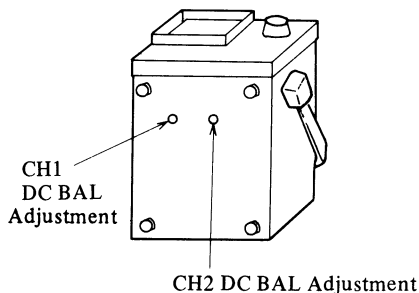


9. ADJUSTMENTS

The ATT balance of the vertical axis can be made easily.

- ① Set the input coupling switches of CH1 and CH2 to GND and set the TRIG MODE to AUTO. Then position the bright line to the center.
- ② Turn the VOLTS/DIV switch to 5mV–10mV and adjust so that the bright line does not move.



10. MAINTENANCE

- 1) Since semiconductors, precision components, etc. are employed in this oscilloscope, use utmost care for operation and storage.
- 2) Clean the scale with soft tissue periodically.
- 3) Store this oscilloscope in the ambient temperature from -15 to 60°C . (except for the battery pack AD-509)

11. SPECIFICATIONS

CRT

Type

Hitachi 95LB31 rectangular mesh type tube with 12kV acceleration potential and metal backed phosphor

Phosphor

P31 standard

Graticule

8×10 div (div = 6.35 mm)

Internal graticule

Focussing

Possible (with automatic focus correction circuit)

Trace rotation

Present

Brightness adjustment

Possible

Z-AXIS INPUT (INTENSITY MODULATION)

DC-coupled, positive-going signal decreases intensity:
5Vp-p signal causes noticeable modulation at normal intensity: DC to 1 MHz.

Input impedance

Approximately 20 k ohm

Maximum input voltage 50V (DC + peak AC)

Coupling DC

VERTICAL DEFLECTION SYSTEM (2 identical channels)

Bandwidth and rise time

DC to at least 50 MHz and rise time 7 ns or less. DC to at least 10 MHz and rise time 35ns or less at magnifier extends. The AC coupled lower -3dB point is 10Hz or less.

Deflection factor

5mV/div to 5V/div in 10 calibrated steps in a 1–2–5 sequence. Uncalibrated continuous control extends deflection factor to at least 12.5 Volts per division in the 5 Volts/div position. x5 MAG increases sensitivity of each deflection factor setting to 1mV/div.

Accuracy

±3% (+10 to +35°C)

Additional error for magnifier ±2%

Display modes

CH1, CH2 (normal or invert), Alternate, Chopped (250 kHz rate), Added

Input impedance

1MΩ ±1.5% in parallel with 30 ±3pF

Maximum input voltage

250V (DC + peak AC) or 500Vp-p AC at 1kHz or less

Input coupling

AC, GND, DC

Delay line

Permits viewing leading edge of display waveform

HORIZONTAL DEFLECTION SYSTEM

Time base A

0.1μs/div to 0.2s/div in 20 calibrated steps in a 1–2–5 sequence. Uncalibrated continuous control extends deflection factor to at least 0.5 seconds per division in the 0.2 sec/div position. x10 MAG extends maximum sweep rate to 10ns/div.

Time base B

0.1μs/div to 2ms/div in 14 calibrated steps in a 1–2–5 sequence. x10 mag extends maximum sweep rate to 2ns/div.

Accuracy

$\pm 3\%$ ($+10^{\circ}\text{C}$ to $+35^{\circ}\text{C}$)

Additional error for magnifier $\pm 2\%$

Horizontal display modes

A only, A intensified, B delayed, X-Y operation

Delayed sweep position adjustment 1 div or less—10 div or more

Delay sweep variable Present

Delay time jitter Better than 1:20,000

A AND B TRIGGERING SYSTEM

A trigger modes

Automatic, Normal, TV (TV-H or TV-V), Single sweep

A trigger hold-off

Adjustable control permits a stable presentation of repetitive complex waveform.

A Trigger source

Internal (Ch1, Ch2), Line, External, External $\div 10$

A trigger slope

+, -

TV sync polarity

TV (-)

Triggering level variable range

For both A and B. Internal; ± 4 div or more

External; approximately $\pm 1\text{V}$

External $\div 10$; approximately $\pm 10\text{V}$

Triggering sensitivity and frequency

For both A and B. However, () is only for B

Frequency	Internal	External	External $\div 10$
DC (30Hz)—10MHz	0.5 div	150 mV	1.5 V
10MHz—50MHz	1.5 div	500 mV	5 V

TV-V sensitivity: SYNC section less than 0.7 div or 200mV

AUTO low band : Approximately 30Hz (when time Base A is $0.1\mu\text{s}/\text{div}$ to $2\text{ms}/\text{div}$)

A trigger coupling

AC : 30Hz to full bandwidth

HF REJ: attenuates signals below approximate 60 kHz

DC : DC to full bandwidth

A external trigger input impedance

1 M Ω \pm 20% in parallel with 30 \pm 6pF (however, setting HF REJ and LF REJ are not included.)

Maximum input voltage

250V (DC + AC peak)

B trigger modes

Automatic, Normal

B trigger slope

+, -

Trigger coupling

AC only; 30Hz to full bandwidth

X-Y OPERATION (CH1; Horiz, CH2; Vert)

Deflection factor

Same as vertical deflection

Accuracy

Y: \pm 3% (+10 to +35°C)

X: \pm 5% (+10 to +35°C)

Additional error for magnifier \pm 2%

X-bandwidth

DC to at least 500kHz -3dB

Phase error

3° or less from DC to 100kHz

CALIBRATOR

An approximate 1kHz frequency 0.5V (\pm 1%) square wave

SIGNAL OUTPUTS

CH1 VERT SIGNAL OUTPUT

Output voltage is at least 25mV/div into a 50 ohm load.
Bandwidth is DC to at least 10 MHz.

POWER SUPPLY

VOLTAGE (50/60Hz)	FUSE
100V (90–130V)	1A
200V (180–260V)	0.5A

Power supply frequency: 50, 60, 400Hz
Power consumption: Approx. 25W
EXT DC power supply DC11–14V approx. 1.5A

Accessory pouch
Hood
Shoulder belt

ENVIRONMENT

Limit of operation temperature 0–+50°C
Limit of operation humidity 35–85%
Rated range of use temperature +10–+35°C
Rated range of use humidity 45–85%
Storage and transport temperature –20–+70°C

DIMENSIONS AND WEIGHT

Approx. 215(W) × 110(H) × 330(D) mm
(8.6(W) × 4.4(H) × 6.4(D) inch)

Approx. 5 kg (11 lbs)

Option

Battery pack AD-509

AD-509 type Battery Pack

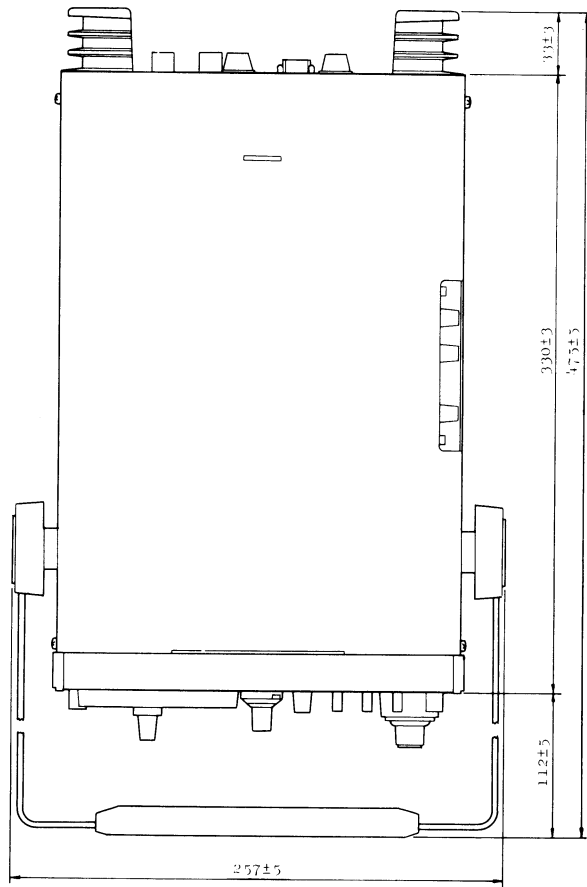
Batteries 10 rechargeable
A nickel-cadmium cells
Nominal capacity 3500 mAh
Nominal voltage 12V

Battery excessive discharge protection

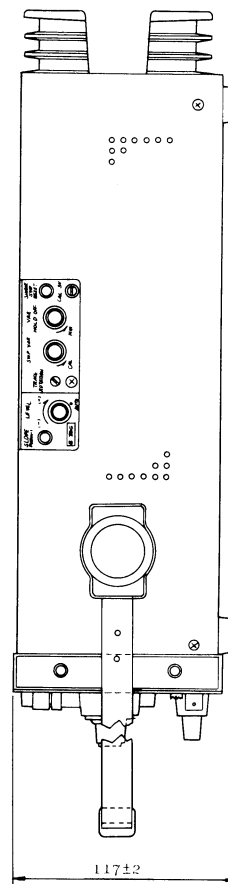
Instrument operation automatically interrupted when battery charge drops to approximately 10.5V.

Charge current Approx. 350 mA
Charge time 13–16 hours for full charge

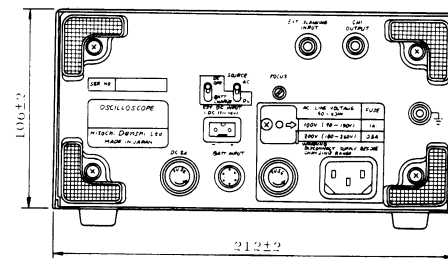
12. EXTERNAL VIEW



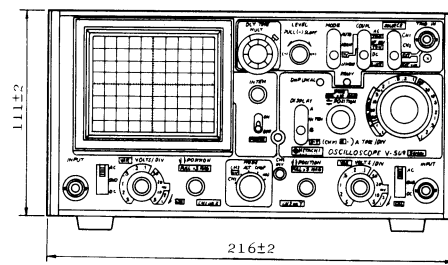
TOP view



SIDE view



REAR view



FRONT view

Unit: mm

MODEL V-509