

10. Appendix

10.1 Appendix A: Specifications

10.1.1 Oscilloscope

Only if other instructions are provided, are all technical specifications applicable to the probe with the 10X attenuation switch setting and the 72-8 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.

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----72-8470 500 MSa/s ----72-8474

Input

Input coupling	DC, AC, Groud
Input impedance	<ul style="list-style-type: none"> ● 1M Ω \pm 2% connected in parallel with 20pF \pm 5pF----72-8470 ● 1M Ω \pm 2% connected in parallel with 15pF \pm 5pF----72-8474
Probe attenuation coefficient	1X, 10X, 100X, 1000X
Max. Input voltage	400V (peak)
Channel delay time (typical)	150ps

Horizontal

Sampling rate range	0.25S/s~100MS/s----72-8470 0.25S/s~500MS/s----72-8474
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----72-8470

	<ul style="list-style-type: none"> ● 5ns/div ~ 100s/div, stepping in the “1-2-5” mode----72-8474
Sampling rate and delay time accuracy	$\pm 100\text{ppm}$ (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.
Sensitivity range (V/div)	5mV/div~5V/div (at the input BNC)
Displacement range	<ul style="list-style-type: none"> ● $\pm 10\text{div}$----72-8470 ● $\pm 1\text{V}(5\text{mV/div} \sim 100\text{mV/div}), \pm 10\text{V}(200\text{mV/div} \sim 1\text{V/div}) \pm 50\text{V}(2\text{V/div} \sim 5\text{V/div})$ ----72-8474
Analog bandwidth	20MHz----72-8470 100MHz----72-8474
Single bandwidth	Full bandwidth
Low frequency response (AD coupling, -3dB)	$\geq 5\text{Hz}$ (at the BNC)
Rise time (typical one at the BNC)	$\leq 17.5\text{ns}$ ----72-8470 $\leq 3.5\text{ns}$ -----72-8474
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)	DC coupling	1div(DC~full bandwidth)
	AC coupling	Same as the DC coupling when it is equal to or larger than 50Hz.
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.
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 (only for 72-8474)	
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, RiseTime, Fall Time, +Width, -Width, +Duty, -Duty, DelayA \rightarrow B \rightarrow and DelayA \rightarrow B \rightarrow .

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	150 V DC	300 V DC

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	$\pm 1.5\% \pm 3$ 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	$\pm 3\% \pm 3$ digit	10mA

Alternating Current (AC)

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

Resistance

Range	Accuracy	Resolution
400.0 Ω	$\pm 1\% \pm 3$ digit	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	$\pm 3\% \pm 3$ digit	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 50 Ω .

10.1.3 General Specifications**Basic parameter**

Mechanical dimension	18 cm×11.5cm×4cm
Weight	645 g
Power consumption	< 72-8470;72-8474
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	8.5 VDC----72-8470 9 VDC----72-8474
Current output	1500mA----72-8470 3000mA----72-8474

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)

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