Data Sheet

UPO1000CS Series Digital Oscilloscope

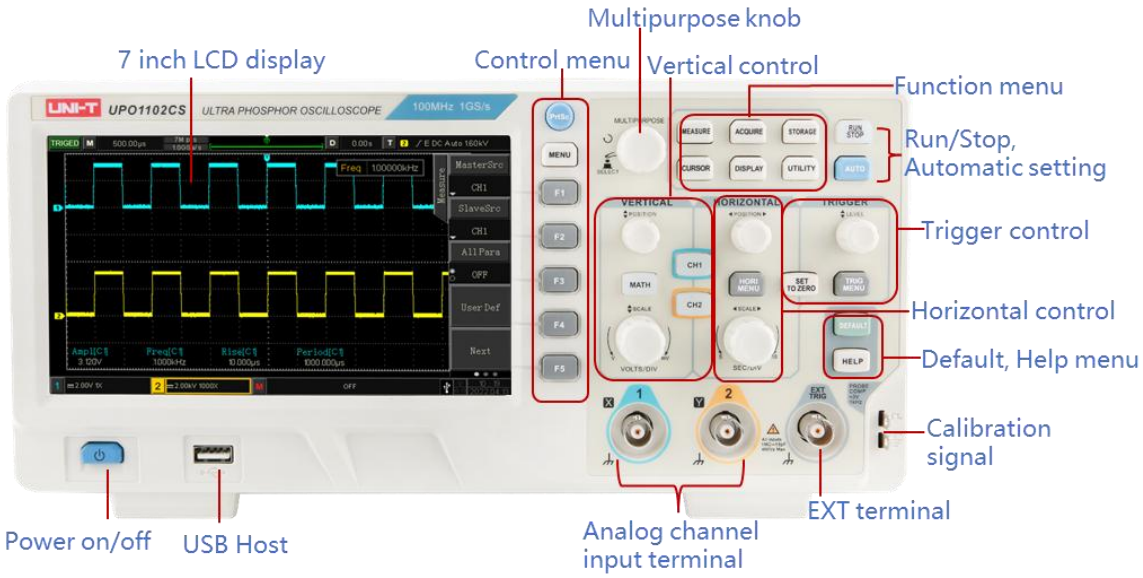
V1.1

2024.06

Main Features

- Analog channel bandwidth: 200 MHz, 100 MHz.
- Number of analog channels: 2.
- Storage depth of each channel: 56 Mpts.
- Sampling rate: 1GSa/s (non-interleaving: independent sampling per channel).
- Waveform capture rate: 500,000 wfms/s.
- Hardware real-time waveform uninterrupted recording of 100000 waveforms.
- Ultra Phosphor super fluorescent display effect, up to 256 levels of gray display.
- Supports RS232, I2C, SPI, CAN and LIN trigger.
- Innovative RS232, I2C, SPI, CAN and LIN hardware decoding.
- Vertical scale: 1 mV/div-20 V/div.
- Low background noise：<100 μVrms.
- 1M points enhanced FFT function. Support frequency setting, waterfall diagram, detection setting and marker measurement etc.
- 36 kinds of waveform parameters can be automatically measured.
- Rich trigger functions (edge, pulse width, video, slope, runt, overshoot, delay, timeout, duration, setup and hold, Nth edge and pattern trigger).
- Multi-Scopes support dual-channel independent trigger fluorescence display.
- Multi-channel independent 7-bit hardware frequency counter.
- DVM supports dual-channel independent AC and DC true RMS measurement.
- Waveform arithmetic functions (FFT, +, -, ×, ÷, digital filtering, logic operations, and advanced operations).
- Rich interfaces: USB Host、USB Device、LAN、EXT Trig、AUX Out(Trig Out、Pass/Fail).
- Supporst SCPI programmable instrument standard command.
- Supports WEB access and control.
- 7-inch 800×480 TFT LCD.

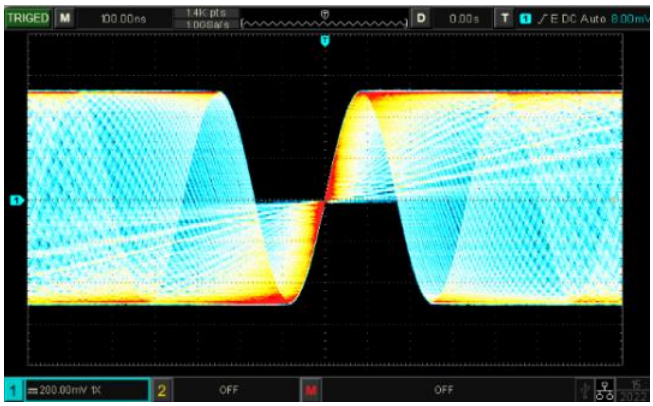
Panel Structure



Product Introduction

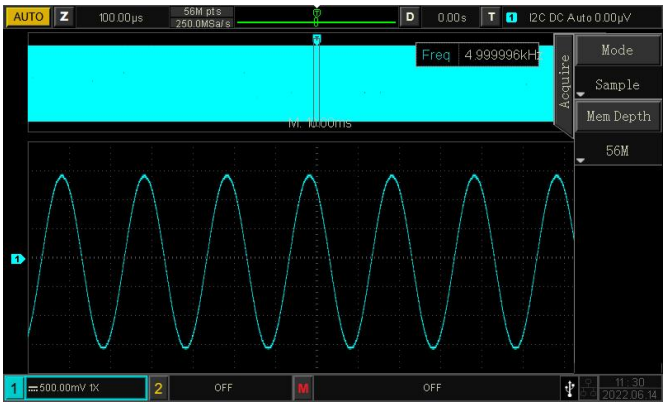
UPO1000CS series is a multi-function, cost-effective digital phosphor oscilloscope. It can be widely used in the fields of electronic and electrical design, debugging, education and industrial design. UPO1000CS series adopts parallel digital signal processing technology, which greatly improves the data processing speed and waveform capture rate. The original Ultra Phosphor technology can present the cumulative effect of the tested signal as a multi-layered afterglow. Compared with traditional digital storage oscilloscopes, the persistence of digital phosphor oscilloscopes can present three-dimensional waveform data of amplitude, time and signal intensity. Fast Acquire technology can accurately capture abnormal events such as video, jitter, noise, and runt signals.

256 gray level display



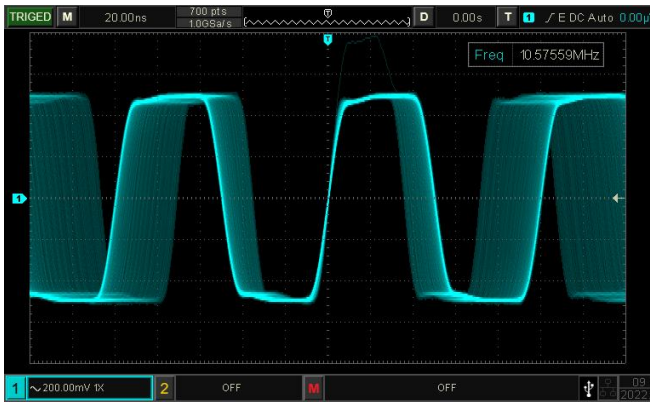
The original Ultra Phosphor display technology is easy to obtain more waveform information and detailed observation.

Deep storage depth



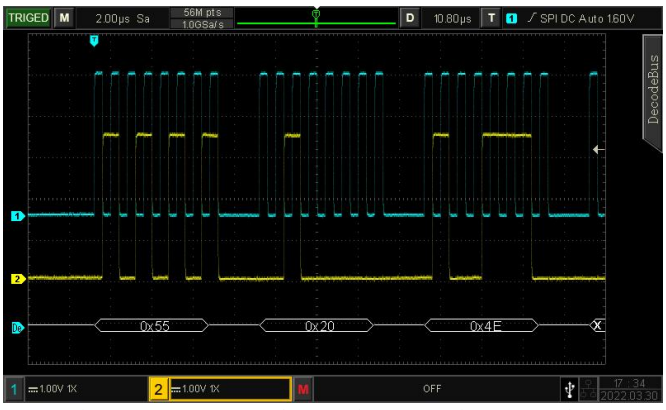
UPO1000CS series 56M sampling points per channel. This enables the oscilloscope to maintain high sampling rate in a wider time base range, At the same time considering the whole and details of the waveform, which greatly improves the ability to capture abnormal waveforms.

Ultra high capture rate



UPO1000CS series adopts innovative digital signal parallel processing technology. It has a very high capture rate in its peer products. Effectively reduce signal loss and help you better capture abnormal signals.

Serial bus trigger and hardware decoding



Innovative hardware decoding realizes real-time decoding. The decoding speed with deep storage 56Mpts realizes the millisecond level, which solves the problem of long-time waiting for viewing decoded data. The decoding will not affect the refresh speed of the waveform, and the waveform has the effect of digital fluorescence display. The event list can display the decoded data with deep storage and the time of the packet. These improved technologies will help you better test the serial bus.

Multi-Scopes

Signals with different clock sources and large frequency difference can also display the waveform stably on the screen, which is convenient for customers to analyze the waveform parameters.

1 M FFT sampling point

UPO1000CS series has 1 M FFT sampling points. It can also set the practical functions of spectrum analyzer such as frequency range, detection mode and spectrum marking. It is convenient for you to analyze the signal in frequency domain on oscilloscope.

Remote control via web page

The oscilloscope can be connected and remotely controlled via the web page. This eliminates the need to install local programs, saving space and time.

Quick Selection

Parameter \ Model	UPO1202CS	UPO1102CS
Bandwidth	200 MHz	100 MHz
Analog channel	2	2
Sampling rate	1 GS/s	1 GS/s
Storage depth	56 Mpts per channel	56 Mpts per channel
Rise time	≤1.8 ns	≤3.5 ns
Capture rate	500,000 wfms/s	500,000 wfms/s
Waveform record	100,000 frames	100,000 frames

Performance Characteristics

All specifications are warranted except those marked "Typical".
Unless otherwise stated, all specifications are for probes with the attenuation switch set to 10× and the UPO1000CS series digital phosphor oscilloscope. To meet these specifications, an oscilloscope must first meet the following two conditions:

- The instrument must run continuously for more than 30 minutes at the specified operating temperature.
- If the operating temperature variation range reaches or exceeds 5 degrees Celsius, you must open the system function menu and execute the self-calibration function.

Sample	
Sampling mode	Real-time sampling
Acquisition mode	Normal, peak detection, averaging, high resolution
Real-time sampling rate	1 GS/s (each channel)
Average	Average:2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192
Memory Depth	56 Mpts (each channel)
Input	
Channels	2
Coupling	DC, AC, GND
Impedance	(1 MΩ± 2%)‖(16 pF± 3 pF)
Probe attenuation	0.001X, 0.01X, 0.1X, 1X, 10X, 100X, 1000X, Custom
Max. Input voltage（1MΩ）	400 V Max（DC+Vpeak）
Vertical System	
Bandwidth (-3 dB)	UPO1102CS: DC to 100 MHz UPO1202CS: DC to 200 MHz
Single bandwidth (-3 dB)	UPO1102CS: DC to 10 0MHz UPO1202CS: DC to 200 MHz

Vertical resolution	8 - bit
Vertical scale	1 mV/div to 20 V/div
Band limit(typical)	20 MHz
Low frequency response (AC coupling, -3dB)	≤5 Hz（On the BNC）
Calculated rise time (10 to 90%) (typical)	UPO1102CS：≤3.5 ns UPO1202CS：≤1.8 ns （The typical rising time of 1 mV/div and 2 mV/div is 2 ns）
DC Gain Accuracy	<10 mV: ±4.0% full scale; ≥10 mV: ±3.0% full scale;
Channel-to-channel isolation(typical)	Dc to maximum bandwidth: >40 dB
Horizontal System	
Time base Scale	UPO1102CS ： 2 ns/div to 1000 s/div UPO1202CS ： 1 ns/div to 1000 s/div
Time base accuracy	≤± （50 + 2 ×Use fixed number of year） ppm
Timebase delay time range	Pre-trigger (negative delay) : ≥1 screen width Post-trigger (positive delay) : 1 s to 50s
Time base mod	Y-T, X-Y, Roll
number of X - Y	1
Hardware real-time waveform recording and playing	100,000 frames
Waveform Capture Rate	150,000 wfms/s
	500,000 wfms/s（Fast Acquire mode）
Multi-Scopes	Quantity: 2 Support each channel independent display, and independently adjustable time base
Trigger	
Trigger level range	Inside: ± 5 Spaces from the center of the screen External: EXT ± 3 V
Trigger modes	Auto, Normal, Single
Trigger holdoff	80 ns to 10 s
Trigger coupling (typical)	DC: Passes all components of the signal
	AC: The direct current component that blocks the input signal
	HFRJ: Attenuates the high-frequency components above 40 kHz
	LFRJ: Blocks the DC component and attenuates the low-frequency components below 40 kHz
	Noise suppression: The high frequency noise in the signal is suppressed to reduce the probability of oscilloscope being triggered by mistake
Edge	
Slope	Rising, Falling, Either

Runt	
When	>, <, <>, none
Polarity	+wid , -wid
Pulse width range	8 ns to 10 s
Window	
Type	Rising, Falling, Either
When	Enter, Exit, Time
Time	8 ns to 10 s
Nth Edge	
Edge type	Rising, Falling
Free time	8 ns to 10 s
Edge number	1 to 65535
Delay	
Edge type	Rise, Fall
When	>, <, <>, none
Delay time	8 ns to 10 s
Timeout	
Edge type	Rising, Falling, Either
timeout	8 ns to 10 s
Pattern	
Pattern Setting	H, L, X, Rising, Falling
Duration	
Type set	H, L, X
When	>, <, <>
Duration	8 ns to 10 s
Setup and Hold	
Edge type	Rising, Falling
Data type	H, L
Setup time	8 ns to 10 s
Hold time	8 ns to 10 s
Pulse	
Polarity	+wid , -wid
When	>, <, <>
Pulse width	2 ns to 10 s
Slope	

Conditions of the slope	Positive slope, negative slope
When	>, <, <>
Time set	8 ns to 10 s
Video	
Signal system line frequency range	Supports standard NTSC, PAL, and SECAM broadcast systems with line counts ranging from 1 to 525 (NTSC) and 1 to 625 (PAL/SECAM)
Decoding	
Decoding type	RS232/UART, I2C, SPI, CAN (optional), LIN (optional)
Number of decodes	1
RS232 / UART	
When	Frame start, error frame, check error, data
Baud rate	2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, custom
Data bits wide	5 bits, 6 bits, 7 bits, 8 bits
I2C	
When	Start, Restart, Stop, loss confirmation, address, data, address& data
Address bits wide	7 bits, 10 bits
Address range	0 to 7F, 0 to 3FF
Bytes	1 to 5
SPI	
When	Idle, Idle& Data
Free time	80 ns to 10 s
Data bits	4 bits to 32 bits
Data set	H, L, X
Edge of the clock	Rise, Fall
CAN (optional)	
Signal types	Rx/Tx, CAN_H, CAN_L, difference
When	Frame start, FRAME type, ID, DATA, ACK loss, BIT padding error, ID and data, End of frame
Signal rate	1 0kbps, 20 kbps, 33.3 kbps, 50 kbps, 62. 5kbps, 83.3 kbps, 100 kbps, 125 kbps, 1 Mbps, custom
Sampling point	1% to 99%
Frame type	Data frame, remote frame, error frame, overload frame
LIN (optional)	
When	Synchronization, Identifier, Data, ID and Data, Wake up frame, Sleep frame, Synchronization error, ID verification error, checksum error
Speed signal	V1, V2, Both
Bit rate	2.4 kbps, 4.8 kbps, 9.6 kbps,19.2 kbps, Specified

Sampling point	1% to 99%
Measure	
Cursor	Cursor Manual mode: Voltage difference between cursors (△V) Time difference between cursors (△T) Inverse of △T (Hz)(1/△T)
	Trace mode: waveform point voltage value and time value
Allows the cursor to be displayed during automatic measurements	allow
Automatic measurement	Maximum, Minimum, Top, Base, Amplitude,Peak-Peak, Middle, Average, Average-Cycle, RMS, RMS-Cycle, AC RMS, Period, Frequency, Rise time, Fall time, RiseDelay, FallDelay, +Width, -Width, FRFR, FRFF, FFFR, FFFF, FRLF, FRLR, FFLR, FFLF, +Duty, -Duty, Area, Area-Cycle, Overshoot, Preshoot, Phase, Pulse count, a total of 36 measurement parameters;
Number of measurements	5 measurements are displayed simultaneously
Measuring range	Screen or cursor
Measurement statistics	Mean, maximum, minimum, standard deviation and number of measurements
Frequency counter	7-bit hardware frequency counter
Mathematical	
Waveform math	A+B, A-B, A×B, A/B, FFT, Editable advanced operations(Log, Exp, Sin, Cos, Tan, Sqrt, Intg, Diff), Logical operations
FFT points	1M points
FFT window type	Rectangle, Hanning, Blackman, Hamming
FFT display	Split screen, Full screen;The time base is independently adjustable
FFT vertical scale	Vrms, dBVrms
FFT	Display mode: Full screen, split screen and waterfall
	Spectrum range Settings: start frequency, end frequency, center frequency, sweep width
	Detection mode: Normal, average, maximum hold, minimum hold
	Tags: Tag type, tag trace, tag maximum number of points, event list
Digital filtering	Low pass, High pass, Band pass, Band stop
Logical operations	and, or, not, xor
Function	Intg, Diff, Log, Exp, Sqrt, Sine, Cosine, Tangent
Storage	
Set	Inside and outside
Waveform	Inside and outside
Bitmap	External USB memory, and can store related parameter information.

Display			
Screen	7-inch 800X480 TFT LCD		
Color	24 - bit true colors		
Afterglow setting	Minimum value, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s, infinite		
Display type	Point, vector		
Interface			
Standard	USB Host, USB Device, LAN, EXT Trig, AUX Out (Trig Out/, Pass/Fail)		
General technical specifications			
Probe compensator output			
Output voltage	About 3 Vp-p		
Frequency	10 Hz,100 Hz,1 kHz,10 kHz		
Power Source			
Power source voltage	100V to 240 VAC (Fluctuations±10%), 50Hz/6 0Hz		
Power consumption	100 VA		
Fuse	2.5 A, F class, 250 V		
Environmental			
Temperature range	Operation：0℃ to +40℃ No operation：-20℃to +70℃		
Cooling method	Forced fan cooling		
Humidity range	Operation: +35℃ ≤ 90% relative humidity; No operation: +35 ℃ to +40 ℃ ≤ 60% relative humidity		
Altitude	Operation: below 3000 meters; Non-operational: up to 15,000 meters		
Pollution degree	2		
Operating environment	Indoor use		
Specifications			
Size (Width x height x depth)	306mm×138mm×124mm		
weight	3.0 kg		
Adjust the interval			
Calibration interval is recommended	1 year		
Standard			
Electromagnetic compatibility	Comply with EMC Directive (2014/30/EU) , in line with or better than IEC61326-1:2021/EN61326-1:2021, IEC61326-2-1:2021/EN61326-2-1:2021		
	Conduction disturbance	CISPR 11/EN 55011	CLASS B group 1，150kHz-30MHz
	Radiated disturbance	CISPR 11/EN 55011	CLASS B group 1，30MHz-1GHz

	Electrostatic discharge (ESD)	IEC 61000-4-2/EN 61000-4-2	4.0 kV (contact), 8.0 kV (air)
	Radio-frequency electromagnetic field Immunity	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 transients (EFT)	IEC 61000-4-4/EN 61000-4-4	2kV (Input AC Power Ports)
	Surges	IEC 61000-4-5/EN 61000-4-5	1kV(Line to line) 2kV(Line to ground)
	Radio-frequency continuous conducted Immunity	IEC 61000-4-6/EN 61000-4-6	3V,0.15-80MHz
	Voltage dips and interruptions	IEC 61000-4-11/EN 61000-4-11	Voltage Dips: 0% UT during 1 cycle; 40% UT during 10/12 cycles; 70% UT during 25/30 cycles Short interruption：0% UT during 250/300 cycles
Safety	EN61010-1:2010+A1:2019 EN IEC61010-2-030:2021+A11:2021 BS EN61010-1:2010+A1:2019 BS EN IEC61010-2-030:2021+A11:2021 UL61010-1:2012 Ed.3+ R:19 Jul2019 UL61010-2-030:2018 Ed.2 CSA C22.2#61010-1:2012 Ed.3+U1; U2; A1 CSA C22.2#61010-2-030:2018 Ed.2		

*The UPO1000CS series have been certified by CE, UKCA, cETLus.

Order information

	Description	Standard Quantity per Carton	Order No.
Model	UPO1102CS (100 MHz, 1 GSa/s, 2CH)	1	UPO1102CS
	UPO1202CS (200 MHz, 1 GSa/s, 2CH)	1	UPO1202CS
Standard accessories	Power cord that conforms to the standard of the destination country	1	--
	USB data cable	1	--
	Passive probe (200 MHz/ 100 MHz)	2	UT-P05/UT-P04
Optional accessories	CAN Decoding options	--	UPO1000CS-AUTO
	LIN Decoding options	--	
	High voltage probe	--	UT-V23, UT-P21
	High-Voltage Differential Probes	--	UT-P30, UT-P31, UT-P32, UT-P33, UT-P35, UT-P36
	Current Probe	--	UT-P40, UT-P41, UT-P42, UT-P43, UT-P44

Note: All mainframes, accessories and options can be ordered from your local UNI-T dealer.

UNI-T oscilloscope probes and accessories supported by UPO1000CS series

Passive probe

Model	Type	
UT-P01		
	High impedance probe	1X: DC to 8 MHz 10X: DC to 25 MHz Oscilloscope compatibility: UNI-T all series
UT-P03		
	High impedance probe	1X: DC to 8 MHz 10X: DC to 60 MHz Oscilloscope compatibility: UNI-T all series
UT-P04		
	High impedance probe	1X: DC to 8 MHz 10X: DC to 100 MHz Oscilloscope compatibility: UNI-T all series
UT-P05		
	High impedance probe	1X: DC to 8 MHz 10X: DC to 200 MHz series Oscilloscope compatibility: UNI-T all
UT-P06		
	High impedance probe	1X: DC to 8 MHz 10X: DC to 300 MHz Oscilloscope compatibility: UNI-T all series
UT-P07A		
	High impedance probe	10X:DC to 500 MHz Input resistance: 10 MΩ Maximum safe operating voltage: <600 Vpk Oscilloscope compatibility: UNI-T all series
UT-P08A		
	High impedance probe	10X:DC to 350 MHz Input resistance: 10 MΩ Maximum safe operating voltage: <600 Vpk Oscilloscope compatibility: UNI-T all series

UT-P20 	High impedance probe	DC to 100 MHz Probe coefficient 100:1 Maximum operating voltage 1500 Vrms Oscilloscope compatibility: UNI-T all series
UT-V23 	High voltage probe	DC to 100 MHz Probe coefficient 100:1 Input resistance 100 MΩ±2% Maximum operating voltage 2000 Vpp Oscilloscope compatibility: UNI-T all series
UT-P21 	High voltage probe	DC to 50 MHz Probe coefficient 1000:1 Maximum operating voltage DC 15 kVrms， AC 10 kV(sine wave) Oscilloscope compatibility: UNI-T all series
UT-P40 	Current probe	DC to 100 kHz Range 50 mV/A, 5 mV/A Current range 0.4 A to 60 A Maximum operating voltage 600 Vrms Oscilloscope compatibility: UNI-T all series
UT-P41 	Current probe	DC to 100 kHz Range 100 mV/A, 10 mV/A Current range 0.4 A to 100 A Maximum operating voltage 600 Vrms Oscilloscope compatibility: UNI-T all series
UT-P42 	Current probe	DC ~ 150 kHz Range 100 mV/A, 10 mV/A Current range 0.4 A to 200 A Maximum operating voltage 600 Vrms Oscilloscope compatibility: UNI-T all series

UT-P43 	Current probe	DC to 25 MHz Range 100 mV/A Maximum measurement current 20 A Rise time 14 ns Oscilloscope compatibility: UNI-T all series
UT-P44 	Current probe	DC to 50 MHz Range 50 mV/A Maximum measurement current 40 A Rise time 7ns Oscilloscope compatibility: UNI-T all series

Active probe

Mode	Type	
UT-P30 	High-Voltage Differential Probes	DC to 100 MHz Attenuation ratio 100:1,10:1 Input differential voltage ±800 Vpp Oscilloscope compatibility: UNI-T all series
UT-P31 	High-Voltage Differential Probes	DC to 100 MHz Attenuation ratio 1000:1,100:1 Input differential voltage ±1.5 kVpp Oscilloscope compatibility: UNI-T all series
UT-P32 	High-Voltage Differential Probes	DC to 50 MHz Attenuation ratio 1000:1,100:1 Input differential voltage ±3 kVpp Oscilloscope compatibility: UNI-T all series
UT-P33 	High-Voltage Differential Probes	DC to 120 MHz Attenuation ratio 100:1,10:1 Input differential voltage ±14 kVpp Oscilloscope compatibility: UNI-T all series
UT-P35 	High-Voltage Differential Probes	DC to 50 MHz Attenuation ratio 500:1,50:1 Rise time 7 ns Accuracy 2% Input differential mode voltage 1/50:130 (DC+peak AC) 1/500:1300 (DC+peak AC) Input common mode voltage

		100 Vrms, CATI 600 Vrms, CATII Oscilloscope compatibility: UNI-T all series
UT-P36 	High-Voltage Differential Probes	DC to 50 MHz Attenuation ratio 2000:1,200:1 Rise time 3.5 ns Accuracy 2% Input differential mode voltage 1/200:560 (DC+peak AC) 1/2000:5600 (DC+peak AC) Input common mode voltage 2800 Vrms, CATI 1400 Vrms, CATII Oscilloscope compatibility: UNI-T all 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.

Limited Warranty and Liability

Uni-T guarantees that the Instrument product is free from any defect in material and workmanship within three years from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination or improper handling. If you need warranty service within the warranty period, please contact your seller directly. Uni-T will not be responsible for any special, indirect, incidental or subsequent damage or loss caused by using this device. For the probes and accessories, the warranty period is one year. Visit instrument.uni-trend.com for full warranty information.

Register your product to confirm your ownership. You will also get product notifications, update alerts, exclusive offers and all the latest information you need to know.

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