

General Characteristics

Oscilloscope

- 2 in 1 (Multimeter function support);
- Record length of 6,000 points for each channel;
- Reading-out with the cursor;
- Twenty automatic measurement functions;
- Autoscale function;
- Color liquid crystal display of high resolution and high contrast with adjustable back light;
- Storage and call-out of waveforms;
- Automatic setting function provided capable of fast setting;
- Multiple-waveform calculation function;
- Implementation of detecting the average and peak values of the waveform;
- Edge, video and alternate triggering function;
- RS232 or USB communication ports;
- Multiple Language User Interface.

Multimeter

- 3 3/4 digits;
- Volts, Amps, Ohms, Diode, Capacitance, Continuity measurement;
- 10A maximum amplitude;
- Isolated inputs between oscilloscope and multimeter.

Specifications

1.1 Oscilloscope

Only if other instructions are provided, are all technical specifications applicable to the probe with the 10X attenuation switch setting and the HDS-N series digital type oscilloscope. In order to be up to these specifications, the oscilloscope should meet the following requirement.

- The instrument should operate continuously for more than 30 minutes under the specified operating temperature.
- If the operating temperature is up to or larger than 5 Celsius degrees, the system function menu must be opened to make the system perform a "Auto- calibration" procedure (see "calibration" on P55).

Except those specifications marked with the word **Typical**, all specifications can be up to.

Sampling

Sampling modes	Normal sampling Peak detection Average value
Sampling rate	100 MS/s----HDS1022M-N 500 MS/s----HDS2062M-N Max 1 GS/s----HDS3102M-N

Input

Input coupling	DC, AC, Ground
Input impedance	<ul style="list-style-type: none"> ● $1M\Omega \pm 2\%$ connected in parallel with $20pF \pm 5pF$----HDS1022M-N ● $1M\Omega \pm 2\%$ connected in parallel with $10pF \pm 5pF$----HDS2062M-N, HDS3102M-N
Probe attenuation coefficient	1X, 10X, 100X, 1000X
Max. Input voltage	400V (peak)
Channel delay time (typical)	150ps

Horizontal

Sampling rate range	<ul style="list-style-type: none"> 0.25S/s~100MS/s----HDS1022M-N 0.25S/s~500MS/s----HDS2062M-N 0.25S/s~1GS/s----HDS3102M-N
Waveform interpolation	(sin x) /x

Record length	6K points on each channel
Scanning speed range (S/div)	<ul style="list-style-type: none"> ● 5ns/div ~ 100s/div, stepping in the "1-2.5-5" mode----HDS1022M-N ● 5ns/div ~ 100s/div, stepping in the "1-2-5" mode----HDS2062M-N, HDS3102M-N
Sampling rate and delay time accuracy	±100ppm (any time interval which is equal to or larger than 1ms)
Time interval (ΔT) measurement accuracy (full bandwidth)	Single: $\pm(1 \text{ sampling interval time} + 100\text{ppm} \times \text{reading} + 0.6\text{ns})$ >average 16 : $\pm(1 \text{ sampling interval time} + 100\text{ppm} \times \text{reading} + 0.4\text{ns})$

Vertical

Analog digital converter (A/D)	With the resolution of 8 bits, make sampling on both channels synchronously.
Displacement range	<ul style="list-style-type: none"> ● ±10 div----HDS1022M-N ● ±1V(5mV/div ~ 100mV/div), ±40V(200mV/div ~ 5 V /div) ----HDS2062M-N, HDS3102M-N
Analog bandwidth	20 MHz ----HDS1022M-N 60 MHz ----HDS2062M-N 100MHz----HDS3102M-N
Single bandwidth	Full bandwidth
Low frequency response (AC coupling, -3dB)	≥5Hz (at the BNC)
Rise time (typical one at the BNC)	$\leq 17.5\text{ns}$ ----HDS1022M-N $\leq 5.8 \text{ ns}$ ----HDS2062M-N $\leq 3.5 \text{ ns}$ ----HDS3102M-N
DC gain accuracy	±3%
DC measurement accuracy (average value sampling mode)	The voltage difference (ΔV) between any two points on the waveform after averaging the captured waveforms more than 16: $\pm(5\% \text{ reading} + 0.05 \text{ divisions})$.

Trigger

Triggering level range	±6 divisions from the screen center
Triggering level accuracy (typical) which is applicable to the signal with rise and fall time equal to or longer than 20ns	±0.3 divisions
Trigger displacement	655 divisions for pre-triggering and 4 divisions for post-triggering.
Trigger Holdoff range	100ns~10s

Make a 50% level setting (Typical).	Operation with the input signal frequency equal to or larger than 50Hz.
Signal system and line/field frequency (Video triggering mode)	Support the NTSC, PAL and SECAM broadcasting systems of any field or line frequency.
Cymometer	
Readout resolution	6 digits
Frequency range	AC coupling, 2Hz to full bandwidth
Single source	<ul style="list-style-type: none"> ● when the triggering mode is edge triggering, it is a one channel Cymometer. ● When the triggering mode is alternating triggering, it is a two channel cymometer. ● When the triggering mode is video triggering, the cymometer will not work..

Measurement

Cursor measurement	Voltage difference (ΔV) and time difference (ΔT) between cursors
Auto measurement	Peak-to-peak value, average value, root mean square value, frequency, period, Vmax, Vmin, Vtop, Vbase, Vamp, Overshoot, Preshoot, Rise Time, Fall Time, +Width, -Width, +Duty, -Duty, DelayA->B \uparrow and DelayA->B \downarrow .

Probe

	1X position	10X position
Bandwidth	Up to 6 MHz (DC)	Up to full bandwidth (DC)
Attenuation rate	1: 1	10: 1
Compensation range	15pf~35pf	
Input resistance	1M Ω ±2%	10M Ω ±2%
Input impedance	85pf~115pf	14.5pf~17.5pf
Input voltage	<200 V DC + Peak AC	<600 V DC + Peak AC

10.1.2 Meter

Voltage (VDC)

Input Impedance: 10M Ω .

Max. Input Voltage: 1000V (DC or AC peak-to-peak value)

Range	Accuracy	Resolution
400.0mv	$\pm 1\% \pm 2$ digits	100uV
4.000V		1mV
40.00V		10mV
400.0V		100mV
1000.0V		1V

Voltage (VAC)

Input Impedance: 10M Ω

Max Input Voltage: 750V (AC, virtual value)

Frequency range: from 40Hz to 400Hz

Display: Virtual value of the sine wave

Range	Accuracy	Resolution
4.000V	$\pm 1\% \pm 3$ digits	1mV
40.00V		10mV
400.0V		100mV
750.0V	$\pm 1.5\% \pm 3$ digit	1V

Direct Current (DC)

Range	Accuracy	Resolution
40.00mA	$\pm 1.5\% \pm 1$ digit	10uA
400.0mA	$\pm 1.5\% \pm 1$ digit	100uA
10A	$\pm 3\% \pm 3$ digits	10mA

Alternating Current (AC)

Range	Accuracy	Resolution
40.00mA	$\pm 1.5\% \pm 3$ digits	10uA
400.0mA	$\pm 2\% \pm 1$ digit	100uA
10A	$\pm 5\% \pm 3$ digits	10mA

Resistance

Range	Accuracy	Resolution
400.0 Ω	$\pm 1\% \pm 3$ digits	0.1 Ω
4.000K Ω	$\pm 1\% \pm 1$ digit	1 Ω
40.00K Ω		10 Ω
400.0K Ω		100 Ω
4.000M Ω		1K Ω
40.00M Ω	$\pm 1.5\% \pm 3$ digits	10K Ω

Capacitance

Range	Accuracy	Resolution
51.20nF	$\pm 3\% \pm 3$ digits	10pF
512.0nF		100pF
5.120uF		1nF
51.20uF		10nF
100uF		100nF

Diode

Voltage reading: 0 V ~1.5 V.

On-off Test

There is a beep sound when the on-resistance is less than 50Ω.

10.1.3 General Specifications

Basic parameter

Mechanical dimension	18 cm×11.5cm×4cm
Weight	645 g
Power consumption	< 6 W---HDS1022M-N, HDS3102M-N < 7 W---HDS2062M-N
Display type	3.7" color liquid crystal display
Display resolution	640 (horizontal) ×480 (vertical) pixels
Display color	65536 colors

Power Adapter

Power supply	100-240 V AC 50/60Hz
Power output	1.5VDC---HDS1022M-N 9 VDC---HDS2062M-N, HDS3102M-N
Current output	1500mA---HDS1022M-N 3000mA---HDS2062M-N, HDS3102M-N

Battery type: 7.4V built-in Li-ion battery.

Working environment

Temperature

Operation	Used battery	0 to 50 °C (32 to 122 °F)
	Power adapter	0 to 40 °C (32 to 104 °F)
Storage	-20 to 60 °C (-4 to 140 °F)	

Humidity

Operation	0 to 10 °C (32 to 50 °F)	no condensation
	10 to 30 °C (50 to 86 °F)	95 %
	30 to 40 °C (86 to 104 °F)	75 %
	40 to 50 °C (104 to 122 °F)	45 %
storage	-20 to 60 °C (-4 to 140 °F) no condensation	