UNI-T®

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# Datasheet

## MSO/UPO3000E Series Digital Oscilloscope

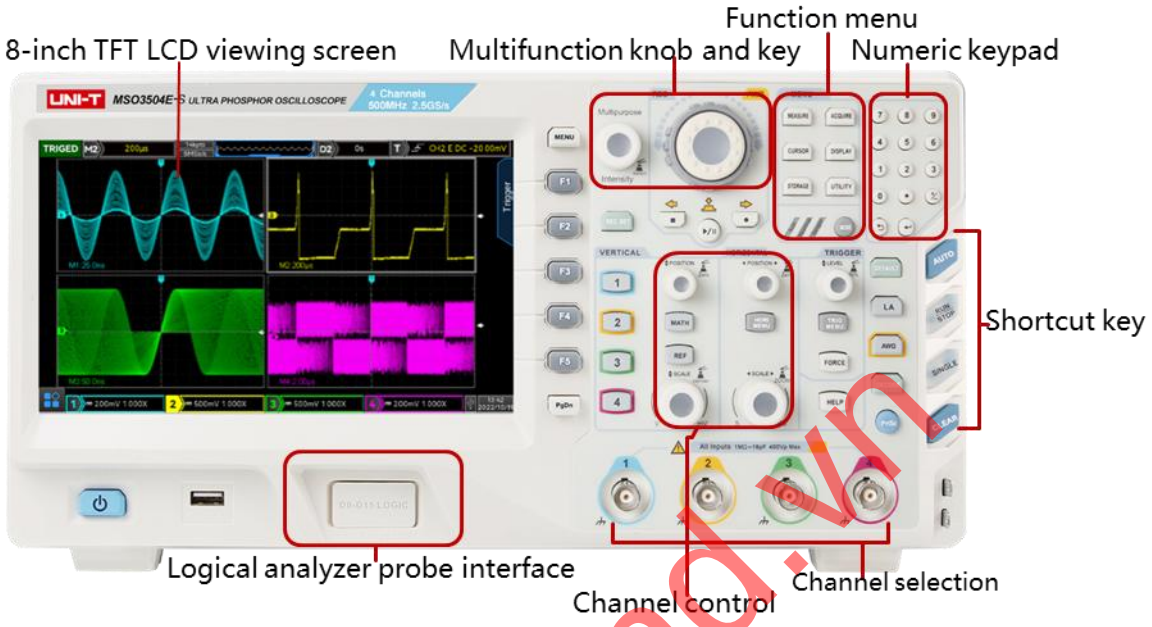
V1.2

August 2024

# Main Features

- Analog channel bandwidth: 350 MHz, 500 MHz
- Real-time sampling rate of analog channel 2.5 GSa/s, Real-time sampling rate of digital channel 1.25 GSa/s (only MSO)
- Input impedance: 1 MΩ,50 Ω
- Storage depth of each channel: 70 Mpts, Maximum storage depth of 250 Mpts in single or scan mode
- 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.
- Supports 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)
- 1M 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 2.0 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 2.0 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 U disk data storage, U disk software upgrade, one-key copy screen and other functions
- Supports plug and play USB device, can communicate with computer through USB device
- Supports SCPI programmable instrument standard commands
- Supports web access and control

# Panel Structure

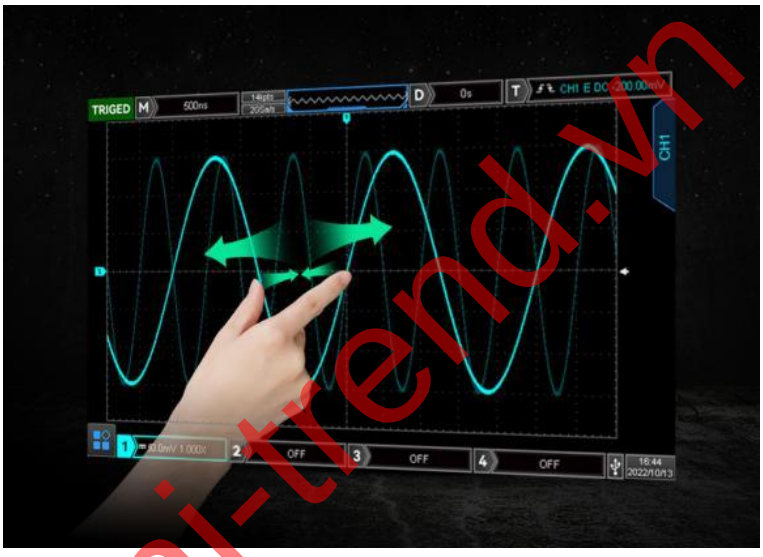



# Product Introduction

The MSO/UPO3000E series digital phosphor oscilloscope is a multifunctional and high-performance oscilloscope based on UNI-T's original Ultra Phosphor 2.0technology. 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 it 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.



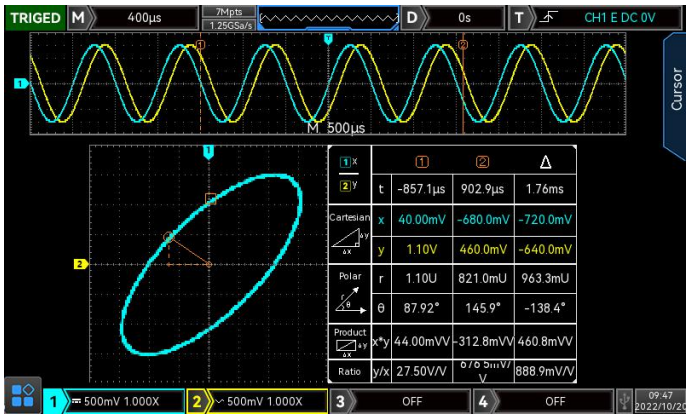



# Rich measurement functions

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

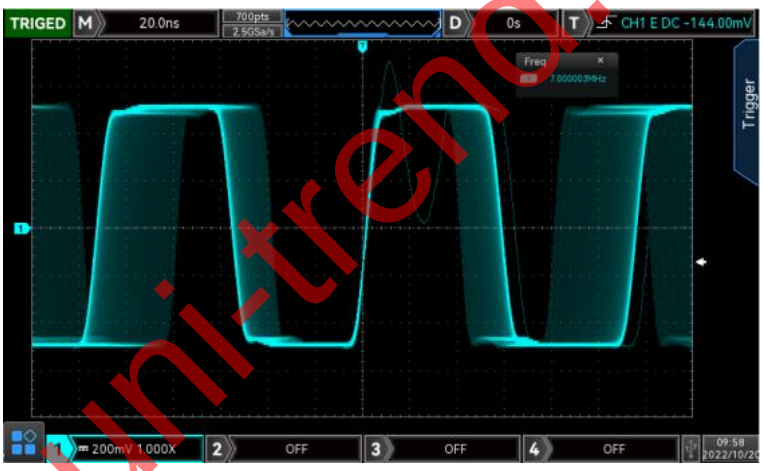
# XY mode

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



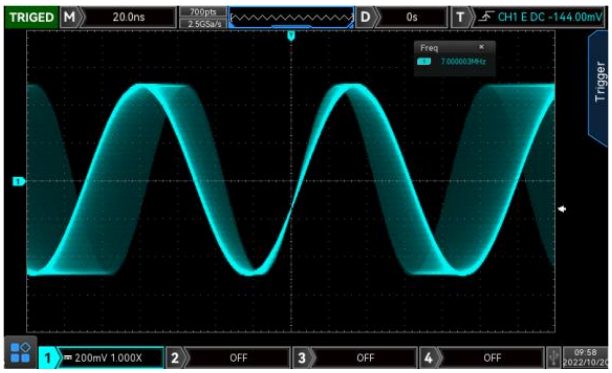

# Ultra high capture rate

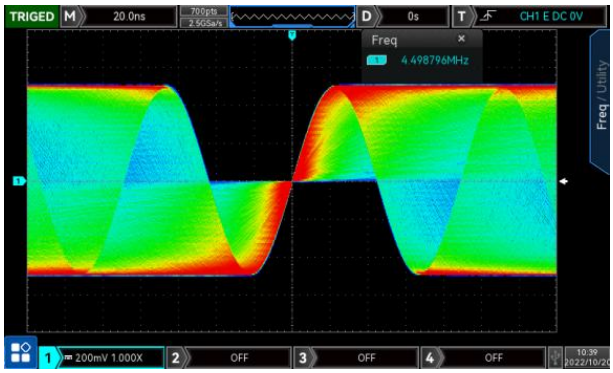
Using innovative digital signal parallel processing technology, it can reach an ultra-high capture rate of 200,000 wfms/s in normal sampling and 1,000,000 wfms/s in Fast Acquire mode. Efficient capture of occasional signals.




# 256-level grayscale display

Using Ultra Phosphor 2.0 display technology, the waveform display is more layered, achieving the fluorescent effect of an analog oscilloscope. It can better show the probability of signal occurrence.



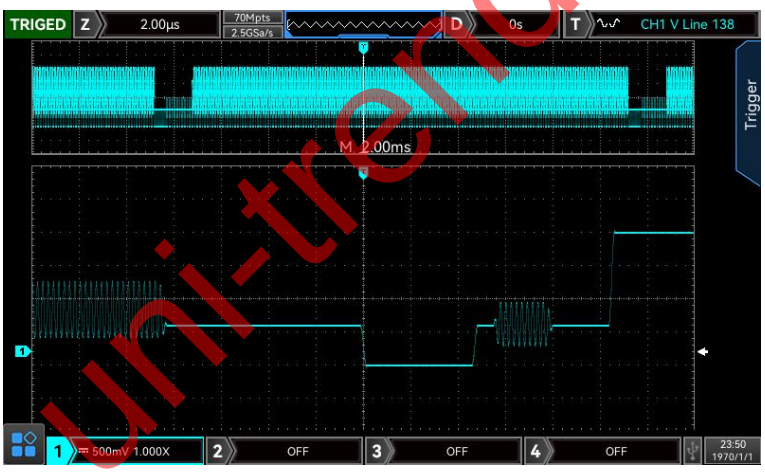



# Channel split screen function Multi-Scopes 2.0

It supports multi-channel split-screen display with 256-level grayscale display, and the horizontal time base and trigger system are independently controlled.

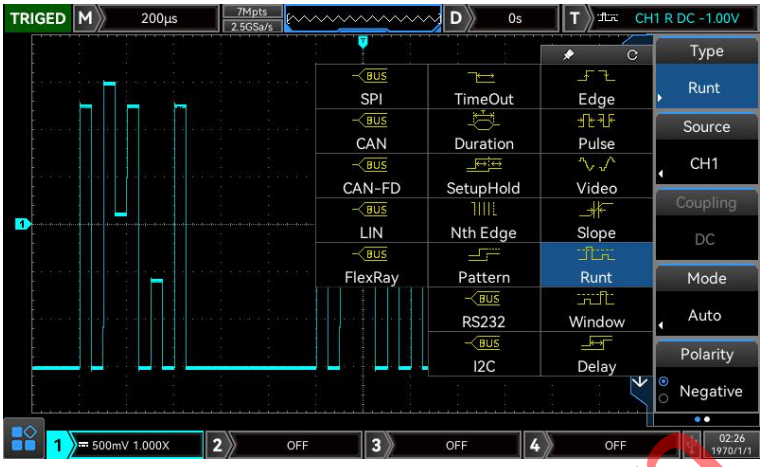

# Memory depth 70Mpts per channel

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.



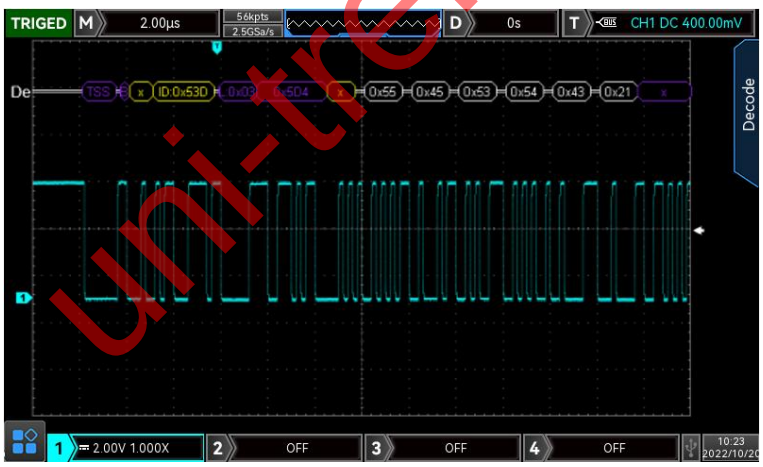
# Rich trigger function

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



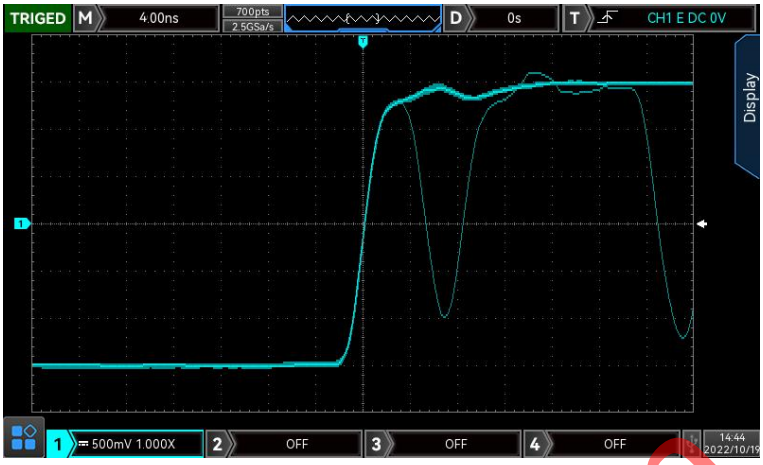

# Full memory hardware decoding

The decoding speed is greatly improved. The full-memory hardware decoding under the deep storage of 70Mpts, 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

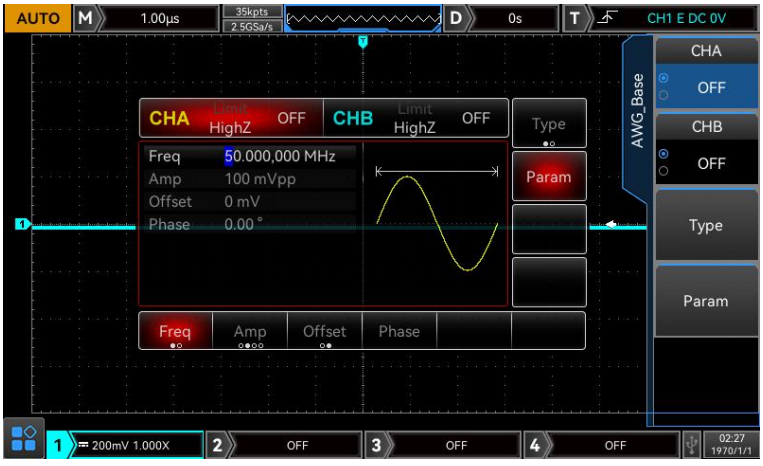
The zone trigger can be used in combination with the existing basic trigger, advanced trigger and protocol trigger to complete the capture of various occasional and complex characteristic signals.




Turn on zone triggers where anomalous signals occur:

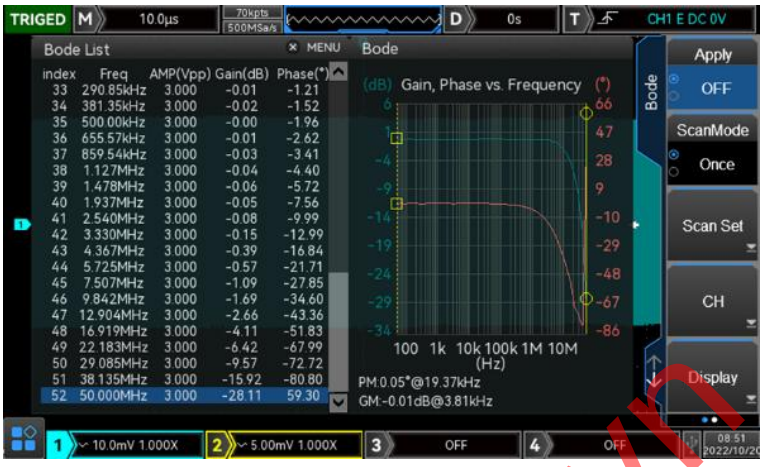

# AWG Function Arbitrary Waveform Generator

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 50 MHz.



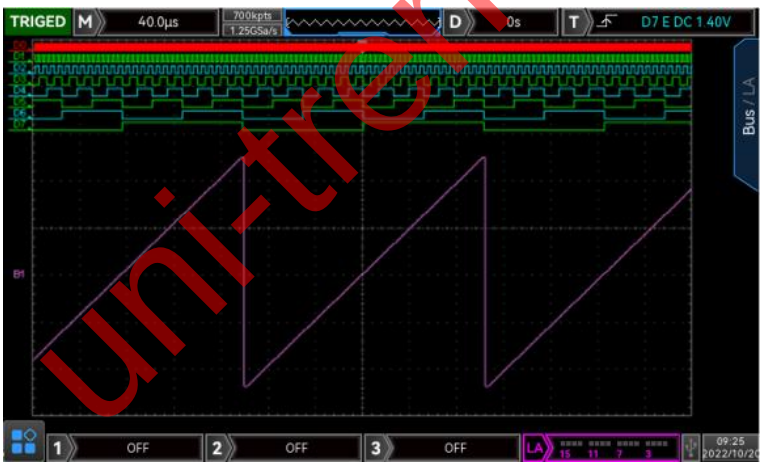
# Bode plot

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 2.54 mm. The UT-M15 offers excellent electrical characteristics with an input impedance of 101kΩ and a capacitive load of only 9.0 pF.

# Web Control

Embedded with Web Server, you can remotely control the instrument, observe waveforms, and obtain measurement results through a browser, which can meet the application requirements of special environments such as high pressure and high temperature. Cross-platform control can be realized without installing driver software and host computer software. MSO/UPO3000E series supports PC and mobile phone two styles of web page layout and touch operation, making it easier and more convenient to use.

# 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/UPO3000E 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 | UPO3354E<br>UPO3352E<br>MSO3354E<br>MSO3352E<br>MSO3354E-S | UPO3504E<br>UPO3502E<br>MSO3504E<br>MSO3502E<br>MSO3504E-S |
|---|---|---|
| Analog Bandwidth(-3dB) | 350 MHz | 500 MHz |
| Rise time (Typical value) | ≤1 ns | ≤750 ps |
| Channels | UPO3XX2E:2 analog channel;<br>UPO3XX4E:4 analog channel;<br>MSO3xx2E:2 analog channel +16 digital channel;<br>MSO3XX4E:4 analog channel +16 digital channel;<br>MSO3XX4E-S:4 analog channel +16 digital channel+ arbitrary wave generator; | |
| | 16 digital channels (To purchase LA connecting cable, only MSO model) | |
| | 2-channel arbitrary wave generator output (only MSO-S) | |
| Sampling mode | Real-time sampling | |
| Acquisition Mode | Sampling, peak detection, envelope, high resolution, averaging | |
| Real-time sampling rate | Analog channel: 2.5 GSa/s (half channel interleaved), 1.25 GSa/s(all channel)<br>Digital channel (MSO model only): 1.25 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 | Automatic (Limit to 7 Mpts), 700 pts, 7 kpts, 70 kpts, 700 kpts, 7 Mpts, 14 Mpts, 28 Mpts, 70 Mpts, 250 Mpts | |
| 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 capacitive touch display | |
| **Vertical system (analog channel)** | | |
| Coupling | DC, AC, GND | |
| Impedance | (1 MΩ± 2%) ‖ (18 pF± 3 pF)<br>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 | |

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|---|---|
| Maximum input voltage | 1 MΩ: 400V Max (DC+Vpeak)<br>50 Ω: 5 Vrms Max |
| Vertical resolution | 8-bit |
| Vertical scale | 1 mV/div to 10 V/div (1 MΩ)<br>1 mV/div to 1 V/div (50Ω) |
| Offset range | 1 mV/div to 100 mV/div: ±2 V (50 Ω or 1 MΩ)<br>200 mV/div to 1 V/div: ±5 V (50 Ω)<br>100 mV/div to 1 V/div: ±25 V (1 MΩ)<br>2 V/div to 10 V/div: ±250 V (1 MΩ) |
| Band limit (typical)t | 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)<br>5.0 V CMOS (+2.5 V), 3.3 V CMOS (+1.65 V)<br>2.5 V CMOS (+1.25 V), 1.8 V CMOS (+0.9 V)<br>ECL (-1.3 V)<br>PECL (+3.7 V)<br>LVDS (+1.2 V)<br>0 V<br>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 |
| Inter-channel delay | ±100 ns |
| **Horizontal system (analog channel)** | |
| Time base Scale | 1 ns/div to 1000 s/div<br>(Display current sampling rate and storage depth) |
| Time base Accuracy | ±1 ppm Initial accuracy; ±1 ppm Aging rate of the first yea; ±3.5 ppm 10 year aging rate |

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|---|---|
| Timebase delay time range | Pre-trigger (negative delay) : ≥1 screen width<br>Post-trigger (positive delay) : 1 s to 50 s |
| Display Format | Y-T, default |
| | X-Y, CH1-CH2,CH1-CH3,CH1-CH4,CH2-CH3,CH2-CH4,CH3-CH4 |
| | Roll, Time base ≥40 ms/div. Roll mode can be automatically entered or exited by adjusting the horizontal time base knob |
| Multi-Scopes | Number: 2/4<br>Support each channel independent display, and independently adjustable time base |
| **Trigger** | |
| Trigger level | Internal: ±5 div from the center of the screen<br>EXT: ± 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 | Rise, Fall, Any |
| Source | CH1 to CH4/AC Line /EXT/D0 to D15 |
| **Runt** | |
| Pulse width conditions | >, <, ≤≥, none |
| Polarity | Positive, Negative |
| Time Range | 6.4 ns to 10 s |
| Source | CH1 to CH4 |
| **Window** | |
| Type | Rise, Fall, Any |
| Trigger position | Enter, Exit, Time |
| Time | 6.4 ns to 10 s |
| Source | CH1 to CH4 |
| **Nth Edge** | |
| Slope | Rise, Fall |
| Free time | 6.4 ns to 10 s |
| Edge number | 1 to 65535 |

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|---|---|
| Source | CH1 to CH4 or D0 to D15 |
| **Delay** | |
| Slope | Rise, Fall |
| Delayed type | >, <, ≤≥, >< |
| Delayed time | 6.4 ns to 10 s |
| Source | CH1 to CH4 or D0 to D15 |
| **Time out** | |
| Slope | Rise, Fall, Any |
| Time out | 6.4 ns to 10 s |
| Source | CH1 to CH4 or D0 to D15 |
| **Duration** | |
| Type set | H, L, X |
| Trigger condition | >, <, ≤≥ |
| Duration | 6.4n s to 10 s |
| Source | CH1 to CH4 or D0 to D15 |
| **Setup Hold** | |
| Edge type | Rise, Fall |
| Data type | H, L |
| Setup time | 3.2 ns to 10 s |
| Hold time | 3.2 ns to 10 s |
| Source | CH1 to CH4 or D0 to D15 |
| **Pulse** | |
| Pulse conditions | +wid (>, <, ≤≥)<br>-wid (>, <, ≤≥) |
| Pulse width | 0.8 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)<br>Negative slope (greater than, less than, within a specified interval) |
| Time set | 6.4 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 |

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|---|---|
| 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)<br>Time difference between cursors (△T)<br>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:<br>Max, Min, High, Low, Ampl, Pk- Pk, Middle, Mean, Cycmean, DC RMS, CycRMS, AC RMS, Period, Freq, Rise, Fall, RiseDelay, FallDelay, +Width, -Width, FRFR, FRFF, FFFR, FFFF, FRLF, FRLR, FFLR, FFLF, +Duty, -Duty, Area, CycArea, Oversht, Presht, Phase, Pulse, a total of 36 measurement parameters;<br>Digital channel:<br>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 |

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| **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 |
| Advanced computing | 0,1,2,3,4,5,6,7,8,9, (, +, -, *, /, ^, >, <, &&, ‖, ==, != ) |
| Mathematical function | Sin, Cos, Sinc, Tan, Sqrt, Exp, Log, ln, Floor, ABS, Acos, Asin, Atan, Sinh, Tanh, Ceil, Cosh, Fabs |
| **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 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 |
| | linearity: 1% |
| | symmetry: 0.1% to 99.9% |
| noise | bandwidth: 50 MHz (Typical values) |
| Built-in wave | Frequency range: 1 μHz to 5 MHz |
| Arbitrary wave | Frequency range: 1 μHz to 5 MHz |
| | wave length: 8 to 512 K points (Play mode) |
| | Internal storage location: 10 |
| Frequency | Accuracy: 100 ppm (less than 10 kHz);50 ppm (greater than 10 kHz) |
| | Resolution : 1μHz |
| 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 |
| Persist time | 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 |
| Points | 1 to 1000 |
| Output amplitude | High resistance: 20 mVpp to 6 Vpp<br>50Ω: 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 Vp-p |
| frequency | 10 Hz,100 Hz,1 kHz (default),10 kHz |
| **Power Source** | |
| Power consumption | 100V to 240 VAC (Fluctuations±10%), 50 Hz/60 Hz |
| | 100V to 120 VAC (Fluctuations±10%), 400 Hz |
| power | 100 VA |
| Fuse | 2.5 A, F-class, 250 V |
| **Environmental** | |
| Temperature range | Operation: 0℃ to +40℃ |
| | Not operation: -20℃ to +70℃ |
| Cooling method | Forced cooling by fan |
| Humidity range | Operation: +35℃ ≤ 90% relative humidity;<br>No operation: +35 ° C to +40 ° C ≤ 60% relative humidity |
| Altitude | Operation: below 3000 meters;<br>Non-operational: up to 15,000 meters |
| Pollution degree | 2 |
| Operating environment | Indoor |
| **Mechanical specifications** | |
| Dimension (W×H | 370 mm×185 mm×115 mm |

×D)

| | | | |
|---|---|---|---|
| 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);<br>3V/m (1.4 GHz to 2 GHz);<br>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)<br>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:<br>0% UT during 1 cycle;<br>40% UT during 10/12 cycles;<br>70% UT during 25/30 cycles<br>Short interruption: 0% UT during 250/300 cycles |
| Safety | EN 61010-1:2010+A1:2019<br>EN IEC61010-2-030:2021+A11:2021<br>BS EN61010-1:2010+A1:2019<br>BS EN IEC61010-2-030:2021+A11:2021<br>UL 61010-1:2012 Ed.3+ R:19 Jul2019<br>UL 61010-2-030:2018 Ed.2<br>CSA C22.2#61010-1:2012 Ed.3+U1; U2; A1<br>CSA C22.2#61010-2-030:2018 Ed.2 | | |

*The MSO/UPO3000E series have been certified by CE, UKCA, cETLus.

# Order information

| | Description | Standard Quantity per Carton | Order No. |
|---|---|---|---|
| Model | MSO3504E-S (500 MHz,4CH+16 digital,AWG) | 1 | MSO3504E-S |
| | MSO3354E-S (350 MHz,4CH+16 digital,AWG) | 1 | MSO3354E-S |
| | MSO3504E (500 MHz,4CH+16 digital) | 1 | MSO3504E |
| | MSO3354E (350 MHz,4CH+16 digital) | 1 | MSO3354E |
| | MSO3502E (500 MHz,2CH+16 digital) | 1 | MSO3502E |
| | MSO3352E (350 MHz,2CH+16 digital) | 1 | MSO3352E |
| | UPO3504E(500 MHz,4CH) | 1 | UPO3504E |
| | UPO3354E(350 MHz,4CH) | 1 | UPO3354E |
| | UPO3502E(500 MHz,2CH) | 1 | UPO3502E |
| | UPO3352E(350 MHz,2CH) | 1 | UPO3352E |
| 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 (500 MHz/350 MHz) | 2/4 | UT-P07A/UT-P08A |
| | Logic analyzer probe (only MSO) | 1 | UT-M15 |
| Optional accessories | All Serial Bus Trigger and Decode Options | -- | MSO/UPO3000CS-BND |
| | Serial bus trigger and decode options (includes RS232, UART, $I^2C$, SPI) | -- | MSO/UPO3000CS-EMBD |
| | RS232/UART trigger and decode options | -- | MSO/UPO3000CS-COM |
| | $I^2C$ trigger and decode options | -- | MSO/UPO3000CS-I2C |
| | SPI trigger and decode options | -- | MSO/UPO3000CS-SPI |
| | Automotive serial bus triggering and decoding options (CAN, CAN-FD, LIN, FlexRay) | -- | MSO/UPO3000CS-AUTO |
| | CAN trigger/decode option | -- | MSO/UPO3000CS-CAN |
| | CAN-FD trigger/decode option | -- | MSO/UPO3000CS -CANFD |
| | LIN trigger/decode option | -- | MSO/UPO3000CS -LIN |

| | | | |
|---|---|---|---|
| | FlexRay trigger/decode option | -- | MSO/UPO3000CS -FlexRay |
| | Bode plot loop test analysis (software) | -- | MSO3000CS -S-BODE |
| | Isolation transformer | | UT-ISOT |
| | 16 digital channels option (software) | -- | UPO3000CS-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/UPO3000E series

# Passive probe

| Model | Type | Description |
|---|---|---|
| UT-P01 | | |
|  | High impedance probe | 1X:DC to 8 MHz<br>10X:DC to 25 MHz<br>Oscilloscope compatibility: UNI-T all series |
| UT-P03 | | |
|  | High impedance probe | 1X:DC to 8 MHz<br>10X:DC to 60MHz<br>Oscilloscope compatibility: UNI-T all series |
| UT-P04 | | |
|  | High impedance probe | 1X:DC to 8 MHz<br>10X:DC to 100 MHz<br>Oscilloscope compatibility: UNI-T all series |
| UT-P05 | | |
|  | High impedance probe | 1X:DC to 8 MHz<br>10X:DC to 200 MHz<br>Oscilloscope compatibility: UNI-T all series |

| | | |
|---|---|---|
| UT-P06 | | |
|  | High impedance probe | 1X:DC to 8 MHz<br>10X:DC to 300 MHz<br>Oscilloscope compatibility: UNI-T all series |
| UT-P07A | | |
|  | High impedance probe | 10X:DC to 500 MHz<br>Input resistance: 10 MΩ<br>Maximum safe operating voltage: <600 Vpk<br>Oscilloscope compatibility: UNI-T all series |
| UT-P08A | | |
|  | High impedance probe | 10X:DC to 350 MHz<br>Input resistance: 10 MΩ<br>Maximum safe operating voltage: <600 Vpk<br>Oscilloscope compatibility: UNI-T all series |
| UT-P20 | | |
|  | High impedance probe | DC to 100 MHz<br>Probe coefficient 100:1<br>Maximum operating voltage 1500 Vrms<br>Oscilloscope compatibility: UNI-T all series |
| UT-V23 | | |
|  | High voltage probe | DC to 100 MHz<br>Probe coefficient 100:1<br>Input resistance 100 MΩ±2%<br>Maximum operating voltage 2000 Vpp<br>Oscilloscope compatibility: UNI-T all series |
| UT-P21 | | |
|  | High voltage probe | DC to 50 MHz<br>Probe coefficient 1000:1<br>Maximum operating voltage DC 15 kVrms,<br>AC 10kV(sine wave)<br>Oscilloscope compatibility: UNI-T all series |
| UT-P40 | | |
|  | Current probe | DC to 100 kHz<br>Range 50 mV/A, 5 mV/A<br>Current range 0.4 A to 60 A<br>Maximum operating voltage 600 Vrms<br>Oscilloscope compatibility: UNI-T all series |

| | | |
|---|---|---|
| UT-P41 | | |
|  | Current probe | DC to 100 kHz<br>Range 100 mV/A, 10 mV/A<br>Current range 0.4 A to 100 A<br>Maximum operating voltage 600 Vrms<br>Oscilloscope compatibility: UNI-T all series |
| UT-P42 | | |
|  | Current probe | DC to 150 kHz<br>Range 100 mV/A, 10 mV/A<br>Current range 0.4 A to 200 A<br>Maximum operating voltage 600Vrms<br>Oscilloscope compatibility: UNI-T all series |
| UT-P43 | | |
|  | Current probe | DC to 25 MHz<br>Range 100 mV/A<br>Maximum measurement current 20 A<br>Rise time 14 ns<br>Oscilloscope compatibility: UNI-T all series |
| UT-P44 | | |
|  | Current probe | DC to 50 MHz<br>Range 50 mV/A<br>Maximum measurement current 40 A<br>Rise time 7 ns<br>Oscilloscope compatibility: UNI-T all series |

# Active probe

| Model | Type | Description |
|---|---|---|
| UT-P30 | | |
|  | High-Voltage Differential Probes | DC to 100 MHz<br>Attenuation ratio 100:1,10:1<br>Input differential voltage ±800 Vpp<br>Oscilloscope compatibility: UNI-T all series |
| UT-P31 | | |
|  | High-Voltage Differential Probes | DC to 100 MHz<br>Attenuation ratio 1000:1,100:1<br>Input differential voltage ±1.5 kVpp<br>Oscilloscope compatibility: UNI-T all series |

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





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