

General Characteristics

Oscilloscope

- Record length of 6,000 points;
- Reading-out with the cursor;
- Eighteen automatic measurement functions;
- Autoscale function;
- Color liquid crystal display of high resolution and high contrast;
- Storage and call-out of waveforms;
- Automatic setting function provided capable of fast setting;
- Implementation of detecting the average and peak values of the waveform;
- Edge and video triggering function;
- USB communication port;
- Multiple Language User Interface.

Multimeter

- 3 3/4 digits;
- Volts,Amps,Ohms,Diode,Capacitance,Continuity measurement;
- 20A maximum amplitude;
- Isolated inputs between oscilloscope and multimeter.

Specifications

1.1 Oscilloscope

Only if another instructions are provided, are all technical specifications applicable to the probe with the 10X attenuation switch setting and the HDS1021M digital 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 range of variation is up to or larger than 5 Celsius degrees, the system function menu must be opened to make the system perform a “self- calibration” procedure.

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 MSa/s |

Input

| | |
|-------------------------------|--|
| Input coupling | DC, AC, Groud |
| Input impedance | 1M Ω \pm 2% connected in parallel with 18pF \pm 5pF |
| Probe attenuation coefficient | 1X, 10X, 100X, 1000X |
| Max. Input voltage | 400V (peak) |

Horizontal

| | |
|--|---|
| Sampling rate range | 0.25S/s~100MS/s |
| Waveform interpolation | (sin x) /x |
| Record length | 6K points |
| Scanning speed range (S/div) | 5ns/div~100s/div, stepping in the “1-2.5-5” mode. |
| Time interval (Δ T)measurement accuracy (full bandwidth) | Single: \pm (1 sampling interval time+100ppm \times reading+0.6ns) >average 16 : \pm (1 sampling interval time +100ppm \times reading+0.4ns) |

Vertical

| | |
|---|---|
| Analog digital converter (A/D) | the resolution of 8 bits |
| Sensitivity range (V/div) | 5mV/div~5V/div (at the input BNC) |
| Displacement range | $\pm 10\text{div}(5\text{mV/div}\sim 2\text{V/div})$, $\pm 6\text{div}(5\text{V/div})$ |
| Analog bandwidth | 20M |
| Single bandwidth | Full bandwidth |
| Low frequency response (AD coupling, -3dB) | $\geq 5\text{Hz}$ (at the BNC) |
| Rise time (typical one at the BNC) | $\leq 17.5\text{ns}$ |
| DC gain accuracy | $\pm 3\%$ |
| 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

| | |
|--|--|
| Trigger sensitivity (Edge triggering) | Ajustable:0.2~1div(DC ~ full bandwidth) |
| Triggering lever range | ± 4 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. |
| Trigger sensitivity (Video triggering and typical mode) | 2 divisions of peak-to-peak value |
| 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 |

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, RiseTime, Fall Time, +Width, -Width, +Duty, -Duty. |

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 \pm 2% | 10M Ω \pm 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 digit | 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 digits | 1V |

Direct Current (DC)

| Range | Accuracy | Resolution |
|---------|--------------------------|------------|
| 40.00mA | \pm 1% \pm 1 digit | 10uA |
| 400.0mA | \pm 1.5% \pm 1 digit | 100uA |
| 20A | \pm 3% \pm 3 digits | 10mA |

Alternating Current (AC)

| Range | Accuracy | Resolution |
|---------|-------------------------|------------|
| 40.00mA | $\pm 1.5\% \pm 3$ digit | 10uA |
| 400.0mA | $\pm 2\% \pm 1$ digit | 100uA |
| 20A | $\pm 5\% \pm 3$ 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 | $\pm 1.5\% \pm 3$ digit | 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 \sim 1.5 V.

On-off Test

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

10.1.3 General Specifications

Basic parameter

| | |
|----------------------|---|
| Mechanical dimension | 18 cm \times 11.5cm \times 4cm |
| Weight | 455 g |
| Power consumption | < 3 W |
| Display type | 3.5" color liquid crystal display |
| Display resolution | 320 (horizontal) \times 240 (vertical) pixels |
| Display color | 65536 colors |

Power Adapter

| | |
|----------------|----------------------|
| Power supply | 100-240 V AC 50/60Hz |
| Power output | 8.5 VDC |
| Current output | 1500 mA |

Battery: 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)

Temperature

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