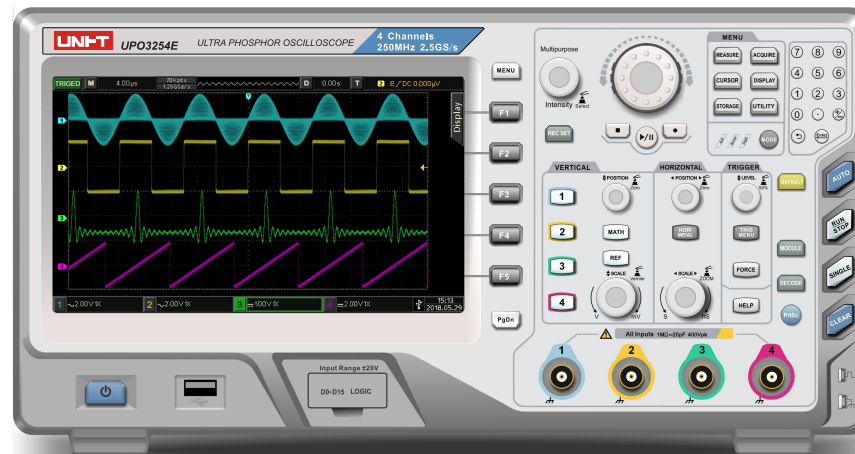


UPO3000E Series Ultra Phosphor Oscilloscope Quick Guide



Introduction

Dear Users:

Hello! Thank you for choosing this brand new UNI-T device. In order to safely and correctly use this instrument, please read this manual thoroughly before use, especially the Safety Notes part.

After reading this manual, it is recommended to keep the manual at an easily accessible place, preferably close to the device, for future reference.

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Document Version

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Statement

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- UNI-T reserves the rights to any product specification and pricing changes.
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If the original purchaser sells or transfers the product to a third party within three years from the date of purchase of the product, the warranty period of three years shall be from the date of the original purchase from UNI-T or an authorized UNI-T distributor. Probes, other accessories, and fuses are not included in this warranty.

If the product is proved to be defective within the warranty period, UNI-T reserves the rights to either repair the defective product without charging of parts and labor, or exchange the defected product to a working equivalent product (determined by UNI-T). Replacement parts, modules and products

may be brand new, or perform at the same specifications as brand new products. All original parts, modules, or products which were defective become the property of UNI-T.

The "customer" refers to the individual or entity that is declared in the guarantee. In order to obtain the warranty service, "customer" must inform the defects within the applicable warranty period to UNI-T, and to perform appropriate arrangements for the warranty service. The customer shall be responsible for packing and shipping the defective products to the designated maintenance center of UNI-T, pay the shipping cost, and provide a copy of the purchase receipt of the original purchaser. If the product is shipped domestically to the location of the UNI-T service center, UNI-T shall pay the return shipping fee. If the product is sent to any other location, the customer shall be responsible for all shipping, duties, taxes, and any other expenses.

This warranty shall not apply to any defects, malfunction or damages caused by accidental, machine parts' wear and tear, using outside the product's specifications, improper use, and improper or lack of maintenance. UNI-T under the provisions of this warranty has no obligation to provide the following services:

- a) Any repair damage caused by the installation, repair, or maintenance of the product by non UNI-T service representatives.
- b) Any repair damage caused by improper use or connection to an incompatible device.
- c) Any damage or malfunction caused by the use of a power source which does not conform to the requirements of this manual.
- d) Any maintenance on altered or integrated products (if such alteration or integration leads to an increase in time or difficulty of product maintenance).

This warranty is written by UNI-T for this product, and it is used to substitute any other express or implied warranties. UNI-T and its distributors do not offer any implied warranties for merchantability or applicability purposes. For violation of this guarantee, UNI-T is responsible for the repair or replacement of defective products as the only and complete remedy available to customers. Regardless of whether UNI-T and its distributors are informed that any indirect, special, incidental, or consequential damage may occur, the UNI-T and its distributors shall not be responsible for any of the damages.

General Safety Overview

This instrument strictly complies with the GB4793 electronic measuring instrument safety requirements and IEC 61010-1 safety standards during design and manufacturing. Please understand the following safety preventative measures, to avoid personal injury, and to prevent damage to the product or any connected products. To avoid possible dangers, be sure to use this product in accordance with the regulations.

Only trained personnel can perform the maintenance program.

Avoid fire and personal injury.

Use the correct power line: Only use the dedicated UNI-T power supply appointed to the local region or country for this product.

Correct plug: Don't plug when the probe or test wire is connected to the voltage source.

Ground the product: This product is grounded through the power supply ground wire. To avoid electric shock, grounding conductors must be connected to the ground. Please be sure that the product is properly grounded before connecting to the input or output of the product.

Correct connection of oscilloscope probe: Ensure that the probe ground and ground potential are correctly connected. Do not connect ground wire to high voltage.

Check all terminal ratings: To avoid fire and the large current charge, please check all the ratings and the marks on the product. Please also refer to the product manual for details on the ratings before connecting to the product.

Do not open the case cover or front panel during operation.

Only use fuses with ratings listed in the technical index.

Avoid circuit exposure: Do not touch exposed connectors and components after power is connected.

Do not operate the product if you suspect it is faulty, and please contact UNI-T authorized service personnel for inspection. Any maintenance, adjustment, or replacement of parts must be performed by UNI-T authorized maintenance personnel.

Maintain proper ventilation.

Please do not operate in humid conditions.

Please do not operate in flammable and explosive environment.

Please keep the product surface clean and dry.

Safety Terms and Symbols

The following terms may appear in this manual:

Warning: Indicate the conditions and behaviors that may endanger life.

Note: Indicate the conditions and behaviors that may cause damage to the product and other properties.

The following terms may appear on the product:

Danger: Performing this operation may cause immediate damage to the operator.

Warning: This operation may cause potential damage to the operator.

Note: This operation may cause damage to the product and other devices connected to the product.

The following symbols may appear on the product:



UPO3000E Series Ultra Phosphor Oscilloscope Introduction

UPO3000E Series Ultra Phosphor Oscilloscope includes the following 4 models:

Model	Analog channels	Analog bandwidth
UPO3152E	2	150MHz
UPO3252E	2	250MHz
UPO3154E	4	150MHz
UPO3254E	4	250MHz

UPO3000E Series Ultra Phosphor Oscilloscope is based on UNI-T's unique Ultra Phosphor technology. A multifunctional, high-performance oscilloscope that is easy to use, with excellent technical specifications, a perfect combination of many functionalities that help users to quickly complete testing. UPO3000E series is aimed at satisfying the most extensive oscilloscope markets, including communications, semiconductors, computers, aerospace defense, instrumentation, industrial electronics, consumer electronics, automotive electronics, field maintenance, R&D, education, etc.

Main features:

- 250MHz/150MHz bandwidth, providing 2-channel and 4-channel models.
- Real-time sampling rate up to 2.5GS/s, allowing you to observe faster signals.
- Standard memory depth of 70Mpts per channel, which allows the oscilloscope to maintain a high sampling rate in a wider time base, and takes into account the waveform integrity and details.
- Waveform capture rate up to 200,000wfms/s.
- Hardware real-time waveform continuous recording and waveform analysis supports recordings up to 100,000 waveforms.

- 256-level grayscale display
- 8-inch WVGA (800×480) TFT LCD, ultra widescreen, vivid colors, clear display.
- Abundant trigger features, including a variety of advanced trigger options. Standard configuration interface: USB-Host, USB-Device, LAN, VGA and Pass/Fail.
- Automatic measurement of 34 waveform parameters.
- Supports USB storage and firmware upgrades, one click screen copy function.
- Simple and convenient numeric keypad.
- Supports plug and play USB device, which can communicate with the computer.

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Getting Started Guide

This chapter introduces the precautions for using the oscilloscope for the first time, the front and rear panels, the user interface, as well as the built-in help system.

(1) General Inspection

It is recommended to follow the steps below before using the UPO3000E series for the first time.

(1) Check for Damages Caused By Transport

If the packaging carton or the foam plastic cushions are severely damaged, please contact the UNI-T distributor of this product immediately.

(2) Check Attachment

Please check Appendix A for the list of accessories. If any of the accessories are missing or damaged, please contact UNI-T distributor or local office of this product.

(3) Machine Inspection

If the instrument appears to be damaged, not working properly, or has failed the functionality test, please contact UNI-T distributor or local office of this product.

If the equipment is damaged due to shipping, please keep the packaging and notify both the transportation department and the UNI-T distributor, UNI-T will arrange maintenance or replacement.

(2) Before Use

To perform a quick verification of the instrument's normal operations, please follow the steps below:

(1) Connect to the Power Supply

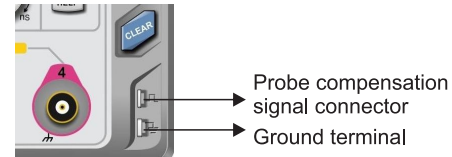
The power supply voltage range is from 100 VAC to 240 VAC, the frequency range is 45Hz to 440Hz. Connect the oscilloscope to the power supply cord that came with the oscilloscope or any power supply cord that meets the host country standards. Turn the power button on the back of the oscilloscope to ON. Now the soft power button \cup in the front of the oscilloscope should be lit green.

(2) Boot Check

Press the soft power button \cup and the light should change to red. The oscilloscope then will show a boot animation, and it will enter the normal interface afterwards.

(3) Connect Probe

Take the probe found in the attachment and connect its BNC terminal to the BNC of channel 1 of the oscilloscope. Connect the probe to the "probe compensation signal connector" and connect the probe's ground alligator clip to the "ground terminal" shown below. The output of the probe compensation signal connector should be a 3Vp-p square wave, with a 1 kHz frequency.



Picture 1-1 Probe compensation signal connector and ground terminal

(4) Function Check

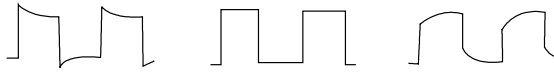
Press the AUTO key, a 3Vp-p 1 kHz square wave should appear. Repeat step 3 for all channels. If the output is not a square wave with the above descriptions, please perform the probe compensation step in the next section.

(5) Probe Compensation

When the probe is connected to any input channel for the first time, this step might be required in order to match the probe and the input channel. An uncompensated probe may cause a measurement error. To adjust the probe compensation, please follow the following steps:

1. Set the probe menu attenuation coefficient to 10 \times , and set the switch on the probe to 10x then connect the probe to CH1. Make sure the probe's hooks is properly connected with the oscilloscope. Connect the probe to the "probe compensation signal connector" and connect the probe's ground alligator clip to the "ground terminal". Turn on CH1 and press the AUTO button.

2. Observe the waveform displayed.

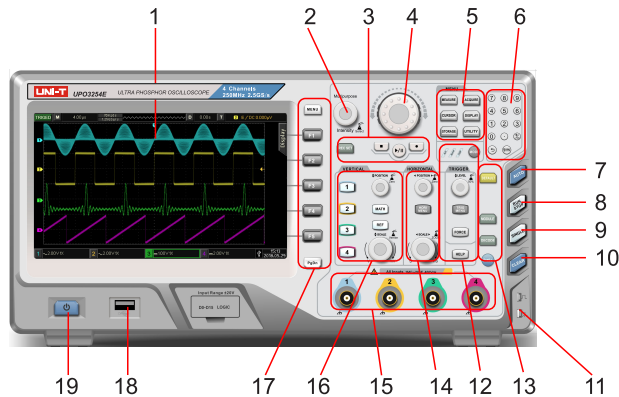


Excessive compensation Correct compensation Insufficient compensation
 Picture 1-2 Probe compensation calibration

3. If the displayed waveform does not look like the above “correct compensation” waveform, use a non-metallic screwdriver to adjust the probe’s variable capacitance until the display matches the “correct compensation” waveform.

Warning: To avoid electric shock when measuring high voltage using the probe, please ensure that the probe insulation is in good condition and avoid physical contact with any metallic part of the probe.

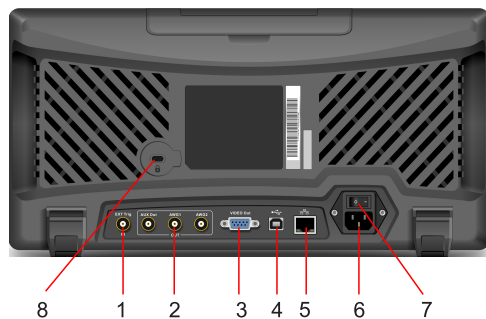
(3) Front Panel



Picture 1-3 Oscilloscope Front Panel

1	Screen display area
2	Multipurpose knob
3	Waveform recording setting
4	Shuttle knob
5	Function menu
6	Numeric keypad
7	Automatic setting
8	Run/stop
9	Single trigger
10	Clear all
11	Probe compensation signal connector and ground terminal
12	Factory setting, AWG (arbitrary waveform generator), protocol decoding, print screen
13	Trigger control area
14	Horizontal control area
15	Analog channel input
16	Vertical control area
17	Menu control
18	USB HOST interface
19	Power on/off

(4) Rear Panel

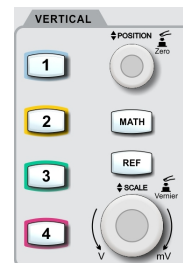


Picture 1-4 Oscilloscope Rear Panel

- ①. EXT Trig: External trigger or external trigger/ 5 input
- ②. Pass/Fail: Pass/Fail detection function output, support Trig_out output at the same time, AWG1 and AWG2 are arbitrary waveform generator output.
- ③. VIDEO Out: VGA video signal output
- ④. USB device: USB device interface, the oscilloscope can communicate with the PC through this interface.
- ⑤. LAN: The oscilloscope can be connected to the local area network for remote control.
- ⑥. AC power input socket: AC power input. Use the power cord provided in the accessories to connect the oscilloscope to the AC power supply (100 ~ 240V, 45 ~ 440Hz).
- ⑦. Power switch: When the AC socket is properly connect to the power supply, turn on this power switch, then press the power on/off on the front panel to turn on the oscilloscope.
- ⑧. Safety lock: You can use the safety lock (sold separately) to lock the oscilloscope in a fixed position.

(5) Operation Panel

(1) Vertical Control



- ① [1], [2], [3], [4]: Analog channel setting keys indicate CH1, CH2, CH3, and CH4. The four channel labels are identified by different colors also corresponding to the colors of the waveforms on the screen and the channel input connectors. Press any key to open the related channel menu (or activate and close the channel).
- ② [MATH]: Press this key to open the mathematical operation menu for add, subtract, multiply, divide, FFT, logic, and advanced operations.
- ③ [REF]: Loads the previously stored reference waveform in the oscilloscope or the USB disk, you can compare the currently measured waveform with the reference waveform.
- ④ Vertical POSITION: Adjust the vertical position of the current channel waveform, and display the vertical offset value **240.00mV** at the baseline cursor. Press this knob to return the channel display position back to the vertical midpoint.
- ⑤ Vertical SCALE: Adjust the vertical scale of the current channel. Turn clockwise to reduce in scale and turn counterclockwise to increase in scale. The waveform display amplitude will increase or decrease during the adjustment, and the scale information **1.100Vx** at the bottom of the screen will change in real time. The vertical scale has 1, 2, and 5 steps. Press the knob allows the vertical scale adjustment to switch between coarse and fine tuning.

2. Horizontal control



- HORI MENU**: Displays extended window, independent time base and trigger hold-off.
- Horizontal **POSITION**: When adjusting the knob, the trigger point moves left and right relative to the center of the screen, and the waveforms of all channels also move left and right. The horizontal displacement value **D 0.00s** at the top of the screen will change in real time. Press this knob to return the channel display position back to the horizontal midpoint.
- Horizontal **SCALE**: Adjust the time scale of all channels. You can see the waveform is compressed or xpanded in the horizontal direction on the screen during the process, and the time base scale **M 100µs** in the lower part of the screen changes in real time. The time base step is 1-2-4. Press the knob to quickly switch between the main window and the extended window.

3. Trigger Control



- MODE**: Press this key to switch the trigger mode to Auto, Normal or Single, and the corresponding backlight of the current trigger mode will turn on.
- LEVEL**: Turn clockwise to increase the level, turn counterclockwise to decrease the level. During the adjustment process, the trigger level value **T 5/DC 0.000V** at the top right of screen will change in real time. Press the knob to quickly return the trigger level to 50% of the trigger signal.
- TRIG MENU**: Displays the contents of the trigger menu. For details, see "Trigger setting system".
- FORCE**: Force trigger button, press this button to force a trigger.
- HELP**: Displays the built-in help system contents.

4. Auto Setting



When this key is pressed, the oscilloscope will automatically adjust the vertical scale factor, sweep time base, and trigger mode according to the input signals.

Note: When using the auto setting function, if the measured signal is a sine wave, the frequency is required to be not less than 20Hz and the amplitude should be in the range of 20mVpp ~ 120Vpp. If this parameter condition is not met, the auto setting function may not be valid.

5. Run/Stop



Press this key to set the oscilloscope's operating state to "run" or "stop". RUN state is indicated by green light. STOP state is indicated by red light.

6. Single Trigger



Press this key to set the trigger mode to "Single" and the orange backlight will be on.

7. Clear All



Clears all waveforms on the screen. If the oscilloscope is in the "RUN" state, it will continue to display new waveforms.

8. Print Screen



Press this key to quickly copy the screen waveforms to a USB storage device in BMP bitmap format.

9. Multipurpose Knob



Intensity: In non-menu operation, turn this knob to adjust the brightness of the waveform display. The brightness adjusting range is 0% ~ 100%. You can also press the **DISPLAY** → waveform brightness to adjust it. **Multipurpose**: Turn the knob to select the sub-menu, then press the knob to confirm selection.

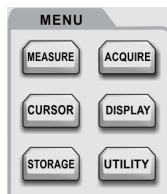
10. Shuttle Knob



For certain numeric parameters that can be set in a large range, this knob provides a quick-adjust function. Rotate clockwise (counterclockwise) to increase (decrease) the value. The inner knob can be fine-tuned, and the outer knob can be coarse tuned.

For example: When playing back the waveform, use the knob to quickly locate the waveform frames that need to be replayed. Similar parameters also include: Trigger hold-off time, pulse width setting, slope time, and so on.

11. Function Keys



MEASURE: Measure setting menu: you can set the measure source, all parameters, user-defined, perform measurement statistics, select measurement indicators, etc. The user-defined includes a total of 34 kinds of parameter measurements, which can be quickly selected through the Multipurpose knob, and the measurement result will appear at the bottom of the screen.

ACQUIRE: Sampling setting menu for setting the acquisition mode and deep storage.

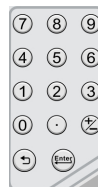
CURSOR: Cursor measurement menu, you can measure the time or voltage of the waveform manually with cursor.

DISPLAY: Select display settings, such as display type, format, grid brightness, waveform brightness, duration, color temperature, inverse color temperature.

STORAGE: Press this key to enter the storage interface. The types that can be stored include: settings, waveforms. You can store either in the oscilloscope internal or the external USB storage device.

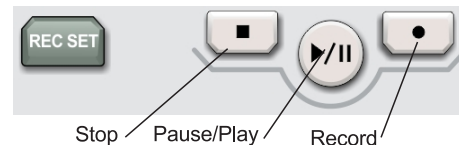
UTILITY: The utility menu can perform the settings such as auto-calibration, system information, language, menu display, waveform recording, pass/fail, square wave output, frequency meter, output selection, backlight brightness, clear data, IP, RTC, etc.

12. Numeric Keypad



For some numerical parameters that can be set to a large range, you can directly enter the number plus the time unit, then press the **Enter** key to confirm if it is without a unit.

13. Waveform Recording



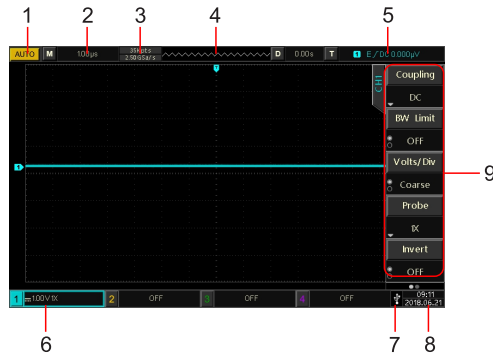
REC SET : Waveform recording setup menu for setting and operation. The setting items can set or display the recording interval, end frame, play delay, and maximum frame.

Stop : Press this key to stop the waveform being recorded or replayed.

Play/Pause : In the stop or pause state, press this key to playback the waveform, press again to pause playback.

Record : Press this key to start the waveform recording.

(6) User Interface



Picture 1-5 Oscilloscope display interface

- ①. Trigger Status Identification: Includes TRIGED (has been triggered), AUTO, READY, STOP, and ROLL (rolling).
- ②. Time Base Scale: Indicates the amount of time represented by one grid on the horizontal axis, which can be adjusted by the horizontal SCALE knob.
- ③. Sampling Rate/ Memory Depth: Indicates the current sampling rate and storage depth.
- ④. Horizontal Displacement: Shows the horizontal displacement value of the waveform, which can be adjusted by turning the horizontal POSITION knob. Press the knob to return the displacement value back to 0.
- ⑤. Trigger Status: Displays trigger source, type, slope, coupling, level, etc.
 - a. Trigger source: There are seven states: CH1~CH4, AC Line, EXT, and EXT/5. CH1~CH4 will each be of a different trigger color, for example, **1** is CH1.
 - b. Trigger type: The types are edge, pulse width, video, slope, and advanced trigger. For example, **E** is an edge trigger.

- c. Trigger edge: The types are rising, falling, and any kinds. For example, **↗** Indicates trigger at the rising edge.
- d. Trigger coupling: The types are DC, AC, high frequency suppression, low frequency suppression, and noise suppression. For example, **DC** indicates DC coupling.
- e. Trigger level: Indicates the current trigger level value, corresponding to the **◀** on the right side of the screen. Adjust the LEVEL knob in the trigger control area to change this parameter.
- ⑥. CH1 Vertical Status: Displays CH1 activation state, channel coupling, bandwidth limitation, vertical scale, and probe attenuation coefficient.

Channel activation state: **1** = 100VX When the background includes the channel color, the channel is activated. Press the button **1**, **2**, **3**, **4** to activate or open/close the corresponding channel.

Channel coupling: Includes DC, AC, and grounding. For example, **DC** is DC coupling in CH1.

Bandwidth limitation: Enable and there will be a **■** icon shown on CH1 vertical status bar.


Vertical scale: When CH1 is activated, the vertical scale parameter can be adjusted by the SCALE knob in the vertical control area.


Probe attenuation coefficient: Displays CH1 probe attenuation coefficient: 0.001X, 0.01X, 0.1X, 1X, 10X, 100X, 1000X.
- ⑦. USB Device Indicator: Displays the indicator when the USB device interface is connected to a USB storage device such as a USB flash disk.
- ⑧. Current date and time.
- ⑨. Operation Menu: Displays the current operation menu. Press **F1** ~ **F5** can change the corresponding submenu content.
- ⑩. Analog Channels and Waveforms: Displays CH1 ~ CH4 channels and waveforms, the color of the channel indicator is consistent with the waveform.


(7) Special Symbols Introduction




Take the left menu as an example:


 : Indicates there is a next level menu.

 : Indicates there is a drop-down menu.

 : Indicates that the menu has two options.

 : Indicates that user can adjust by the Multipurpose knob.

 : The number of circles indicates the total pages of the menu. There is no small circle for one single page.

For two pages or more, small circles will be shown. Press the  key to turn the pages.

Take the left menu as an example:

System Prompts and Troubleshooting

(1) System Prompt Information Description

Operation at limit: In the current state, adjustment has reached the limit and cannot continue. When the vertical scale knob, time base knob, level shift, vertical shift or trigger level, etc. reaches the adjustment limit, the prompt will show up.

USB device is not inserted: When the USB storage device is not connected, this prompt appears if you select a storage disk as USB.

Load Failed: When loading a saved setting or waveform, this prompt appears if there is no stored setting or waveform in the memory location.

(2) Trouble Shooting

(1) When the power button is pressed and the oscilloscope is black screen:

- ① Check the power supply connection and check power supply is normal or not.
- ② Make sure the power switch at the back of the oscilloscope is open, press the front panel power key and confirm green light is present.
- ③ If there is a relay sound, it indicates that the oscilloscope starts normally. Try the following operations: press the **[DEFAULT]** key, then press **[F1]**, if device returns to normal, it means backlight brightness is too low.
- ④ After completing the above steps, restart the oscilloscope.
- ⑤ If you still cannot use this product normally, please contact UNI-T and let us serve you.

(2) After signal acquisition, waveform does not appear on display:

- ① Check if the probe is connected to the signal test point.
- ② Check if the signal line is connected to the analog channel input.
- ③ Check the analog channel of the input signal and that channel is open.

- ④ Connect the probe to the probe compensation signal connector on oscilloscope's front panel and check whether the probe is normal.
- ⑤ Check to see if there is a signal to be detected (solve the problem by comparing the channel with signal generated and the one with problem).
- ⑥ Press **[AUTO]** button for signal re-acquisition.

(3) The measured voltage amplitude value is 10 times larger or smaller than the actual value:

Make sure the probe attenuation coefficient in the channel matches the attenuation of the probe used.

(4) There is a waveform but not stable:

- ① Check the trigger source in the trigger menu and confirm that it matches the input channel of the actual signal.
- ② Check the trigger type: normal signals should use edge trigger mode. Stable waveform will be displayed only by setting to the correct trigger mode.
- ③ Try changing the trigger coupling to high frequency suppression or low frequency suppression in order to filter out the high or low frequency noise which might interfere the trigger.

(5) Pressing the **[RUN/STOP]** key and no waveform is displayed:

- ① Check whether the trigger mode is normal or single, and whether the trigger level has exceeded the waveform range. If so, center the trigger level or set the trigger mode to auto with the **[AUTO]** key.
- ② Press the **[AUTO]** key to complete the above settings automatically.

(6) Waveform refresh rate is too slow:

- ① Check whether the acquisition mode is average, and the average times is large.
- ② You can speed up the refresh rate by reducing the average times or select other acquisition mode such as normal sampling.

Technical Index

Aside from specification labeled "typical", all specifications are guaranteed.

Unless otherwise stated, all technical specifications are applicable to probes with attenuation 10X and UPO3000E series oscilloscope. Oscilloscope must first meet the following two conditions in order to achieve these standards:

- The instrument must be operated at the specified operating temperature for more than thirty minutes.
- If the operating temperature range reaches or exceeds 5 degree Celsius, user must turn on the system function menu to perform self-correcting.

Input				
Input Coupling	DC, AC, GND			
Input Impedance	1MΩ±1% // 18pF ±3pF			
Probe Attenuation Coefficient	0.001×, 0.01×, 0.1×, 1×, 10×, 100×, 1000×			
Maximum Input Voltage	CATI 300 Vrms, CATII 100 Vrms, Transient Overvoltage 1000 Vpk			
Vertical				
Model	UPO3152E	UPO3252E	UPO3154E	UPO3254E
Analog Bandwidth	150MHz	250MHz	150MHz	250MHz
Rise Time (Typical)	≤2.4ns	≤1.4ns	≤2.4ns	≤1.4ns
Channels	2	2	4	4
Vertical Resolution	8bit			
Vertical Scale	1mV/div ~ 20V/div (1-2-5 base)			
Vertical Displacement Range	1mV/div ~ 50 mV/div: ±2V; 100 mV/div ~ 1 V/div: ±40V; 2V/div ~ 20 V/div: ±400V			
Bandwidth Limit (Typical)	20MHz			

Low Frequency Response (AC coupling, -3dB)	≤5 Hz (on BNC)
DC Gain Accuracy	<5 mV : ±3% , ≥5 mV : ±2% (Sampling or average sampling method)
DC Offset Accuracy	≤±3% (Sampling or average sampling method)
Channel Isolation	DC to maximum bandwidth: >40 dB
Horizontal	
Timing Scale	2ns/div ~ 40s/div (1-2-4 base)
Timing Accuracy	≤±(50+ 2×Service Life)ppm
Delay Range	Pre-trigger (negative delay) : ≥1 screen width; Post-trigger (positive delay) : 1s~50s
Time Base Mode	YT, XY, ROLL
Waveform Capture Rate	200,000 wfms/s
Sampling	
Sampling Mode	Real-time sampling
Real-time Sampling Rate	2.5GS/s (single channel), 1.25GS/s (dual channel), 1.25GS/s (quad channel)
Acquisition Mode	Sampling, peak detection, high resolution, envelope, and average
Average Value	After all channels have reached N samples at the same time, the number of N can be selected between 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096 and 8192.
Waveform Interpolation	sin(x) / x
Memory Depth	Auto, 7kpts, 70kpts, 700kpts, 7Mpts, 70Mpts optional

Trigger	
Trigger Level Range	Internal: Center of the screen ± 8 grids; External: $\pm 0.8V$
Trigger Mode	Automatic, normal, single
Trigger Hold-off Range	80ns ~ 10s
High Frequency Suppression	80kHz
Low Frequency Suppression	8kHz
Noise Suppression	Reduces waveform noise (10 mV/div ~ 20 V/div, the sensitivity of DC coupling trigger is reduced 2 times)
Trigger Sensitivity	≤ 1 div
Edge Trigger	
Edge Type	Rising, falling, any
Pulse Width Trigger	
Pulse Width Condition	>, <, =
Polarity	Positive, negative pulse width
Pulse Width Range	3.2ns ~ 10s
Runt Trigger	
Pulse Width Condition	>, <, =
Polarity	Positive, negative polarity
Pulse Width Range	6.4ns ~ 10s

Window Trigger	
Window Type	Rising edge, falling edge, any edge
Trigger Position	Window enter, exit, time
Window time	6.4ns ~ 10s
N-Edge Trigger	
Edge Type	Rising edge, falling edge
Idle Time	6.4ns ~ 10s
Number of Edges	1 ~ 65535
Delay Trigger	
Edge Type	Rising edge, falling edge
Delay Type	Greater than, less than, within range, out of range
Delay time	Normal:6.4ns~10s; Lower time limit:6.4ns~10s; Upper time limit:28.8ns~10s
Timeout Trigger	
Edge Type	Rising edge, falling edge, any edge
Timeout	6.4ns~10s
Duration Trigger	
Code	H, L, X
Trigger Condition	Greater than, less than, within range
Duration Time	Normal:6.4ns~10s; Lower time limit:6.4ns~10s; Upper time limit:28.8ns~10s

Setup/Hold Trigger	
Edge Type	Rising edge, falling edge
Data Type	H, L
Setup Time	6.4ns~10s
Hold Time	6.4ns~10s
Slope Trigger	
Slope Condition	Positive slope (greater than, less than, specified range)
	Negative slope (greater than, less than, specified range)
Time Setting	6.4ns~10s
Video Trigger	
Signal System Horizontal Scanning Frequency Range	Supports standard NTSC, PAL and SECAM broadcast system with line numbers ranging from 1~525 (NTSC) and 1~625 (PAL/SECAM).
Code Trigger	
Code Setting	H, L, X, rising edge, falling edge
Rs232 Decode	
Trigger Condition	Start of frame, error frame, parity error, data
Baud Rate	2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, user-defined
Data byte width	5 bits, 6 bits, 7 bits, 8 bits

I2C Decode	
Trigger Condition	Start, restart, stop, lost acknowledgment , address, data, address/data
Address byte Width	7 bits, 10 bits
Address Range	0 to 119, 0 to 1023
Byte Size	1bit to 5bits
Data Qualifier	Equal to, greater than, less than
SPI Decode(4 channels only)	
Trigger Condition	Chip select, timeout
Idle Time	80ns~1s
Data bit size	4 bits to 32 bits
Data Setting	H, L, X
Clock Edge	Rising edge, falling edge
USB Decode(Optional)	
Signal Speed	Low speed, full speed
Trigger Condition	Synchronization, reset, pause, restore, packet tail, token packet, data packet, handshake packet, SOF, error.
CAN Decode(Optional)	
Signal Type	Rx/Tx, CAN_H, CAN_L, Difference
Trigger Condition	Frame start, frame type, ID, data, ACK missing, bit stuffing error, ID and data, frame end
Signal Rate	10kbps, 20kbps, 33.3kbps, 50kbps, 62.5kbps, 83.3kbps, 100kbps, 125kbps, 1Mbps, user-defined

Sampling Point	1% to 99%	
Frame Type	Data frame, remote frame, error frame and overload frame	
Measure		
Cursor	Manual	Voltage difference between cursors (ΔV) Time difference between cursors (ΔT) The reciprocal of ΔT (Hz) ($1/\Delta T$)
	Tracking Mode	Voltage and time at waveform point
	Indicator	Allows cursor display during automatic measurement
Automatic Measurement	Maximum, minimum, peak-to-peak, median, top, bottom, amplitude, period average, average, periodic RMS, RMS, overshoot, preshoot, frequency, period, rise time, fall time, positive pulse width, negative pulse width, rise delay, fall delay, FRR, FRF, FFR, FFF, LRF, LRR, LFR, LFF, positive duty ratio, negative duty ratio, phase, area, cycle area.	
Number of Measurement	Displays 5 measurements at the same time	
Measurement Range	Screen or cursor	
Measurement Statistics	Average, maximum, minimum, standard deviation and the number of measurements	
Frequency Meter	6-bit hardware frequency meter	
Mathematical Operations		
Waveform Calculation	A+B, A-B, A×B, A/B, FFT, logic operation, digital filtering, advanced operation	
FFT Window Type	Rectangle, Hanning, Blackman, Hamming	
FFT Display	Split screen; time base can be adjusted independently	
FFT Vertical Scale	Vrms, dBVrms	

Digital Filter	Low-pass, high-pass, band-pass and band-stop
Logic Operation	AND, OR, NOT, XOR
Advanced Operation	Log, Exp, Sin, Cos, Tan, Sqrt, Inth, Diff
Storage	
Setting	Internal (256), external USB storage device
Waveform	Internal (256), external USB storage device
Bitmap	External USB storage device, it can also store the relevant parameter information.
Display	
Display Type	8-inch TFT LCD
Display Resolution	800 horizontal×RGB×480 vertical pixels
Display Color	160,000,000
Duration	Minimum, 50ms, 100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 20s and infinite.
Menu Duration	1s, 2s, 5s, 10s, 20s, manual
Display Type	Point, vector
Interface	
Standard/Optional Interface	Standard: USB-Host, USB-Device, LAN, VGA, EXT Trig, AUX Out Optional: Signal source output interface (WaveGen), multimeter module (UT-M12)

General Technical Specifications

Probe Compensation Signal Output	
Output Voltage	About 3Vp-p
Frequency	10Hz, 100Hz, 1kHz (default), 10kHz
Power Supply	
Power Supply Voltage	100V ~ 240VACrms
Frequency	45Hz ~ 440Hz
Fuse	2. 5A, T, 250V
Environment	
Temperature Range	Operational: 0°C~+40°C; Non-Operational: -20°C~ +60°C
Cooling Method	Fan forced cooling
Humidity Range	Operational: below +35°C≤90%relative humidity; Non-Operational: +35°C~ +40°C≤60%relative humidity
Altitude	Operational: below 3000m; Non-Operational: below 15,000m
Mechanical Specifications	
Size	370mm (W) × 195mm (H) × 125mm (D)
Weight	4. 2kg
Calibration Interval	
Recommend to perform calibration once a year	

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