SPECIFICATION

INTRODUCTION

The TEKTRONIX 2205 Oscilloscope is a rugged, lightweight, dual-channel, 20 MHz instrument that features a bright, sharply defined trace on an 80 by 100 mm cathode-ray tube (crt).

Its low-noise vertical system supplies calibrated deflection factors from 5 mV to 5 V per division at full bandwidth.

Stable triggering is achieved over the full bandwidth of the vertical system. The flexibility and high sensitivity of the trigger system provides a range of conveniences such as hands-free triggering with the peak-to-peak automatic mode, independent selection of TV line and TV field triggering at any sweep speed, and single-sweep triggering. The trigger signal is dc coupled. An external triggering signal or an external Z-axis modulation signal can be applied via a front-panel connector and the source-selector switches.

The horizontal system provides calibrated sweep speeds from 0.5 s to 100 ns per division. For greater measurement accuracy, a X10 magnifier circuit extends the maximum sweep speed to 10 ns per division.

ACCESSORIES

The instrument is shipped with the following accessories:

1 Operators Manual
2 1X Signal Adapters
1 Power Cord
2 Fuses
1 Power Cord Clamp
1 Washer
1 Screw

Part numbers for these standard accessories, as well as for other optional accessories, are located in Section 7, Options and Accessories. The voltage-sensing signal adapters were designed specifically to complement the performance of your 2205.

PERFORMANCE CONDITIONS

The 2205 electrical characteristics listed in Table 1-1 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 1-2. 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 1-3.

Table 1-1
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 +15°C to +35°C	±3%.
0°C to +15°C and +35°C to +40°C	±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) +5°C to +35°C	Applicable from 5 mV per division to 5 V per division. Rise times calculated from: $t_r = \frac{0.35}{BW \text{ in MHz}}$ 17.5 ns or less.[a]
0°C to +5°C and +35°C to +40°C	23.3 ns or less.[a]
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.[a]
Ac Coupled Lower Cutoff Frequency	10 Hz or less at -3 dB.[a]
CHOP Mode Switching Rate	500 kHz ±30%.[a]
Input Characteristics Resistance	1 MΩ ±2%.[a]
Capacitance	25 pF ±2%.[a]
Maximum Safe Input Voltage (DC or AC Coupled) ⚠	400 V (dc + peak ac) or 800 V ac p-p to 10 kHz or less.[a]
Common-mode Rejection Ratio (CMRR)	At least 10 to 1 at 10 MHz.
Trace Shift With VOLTS/DIV Switch Rotation	0.75 division or less (Variable control in CAL detent).[a]
With VOLTS/DIV Variable Control Rotation	1 division or less.[a]
With Channel 2 Inverted	1.5 division or less.[a]
Channel Isolation	Greater than 100:1 at 20 MHz.

[a]Performance requirement not checked in manual.

Table 1–1 (cont)

Characteristics	Performance Requirements
TRIGGER SYSTEM	
Trigger Sensitivity	
P–P AUTO/TV LINE and NORM Modes	5 MHz: 0.3 div (Internal Signal), 40 mV (External Signal); 30 MHz: 1.0 div (Internal Signal), 150 mV (External Signal)
Lowest Usable Frequency in P–P AUTO Mode	≥ 20 Hz.[a]
TV FIELD Mode	1.0 division of composite sync.[a]
External Input	
Resistance	1 MΩ ±10%.[a]
Capacitance	25 pF ±2.5 pF.[a]
Maximum Input Voltage ⚠1	400 V (dc + peak ac) or 800 V ac p–p at 10 kHz or less.[a]
Trigger Level Range	
NORM Mode	±15 division 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.[a]
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.[a]
Accuracy	Magnified: X1, X10
+15°C to +35°C	±3%, ±4%
0°C to +15°C and +35°C to +40°C	±4%[a], ±5%[a]
	Sweep accuracy applies over the center eight divisions. Exclude the first 25 ns of the sweep for magnified sweep speeds and anything beyond the 100th magnified division.

[a]Performance requirement not checked in manual.

Table 1–1 (cont)

Characteristics	Performance Requirements
HORIZONTAL DEFLECTION SYSTEM (cont)	
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 ±5%; X10 ±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 center vertical graticule line.[a]
Z-MODULATION	
Sensitivity	5 V causes noticeable modulation. Positive-going input decreases intensity.
Usable frequency range	Dc to 5 MHz.[a]
Maximum Safe Input Voltage ⚠	400 V (dc + peak ac) or 800 V ac p-p to 10 kHz or less.[a]
X-Y OPERATION (X1 MODE)	
Deflection Factors	Same as vertical deflection system with variable controls in the CAL detents.[a]
Accuracy	
X-Axis	±5%.
Y-Axis	Same as Vertical Deflection System.[a]
Bandwidth (–3 dB)	
X-Axis	Dc to at least 1 MHz.
Y-Axis	Same as Vertical Deflection System.[a]
Phase difference between X- and Y-Axis Amplifiers	±3° from dc to 50 kHz.[a]
PROBE ADJUST SIGNAL OUTPUT	
Voltage into 1 MΩ Load	0.5 V ±5%.
Repetition Rate	1 kHz ±20%.[a]

[a]Performance requirement not checked in manual.

Table 1-1 (cont)

Characteristics	Performance Requirements
POWER REQUIREMENTS	
Line Voltage Ranges	
115 V Setting	95 Vac to 128 Vac.[a]
230 V Setting	185 Vac to 150 Vac.[a]
Line Frequency	48 Hz to 440 Hz. [a]
Maximum Power Consumption	40 W (60 VA). [a]
Line Fuse	UL 198.6 3AG (1/4 X 1 1/4 inch)
115 V Setting	0.75 A, Slow.
230 V Setting	0.5 A, Slow.
CATHODE-RAY TUBE	
Display Area	8 X 100 mm.[a]
Standard Phosphor	GH (P31).[a]
Nominal Accelerating Voltage	1800 V ±10%.[a]

[a]Performance requirement not checked in manual.

Table 1–2
Environmental Characteristics

Characteristics	Performance Requirements
Temperature	
Operating	0°C to +40°C (+32°F to +104°F).
Nonoperating	–55°C to +75°C (–67°F to +167°F). Tested to MIL–T–28800C, paragraphs 4.5.5.1.3 and 4.5.5.1.4, except in 4.5.5.1.3 steps 4 and 5 (0°C operating test) are performed ahead of step 2 (–55°C nonoperating test). Equipment shall remain off upon return to room ambient during step 6. Excessive condensation shall be removed before operating during step 7.
Altitude	
Operating	To 4,570 meters (15,000 feet). Maximum operating temperature decreased 1°C per 300 m (1000 feet) above 1500 m (5,000 feet).
Nonoperating	To 15,250 meters (50,000 feet).
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 and FCC Regulations.

Table 1–3
Mechanical Characteristics

Characteristics	Description
Weight with Power Cord	6.7 kg (14.8 lbs) or less.
Domestic Shipping Weight	9.1 kg (20.1 lbs) or less.
Dimensions	
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	440 mm (17.2 in).
With Optional Front Cover	445 mm (17.5 in).
With Handle Extended	516 mm (20.3 in).

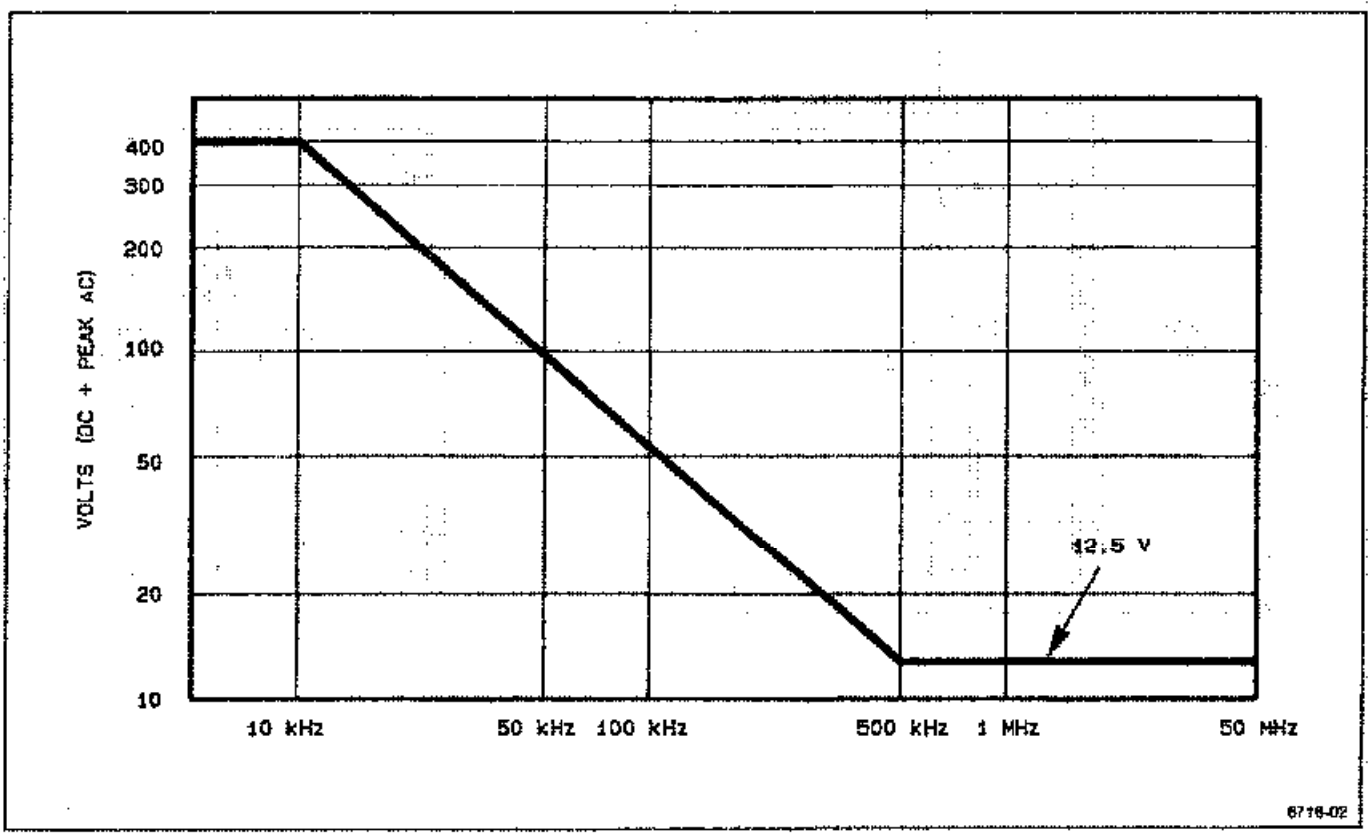

Figure 1-1. Maximum input voltage vs frequency derating curve for CH 1 OR X, CH 2 OR Y, and EXT INPUT OR Z connectors.

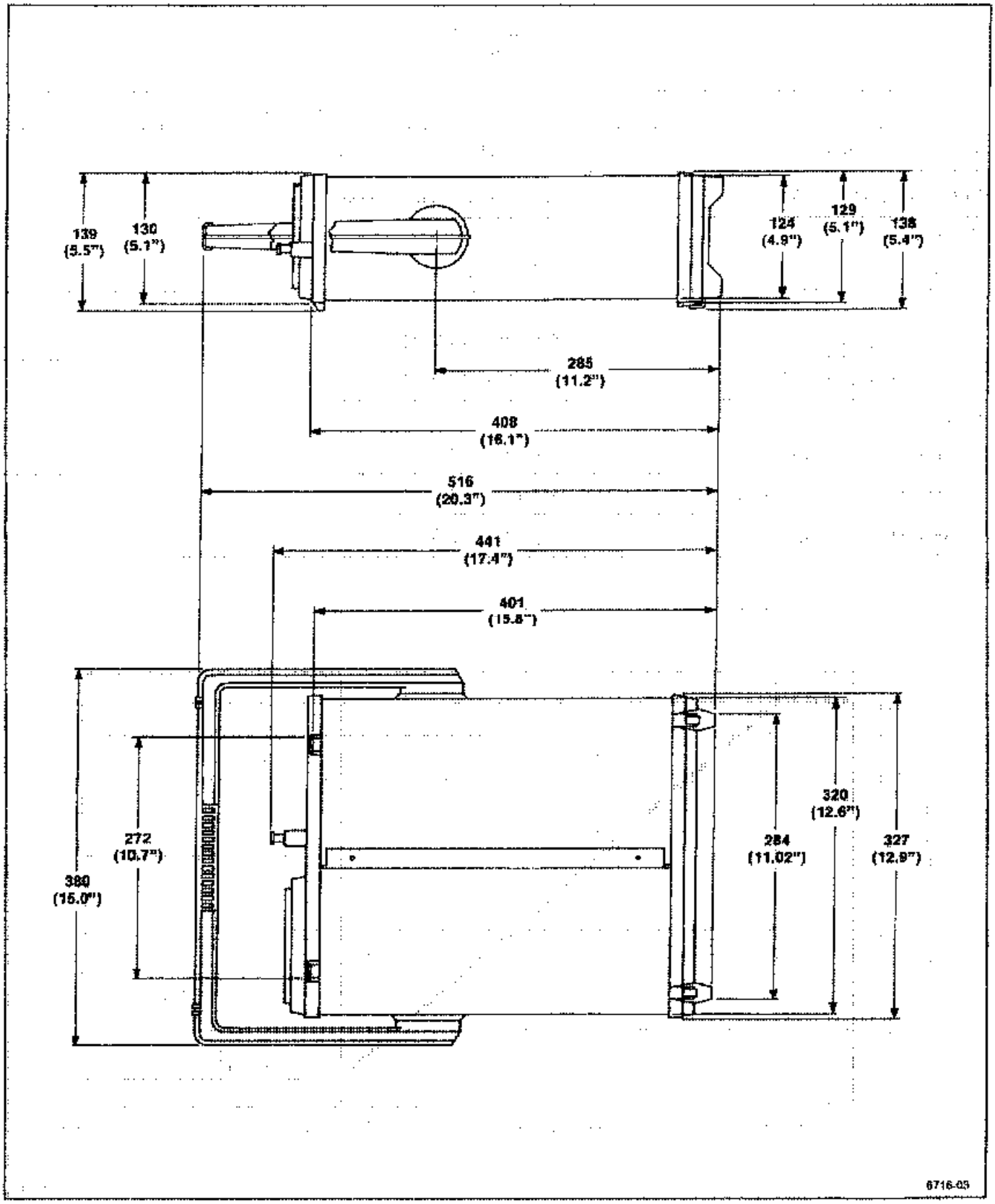

Figure 1-2. Instrument dimensional drawing.