

Portable Color Digital Oscilloscope

Redefining Portable Field Oscilloscopes

VC-5470

100MS/s(2-channel simultaneously)
 150MHz Bandwidth,
 Deep 8kword/channel Memory
 10ns Peak Detector

VC-5460

60MS/s(1-channel),
 30MS/s(2-channel simultaneously)
 150MHz Bandwidth,
 2kword/channel Memory

VC-5430

30MS/s(2-channel simultaneously)
 50MHz Bandwidth,
 2kword/channel Memory

VC-5410

15MS/s(2-channel simultaneously)
 20MHz Bandwidth,
 2kword/channel Memory

Competing Desktop DSO's in Sampling Performance and Functions

- 8kw × 25 (VC-5470), 2kw × 100 (VC-5460/5430), 2kw × 20 (VC-5410) Waveform Save Memories
- GO-NOGO Comparison (VC-5470/5460/5430) ● Envelope Mode (VC-5470) ● TV Line Selector (VC-5470/5460)
- Differential Inputs and Triggering ● Automatic Pulse Parameter Measurements ● Automatic Setup ● 10-Setup Memories
- Automatically Timed Data Collection (VC-5470/5460/5430)
- Built-in Battery
- Fully Programmable (via RS-232C)
- Hardcopy Output via RS-232C and Centronics Port



PRODUCT OF MORE THAN ONE COUNTRY.
 Helix Ltd, Stourbridge, England.

250 × 179 mm
 40 SHEETS

These products are manufactured at a position which has received quality control system certification in accordance with the ISO 9001 international standard



CERTIFICATE No. JMI-0062
 ISO 9001-1994
 BS EN ISO 9001: 1994
 EN-ISO 9001-1994
 JIS Z 9901-1994

See What You've Been Missing

- Active Color LCD has a high speed refresh rate to improve waveform update. This technology is superior to passive backlight LCD and rivaling intensity found in CRT display's.
- Waveform, setting values, cursors, measurement values and other information are displayed with color-coding for each channel individually, enabling easy identification.
- The VC-5400 series features a 2k word data memory (8k word for VC-5470), similar to benchtop scopes. Longer record length allow viewing of complex signal detail.
- The LCD display is immune to the effects of magnetic fields. This allows usage in difficult high-voltage environment where magnetic fields corrupt CRT displays.



Power That's Easy to Use

- Easy one button access to autoset, hardcopy, or save/recall waveforms and panel setup.
- Analog knobs for control of position and trigger level make the VC-5400 series operate like familiar analog and digital bench-type oscilloscopes.
- Autoset allows one button automatic signal capture and set-up on one or two channels.
- The VC-5400 series features 10 front panel setups for one button recall.

PC-type Battery Power Management

- low power consumption allows continuous operation up to 2 hours (VC-5430/5410: approx. 2 hours, VC-5470/5460: approx. 1 hour).
- The built-in battery is automatically charged while operating with the AC adapter.
- Resume mode allows user to power off and recall previous mode when power is turned back on.
- Alarm mode allows user to turn the VC-5400 series on at preset times and intervals for automatically data collection while minimizing battery drain.
- Auto power-off mode and standby (display only) mode allow user to minimizing battery usage during inactive periods.

New Low Profile Sub-Notebook [Size • Package • Form-Factor]

- Fits in standard briefcase or tool kit case.
- Optional case available for hands-free operation and shipping / traveling.



**Carrying Case
No.7305**



Selection Table

	VC-5410	VC-5430	VC-5460	VC-5470
Bandwidth	20MHz	50MHz	150MHz	150MHz
Max. Sampling Rate	15MS/s	30MS/s	60MS/s	100MS/s
Peak Detector	No			10ns
Channels	Dual channel			
Autoset	Automatically Scale Voltage, Time and Trigger			
Record Length	2k word/channel			8k word/channel
Vertical Sensitivity	1mV to 5V/div			
Max. Input Voltage	400V(DC+ACpeak at 1kHz)			
Timebase	20ns to 50s/div	5ns to 50s/div	2ns to 50s/div	
Trigger Mode	AUTO, NORM, TV-V, TV-H		AUTO, NORM, TV-V, TV-H, TV-LINE	
Special Trigger Mode	Differential Trigger, Divided Trigger			
Envelope Mode	No			2 to 2048 Sweeps or Infinite
Set-up Memory	Save & Recall 10 Front Panel Setups			
Waveform Memory	2k word x 20 Waveforms	2k word x 100 Waveforms		8k word x 25 Waveforms
Comparison / Tolerance Checking	No	GO-NOGO Mask Test Save to Memory, Print, Display		
Timed Data Acquisition	No	Automatically Data Collection at Preset Time and Intervals		
Cursor Measurements	Voltage, Time, Frequency	Voltage, Time, Frequency, Waveform Tracking Voltage		
Pulse parameter Measurements	17 IEEE Defined Parameter Voltage (Vmin, Vmax, Vp-p, Vbase, Vtop, Vampl, Vrms, Vavg, Overshoot, Undershoot) Time (Freq, Period, Rise, Fall, Width(+), Width(-), Duty)			
Waveform Mathematics	Average, Add, Subtract, Invert, X-Y			
PC Interface	RS-232C Full Remote Control			
Printer Interface	Centronics or RS-232C			
Display Type	Active Matrix Color TFT			

Benchtop Performance You Can Take to the Field

Envelope Mode (VC-5470 only)

It is possible to calculate the minimum and maximum values for each storage points during specified times of sweep. This mode is useful for capturing of non-periodic abnormality phenomena.

Video Observation System

The VC-5400 series features TV-H, TV-V, and TV-LINE (VC-5470/ 5460) triggering. Both NTSC (525 lines) and PAL (625 lines) are supported.



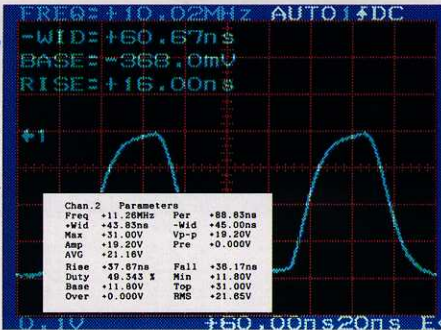
Waveform Save Memory

Up to 100 waveforms of 2kw (for VC-5470, 25 waveforms of 8kw) (for VC-5410, 20 waveforms of 2kw) can be stored in memory. Memory is backed up by the built-in battery of the VC-5400 series, so that waveforms measured on-site can be easily ported to other location for further observation and analysis. This feature can be combined with time interval data acquisition (except VC-5410) and GO-NOGO comparison (except VC-5410) to implement automatic waveform acquisition.

WAVE0	DAT	8532	95-10-14	13:25
WAVE1	DAT	8532	95-10-14	13:30
WAVE2	DAT	8532	95-10-14	13:35
WAVE3	DAT	8532	95-10-14	13:40
WAVE4	DAT	8555	95-10-14	13:45
WAVE5	DAT	8555	95-10-14	13:50
WAVE6	DAT	8532	95-10-14	13:55
WAVE7	DAT	8532	95-10-14	14:00
WAVE8	DAT	8532	95-10-14	14:05
WAVE9	DAT	8529	95-10-14	14:10
WAVE10	DAT	8529	95-10-14	14:15
WAVE21	DAT	8532	95-10-19	15:35
WAVE22	DAT	8551	95-10-19	16:20
WAVE23	DAT	8551	95-10-19	17:00
WAVE24	DAT	8551	95-10-19	17:05

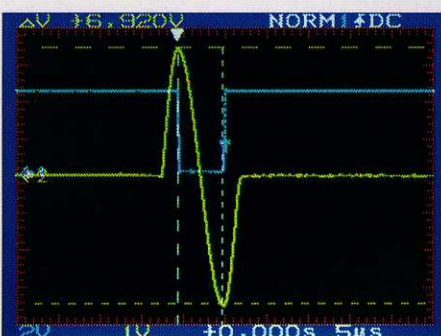
Automatic Pulse Parameter Measurement

Any 4 of the 17 waveform parameters can be measured and displayed simultaneously. It is also possible to output all 17 parameters when printing or plotting.



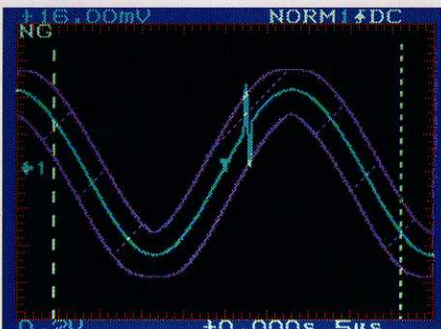
Cursor Measurement

Cursor can be used to provide direct readouts of voltage, time, and frequency measurements. It is possible to select waveform-tracking cursors, enabling precise measurement. (except waveform-tracking cursors for VC-5410)



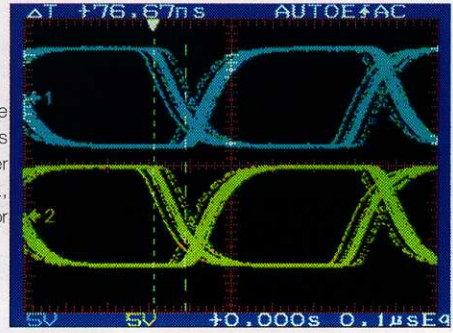
GO-NOGO Comparison (except VC-5410)

A tolerance range can be established or downloaded from a PC and used to capture intermittent conditions or pass/fail signals. Automatic reaction to this condition can be result in saving to memory, printing, or sequencing to another test setup.



Infinite Persistence Display

By using the infinite display mode, it is possible to observe jitter and other phenomena, and to capture irregular or intermittent signals.



Averaging

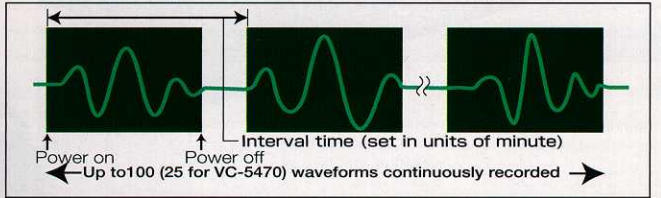
Exponential averaging can be used to reduce noise that is not synchronized with the signal being observed. The weighting coefficient can be selected in the range 2 to 256 (power of 2).

Waveform Mathematics

Addition, subtraction, inversion and X-Y are possible of waveforms during acquisition. Two types of mathematics can be made simultaneously.

Alarm Function (except VC-5410)

The alarm function can be used to automatically switch on and collect waveforms at a preset time. If the interval time is set and used in combination with the GO-NOGO comparison function, it is possible to automatically collect up to 100 waveforms (25 for VC-5470), enabling unmanned waveform collection over long period of time.

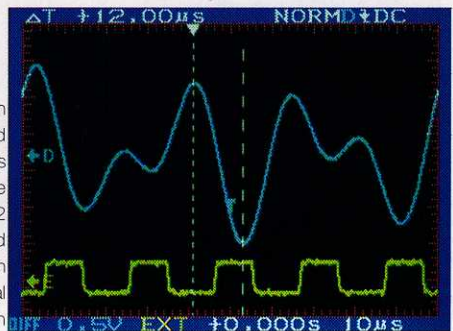


Pre-triggering and post triggering

It is possible using the delay position knob to shift the observation time position in the range from 10 division before to 400 division after the trigger point (instantly resettable to zero).

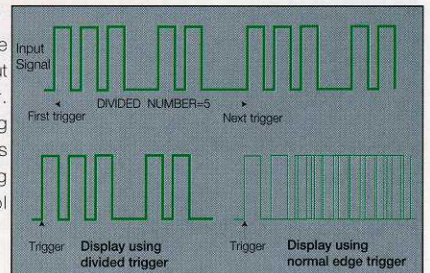
Differential Input and Triggering

Measurements on such ungrounded balanced circuits as used in LANs and telephone circuits are easy, using the CH1/CH2 differential input and differential triggering. In contrast to a conventional DSO, in which summation is performed after storage, summation is performed before storage, thereby achieving an improved dynamic range. The differential triggering enables triggering on a signal that is free of common-mode noise. In addition, the sensitivity of CH1 and CH2 automatically track each other, so that they are always the same.



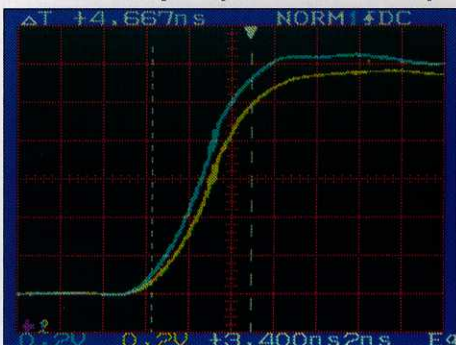
Divided Trigger

Viewing complex digital pulse trains is not possible without frequency divided trigger. Divided trigger allows viewing of a repeating signal such as those found in rotating machines, digital control signals and video signals.

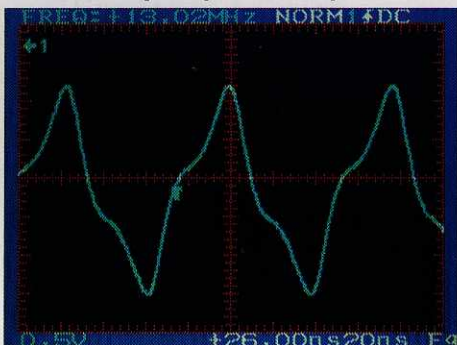


How Fast is Your Signal

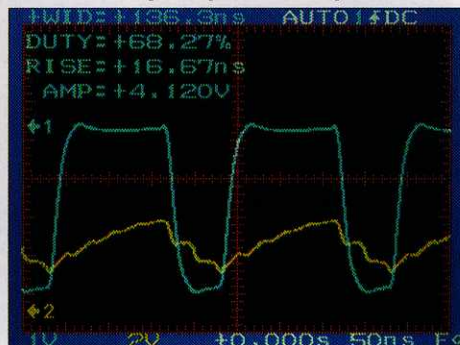
150MHz Input (VC-5470/5460)



50MHz Input (VC-5430)



20MHz Input (VC-5410)



High Performance Sampling for Today's Applications

High Speed Sampling

Sampling up to 100MS/s (VC-5470), enabling observation of such high speed one-time events as noise spike.

Dual A/D Design

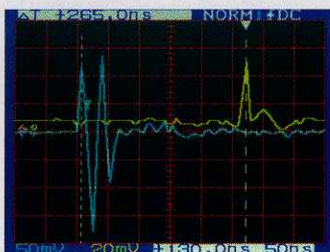
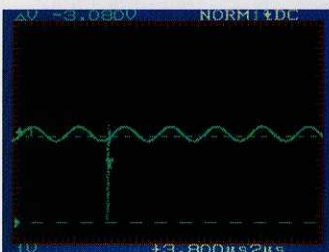
The VC-5400 series feature dual A/D's which allow accurate timing measurements between channels.

Peak Detector(VC-5470 only)

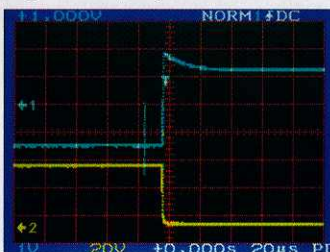
A Peak Detector is provided to enable detection of 10ns glitch pulses and extraction of the envelope of high-density signals such as modulation signals and TV signals, even in long time sweep range.

Deep Memory

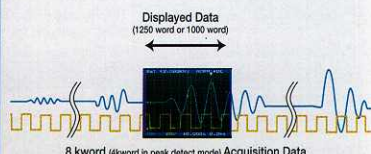
The VC-5470 features a 8 kword (2 kword for other models) acquisition memory similar to or more than bench type scopes. Deeper memory allows viewing of complex signal detail using scrolling and magnification after storage.



100MS/s (20 times magnification after storage at 1us/div sweep range)



Acquisition Memory for VC-5470



How Do You Interface

. . . to a Computer

Fully Programmable (RS-232C)

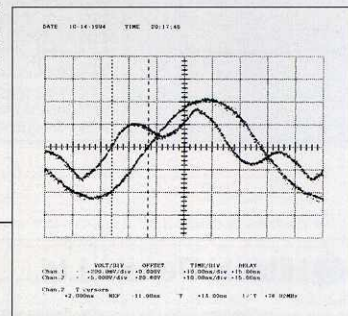
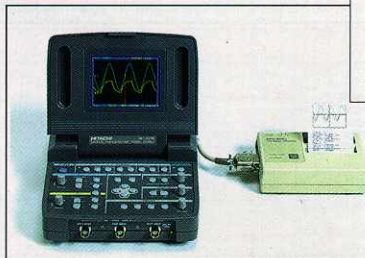
By using the RS-232C interface, it is possible to interface to a computer, enabling waveform data, parameter measurements, and instrument setting transfers. This simplifies not only incorporation into automated measurement and remote monitoring systems, but off-line software processing of waveform data as well.



. . . to a Printer

Centronics Parallel Port

Hardcopy can be downloaded to most laser and dot matrix printers that support HP Thinkjet™, HP-GL™ or ESC/P™ (Epson FX compatible) graphic protocol.

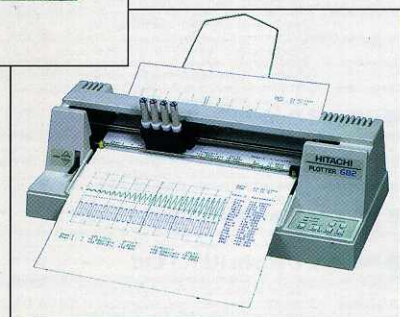
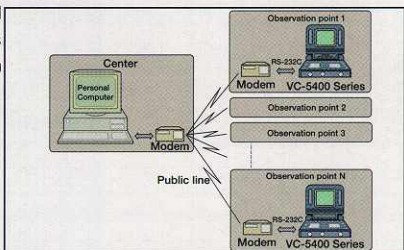


PC Compatible Software

National Instruments "LabVIEW®" software is available for the VC-5400 series. This software allows waveform transfer, instrument control, waveform analysis (such as FFT), and export to graphic file format.

Remote Modem Support

By using a modem, it is possible to control a remotely located VC-5400 series via a standard telephone line. This enables unmanned collection of data from a number of remote locations.



Specifications

Display	
Type	4-inch color TFT liquid crystal display (with CFL backlighting)
Resolution	(160 dots × 3 colors)(H) × (220 dots)(V)
Vertical System	
Resolution	8 bits
Sensitivity	1mV/div to 5V/div (12 ranges)
Accuracy	±3% (±5% in 1mV and 2mV/div)
Bandwidth (-3dB)	VC-5470/5460: DC to 150MHz VC-5430: DC to 50MHz VC-5410: DC to 20MHz
AC coupling cutoff frequency	10Hz
Input impedance	VC-5470/5460: 1MΩ ±1.5%, 25pF±3pF VC-5430/5410: 1MΩ ±1.5%, 23pF±3pF
Input withstand voltage	400V (DC + ACpeak at 1kHz)
Safety input voltage	42Vpk (DC + ACpeak at 1kHz)
Operating mode	ON/OFF selectable for CH1 and CH2 independently DIFF (EXT input waveform displayable)
Horizontal System	
Maximum sampling rate	VC-5470: 100MS/s (2-channel simultaneously) VC-5460: 60MS/s (1 channel display) 30MS/s (2-channel simultaneously) VC-5430: 30MS/s (2-channel simultaneously) VC-5410: 15MS/s (2-channel simultaneously)
Equivalent sampling rate	VC-5470: 12.5GS/s VC-5460: 15GS/s VC-5430/5410: 6GS/s
Acquisition memory capacity	VC-5470: 8kword/channel, 4kword/channel (peak detect mode) VC-5460/5430/5410: 2kword/channel
Sweep time	VC-5470; Equivalent sampling: 2ns/div to 0.5µs/div ±1% Real-time sampling: 0.2µs/div to 1s/div ±0.04% Roll mode: 0.2s/div to 50s/div ±0.25% Peak detect mode: 2µs/div to 1s/div ±0.04% VC-5460; Equivalent sampling: 2ns/div to 2µs/div ±1% (2-channel display) 2ns/div to 1µs/div ±1% (1-channel display) Real-time sampling: 5µs/div to 1s/div ±0.04% (2-channel display) 2µs/div to 1s/div ±0.04% (1-channel display) Roll mode: 0.2s/div to 50s/div ±0.25% VC-5430; Equivalent sampling: 5ns/div to 2µs/div ±1% Real-time sampling: 5µs/div to 1s/div ±0.04% Roll mode: 0.2s/div to 50s/div ±0.25% VC-5410; Equivalent sampling: 20ns/div to 5µs/div ±1% Real-time sampling: 10µs/div to 1s/div ±0.04% Roll mode: 0.2s/div to 50s/div ±0.25%
Pre-/post-trigger	10div (pre-) to 400div (post-)
Peak detect (VC-5470 only)	100% capture for 10ns pulse 50% capture for 5ns pulse
Envelope (VC-5470 only)	No of sweeps: 2 to 2048 (power of 2) sweeps, or infinite sweeps
Trigger System	
Trigger source	CH1, CH2, DIFF (differential), EXT
Trigger mode	VC-5470/5460: AUTO, NORM, TV-V, TV-H, TV-LINE VC-5430/5410: AUTO, NORM, TV-V, TV-H
Trigger coupling	DC, AC, HFrej, LFrej
Trigger slope	+, -
Trigger sensitivity	Internal (CH1, CH2, DIFF): VC-5470/5460 DC to 20MHz 20 to 150MHz VC-5430 DC to 10MHz 10 to 50MHz VC-5410 DC to 5MHz 5 to 20MHz 5mV to 5V/div 0.5div min. 1.5div min. 1mV, 2mV/div 2.5mVp-p min. 7.5mVp-p min. External: VC-5470/5460 DC to 150MHz VC-5430 DC to 50MHz 0.1Vp-p min. VC-5410 DC to 20MHz
AC lower cutoff frequency	Approx. 10Hz (-3dB)
HFrej/LFrej cutoff frequency	Approx. 50kHz (-3dB)
AUTO low end	Approx. 20Hz
Frequency divided trigger	The number of times the signal crosses the trigger level with the specified trigger slope is counted, and each time this occurs a specified N number of times, trigger is done. Frequency divisor: 2 to 4096 Trigger frequency: 10MHz max.

Specifications and outer appearance are subject to change without prior notice

Display Functions	
Color display	Separate colors for display of waveforms, settings, and measured values for each channel
Waveform display	Refreshed display / Infinite-persistence (overlaid) display, Waveform clear, Dot display / line display, Interpolated (sine / linear) display, X-Y display, Horizontal expansion / shift, Vertical expansion / shift GND level display, Scale display (grid lines, frame, axes)
Other function	VC-5470: 1250 word /10div or 1000 word /10div "in peak detect mode, number of data change with time range
Number of data displayed	VC-5460/5430/5410: 1500 word /10div or 1200 word /10div
Processing Function	
Averaging	Exponential averaging Weighting coefficient: 2 to 256 (power of 2)
Mathematics function	Addition, Subtraction, Polarity inversion
Measurement Function	
Cursor measurements	Types: Measurement between cursors, Waveform tracking ΔV measurement (except VC-5410)
Pulse parameter measurement	Any 4 of the following 17 pulse parameters can be selected for simultaneous measurement Frequency, Period, Rise time, Fall time, Positive pulse width, Negative pulse width, Duty cycle, Minimum value, Maximum value, Peak-to-peak value, Base, Top, Amplitude, Preshoot, Over shoot, Rms value, and Average value Instant optimized setting of sweep time, vertical sensitivity, vertical position are automatically made
Auto-setup	
Save Function	
Waveform save/recall	Pixel memory (except VC-5410): Saving to memory and recall from memory are possible of the waveform information from an entire display screen Waveform memory: Saving to memory and recall from memory are possible of the each waveform VC-5470: 25 waveforms (8 kword) VC-5460/5430: 100 waveforms (2 kword) VC-5410: 20 waveforms (2 kword)
Setup save/recall	10 panel setup can be saved and recalled
Resume function	When power is switched off, the current panel setting and display information are stored in backup memory.
Clock Function	
Time display	Time can be included in both printer and plotter output Current time can be saved when waveforms are saved
Alarm function (except VC-5410)	Power can be switched on automatically at a specified time
Auto power off / standby mode	Automatically switches the power off or display off (standby mode) in no operation are made over a specified length of time.
Input /Output Function	
Interface	RS-232C and Centronics
Panel control	Fully programmable from an external personal computer or other controller via the RS-232C
Printer output	Hardcopies can be generated using various printer
Plotter output	Plotter output to an externally connected plotter having RS-232C or Centronics Number of pen colors: 5 Plotting size: A6, A5, A4, A3 Plotting paper size: A4, A3 (A/B)
Calibration output	Frequency: 1kHz ±20% Voltage: 5V ±1%
General Specifications	
Outer dimensions	184(W) × 259(D) × 62(H)mm, 7.2 × 10.2 × 2.4 ins.
Weight	Approx. 2kg, 4.4 lbs. (include battery)
Power supply	Dedicated AC adapter, internal battery, or external battery pack (option)
Power consumption	VC-5470: 15 W (typical) VC-5460: 12W (typical) VC-5430/5410: 10W (typical)
Internal battery	operating time; VC-5470/5460: Approx. 1 hour VC-5430/5410: Approx. 2 hours Charging time: 16 hours (typical)
Environmental Conditions	
Temperature	Rated range of use: 10 to 35°C (50 to 95°F) (when automatic calibration has been done at 25°C±5°C (62 to 86°F)) Operation mode: 0 to 40°C (32 to 104°F) Storage mode: -20 to 60°C (-4 to 140°F)
Humidity	Operation mode: 45 to 80% Storage mode: 35 to 85% (70% max. at an ambient temperature of 50°C (122°F) or higher)
Standard Accessories	
AC adapter(1), Probe: 10:1 (2), Operation manual(1)	
Options	
Carrying case: No.7305 RS-232C cable: No.4314 (for plotter), No.4315 (for PCs) Centronics cable: No.4316 (for printer)	

 Hitachi Denshi, Ltd.

HITACHI DENSHI (Europa) GmbH

Weiskircher Str. 88
63110 Rodgau, Germany
T. 06106-6992-0
Fax 06106-16906

http://ourworld.compuserve.com/homepages/Hitachi_Denshi
E-Mail: 100443.2014@compuserve.com