



3WPI

OSCILLOGRAPH TUBE

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

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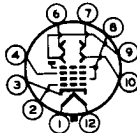
DATA

General:

- Heater, for Unipotential Cathode:
 - Voltage 6.3 ac or dc volts
 - Current 0.6 ± 10% amp
- Direct Interelectrode Capacitances:
 - Grid No.1 to all other electrodes 4.6 to 8.7 μf
 - Cathode to all other electrodes 3 to 5.7 μf
 - Deflecting electrode DJ₁ to
 - deflecting electrode DJ₂ 1.7 to 3.3 μf
 - Deflecting electrode DJ₃ to
 - deflecting electrode DJ₄ 1 to 2 μf
 - DJ₁ to all other electrodes 5.5 to 10.5 μf
 - DJ₂ to all other electrodes 5.5 to 10.5 μf
 - DJ₃ to all other electrodes 3.5 to 6.8 μf
 - DJ₄ to all other electrodes 3.5 to 6.8 μf
- Faceplate, Flat Clear Glass
- Phosphor (For Curves, see front of this Section) P1
- Fluorescence Green
- Phosphorescence Green
- Persistence Medium
- Focusing Method Electrostatic
- Deflection Method Electrostatic
- Deflecting-electrode
 - arrangement See Dimensional Outline
- Overall Length 11-1/2" ± 1/8"
- Greatest Diameter of Bulb 3" ± 1/16"
- Minimum Useful Screen Diameter 2-3/4"
- Minimum Useful Scan (Centered with
 - respect to tube face):
 - By deflecting electrodes DJ₁ & DJ₂ 2-1/2"
 - By deflecting electrodes DJ₃ & DJ₄ 2-1/4"
- Weight (Approx.) 1 lb
- Mounting Position Any
- Bulb J24R
- Base Small-Shell Duodecal 10-Pin (JETEC No. B10-75),
or Small-Shell Duodecal 12-Pin (JETEC No. B12-43)

Basing Designation for BOTTOM VIEW 12T

- Pin 1 - Heater
- Pin 2 - Grid No.1
- Pin 3 - Cathode
- Pin 4 - Grid No.3
- Pin 6 - Deflecting Electrode DJ₁
- Pin 7 - Deflecting Electrode DJ₂
- Pin 8 - Ultor (Grid No.2, Grid No.4, Collector)
- Pin 9 - Deflecting Electrode DJ₄
- Pin 10 - Deflecting Electrode DJ₃
- Pin 12 - Heater



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Maximum Ratings, Design-Center Values:

ULTOR VOLTAGE.	2500 max.	volts
ULTOR INPUT (AVERAGE).	6 max.	watts
GRID-No.3 VOLTAGE.	1000 max.	volts
GRID-No.1 VOLTAGE:		
Negative bias value.	200 max.	volts
Positive bias value.	0 max.	volts
Positive peak value.	0 max.	volts
PEAK VOLTAGE BETWEEN ULTOR AND ANY DEFLECTING ELECTRODE		
	500 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	180 max.	volts
Heater positive with respect to cathode.	180 max.	volts

Equipment Design Ranges:

For any ultor voltage (E_{c4}) between recommended minimum and 2500 volts*

Grid-No.3 Voltage for Focus.	16.5% to 31% of E_{c4}	volts
Grid-No.1 Voltage for Visual Ex- tinction of Unde- flected Focused Spot	-3% to -5% of E_{c4}	volts
Grid-No.3 Current for Any Operat- ing Condition.	-15 to +10	μ a
Deflection Factors:		
DJ ₁ & DJ ₂	41.5 to 50.5	v dc/in./kv of E_{c4}
DJ ₃ & DJ ₄	28.5 to 35	v dc/in./kv of E_{c4}
Spot Position.	##	

Examples of Use of Design Ranges:

<i>For ultor voltage of</i>	<i>1000</i>	<i>1500</i>	<i>2000</i>	<i>volts</i>
Grid-No.3 Volt- age for Focus.	165 to 310	247 to 465	330 to 620	volts
Grid-No.1 Voltage for Visual Ex- tinction of Undeflected Focused Spot .	-30 to -50	-45 to -75	-60 to -100	volts
Deflection Factors:				
DJ ₁ & DJ ₂	41.5 to 50.5	62.3 to 75.8	83 to 101	v dc/in.
DJ ₃ & DJ ₄	28.5 to 35	42.8 to 52.5	57 to 70	v dc/in.

* Brilliance and definition decrease with decreasing ultor voltage. Recommended minimum for the 3WPI in general service is 1000 volts but a value as low as 500 volts may be used under conditions of low-velocity deflection and low ambient-light levels.

##: See next page.



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Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max.	megohms
Resistance in Any Deflecting-Electrode Circuit [■]	5 max.	megohms

SPECIAL PERFORMANCE DATA

For ultor voltage of 1500 volts

Line Width [▲]	0.026 max.	inch
Peak Grid-No.1 Drive from Spot Cutoff [▲]	50 max.	volts
Raster Shape	§	
Deflection Factor Uniformity	↓	

^{##} With grid-No.1 voltage adjusted to give a spot that is just visible, and the tube shielded from all extraneous fields, the center of the undeflected focused spot will fall within a circle of 3/16-inch radius concentric with the center of the tube face.

[■] It is recommended that the deflecting-electrode-circuit resistances be approximately equal.

[▲] Under the following conditions: heater voltage of 6.3 volts, brightness of 7 foot-lamberts measured on a 2" x 2", 49-line raster with high-frequency scanning applied to deflecting electrodes DJ₁ and DJ₂. For *line-width measurement*, the high-frequency scanning is adjusted to give a raster width of 6.9 cm with the grid-No.3 voltage adjusted to give sharpest focus at center of tube face. Raster height is contracted until the individual scanning lines are just barely distinguishable. *Line width* is expressed as the quotient of the contracted raster height measured at the center line of the tube face divided by the number of scanning lines (49).

[§] Under the following conditions: heater voltage of 6.3 volts, grid-No.3 voltage adjusted for focus, and grid-No.1 voltage adjusted to give visible raster. With 49-line raster centered with respect to the tube face and size adjusted to give mean dimensions of 1.875" in 1DJ2 direction and 1.688" in 3DJ4 direction, all points on the raster will lie within the area between the two rectangles also centered with respect to the tube face; the one, 1.920" in 1DJ2 direction by 1.730" in 3DJ4 direction; the other, 1.830" in 1DJ2 direction and 1.646" in 3DJ4 direction.

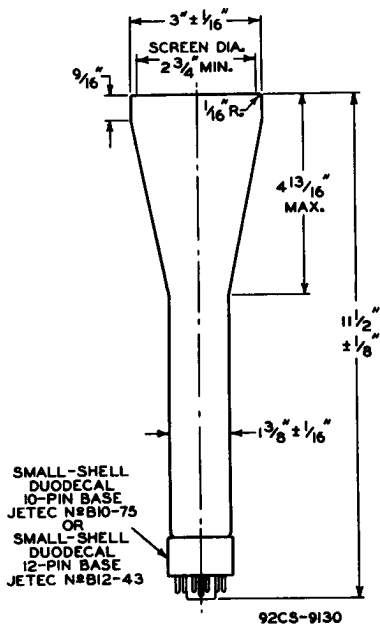
[↓] The deflection factor for either DJ₁ and DJ₂ electrodes or DJ₃ and DJ₄ electrodes for a deflection of less than 75 per cent of the respective useful scan will not differ from the deflection factor for the corresponding deflecting electrodes at 25 per cent of the useful scan by more than 2 per cent.

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

THE PLANE THROUGH THE TUBE AXIS AND PIN 3 MAY VARY FROM THE TRACE PRODUCED BY DJ_1 AND DJ_2 BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF $\pm 10^\circ$. ANGLE BETWEEN $DJ_1 - DJ_2$ TRACE AND $DJ_3 - DJ_4$ TRACE IS $90^\circ \pm 1^\circ$.

DJ_1 AND DJ_2 ARE NEARER THE SCREEN; DJ_3 AND DJ_4 ARE NEARER THE BASE. WITH DJ_1 POSITIVE WITH RESPECT TO DJ_2 , THE SPOT WILL BE DEFLECTED TOWARD PIN 3; LIKewise, WITH DJ_3 POSITIVE WITH RESPECT TO DJ_4 , THE SPOT WILL BE DEFLECTED TOWARD PIN 12.

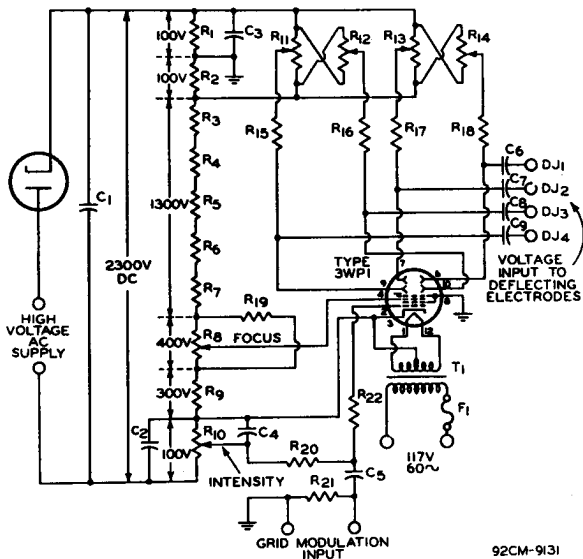


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OSCILLOGRAPH TUBE

TYPICAL OSCILLOGRAPH CIRCUIT



92CM-9131

C1: 0.5 μ f, 3000 volts
 C2: 8 μ f, 250 volts
 C3: 1 μ f, 200 volts
 C4: 1 μ f, 200 volts
 C5: 0.05 μ f, 3000 volts
 C6 C7 C8 C9: 0.05 μ f, 600 volts
 R1 R2: 510000 ohms, 1/2 watt
 R3 R4 R5 R6: 270000 ohms, 1/2 watt
 R7: 220000 ohms, 1/2 watt
 R8: 500000-ohm potentiometer, 1/2 watt
 R9: 300000 ohms, 1/2 watt
 R10: 100000-ohm potentiometer, 1/2 watt

R11 R12: Dual 1-megohm potentiometer, 1/2 watt
 R13 R14: Dual 1-megohm potentiometer, 1/2 watt
 R15 R16 R17 R18: 1.5 megohms, 1/2 watt
 R19: 2 megohms, 1 watt
 R20: 510000 ohms, 1/2 watt
 R21: 5 megohms, 1/2 watt
 R22: 5100 ohms, 1/2 watt
 T1: Transformer, with 6.3-volt/1-ampere secondary, insulated for at least 3000 volts, such as Thordarson T26F65.
 F1: 1-ampere fuse

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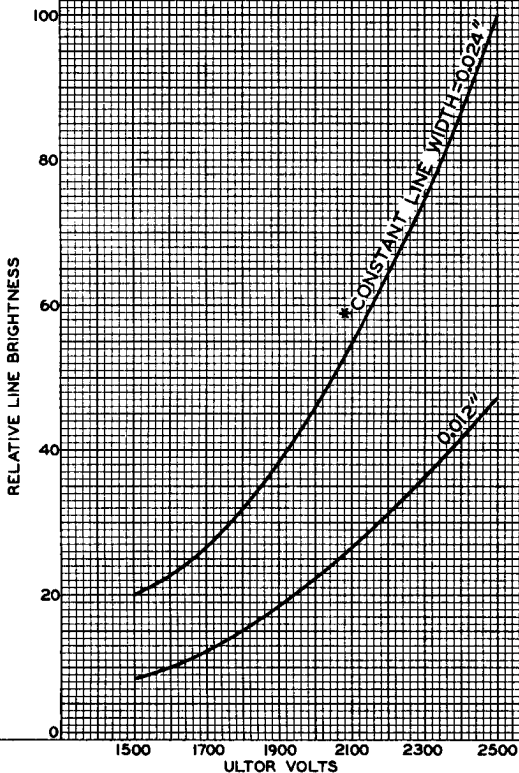
AVERAGE CHARACTERISTICS

$E_f = 6.3$ VOLTS

GRID-N#3 VOLTS ADJUSTED FOR FOCUS.

GRID-N#1 VOLTS ADJUSTED TO GIVE ULTOR-CURRENT VALUE REQUIRED TO MAINTAIN CONSTANT LINE WIDTH AT DIFFERENT ULTOR VOLTAGES. FOR A GIVEN ULTOR VOLTAGE, LINE WIDTH AND RELATIVE LINE BRIGHTNESS INCREASE WITH INCREASE IN ULTOR CURRENT.

* LINE WIDTH MEASURED BETWEEN POINTS WHERE BRIGHTNESS WAS APPROX. $1/2$ THAT AT CENTER OF LINE.



TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

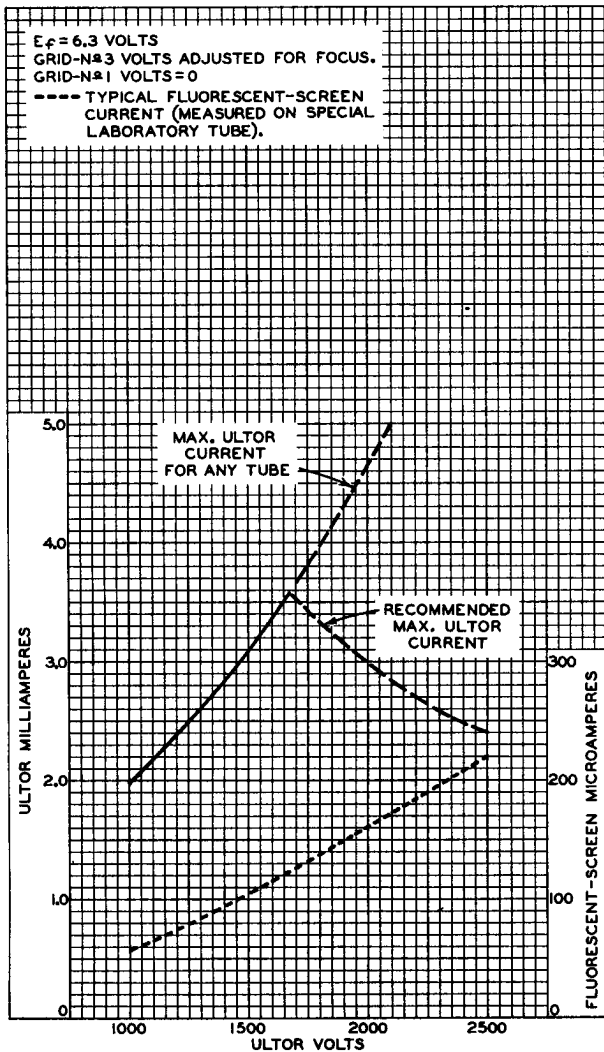
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CHARACTERISTICS



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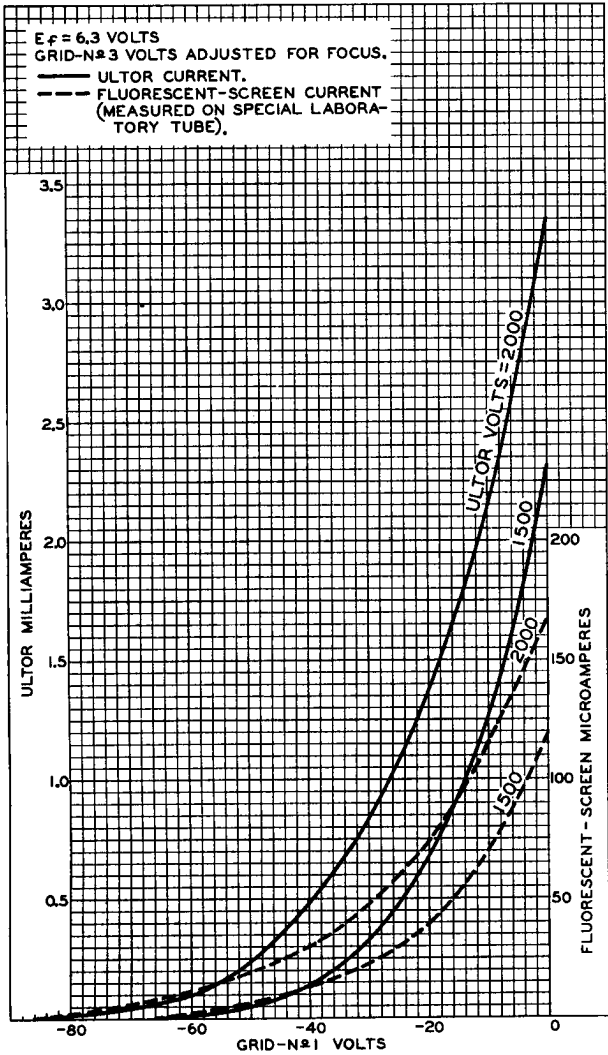
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AVERAGE CHARACTERISTICS



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3WP2

OSCILLOGRAPH TUBE

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

3WP2
3WP11

The 3WP2 is the same as the 3WP1 except for the following items:

General:

Phosphor (For Curves, see front of this Section)	. . . . .	P2
Fluorescence	. . . . .	Greenish-Yellow
Phosphorescence	. . . . .	Greenish-Yellow
Persistence	. . . . .	Long

Line width and drive values for the 3WP2 are the same as those shown for type 3WP1 under the heading SPECIAL PERFORMANCE DATA and are based upon operation at brightness values calculated from 3WP1 performance.

3WP11

OSCILLOGRAPH TUBE

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

The 3WP11 is the same as the 3WP1 except for the following items:

General:

Phosphor (For Curves, see front of this Section)	. . . . .	P11
Fluorescence	. . . . .	Blue
Phosphorescence	. . . . .	Blue
Persistence	. . . . .	Short

Line width and drive values for the 3WP11 are the same as those shown for type 3WP1 under the heading SPECIAL PERFORMANCE DATA and are based upon operation at brightness values calculated from 3WP1 performance.