

The electrical characteristics listed in Table 5-1 are valid for the 2225 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 2225 meets the requirements of MIL-T-28800C, paragraphs 4.5.5.1.3, 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. Sensitivity increases to 500 μ V per division with X10 vertical magnification.
Accuracy	$\pm 3\%$. With X10 vertical magnification, accuracy is $\pm 5\%$.
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	7.0 ns or less.
0°C to +5°C +35°C to +40°C	8.8 ns or less.
Step Response Aberrations 5 mV per division to 0.5 V per division	+5%, -5%, 5% p-p or less.

Table 5-1 (cont'd)

Characteristics	Performance Requirements
VERTICAL DEFLECTION SYSTEM (cont'd)	
Bandwidth (−3 dB) +5°C to +35°C	50 MHz or more.
0°C to +5°C	40 MHz or more.
35°C to +40°C	
X10 Magnification	5 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 M Ω ±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 in X1. At least 10 to 1 at 1 MHz with X10 vertical magnification.
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.
With X10 Vertical Magnification	2.0 divisions or less.
Channel Isolation	Greater than 100 to 1 at 10 MHz.
Trace Separation Range	At least ±3 divisions.

Table 5-1 (cont'd)

Characteristics	Performance Requirements		
TRIGGER SYSTEM			
Trigger Sensitivity P-P AUTO/TV LINE and NORM Modes			
	5 MHz	50 MHz	
	Internal Signal	0.3 div.	1.0 div
	External Signal	40 mV	200 mV
Lowest Usable Frequency in P-P AUTO Mode	≥20-Hz 1.0-division internal signal or 100-mV external signal will lock.		
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.		
AC Coupled Lower Cutoff Frequency	10 Hz or less at - 3 dB with internal signal. 20 Hz or less at - 3 dB with external signal.		
Trigger Level Range			
NORM Mode	Can be set to any point on the trace that can be displayed.		
EXT Source	At least ± 1.6 V, 3.2 V p-p.		
EXT/10 Source	At least ± 16 V, 32 V p-p.		
Variable Holdoff Range	Can increase sweep holdoff time by at least a factor of 10, with SEC/ DIV set to 1 ms.		
LF Reject Lower 3 dB Point	30 kHz ± 25%.		
HF Reject 3 dB Point	30 kHz ± 25%.		

Table 5-1 (cont'd)

Characteristics	Performance Requirements			
HORIZONTAL DEFLECTION SYSTEM				
Sweep Rate Calibrated Range	0.5 s per division to 0.05 μ s per division in a 1-2-5 sequence of 22 steps. Magnification extends maximum usable sweep speed to 5 ns per division.			
Accuracy	X1	Magnified		
		X5	X10	X50
+15°C to + 35°C		±3%	±4%	±4%
0°C to + 40°C	±4%	±5%	±5%	±8%
Variable Control Range	Continuously variable and uncalibrated between calibrated step settings. Decreases CAL sweep speeds at least by a factor of 2.5.			
Sweep Linearity	X1	Magnified		
		X5	X10	X50
	±5%	±7%	±7%	±9%
Position Control Range	Start of sweep to 10th division in X1, to 50th division in X5, to 100th division in X10, and to 500th division in X50 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.			
Trace Shift Between ALT and MAG Modes	Less than 1 division.			
Sweep Length	Greater than 10 divisions.			
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.			

Table 5-1 (cont'd)

Characteristics	Performance Requirements
X-Y OPERATION (X1 MODE)	
Deflection Factors	Same as Vertical Deflection System with Variable controls in CAL detents.
Accuracy	
X-Axis	$\pm 5\%$.
Y-Axis	Same as Vertical Deflection System.
Bandwidth (–3 dB)	
X-Axis	Dc to at least 2 MHz.
Y-Axis	Same as Vertical Deflection System.
Phase Difference Between X- and Y-Axis Amplifiers	$\pm 3^\circ$ from dc to 150 kHz.
PROBE ADJUSTMENT SIGNAL OUTPUT	
Voltage into 1 M Ω Load	0.5 V $\pm 5\%$.
Repetition Rate	1 kHz $\pm 20\%$.
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 (1/4 x 1 1/4 inch)
115 V Setting	1.0 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	12,600 V ± 60 V

Table 5-2
Environmental Characteristics

Characteristics	Description
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)	95% +0%, –5%
Nonoperating (+30°C to +60°C)	95% +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 the 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 and FCC Regulations.

Table 5-3
Mechanical Characteristics

Characteristics	Description
Weight With Power Cord	6.6 kg (14.6 lbs) or less.
Domestic Shipping Weight	9.0 kg (19.8 lb) or less.
Height	138 mm (5.4 in).
Width	
With Handle	380 mm (15.0 in).
Without Handle	327 mm (12.9 in).
Depth	
Without Front Cover	438 mm (17.2 in).
With Optional Front Cover	445 mm (17.5 in).
With Handle Extended	511 mm (20.1 in).

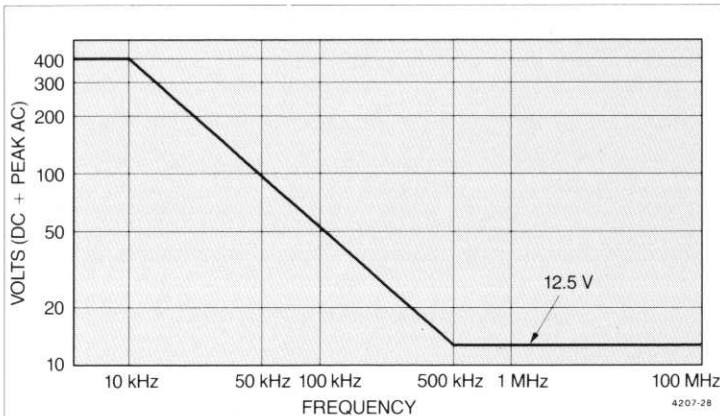


Figure 5-1. Derating curve for CH 1 OR X, CH 2 OR Y, and EXT INPUT connectors.