GL-8093

IMAGE ORTHICON

FIELD MESH **3 IN. DIAMETER, MAXIMUM**

MAGNETIC FOCUS AND DEFLECTION

The GL-8093 is a television camera tube for studio pickup service where high quality of performance is required and lighting can be controlled.

The construction of the target-mesh assembly assures a high signal-to-noise ratio, particularly desirable for video-taping requirements. The GL-8093 also features a field mesh in the scanning section which enhances picture quality by providing sharp transition from black to white without spurious effect (white edges) and by improving flatness of field and corner resolution.

A suppressor grid maintains high signal-to-noise ratio by preventing field-mesh secondary electrons from entering the electron multiplier.

A photocathode with a spectral response close to that of the eye permits portrayal of scenes in nearly their true tonal gradation.

In operation alignment is performed with the lens open on a chart or scene since dynode aperatures are not visible with the lens capped.

The tube is interchangeable with the GL-5820, -7293 and 7513.

Electrical

Cathode—Unipotential
Heater Voltage, AC or DC ..... 6.3 ± 10% Volts
Heater Current ..... 0.6 Ampere
Photocathode—Semi-transparent
  Response—S-10
  Rectangular Image, 4 by 3 aspect ratio
    Useful Size, maximum diagonal ..... 1.8 Inches
    Orientation—Proper orientation is obtained when the vertical scan is essentially parallel to the plane passing through the center of the faceplate and pin No. 7 of the shoulder base.
Focusing Method—Magnetic
Deflecting Method—Magnetic
Direct Interelectrode Capacitance
  Anode to All Other Electrodes ..... 12 $\mu\mu f$

Mechanical

Over-all Length	15.20 ± 0.25	Inches
Greatest Diameter of Bulb	3.00 ± 0.06	Inches
Minimum Deflecting-Coil Inside Diameter	2⅜	Inches
Deflecting-Coil Length	5	Inches
Focusing-Coil Length	10	Inches
Alignment-Coil Length	1.5/16	Inch
Photocathode Distance Inside End of Focusing Coil	½	Inch
Weight, approximate	1.4	Pounds

Operating Position—Any, except with diheptal base up and the tube axis at an angle of less than 20 degrees from vertical.

Thermal

Operating Temperature of Any Part of Bulb	50	C
Operating Temperature of Bulb at Large End of Tube, Target Section, Minimum	35	C
Temperature Difference Between Target Section and Any Part of Bulb—Hotter than Target Section	5	C

3418

MAXIMUM RATINGS—ABSOLUTE VALUES

Photocathode Voltage	−550	Volts
Photocathode Illumination	50	Foot-Candles
Anode Supply Voltage*	1350	Volts
Grid-No. 1 Voltage		
Negative-Bias Value	125	Volts
Positive-Bias Value	0	Volt
Grid-No. 2 and Dynode-No. 1 Voltage	350	Volts
Grid-No. 3 Voltage	400	Volts
Grid-No. 4 Voltage	300	Volts
Grid-No. 5 Voltage	150	Volts
Grid-No. 6 Voltage	−550	Volts
Voltage per Multiplier Stage		Its
Target Voltage		
Positive Value	10	Volts
Negative Value	10	Volts
Peak Heater-Cathode Voltage		
Heater Negative with Respect to Cathode	125	Volts
Heater Positive with Respect to Cathode	10	Volts

from JEDEC release #3417, Sept. 11, 1961

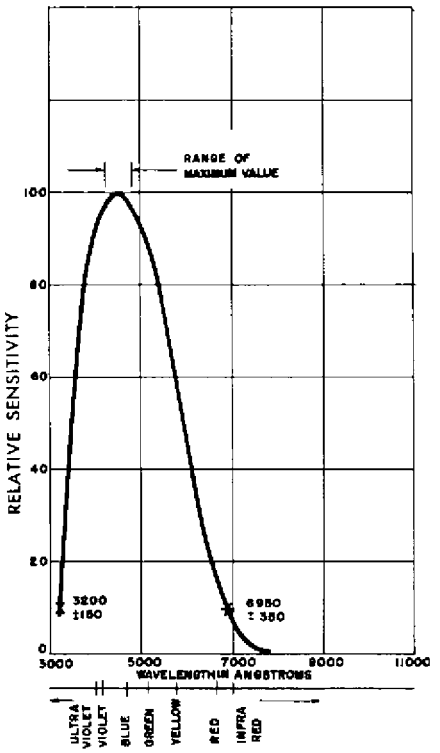
TYPICAL OPERATION

Photocathode Voltage, image focus	−400 to −540	Volts
Grid-No. 1 Voltage for Picture Cutoff, beam	−45 to −115	Volts
Grid-No. 2 and Dynode-No. 1 Voltage	300	Volts
Grid-No. 3 Voltage†, multiplier focus	225 to 330	Volts
Grid-No. 4 Voltage, beam focus	140 to 180	Volts
Grid-No. 5 Voltage, decelerator	0 to 125	Volts
Grid-No. 6 Voltage, accelerator—75 percent of Photocathode Voltage, approximate	−300 to −405	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
DC Anode Current, average	30	Microamperes
Signal Output Current, peak-to-peak	5 to 30	Microamperes
Target Voltage‡		
Target Cutoff Voltage‡	−3 to +1	Volts
Target Temperature Range	35 to 45	C
Ratio of Peak-to-Peak Highlight Video Signal Current to RMS Noise Current:		
Minimum	38	
Average	50	
Photocathode Illumination at 2870°K Required to Reach Knee of Light Transfer Characteristic, approximate	0.018	Foot-Candle
Minimum Peak-to-Peak Blanking Voltage	5	Volts
Field Strength at Center of Focusing Coils§	75	Gausses
Field Strength of Alignment Coil** approximate	0 to 3	Gausses

* Ratio of dynode voltages is shown under Typical Operation.
† Adjust to give maximum signal.
‡ Adjustable from −3 to +5 volts with blanking voltage off. Normal setting of target voltage is +2 volts from target cutoff.
§ 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.
**Adjusted to produce flattest field with maximum response. Alignment is correct when the center of the picture merely goes through focus and does not rotate when beam focus (Grid-No. 4) is varied.

SPECTRAL-SENSITIVITY CHARACTERISTIC—S-10 RESPONSE

For Equal Values of Radiant Flux at All Wavelengths



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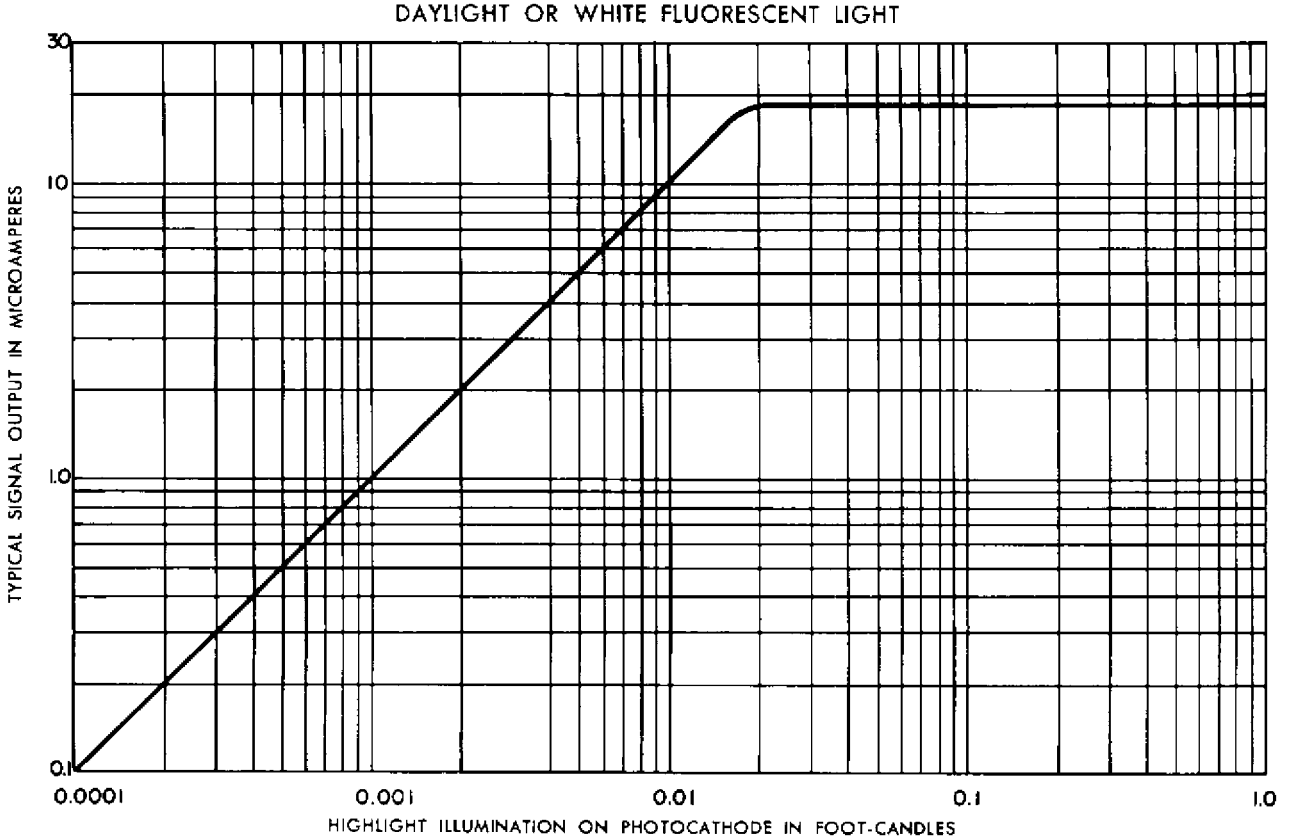
"X"-POINTS REPRESENT 10 PERCENT OF MAXIMUM RESPONSE.

4-26-60

TYPICAL SIGNAL OUTPUT

SCENE: BLACK AND WHITE BALANCED TUNGSTEN, DAYLIGHT OR WHITE FLUORESCENT LIGHT



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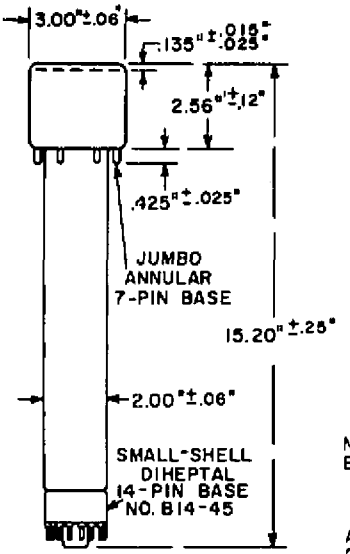
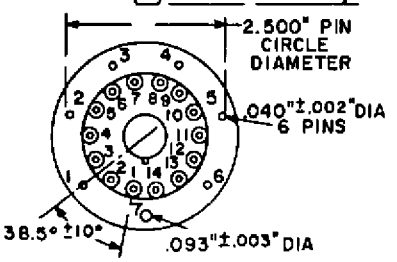
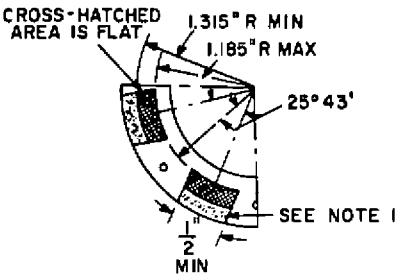




ENLARGED BOTTOM VIEW



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 GAGE

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 GAGE WITH:

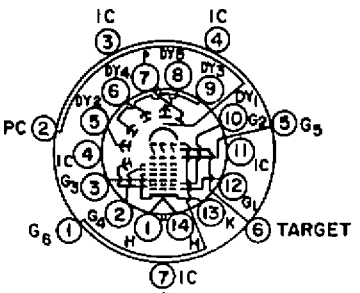
a. SIX HOLES HAVING DIAMETER OF 0.065"±.001" AND ONE HOLE HAVING DIA OF 0.150"±0.001". ALL HOLES HAVE DEPTH OF 0.265"±0.001". THE SIX 0.065" HOLES ARE ENLARGED BY 45° TAPER TO DEPTH OF 0.047". ALL HOLES ARE SPACED AT ANGLES OF 51° 26'±8' ON CIRCLE DIAMETER OF 2.500"±0.001".

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 OF 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".

DIRECTION OF LIGHT: PERPENDICULAR TO LARGE END OF TUBE



WHITE INDEX LINE ON FACE

BOTTOM VIEW

BASING DIAGRAM

SMALL-SHELL DIHEPTAL 14-PIN BASE

PIN 1: HEATER
PIN 2: GRID NO. 4 & FIELD MESH
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. 6
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 AND 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).

KEYED JUMBO ANNULAR 7-PIN BASE

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