





FEATURES

- Vertical axis has high sensitivity and wide bandwidth and especially covers fully specified frequency response at 2mV/div for all models.
 - CS-1022 ; Dual Trace
 - 1mV/div : DC to 10 MHz, -3 dB
 - 2mV/div : DC to 20 MHz, -3 dB
 - CS-1012 ; Dual Trace
 - 1mV/div : DC to 7 MHz, -3 dB
 - 2mV/div : DC to 10 MHz, -3 dB
 - CS-1020 ; Single Trace
 - 1mV/div : DC to 10 MHz, -3 dB
 - 2mV/div : DC to 20 MHz, -3 dB
 - CS-1010 ; Single Trace
 - 1mV/div : DC to 7 MHz, -3 dB
 - 2mV/div : DC to 10 MHz, -3 dB
- Vertical sensitivity range is selectable from 1mV/div to 5V/div with rotary switch continuously.
- Time base permits the high sweep speed.
 - CS-1022, 1020; 20nsec/div ($\times 10$ MAG)
 - CS-1012, 1010; 50nsec/div ($\times 10$ MAG)
- Vertical sensitivity error and sweep rate error are $\pm 3\%$ and accurate measurements are provided.
- The 150 mm rectangular CRT with internal graticule provides high brightness and accurate measurements, free of parallax error.
 - CS-1022, 1020; domed mesh type CRT with post-deflection acceleration and high brightness phosphors (acceleration voltage; 6 kV).
 - CS-1012, 1010; high brightness CRT (acceleration voltage; 2 kV).
- For convenience in making rise time measurements, the 0%, 10%, 90% and 100% levels are marked on the graticule scale of the CRT.
- Trace rotation is electrically adjustable from the front panel.
- By SCALE ILLUM control, the waveform is easily observed in the dark and the photograph of the waveform is easily provided.
- Selectable AUTO FREE RUN function provides sweep without trigger input signal.
- The FRAME-LINE switch provides selection of sync pulse for sweep triggering from small amplitude to large amplitude without adjusting when viewing composite video waveforms.
- For CS-1022 and 1012, vertical mode automatically provides the trigger signal with TRIG SOURCE and V. MODE switches.
- X-Y operation is easily provided by one-touch.
 - CS-1022, 1012; CH1 Y axis,
CH2 X axis
 - CS-1020, 1010; VERT INPUT Y axis
EXT TRIG INPUT X axis
- CS-1022 and 1012 are provided with CH1 OUTPUT terminal to monitor input signal of CH1.
- CS-1020 and 1010 are provided with VERT OUTPUT terminal to monitor input signal of VERT INPUT.

SPECIFICATIONS

	CS-1022	CS-1012	CS-1020	CS-1010
CRT	150FTM31	150GTM31	150FTM31	150GTM31
Acceleration Voltage	6 kV	2 kV	6 kV	2 kV
Display Area	8 × 10 div (1 div = 10 mm)			
Type	Rectangular, with internal graticule			
VERTICAL AXIS	CH1 and CH2		—	
Sensitivity	1 mV/div to 5 V/div, ±3%			
Attenuator	12 steps, 1 mV/div to 5 V/div in 1-2-5 sequence. Vernier control for fully adjustable sensitivity between steps.			
Input Impedance	1 MΩ ±2%, approx 32 pF	1 MΩ ±2%, approx 35pF	1 MΩ ±2%, approx 32pF	1 MΩ ±2%, approx 35pF
Frequency Response 2 mV/div to 5 V/div 1 mV/div	DC; DC to 20 MHz, -3 dB AC; 5 Hz to 20 MHz, -3 dB DC; DC to 10 MHz, -3 dB AC; 5 Hz to 10 MHz, -3 dB	DC; DC to 10 MHz, -3 dB AC; 5 Hz to 10 MHz, -3 dB DC; DC to 7 MHz, -3 dB AC; 5 Hz to 7 MHz, -3 dB	DC; DC to 20 MHz, -3 dB AC; 5 Hz to 20 MHz, -3 dB DC; DC to 10 MHz, -3 dB AC; 5 Hz to 10 MHz, -3 dB	DC; DC to 10 MHz, -3 dB AC; 5 Hz to 10 MHz, -3 dB DC; DC to 7 MHz, -3 dB AC; 5 Hz to 7 MHz, -3 dB
Rise Time	17.5 nsec or less (20 MHz) 35 nsec or less (10 MHz)	35 nsec or less (10 MHz) 50 nsec or less (7 MHz)	17.5 nsec or less (20 MHz) 35 nsec or less (10 MHz)	35 nsec or less (10 MHz) 50 nsec or less (7 MHz)
Crosstalk	-40 dB minimum		—	
Operating Modes	CH1; single trace CH2; single trace ADD; CH1 + CH2 added display ALT; two waveforms alternating CHOP; two waveforms chopped		—	
Chop Frequency	Approx. 250 kHz		—	
Channel Polarity	Normal or inverted, CH2 only inverted		—	
 Maximum Input voltage	500 Vp-p or 250 V (DC + AC peak)			
Non-Distorted Maximum Amplitude	More than 8 div, DC to 20 MHz	More than 6 div, DC to 10 MHz	More than 8 div, DC to 20 MHz	More than 6 div, DC to 10 MHz
HORIZONTAL AXIS	(input thru CH2, × 10 MAG not included)		(× 10 MAG not included)	
Operating Mode	With TRIG MODE switch, X-Y operation is selectable. CH1; Y axis CH2; X axis		With TRIG MODE switch, X-Y operation is selectable. VERT. INPUT; Y axis EXT TRIG INPUT; X axis	
Sensitivity	Same as vertical axis (CH2)		100 mV/div	
Input Impedance	Same as vertical axis (CH2)		1 MΩ ±2%, approx. 32pF	1 MΩ ±2%, approx. 35 pF
Frequency Response	DC; DC to 1 MHz, -3 dB AC; 5 Hz to 1 MHz, -3 dB	DC; DC to 500 kHz, -3 dB AC; 5 Hz to 500 kHz, -3 dB	DC; DC to 1 MHz, -3 dB	DC; DC to 500 kHz, -3 dB
X-Y Phase Difference	3° or less at 100 kHz	3° or less at 50 kHz	3° or less at 100 kHz	3° or less at 50 kHz
 Maximum Input Voltage	Same as vertical axis (CH2)		50 V (DC + AC peak)	
SWEEP				
Type	NORM	Triggering sweep		
	AUTO	Sweep free runs in absence of trigger		

	CS-1022				CS-1012			CS-1020			CS-1010		
Sweep Time	0.2 μs/div to 0.5 s/div, ±3% in 20 ranges, in 1-2-5 sequence. Vernier control provides fully adjustable sweep time between steps.				0.5 μs/div to 0.5 s/div, ±3% in 19 ranges, in 1-2-5 sequence. Vernier control provides fully adjustable sweep time between steps.			0.2 μs/div to 0.5 s/div, ±3% in 20 ranges, in 1-2-5 sequence. Vernier control provides fully adjustable sweep time between steps.			0.5 μs/div to 0.5 s/div, ±3% in 19 ranges, in 1-2-5 sequence. Vernier control provides fully adjustable sweep time between steps.		
Sweep Magnification	× 10 (ten times) ± 5%												
Linearity	± 3% all ranges, ± 5% on 0.5 s/div to 0.5 μs/div range at × 10 magnification.												
TRIGGERING													
Internal Sync	V. MODE; Triggered by input signal selected by vertical MODE setting. CH1; Triggered by CH1 signal CH2; Triggered by CH2 signal LINE; Triggered by line voltage						INT; Triggered by vertical input signal LINE; Triggered by line voltage						
External Sync	EXT; Triggered by signal applied to EXT TRIG INPUT jack						EXT; Triggered by signal applied to EXT TRIG INPUT jack						
External sync Input Impedance	1 MΩ, ± 2% approx 32pF				1 MΩ, ± 2% approx 35pF			1 MΩ, ± 2% approx 30pF			1 MΩ, ± 2% approx 30pF		
 Maximum External Trigger Voltage	50 V (DC + AC peak)												
Coupling	AC, VIDEO FRAME, VIDEO LINE												
Tigger Sensitivity													
		FREQ, RANGE	INT	EXT	FREQ, RANGE	INT	EXT	FREQ, RANGE	INT	EXT	FREQ, RANGE	INT	EXT
	AUTO	20Hz to 20MHz	1div	0.1Vp-p	20Hz to 10MHz	1div	0.1Vp-p	20Hz to 20MHz	1div	0.1Vp-p	20Hz to 10MHz	1div	0.1Vp-p
	NORM	5Hz to 20MHz	1div	0.1Vp-p	5Hz to 10MHz	1div	0.1Vp-p	5Hz to 20MHz	1div	0.1Vp-p	5Hz to 10MHz	1div	0.1Vp-p
	VIDEO	FRAME, LINE	1div	0.1Vp-p	FRAME, LINE	1div	0.1Vp-p	FRAME, LINE	1div	0.1Vp-p	FRAME, LINE	1div	0.1Vp-p
PROBE ADJ. VOLTAGE													
0.5 V, ± 6%, square wave, positive polarity, approx 1 kHz													
INTENSITY MODULATION													
Sensitivity	TTL compatible Positive voltage increases brightness. Negative voltage decreases brightness.												
Input Impedance	Approx 10 kΩ												
Usable Frequency Range	DC to 2 MHz				DC to 1 MHz			DC to 2 MHz			DC to 1 MHz		
 Maximum Input Voltage	50 V (DC + AC peak)												
VERTICAL AXIS SIGNAL OUTPUT	CH1 SIGNAL OUTPUT						VERTICAL SIGNAL OUTPUT						
Output Voltage	Approx 50 mV/div (50 Ω load)												
Output Impedance	Approx 50 Ω												
Frequency Response	100 Hz to 20 MHz, – 3 dB (50 Ω load)				100 Hz to 10 MHz, – 3 dB (50 Ω load)			100 Hz to 20 MHz, – 3 dB (50 Ω load)			100 Hz to 10 MHz, – 3 dB (50 Ω load)		
TRACE ROTATION													
Electrical, adjustable from front panel													
POWER REQUIREMENT													
AC 100/120/220/240 V ± 10% 50/60 Hz													
Power Consumption	Approx 43 W				Approx 41W			Approx 38W			Approx 36W		
DIMENSIONS													
() dimensions include protrusions from basic outline dimensions.													
	Width	260 mm (260 mm)											
	Height	160 mm (180 mm)											
	Depth	400 mm (460 mm)											