PERFORMANCE CHARACTERISTICS

INTRODUCTION

Performance characteristics given in the Electrical Specifications apply when the instrument has been self calibrated within ±5°C of the ambient temperature, has warmed up at least 20 minutes, and is operating in an ambient temperature between −10°C and +55°C (unless otherwise noted).

Environmental and Mechanical Specifications are listed after the Electrical Specifications.

RECOMMENDED PERFORMANCE CHECK SCHEDULE

To ensure accurate measurements, check the performance of this instrument every 2000 hours of operation (once each year if used infrequently). If repairs are made, affected circuits may need to be readjusted.

ELECTRICAL SPECIFICATIONS

VERTICAL DEFLECTION SYSTEM

Deflection Factor

5 mV per division to 50 V per division in a 1–2–5 sequence.[1]

Vertical Resolution

8-bits, 25 levels per division. 10.24 divisions of dynamic range.[1]

DC Accuracy

+15°C to +35°C	±3%.[2]
−15°C to +15°C	±4%.[2]
+35°C to +55°C	±4%.[2]

[1]Performance Requirement not checked in manual.
[2]When the self calibration has been done within ±5°C of the ambient temperature.

VOLTS/DIV Variable Control

Increases the deflection factor by 2.5 to 1.

Aberrations

+6%, −6%, 6% p-p or less.[1]

Measured with a 5-division reference signal from a 50-Ω source driving a 50-Ω load at the probe tip. Vertically center the top of the reference signal.

Useful Rise Time

$$\frac{\text{SEC/DIV} \times 1.6}{50}$$ [1]

Rise time is limited to 35 ns by the vertical amplifier response.

Useful Bandwidth

SAMPLE $\frac{5}{\text{SEC/DIV}}$ Hz.[1]

Useful-storage bandwidth is limited to the frequency where there are 10 samples per sine-wave signal period at the maximum sampling rate. This yields a maximum amplitude error of 5%. Maximum sampling rate is 10 MHz at 5 μs per division.

Accuracy at the useful-storage-bandwidth limit is measured with respect to a 6-division, 50-kHz sine wave.

REPETITIVE

0.5 μs/div to 50 μs/div	10 MHz.
1 μs/div	5 MHz.[1]
2 μs/div	2.5 MHz.[1]

Repetitive bandwidth is limited to 10 MHz by the analog system.

PEAK DETECT (ENV and CONT ENV acquisition modes at 20 μs per division and slower)

Sine-wave Amplitude Capture (5% p-p maximum amplitude uncertainty)	1 MHz.
Pulse Width Amplitude Capture (50% p-p maximum amplitude uncertainty).	100 ns.

A/D Converter Linearity

Monotonic with no missing codes.[1]

Position Control Range

±12 divisions.

Input Linear Range

±20 divisions.[1]

DC Balance

0.2 division or less trace shift when switching between VOLTS/DIV switch settings when the ambient temperature is within ±5°C of the temperature at which the last self calibration was done.[1]

INVERT Balance

0.4 division or less trace shift when switching between INVERT and non-INVERT displays when the ambient temperature is within ±5°C of the temperature at which the last self calibration was done.[1]

Input Current

2.5 nA or less (0.5 division or less trace shift when switching between DC and GND input coupling with the VOLTS/DIV switch at 5 mV per division).[1]

Input R and C

Input Resistance	1 MΩ ±10%.[1]
Input Capacitance	27 pF ±3 pF.[1]

These R and C characteristics include the probe.

Common-to-Ground Capacitance	Less than 150 pF.[1]

⚠ Maximum Rated Normal-Mode Input Voltage (probe tip to probe common)

400 V (dc + peak ac) to 2 MHz.[1]

See Figure 1-1 for voltage versus frequency derating curve.

⚠ Maximum Common-Mode Potential (probe common to chassis)

400 V (dc + peak ac) to 1 kHz.[1]

See Figure 1-2 for voltage versus frequency derating curve.

⚠ Maximum Rated Potential Between Channels

800 V (dc + peak ac).[1]

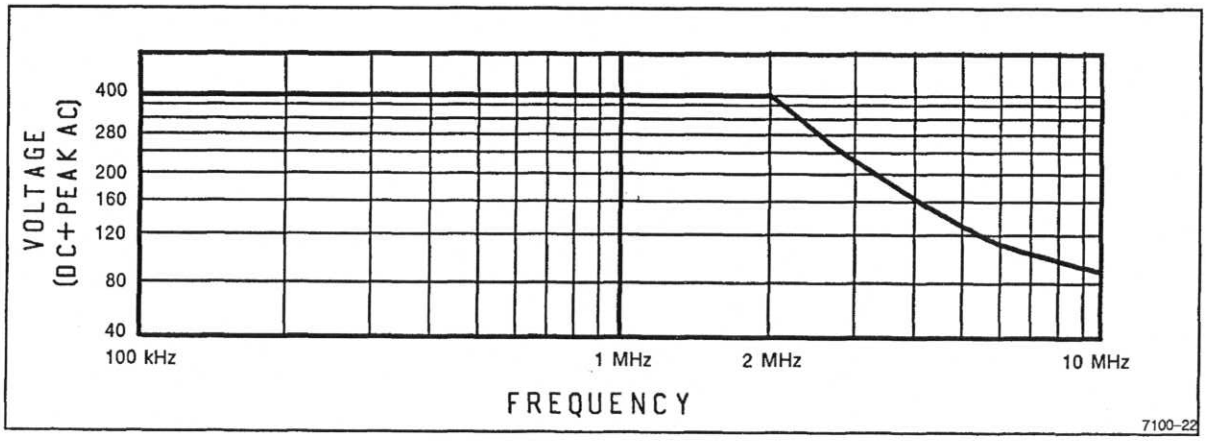

Figure 1-1. Maximum normal-mode voltage versus frequency derating curve.

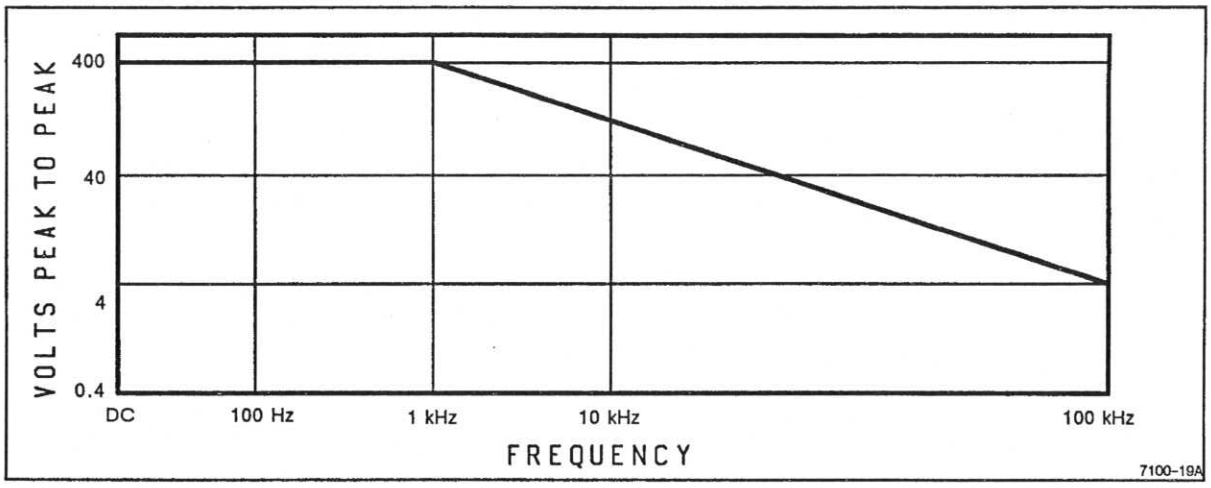

Figure 1-2. Maximum common-mode voltage versus frequency derating curve.

Common-Mode Rejection Ratio

DC-to-1 kHz	80 dB or more.[1]
1 kHz-to-100 kHz	60 dB or more.[1]

Isolation: Channel Signal to Channel Signal

DC-to-10 MHz	80 dB or more.[1]

Isolation: Channel Common to Channel Signal

DC-to-1 kHz	80 dB or more.[1]
1 kHz-to-100 kHz	60 dB or more.[1]

TRIGGER SYSTEM

Internal

Sensitivity	0.5 division to 20 MHz.
Level	±20 divisions.[1]

External

Sensitivity	250 mV at 10 MHz.
Level	±2.3 V.
Input Resistance	1 MΩ ±10%.[1]
Input Capacitance	18 pF ±5 pF.[1]

[1]**Performance Requirement not checked in manual.**

Trigger Jitter

2 μs/div to 50 ns/div (5 ns/div in X10 MAG).

X1	1/50th division ±2 ns.[1]
X10 MAG	1/5th division ±2 ns.

HORIZONTAL SYSTEM

Range

50 ns per division to 20 s per division.[1]

The X10 MAG control extends the maximum sweep speed to 5 ns per division.

Displayed Accuracy

X1	±2 %.
X10 MAG	±5%.[1]

Accuracy is over 10 divisions.

Sample Rate

NORMAL	$\frac{50}{\text{SEC/DIV}}$ Hz.[1]
PEAKDET (ENV and CONT ENV)	10 MHz.[1]
REPETITIVE	
50 ns/div to 1 μs/div	10 MHz.[1]
2 μs/div	5 MHz.[1]
ACCURACY	0.01%.[1]

Sample accuracy is based on the accuracy of the 20-MHz oscillator.

Record Length

512 data points; calibrated to 50 points per division.[1]

POSITION Control Range

Start of the first division and end of the tenth division can be positioned past the center vertical graticule.

Displayed Trace Length

10.24 divisions.[1]

X-Y OPERATION

Accuracy

Same as the Vertical system.[1]

Useful Bandwidth

$\frac{5}{\text{SEC/DIV}}$ Hz.[1]

Skew Between CH 1 and CH 2

5 ns.[1]

RS-232 INTERFACE

Maximum Applied Voltage (any pin)

25 V (dc + peak ac).[1]

Baud Rates

300, 1200, 2400, 9600; 0.1% accuracy based on the microprocessor clock.[1]

Signals

RD, TD, and SGND. SGND is connected internally to EXTERNAL TRIG COM. DSR and CTS are always high, and DTR and RTS are ignored.[1]

Levels

Compatible with RS-232C.

EXTERNAL POWER REQUIREMENTS

Voltage Range

Pin-to-pin

AC	16.0 to 20 Vac at 47 to 400 Hz.[1]
DC	12 to 28 Vdc.[1]

Either Power Pin-to-EXT TRIG COMM or RS-232 COMM	−0.5 V to 28 Vac peak.[1]

Current

1 ampere maximum when charging batteries.[1]

Maximum Power Consumption

15 watts or 16 volt-amperes (when charging batteries).[1]

Internal Batteries

Battery

Sealed, lead-acid battery.[1]

Charge Time

Three hours for full charge with oscilloscope not operating.[1]

Battery Excessive Discharge Protection

Instrument operation is automatically interrupted when battery charge drops to 7.32 V.[1]

Typical Operating Time

Two hours at maximum sample rate, no trigger, and AUTO TIMEOUT feature turned off .[1]

Battery Capacity versus Temperature

−15°C	20°C to 30°C	55°C
80%	100%	110%

[1]**Performance Requirement not checked in manual.**

ENVIRONMENTAL SPECIFICATIONS

Environmental Requirements

Instrument will meet the requirements of Tektronix Standard 062-2853-00, Class 3.

The instruments meets all the following MIL-T-28000D requirements for Type III, Class 3 equipment, except where noted otherwise.

Temperature

Operating	−10°C to +55°C (+14°F to +131°F).[1]
Nonoperating	−51°C to +71°C (−60°F to +160°F).[1]

Tested to MIL-T-28800D, para 4.5.5.1.3 and 4.5.5.1.4 except that in para 4.5.5.1.3, steps 4 and 5 are performed before step 2 (−51°C nonoperating test). Equipment shall remain off upon return to room-ambient temperature during step 6. Excessive condensation shall be removed before operating during step 7.[1]

Altitude

Operating	4,570 meters (15,000 feet). Maximum operating temperature decreases 1°C per 1,000 feet above 5,000 feet.[1]
Nonoperating	To 15,240 meters (50,000 feet).[1]

Humidity (Operating and Nonoperating)

Five cycles (120 hours) referenced to MIL-T-28800D para 4.5.5.1.2 for type III, Class 3 instruments. Operating and nonoperating at 95% (−5%, +0%) relative humidity. Operating at +30°C and +55°C for all modes of operation; nonoperating at +30°C and +60°C.[1]

EMI

Meets radiated and conducted emission requirements per VDE 0871, Class B. Meets FCC section 15, sub-part J, Class A.[1]

To meet EMI regulations and specifications, use the specified shielded cable and metal connector housing with the housing grounded to the cable shield on the RS-232 connector.

Vibration (operating)

15 minutes along each of 3 major axes at a total displacement of 0.025 inch p-p (3.8 g at 55 Hz) with frequency varied from 10 Hz to 55 Hz in 1-minute sweeps. Hold for 10 minutes at 55 Hz in each of the three major axes. All major resonances must be above 55 Hz.[1]

Shock (Operating and Nonoperating)

100 g, half-sine, 1-ms duration, 3 shocks per axis each direction, for a total of 18 shocks.[1]

MECHANICAL SPECIFICATIONS

Weight

Without accessories	4.4 lbs (2 kg).
With accessories	6lbs.
Domestic Shipping Weight	7lbs.

Dimensions

Length	9.9 in (252 mm).
Height	3.4 in (86.4 mm).
Width	6.25 in (158.8 mm).

Cooling

There are no cooling vents provided.

Finish

Tektronix Blue pebble finish with black synthetic rubber hand grips and black vinyl probe pouch.

Construction

Plastic cabinet. Glass-laminate circuit boards with surface-mounted components.

CRT

CRT graticule area is 8 divisions high by 10 divisions wide. The divisions are 0.5 cm on a side and the diagonal size is 6.4 cm (approximately 2.5 inches). A special low-reflectance surface on the crt face aids viewing in high-ambient light areas.

[1] **Performance Requirement not checked in manual.**