5ATP- CATHODE-RAY TUBES

The Du Mont Type 5ATP- are high-voltage, tight-tolerance electrostatically focused and deflected cathode-ray tubes operating on the new mono-accelerator principle.

Mono-accelerator construction provides a considerable improvement in the performance of cathode-ray tubes with no sacrifice in spot size, trace brilliance or deflection sensitivity. In the radically new electron gun, all beam acceleration takes place *before* the beam enters the deflection system. Under this arrangement, the beam path is such that field distortion is virtually non-existent. This distortion eliminated, excellent deflection linearity is achieved as well as uniform spot size and intensity over the entire scanned area.

The 5ATP- is designed for accelerating potentials up to 6000 volts. At this voltage, screen illumination comparable to other tube designs, operating at voltages up to 60% higher, is obtained with much greater deflection sensitivity. The deflection sensitivity is further increased through location of the deflection plates so that the useful screen area measures 2.5 x 4 inches, with the shorter dimension in the Y-axis. Critical tolerances of mono-accelerator design only possible through Du Mont pioneered tight-tolerance construction.

Deflection-plate connections are brought out through the tube wall at the neck to minimize lead inductance and capacitance. A flat faceplate reduces measurement error owing to parallax between screen and scale. These features, combined with the high degree of accuracy inherent in the tight-tolerance design make the Type 5ATP- particularly well suited for accurate analysis of high frequencies and rapidly occurring pulses and transients.

GENERAL CHARACTERISTICS

Electrical Data

		Min.	Max.	
Focusing Method			Electrostatic	
Deflecting Method			Electrostatic	
Direct Interelectrode Capacitances		Min.	Max.	
Cathode to all other electrodes		3.3	6.1	$\mu\mu$f.
Grid #1 to all other electrodes		5.8	11.0	$\mu\mu$f.
D1 to D2		2.1	3.9	$\mu\mu$f.
D3 to D4		1.5	2.7	$\mu\mu$f.
D1 to all other electrodes		5.0	9.2	$\mu\mu$f.
D2 to all other electrodes		4.9	9.1	$\mu\mu$f.
D3 to all other electrodes		3.7	6.9	$\mu\mu$f.
D4 to all other electrodes		3.2	6.0	$\mu\mu$f.

Optical Data

	No. 1	No. 2	No. 7	No. 11
Phosphor Number	No. 1	No. 2	No. 7	No. 11
Fluorescent Color	Green	Green	Blue	Blue
Phosphorescent Color	——	Green	Yellow	——
Persistence	Medium	Long	Long	Short

Mechanical Data

Overall Length	17⅝ ± ¼ Inches
Greatest Diameter of Bulb	5¼ ± 3/32 Inches
Minimum Useful Screen Diameter	4¼ Inches
Bulb Number	J42P1
Neck Contacts	J1-25
Base	B12-37
Basing	14V

Base Alignment
D1D2 trace aligns with Pin #5 and tube axis .... ± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin #5
Positive voltage on D3 deflects beam approximately toward Pin #2
Angle between D3D4 and D1D2 traces .... 90 ± 1 Degrees

MAXIMUM RATINGS (Design Center Values)

Heater Voltage .... 6.3 Volts
Heater Current at 6.3 Volts .... 0.6 ± 10% Ampere
Accelerator Voltage .... 10,000 Max. Volts D-C
Grid #2 Voltage .... 700 Max. Volts D-C
Accelerator Input .... 4½ Max. Watts
Focusing Electrode Voltage .... —500 to +1000 Max. Volts D-C
Grid #1 Voltage
  Negative Bias Value .... 200 Max. Volts D-C
  Positive Bias Value .... 0 Max. Volts D-C
  Positive Peak Value .... 0 Max. Volts
Peak Heater-Cathode Voltage
  Heater Negative with respect to cathode .... 180 Max. Volts
  Heater Positive with respect to cathode .... 180 Max. Volts
Peak Voltage between Accelerator and any Deflection Electrode .... 2000 Max. Volts

TYPICAL OPERATING CONDITIONS

Accelerator Voltage .... 6000 Volts D-C
Grid #2 Voltage .... 300 Volts D-C
Focusing Electrode Voltage .... 0 to 700 Volts D-C
Grid #1 Voltage[1] .... —34 to —56 Volts D-C
P11 Light Output[2] .... 100 Min. Ft. L.
Modulation[2] .... 40 Max. Volts D-C
Line Width "A"[2] .... .035 Max. Inch
Accelerator Current[2] .... 750 Max. Microamperes D-C
Deflection Factors:
  D1D2 .... 94 to 116 Volts D-C per Inch
  D3D4 .... 34 to 42 Volts D-C per Inch
Deflection Factor Uniformity[3] .... 1% Max.
Useful Scan:
  D1D2 .... 3.50 (± 1.75 min. from tube face center) Inches
  D3D4 .... 1.60 (± .80 min. from tube face center) Inches
Pattern Distortion @ 90% of Useful Scan[4] .... 2% Max.
Focusing Electrode Current for any operating condition .... —15 to +15 Microamperes
Spot Position (undeflected) .... Within a 5/16-inch radius circle[6]

CIRCUIT DESIGN VALUES

D1D2 Deflection Factor .... 15.6 to 19.3 Volts D-C per Inch per Kilovolt of Accelerator
D3D4 Deflection Factor .... 5.7 to 7.0 Volts D-C per Inch per Kilovolt of Accelerator

MAXIMUM CIRCUIT VALUES

Grid #1 Circuit Resistance .... 1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit[7] .... 1 Max. Megohm
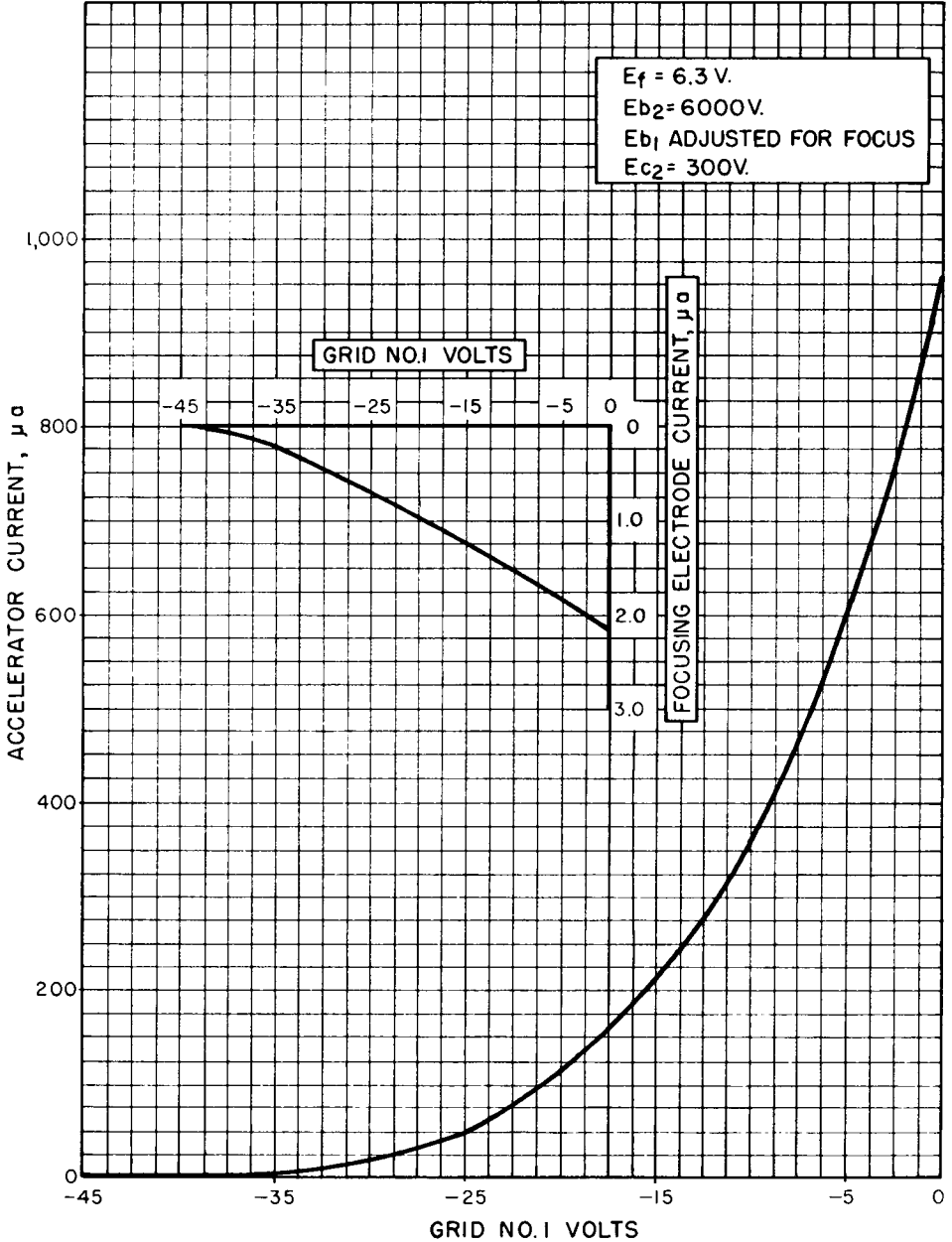
NOTES

1. Visual extinction of undeflected focused spot.
2. Measured in accordance with MIL-E-1 specifications. Light output measured with Type 3 Photronic Cell without eye correction.
3. The deflection factor (for both D1D2 and D3D4 plate pairs, separately) for any deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
4. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 1.469 x 3.213-inch rectangle, will fall within the area bounded by the 1.469 x 3.213-inch rectangle and an inscribed 1.411 x 3.087-inch rectangle.
5. Deflection accuracy may be obtained by combining angle between traces, deflection factor uniformity and pattern distortion characteristics. In general, for deflections less than those indicated the accuracy will improve.
6. When the tube is operated at typical operating conditions (Eh = 6.3 V., Eb2 = 6000 V., Eb1 at focus, Ec2 = 300 V.); Ec1 adjusted to avoid damage to the screen; with each of the deflecting electrodes connected to the accelerator; and with the tube shielded against external influences, the spot will fall within a 5/16-inch radius circle, centered on the tube face.
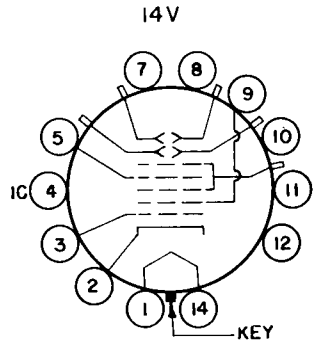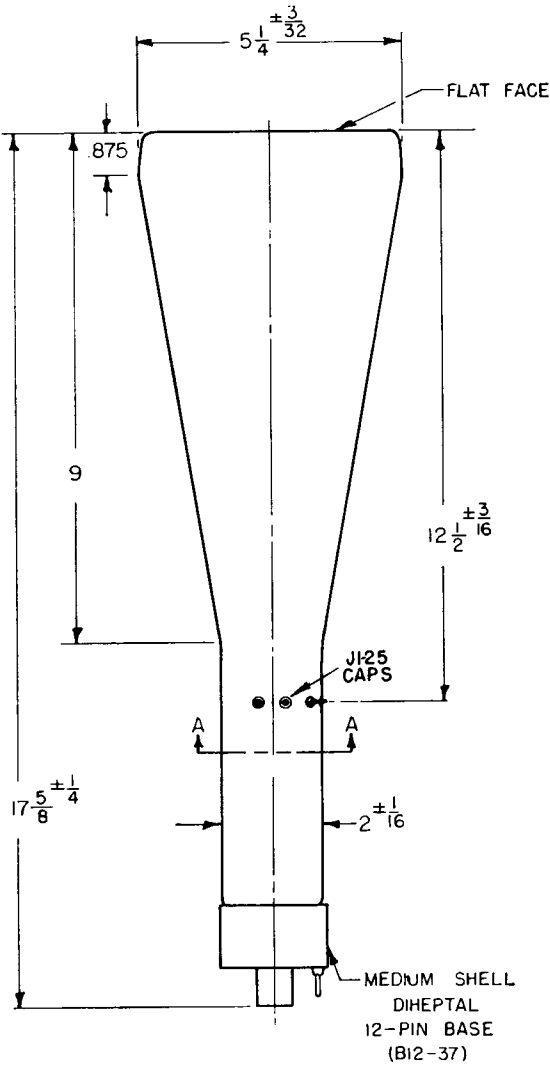
Under stable operating conditions, the position of the spot will not shift with changes in intensity by more than .025 inch.

7. It is recommended that the deflecting electrode circuit resistances be approximately equal.
8. An adjustable D.C. potential between the accelerator and the deflection plates may be used to secure best overall focus.
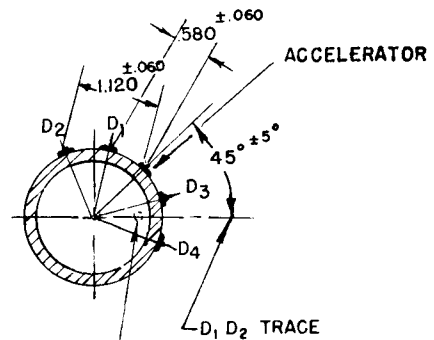
5ATP–
AVERAGE CHARACTERISTICS

$E_f = 6.3$ V.
$E_{b2} = 6000$ V.
E_{b1} ADJUSTED FOR FOCUS
$E_{c2} = 300$ V.

GRID NO.1 VOLTS

ACCELERATOR CURRENT, μa

FOCUSING ELECTRODE CURRENT, μa

GRID NO.1 VOLTS

TYPE 5ATP-

FLAT FACE

$5\frac{1}{4}$ ± $\frac{3}{32}$

.875

9

$12\frac{1}{2}$ ± $\frac{3}{16}$

$17\frac{5}{8}$ ± $\frac{1}{4}$

J-25
CAPS

A   A

2 ± $\frac{1}{16}$

MEDIUM SHELL
DIHEPTAL
12-PIN BASE
(B12-37)

14 V

BOTTOM VIEW OF BASE

KEY

PIN NO.	ELEMENT
I —	HEATER
2 —	CATHODE
3 —	GRID NO. I
4 —	INTERNAL CONNECTION
5 —	FOCUSING ELECTRODE
9 —	GRID NO. 2
14 —	HEATER

ACCELERATOR

±.060
.580

±.060
1.120

D_2 D_1

$45° ± 5°$

D_3

D_4

$D_1 D_2$ TRACE

PIN NO. 5

SECTION A-A

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