Datasheet

MSO/UPO2000 Series Digital Oscilloscope

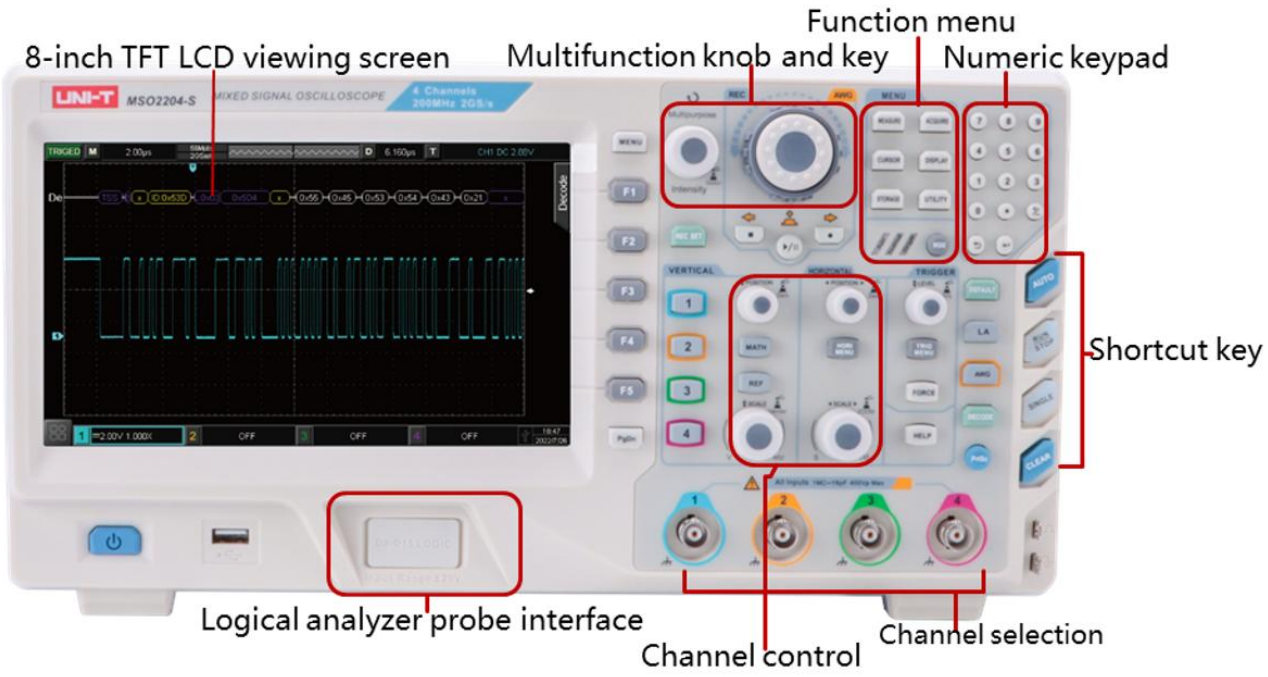
V1.2

August 2024

Main Features

- Analog channel bandwidth: 200 MHz, 100 MHz
- Real-time sampling rate of analog channel: 2 GSa/s, Real-time sampling rate of digital channel 1 GSa/s (only MSO)
- Number of analog channels: 2 or 4
- Memory depth of each channel: 56 Mpts
- 16 digital channels, storage depth 56 Mpts (only MSO)
- Waveform capture rate up to 1,000,000 wfms/s
- Built in 50MHz dual channel function / arbitrary waveform generator (only MSO-S). It supports real-time loading of oscilloscope screen data to AWG arbitrary wave output
- Support Bode Plot loop test and analysis function
- Hardware real-time waveform uninterrupted recording and analysis up to 120,000 frames
- Waveform operation functions (+, -, ×, ÷, digital filtering, logic operation and advanced operation)
- 4M points enhanced FFT, supporting frequency setting, waterfall diagram, detection setting and mark measurement, etc
- Auto measurement of 36 waveform parameters
- Supports parameter measurement while scanning
- Multi-Scopes supports multi-channel independent trigger and fluorescent display
- Multi-channel independent 7-bit hardware frequency counter
- DVM supports multi-channel independent AC / DC true RMS measurement
- Rich trigger functions: edge, pulse, video, slope, runt, over amplitude pulse, delay, timeout, duration, setup/hold, Nth edge and pattern trigger
- Zone trigger function, which can be used to capture accidental signals and observe complex signals
- Protocol trigger and decoding function (optional): RS232, I2C, SPI, CAN, CAN-FD, LIN, FlexRay
- Ultra Phosphor super fluorescent display effect, up to 256 levels of gray display
- 8-inch 800×480 capacitive touch, supporting various gesture operations: click, slide, zoom, edit, drag, etc
- Rich interfaces: USB Host, USB Device, LAN, EXT Trig, AUX Out (Trig Out, Pass/Fail), AWG, VGA
- Supports SCPI programmable instrument standard commands
- Supports web access and control

Panel Structure

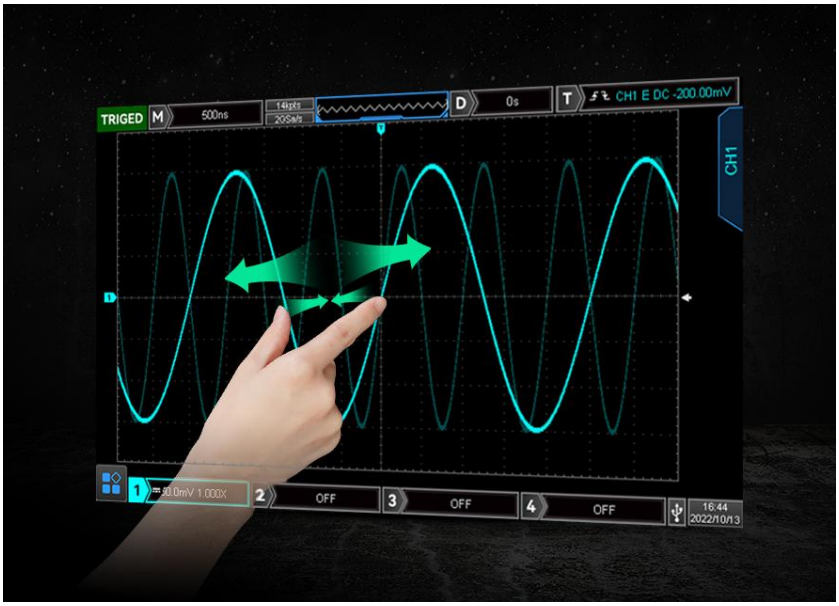


Product Introduction

The MSO/UPO2000 series digital phosphor oscilloscope is a multifunctional and high-performance oscilloscope based on UNI-T's original Ultra Phosphor technology. It realizes the combination of ease of use, excellent technical indicators and many functional features. It can help users complete the measurement work faster. It is an oscilloscope designed for general design / debugging / testing needs in many fields, such as communication, semiconductor, computer, instrumentation, industrial electronics, consumer electronics, automotive electronics, on-site maintenance, R & D / education, etc. Fast Acquire technology can accurately capture abnormal events such as video, jitter, noise and low wave signals.

Brand new interactive experience

The 8-inch touch screen design supports a variety of gesture operations, such as click, slide, zoom, edit, drag, etc. Makes measurement actions smoother and more convenient, allowing users to master the oscilloscope more quickly. At the same time, the traditional button and knob operation is still retained, and the interactive experience is optimized to the greatest extent.

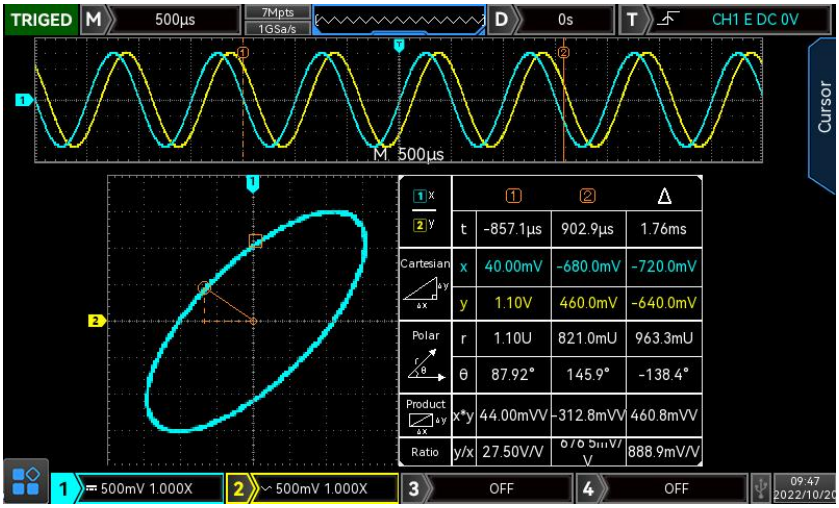


Rich measurement functions

Automatic parameter measurement up to 36 kinds. Provides a variety of automatic measurement parameters while you measure waveforms, greatly improving your measurement efficiency.

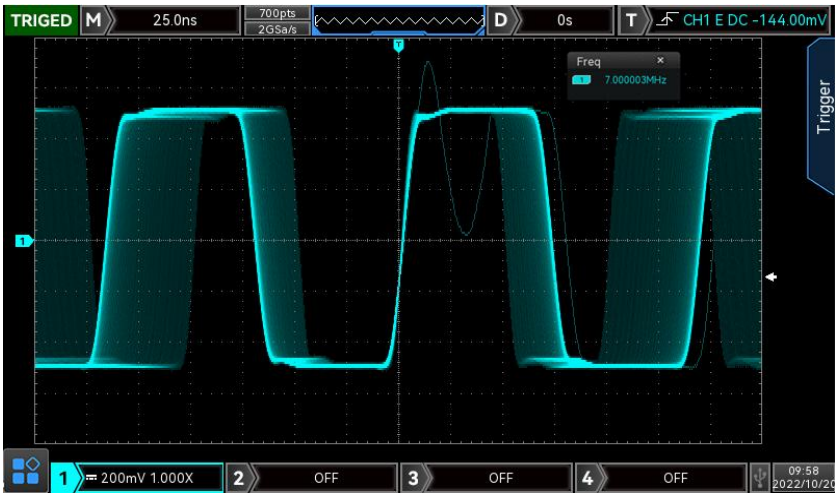
XY mode

XY mode cursor measurement can quickly measure the phase difference between two signals.



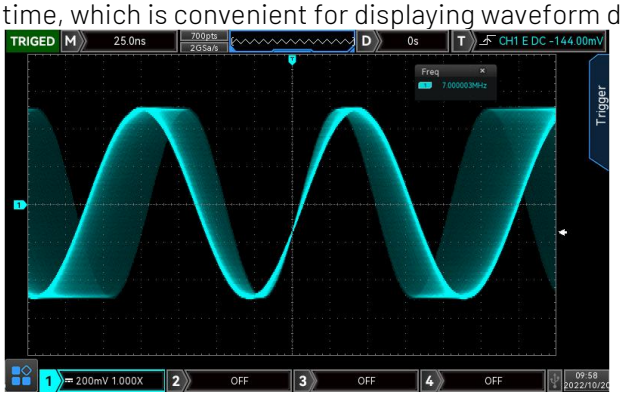
Ultra high capture rate

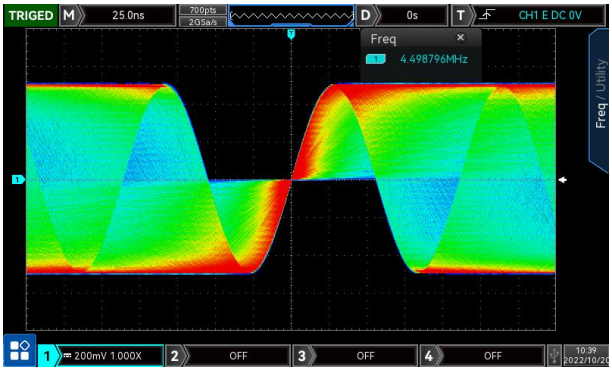
Using innovative digital signal parallel processing technology, it can reach an ultra-high capture rate of 200,000wfms/s in normal sampling and 1,000,000 wfms/s in Fast Acquire mode. Efficient capture of occasional signals.



256-level grayscale display

Using the original Ultra Phosphor display technology, you can observe the accumulated effect for a long time, which is convenient for displaying waveform details and occasional abnormalities.



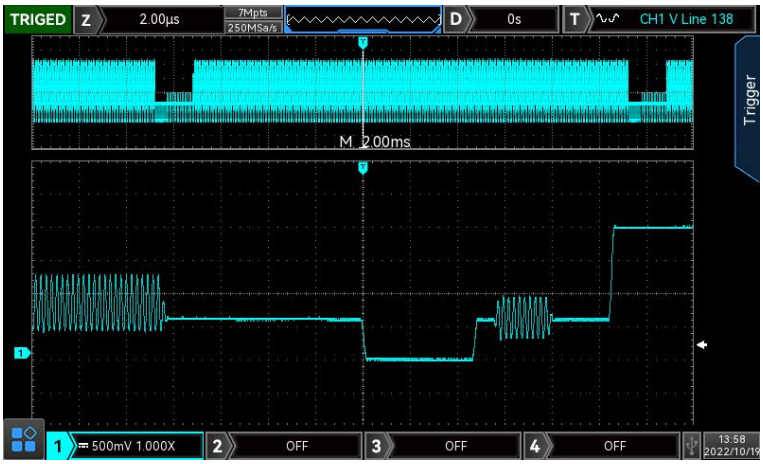


Channel split screen function

Using the original Multi-Scopes technology, the waveform display is more user-friendly, which is convenient for users to experience and analyze waveform details.

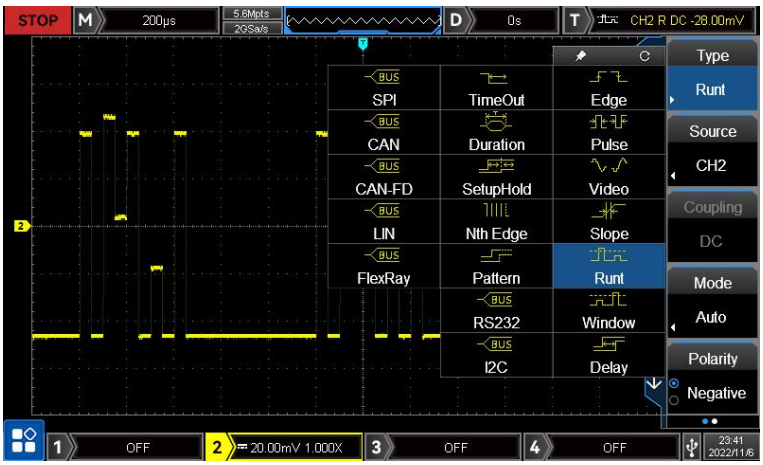
Memory depth 56Mpts per channel

The oscilloscope can maintain a high sampling rate in a wider time base range, while taking into account the overall and details of the waveform, greatly improving the capture rate of abnormal waveforms.



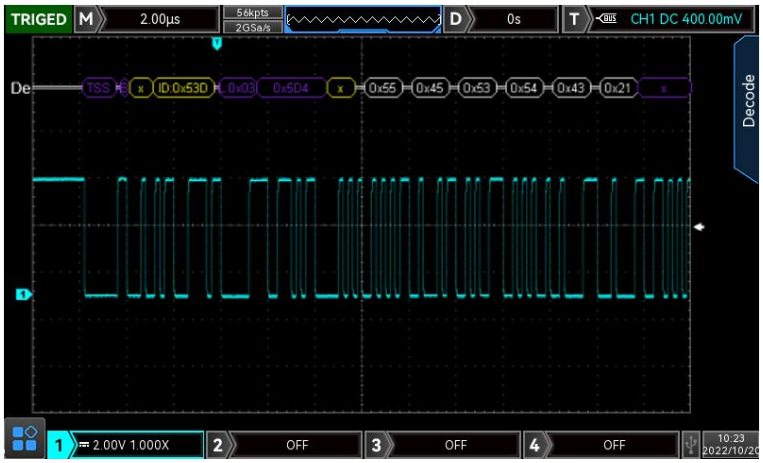
Rich trigger function

With a wealth of advanced trigger and bus trigger functions, it can help users accurately and quickly capture and display the signal of interest.



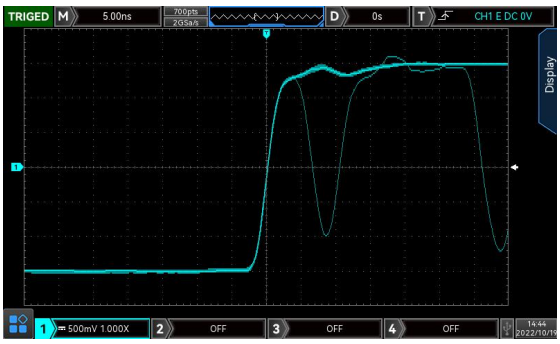
Full memory hardware decoding

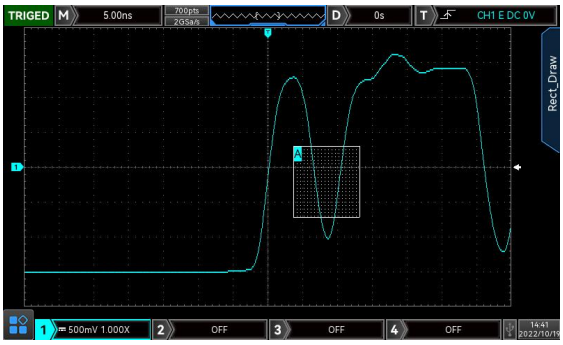
The decoding speed is greatly improved. The full-memory hardware decoding under the deep storage of 56Mpts, the decoding time is increased from more than ten seconds to milliseconds, which realizes real-time decoding and greatly improves the user's problem diagnosis efficiency.
The recorded waveform also supports full-memory hardware real-time decoding.



Zone trigger

The zone trigger can be used in combination with the existing basic trigger, advanced trigger and protocol trigger to complete the capture of various occasional and complex characteristic signals.



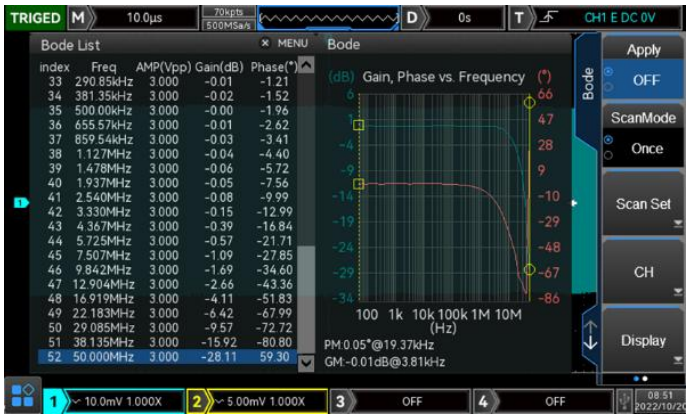


AWG Function Arbitrary Waveform Generator

The built-in dual-channel function arbitrary waveform generator can output sine wave, square wave, ramp wave, pulse wave, arbitrary wave, noise and DC. The maximum frequency output of sine wave is 50MHz.

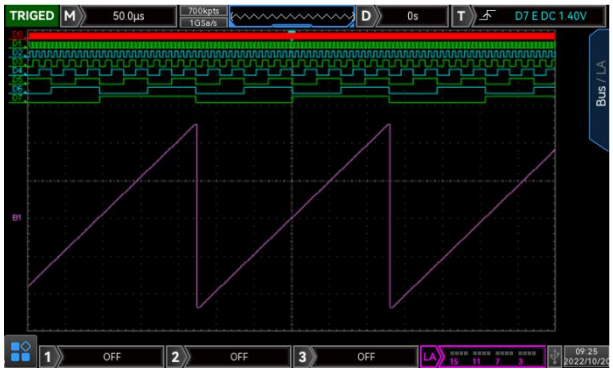
Bode plot

Can be used for loop analysis. It is a critical measurement often used to characterize the frequency response (gain, phase, and frequency) of today's various electronic designs, including passive filters, amplifier circuits, and negative feedback networks for switch-mode power supplies.



LA Logic Analyzer

Can be used for parallel bus, protocol decoding and timing measurements.

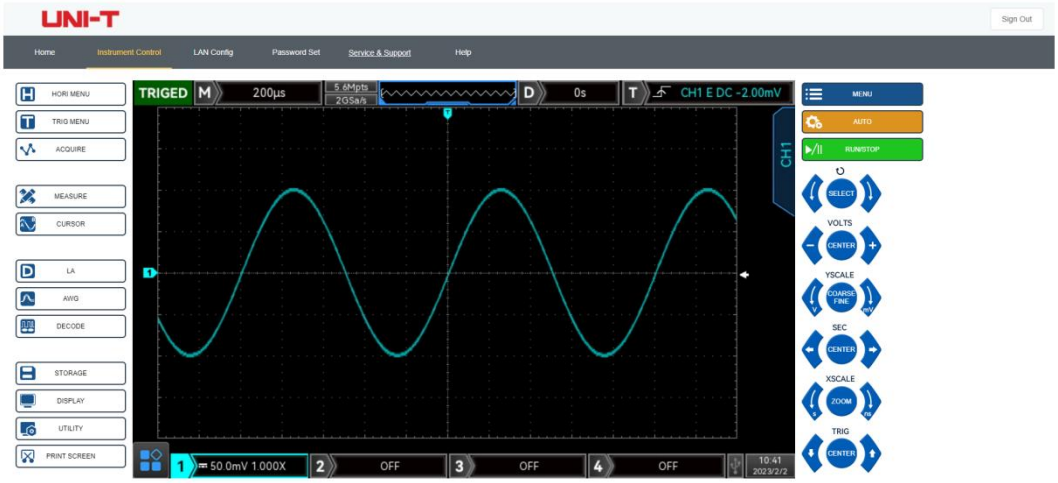


Logic Analysis Probe

Provides two 8-channel splitters and simplifies connection to the device under test. When connecting with square pins, UT-M15 can be directly connected with 8X2 square pin headers with pins of 2.54mm. The UT-M15 offers excellent electrical characteristics with an input impedance of 101kΩ and a capacitive load of only 9.0pF.

Web Control

The oscilloscope can be accessed through the web page, saving the trouble of installing the upper computer software. Support PC and mobile phone dual platform control. Remote operation is more flexible and comfortable.



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 MSO/UPO2000 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.

Model	UPO2102 UPO2104 MSO2102 MSO2104 MSO2102-S MSO2104-S	UPO2202 UPO2204 MSO2202 MSO2204 MSO2202-S MSO2204-S
Analog Bandwidth(-3dB)	100 MHz	200 MHz
Rise time (Typical value)	≤3.5 ns	≤1.8 ns*
Channels	UPO 2XX2:2 analog channel, UPO 2XX4:4 analog channel MSO2xx2:2 analog channel +16 digital channel, MSO2XX4:4 analog channel +16 digital channel	
	16 digital channels (UPO2000-16LA is optional for UPO series)	
	2-channel arbitrary wave generator output (only MSO-S)	
Sampling mode	real-time sampling	
Acquisition Mode	Normal, peak detection, envelope, high resolution, averaging	
Real-time sampling rate	Analog channel: 2 GSa/s (half channel interleaved), 1 GSa/s (all channel) Digital channel (MSO model only) : 1 GSa/s;	

Average	After all channels are sampled for N times at the same time, the N times can be selected from 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, and 8192
Memory Depth	Analog channel: Automatic, 7 kpts, 70 kpts, 700 kpts, 7 Mpts, 28 Mpts, 56 Mpts are optional
	Digital channel (MSO model only) : Automatic, 7 kpts, 70 kpts, 700 kpts, 7 Mpts, 14 Mpts, 28 Mpts, 56 Mpts are optional
Waveform capture rate	200,000 wfms/s
	1,000,000 wfms/s (Fast Acquire)
Hardware real-time waveform recording and playback	120,000 frames
Screen	8- inch 800x480 HD capacitive touch display

* The typical rise time of 200MHz oscilloscope is 2.0ns for 1mV/div and 2mV/div.

Vertical system (analog channel)	
Coupling	DC, AC, GND
Impedance	(1 MΩ± 2%) ‖ (16 pF± 3 pF) 50 Ω± 1.5%
Probe attenuation	Voltage probe: 0.001X, 0.01X, 0.1X, 1X, 10X, 100X, 1000X, Custom
	Current probe: 5 mV/A, 10 mV/A, 100 mV/A, 200 mV/A, Custom
Maximum input voltage	400V Max (DC+Vpeak)
Vertical resolution	8-bit
Vertical scale	500μV/div to 20 V/div (1 MΩ
Offset range	500μV/div to 50 mV/div: ±2 V (1 MΩ) 100 mV/div to 500 mV/div: ±20V (1 MΩ) 1 V/div to 5 V/div: ±200 V (1 MΩ) 10 V/div to 20 V/div: ±400 V (1 MΩ) With DC offset, shows vertical shift reading V
Band limit (typical)	20 MHz
Low frequency response	(AC coupling, -3 dB); ≤5 Hz (on BNC)
DC Gain Accuracy	<5 mV: ±3%, ≥5 mV: ±2%
DC Offset Accuracy	≤± (2%+0.1 div+2 mV)
Unit	W, A, V, and U. The default value is V
Channel-to-channel isolation(typical)	Dc to maximum bandwidth: >40 dB
(Digital channel, MSO only)	
Threshold	Adjustable threshold for 8 channels 1 group
Threshold selection	TTL (1.4 V) 5.0 V CMOS (+2.5 V) , 3.3 V CMOS (+1.65 V) 2.5 V CMOS (+1.25 V) , 1.8 V CMOS (+0.9 V) ECL (-1.3 V) PECL (+3.7 V)

	LVDS (+1.2 V) 0 V Custom
Threshold range	±20.0 V, 20 mV step
Threshold accuracy	±(100 mV + 3% threshold setting)
Dynamic range	±10 V + threshold
Maximum input voltage	CAT I 40 Vrms
Input impedance	(101 kΩ±1%)‖(9 pF ± 1 pF)
Minimum voltage swing	500 mVpp
Minimum detectable pulse width(typical)	2 ns
Vertical resolution	1 bit
Channel-to-channel deskew range	±100 ns
Horizontal system (analog channel)	
Time base Scale	100 MHz: 2 ns/div to 1000 s/div 200 MHz: 1 ns/div to 1000 s/div (Display current sampling rate and storage depth)
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 10 s
Display format	Y-T, default
	X-Y, CH1-CH2,CH1-CH3,CH1-CH4,CH2-CH3,CH2-CH4,CH3-CH4
	Roll, Time base ≥50 ms/div. Roll mode can be automatically entered or exited by adjusting the horizontal time base knob
Multi-Scopes	Number: 2/4 Support each channel independent display, and independently adjustable time base
Trigger	
Trigger level range	Internal: ±5 div from the center of the screen EXT: ± 1.8 V EXT/5: ± 9 V
Trigger modes	Auto, Normal, Single
Trigger holdoff range	80 ns -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
Source	CH1 to CH4/AC Line /EXT/D0 to D15
Runt	
Pulse width conditions	>, <, ≤≥, none
Polarity	Positive, Negative
Time Range	8 ns to 10 s
Source	CH1 to CH4
Window	
Type	Rise, Fall, Any
Trigger position	Enter, Exit, Time
Time	8 ns to 10 s
Source	CH1 to CH4
Nth Edge	
Slope	Rising, Falling
Free time	8 ns to 10 s
Edge number	1 to 65535
Source	CH1 to CH4 or D0 to D15
Delay	
Slope	Rising, Falling
Delayed type	>, <, ≤≥, ><
Delayed time	8 ns to 10 s
Source	CH1 to CH4 or D0 to D15
Time out	
Slope	Rising, Falling, Either
Time out	8 ns to 10 s
Source	CH1 to CH4 or D0 to D15
Duration	
Type set	H, L, X
Trigger condition	>, <, ≤≥
Duration	8 ns to 10 s
Source	CH1 to CH4 or D0 to D15
Setup Hold	
Edge type	Rising, Falling
Data type	H, L

Setup time	4 ns to 10 s
Hold time	4 ns to 10 s
Source	CH1 to CH4 or D0 to D15
Pulse	
Pulse conditions	+wid (>, <, ≤≥) -wid (>, <, ≤≥)
Pulse width	1 ns to 4 s
Source	CH1 to CH4, AC Line, EXT or D0 to D15

Slope	
Conditions of the slope	Positive slope (greater than, less than, within the specified interval) Negative slope (greater than, less than, within a specified interval)
Time set	8 ns to 1 s
Source	CH1 to CH4
Video	
Signal Standard	Support standard NTSC, PAL, and SECAM broadcast systems with lines ranging from 1 to 525(NTSC) and 1 to 625 (PAL/SECAM)
Source	CH1 to CH4
Pattern	
Pattern Setting	H, L, X, Rising edge, falling edge
Source	CH1 to CH4/D0 to D15
RS232 / UART	
trigger condition	Frame start, error frame, check error, data
Baud rate	2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps, Custom
Data bits wide	5 bits, 6 bits, 7 bits, 8 bits
Source	CH1 to CH4 or D0 to D15
I2C	
Condition	Start, Restart, Stop, loss confirmation, address, data, address data
Address bits wide	7 bits, 10 bits
Address range	0 to 119, 0 to 1023
bytes	1 to 5
Data qualifier	=, >, <
Source	CH1 to CH4 or D0 to D15
SPI	
Condition	Film selection, free time
timeout	100 ns to 1 s

Data bits	4 bits to 32 bits
The data set	H, L, X
The edge of the clock	Rise, Fall
Source	CH1 to CH4 or D0 to D15
CAN	
Signal types	CAN_H, CAN_L
Condition	Frame beginning, DATA frame, REMOTE frame, ERROR frame, OVERLOAD frame, Identifier, Data, ID and Data, Frame end, loss acknowledgement, for padding error
Signal rate	10 kbps, 20 kbps, 31.25 kbps, 33.3 kbps, 37 kbps, 50 kbps, 62.5 kbps, 68.266 kbps, 83.3 kbps, 92.238 kbps, 100 kbps, 125 kbps, 153 kbps, 250 kbps, 400 kbps, 500 kbps, 800 kbps, 1 Mbps, Custom
Source	CH1 to CH4 or D0 to D15
CAN - FD	
Signal types	CAN_H, CAN_L
Condition	Frame beginning, DATA frame, REMOTE frame, ERROR frame, OVERLOAD frame, Identifier, Data, ID and Data, Frame end, loss acknowledgement, for padding error
Baud Rate	10 kbps, 20 kbps, 31.25 kbps , 33.3 kbps, 37 kbps, 50 kbps, 62.5 kbps, 68.266 kbps, 83.3 kbps, 92.238 kbps, 100 kbps, 125 kbps, 153 kbps, 250 kbps, 400 kbps, 500 kbps, 800 kbps, 1 Mbps, Custom
FD bit 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 or D0 to D15
LIN	
Condition	Synchronization, identifiers, Data, ID and data, wake frame, sleep frame, Error
speed signal	V1, V2, Both
Baud Rate	2.4 kbps, 4.8 kbps, 9.6 kbps, 19.2 kbps, Custom
Data Length	1 to 8
Source	CH1 to CH4 or D0 to D15
FlexRay	
trigger condition	Frame beginning, indicator, identifier, loop number, Header field, Data, ID and data, frame end, Error
polarity	BM, BDiff or BP
Bit rate	2.5 Mbps, 5 Mbps, 10 Mbps
Source	CH1 to CH4 or D0 to D15
Decode	
Decoding the number	One serial, two parallel
Decoding type	RS232/UART, I^2C, SPI, CAN, CAN-FD, LIN, FlexRay
parallel	Up to 18-bit parallel bus decoding, support analog channel and digital channel combination. Supports custom clock Settings.

Source	CH1 to CH4 or D0 to D15
Measurement	
cursor	Voltage difference between cursors (△V) Time difference between cursors (△T) Inverse of △T (Hz)(1/△T)
	The voltage value and time value of the waveform point
	Allows the cursor to be displayed during automatic measurements
Automatic measurements	Analog channel: 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; Digital channel: Freq, period, +Width,-Width, +Duty,-Duty, RiseDelay A→B, FallDelay A→B, phase A→B, phase B→A
Number of measurements	5 measurements are displayed simultaneously
Measuring range	Screen or cursor
XY measurement	Support time, Cartesian coordinates, polar coordinates, product and proportion display
Measurement statistics	Mean, maximum, minimum, standard deviation and number of measurements
Frequency meter	7-bit hardware frequency meter
Math	
Waveform math	A+B, A-B, A×B, A/B, FFT, Can edit advanced operation, logic operation
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, independent, waterfall -1and waterfall -2
	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
Operation	0,1,2,3,4,5,6,7,8,9, (, +, -, *, /, ^, >, <, &&, ‖, ==, !=,)
Function	Sin, Cos, Sinc, Tan, Sqrt, Exp, Lg, In, Floor, ABS, Acos, Asin, Atan, Sinh, Tanh, Ceil, Cosh, Fabs,intg,diff
Storage	
Setting	Internal (256 groups), external USB memory
Waveform	Internal (256 groups), external USB memory

Bitmap	External USB memory, and can store related parameter information.
Signal source (MSOXXXX-S model only)	
Channel	2
Sampling Rate	250 MSa/s
Vertical Resolution	16 bits
Max. Output Frequency	50 MHz
Waveforms	Sine wave, square wave, ramp wave, pulse wave, noise, DC, arbitrary wave
Built-in waveform	Sinc, ExpRise, ExpFall, Cardiac, Gauss, Lorentz, and HaverSine
Sine	Frequency: 1 μHz to 50 MHz
	Amplitude flatness: ±0.5 dB (Relative to 1 kHz)
	Harmonic distortion (typical): -40 dBc
	Non-harmonic suprious (typ)): -40 dBc
	Total harmonic distortion (typical): 1% (DC to 20 kHz, 1 Vpp)
	SNR: 40 dB
Square/pulse	Frequency range: Square wave: 1 μHz to 15 MHz; Pulse: 1 μHz to 15 MHz
	Rise and fall time: <13 ns (Typical values 1 kHz, 1 Vpp, 50 Ω)
	Overshoot: Typical values 2% (1 kHz, 1 Vpp, 50 Ω)
	Duty ratio: Square wave: 1% to 99%, adjustable; Pulse: 1% to 99%, adjustable
	Duty cycle resolution: 1% or 10 ns (whichever is larger)
	Minimum pulse width: 20 ns
	Pulse width resolution: 10 ns
	Jitter: 2ns
Ramp wave	Frequency range: 1 μHz to 400 kHz
	Llinearity: 1%
	Symmetry: 0.1% to 99.9%
noise	Bandwidth: 50 MHz (typical)
Built-in wave	Frequency range: 1 μHz to 5 MHz
Arbitrary wave	Frequency range: 1 μHz to 5 MHz
	wave length: 8 to 512K points (Play mode)
	Internal storage location: 10
Frequency	Accuracy: 100 ppm (less than 10 kHz); 50 ppm (greater than 10 kHz)
	Resolution : 1 μHz
Amplitude	Output range: 20 mVpp to 6 Vpp (high resistance);10 mVpp to 3 Vpp (50 Ω)

	Resolution: 1 mV
	Accuracy (Typical value: 1 kHz, sine wave, 0V, deviation): ± (5%+2 mVpp)
DC offset	Range: ± 3 V (high resistance); ±1.5 V (50 Ω)
	Resolution: 1 mV
	Accuracy: ± (offset set value 5%+2 mV)
AM modulation	
Carrier	Sine, Square, Ramp, Arbitrary wave
Source	internal
Modulation wave	Sine, Square, Rising ramp, Falling ramp, Noise, Arbitrary wave
Modulation frequency	2 mHz to 50 kHz
Modulation depth	0% to 120%
FM modulation	
carrier	Sine, Square, Ramp, Arbitrary wave
Source	internal
modulation wave	Sine, Square, Rising ramp, Falling ramp, Noise, Arbitrary wave
Modulation frequency	2 mHz to 50 kHz
Deviation	12.5 MHz(max)
Display	
Display type	8-inch TFT LCD
Resolution of display	800 horizontal ×RGB×480 vertical pixels
display color	24 - bit true colors
persistence	Minimum value, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 5 s, 10 s, 20 s, infinite
Menu Hold	Hold time: 5 s, 10 s, 20 s, infinite
Display type	Point, vector
Real time clock	Time and date (user adjustable)
Bode	
Start frequency	50 Hz to 50 MHz
Stop frequency	60 Hz to 50 MHz
Count	1 to 1000
Amplitude	High resistance: 20 mVpp to 6 Vpp 50 Ω: 10 mVpp to 3 Vpp
interface	
Standard or optional	USB-host, USB-Device, LAN, EXT Trig, AUX Out(Trig Out\Pass/Fail) output, signal source output interface (only MSO-S model), VGA
General technical specifications	

Probe compensator output			
output voltage	About 3 Vpp		
frequency	10 Hz,100 Hz,1 kHz (default),10 kHz		
Power Source			
Power source voltage	100V to 240 VAC (Fluctuations±10%), 50 Hz/60 Hz		
	100V to 120 VAC (Fluctuations±10%), 400 Hz		
Power consumption	100 VA		
Fuse	2.5 A, F-class, 250 V		
Environmental			
Temperature	Operation: 0℃ to +40℃		
	Not operation: -20℃ to +70℃		
Cooling	Forced cooling by fan		
Humidity range	Operation: +35℃ ≤ 90% relative humidity; No operation: +35 ° C to +40 ° C ≤ 60% relative humidity		
Altitude	Operation: below 3000 meters; Non-operational: up to 15,000 meters		
Pollution degree	2		
Operating environment	Indoor		
Mechanical specifications			
Dimension (W × H × D)	370 mm×185 mm×115 mm		
Weight	4.5 kg		
Calibration interval			
Calibration interval	1 year		
Standard			
Electromagnetic compatibility	Comply with EMC Directive (2014/30/EU), comply with or better than IEC 61326-1:2021/EN61326-1:2021, IEC 61326-2-1:2021/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	IEC 61000-4-6/EN 61000-4-6	3V,0.15-80MHz

	conducted Immunity		
	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	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 UL 61010-1:2012 Ed.3+ R:19 Jul2019 UL 61010-2-030:2018 Ed.2 CSA C22.2#61010-1:2012 Ed.3+U1; U2; A1 CSA C22.2#61010-2-030:2018 Ed.2		

*The MSO/UPO2000 series have been certified by CE, UKCA, cETLus.

Order information

	Description	Standard Quantity per Carton	Order No.
Model	MSO2204-S (200 MHz,2 GSa/s,4CH+16 digital, AWG)	1	MSO2204-S
	MSO2104-S (100 MHz,2 GSa/s,4CH+16 digital, AWG)	1	MSO2104-S
	MSO2202-S (200 MHz,2 GSa/s,2CH+16 digital, AWG)	1	MSO2202-S
	MSO2102-S (200 MHz,2 GSa/s,2CH+16 digital, AWG)	1	MSO2102-S
	MSO2204 (200 MHz,2 GSa/s,4CH+16 digital)	1	MSO2204
	MSO2104 (100 MHz,2 GSa/s,4CH+16 digital)	1	MSO2104
	MSO2202 (200 MHz,2 GSa/s,2CH+16 digital)	1	MSO2202
	MSO2102 (100 MHz,2 GSa/s,2CH+16 digital)	1	MSO2102
	UPO2204 (200 MHz,2 GSa/s,4CH)	1	UPO2204
	UPO2104 (100 MHz,2 GSa/s,4CH)	1	UPO2104
	UPO2202 (200 MHz,2 GSa/s,2CH)	1	UPO2202
	UPO2102 (100 MHz,2 GSa/s,2CH)	1	UPO2102
Standard accessories	Power cord that conforms to the standard of the destination country	1	--
	USB data cable	1	UT-D14

	BNC-BNC straight-through cable (only MSO-S)	1	UT-L45
	BNC-red and black alligator clip cable (only MSO-S)	1	UT-L02A
	Passive probe (200 MHz/100 MHz)	2/4	UT-P05/UT-P04
	Logic analyzer probe (only MSO)	1	UT-M15
Optional accessories	Serial bus trigger and decode options (MSO/UPO2000-EMBD& MSO/UPO2000-AUTO)	--	MSO/UPO2000-BND
	Serial bus trigger and decode options (includes RS232, UART, I2C, SPI)	--	MSO/UPO2000-EMBD
	RS232/UART trigger and decode options	--	MSO/UPO2000 -COM
	I2C trigger and decode options	--	MSO/UPO2000 -I2C
	SPI trigger and decode options	--	MSO/UPO2000 -SPI
	Automotive serial bus triggering and decoding options (CAN, CAN-FD, LIN, FlexRay)	--	MSO/UPO2000-AUTO
	CAN trigger/decode option	--	MSO/UPO2000-CAN
	CAN-FD trigger/decode option	--	MSO/UPO2000-CAN-FD
	LIN trigger/decode option	--	MSO/UPO2000-LIN
	FlexRay trigger/decode option	--	MSO/UPO2000-FlexRay
	Bode plot loop test analysis (software)	--	MSO-BODE
	Isolation transformer		UT-ISOT
	16 digital channels option (software)	--	UPO2000-16LA
	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
	16-way logic analyzer probe	--	UT-M15

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

UNI-T oscilloscope probes and accessories supported by MSO/UPO2000 series

Passive probe

Model	Type	Description
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 8MHz 10X:DC to 60MHz 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 Oscilloscope compatibility: UNI-T all series
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	10X:DC to 350 MHz

	probe	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 200 0Vpp 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 50mV/A, 5mV/A Current range 0.4A to 60A Maximum operating voltage 600Vrms 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 to 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 50mV/A Maximum measurement current 40A Rise time 7ns Oscilloscope compatibility: UNI-T all series

Active probe

Model	Type	Description
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	DC to 50 MHz

	Differential Probes	Attenuation ratio 500:1,50:1 Rise 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: UNI-T all series
UT-P36 	High-Voltage Differential Probes	DC to 50MHz Attenuation ratio 2000:1,200:1 Rise 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: 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.

Learn more at: www.uni-trend.com

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.

UNI-T

Headquarter
Uni-Trend Technology (China) Co., Ltd.
Addresses: No.6, Industrial North 1st Road, Songshan Lake Park, Dongguan City, Guangdong Province, China
Tel: (86-769) 8572 3888

Europe
UNI-TREND TECHNOLOGY EU GmbH
Addresses: Affinger Str. 12
86167 Augsburg Germany
Tel: +49 (0)821 8879980

North America
Uni-Trend Technology US INC.
Addresses: 3171 Mercer Ave STE 104, Bellingham, WA 98225
Tel: +1-888-668-8648