

OSCILLOSCOPES

100MHz 2-Channel Programmable Oscilloscope
(With Digital Readout / Cursor)

CS-5370P

OUTLINE

The CS-5370P is 2-channel Oscilloscope developed with concepts of high function design, high accuracy and easy operation. The panel layout never diminishes the intuitive and high-speed response provide fatigue free operation even after long-hours of use. CS-5370P incorporating readout function offers you parameter measurement and auto setup functions enabling to measure AC voltage (V_p-p), DC voltage, frequency and period. CS-5370P is provided with full features including $\pm 2\%$ high-accuracy measurement, delay sweep function, automatic triggering and high intensity, high-resolution CRT. CS-5370P with high-performance will surely assist you in many kinds of field activities.

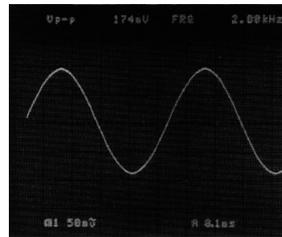
FEATURES

Programmable function

Internal non volatile program memory allows programmed sequences of up to 100 steps.

Optional RS-232C or GP-IB interface card enable bus controlled set up and waveform adjustment.

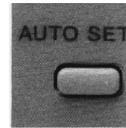
Parameter Auto Measurement Function



It is possible to measure the voltage, frequency and period automatically just input the signal. Especially for voltage measurement, measurement mode is automatically selected according to the input selector.

For example, when the AC input is selected, "Peak-to-Peak" voltage is automatically measured, and when the DC input is selected, DC voltage is measured automatically.

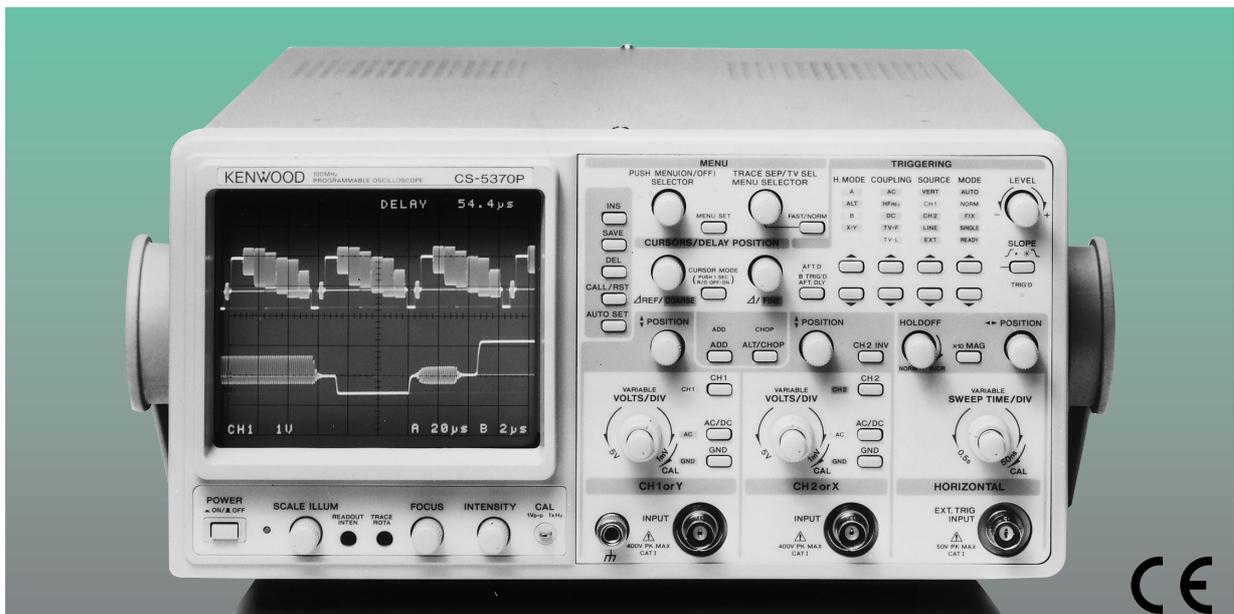
Auto Setup Function



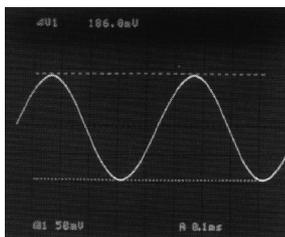
By pressing the AUTO SET key, the voltage range and time range are selected automatically.

RS-232C
OPTION

GP-IB
OPTION



Cursor Measurement Function



The cursor measurement function allows a high accuracy measurement of signal values. When the probes are used, its attenuation ratio can be converted automatically. It is also possible to measure the voltage value and phase differences. When the delay sweep is used, the delay time is also displayed, enabling an accurate measurement results without any errors due to visual checks in conventional systems.

High-Sensitivity Design with Vertical Axis of 1 mV/div

The vertical axis sensitivity can be varied continuously from 1 mV/div. to 5 V/div. using the 1-2-5 step attenuator. The 1 mV/div. position is very useful to measure low-level and complicated signals. (Frequency response at 1 mV/div. and 2mV/div are DC to 20 MHz (-3 dB)).

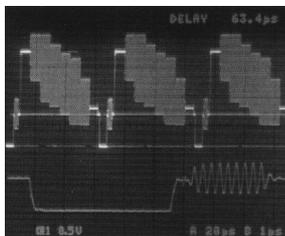
Automatic Sync (FIX) Function

With this function, the synchronization level is automatically controlled by tracking the amplitude of the waveform to maintain the sync lock status. This function eliminates annoying and complicated synchronization operations.

Easy Operation Panel Layout

The CS-5370P used touch switches and LEDs.

Delayed sweep with waveform partial magnification capability



The main (A) sweep waveform in which the magnified section is brightened by intensity modulation and the delayed (B) sweep waveform which shows only the magnified section can be observed simultaneously. This is a real alternate delayed sweep.

High-Accuracy $\pm 2\%$ Design for More Precision Measurement

In order to obtain highly reliable measurement results, the vertical axis sensitivity and sweep time for the main circuit is maintained within $\pm 2\%$ precision. Other specifications also guarantees the rated values (under temperature conditions of 10 to 30°C, humidity of 85% or less).

Square-Type 150 mm CRT with Self-Illuminated Light and Inside Scale (17kV)

A large-sized, square, dome-mesh type CRT with rear accelerator is employed. It features both high intensity and high resolution while providing accurate measurements without parallax view. The auto focus circuit is also incorporated to display sharp waveforms at all times.

Single sweep for observations of single-shot channel

The single sweep function is powerful in measurement of single-shot or sudden channel. Waveform photography using a camera is as easy as ordinary, visual observations. It is easy not only for observations during normal visual inspections but also for camera shots of the waveforms.

Variable hold-off allowing observation of waveforms with complicated cycle

Signals which are hard to be synchronized due to complicated repetition cycles, for example digital signals and video signal bursts, can be synchronized stably by converting them into the hold-off time.

High-Accuracy Calibration Signals

A calibration signal output is provided to output the highly accurate frequency of $\pm 0.1\%$ and voltage accuracy of $\pm 1\%$, enabling checking of the measurement precision at any required time.

CH1 signal output connector

The CH1 signal output is obtained by branching the input signal in the middle of the signal line. As this connector outputs the input signal at a rate of 50 mV/div, connecting a frequency counter makes it possible to measure the frequency of a very low signal while observing its waveform

Wide Dynamic Range and Distortion-Free Accurate Waveform Display

Its wide dynamic range having greater margins assures the linearity of the waveforms displayed on the CRT, providing highly accurate waveform displays without any distortion up to the upper frequency limits.

OSCILLOSCOPES

SPECIFICATIONS

CRT Type/accelerating voltage		150 mm rectangular with internal graticule 8 × 10 div. (1 div.=10mm) /approx. 17 kV		
Vertical Axis (CH1, CH2)				
Sensitivity		5 mV to 5 V/div. ± 2%, 1 mV, 2 mV/div. ± 5%, 1-2-5 step, 12 ranges, fine adjustable within the selected range		
Input Impedance		1 MΩ ± 1%, approx. 20 pF		
Frequency Response				
	5 mV to 5 V/div.	DC: DC to 100 MHz (within -3 dB) AC: 5 Hz to 100 MHz (within -3 dB)		
	1 mV, 2 mV/div	DC: DC to 20 MHz (within -3 dB) AC: 5 Hz to 20 MHz (within -3 dB)		
Rising Time		5 mV to 5 V/div.: approx. 3.5 ns 1 mV, 2 mV/div.: approx. 17.5 ns		
Signal Delay Time		Leading edge can be confirmed using a square wave that has a rising time of less than this unit		
Crosstalk		-40 dB (at 1 kHz)		
Max. Input Voltage		800 Vp-p or 400 V (DC + AC peak, 1 kHz)		
Vertical Axis				
Operation Mode		CH1, CH2, ADD, ALT, CHOP		
Chopping Frequency		Approx. 250 kHz		
Polarity Inversion		CH2 only		
Horizontal (CH2 Input)				
Sensitivity		5 mV to 5 V/div. ± 3%, 1 mV, 2 mV/div. ± 5%, 1-2-5 step, 12 ranges, fine adjustable within the selected range		
Input Impedance		Same as vertical axis (CH2)		
Frequency Response		DC: DC to 1 MHz (-3 dB), AC: 5 Hz to 1 MHz (-3 dB)		
X-Y Phase Difference		Less than 3° at 100 kHz		
Operation Mode		Switchable to X-Y mode with H.MODE key CH1: Y axis, CH2: X axis		
Max. Input Voltage		Same as vertical axis (CH2)		
Sweep				
Sweep Mode		A, ALT, B, X-Y		
Sweep Time	A Sweep	0.5 s to 50 ns/div. ± 2%, 1-2-5 step, 22 ranges, fine adjustable within the selected range		
	B Sweep	50 ms to 50 ns/div. ± 2%, 1-2-5 step, 19 ranges		
Sweep Magnification		× 10 ± 5%, (± 8% at 0.5 μs/div.)		
Linearity		± 3% (± 5% at × 10 MAG mode)		
Hold Off		A Sweep, continuously variable from NORM position		
Trace Separation		B Sweep is continuously variable ± 4 div. with respect to A sweep.		
Delay Sweep Mode		Continuous delay (After Delay), Synchronous delay (B TRIG'D): Synchronized with trigger signal		
Delay Time		Continuously variable from 0.2 div. to 10 div. (0.5s/div. to 50ns/div.)		
Delay Time Error		± (3% of setting value + 1% of full scale) + (0 to 300 ns)		
Delay Jitter		20000 (10 times of A Sweep setting value) : 1 (at A Sweep 1 ms/div, B Sweep 1 μs/div)		
Triggering Mode				
Trigger Mode		AUTO, NORM, FIX, SINGLE, RESET		
Trigger Sources		VERT, CH1, CH2, LINE		
Trigger Coupling		AC, HF-REJ, DC, TV-F, TV-L		
Trigger Sensitivity (NORM MODE)	Coupling	Frequency	NORM	FIX*
		10Hz to 50MHz	1.0 div	1.5 div
	AC	50MHz to 100MHz	1.5 div	2.0 div
		10Hz to 10kHz	1.0 div	1.5 div
	HF-REJ	10 kHz or more	> min	> min
		DC	DC to 50MHz	1.0 div
50MHz to 100MHz	1.5 div		2.0 div	
TV-F, TV-L	Composite video signal	1.5 div		
(Above values are obtained with the signal input of: AUTO: 40 Hz or more, FIX: 50 Hz or more Internal sensitivity indicated as the amplitude on the CRT. Sensitivity in HF-Rej mode ">min" denotes the amplitude required for synchronization will increase.)				
Calibration Signal				
Waveform		Square wave		
Polarity		Positive		
Amplitude		1 Vp-p ± 1%		
Frequency		1 kHz ± 0.1%		
Intensity Modulation				
Input Voltage		Dims at TTL high level (+5V)		
Input Impedance		Approx. 10 kΩ		
Frequency Response		DC to 5 MHz		
Max. Input Voltage		84 Vp-p or 42 V (DC + AC peak, 1 kHz)		

CH1 Signal Output (50Ω Load)	
Output Voltage	Approx. 50 mVp-p/div.
Output Impedance	Approx. 50Ω
Frequency Response	
	5 mV to 5 V/div. 100 Hz to 100 MHz (-3 dB)
	1 mV, 2 mV/div. 100 Hz to 20 MHz (-3 dB)
Trace Rotation	Enables trace rotation adjustment by semi-fixed controller on the panel.

Readout Section

Panel Setup Value	CH1, CH2 scale factor (with probe detection), V-UNCAL, ADD, INV, A/B Sweep scale factor (MAG conversion, "*" is displayed in MAG mode), X-Y, Sweep UNCAL, DELAY, TIME, B TRIG'D	
Cursor Measurement (ΔV1 only in X-Y mode)	ΔV1: Voltage display by converting CH1 scale factor ΔT : Time display by converting A Sweep scale factor	ΔV2: Voltage display by converting CH2 scale factor Δ1/T: Frequency display by converting Sweep scale factor
Volts/Div or Time/Div UNCAL mode	RATIO: Voltage ratio, time ratio display with 5 div. on the CRT as 100% PHASE: Phase difference display with 5 div. on the CRT as 360°	
Resolution/Measurement Error	10 bits/± 4%	
Measuring Range	Vertical	More than ± 3.6 div. from the center of CRT
	Horizontal	More than ± 4.6 div. from the center of CRT
Parameter auto setting function	Each parameter is measured and displayed for the signal selected as the trigger signal source from CH1 or CH2	
Frequency (FRQ)	Mode selectable in Cursor mode. Measured with internal counter to be displayed	
Frequency Range	2 Hz to 100 MHz	
Effective Digits/Accuracy	3 digits/0.01% ± 1 digit	
Measurement Sensitivity	Same as trigger sensitivity	
Period (PER)	Mode selectable in Cursor mode. Measured with internal counter to be displayed	
Measurement Range	0.5 s to 10 ns	
Effective Digits/Accuracy	3 digits/0.01% ±1 digit	
Measurement Sensitivity	Same as trigger sensitivity	
AC Voltage (Vp-p)	Mode selectable in Cursor mode. Peak-to-peak voltage is measured and displayed	
Measurement Range	0.5 div. to Effective CRT area	
Frequency Range	10 Hz to 100 kHz	
Effective Digits/Accuracy	3 digits/10 Hz to 40 Hz: ± {8% + attenuator setup value (V/div) × 0.04 div}	
	40 Hz to 100 kHz: ± {3% + attenuator setup value (V/div) × 0.04 div}	
DC Voltage (DCV)	Mode selectable in Cursor mode. Average DC voltage is measured and displayed	
Sensitivity	0.5 div. to Effective CRT area	
Effective Digits/Accuracy	3 digits/± {3% + attenuator setup value (V/div) × 0.04 div}	
Auto Setup	For CH1, CH2, Vertical axis attenuator, Sweep range, Vertical position, Horizontal position are automatically setup	
Period	1.5 to 5 periods (H.Variable.; CAL mode, for input signal up to 10 MHz)	
Amplitude	2 to 4 div. (1 to 2 div. for 2-channel)	
Frequency (Size wave)	50 Hz to 100 MHz	
Position	Vertical axis: 1 channel ; almost center of CRT, 2 channel ; CH1 approx. +2 div., CH2 approx. -2 div. from the center of CRT Horizontal axis: starts from left edge of CRT scale	
Backup	Panel setup values are backed up by built-in battery. Battery service life approx. 30,000 hours (with room temperature)	

Programable Function

Program capacity	Maximum 100 steps (Possible to divide up to 5 groups.)
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Power Supply & Others

Power Requirements	
Input Voltage	AC 100/120/220/230 V (±10%), 50 Hz / 60 Hz
Power Consumption	Max. 62W, 76 VA
Insulator Voltage	AC 1.5 kV, 1 minute
Insulator Resistance	More than 100MΩ at DC 500 V
Dimensions (W x H x D)	305 x 150 x 400 mm / (344 x 165 x 459 mm, Maximum dimensions)
Weight	Approx. 9.6 kg
Operating Environment (limited as indoor use)	
Overvoltage Category/Altitude/Pollution	II / 2000 m / 2
Specification Guaranteed	
Temperature & Humidity	+10 to +35°C, 85% or less (with no condensation)
Operation/Storage	
Temperature & Humidity	0 to +40°C, 85% or less (with no condensation)/ -20 to +70°C, 85% or less (with no condensation)
Accessories	Operation Manual (1)/Adjusting Screwdriver (1)/Power Supply Cable (1)
Probe	PC-51 (2)
Applicable Standards	
Safety Standard	EN61010-1 & A2 (1995)
EMI	EN55011 (1991) Class B, FCC 47 CFR, Part 15, Sub-Part B, Class B
Immunity	IEC801-2 (1991) 8kVAD, IEC801-3 (1984) 3V/m, IEC801-4 (1998)