SECTION 1
SPECIFICATION

Cathode-Ray Tube (CRT)

CRT Type	Rectangular
Graticule	8 div X 10 div (1 div =10mm), Internal graticule, Variable edge lighting.
Phosphor	P31 (standard)
Accerelating Potential	Approximately 20kV.
Brightness Enhancing	Brightness can be enhanced in sweep range from 10 ns/div to 0.5 μs/div.
Beam Finder	Returns trace to graticule area.

Vertical Deflection System

Display Mode	Channel 1, Channel 2, Alternate display of Channel 1 and Channel 2, Chopped display of Channel 1 and Channel 2 (chopped repetion rate : 1 MHz ±40%), Added display of Channel 1 and Channel 2, Alternate or chopped display of Channel 1, Channel 2 and Channel 3.
Channel 1 and Channel 2	
Deflection Factor	5 mV/div to 5 V/div in 10 calibrated steps in a 1-2-5 sequence. 5 mV/div to 12.5 V/div continuously variable with control. Accuracy: ±2% (10°C to 35°C) ±5% (−10°C to 50°C)
Frequency Response	(10°C to 35°C) 5 mV/div: DC to 250 MHz −3 dB 10 to 50 mV/div: DC to 350 MHz −3dB 0.1 to 0.5 V/div: DC to 350 MHz −3.5 dB Notes: 1. The AC-coupled lower −3 dB frequency is 4 Hz or less (0.4 Hz or less with X10 probe). 2. The bandwidth with the BANDWIDTH switch pushed-in is approximately 20 MHz.
Rise Time	Approximately 1ns (350 MHz bandwidth).
Pulse Response	Overshoot: 5% or less Sag: 1% or less Other distortion: 5% or less (at 10mV/div)
Delay Line	Allows viewing of leading edge.
Input Coupling	AC, GND, DC, 50Ω(DC)
Input RC	1MΩ input: 1MΩ ± 2%// 17pF ±2 pF 50Ω input: 50Ω ±2%
Maximum Input Voltage	
	1MΩ input: 500V (DC + Peak AC) 50Ω input: 5V (DC + Peak AC)
Common-Mode Rejection Ratio	
	50:1 or greater at 1 kHz 15:1 or greater at 20 MHz
Drift	0.2 div/hour (typical) after a 30-minute warm-up.
Polarity Inversion	Provided for Channel 2.
Cascaded Operation	(Channel 1 signal output connected to Channel 2 input)
Deflection Factor	1 mV/div

Accuracy: ±4% (10°C to 35°C)
±8% (−10°C to 50° C)

Frequency Response: DC to 20 MHz −3 dB

Channel 3

Deflection Factor: 0.1 V/div, 1 V/div

Accuracy: ±3%(10°C to 35°C)
±8%(−10°C to 50° C)

Frequency Response: (10°C to 35°C)
0.1 V/div: DC to 200 MHz −3 dB
1 V/div: DC to 200 MHz −4 dB

Notes:
1. The AC-coupled lower −3 dB frequency is 4 Hz or less (0.4 Hz or less with X10 probe).
2. The bandwidth with the BANDWIDTH switch pushed-in is approximately 20 MHz.

Pulse Response: Overshoot: 8% or less
Sag: 2% or less
Other distortion: 7% or less (at 0.1 V/div)

Input Coupling: AC, DC

Input RC: 1MΩ ± 2% // 17pF ± 3pF

Maximum Input Voltage: 500V (DC + Peak AC)

Triggering

Internal Trigger Source: Channel 1, Channel 2, Channel 3, Normal (displayed signals)

A Triggering

Source	Internal, Line
Coupling	AC, HF REJ, DC
Slope	Positive-going, Negative-going
Sensitivity	Shown in Table 1-1.

Table 1-1 (10°C to 35°C)

Frequency range	Channel 1 and Channel 2	Channel 3
DC to 10 MHz	0.3 div	0.2 div
10 to 100 MHz	1.0 div	1.0 div
100 to 350 MHz	2.0 div	2.0 div

Notes:
1. Signals below 30 Hz are attenuated in the AC coupling.
2. Signals above 10 kHz are attenuated in the HF REJ coupling.
3. In the AUTO position of the sweep MODE switch, the lower end of triggerable frequency is 50 Hz.

B Triggering

Source	Internal, External
Coupling	AC, DC
Slope	Positive-going, Negative-going
Input RC	1 MΩ ±5% // 20 pF ±5 pF
Maximum Input Voltage	500 V (DC + Peak AC)
Sensitivity	Shown in Table 1-2

Table 1-2 (10°C to 35°C)

Frequency range	Internal	External
DC to 10 MHz	0.4 div	75 mVp-p
10 to 100 MHz	1.0 div	150 mVp-p

Note: Signals below 30 Hz are attenuated in the AC coupling.

Horizontal Deflection System

Display Mode: A sweep, A intensified by B, Alternate sweep of A and B, B sweep

A Sweep

Sweep Mode	Automatic, Normal, Single
Sweep Rate	10 ns/div to 0.5 s/div in 24 calibrated steps in a 1-2-5 sequence. 10 ns/div to 1.25 s/div continuously variable with control. Accuracy I (over center 8 divisions): ±2% (10°C to 35°C) ±4% (−10°C to 50°C) Accuracy II (over any 2 divisions within center 8 divisions): ±5% (10°C to 35°C)
Holdoff Time	Continuously variable with control.

B Sweep

Sweep Mode	Automatic, Triggered
Sweep Rate	10 ns/div to 50 ms/div in 21 calibrated steps in a 1-2-5 sequence. Accuracy I (over center 8 divisions): ±2% (10°C to 35°C) ±4% (−10°C to 50°C) Accuracy II (over any 2 divisions within center 8 divisions): ±5% (10°C to 35°C)
Delay Time	1μs to 5s Accuracy: ±3% (10°C to 35°C)
Delay Jitter	1/20,000 or less

Sweep Magnification	10 times (Maximum sweep rate: 1 ns/div) Magnified sweep rate accuracy I (over center 8 divisons, 10°C to 35°C): 0.1 μs/div to 50 ms/div: ±3% 10 ns/div to 50 ns/div:±4% 1 ns/div to 5 ns/div: 5% Magnified sweep rate accuracy II (over any 2 divisions within center 8 divisions, 10°C to 35°C): 0.1 μs/div to 50 ms/div: ±5% 10 ns/div to 50 ns/div: ±6% 1 ns/div to 5 ns/div: ±10%

X−Y Operation

Input	X-axis: Channel 1 Y-axis: Channel 2

X-Axis

Deflection Factor	Same as Channel 1. Accuracy: ±3% (10°C to 35°C) ±5% (−10°C to 50°C)
Frequency Response	DC to 4 MHz −3 dB
Input RC	Same as Channel 1.
Maximum Input Voltage	Same as Channel 1.

Y-Axis	Same as Channel 2.
X-Y Phase Difference	3° or less (at 100 kHz)

Z Axis

Sensitivity	0.5 Vp-p for noticeable intensity modulation. (Positive-going signal decreases intensity.)
Frequency Range	DC to 5 MHz
Input Resistance	5 kΩ ±10%
Maximum Input Voltage	50 V (DC + Peak AC)

Calibrator

Waveshape	Square wave
Repetition Rate	1 kHz Accuracy: ±1% (10°C to 35°C)
Duty Ratio	48% to 52%
Output Voltage	0.6 Vp-p Accuracy: ±1% (10°C to 35°C) ±1.5%(−10°C to 50°C)
Output Resistance	Approximately 300Ω
Output Current	(Offered as an option.) 5 mAp-p Accuracy: ±1% (10°C to 35°C)

Output Signal

Channel 1 Signal

Output Voltage	25 mV for each division of CRT display.
Frequency Response	DC to 20 MHz −3 dB
Output Resistance	Approximately 50Ω

A Gate

Output Voltage	Approximately 5 Vp-p, Positive-going (baseline at about 0 V)
Output Resistance	Approximately 300Ω

B Gate

Output Voltage	Same as A Gate.
Output Resistance	Same as A Gate.

Power Supply

Line Voltage	100 (90 to 110)/117 (106 to 128)/ 217 (196 to 238)/234 (211 to 257) VAC Selected by the Line Voltage Selector.
Line Frequency	50 to 400 Hz
Power Consumption	Approximately 100W (at 100V AC)

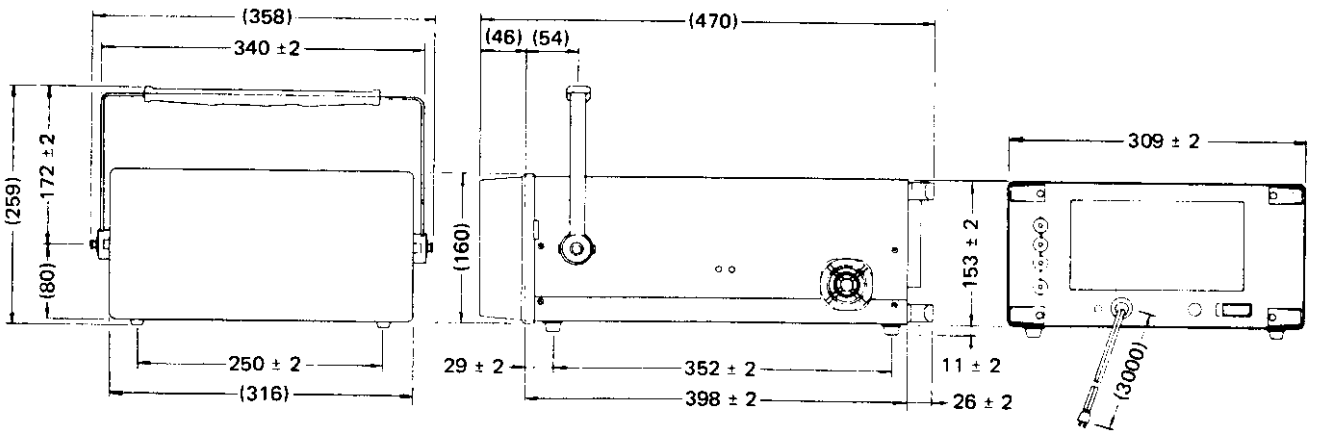
Physical Characteristic

Cooling	Fored-air cooling
Weight	Approximately 11 kg
Dimensions	(309 ±2)W x (153 ±2)H x (398 ±2) L (mm) Refer to Fig. 1-1.

Environmental Characteristic

Operating Temperature	−10°C to 50°C
Operating Humidity	90% RH, 40°C
Storage Temperature	−20°C to 70°C
Storage Humidity	80% RH, 70°C
Altitude	Operating: 5,000 m maximum (balometric pressure:405 mmHg) Non-operating: 15,000 m maximum (balometric pressure:90.4 mmHg)
Vibration (non-operating)	Vibrate for 15 minutes along each axis at a total displacement of 0.67 mm p-p with the frequency varied from 10-55 Hz in one-minute cycle.

Fig. 1-1 Dimensions



Shock (non-operating)

Lift one bottom edge of the instrument 5 cm over a hard bench, and drop.
(30° maximum in elevation angle)
Repeate 3 times for each edge.

Drop (package drop)

Drop from a height of 75 cm on one corner, all edges radiating from that corner and all flat surfaces.