





ENLARGED BOTTOM VIEW

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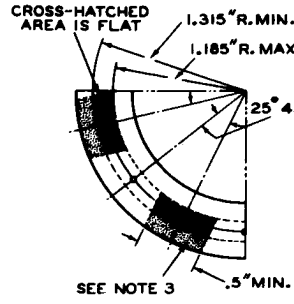
NOTE 1: ENDS OF PINS CHAMFERED 45°; FLAT ENDS 0.020" ± 0.010".

DETAIL OF BOTTOM VIEW OF JUMBO ANNULAR BASE



NOTE 2: PLASTIC COATING MAY INCREASE DIAMETER OF BASE SHELL TO 2.08" MAX. AND MAY INCREASE HEIGHT OF BASE SHELL BY 0.03" MAX.

NOTE 3: 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:

a. 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°26' ± 5' ON CIRCLE DIAMETER OF 2.500" ± 0.001".

b. SEVEN STOPS HAVING HEIGHT OF 0.187" ± 0.001", CENTERED BETWEEN PIN HOLES, TO BEAR AGAINST FLAT AREAS OF BASE.

c. RIM EXTENDING OUT A MINIMUM OF 0.125" FROM 2.812" DIAMETER AND HAVING HEIGHT OF 0.126" ± 0.001".

d. NECK-CYLINDER CLEARANCE HOLE HAVING DIAMETER OF 2.200" ± 0.001".

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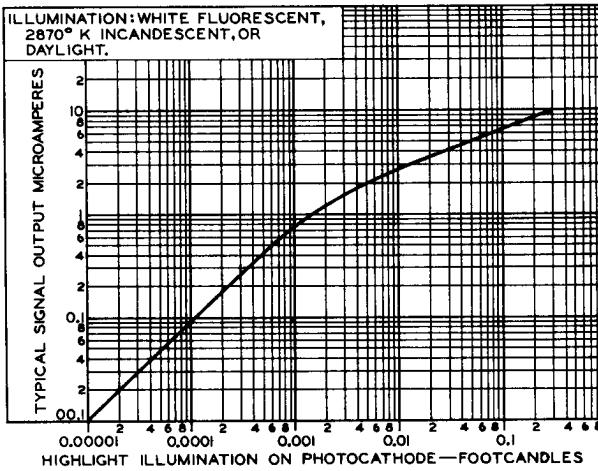
BASIC LIGHT-TRANSFER CHARACTERISTIC



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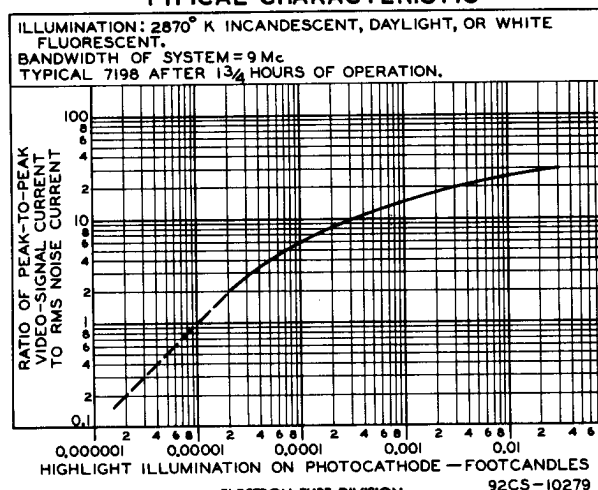
TYPICAL CHARACTERISTIC



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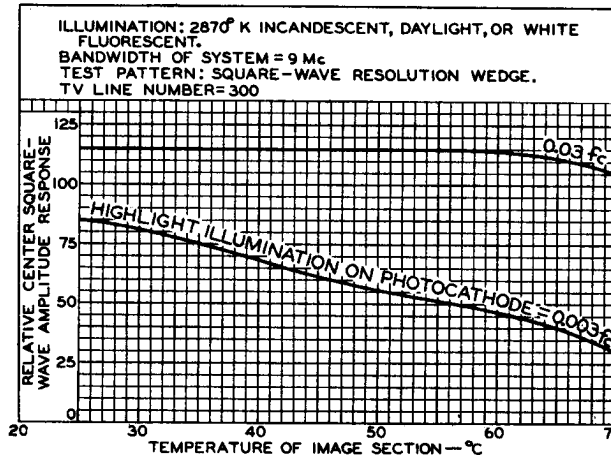
TYPICAL CHARACTERISTICS



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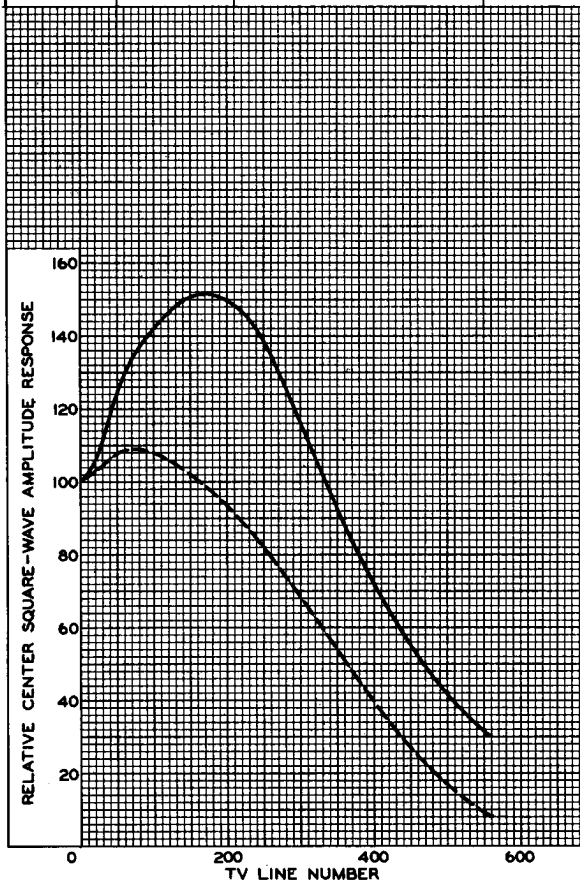
TYPICAL CHARACTERISTICS

ILLUMINATION: 2870° K INCANDESCENT, DAYLIGHT, OR WHITE FLUORESCENT.
BANDWIDTH OF SYSTEM = 9Mc
TEMPERATURE OF IMAGE SECTION = 40° C
TYPICAL 7198 AFTER 1 3/4 HOURS OF OPERATION.

CURVE	HIGHLIGHT ILLUMINATION ON PHOTOCATHODE
———	0.03 FOOTCANDLE
— — —	0.003 FOOTCANDLE



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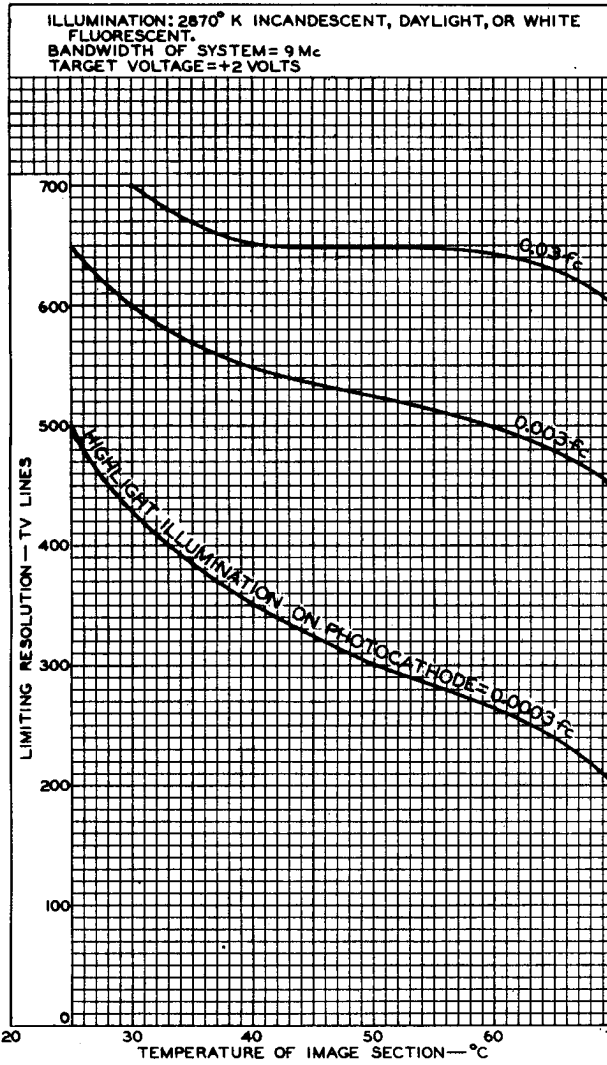
TYPICAL CHARACTERISTICS



RCA

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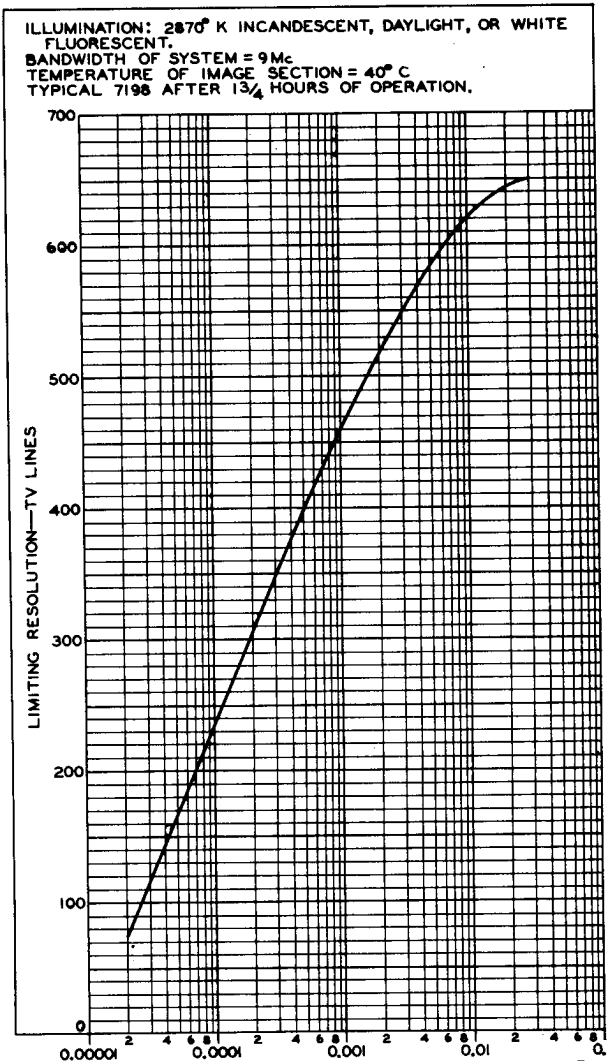
TYPICAL CHARACTERISTIC



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