

2. SPECIFICATIONS

2.1 Description

The Model LS 1020 Dual-Trace Portable Oscilloscope with 6-inch rectangular, internal graticule CRT features a bandwidth of DC to 20 MHz, maximum deflection factor of 0.5 mV/div (5MHz), and maximum sweep speed of 50 ns/div. Various functions (e.g., TV sync separator, variable holdoff, X-Y display mode) allow this oscilloscope for educational use as well as production line and service applications of TVs, VTRs, and audio products.

2.2 Features

- High-sensitivity of 0.5 mV/div
Enables measurement of low level signals (e.g., power supply ripple, noise components).
- TV-V, TV-H trigger
Allows TV video signal observation. Stable display can be obtained by selecting the vertical or horizontal sync signal of the video signal regardless of the TIME/DIV switch setting.
- Variable holdoff
The variable holdoff time (from the sweep end to sweep start) can display complex waveform stably.
- ALT trigger
Displays asynchronous waveforms stably.
- X-Y display
Offers X-Y oscilloscope capability: CH1 for X axis, CH2 for Y axis.
- Scale illumination
Permits operating the oscilloscope in dark locations, or photographing the screen.
- CH1 OUTPUT connector
Outputs buffered signal applied to the CH1 input connector. Therefore, the oscilloscope can be used as a wideband, high-sensitivity amplifier.

2.3 Specifications

2.3.1 LS 1020 Oscilloscope

CRT

Type	150 mm, rectangular, internal graticule
Accelerating Potential	2 kV, regulated
Effective Display Area	8 x 10 divisions (1 div = 10 mm)
Beam rotator	Adjustment on the front panel
Scale Illumination	3 steps
Intensity Modulation	Positive TTL level reduces brightness

Vertical Axis (CH1, CH2)

Deflection Factor	5 mV/div to 5 V/div 0.5 mV/div to 2 mV/div (X10 MAG on) 1-2-5 sequence, 10 ranges, continuous variable between ranges
Accuracy	±3 % ±5 % (X10 MAG on)
Bandwidth	
DC Coupled	DC to 20 MHz (8 div ref), -3 dB DC to 5 MHz (8 div ref), -3 dB (X10 MAG on)
AC Coupled	Lower cutoff frequency: 10 Hz, -3 dB
Rise Time	17.5 ns 70 ns (X10 MAG on)
Input Impedance	1 MΩ ±1.5 % 30 pF ±5 pF (deviation: ±2 pF)
Input Coupling	AC, GND, DC
Maximum Input Voltage	400 V peak
Operation Mode	CH1, CH2, CHOP, ALT, ADD
Polarity	CH2 only
CH1 OUT	Approx. 50 mV/div (into 50 Ω) DC to 20 MHz, -3 dB

Horizontal Axis

Sweep Mode	Triggered sweep, automatic sweep
Sweep Time	0.1 μs/div to 0.2 s/div 1-2-5 sequence, 20 ranges, continuous variable between ranges
Accuracy	±3 %
Magnifier	10 times ±5% (0.1 and 0.2 μs/div ranges are not calibrated.)
Maximum Sweep Speed	50 ns/div (X10 MAG on)

Triggering

Holdoff Variable Range One sweep or longer
 Signal Source ALT, CH1, CH2, LINE, EXT
 Coupling AC, HF-REJ, DC, TV-V, TV-H
 Trigger Slope +, -
 Sensitivity

	Frequency Range	Internal	External
NORM	30 Hz to 10 MHz	0.5 div	0.2 Vp-p
	2 Hz to 20 MHz	1.5 div	0.6 Vp-p
AUTO	30 Hz to 10 MHz	0.5 div	0.2 Vp-p
	30 Hz to 20 MHz	1.5 div	0.6 Vp-p

TV triggering

Triggered by sync signal of composite video signal.
 To select the trigger polarity to match the signal polarity, use SLOPE switch.

X-Y Mode

Input Connector CH1: X axis, CH2: Y axis
 Deflection Factor Same as the vertical axes
 X Axis Bandwidth DC or 10 Hz to 1 MHz (8 div ref), -3 dB
 X-Y Phase Accuracy $\leq 3^\circ$ at 100 kHz

Calibrator

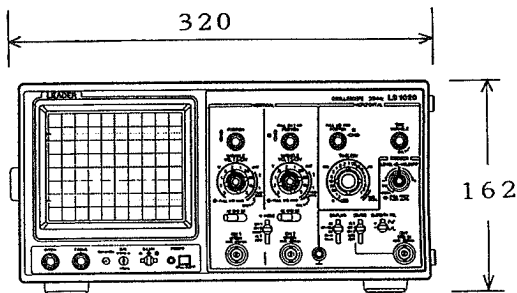
Output Voltage 0.5 Vp-p $\pm 2\%$
 Frequency Approx. 1 kHz, square wave

Environmental Conditions

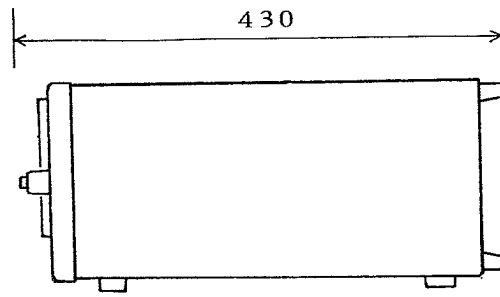
Operating Temperature: 0 to 40°C
 Humidity: 10 to 85 % RH
 Spec-Guaranteed Temperature: 10 to 35°C
 Humidity: 10 to 85 % RH

Others

Power Requirements 100 V, 120 V, 220 V $\pm 10\%$ 50/60 Hz
 Power Consumption 50 VA
 Size and Weight 310 (W) x 150 (H) x 375 (D) mm, 8.5 kg



Front View



Rear view

Accessories

LP-051 Low Capacitance Probe (X10, X1 selectable)	2
Fuse	1
Instruction Manual	1

2.3.2 LP-051 Low Capacitance Probe

Applicable Oscilloscope Input Resistance: 1 M Ω , ± 2 %
Input Capacitance: 20 to 35 pF

	X10	X1
Attenuation	1/10, ± 2 %	1/1
Bandwidth	DC to 50 MHz	DC to 6 MHz
Input Resistance	10 M Ω	1 M Ω
Input Capacitance	Approx. 20 pF	Approx. 200 pF
Maximum Input Voltage	600 VDC	