Oscillograph Tube

ELECTROSTATIC FOCUS
ELECTROSTATIC DEFLECTION

General:

DATA

Heater, for Unipotential Cathode:
Voltage.............. 2.5 ac or dc volts
Current.............. 2.1 amp

Direct Interelectrode Capacitances (Approx.):
Grid No.1 to All Other Electrodes...... 10.5 µf
DJ1 to DJ2.............. 2.0 µf
DJ3 to DJ4.............. 1.0 µf
Phosphor (For Curves, see front of this Section) No.1
Fluorescence.............. Green
Persistence.............. Medium

Focusing Method.............. Electrostatic
Deflection Method.............. Electrostatic
Overall Length.............. 20-1/16" ± 3/8"
Greatest Diameter of Bulb.............. 9-1/4" ± 1/8"
Minimum Useful Screen Diameter.............. 8-1/4"
Mounting Position.............. Any

Caps:
Anode No.2.............. Medium
Deflecting Electrodes (Four).............. Small

Base.............. Long Medium-Shell Small 6-Pin

BOTTOM VIEW

Pin 1 – Heater
Pin 2 – Anode No.1
Pin 3 – Grid No.2
Pin 4 – Grid No.1
Pin 5 – Cathode
Pin 6 – Heater
Single Medium Cap –
Anode No.2
Cap over (Deflecting Electrode
Pin 2) over (Deflecting Electrode
DJ1) over (Deflecting Electrode
DJ2)
Cap over (Deflecting Electrode
Pin 5) over (Deflecting Electrode
DJ3)
Cap over (Deflecting Electrode
Pin 1 & 6) over (Deflecting Electrode
DJ4)

DJ1 and DJ2 are nearer the screen
DJ3 and DJ4 are nearer the base

With DJ1 positive with respect to DJ2 the spot is deflected toward pin 2. With DJ3 positive with respect to DJ4, the spot is deflected toward pins 1 and 6.

The angle between the trace produced by DJ1 and DJ2 and its intersection with the plane through the tube axis and pin 2 does not exceed 10°.

The angle between the trace produced by DJ3 and DJ4 and the trace produced by DJ1 and DJ2 is 90° ± 6°.

Maximum Ratings, Design-Center Values:

ANODE- No. 2 VOLTAGE.............. 7000 max. volts
ANODE- No. 1 VOLTAGE.............. 1900 max. volts

The product of anode-No. 2 voltage and average anode-No. 2 current should never exceed 6 watts.

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GRID No.2 VOLTAGE: ........................................... 300 max. volts
GRID No.1 VOLTAGE:
    Negative bias value: ..................................... 125 max. volts
    Positive bias value: ...................................... 0 max. volts
    Positive peak value: ..................................... 2 max. volts
PEAK VOLTAGE BETWEEN ANODE No.2
AND ANY DEFLECTING ELECTRODE: ........ 3000 max. volts
PEAK HEATER-CATHODE VOLTAGE:
    Heater negative with respect to cathode: 125 max. volts
    Heater positive with respect to cathode: 125 max. volts

Equipment Design Ranges:
For any anode-No.2 voltage ($E_b$) between 1500 and 7000 volts:
Anode-No.1 Voltage: ........ 15% to 26% of $E_b$ ....... volts
Grid-No.2 Voltage ......... 250 ........ volts
Max. Grid-No.1 Voltage for Visual Cutoff: .... 30% of $E_b$ ....... volts
Max. Anode-No.1 Current Range: .... 15 to +10 ....... µamp
Deflection Factors:
    $D_1$ to $D_2$: ........ 38 to 54 $\nu$ dc/in./kv of $E_b$
    $D_2$ to $D_4$: ........ 30 to 44 $\nu$ dc/in./kv of $E_b$

Examples of Use of Design Ranges:
For Anode-No.2 Volt. of 1500 2500 5000 7000 volts
Anode-No.1 Voltage .... 225-390 375-650 750-1300 1050-1800 volts
Grid-No.2 Voltage .... 250 250 250 250 volts
Max. Grid-No.1 Volt. ... for Visual Cutoff .... -75 -75 -75 -75 volts
Deflection Factors:
    $D_1$ to $D_2$: ........ 57-81 93-135 190-270 266-378 $\nu$ dc/in.
    $D_2$ to $D_4$: ........ 45-66 75-110 150-220 210-308 $\nu$ dc/in.

Maximum Circuit Values:
Grid-No.1-Circuit Resistance ........ 1.5 max. megohms
Resistance in Any Deflecting-Electrode
Circuit ........ 5 max. megohms

Minimum Circuit Values:
The power supply should be of the limited-energy type with inherent regulation to limit the continuous short-circuit current to 5 milliamperes. If the supply permits the instantaneous short-circuit current to exceed 1 ampere, or is capable of storing more than 250 microcoulombs, the effective resistance in circuit between indicated electrode and the output

* Brilliance and definition decrease with decreasing anode-No.2 voltage. In general, anode-No.2 voltage should not be less than 1500 volts.

☐ It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

Indicates a change.
capacitor should be as follows:
Grid-No.1 - Circuit Resistance .......... 150 min. ohms
Grid-No.2 - Circuit Resistance .......... 330 min. ohms
Anode-No.1 - Circuit Resistance .......... 2000 min. ohms
Anode-No.2 - Circuit Resistance .......... 8200 min. ohms

The resistors should be capable of withstanding the applied voltages.
TYPICAL OSCILLOGRAPH CIRCUIT

C₁ = FILTER CAPACITOR 0.5 to 2.0 μF
C₂, C₃, C₄, C₅ = SEE NOTE
R₁ + R₂ + R₃ + R₄ + R₅ = BLEEDER POTentiOMETER
R₆ = 2.5 MEGOhMS
R₇ = 0.5 MEGOhMS
R₈ = 0.375 MEGOhMS
R₉ = 0.125 MEGOhMS
R₁₀ = 0.050 MEGOhMS
R₁₁ = SEE ON

NOTE: When the cathode or the negative end of the cathode-ray high-voltage supply is grounded, blocking capacitors C₂, C₃, C₄, and C₅ should have a high voltage rating. When anode No. 2 is grounded, C₂, C₃, C₄, and C₅ may be low-voltage capacitors.

For dc amplifier service, the deflecting electrodes should be coupled directly to the output of the amplifier by omitting the blocking capacitors. In addition, it will usually be preferable to remove the associated deflecting-electrode resistor in order to minimize the loading effect of the resistor on the dc amplifier. With the resistor removed, it is essential, in order to minimize spot defocusing, that anode No. 2 be returned to some point in the dc amplifier circuit such that the potential difference between anode No. 2 and the average voltage across the deflecting electrodes will be as low as possible.

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OSCILLOGRAPH TUBE

G. OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF BOTTOM OF THE BASE.

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AVERAGE CHARACTERISTICS

$E_F = 2.5$ VOLTS
ANODE-N°1 VOLTS ADJUSTED TO GIVE FOCUS
GRID-N°2 VOLTS = 2.50