5820
IMAGE ORTHICON
For outdoor and studio pickup

DATA

MAGNETIC FOCUS

MAGNETIC DEFLECTION

General:
Heater, for Unipotential Cathode:
Voltage ............... 6.3 ± 10% ........ ac or dc volts
Current ............... 0.6 ................ amp
Direct Interelectrode Capacitance:
Anode to all other electrodes .......... 12 μf
Photocathode, Semitransparent:
Response .............. See accompanying Spectral-Sensitivity-Characteristics curves
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" ± 0.25"
Greatest Diameter of Bulb .......... 3.00" ± 0.06"
Minimum Deflecting-Coil Inside Diameter .......... 2-3/8"
Deflecting-Coil Length ........ 5"
Focusing-Coil Length .......... 10"
Alignment-Coil Length .......... 15/16"
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 6—Target
Pin 3—Internal Connec-
tion—Do Not Use Pin 7—Internal Connec-
tion—Do Not Use
Pin 4—Internal Connec-
tion—Do Not Use

See basing diagram on next page.

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ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

Indicates a change.
End Base... Small-Shell Diheptal 14-Pin (JETEC 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 Values:

Photocathode:
Voltage .................................. -550 max. volts
Illumination ................................ 50 max. ft-c

Operating Temperature:
Of any part of bulb ..................... 50 max. °C
Of bulb at large end of tube
(Target section) ......................... 35 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 .................................. 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

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

*: See next page.
Typical Operation and Characteristics:

Photocathode Voltage (Image Focus) ... -400 to -540 volts
Grid-No.6 Voltage (Accelerator)—
  Approx. 75% of photocathode voltage ... -300 to -405 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
Anode Current (DC) ... 30 µA
Signal-Output Current (Peak to peak) ... 3 to 24 µA
Target-Temperature Range ... 35 to 45 °C
Ratio of Peak-to-Peak Highlight
  Video-Signal Current to RMS Noise Current (Approx.) ... 35
Minimum Peak-to-Peak Blanking Voltage ... 5 volts
Field Strength at Center of Focusing Coil ▲ ... 75 gauss
Field Strength of Alignment Coil (Approx.) ... 0 to 3 gauss

° 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.
▲ 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.

Operating Considerations:

The operating position of the 5820 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 Dihedral-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.

When the equipment—design or operating conditions are such that the maximum temperature rating or maximum temperature difference as given under Maximum and Minimum Ratings will be exceeded, provision should be made to direct a blast of cooling air from the Dihedral-base end of the tube along the entire length of the bulb surface, i.e., through the space between the bulb surface and the surrounding deflecting-coil assembly and its extension. Any attempt to effect cooling — indicates a change.
of the tube by circulating even a large amount of air around the focusing coil will do little good, but a small amount of air directly in contact with the bulb surface will effectively drop the bulb temperature. For this purpose, a small blower is satisfactory, but it should be run at low speed to prevent vibration of the 5820 and the associated amplifier equipment. Unless vibration is prevented, distortion of the picture may occur.

To keep the operating temperature of the large end of the tube from falling below 35°C, some form of controlled heating should be employed. Ordinarily, adequate heat will be supplied by the focusing coil, deflecting coils, and associated amplifier tubes so that the temperature can be controlled by the amount of cooling air directed along the bulb surface. If, in special cases, a target heater is required, it should fit between the focusing coil and the bulb near the shoulder of the tube, and be non-inductively wound.

Resolution in excess of 500 lines at the center of the picture can be produced by the 5820. The Square-Wave Response Characteristics curves show the center square-wave amplitude response versus television line number for the 5820 when it is operated with the highlights at the knee of the light-transfer characteristic and at one lens stop above the knee and at a temperature of 35°C. The values of response plotted on the curves are those obtained after optimum adjustments are made.

To utilize the resolution capability of the 5820 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.

For very high illumination or for individual tubes with exceptionally high photocathode sensitivity, it may not be possible to stop the lens down far enough to reduce the high-light illumination on the photocathode to a value near the knee of the transfer characteristic. When such a condition is encountered, the use of a Wratten neutral filter selected to give the required reduction in illumination is recommended. Ordinarily, two filters—one having 10% transmission and the other 20%—will give sufficient choice. Such filters with lens-adapter rings can be obtained at a photographic-supply store.
IMAGE ORTHICON 5820

DETAIL OF BOTTOM VIEW OF JUMBO ANNULAR BASE

CROSS-HATCHED AREA IS FLAT

1.315" R.MIN.
1.185" R.MAX.

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:

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".

b. SEVEN HOLES HAVING DEPTH 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".

ENLARGED BOTTOM VIEW

2.00" ± 0.06" DIA.

3.00" ± 0.06" DIA.

JUMBO ANNULAR 7-PIN BASE

SMALL-SHELL DIHEPTAL 14-PIN BASE

5820

JETEC N° B14-45

2.500" DIA.

38.5° ± 10°

.093" ± .003" DIA.

RCA

ENLARGED BOTTOM VIEW

92CM-8293R3

7-58

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-8293R3
SPECTRAL-SENSITIVITY CHARACTERISTICS

FOR INCIDENT RADIANT ENERGY WITHIN NORMAL OPERATING RANGE OF TUBE.

CURVE A: WITHOUT FILTER.
CURVE B: WITH WRATTEN N°6 FILTER.
CURVE C: SPECTRAL CHARACTERISTIC OF AVERAGE HUMAN EYE.
SQUARE-WAVE RESPONSE CHARACTERISTICS

TEST PATTERN: SQUARE WAVE.
OPERATING TEMPERATURE OF BULB ADJACENT TO TARGET: 35°C.
RESPONSE MEASURED IN SYSTEM HAVING 10-Mc BANDWIDTH.

<table>
<thead>
<tr>
<th>CURVE</th>
<th>HIGHLIGHTS IN RELATION TO LIGHT TRANSFER CHARACTERISTIC AT KNEE</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>ONE LENS STOP ABOVE KNEE</td>
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<tr>
<td>B</td>
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CENTER SQUARE-WAVE AMPLITUDE RESPONSE—PER CENT

TELEVISION LINE NUMBER

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARIBSON, NEW JERSEY

92CM-8439RI
ILLUSTRATION: TUNGSTEN LIGHT, DAY-LIGHT, OR WHITE FLUORESCENT, FOR SMALL-AREA HIGHLIGHTS.

TYPICAL SIGNAL OUTPUT—MICROAMPERES

0.0001 0.001 0.01 0.1
HIGHLIGHT ILLUMINATION ON PHOTOCATHODE—FOOT-CANDLES

92CS-7296R2