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UPO2000HD Series

High-Resolution Oscilloscope

Datasheet

V1.1

May 2025

Product Introduction

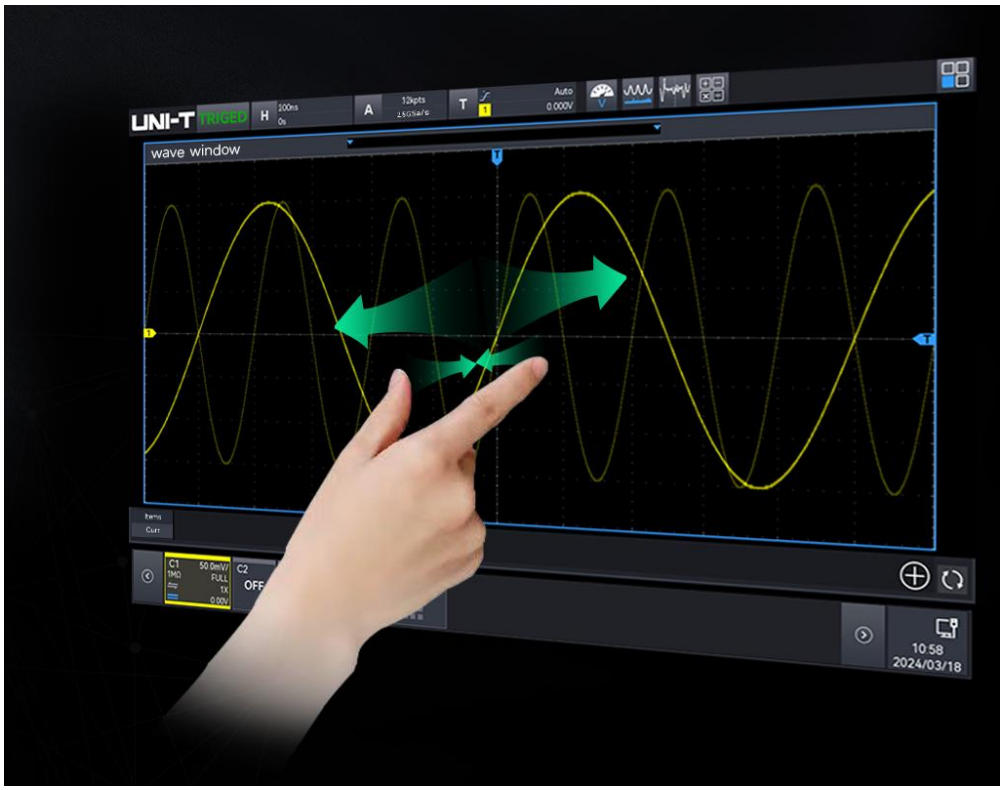
UPO2000HD series high-resolution oscilloscope has the maximum bandwidth of 200 MHz, the maximum sampling rate of 2.5 GSa/s, and is equipped with 4 or 2 analog channels, with the memory depth of up to 100 Mpts. UPO2000HD series adopts exclusive Ultra Phosphor 3.0 technology, achieving the waveform capture rate of up to 1,000,000 wfms/s, with 256 levels of gray temperature colors, and features an innovative digital trigger system with high trigger sensitivity and low jitter.

This oscilloscope supports multiple advanced triggers, serial bus triggering and decoding, and offers advanced sampling and analysis modes such as spectrum analysis, power analysis, histogram, waveform recording, enhanced resolution (ERES), hardware-accelerated template testing, and search and navigation. Additionally, this oscilloscope provides multiple measurement and mathematical operations.

UPO2000HD series features a 10.1-inch capacitive touch screen that supports multiple gestures for common waveform operations. Combined with multiple one-touch keys on the front panel, this greatly optimizes the efficiency of oscilloscope operation and improves the user experience.

Mainstream touchscreen design providing an intelligent interactive experience

Featuring a 10.1-inch HD capacitive multi-touch screen, it supports a variety of gesture operations such as touch, drag, zoom and rectangle drawing. This makes operation more convenient and smoother, and helping the user learn the instrument more easily. It retains the traditional key and knob operation while also supporting mouse and keyboard, making instrument operation more versatile and greatly improving the interactive experience.



Brand new appearance design

UPO2000HD series features an innovative appearance with a double-sided thinning design. The display is aligned horizontally with the panel to enhance touch operation and visibility range. The black frame margin, enhances the overall sense of the instrument.

Features and Advantages

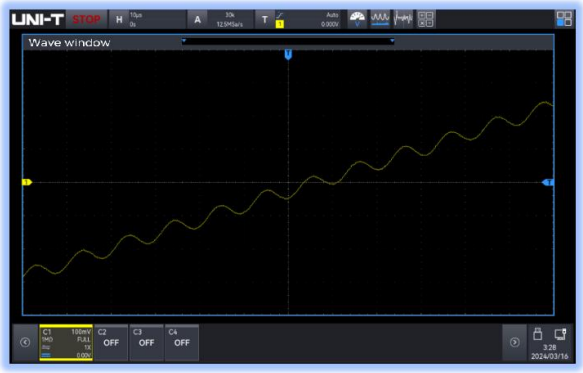
- Analog channel bandwidth: 200 MHz / 100 MHz / 70 MHz
- Real-time sampling rate of the analog channel is up to 2.5 GSa/s
- 12-bit vertical resolution, with up to 4096 points, ensures that the waveform details are clearly visible.
- 4 or 2 analog channels, and the memory depth of up to 100 Mpts
- The maximum waveform capture rate is up to 250,000 wfms/s (sequence mode: 1,000,000 wfms/s)
- 6 instrument functions: high-resolution oscilloscope, spectrum analyzer, digital voltmeter, frequency meter, protocol analyzer, power analysis
- Parameter measurement adds histogram and line graph display
- Uninterrupted hardware real-time waveform recording and analysis of up to 125,000 frames and supports USB memory export function
- Enhanced FFT of up to 4M points, supporting the spectrum analyzer functions such as frequency setting, waterfall curve, detection setting, and marker
- Supports ERES (enhanced resolution) of up to 4-bit
- 56 kinds of parameter measurements
- Multi-Windows display
- Multi-channel 7-digit hardware frequency meter, supporting frequency refresh time and adjustable effective digit settings
- DVM multi-channel RMS measurement: DC, AC RMS and DC+ACRMS
- Multiple trigger types: edge, pulse width, video, ramp, runt pulse, over-amplitude pulse, delay, timeout, duration, setup & hold, Nth edge and code pattern
- Protocol triggering and decoding function: RS232/UART, I^2C, SPI, CAN, CAN-FD, LIN, FlexRay, AUDIO, SENT
- Zone trigger for capturing sporadic signals and observing complicated signals
- Ultra Phosphor 3.0 provides a super fluorescent display effect with up to 256 levels of gray
- 10.1-inch 1280x800 HD capacitive multi-touch screen, supporting gesture control such as click, slide, zoom, edit, and drag
- Multiple peripheral interfaces: USB Host, USB Device, LAN, EXT Trig, AUX Out (Trig Out, Pass/Fail), HDMI
- Supports SCPI (Standard Command for Programmable Instrument)
- Built-in WebServer for accessing and controlling the instrument through a browser, supporting access from PC and mobile devices for cross-platform compatibility.
- Supports on-line update

Design Features

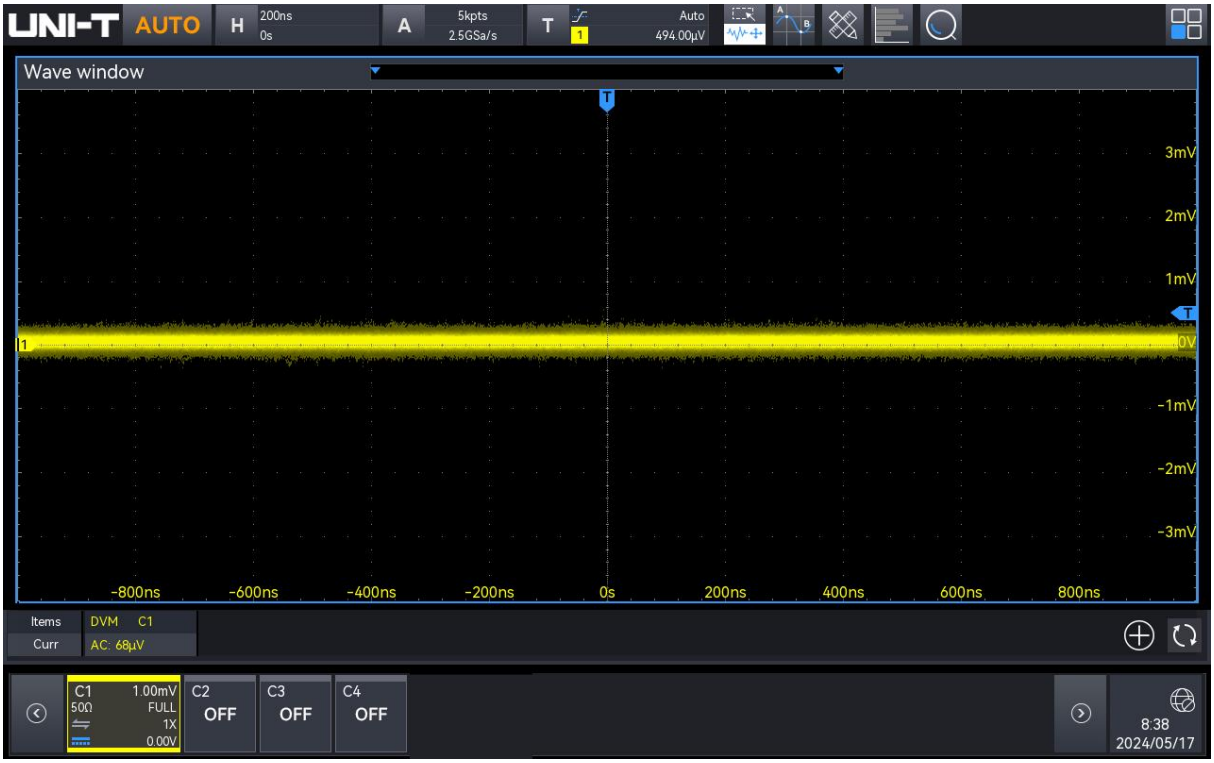
High-resolution

12-bit high-resolution ADC sampling has a quantization level of up to 4096, which is 16 times that of a traditional 8-bit ADC, allowing for better restoration of waveform details.

8-bit

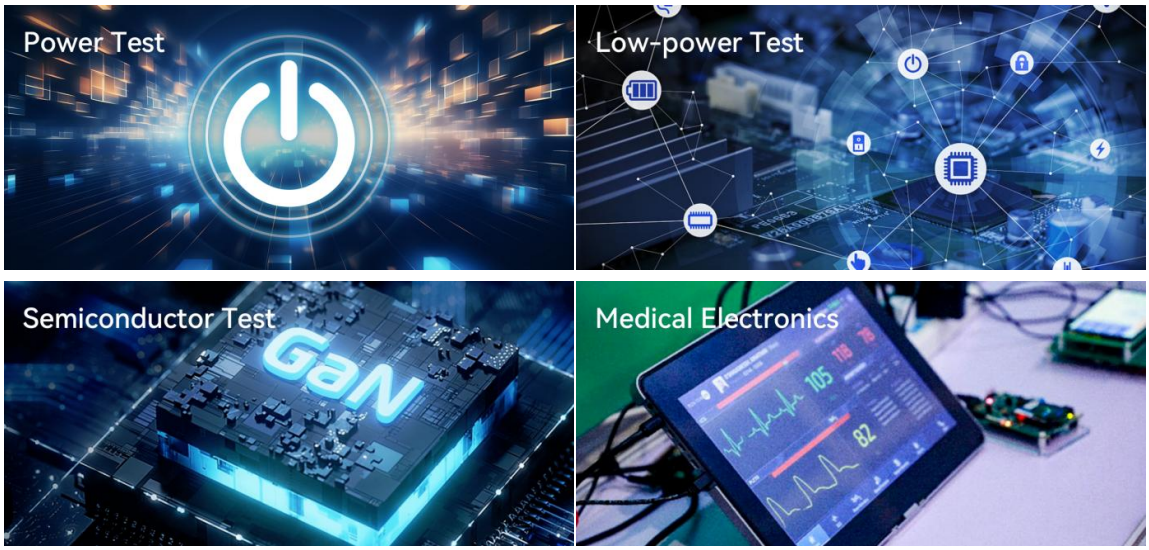


12-bit



The excellent background noise, which is only 70 µVrms at the full bandwidth of 200 MHz, allows the 12-bit ADC to perform optimally.

Application Scope



Cost-effective, Six-in-one Integrated Oscilloscope

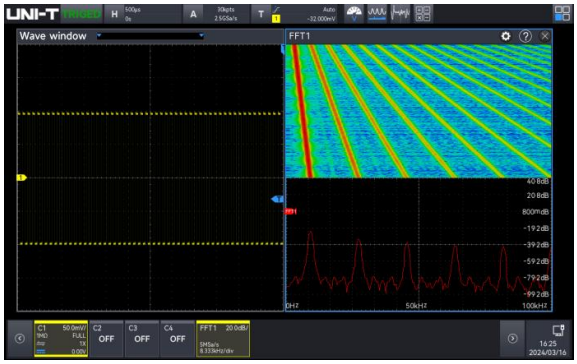
UPO2000HD series integrates 6 instrument functions, including a high-resolution oscilloscope, spectrum analyzer, power analysis, digital voltmeter, high-precision frequency meter, protocol analyzer.This is a cost-effective oscilloscope for users.

High-Resolution Oscilloscope

- Bandwidth: 200 MHz/100 MHz/70 MHz
- Maximum real-time sampling rate: 2.5 GSa/s
- Maximum memory depth: 100 Mpts
- 4 or 2 analog channels, 1 external trigger channel

Spectrum Analyzer

- Standard enhanced FFT with up to 4 Mpts for 4 or 2 channel signal analysis
- Frequency range: 0 to 1.25 GHz
- Waterfall curve
- 4 traces and 4 detections
- Mark type: Auto, manual and threshold
- Marker point list



Digital Voltmeter

- 4-digit voltmeter
- Measurement: DC/AC RMS/AC+DCRMS
- Limit alarm

High-precision Frequency Meter

- 7-digit hardware frequency meter
- Frequency meter: Refresh time and adjustable effective digit settings
- Summary counter

Protocol Analyzer

- 9 kinds of triggering and decoding protocols, including those for computers, embedded serial buses, automobile, aerospace, and audio applications.
- Decoding can be operated in the pause and record modes.
- Supports event list and search function

Name	Description	Standard/Option
Computer serial bus triggering and analysis	RS-232//UART	Standard
Embedded serial bus triggering and analysis	I2C, SPI	Standard
Automobile serial bus triggering and analysis	CAN	Standard
Automobile serial bus triggering and analysis	LIN	Standard
Automobile serial bus triggering and analysis	CAN-FD	Standard
Automobile sensor bus triggering and analysis	FlexRay	Standard
Computer serial bus triggering and analysis	SENT	Standard
Audio serial bus triggering and analysis	Audio	Standard

Power Analyzer (Option)

With the development of chip technology, the requirements for power supply systems are also increased. Nowadays, low-voltage, high-current power supply networks have become a trend. Especially for chips or networks composed of precision components, it is essential to ensure reliable power supply and noise suppression across various parts of the circuit, as well as to maintain the integrity of signal transmission between chips. This presents greater challenges for power supply testing. Designers are now more focused on energy-efficient power supplies and response speed to ensure the power supply remains stable and clean. Based on this, power integrity testing becomes particularly important. Power integrity directly affects signal integrity, and conversely, signal quality also reflects power quality. Furthermore, power quality can cause a series of electromagnetic interference issues, which can be a significant concern for designers. Therefore, having an oscilloscope capable of power analysis is undoubtedly your best choice.

MSO3000HD series provides a comprehensive set of power analysis tools and evaluation results. To use them, simply select the appropriate analysis type and connect the voltage probe and current probe to the power system test point or specified test fixtures, as shown in the diagram. Then, connect to the desired channel for observation and make any necessary fine-tuning adjustments to achieve your desired results.

- Power quality
- Harmonic analysis
- Current harmonics
- Rds (on)
- Switching loss
- Conversion rate
- Safe operating area
- Modulation analysis
- Output ripple
- Startup/shutdown time *
- Transient response *
- Power efficiency *

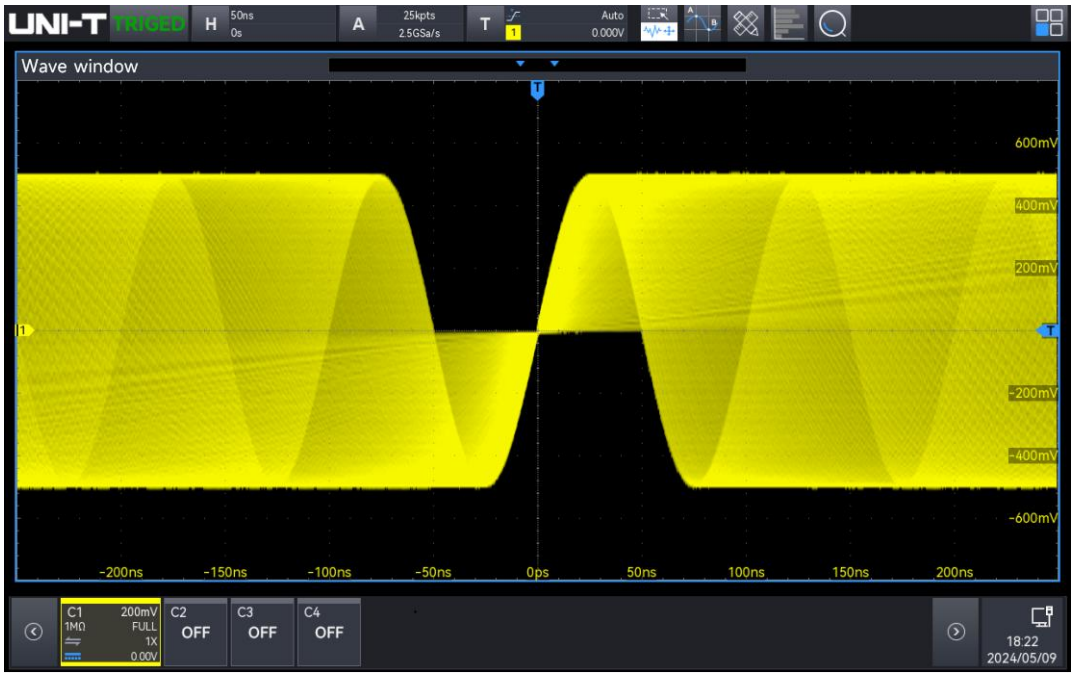
Items	Cur	Max	Min	Avg	Dev	Cnt
VCrest	328.00V	784.00V	0.0000V	328.00V	0.0000V	100
VRMS	212.91V	307.99V	6.4133mV	212.75V	187.08mV	100
VCrest factor	154.05%	254.54%	0.0000%	154.16%	122.47m%	100
ICrest	320.00mA	820.00mA	0.0000A	321.59mA	5.4285mA	100
IRMS	96.568mA	1.5916A	6.2823mA	96.486mA	369.45μA	100
ICrest factor	331.37%	469.69%	0.0000%	333.30%	5.2877%	100
Active power	8.5014W	136.36MW	-8.2129W	8.5982W	37.824mW	100
Reactive power	18.720VAR	45.766VAR	30.858μVAR	18.640VAR	78.062mVAR	100
Apparent power	20.560VA	50.677VA	49.178μVA	20.527VA	71.534mVA	100
Power factor	41.347%	85.880%	-99.147%	41.886%	205.77m%	100
Phase	65.576°	172.51°	30.817°	65.237°	136.93m°	100

“*” indicates features being added. Power analysis support is subject to the latest firmware available on the official website.

Ultra Phosphor 3.0

When attempting to identify and debug occasional or intermittent anomalies in signals, the waveform capture rate is a crucial indicator. This rate represents the oscilloscope's ability to capture waveforms per unit of time, reflecting its speed in processing and analyzing signals.

UPO2000HD series uses advanced software and hardware architecture to achieve 5 to 10 times higher data processing performance than previous generation products. Equipped with Ultra Phosphor 3.0, it supports 8-channel parallel graph mapping, with a processing rate of up to 20 Gbps and the waveform capture rate of up to 250,000 wfms/s, and up to 1 million 1.8 ns fast edge signals in sequence mode, facilitating easy and accurate capture of occasional signals.



Brand New Quick Autoset Strategy

Fuzzy control is an intelligent control method based on fuzzy set theory, fuzzy linguistic variables, and fuzzy logic reasoning. The advantages of the algorithm are fewer iterations, faster speed, and better anti-interference ability.

In the past, oscilloscopes performed Autoset to find the appropriate signal amplitude and frequency for display. However, the response speed varied significantly among oscilloscope manufacturers due to different solutions adopted. This inconsistency affected the user experience.

UNI-T has redefined Autoset execution by adopting a fast fuzzy algorithm based on analog signals and multi-channel parallel processing technology. This is complemented by a 7-bit high-precision hardware frequency counter, allowing the oscilloscope to quickly find and process the amplitude and frequency of unknown signals during Autoset execution. The entire channel can be opened in less than 1.5s, and a single channel in less than 1s, greatly enhancing working efficiency and reducing the risk of misuse for users who frequently change test objects and require rapid testing.

Multiple Parameter Measurements

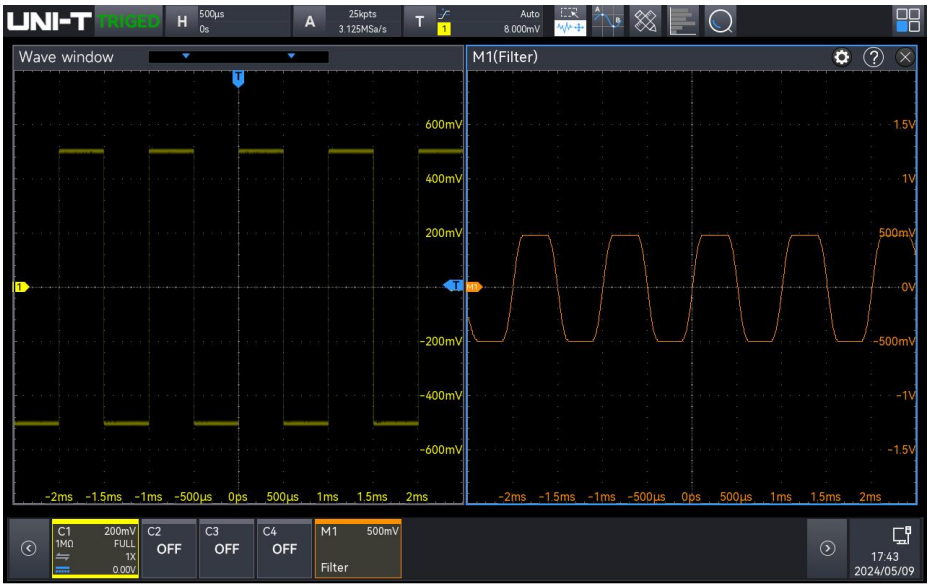
Parameter measurement is a crucial function for engineers when using an oscilloscope. UPO2000HD series provides 56 measurement parameters, with the capability to display up to 27 measurement parameters simultaneously. Each page of measurement statistics displays 9 parameters, which can be presented in histograms and trend charts. The histogram visually represents the probability distribution of the parameters, while the trend chart reflects parameter changes over time.

The parameter snapshot displays 39 test items for single-channel measurement. These include voltage and time measurement parameters, with measured results constantly refreshed during the process. UPO2000HD series introduces a new amplitude calculation strategy, incorporating top and bottom strategies, making it convenient for engineers to utilize the parameter measurement function. Additionally, UPO2000HD series now includes a burst function that displays burst parameters, enabling accurate and immediate analysis of channel measurement data.

Mathematical Operation

UPO2000HD series provides a system of algorithms for complex waveform operations, allowing you to further process waveforms and display the results directly on the oscilloscope.

- Basic operation: +, -, *, ÷
- Digital filter (high-pass, low-pass, band-pass and band-limit)
- Custom function operation: analog channel, MATH



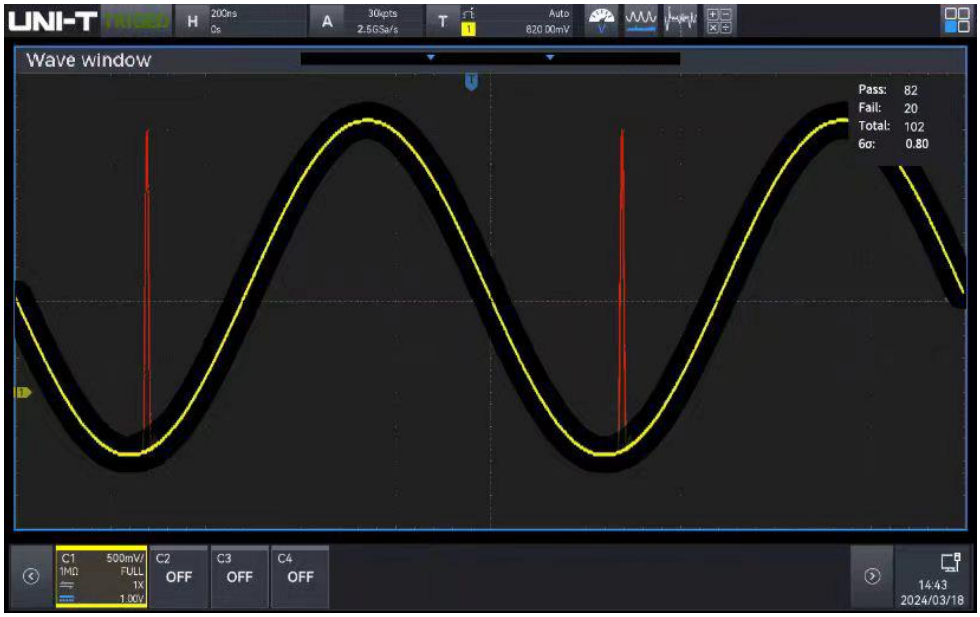
Navigate and Search

The memory depth of UPO2000HD series is upgraded to 100 Mpts, allowing it to capture tens of thousands of waveforms in one capture. Searching for waveforms manually can be time-consuming for engineers.

UPO2000HD series provides customizable search conditions, which are very useful for locating sampled signals and finding waveforms of interest. With the analysis function, events can be analyzed in detail, eliminating the time-consuming and inconvenient process of manual searches.

Hardware-accelerated Template Test

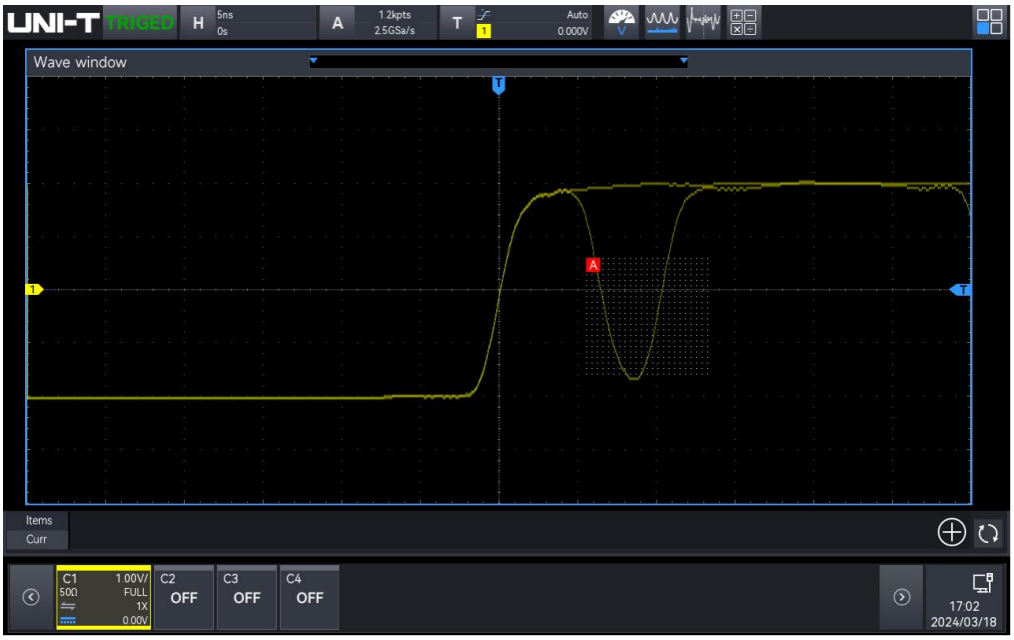
Using hardware-accelerated template testing, the waveform test can be completed in a few seconds to meet special standards.



Zone Trigger

The zone trigger function serves two purposes: firstly, to isolate occasional abnormal signals, and secondly, to stabilize the waveform display. Only a stable trigger can provide a stable waveform display. With this function, engineers can handle complex and variable signals during debugging. The zone trigger function is easy to use, so engineers don't have to spend time learning how to use it.

A rectangle drawing gesture can quickly isolate a signal to be observed. The waveform does not have to be completely stable to trigger; the zone trigger function can capture a waveform that meets the specified conditions and stabilize it for triggering.

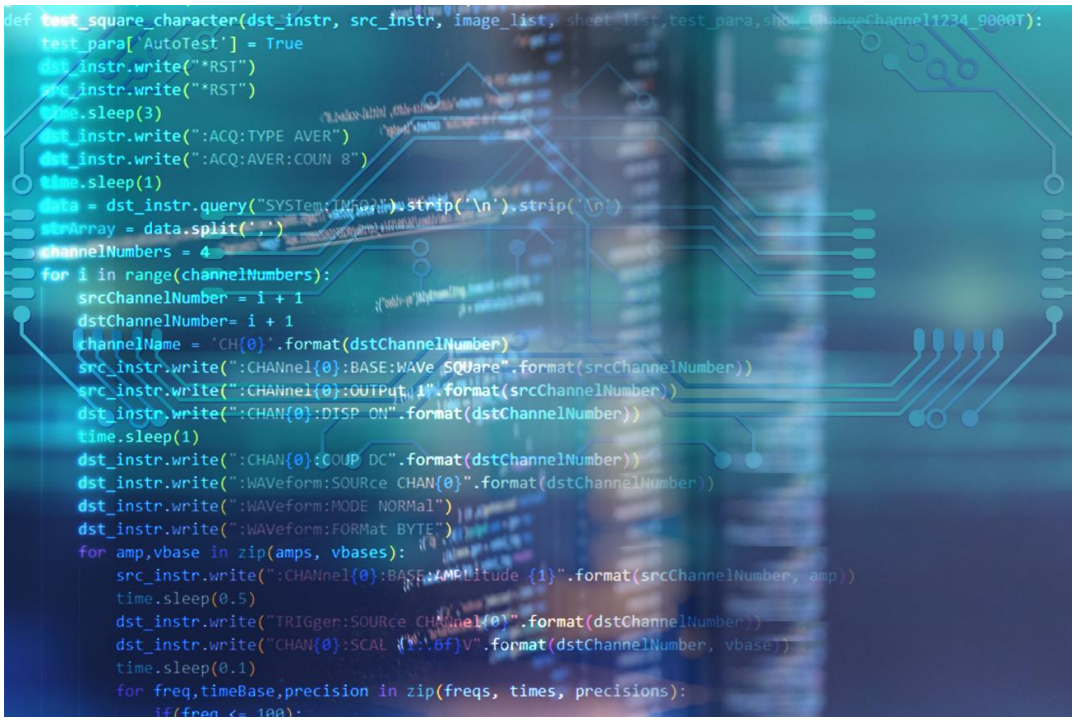


Various Connection

UPO2000HD series offers a wide range of connections with flexibility and convenience.

Multiple Control Methods

Control or secondary development through the instruction set conforming to the SCPI standard.



Use UNI-T free instrument manager for control.

It can be controlled by installing instrument management software on the PC side through LAN or USB Device.

WebServer

SCPI for remote checking and control

Export waveform files

Browsing the user manual online

PC/Mobile phone access

Document Version and Revision

Document Version	**V1.0**
Document Revision	Original version
Firmware version：V1.00.0028 Logic version：V1.00.0013 Hardware version：V1.02.0000	
Document Version	**V1.1**
Document Revision	1、 Added enhanced resolution acquisition mode. 2、Added Rds (on), switching loss, conversion rate, SOA (Safe operating area), modulation analysis, output ripple, startup/shutdown time, transient response, and power efficiency for power analysis 3、Input capacitance in input resistance changed from 18 pf to 17 pf. 4、Added delay (r-r) and delay (f-f) for automatic measurements.
Firmware version：V1.00.0047 Logic version：V1.00.0027 Hardware version：V1.02.0000	

Performance Characteristics

All specifications are guaranteed, except those marked "typical".

Unless otherwise stated, all the performance characteristics are suitable for the probe that the attenuation switch set to 10x and UPO2000HD series mixed signal oscilloscope.

To meet these specifications, the oscilloscope should first meet the following conditions.

- The instrument must be operated continuously for at least thirty minutes at the specified operating temperature.
- The self-calibration must be performed when the operating temperature reaches or exceeds 5 °C.

Model	UPO2204HD	UPO2202HD	UPO2104HD	UPO2102HD	UPO2074HD	UPO2072HD
Analog bandwidth	200 MHz		100 MHz		70 MHz	
Calculated rise time (10 to 90%) (typical)	≤1.80 ns		≤3.50 ns		≤5.0 ns	
Input channel number	4 or 2 analog channels, and EXT					
Sampling mode	Real-time sampling					
Acquisition mode	Normal, peak detect, high resolution, averaging, enhanced resolution					
ERES	Enhanced bit: 1 , 1.5 , 2 , 2.5 , 3 , 4 (12 to 16-bit)					
Maximum sample rate	Analog channel: 2.5 GSa/s (single channel),1.25 GSa/s (dual channels),625 MSa/s (four channels)					
Average	After all channels have reached N samples simultaneously, the number of N times can be selected from 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192.					
Memory depth	Auto (limit to 5 Mpts), 25 kpts, 250 kpts, 500 kpts, 5 Mpts, 50 Mpts, 100 Mpts					
Maximum waveform capture rate	250,000 wfms/s					
	1,000,000 wfms/s (sequence mode)					
Sequential sampling	Maximum 125,000 frames, , minimum two trigger interval < 1 μs					
Hardware real-time waveform recording and playing	125,000 frames					
Screen	10.1 - inch 1280x800 HD capacitive touch screen					

Vertical System (Analog channel)	
Input coupling	DC, AC, GND
Input impedance	(1 MΩ ± 2%) ‖ (17 pF ± 2 pF) , 50 Ω ± 1.5%
Probe attenuation factor	Voltage probe ratio: 0.001X,0.01X,0.1X,1X,0X,100X,1000X,Custom Current probe ratio: 5 mV/A,10 mV/A,50 mV/A,100 mV/A,200 mV/A,500 mV/A,1 V/A,Custom
Maximum input voltage	1MΩ: 400 V (DC+ACVpk) 135 V_{RMS} 50Ω: 5 VRMS Max
Vertical resolution	12-bit
Vertical scale	500 μV/div to 10 V/div (1 MΩ) 500 μV/div to 1 V/div (50 Ω)
Offset range	500 μV/div to 50 mV/div: ±2 V (50 Ω and 1 MΩ) 50.5 mV/div to 1 V/div: ±5 V (50 Ω) 50.5 mV/div to 1 V/div: ±25 V (1 MΩ) 1.01 V/div to 10 V/div: ±250 V (1 MΩ) Vertical offset reading: V
Band limit (typical)	50 Ω: 20 MHz, Full, Digital BW 1M Ω: 20 MHz , Full, Digital BW
Low-frequency response	(AC coupling,-3 dB); ≤5 Hz (on BNC)
DC gain accuracy	<5 mV: ± 2% full scale, ≥5 mV: ±1.5% full scale
DC offset accuracy	± (2%+0.1 div+2 mV)
Unit	W, A, V and U,default: V
Channel-to-channel isolation(typical)	DC to maximum bandwidth: >40 dB
Horizontal System (Analog channel)	
Time base range	2 ns/div to 1000 s/div (simultaneously display the current sampling rate and memory depth)
Time base accuracy	±5 ppm (original accuracy); ±1 ppm (annual aging rate)
Time base delay time range	Pre-trigger (negative delay): ≥ 1 screen width Post-trigger (positive delay): 1 s to 5 ks
Time base mode	Y-T (default)
	X-Y (CH1-CH2, CH1-CH3, CH1-CH4, CH2-CH3, CH2-CH4, CH3-CH4)
	Roll,time base ≥ 50 ms/div,using the horizontal rotary knob to enter or exit Roll mode Scan,time base ≥ 50 ms/div, user can select Roll or Scan mode
Trigger	
Trigger Sensitivity	CH1-CH4:

	≤ 10 mV/div, The larger value of 1 div or 5 mVpp > 10 mV/div, 0.5 div EXT: 400 mVpp, DC to 10 MHz 800 mVpp, 10 MHz to External trigger bandwidth frequency（250 MHz）
	Enable the noise rejection, with trigger sensitivity reducing half
Trigger level range	Internal: ± 4 div from the center of the screen EXT: ± 9 V
Trigger modes	Auto, Normal, Single
Trigger holdoff range	0.0 ps to 10 s
Trigger coupling (typical)	DC: all signal can pass
	AC: block DC component of input signal
	HF reject: suppress high-frequency components of signals above 40 kHz
	LF reject: suppress low-frequency components of signals below 40 kHz
Noise reject	Suppress the high-frequency noise of signal, to reduce the error-touched possibility
Zone Triggering	
Zone	2 Zones; source: CH1 to CH4; Feature: Must Intersect, Must Not Intersect
Edge	
Slope	Rising, Falling, Either
Source	CH1 to CH4, AC Line, EXT
Runt	
When	>, <, ≤ ≥, None
Polarity	Positive, Negative
Pulse width	3.2 ns to 10 s
Source	CH1 to CH4
Window	
Polarity	Rising, Falling, Either
When	Enter, Exit, Time
Set	3.2 ns to 10 s
Source	CH1 to CH4
Nth edge	
Slope	Rising, Falling
Idle time	3.2 ns to 10 s
Edge number	1 to 65535
Source	CH1 to CH4

Delay	
Edge type	Rising, Falling
When	>, <, ≤ ≥, > <
Delay time	3.2 ns to 10 s
Source	CH1 to CH4
Timeout	
Slope	Rising, Falling, Either
Timeout	3.2 ns to 10 s
Source	CH1 to CH4
Duration	
Code pattern	H, L, X
When	>, <, ≤ ≥
Duration	3.2 ns to 10 s
Source	CH1 to CH4
Setup and Hold	
Clock edge	Rising, Falling
Data type	H, L
Setup	3.2 ns to 10 s
Hold	3.2 ns to 10 s
Source	CH1 to CH4
Pulse width	
Polarity	Positive (>, <, ≤ ≥) Negative (>, <, ≤ ≥)
Pulse Width	0.8 ns to 4 s
Source	CH1 to CH4,AC Line,EXT
Slope	
Slope	Positive (>, <, ≤ ≥) Negative (>, <, ≤ ≥)
Time	0.8 ns to 1 s
Source	CH1 to CH4
Video	
Standard	PAL,NTSC,SECAM,525p/60,625p/50,720p/24,720p/25,720p/30,720p/50 ,720p/60,1080i/25,1080i/30,1080p/24,1080p/25,1080p/30,1080pfs/24
Source	CH1 to CH4
Pattern	
Code pattern	H, L, X, Rising, Falling

Source	CH1 to CH4
RS232/UART	
When	Start, FrameErr, CheckErrr, Data
Baud rate	2400 bps,4800 bps,9600 bps,9200 bps,38400 bps,57600 bps,115200 bps,230400 bps,460800 bps,921600 bps,1 Mbps,custom
Data bit	5 bits, 6 bits, 7 bits, 8 bits
Source	CH1 to CH4
I2C	
When	Start, Restart, Stop, Loss, Address, Data, Address & Data
Addr mode	7 bits, 10 bits
Addr range	0 to 119, 0 to 1023
Byte length	1 to 5
Data qualifier	=,>, <
Source	CH1 to CH4
SPI	
Mode	Timeout, CS
Timeout	100 ns to 1 s
Data bit	4 bit to 32 bit
Data set	H,L,X
Clock edge	Rising, Falling
Source	CH1 to CH4
CAN	
Signal type	CAN_H,CAN_L
When	Start, Data Frame, Remote Frame, Error Frame, Over-Load, Identifier, Data, Identifier&Data, End of Frame, Missing Ack, Biterror, CRC, Error, ALL Errors
Data rate	10 kbps, 19.2 kbps, 20 kbps, 33.3 kbps, 38.4 kbps, 50 kbps, 57.6 kbps, 62.5 kbps, 83.3 kbps, 100 kbps, 115.2 kbps, 125 kbps, 230.4 kbps, 250 kbps, 490.8 kbps, 500 kbps, 800 kbps, 921.6 kbps, 1 Mbps, 2 Mbps, 3 Mbps, 4 Mbps, 5 Mbp, custom
Source	CH1 to CH4
CAN-FD	
Signal type	CAN_H, CAN_L
When	Start, Data Frame, Remote Frame, Error Frame, Over-Load, Identifier, Data, Identifier&Data, End of Frame, Missing Ack, Bit Error, CRC Error, ALL Errors
Data rate	10 kbps, 19.2 kbps, 20 kbps, 33.3 kbps, 38.4 kbps, 50 kbps, 57.6 kbps,

	62.5 kbps, 83.3 kbps, 100 kbps, 115.2 kbps, 125 kbps, 230.4 kbps, 250 kbps, 490.8 kbps, 500 kbps, 800 kbps, 921.6 kbps, 1 Mbps, 2 Mbps, 3 Mbps, 4 Mbps, 5 Mbp, custom
FD data rate	250 kbps, 500 kbps, 800 kbps, 1 Mbps, 1.5 Mbps, 2 Mbps, 4 Mbps, 6 Mbps, 8 Mbps, custom
Source	CH1 to CH4
LIN	
Trigger condition	Sync, Identifier, Data, Identifier & Data, Wake Frame, Sleep Frame, Error
Version	V1,V2,Either
Baud rate	1.2 kbps, 2.4 kbps, 4.8 kbps, 9.6 kbps, 10.417 kbps, 19.2 kbps, 20 kbps, custom
Data length	1 to 8
Source	CH1 to CH4
FlexRay	
When	Start, Indicators, Identifier, Cycle, Heade, Data, Identifier & data, End frame, Error
Polarity	BM, BDiff/BP
Baud rate	2.5 Mbps, 5 Mbps, 10 Mbps, custom
Source	CH1 to CH4
AUDIO	
When	Word, Left, Right, Any
Format	Standard, Left Aligned, Right Aligned, TDM
Source	CH1 to CH4
SENT	
When	Fast:Sync, Status, Data, CRC, STAT+Data, S&D +CRC, F_ CRC Error, CONT Pul Err Slow:Sync, Short ID, Short Data, Short CRC, Short ID & data, Enh ID, Enh Data, Enh CRC, Enh ID & data, SLO CH CRC error
Source	CH1 to CH4
Decoding	
Number of decodes	4
Decoding type	Standard: RS232/UART, I2C,SPI, CAN, CAN-FD, LIN, FlexRay, AUDIO, SENT
Parallel	None
Source	CH1 to CH4
Measurement	
Cursor	Voltage difference between cursors (△Y)

	Time difference between cursors (△X) Reciprocal of △X (Hz)(1/△X)
	Voltage and time of waveform point
	Display the cursor in the automatic measurement
Automatic measurements	**Analog channel: 56 kinds of parameter** Maximum, Minimum, Top, Base, Amplitude, Middle, Peak-Peak, Average, Average-Cycles, RMS, RMS-Cycles, AC RMS, AC RMS-Cycles, Area, Area-Cycles, +Area, -Area, +Area-Cycles, -Area-Cycles, +Overshoot, -Overshoot, +Preshoot, -Preshoot, Period, Frequency, Rise time, Fall time, +Width, -Width, +Duty, -Duty, +Pulse count, -Pulse count, Rising edge count, Falling edge count, Burst width, Burst Interval, Burst Period, Burst Per count, Ratio, Period Ratio, Setup time, Hold time, Setup & Hold Ratio, FRFR, FRFF, FFFR, FFFF, FRLF, FRLR, FFLR, FFLF, Delay(r-r), Delay(f-f),Phase(r-r), Phase(f-f)
Measurement mode	Common measurement and accuracy measurement (Full memory hardware measurements)
Measurement type	Simultaneously display 27 kinds of parameter measurement
Measurement range	Main time base, Zoom time base, Cursor area
Measurement statistics	Mean, Maximum, Minimum, Std Dev, Count, Tendency chart, Bar Chart
XY measurement	Time, Cartesian, Polar, Product, Ratio
Analysis	Frequency Counter, DVM, Pass/Fail, Waveform recording, Power Analysis
Power Analysis (Optional)	
Measure	Power quality, Current harmonics, Surge current, Rds(on), Switching Loss, Conversion rate, Safe operating area, Modulation analysis, Output ripple, Startup/shutdown time, Transient response, Power efficiency
Histogram	
Source	CH1 to CH4
Type	Horizontal, Vertical
Math	
Waveform math	A+B, A-B, A×B, A÷B, Advanced, Filter
Filter	Low pass, High pass, Band pass, Band stop
Operation	0, 1, 2, 3, 4, 5, 6, 7, 8, 9 (+, -, *, /, ^, >, <, &&, ||, ==, !=)
Function	sin, cos, sinc, tan, sqrt, exp, lg, ln, floor, abs, acos, asin, atan, sinh, tanh, ceil, cosh, fabs, intg, diff,sign
FFT	
Channel number	4 or 2

Window types	Hanning, Hamming, Rectangle, Blackman
FFT count	Up to 4 Mpts
FFT vertical scale	Vrms, dBVrms
FFT	Display mode: full screen, split screen, spectrum display, waterfall
	Spectrum range: Start frequency, Stop frequency, Center frequency, Span
	Four traces: Normal, Average, Max Hold, Min Hold
	Marker: Marker type, Marker Points, Marker list
Storage	
Setting	Set Status (.set)
Waveform	Waveform data (*.dat) (*.csv) (*.bsv)
Image	Image storage (*.bmp) (*.png) (*.jpg)
Report	Decoding Event List (*.csv) (*.pdf) (*.html)
Display	
Screen	10.1 - inch multi-touch capacitive screen
Resolution	1280×RGB×800 vertical pixel
Color	24-bit true colors
Persistence	Auto, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 5 s, 10 s, 20 s, infinite, close
Display type	Point, Vector
Real-Time clock	Time and data (user-defined)
Waveform Intensity	1% to 100% (default 50%)
Grid Intensity	0% to 100% (default 50%)
Backlight Intensity	1% to 100% (default 50%)
Transparent	0% to 100% (default 50%)
DVM (typical)	
Source	CH1 to CH4
Mode	DC, AC+DC RMS, AC RMS
Resolution	4-bit
Buzzer	Beeps when the specified limit values are reached or exceeded
Frequency Counter	
Source	CH1~CH4, EXT
Measurement	Frequency, Period, Totalizer
Counter	The maximum effective digits are 7, and user adjustable
Maximum measurement frequency	48-bit counter counts against rising edges

Time reference	±5 ppm (original accuracy); ±1 ppm (annual aging rate)
Interface	
USB-Host 3.0	1 on the front panel, 2 on the rear panel
USB-Device 3.0	1 on the rear panel
LAN	LAN (VXI11), 10/100/1000 Base-T, RJ-45
AUX Out	Trig Out, Pass/Fail
10MHz reference input	50 Ω, amplitude 400 mVpp to 4.5 Vpp (-3.979 dBm, 17.044 dBm), frequency 10 MHz ± 10 ppm
10MHz reference output	50 Ω, 1.65 Vpp square wave
HDMI[1]	1 port for external display or projector
General technical specification	
Probe compensator output	
Output voltage	3 Vp-p
Frequency	10 Hz, 100 Hz, 1 kHz (default), 10 kHz
Power Source	
Power source voltage	100 V to 240 VAC, 50Hz/60Hz 100 V to 120 VAC, 400 Hz
Power consumption	120 W Max
Fuse	2.5 A, F-class, 250 V
Environmental	
Temperature	Operating: 0 °C to +40 °C
	Non-operating: -20 °C to + 60 °C
Cooling	Forced cooling by fan
Humidity	Operating: below +35 °C, relative humidity ≤ 90 %; non-operating: +35 °C to +40 °C, relative humidity ≤60%
Altitude	Operating: below 3,000 meters; non-operating: below 15,000 meters
Pollution degree	2
Operating environment	In-door
Mechanical Specifications	
Dimension (W × H × D)	361 mm×209 mm×106 mm
Weight	2.92 kg
Calibration interval	
Calibration interval	1 year

Safety Regulations			
Electromagnetic compatibility	Compliance with EMC directive (2014/30/EU), compliance with or superior to IEC 61326-1:2021/ EN61326-1:2021, IEC 61326-2-1:2021/ EN61326-2-1:2021		
	Conducted disturbance	CISPR 11/EN 55011	CLASS B group 1, 150 kHz-30 MHz
	Radiation disturbance	CISPR 11/EN 55011	CLASS B group 1, 30 MHz-1 GHz
	(ESD)	IEC 61000-4-2/EN 61000-4-2	4.0 kV (contact), 8.0 kV (air)
	Radio sensitivity	IEC 61000-4-3/EN 61000-4-3	0V/m (80 MHz to 1 GHz) 3V/m (1.4 GHz to 2 GHz) 1V/m (2.0 GHz to 2.7GHz)
	Electrical fast transient (EFT)	IEC 61000-4-4/EN 61000-4-4	2kV (AC input)
	Surge	IEC 61000-4-5/EN 61000-4-5	1kV (live to zero) 2kV (live/zero to ground)
	Radio continuous sensitivity	IEC 61000-4-6/EN 61000-4-6	3V, 0.15-80 MHz
	Voltage dip and short-term interruption	IEC 61000-4-11/EN 61000-4-11	Voltage dip: 0% UT during 1 cycle 40% UT during 10/12 cycles 70% UT during 25/30 cycles Short-term interruption: 0% UT during 250/300 cycles
Safety specification	EN 61010-1:2010+A1:2019 EN IEC61010-2-030:2021+A11:2021 BS EN61010-1:2010+A1:2019 BS EN IEC61010-2-030:2021+A11:2021		

Remarks

1: only support standard HDMI, not support other adapters.

Order information

	Description	Order No.
Model	UPO2204HD (200MHz, 4 analog channels)	UPO2204HD
	UPO2202HD (200MHz, 2 analog channels)	UPO2202HD
	UPO2104HD (100MHz, 4 analog channels)	UPO2104HD
	UPO2102HD (100MHz, 2 analog channels)	UPO2102HD
Standard accessories	National standard cable x 1	
	USB 3.0 cable x 1	UT-D30
	Passive probe (200 MHz/100 MHz) x 4/2	UT-P05/ UT-P04
Optional accessories	Power analysis	UPO2000HD-PWR
	Deskew Fixture	UT-DF01
	High voltage probe	UT-V23/UT-P21
	High voltage differential probe	UT-P30/UT-P31/UT-P32/UT-P33/UT-P35/UT-P36
	Current probe	UT-P40/UT-P41/UT-P42/UT-P43/UT-P44

Remarks: Please order all hosts, accessories and options from your local UNI-T distributor.

Oscilloscope probes and accessories

Passive probe

Model	Type	
UT-P01 	High resistance probe	1X: DC to 8 MHz 10X: DC to 25 MHz Oscilloscope compatibility: all series of UNI-T
UT-P03 	High resistance probe	1X: DC to 8 MHz 10X: DC to 60 MHz Oscilloscope compatibility: all series of UNI-T
UT-P04 	High resistance probe	1X: DC to 8 MHz 10X: DC to 100 MHz Oscilloscope compatibility: all series of UNI-T
UT-P05 	High resistance probe	1X: DC to 8 MHz 10X: DC to 200 MHz Oscilloscope compatibility: all series of UNI-T
UT-P06 	High resistance probe	1X: DC to 8 MHz 10X: DC to 300 MHz Oscilloscope compatibility: all series of UNI-T
UT-P07A 	High resistance probe	10X: DC to 500 MHz Input resistance:10 MΩ Maximum of operating voltage: <600V pk Oscilloscope compatibility: all series of UNI-T

UT-P08A 	High resistance probe	10X: DC to 350 MHz Input resistance: 10 MΩ Maximum of operating voltage: <600V pk Oscilloscope compatibility: all series of UNI-T
UT-P20 	High resistance probe	DC to 100 MHz Probe coefficient 100:1 Maximum of operating voltage: 1500 Vrms Oscilloscope compatibility: all series of UNI-T
UT-V23 	High voltage probe	DC to 100 MHz Probe coefficient 100:1 Input resistance: 100 MΩ±2% Maximum of operating voltage: 2000 Vpp Oscilloscope compatibility: all series of UNI-T
UT-P21 	High voltage probe	DC to 50 MHz Probe coefficient 1000:1 Maximum of operating voltage: DC 15 kVrms,AC 10 kV (sine wave) Oscilloscope compatibility: all series of UNI-T

Current probe

Model	Type	
UT-P40 	Current probe	DC to 100 kHz Range: 50 mV/A, 5 mV/A Current range: 0.4 A to 60 A Maximum of operating voltage: 600 Vrms Oscilloscope compatibility: all series of UNI-T
UT-P41 	Current probe	DC to 100 kHz Range: 100 mV/A, 10 mV/A Current range: 0.4 A to 100 A Maximum of operating voltage: 600 Vrms Oscilloscope compatibility: all series of UNI-T

UT-P42 	Current probe	DC to 150 kHz Range: 100 mV/A, 10 mV/A Current range: 0.4 A to 200 A Maximum of operating voltage: 600 Vrms Oscilloscope compatibility: all series of UNI-T
UT-P43 	Current probe	DC to 25 MHz Range: 100 mV/A Maximum test current: 20 A Rising time: 14 ns Oscilloscope compatibility: all series of UNI-T
UT-P44 	Current probe	DC to 50 MHz Range: 50 mV/A Maximum test current: 40 A Rising time: 7 ns Oscilloscope compatibility: all series of UNI-T
UT-P4030D 	High-frequency current probe	Bandwidth: DC to 100 MHz Rising time: ≤3.5 ns Range selection: 30 A/5 A Maximum test current: 30 A Voltage of insulated line: 300 V CAT I Oscilloscope compatibility: all series of UNI-T
UT-P4150 	High-frequency current probe	Bandwidth: DC to 12 MHz Rising time: ≤29 ns Range selection: 150 A/30 A Maximum test current: 150 A Voltage of insulated line: 600 V CATII 300 V CATIII Oscilloscope compatibility: all series of UNI-T
UT-P4500 	High-frequency current probe	Bandwidth: DC to 5 MHz Rising time: ≤70 ns Range selection: 500 A/75 A Maximum test current: 500 A Voltage of insulated line: 600V CATII 300 V CATIII

		Oscilloscope compatibility: all series of UNI-T
UT-P4100A 	Low-frequency current probe	Bandwidth: DC to 600 kHz Rising time: ≤583 ns Maximum test current: 100 A Range selection: 100 A/10 A Range sensitivity: 0.1 V/A, 0.01 V/A Common-mode voltage RMS: CATI 600 V CATII 600 V CATIII 300 V Oscilloscope compatibility: all series of UNI-T
UT-P4100B 	Low-frequency current probe	Bandwidth: DC to 2 MHz Rising time: ≤175 ns Maximum test current: 100 A Range selection: 100 A/10 A Range sensitivity: 0.1 V/A, 0.01 V/A Common-mode voltage RMS: CATI 600 V CATII 600 V CATIII 300 V Oscilloscope compatibility: all series of UNI-T

Active Probe

Model	Type	
UT-P30 	High voltage differential probe	DC to 100 MHz Attenuation ratio 100:1,10:1 Input differential-mode voltage: ± 800 Vpp Oscilloscope compatibility: All UNI-T series
UT-P31 	High voltage differential probe	DC to 100MHz Attenuation ratio 1000:1,100:1 Input differential-mode voltage: ± 1.5 kVpp Oscilloscope compatibility: All UNI-T series

UT-P32 	High voltage differential probe	DC to 50 MHz Attenuation ratio 1000:1,100:1 Input differential-mode voltage: ± 3 kVpp Oscilloscope compatibility: All UNI-T series
UT-P33 	High voltage differential probe	DC to 120 MHz Attenuation ratio 100:1,10:1 Input differential-mode voltage: ± 14 kVpp Oscilloscope compatibility: All UNI-T series
UT-P35 	High voltage differential probe	DC to 50 MHz Attenuation ratio 500:1, 50:1 Rising time: 7 ns Accuracy: 2% Input differential-mode voltage: 1/50:130 (DC+peakAC) 1/500:1300 (DC+peakAC) Input common-mode voltage: 100 Vrms, CATI 600 Vrms, CATII Oscilloscope compatibility: All UNI-T series
UT-P36 	High voltage differential probe	DC to 50 MHz Attenuation ratio 2000:1, 200:1 Rising time: 3.5 ns Accuracy: 2% Input differential-mode voltage: 1/200:560 (DC+peakAC) 1/2000:5600 (DC+peakAC) Input common-mode voltage: 2800 Vrms, CATI 1400 Vrms, CATII Oscilloscope compatibility: All UNI-T series

Options ordering and installation

1. **Purchase options:** Based on your requirements, please purchase the specified function options from UNI-T Sales Personnel and provide the serial number of the instrument that needs the option installed.
2. **Receive certificate:** You will receive the license certificate based on the address provided in the order.
3. **Register and obtain license:** Visit the UNI-T official website license activation session for registration. Use the license key and instrument serial number provided in the certificate to obtain the option license code and license file.
4. **Install the option:** Download the option license file to the root directory of a USB storage device, and connect the USB storage device to the instrument. Once the USB storage device is recognized, the Option Install menu will be activated. Press this menu key to begin installing the option.