KENWOOD

OSCILLOSCOPES

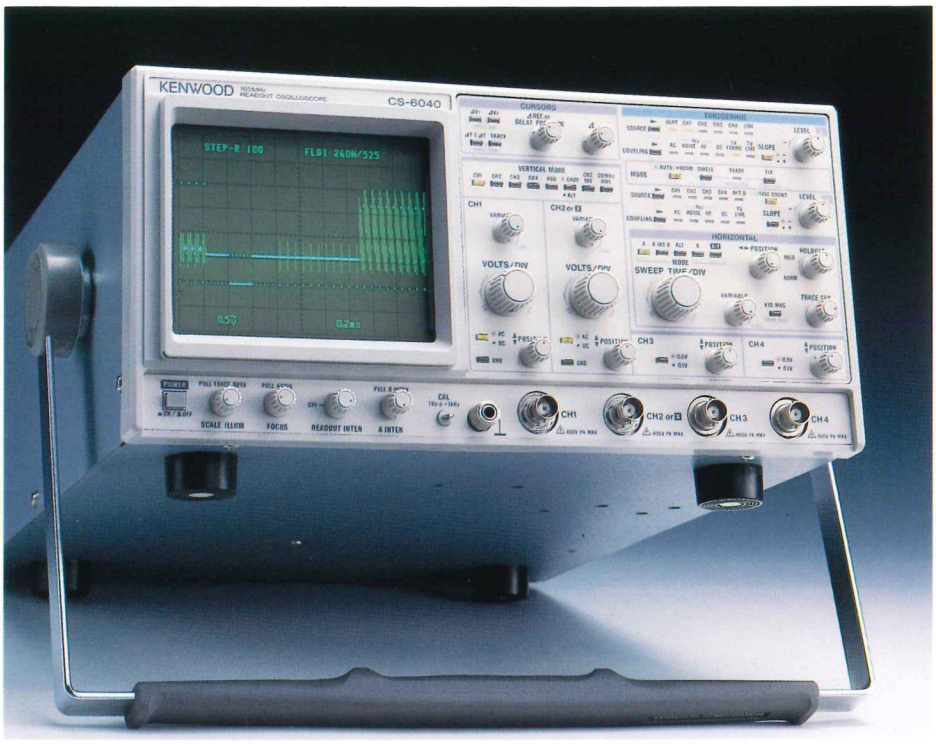
TEST & MEASURING INSTRUMENT

COMPARISON FIGURES OF OSCILLOSCOPES

	CS-6040	CS-6030	CS-5170	CS-5175	CS-5165	CS-5155	CS-5130
Bandwidth	150MHz	100MHz	100MHz	100MHz	60MHz	50MHz	40MHz
Deflection Factor	1mV/div to 20MHz 5mV/div to 150MHz	1mV/div to 20MHz 5mV/div to 100MHz	1mV/div to 20MHz 5mV/div to 100MHz	1mV/div to 20MHz 5mV/div to 100MHz	1mV/div to 20MHz 5mV/div to 60MHz	1mV/div to 20MHz 5mV/div to 50MHz	1mV/div to 15MHz 5mV/div to 40MHz
No. of Channels	4-Channel/ 10-Trace	4-Channel/ 10-Trace	2-Channel/ 4-Trace	2-Channel/ 4-Trace	3-Channel/ 6-Trace	3-Channel/ 6-Trace	2-Channel/ 4-Trace
CRT (Accelerating Voltage)	20kV	17kV	12kV	12kV	12kV	12kV	12kV
Digital Readout & Cursor	○	○	○				○
Max. Sweep Speed	20ns/div	20ns/div	50ns/div	50ns/div	50ns/div	50ns/div	0.2μs/div
Delayed Sweep	○	○	○	○	○	○	○
Trigger Delay	○						
Digital Storage							
Delay Line	○	○	○	○	○	○	○
V-Mode Alternate Trigger			○	○	○	○	○
Single Sweep	○	○	○	○	○	○	○
Magnified Sweep	○	○	○	○	○	○	○
Automatic Triggering (Fix)	○	○	○	○	○	○	○
Intensity Modulation	○	○	○	○	○	○	○
Vertical-axis Signal Output	○	○	○	○	○	○	○
Variable Holdoff	○	○	○	○	○	○	○
Video Sync	○	○	○	○	○	○	○
Line Sync	○	○	○	○	○	○	○
Power Requirements	AC	AC	AC	AC	AC	AC	AC
Dimensions (W×H×D)mm	310×150×400	310×150×400	319×132×380	319×132×380	319×132×380	319×132×380	319×132×380
Weight	9.0kg	9.0kg	9.2kg	9.0kg	9.2kg	9.2kg	9.0kg
Page	3	3	5	5	6	6	8

	CS-5135	CS-5140	CS-4035	CS-4026	CS-4025	CS-3025	CS-1575A	CO-1305	CO-1506	
	40MHz	40MHz/ 100MHz	40MHz	20MHz	20MHz	20MHz	5MHz	5MHz	1.5MHz	
	1mV/div to 15MHz 5mV/div to 40MHz	1mV/div to 5MHz 5mV/div to 40/100MHz	1mV/div to 5MHz 5mV/div to 40MHz	1mV/div to 5MHz 5mV/div to 20MHz	1mV/div to 5MHz 5mV/div to 20MHz	1mV/div to 4MHz 5mV/div to 20MHz	10mV/div to 5MHz	10mV/div to 5MHz	20mV/div to 1.5MHz	
	2-Channel/ 4-Trace	2-Channel	2-Channel	2-Channel	2-Channel	2-Channel	2-Channel	1-Channel	1-Channel	
	12kV	12kV	12kV	12kV	※2kV	1.8kV	2kV	1.4kV	1.8kV	
		○								
	0.2μs/div	10ns/div	0.2μs/div	0.2μs/div	0.5μs/div	0.2μs/div	10μs/div	100kHz	10μs/div	
	○									
	○									
	○						○			
	○									
	○	○	○	○	○	○				
	○									
	○	○	○	○	○			○		
	○		○	○	○					
	○	○								
	○	○	○	○	○	○				
	○		○	○	○	○	○			
	AC	AC	AC	AC	AC	AC	AC	AC	AC	
	319×132×380	319×132×380	290×150×380	290×150×380	290×150×380	216×89×298	260×190×375	130×190×280	150×220×410	
	8.5kg	9.5kg	6.8kg	6.8kg	6.8kg	4.0kg	8.0kg	3.5kg	6.2kg	
	8	7	9	9	9	10	11	12	12	

※P-7 Long Persistarce CRT version is also available

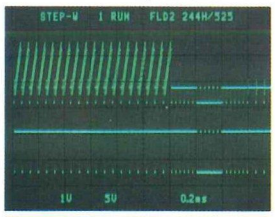


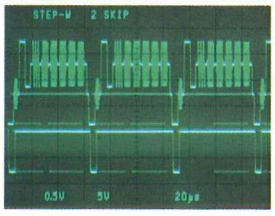
100 Programmable Steps and NTSC/PAL TV Line Counter Functions Provided as Standard

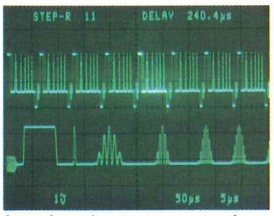
The CS-6040/6030 features a maximum of 100 programmable steps of front-panel setting values (20 steps×5 blocks), which can be read out as required, a TV line counting function extremely valuable in video signal waveform observation, and a trigger counter function useful in digital waveform observation. In addition, these scopes display setting values using a CRT readout function, and have cursor functions for digital measurements of waveform. The CS-6040 features four channels and bandwidth to 150MHz, while the CS-6030 has a bandwidth of 100MHz, and a high-intensity 20kV CRT (17kV for the CS-6030). Almost all functions are controlled by logic-type panel controls, thereby greatly enhancing reliability and operational simplicity in these high-performance oscilloscopes.

100 program steps

Up to 100 steps (20 steps × 5 blocks) of front-panel setting values can be programmed and read out using the programming function. Since the cursor, vertical sensitivity, sweep time, and trigger-related setting values can be programmed,



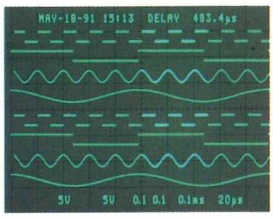




by simply programming repeatedly used settings, these can be recalled for quick setup when required. In addition, a rear-panel footswitch connector is provided for remote control.

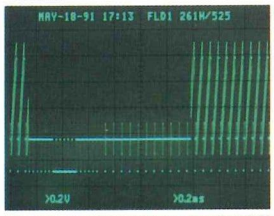
4-Channel, 10-Trace

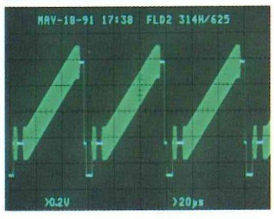
The CS-6040/6030's four channels easily provide the display capability for operation of complex digital or video signals. In addition, the alternate delayed sweep function can be used to magnify an arbitrarily selected portion of the main sweep waveform for simultaneous 4-channel, 10-trace display.



TV line counter

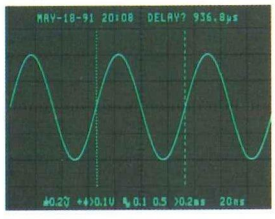
An NTSC/PAL TV line counter is provided as standard. This enables the line signal of video signals to be specified for each field.





Readout Function

Vertical-axis sensitivity, sweep time, delay time, input selection and other settings are instantly readable on the CRT screen together with waveforms.

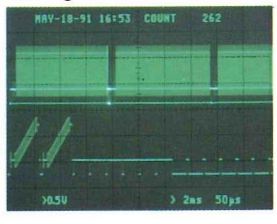


Cursor Measurement

By setting two cursor lines on the CRT screen, it is possible to provide a digital readout of voltage, time, voltage ratio, time ratio, frequency, and phase difference on the CRT screen.

Trigger Counter

It enables the setting of a delay as a count with respect to the main sweep. This makes possible not only observation of VITS signals including video signals but observation of a digital circuit plus timing as well.



Trigger Mode Automatically Sets by Selecting the Vertical Mode

Setting the trigger source is as simple as switching the vertical mode. This eliminates having to set the trigger source independently.

150MHz
100MHz

150MHz Response on all Four Channels

All four channels have DC to 150MHz response guaranteed (to 100MHz for the CS-6030). In addition, these scopes both have 1mV/div sensitivity for CH1 and CH2 (0.5V and 0.1V attenuator switching for CH3 and CH4).

Independent A and B Trigger Modes

A and B trigger coupling and source are independently settable, enabling independent settings of trigger conditions for stable waveform observations.

Guaranteed Channel-to-Channel Time Matching

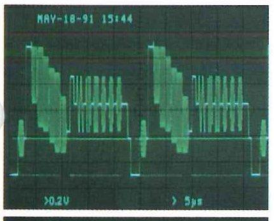
Time matching to 0.5ns or better between CH1 and CH2 and 1ns or better between CH1/2 and CH3/4 are guaranteed, and important specification in accurate timing measurements of logic circuitry.

Trace Separation Shifts the Delayed Swept Waveform

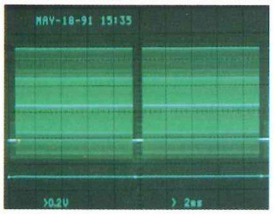
Using the ALT sweep, the delay swept waveform can be shifted downward up to four divisions with respect to the main swept waveform, enabling easy observation without annoying waveform overlap.

Dedicated Video Clamp Triggering for Video Signals Eliminates Triggering Adjustments

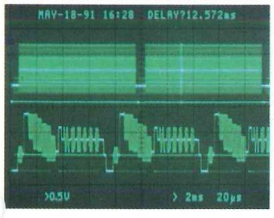
A video clamp feature provides instant triggering on vertical or horizontal video signals. Compared to previous systems, this eliminates triggering adjustments and provides a stable triggered display. By triggering on the main sweep frame signal, it is possible to observe a stable display of any expanded portion of the line signal with the delayed sweep.



Vertical Video Signal



Horizontal Video Signal



Frame Signal (Top), Line Signal (Bottom)

±2% Accuracy Ensures Accurate Measurements

To ensure measurements of the highest reliability, these scopes guarantee an accuracy of ±2% for vertical-axis sensitivity and sweep time, with other specifications within specified limits as well.

Unique ×10 MAG for Delayed Sweep

Independent of the Main Sweep ×10 MAG, a separate ×10 MAG, is provided which operates on only the delayed sweep, without affecting the main sweep during alternate delayed sweep.

Automatically Converted Measurement Voltages, Even When Using a Probe

When using the standard PC-31 probe, the readout display is automatically converted to reflect the attenuation ratio of 10:1, eliminating reading errors and troublesome calculations.

Single Sweep for Waveform Photography

A one-shot illumination feature enables scale illumination and readout to be switched on momentarily. This eliminates the problem of over exposure caused by readouts and other illumination.

ΔV1 and ΔV2 Cursor Measurements Even in the X-Y Mode

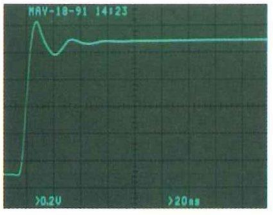
In addition to such measurements in the normal sweep mode, ΔV2 and ΔV1 measurements are possible with the vertical and horizontal cursors, especially, in the X-Y measurement mode as well.

0.02% Delay Time Resolution

A 12 bit DAC is used to provide an additional bit of DAC resolution to eliminate the use of software and provide a delay-time resolution of 0.02% of full scale.

Maximum Sweep Speed of 2ns/div (using ×10 MAG)

Sweep time is continuously switchable in the range 0.5s to 20ns/div. In addition, a signal delay line is provided to enable accurate observation of the rising edge of fast signals and of high-frequency signals.



Vertical-Axis Signal Output

This output provides a signal delivered from the input signal circuitry. Its amplitude is approximately 50mV/div with respect to the displayed signal, enabling its connection to a frequency counter for highly accurate frequency measurements of minute-level signals.

Variable Holdoff for Observation of Waveforms with Complex Periodicities

The holdoff time can be varied to ensure stable triggering on even digital signals and burst signals having complex periodicities.

Individual A and B Intensity and Readout Adjustments for Optimum Display Setups

The delayed sweep intensity can be adjusted independently of the main sweep intensity using the B-INT adjustment. This ensures an easy-to-view display even when the magnification is changed.

20MHz Bandlimiting Cuts out High-Frequency Components

By limiting the bandwidth of the vertical-axis amplifier to approximately 20MHz, it is possible to eliminate high-frequency noise and pulse-type overshoot contained on the signal being observed, thereby providing an easier-to-observe waveform display.

8-Division Dynamic Range for Precision, Distortion-free Waveform Display

Dynamic range to spare is the key to waveform display linearity, enabling distortion-free waveform display up to the limit of scope frequency response.

SPECIFICATIONS

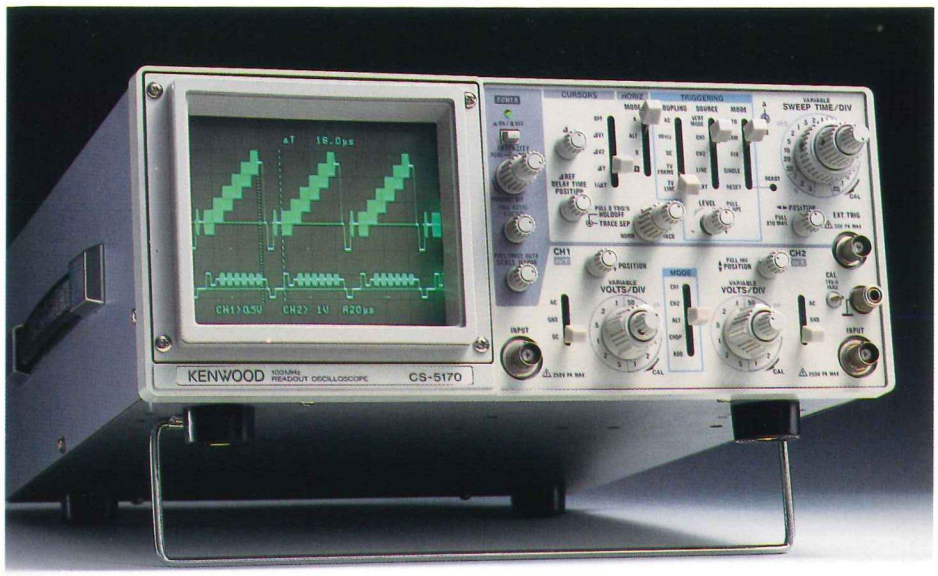
CRT:	150mm Rectangular, Phosphor P31 Accelerating voltage 20kV*17kV
Vertical amplifier (CH1 & CH2 identical)	
Operating modes:	CH1, CH2, CH3, CH4, ADD, ALT & CHOP
Attenuator:	1mV/div to 5V/div (12 ranges)
Freq. response:	DC to 150MHz (−3dB) *100MHz 5Hz to 150MHz (−3dB) *100MHz
Input impedance:	1MΩ, 20pF
Signal delay line:	Enables CRT display of leading edges
Polarity inversion:	CH2 only
Vertical amplifier (CH3 & CH4 identical)	
Sensitivity:	0.1V/div, 0.5V/div
Freq. response:	DC to 150MHz (−3dB) *100MHz
Input impedance:	1MΩ, 20pF
Horizontal amplifier (CH2 input)	
Sensitivity:	Same as vertical CH2
Freq. response:	Same as vertical CH2
Time base	
Sweep mode:	A, A-INT-B, ALT, B & X-Y
Sweep time (A):	20ns/div to 0.5s/div (23 ranges)
Sweep time (B):	20ns/div to 50ms/div (20 ranges)
Magnified sweep:	×10
Triggering	
A trigger mode:	AUTO, NORM, SINGLE & FIXED
Trigger source:	V.MODE, CH1, CH2, CH3, CH4 & LINE
Coupling:	AC, NOISErej, HFrej, DC, TV-frame & TV-line
B trigger mode:	Starts after delay, B triggerable after delay & trigger count
Trigger source:	CH1, CH2, CH3 & CH4
Coupling:	AC, NOISErej, HFrej, DC & TV-line
Trigger sensitivity:	
INT:	1 div (DC to 50MHz), 1.5 div (DC to 150MHz) *100MHz
TV-Frame & TV-Line:	1 div (140IRE)
Calibration voltage:	1Vp-p (1kHz)
Intensity modulation:	0 to +5V
Vertical axis signal out:	50mVp-p (50Ω load)
Power requirements:	100/120/220/240VAC, 73W
Dimensions:	310(W)×150(H)×400(D) mm
Weight:	9kg
Accessories:	Instruction manual (1), Probes PC-31 (2)
Readout	
Calendar function:	Year/month/day/hour/minute
Setting & setting value:	● CH1 thru CH4 scale factor ● AC/DC & GND ● V-UNCAL ● ADD, INVERT & BW ● A/B sweep scale factor ● Sweep variable UNCAL ● X-Y (CH2-X) ● Delay time ● Trig count ● TV count
Cursor functions	
Cursor modes:	ΔV1, ΔV2, ΔT, 1/ΔT, Ratio & Phase
Program mode	
Program capacity:	20 steps×5 blocks
Program contents:	● Cursor (Cursor mode/Cursor) ● Vertical (vert. mode/ATT/AC, DC, GND) ● Horizontal (Hori. mode/Sweep time) ● Position (Hori. position) ● Delay time ● Triggering (A source/A couple/A slope/B source/B couple/B slope) ● Sweep mode

(*for the CS-6030)

CS-5170 100MHz 2-Channel Oscilloscope with Readout and Cursor Measurement

CS-5175 100MHz 2-Channel Oscilloscope

100MHz

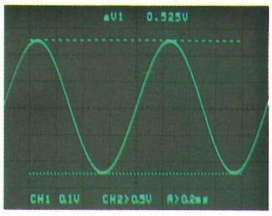


The 100MHz Scope that Proves Simple Can be Better.

The CS-5170 and CS-5175 are economical pricing and superior performance in a dual channel 100MHz oscilloscope. The CS-5170 offers on-screen digital readout and measurement cursor functions for quick and easy operation. The CS-5175 offers the same performance as the CS-5170 but eliminates the CRT readout and cursors.

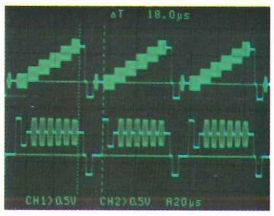
High-Accuracy Cursor Measurements (CS-5170 only)

Two cursor lines can be used to measure waveform voltages, voltage difference, time difference, time ratio, frequency, and phase difference, with measurement results displayed digitally for easy reading. Using delayed sweep, the delay time is displayed directly, thereby eliminating the need to read this "by eye" as was necessary with previous scopes.



Digital Readout for Instant Answers (CS-5170 only)

The vertical- and horizontal-axis range settings, VARIABLE and UNCAL setting conditions are clearly displayed on the CRT screen. Using an accessory probe (PC-31), the vertical sensitivity display senses and reflects the 10:1 ratio automatically.

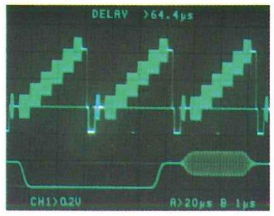


High-Sensitivity Design: 1mV/division

Vertical-axis sensitivity can be set from 1mV to 5V/div and is continuously adjustable using an attenuator.

Partial Waveform Expansion Using Delayed Sweep

An intensified portion of the waveform of sweep A can be observed using sweep B (delayed sweep), simultaneously with the full original waveform. This is made possible by a true alternate delayed sweep.



Video Clamp for Easy Video-Signal Observation

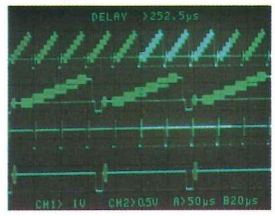
A video clamp function is provided to enable observation of vertical and horizontal video signals with stable triggering.

Maximum Sweep Speed 5ns/div

The sweep speed can be continuously varied over the range 0.5s to 0.05μ/div. In addition, a signal delay line enables observation of the rising edges of fast signal and accurate observation of high-frequency signals.

2 Channel/4 Trace Waveform Display

Both CH1 and CH2 can be swept simultaneously by the main (A) sweep. In addition, it is possible to sweep them with the delay (B) sweep to provide a 4 trace display, using the alternate delayed sweep.



Sufficient Dynamic Range Enables Accurate Waveform Display Free From Distortion

Dynamic-range-to-spare ensures waveform display linearity and that the full frequency response of the scope can be utilized without distortion.

Vertical Mode Ensures Highly Reliable Waveform Triggering

Even when the frequencies of the CH1 and CH2 signals differ, vertical mode triggering ensures stable, reliable waveform triggering.

Vertical-Axis Signal Output

This signal is delivered from the input signal after passing through part of the input circuitry. It provides a signal scaled to approximately 50mV/division, enabling connection of a frequency counter for accurate measurement of frequency while observing the waveform.

SPECIFICATIONS

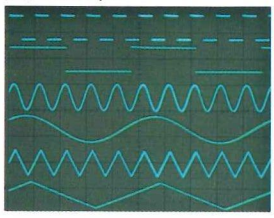
CRT:	150mm Rectangular, Phosphor P31 Accelerating voltage 12kV
Vertical amplifier (CH1 & CH2 identical)	
Operating modes:	CH1, CH2, ALT, CHOP & ADD
Attenuator:	1mV/div to 5V/div (12 ranges)
Freq. response:	DC to 100MHz (−3dB) 5Hz to 100MHz (−3dB)
Input impedance:	1MΩ, 30pF
Signal delay line:	Enables CRT display of leading edges
Polarity inversion:	CH2 only
Horizontal amplifier (CH2 input)	
Sensitivity:	Same as vertical CH2
Freq. response:	Same as vertical CH2
Time base	
Sweep mode:	A, ALT, B & X-Y
Sweep time (A):	50ns/div to 0.5s/div (22 ranges)
Sweep time (B):	50ns/div to 50ms/div (19 ranges)
Magnified sweep:	×10
Triggering	
Mode:	AUTO, NORM, FIX & SINGLE-RESET
Source:	V.MODE, CH1, CH2, EXT & LINE
Coupling:	AC, HFrej, DC, TV-frame & TV-line
Sensitivity:	
INT:	1 div (DC to 50MHz), 1.5 div (DC to 100MHz)
EXT:	0.15Vp-p (DC to 50MHz), 0.2Vp-p (DC to 100MHz)
Calibration voltage:	1Vp-p (1kHz)
Intensity modulation:	0 to +5V
Vertical axis signal out:	50mVp-p (50Ω load)
Power requirements:	100/120/220/240VAC, 50/60Hz, 59W
Dimensions:	319(W)×145(H)×380(D) mm
Weight:	9.2kg
Accessories:	Instruction manual (1), Probes PC-31 (2)
Readout (CS-5170 only)	
Setting & setting value:	● CH1 & CH2 scale factor ● V-UNCAL ● ADD ● INVERT ● Sweep Scale factor ● H-UNCAL ● X-Y
Cursor functions (CS-5170 only)	
Cursor modes:	ΔV1, ΔV2, ΔT, 1/ΔT, Ratio & Phase

Basic Technology, High Quality and Performance.

These oscilloscopes boast the same high quality that has made even more sophisticated scopes from Kenwood true leaders in their field. The CS-5165 and CS-5155 provide a true delayed sweep, a bright CRT, high sensitivity, and much more. These scopes clearly provide functions and performance beyond expectations for instruments in this class, making them truly powerful tools for the engineer.

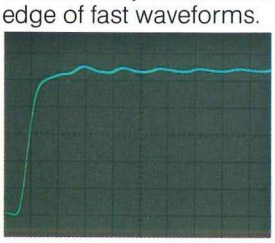
3-Channel/6-Trace Display for Diverse Waveform Display Capability

The CH1, CH2 and CH3 input signals can be swept simultaneously by the main (A) sweep. In addition, it is possible to simultaneously use an alternate, delayed sweep to sweep a delayed waveform (B) sweep.



Maximum Sweep Speed of 5ns/div Makes Easy Work of Displaying Fast Signals

Sweep speed can be set continuously from 0.5s to 50ns/div. In addition, the use of an internal signal delay line enables the accuracy observation of the rising edge of fast waveforms.

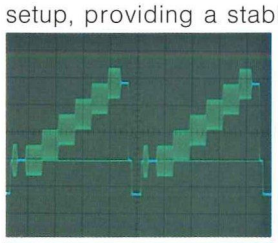


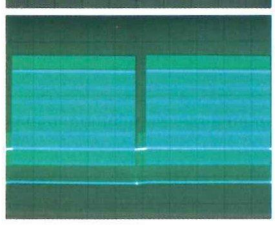
High-Sensitivity Design Provides 1mV/div Vertical-Axis Sensitivity

The vertical-axis sensitivity can be set from 1mV to 5V/div, with continuously variable adjustment in between settings. This high sensitivity enables measurement of even low-level, complex signals.

Video Signal Clamp Eliminates the Need for Triggering Adjustments

Instant observation of either the vertical or horizontal video signals is possible, using the built-in video clamp feature. In addition, compared with previously available scopes, the CS-5165/5155 eliminates the need for triggering setup, providing a stable, reliably triggered display. If the trigger is applied at the main (A) sweep with the frame signal, it is possible to observe any desired part of the line signal magnified using the delayed sweep (B), with a stable sweep.





Accurate Timing Alignment of 3-Signals Using the V-Mode

Even if the frequencies of the CH1, CH2 and CH3 input signals differ, it is possible to achieve accurate alignment of the signals on the time axis, with stable triggering.

Unique Delayed Sweep (Delay Time Zero)

While the delayed sweep can be used with continuous delay or synced delay, yet another mode is that of delay time zero, in which sweeps A and B are started simultaneously. This mode enables expanded display of the rising edge of a waveform and display of the waveform of irregular period.

Automatic Triggering (FIX) Eliminates Troublesome Triggering Setup

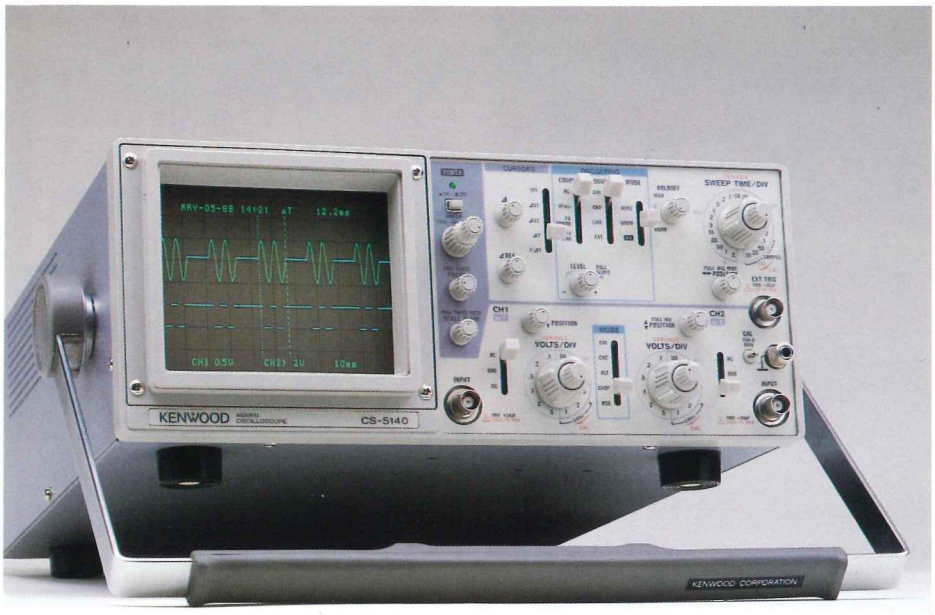
The amplitude of the observed waveform is track and used to automatically set the trigger level using FIX function. This eliminates the usually troublesome triggering setup required with most scopes.

- ***Dynamic Range Provides the Margin to Ensure Undistorted Waveform Display***
- ***Vertical-Axis Signal Output***
- ***Variable Holdoff Enables Observation of Even Waveform with Complex Periodicities***
- ***150mm CRT with Internal Graticule, Scale Illumination and 12kV Accelerating Voltage***

SPECIFICATIONS

CRT:	150mm Rectangular, Phosphor P31 Accelerating voltage 12kV
Vertical amplifier (CH1 & CH2 identical)	
Operating modes:	CH1, CH2, DUAL, ADD & TRIPLE (ALT & CHOP)
Attenuator:	1mV/div to 5V/div (12 ranges)
Freq. response:	DC to 60MHz (−3dB) *50MHz 5Hz to 60MHz (−3dB) *50MHz
Input impedance:	1MΩ, 20pF
Signal delay line:	Enables CRT display of leading edges
Polarity inversion:	CH2 only
Vertical amplifier (CH3)	
Sensitivity:	0.5V/div
Fre. response:	DC to 60MHz (−3dB) *50MHz
Input impedance:	1MΩ, 20pF
Horizontal amplifier (CH2 input)	
Sensitivity:	Same as vertical CH2
Freq. response:	DC to 1MHz (−3dB)
Time base	
Sweep mode:	A, ALT, B & X-Y
Sweep time (A):	50ns/div to 0.5s/div (22 ranges)
Sweep time (B):	50ns/div to 50ms/div (19 ranges)
Magnified sweep:	×10
Triggering	
Mode:	AUTO, NORM, FIX & SINGLE-RESET
Source:	V.MODE, CH1, CH2, CH3/EXT & LINE
Coupling:	AC, HFrej, DC, TV-frame & TV-line
Sensitivity:	
INT:	1 div (DC to 50MHz), 1.5 div (DC to 60MHz)
EXT:	0.15Vp-p (DC to 50MHz), 0.8Vp-p (DC to 60MHz)
Calibration voltage:	1Vp-p (1kHz)
Intensity modulation:	0 to +5V
Vertical axis signal out:	50mVp-p (50Ω load)
Power requirements:	100/120/220/240VAC, 50/60Hz, 59W
Dimensions:	319(W)×132(H)×380(D) mm
Weight:	9.2kg
Accessories:	Instruction manual (1), Probes PC-39 (2)

(*for the CS-5155)



Readout Function Provides a Display of all Essential Data Along with the Waveform– All of this and Observation to 100MHz.

The CS-5140 uses a sampling technique at high sampling speeds (faster than 0.1μs/div) to achieve periodic-waveform observation up to 100MHz. At low sweep speeds (0.2μs/div and slower), the CS-5140 reverts automatically to operation as a conventional oscilloscope, thereby maintaining the normal operational feel of a conventional scope over a broad frequency range. This convenience is further augmented by such functions as readout and cursor measurement, making the CS-5140 a truly new-concept scope from those who should know about new concepts-Kenwood.

Equivalent sampling enables periodic-waveform observation up to 100MHz (–3dB)

When the sweep time is set to 0.1μ/div or faster, the CS-5140 automatically goes into the equivalent sampling mode, enabling continuous observations of waveforms up to 100MHz (In this mode, however, it is not possible to observe non-periodic signals such as glitches and fast transient events).

Automatically switching to conventional 40MHz oscilloscope mode frees the operation to observe waveforms rather than the oscilloscope

At sweep ranges of 0.2μs/div or slower, the CS-5140 automatically switches to operation as a conventional 40MHz oscilloscope. This happens even if the scope was operating in the sampling mode, without the operator having to worry about when to switch modes. It thus preserves the "feel" of a conventional scope, while offering the benefits of sampling.

Readout function provides easy-to-interpret and record measurement conditions settings

Conditions such as vertical and horizontal range setting, VARIABLE, UNCAL and sweep time settings are clearly displayed on the CRT screen with the observed waveform. This enables easy checking during measurement and means that a single photograph of the screen provides a complete record of the measurement, including such vital setting information. When the PC-31 probe is used, the displayed vertical sensitivity is automatically scaled to ×10.

Cursor function enables easy digital measurement of voltage, time, frequency and phase differences

Two cursor lines can be used to measure voltage, voltage difference, time difference, time ratio, frequency and phase differences from the waveform displayed on the CRT screen, with results indicated on the CRT screen digitally. Simply move the cursor to the desired point and read the data value. This greatly simplifies the usually troublesome task of making readings from the CRT screen, thereby reducing errors as well.

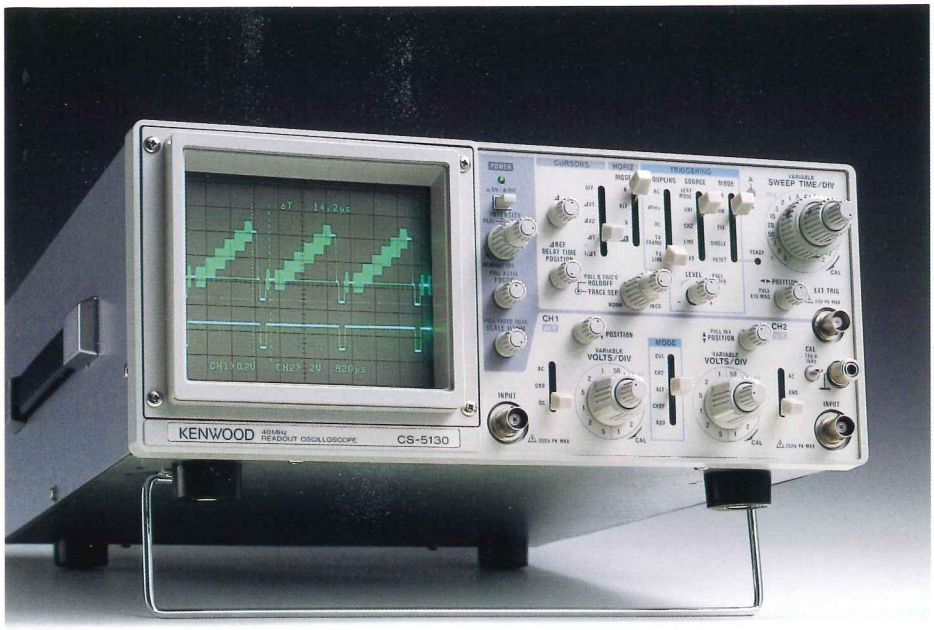
Maximum sweep speed of 10ns/div (1ns/div when using ×10 MAG) ensures high-accuracy measurement of even high-speed waveforms

The CS-5140 features a sweep speed of 10ns/div to 0.1μ/div in the sampling mode and 0.2μs/div to 0.2s/div in the real-time mode, enabling observations of waveforms up to 100MHz, without manual mode switching. And using sweep magnification (×10), the horizontal axis can be instantly expanded 10-fold, enabling detailed observations of the most complex signal.

- ***Wide dynamic range and broad bandwidth combine with a sampling technique which improves display intensity***
- ***High intensity CRT (12kV accelerating voltage***
- ***High sensitivity– 1mV/div (DC to 5MHz)***

SPECIFICATIONS

CRT:	150mm Rectangular, Phosphor P31 Accelerating voltage 12kV
Vertical amplifier (CH1 & CH2 identical)	
Operating modes:	CH1, CH2, ALT, CHOP & ADD
Attenuator:	1mV/div to 5V/div (12 ranges)
Freq. response:	
Real-time mode:	DC to 40MHz (–3dB) 5Hz to 40MHz (–3dB)
Equivalent sampling mode:	DC to 100MHz (–3dB) 5Hz to 100MHz (–3dB)
Input impedance:	1MΩ, 22pF
Polarity inversion:	CH2 only
Horizontal amplifier (CH2 only)	
Sensitivity:	Same as vertical CH2
Freq. response:	DC to 500kHz (–3dB)
Time base	
Sweep mode:	Norm & Auto
Sweep time:	10ns/div to 0.2s/div (23 ranges)
Magnified sweep:	×10
Triggering	
Mode:	AUTO, NORM, FIX & SINGLE-RESET
Source:	CH1, CH2 & EXT
Coupling:	AC, HFrej, TV-frame & TV-line
Sensitivity:	
INT:	1 div (10Hz to 100MHz)
EXT:	0.1Vp-p (10Hz to 100MHz)
Calibration voltage:	1Vp-p (1kHz)
Intensity modulation:	0 to +5V
Power requirements:	100/120/220/240VAC, 50/60Hz, 53W
Dimensions:	319(W)×132(H)×380(D) mm
Weight:	9.5kg
Accessories:	Instruction manual (1), Probes PC-31 (2)
Readout	
Calendar function:	Year/month/day/hour/minute
Setting & setting value:	● CH1 & CH2 scale factor ● V-UNCAL ● ADD ● INVERT ● Sweep scale factor ● H-UNCAL ● X-Y
Cursor functions	
Cursor modes:	ΔV1, ΔV2, ΔT, 1/ΔT, Ratio & Phase



Dramatic Cost Performance in a 40MHz Scope.

The CS-5130 is designed to provide the maximum performance. It features a digital readout function and cursor measurements to enhance measurement accuracy.
The CS-5135 is a high-performance 2-channel/4-trace 40MHz oscilloscope that has all of the basic performance, although it lacks the readout and cursor functions. Its bright CRT display, automatic triggering capability, and high sensitivity place it with best in 40MHz scopes.

High-Accuracy Cursor Measurements (CS-5130 only)

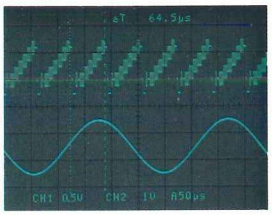
Two cursor lines can be used to measure waveform voltages, voltage difference, time difference, time ratio, frequency and phase difference with measurement results displayed digitally for easy reading. It's as simple as moving the cursors to the desired points on the waveform display and reading the data on the CRT screen. When using the delayed sweep, the delay time is displayed directly.

High-Sensitivity 1mV/division

Vertical-axis sensitivity can be set from 1mV to 5V/div and is continuously adjustable using an attenuator. The 1mV/div range is particularly effective in observing extremely low signal (DC to 15MHz response in this range).

Digital Readout for Instant Answer (CS-5130 only)

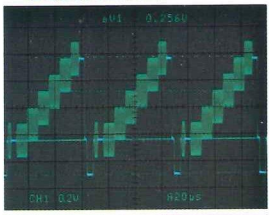
The vertical- and horizontal-axis range settings. VARIABLE and UNCAL setting conditions are clearly displayed on the CRT screen for easy reading of the actual vertical sensitivity and sweep time values. Using an accessory probe of PC-33, the vertical sensitivity display on the CRT screen is converted to 10:1 ratio automatically.

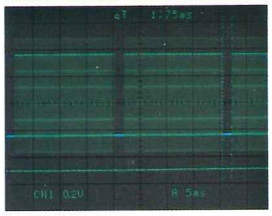


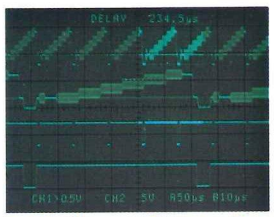
FIX (Automatic Triggering) Eliminates Troublesome

This function automatically adjusts the trigger level to suit the amplitude of the waveform being observed to maintain stable triggering while eliminating troublesome trigger settings.

Video Clamp for Easy Video Observation







- Maximum Sweep Speed of 20ns/div
- Sufficient Dynamic Range
- Vert Mode Ensures Highly Reliable Waveform Triggering
- Signal-output is available
- Holdoff Ensures Reliable Triggering on Complex Waveforms

SPECIFICATIONS

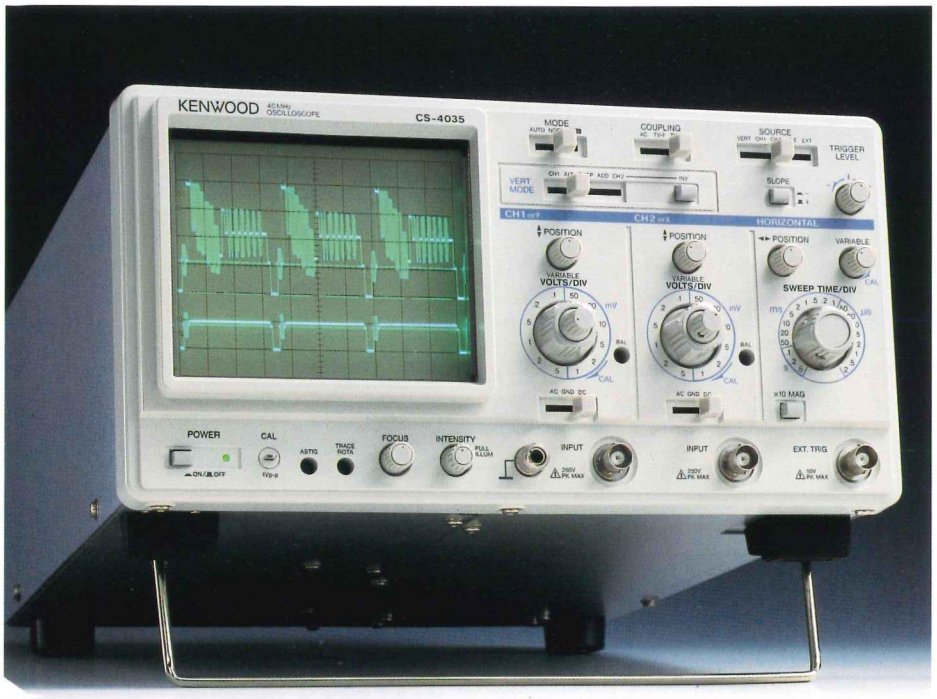
CRT:	150mm Rectangular, Phosphor P31 Accelerating voltage 12kV
Vertical amplifier (CH1 & CH2 identical)	
Operating modes:	CH1, CH2, ALT, CHOP & ADD
Attenuator:	1mV/div to 5V/div (12 ranges)
Freq. response:	DC to 40MHz (−3dB) 5Hz to 40MHz (−3dB)
Input impedance:	1MΩ, 30pF
Signal delay line:	Enables CRT display of leading edges
Polarity inversion:	CH2 only
Horizontal amplifier (CH2 input)	
Sensitivity:	Same as vertical CH2
Freq. response:	DC to 1MHz (−3dB)
Time base	
Sweep mode:	A, ALT, B & X-Y
Sweep time (A):	200ns/div to 0.5s/div (20 ranges)
Sweep time (B):	200ns/div to 50ms/div (17 ranges)
Magnified sweep:	×10
Triggering	
Mode:	AUTO, NORM, FIX & SINGLE-RESET
Source:	V.MODE, CH1, CH2, EXT & LINE
Coupling:	AC, HFrej, DC, TV-frame & TV-line
Sensitivity:	
INT:	1 div (DC to 20MHz), 1.5 div (DC to 40MHz)
EXT:	0.15Vp-p (DC to 20MHz), 0.2Vp-p (DC to 40MHz)
Calibration voltage:	1Vp-p (1kHz)
Intensity modulation:	0 to +5V
Vertical axis signal out:	50mVp-p (50Ω load)
Power requirements:	100/120/220/240VAC, 50/60Hz, 47W
Dimensions:	319(W)×132(H)×380(D) mm
Weight:	9kg
Accessories:	Instruction manual (1), Probes PC-33 (2) *PC-30 (2)
Readout (CS-5130 only)	
Setting & setting value:	● CH1 & CH2 scale factor ● V-UNCAL ● ADD ● INVERT ● Sweep scale factor ● H-UNCAL ● X-Y
Cursor functions (CS-5130 only)	
Cursor modes:	ΔV1, ΔV2, ΔT, 1/ΔT, Ratio & Phase

CS-4035 40MHz 2-Channel Oscilloscope
CRT (12kV) with illuminated scales

CS-4026 20MHz 2-Channel Oscilloscope
CRT (12kV) with illuminated scales

CS-4025 20MHz 2-Channel Oscilloscope
CRT (2kV)

40MHz
20MHz



tenfold, enabling detailed observation of just the desired portion of complex waveforms.

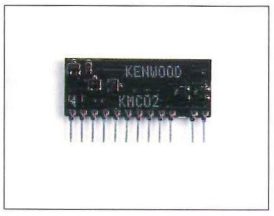
Convenient vert mode
A vert mode is provided which automatically switches the sweep trigger source to the vertical-axis mode. Thus, when the vertical mode is CH1 or CH2, the trigger source is the CH1 or CH2 signal, respectively. For the ALT, CHOP and ADD modes, the CH1 signal is used as the trigger source.

- ***Sufficient dynamic range enables accurate waveform display free from distortion***
- ***Vertical axis signal output***
- ***Observation of intensity-modulated waveforms***
- ***Trace rotation adjustment from the front panel***

Hybrid ICs Ensure High Quality and Reliability

By adopting the same design philosophy as used in top-of-the-line scopes, the Kenwood design team has produced the CS-4000 Series with the quality that makes it truly worthy of the name Kenwood. To ensure this level of quality, Kenwood used a large number of original hybrid ICs.

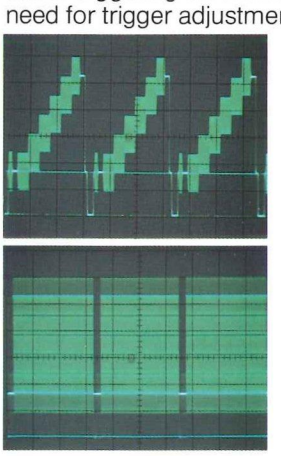
Unique Kenwood Hybrid IC Technology
In-house designed hybrid ICs are used for the main circuitry of the CS-4000 Series, thereby ensuring stable, uniform performance.



The large CRT (12kV) with illuminated scales and inner graticule
The large, dome-mesh, post-accelerator (12kV) type CRT of these scopes provides a both high intensity and excellent resolution, while completely eliminating parallax (except CS-4025).

High sensitivity: 1mV/div (DC to 5MHz)
Vertical-axis sensitivity is continuously switchable from 1mV/div to 5V/div using an attenuator. The 1mV/div sensitivity is extremely powerful in measurements on complex, low-level signals.

Instantly selectable TV sync
Vertical and horizontal video signals can be instantly selected for observation, with stable triggering achieved without the need for trigger adjustment.



Fast sweep: 20ns/div (using × 10 MAG)
The sweep time can be continuously switched from 0.5s/div to 0.2μs/div (0.5s/div to 0.5μs/div for CS-4025). In addition, sweep expansion (×10 MAG) can be used to infinitely expand the sweep

SPECIFICATIONS

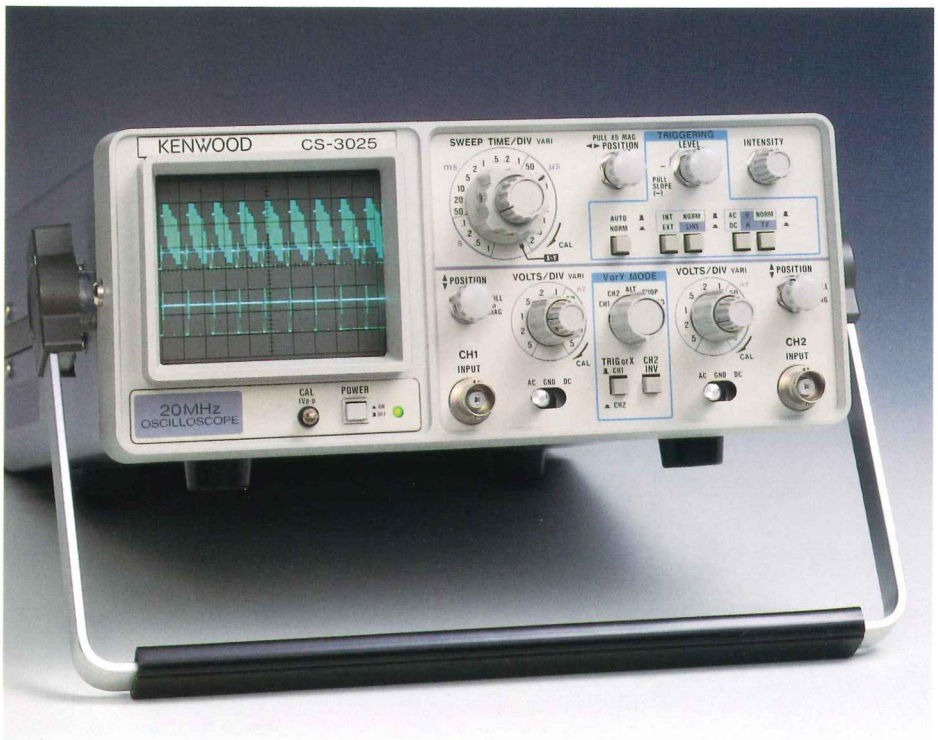
CRT:	150mm Rectangular, Phosphor P31 Accelerating voltage 12kV*2kV
Vertical amplifier (CH1 & CH2 identical)	
Operating modes:	CH1, CH2, ALT, CHOP & ADD
Attenuator:	1mV/div to 5V/div (12 ranges)
Freq. response:	DC to 40MHz (−3dB) ** *20MHz 10Hz to 40MHz (−3dB) ** *20MHz
Input impedance:	1MΩ, 28pF
Polarity inversion:	CH2 only
Horizontal amplifier (CH2 input)	
Sensitivity:	Same as vertical CH2
Freq. response:	DC to 500kHz (−3dB)
Time base	
Sweep mode:	Norm & Auto
Sweep time:	200ns/div to 0.5s/div (20 ranges) *500ns/div to 0.5s/div (19 ranges)
Magnified sweep:	×10
Triggering	
Mode:	AUTO & NORM
Source:	CH1, CH2, LINE & EXT
Coupling:	AC, TV-frame & TV-line
Sensitivity:	
INT:	1.5 div (10Hz to 20MHz), 2 div (20MHz to 40MHz) ** *1.5 div (10Hz to 10MHz), ** *2 div (10MHz to 20MHz)
EXT:	0.25Vp-p (10Hz to 20MHz), 0.3Vp-p (20MHz to 40MHz) ** *0.2Vp-p (10Hz to 10MHz), ** *0.3Vp-p (10MHz to 20MHz)
Calibration voltage:	1Vp-p (1kHz) *1Vp-p (Line freq.)
Intensity modulation:	0 to +5V
Power requirements:	100/120/220/240VAC, 50/60Hz, 30W *29W
Dimensions:	290(W)×150(H)×380(D) mm
Weight:	6.8kg
Accessories:	Instruction manual (1), Probes PC-35 (2)

(*for the CS-4025 and **for the CS-4026)

CS-3025 20MHz 2-Channel Oscilloscope

(AC operation only)

20MHz



High-intensity CRT (1.8kV)

The 90-mm rectangular CRT features high intensity, internal graticule and provides clear sharp waveform displays.

Wide sweep time range

The sweep time can be set over the wide range of 0.2μs/div to 1s/div. In addition, sweep magnification (×5 MAG) can be used to obtain a fastest sweep time of 40ns/div, enabling detailed observations of high-speed events.

High sensitivity: 1mV/div

The basic sensitivity is 5mV/div to 5V/div, by using ×5 MAG, it is possible to enhance this to 1mV/div, enabling easy observations of even to lowest level signals.

Stable triggering on TV signals

Obtaining stable triggering on vertical or horizontal TV signals is as simple a operating a front panel control.

- ***The provision of both TV-V and TV-H enables easy observation of video signal waveforms from TVs or VCRs***
- ***Panel cover supplied as a standard accessory***
- ***X-Y operation***

Magazine-size, 4-kg Portable Ideal for Field Service.

The CS-3025 is an elegant implementation of the concept of bringing a benchtop instrument into the field for portable use. This scope is designed to be compact enough to follow you anywhere in the field. It is the result of natural evolution from the new high-tech series of oscilloscopes from Kenwood, and feature not only high performance, but a dramatically compact design, being not much larger than a weekly news magazine and weighing only 4 kilograms.

In addition to obvious applications such as TV, video equipment, CD player and laser disc player servicing, this scope will enjoy wide use in such application as field service for computers, word-processors, facsimile machines and other office, factory and home automation products.

Compact, lightweight, highly potable design

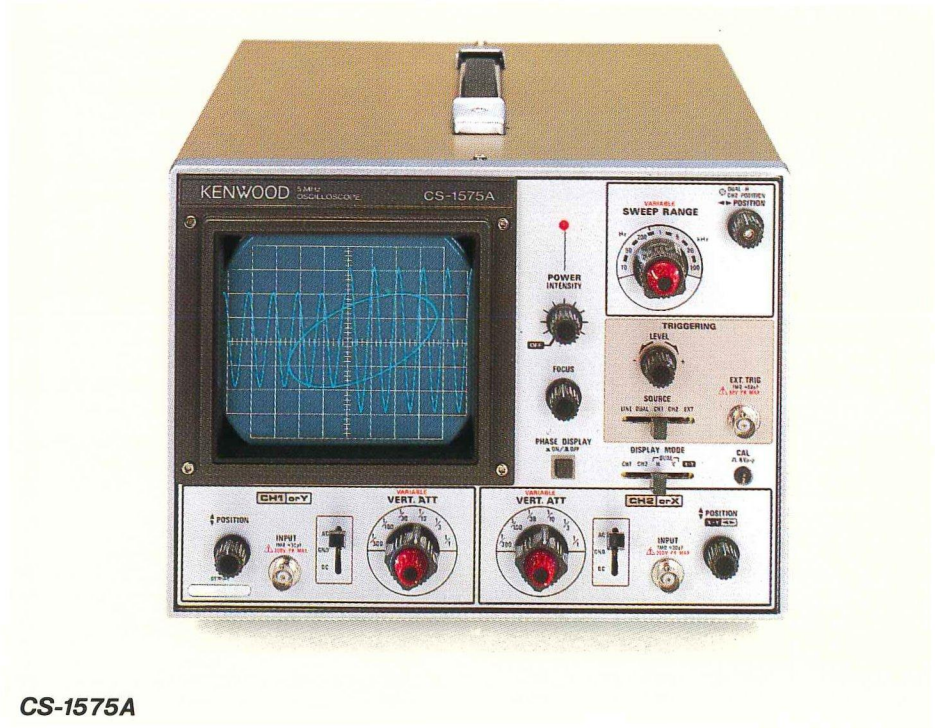
This scope weights at just 4 kilograms and is no much larger than a weekly magazine. In addition, it features a convenient carrying handle for enhanced portability.

SPECIFICATIONS

CRT:	90mm Rectangular, Phosphor P31 Accelerating potential 1.8kV
Vertical amplifier (CH1 & CH2 identical)	
Operating modes:	CH1, CH2, ALT, CHOP & ADD
Attenuator:	5mV/div to 5V/div (10 ranges)
Freq. response:	DC to 20MHz (−3dB) 5Hz to 20MHz (−3dB)
Input impedance:	1MΩ, 40pF
Polarity inversion:	CH2 only
Horizontal amplifier (CH2 input)	
Sensitivity:	Same as vertical CH2
Freq. response:	DC to 200kHz (−3dB)
Time base	
Sweep mode:	Norm & Auto
Sweep time:	200ns/div to 1s/div (21 ranges)
Magnified sweep:	×5
Triggering	
Mode:	AUTO & NORM
Source:	INT, LINE & EXT
Coupling:	AC, DC, TV-V & TV-H
Sensitivity:	
INT:	0.5 div (DC to 2MHz), 1 div (DC to 20MHz)
EXT:	0.1Vp-p (DC to 2MHz), 0.2Vp-p (DC to 20MHz)
Calibration voltage:	0.25Vp-p (1kHz)
Power requirements:	100/120/220/240VAC, 50/60Hz, 22W
Dimensions:	216(W)×89(H)×298(D) mm
Weight:	4kg
Accessories:	Instruction manual (1), Probes PC-30 (2), Panel cover (1)

CS-1575A 5MHz 2-Channel Oscilloscope | CO-1305 5MHz Oscilloscope

5MHz
1.5MHz



CS-1575A

Simultaneous Waveform and Phase Observation!

In addition to the conventional dual trace display, the CS-1575A features a new left/right waveform display and a lissajous display function which enables convenient measurement of the phase difference between two signals, overlaid with the normal waveform display. These features make the CS-1575A a truly multi-purpose oscilloscope.

Simultaneous dual-trace and lissajous pattern display
When display two traces, a lissajous pattern, enabling convenient measurement of the phase between the two signals, may be displayed simultaneously with the waveforms.

Zero degree phase and lissajous pattern display
When only the lissajous pattern is being displayed, the zero degree waveform (raised intensified line at the right) may be simultaneously displayed, if desired.

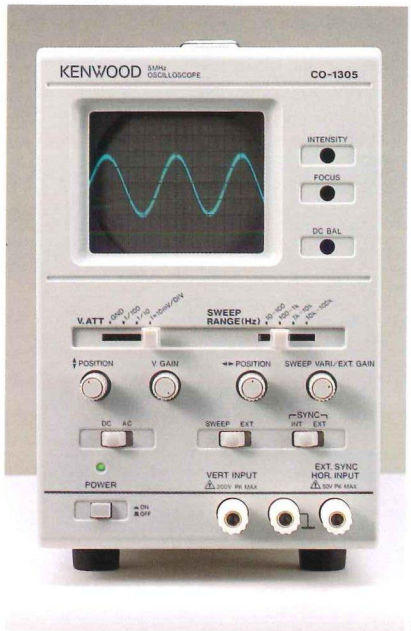
Convenient dual trigger
For single and dual-trace displays, automatic trigger source selection is performed. Also, an auto free-run function is provided for CH1 and CH2 independently, enabling stable triggering for one waveform even if the other waveform is not present.

- ***Automatic switching of CHOP and ALT depending upon the sweep range***
- ***LINE sync***
- ***High-sensitivity X-Y display using CH1 to drive the Y axis and CH2 to drive the X axis***
- ***Auto free-run mode enables the display of the trace even with no signal present***

SPECIFICATIONS

CRT:	130mm Round type, Phosphor P31
Vertical amplifier (CH1 & CH2 identical)	
Operating modes:	CH1, CH2, Dual-H, Dual-V & X-Y
Attenuator:	1/1, 1/3, 1/10, 1/30, 1/100 & 1/300 (6 ranges)
Freq. response:	DC to 5MHz (−3dB) 5Hz to 5MHz (−3dB)
Input impedance:	1MΩ, 30pF
Horizontal amplifier (CH2 input)	
Sensitivity:	Same as vertical CH2
Freq. response:	DC to 1MHz (−3dB)
Time base	
Sweep mode:	Auto free-run sweep
Sweep freq.:	10Hz to 100kHz (6 ranges)
Triggering	
Source:	CH1, CH2, LINE, DUAL & EXT
Coupling:	AC
Sensitivity:	
INT:	1 div (20Hz to 5MHz)
EXT:	1Vp-p (20Hz to 5MHz)
Calibration voltage:	0.6Vp-p (Line freq.)
Power requirements:	100/120/220/240VAC, 50/60Hz, 25W
Dimensions:	260(W)×190(H)×375(D) mm
Weight:	8kg
Accessories:	Instruction manual (1), Cable CA-41 (2)

High-Quality Scopes with All the Sensitivity.



CO-1305

The CO-1305 is a compact, lightweight oscilloscope using a 75mm CRT. It features high sensitivity of 10mV/div, and a wide frequency response of DC to 5MHz. The sweep frequency covers the range of 10Hz to 100kHz, in addition to internal sync, external sync may also be used. By disabling the sweep. Lissajous patterns may also be displayed.

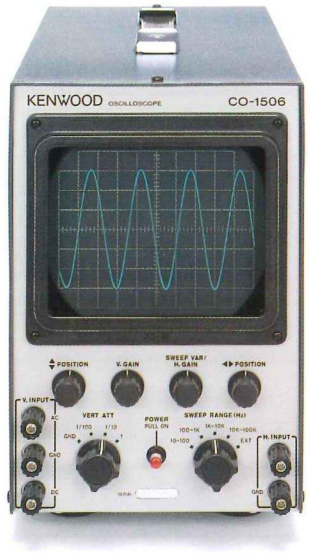
- ***High-sensitivity vertical axis (10mV/div) and a wide frequency bandwidth of DC to 5MHz.***
- ***This model is small in size and lightweight, the panel is designed vertical. This enables to put in narrow space and in suitable for use production benches and portable applications.***

SPECIFICATIONS

CRT:	75mm Round type, Phosphor P31
Vertical amplifier	
Sensitivity:	10mV/div
Attenuator:	1/1, 1/10, 1/100 & GND
Freq. response:	DC to 5MHz(−3dB) 2Hz~5MHz (−3dB)
Input impedance:	1MΩ 50pF
Horizontal amplifier	
Sensitivity:	300mV/div
Freq. response:	DC to 250KHz
Sweep freq:	10Hz to 100kHz(4ranges)
Trigger source:	INT & EXT
Power requirements:	100/120/220/240V AC 50/60Hz 15W
Dimensions:	130(W)×190(H)×280(D)mm
Weight:	3.5kg
Accessories:	Instruction manual(1), Cable CA-46(1)

CO-1506 1.5MHz Oscilloscope

1.5MHz



CO-1506

The CO-1506 is an oscilloscope employing a 130mm cathode ray tube. Its vertical sensitivity is 20mV/div and its frequency bandwidth of DC to 1.5MHz. This oscilloscope is ideal for observing waveforms. It can be used in a wide range of application for not only production process but also service and educational purposes.

- ***It has a high vertical sensitivity of 20mV/div and a wide frequency bandwidth of DC to 1.5MHz***
- ***This model is small in size and light weight, the panel is designed vertical. This enables to put in narrow space and in suitable for use in production benches.***

SPECIFICATIONS

CRT:	130mm Round type, Phosphor P31
Vertical amplifier	
Sensitivity:	20mV/div
Attenuator:	1/1, 1/10, 1/100 & GND
Freq. response:	DC to 1.5MHz (−3dB) 2Hz to 1.5MHz (−3dB)
Input impedance:	1MΩ, 35pF
Horizontal amplifier	
Sensitivity:	500mV/div
Freq. response:	DC to 250kHz
Sweep freq.:	10Hz to 100kHz (4 ranges)
Trigger source:	INT & EXT
Power requirements:	100/117/230VAC, 50/60Hz, 15W
Dimensions:	150(W)×220(H)×410(D) mm
Weight:	6.2kg
Accessories:	Instruction manual (1), Cable CA-46 (1)

ACCESSORIES/OPTION PARTS

Description	Model	CS-6040	CS-6030	CS-5170	CS-5175	CS-5165	CS-5155	CS-5130
Cable	CA-36							
Cable	CA-41	○	○	○	○	○	○	○
Cable	CA-43	○	○	○	○	○	○	○
Cable	CA-46							
Scope Cart	MB-87	○	○	○	○	○	○	○
Probe	PC-30							
Probe	PC-31	○	○	○				
Probe	PC-32							
Probe	PC-33							○
Probe	PC-35							
Probe	PC-39				○	○	○	
Rack Mount Adapter	RK-1005			○	○	○	○	○
Rack Mount Adapter	RK-1006							
Rack Mount Adapter	RK-2003	○	○					
Terminal Adapter	TA-54	○	○	○	○	○	○	○
Thruline Termination	TA-57	○	○	○	○	○	○	○
Pouch	MC-78	○	○	○	○	○	○	○
Carring Case	MC-81							
Carring Case	MC-82							
Carring Case	MC-83							
Battery Pack	BP-70							
Panel Cover	MD-88			○	○	○	○	○
Panel Cover	MD-89	○	○					


Cable CA-36


Cable CA-41


Cable CA-43


Scope Cart MB-87


Probe PC-30


Probe PC-31


Probe PC-32


Probe PC-33


Probe PC-35


Probe PC-39

	CS-5135	CS-5140	CS-4035	CS-4026	CS-4025	CS-3025	CS-1575A	CO-1303D	CO-1305	CO-1506
								○	○	○
	○	○	○	○	○	○	○			
	○	○	○	○	○	○	○			
								○	○	○
	○	○	○	○	○		○			
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	○	○	○	○	○					
						○				
						○				
	○	○								

Terminal Adapter TA-54

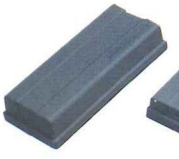
Thurline Termination TA-57

Pouch MC-78

Carring Case MC-81

Carring Case MC-82

Battery Pack BP-70



Panel Cover MD-88

Panel Cover MD-89

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