TECHNICAL DATA

TEKTRONIX T945P__

Revision A 10/11/62 T 5431

The Tektronix Type T945P__ is an aluminized 5-inch flat-faced cathode ray tube with electrostatic focus and deflection and a helical post-accelerator. The tube features faceplate shielding to prevent radio interference; provisions for use at high altitudes, over wide temperature ranges, and in high-humidity and fungus environments; and a ruggedized structure to withstand vibration and shock. The T945P__ is designed to meet the applicable portions of Mil-T-945A environmental specifications. The T945P__ was designed for use in the Tektronix Type 945 Oscilloscope.

MECHANICAL SPECIFICATIONS:

Overall length	$18\frac{1}{8} \pm \frac{3}{16}$ inches *
Greatest diameter of bulb	$5\frac{5}{16}$ inches
Bulb contact	J1-21
Neck pin diameter	0.040 ±.002 inch
Base	JEDEC NO. B14-38
Bulb and base alignment	See outline drawing

ENVIRONMENTAL SPECIFICATIONS:

Temperature (storage)	—65°C to +85°C[1]
Humidity	10 days[2]
Vibration	10 G's[3]
Radio interference (operating)	Tek MP Spec 1A[4]*

ELECTRICAL DATA:

Heater voltage	6.3 volts RMS
Heater current	0.6 ±10% ampere RMS
Helix resistance	200 megohms Min.
Faceplate shielding resistance	750 ohms Max.[5]
Capacitance, interelectrode (typical values)	
Grid No. 1 to all other electrodes	8.6 μμf
Cathode to all other electrodes	4.6 μμf
DJ_1 to DJ_2	1.8 μμf
DJ_1 to all other electrodes except DJ_2	3.8 μμf
DJ_2 to all other electrodes except DJ_1	3.8 μμf
DJ_3 to DJ_4	1.6 μμf
DJ_3 to all other electrodes except DJ_4	3.2 μμf
DJ_4 to all other electrodes except DJ_3	3.2 μμf

Deflection polarity

Positive voltage on DJ_1 deflects beam toward pin No. 4

Positive voltage on DJ_3 deflects beam toward pin No. 1

Geometry (measured under typical operating conditions and PDA ratio of 6)

Minimum useful scan DJ_1-DJ_2	10 cm
Minimum useful scan DJ_3-DJ_4	4 cm
Trace orthogonality	90° ±1°
Centering of undeflected spot with respect to geometric center (deflection electrodes connected to grid No. 5)	5 mm
Raster distortion	1.7% Max.

MAXIMUM RATINGS (all measurements taken with respect to cathode):

Post-accelerator voltage	12,000 volts Max.
Accelerator and deflection system (1st anode, 2nd anode, deflection plates, deflection plate shields, isolation shield, lower helix)	2100 volts Max.
Focus electrode	
Voltage range	0 to 800 volts
Maximum current to focus electrode	±10 μa
Peak voltage between electrodes	
Plate to plate	500 volts Max.
Plate to all other electrodes in the accelerator and deflection system	500 volts Max.
Between any two electrodes in the accelerator and deflection system	500 volts Max.
Grid No. 1 voltage	
Negative bias value	200 volts Max.
Positive bias value	0 volts Max.
Peak positive bias value	2 volts Max.
Peak heater-cathode voltage	
Heater negative with respect to cathode	125 volts Max.
Heater positive with respect to cathode	125 volts Max.
Maximum average electrode power dissipation	
1st anode	6 watts Max.

TYPICAL OPERATING CONDITIONS (all measurements taken with respect to cathode):

Electrode designation	Symbol	
Post-accelerator voltage	Epa	10,000 volts DC
Lower helix voltage	Elh	1575 to 1700 volts DC[6]
Isolation shield voltage	Eg5	1575 to 1700 volts DC[6]
Average of deflection plates	Edp	1650 volts DC
DJ_3-DJ_4 deflection shield voltage	Es4	1650 volts DC[7]
Accelerator voltage		
Grid No. 4 (astigmatism)	Eg4	1575 to 1850 volts DC[8]
Grid No. 2 (1st anode)	Eg2	1700 volts DC
Grid No. 3 voltage (focus)	Eg3	210 to 550 volts DC[8]
Grid No. 1 voltage (control)	Eg1	—50 to —80 volts DC (cutoff)

Deflection factors (nominal)

DJ_1-DJ_2	30 volts/cm
DJ_3-DJ_4	6.6 volts/cm

Useful scan[9]

DJ_1-DJ_2	10 cm
DJ_3-DJ_4	4 cm

DESIGN RANGES:

Minimum scan (PDA ratio of 6)[9]

DJ_1-DJ_2	10 cm
DJ_3-DJ_4	4 cm

Deflection factors (PDA ratio of 6)

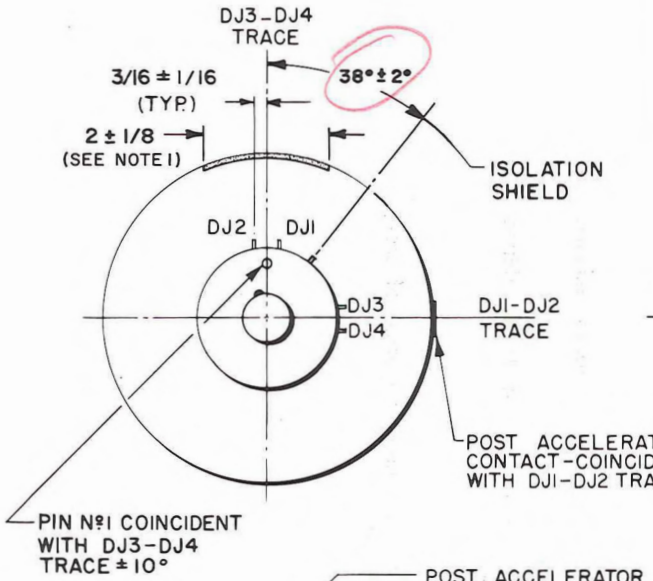
DJ_1-DJ_2	17 to 19.4 v/cm/kv of Edp
DJ_3-DJ_4	3.6 to 4.4 v/cm/kv of Edp
Grid No. 1 voltage for extinction of undeflected focused spot	5% of Edp
Focus electrode voltage (recommended range)	13% to 33% of Edp

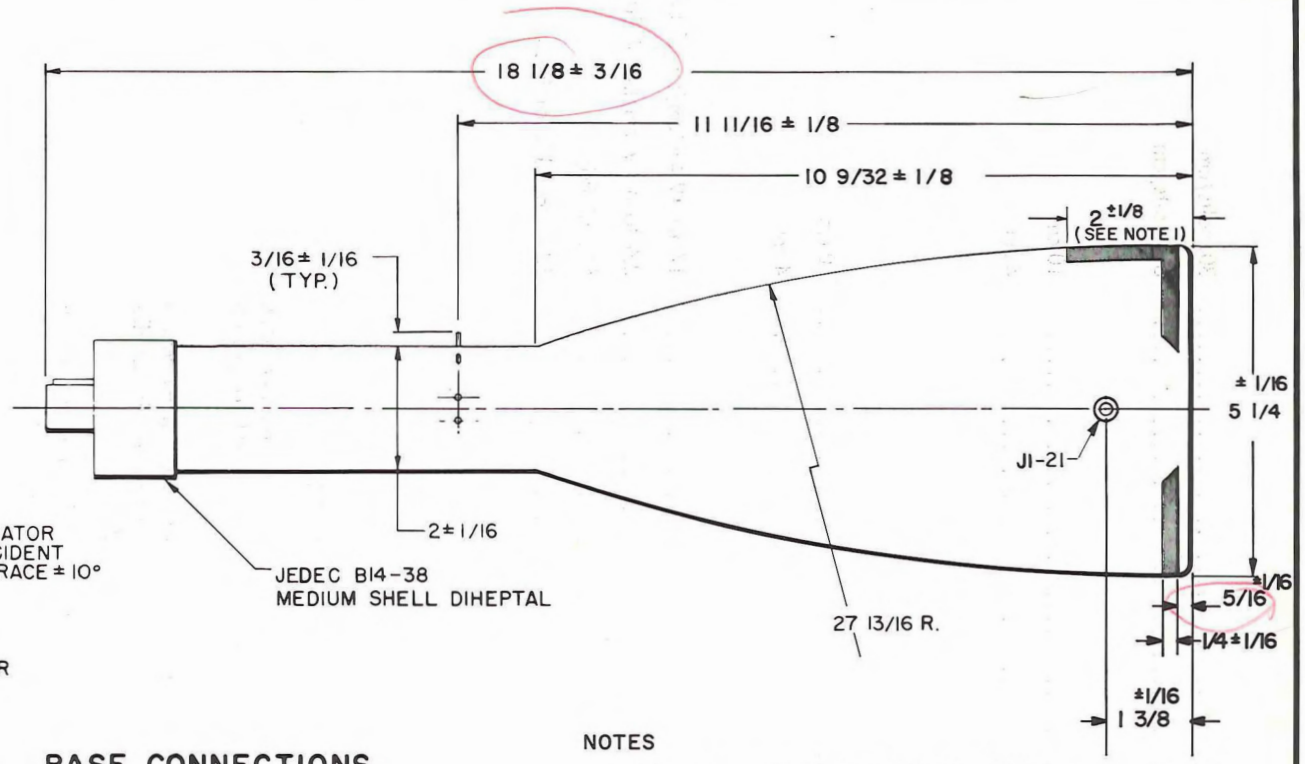
NOTES:

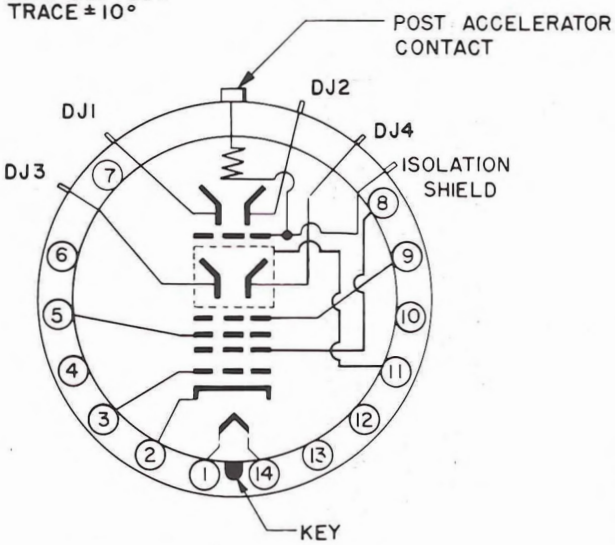
* Asterisk denotes change.

1. Per Mil-T-945A.
2. +18°C to +65°C, 90% to 98% relative humidity per Mil STD-170.
3. a) Vibrated in DJ_1-DJ_2 and DJ_3-DJ_4 plane at 50 cps with a maximum peak-to-peak excursion of 0.080 inch. Maximum trace excursion in either plane not to exceed 0.121 inch peak-to-peak.

   b) Vibrated in DJ_1-DJ_2 and DJ_3-DJ_4 plane at 25 cps and at 50 cps with a maximum peak-to-peak excursion of 0.080 inch, displaying a Lissajous figure to detect distortion between the DJ_1-DJ_2 and DJ_3-DJ_4 plates per Mil-E-1D.
4. Shielded faceplate to be connected to instrument ground for R.F.I. attenuation per Tektronix specification Tek MP Spec 1A, Mil-I-16910, Mil-I-26600, Mil-I-11748.
5. Measured center to outside.
6. Lower helix and isolation shield are connected internally. Pattern distortion minimal with proper potential.
7. Adjustment of DJ_3-DJ_4 deflection shield voltage improves linearity of DJ_3-DJ_4 deflection by controlling edge effect of DJ_3-DJ_4 plate field.
8. Recommended range. Adjust for best overall focus.
9. The deflection plates intercept part of the electron beam near the edge of scan; therefore, a low-impedance deflection drive is desirable.







BASE SCHEMATIC

BASE CONNECTIONS

1, 14	HEATER
2	CATHODE
3	GRID Nº 1
4,6,7,10 12,13	N.C.
5	GRID Nº 3 (FOCUS)
8.	GRID Nº 2 (1ST. ANODE)
9.	GRID Nº 4 (ASTIGMATISM)
11.	DJ3–DJ4 (SHIELD)

NOTES

1. CONTACT AREA FOR EXTERIOR CONDUCTIVE FACEPLATE COATING.

MARK	DATE	DESCRIPTION	BY	APPR
		CATHODE-RAY TUBE DIVISION TEKTRONIX, INC. PORTLAND, OREGON, U.S.A.		
		TUBE TYPE: T 945	DATE: 10-11-62 MOD. C	