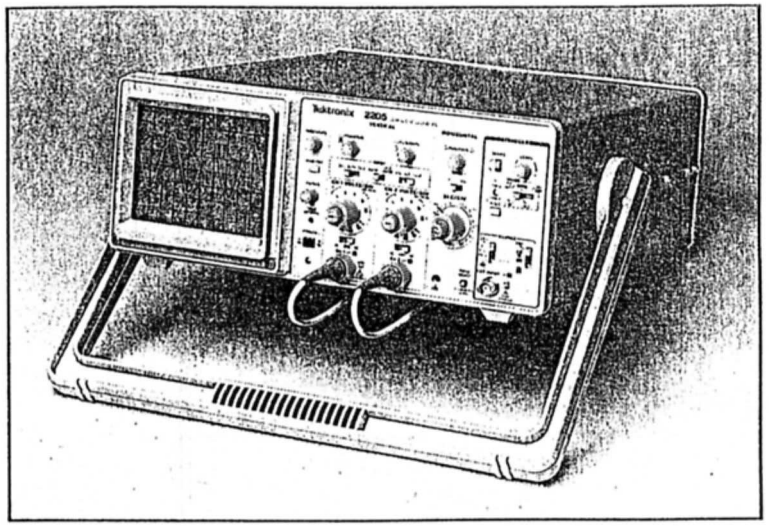
TEK

OPERATOR'S MANUAL
070-6717-00

2205 OSCILLOSCOPE



Tektronix®
COMMITTED TO EXCELLENCE

The 2205 electrical characteristics listed in Table 5–1 are valid when it has been adjusted at an ambient temperature between +20°C and +30°C, has had a warm–up period of at least 20 minutes, and is operating at an ambient temperature between 0°C and +40°C (unless otherwise noted).

Environmental characteristics are given in Table 5–2. The 2205 meets the requirements of MIL–T–28800C, paragraphs 4.5.5.5.1.3, 4.5.5.1.4, and 4.5.5.1.2.2 for Type III, Class 5 equipment, except where otherwise noted.

Mechanical characteristics of the instrument are listed in Table 5–3.

TABLE 5–1
Electrical Characteristics

Characteristics	Performance Requirements
VERTICAL DEFLECTION SYSTEM	
Deflection Factor	
Range	5 mV per division to 5 V per division in a 1–2–5 sequence of 9 steps.
Accuracy	± 3%.
Variable Control Range	Continuously variable and uncalibrated between step settings. Increases deflection factor by at least 2.5 to 1.
Step Response (Rise Time)	Applicable from 5 mV per division to 5 V per division. Rise times calculated from: $t_r = \frac{0.35}{BW}$
+5°C to +35°C	17.5 ns or less.
0°C to +5°C and +35°C to +40°C	23.3 ns or less.

TABLE 5-1 (cont'd)

Characteristics	Performance Requirements	
HORIZONTAL DEFLECTION SYSTEM		
Sweep Rate		
Calibrated Range	0.5 s per division to 0.1 µs per division in a 1-2-5 sequence. Magnification extends maximum usable sweep speed to 10 ns per division.	
Accuracy	**Magnified**	
	X1	**X10**
+15°C to +35°C	± 3%	± 4%
0°C to +40°C	± 4%	± 5%
Variable Control Range	Continuously variable and uncalibrated between calibrated step settings. Decreases calibrated sweep speeds at least by a factor of 2.5.	
Sweep Linearity	**Magnified**	
	X1	**X10**
	± 5%	± 7%
Position Control Range	Start of sweep, to 10th division in X1 and to 100th division in X10, will position past the center vertical graticule line.	
Registration of Unmagnified and Magnified Traces	0.2 division or less, aligned to central vertical graticule line.	

TABLE 5-1 (cont'd)

Characteristics	Performance Requirements
Z-MODULATION	
Sensitivity	5 V causes noticeable modulation. Positive-going input decreases intensity.
Usable Frequency Range	Dc to 5 MHz.
Maximum Safe Input Voltage	400 V (dc + peak ac) or 800 V ac p-p to 10 kHz or less.
X-Y OPERATION (X1 MODE)	
Deflection Factors	Same as Vertical Deflection System with Variable controls in CAL detents.
Accuracy	
X-Axis	± 5%
Y-Axis	Same as Vertical Deflection System.
Bandwidth (-3 dB)	
X-Axis	Dc to at least 1 MHz.
Y-Axis	Same as Vertical Deflection System.
Phase Difference Between X- and Y-Axis Amplifiers	± 3° from dc to 50 kHz.
PROBE ADJUSTMENT SIGNAL OUTPUT	
Voltage into 1 MΩ Load	0.5 V ± 5%.
Repetition Rate	1 kHz ± 20%.

TABLE 5-1 (cont'd)

Characteristics	Performance Requirements
VERTICAL DEFLECTION SYSTEM (cont'd)	
Bandwidth (-3 dB)	
+5°C to +35°C	20 MHz or more.
0°C to +5°C and +35°C to +40°C	15 MHz or more.
AC Coupled Lower Cutoff Frequency	10 Hz or less at -3 dB.
CHOP Mode Switching Rate	500 kHz ± 30%.
Input Characteristics	
Resistance	1 MΩ ± 2%.
Capacitance	25 pF ± 2 pF.
Maximum Safe Input Voltage (DC or AC Coupled)	400 V (dc + peak ac) or 800 V ac p-p to 10 kHz or less.
Common-Mode Rejection Ratio (CMRR)	At least 10 to 1 at 20 MHz.
Trace Shift	
With VOLTS/DIV Switch Rotation	0.75 division or less (Variable control in CAL detent).
With VOLTS/DIV Variable Control Rotation	1.0 division or less.
With Channel 2 Inverted	1.5 divisions or less.
Channel Isolation	Greater than 100 to 1 at 10 MHz.

TABLE 5-1 (cont'd)

Characteristics	Performance Requirements	
TRIGGER SYSTEM		
Trigger Sensitivity		
P-P AUTO/TV LINE and NORM Modes	5 MHz	30 MHz
Internal Signal	0.3 div	1.0 div
External Signal	40 mV	150 mV
Lowest Usable Frequency in P-P AUTO Mode	≥20 Hz	
TV FIELD Mode	1.0 division of composite sync.	
External Input		
Resistance	1 MΩ ± 10%.	
Capacitance	25 pF ± 2.5 pF.	
Maximum Voltage	400 V (dc + peak ac) or 800 V ac p-p at 10 kHz or less.	
Trigger Level Range		
NORM Mode	±15 divisions referred to the appropriate vertical input.	
EXT Source	At least ±1.6 V, 3.2 V p-p.	
EXT/10 Source	At least ±16 V, 32 V p-p.	

TABLE 5-1 (cont'd)

Characteristics	Performance Requirements
POWER REQUIREMENTS	
Line Voltage Ranges	
115 V Setting	95 V ac to 128 V ac.
230 V Setting	185 V ac to 250 V ac.
Line Frequency	48 Hz to 440 Hz.
Maximum Power Consumption	40 W (60 VA).
Line Fuse	UL198.6, 3AG (¼ x 1¼ inch)
115 V Setting	0.75 A Slow
230 V Setting	0.5 A, Slow
CATHODE-RAY TUBE	
Display Area	80 by 100 mm.
Standard Phosphor	GH (P31).
Nominal Accelerating Voltage	1800 V ±10%.

Table 5-2
Environmental Characteristics

Characteristics	Performance Requirements
Temperature	
Operating	0°C to +40 °C (+32°F to +104 ° F).
Nonoperating	-55 ° C to +75 ° (-67 °F to +167 °F).
Altitude	
Operating	To 4500 m (15,000 ft.). Maximum operating temperature decreases 1° C per 300 m (1,000 ft.) above 1,500 m (5,000 ft.).
Nonoperating	To 15,250 m (50,000 ft.).
Relative Humidity	
Operating (+30°C to +40 °C)	85% +0%, -5%
Nonoperating (+30°C to +60 °C)	85% +0%, -5%
Vibration (Operating)	15 minutes along each of three major axes at a total displacement of 0.015 inch p-p (2.4 g at 55 Hz) with frequency varied from 10 Hz to 55 Hz to 10 Hz in one-minute sweeps. Hold for 10 minutes at 55 Hz in each of three major axes. All major resonances must be above 55 Hz.
Shock (Operating and Nonoperating)	30 g, half-sine, 11-ms duration, three shocks per axis each direction, for a total of 18 shocks.
Radiated and Conducted Emission Requirements	Meets VDE 0871 Class B.

Table 5-3
Mechanical Characteristics

Characteristics	Performance Requirements
Weight With Power Cord	8.25 kg (13.7 lbs) or less.
Domestic Shipping Weight	9.1 kg (20.0 lbs) or less.
Height	138 mm (5.4 in).
Width	
With Handle	379 mm (14.9 in).
Without Handle	327 mm (12.9 in).
Depth	
Without Front Cover	441 mm (17.4 in).
With Optional Front Cover	455 mm (17.9 in).
With Handle Extended	516 mm (20.3 in).

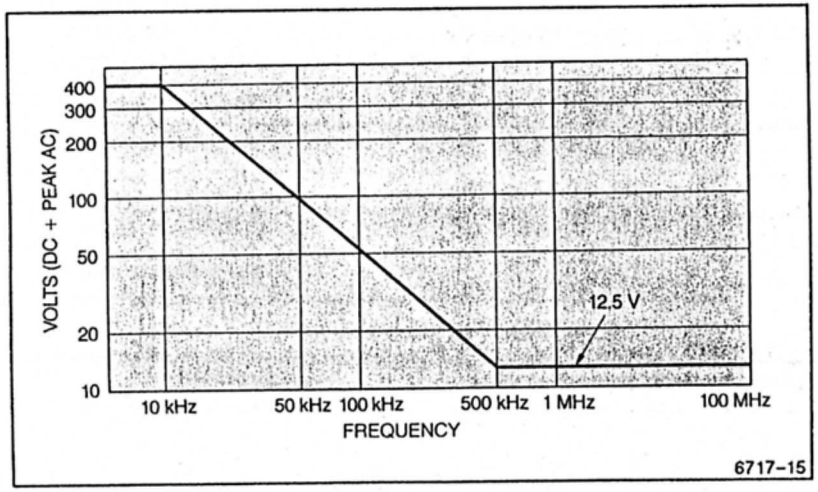


Figure 5-1. Maximum input voltage versus frequency derating curve for CH 1 OR X, CH 2 OR Y, and EXT INPUT connectors.