ANENG®

USER MANUAL

HIGH PRECISION



OSCILLOSCOPE MULTIMETER

Safety Information

Before using this product, please make sure to read the safety information beforehand

1.1. Safety terms and symbols

Terminology in this manual

The following terms may appear in this manual

⚠	Warning. A warning statement indicating conditions and behaviors that may endanger life safety.
⚠	Attention. A cautionary statement indicating the conditions and behaviors that may cause damage to the product and other property.

Terminology on the product

The following terms may appear on the product..

Danger. Indicates that reading this tag may immediately cause damage to you.

Warning. Indicates that reading this tag may not immediately cause harm to you

Attention. Indicates that it may cause damage to this product or other property.

Symbols on the product

The following symbols may appear on the product.

High voltage	Attention, refer to the manual	Protective grounding terminal	Shell grounding terminal	Measure the grounding terminal
⚠	⚠	⏚	⏚	⏚

Safety requirements

Please read the following safety precautions to avoid personal injury and prevent damage to this product or any other products connected to it. To avoid potential hazards, this product can only be used within the specified range.

⚠ Warning

To prevent electric shock or fire, please use a suitable power adapter. Only use power adapters that are specific to this product and approved for use in the country of use.

⚠ Warning

The two channels of the oscilloscope are non-isolated channels. When measuring, the channel should use a common reference, and the ground wires of the two probes should not be connected to two non-isolated places with different DC levels, otherwise it may cause a short circuit due to the connection of the oscilloscope probe's ground wire.

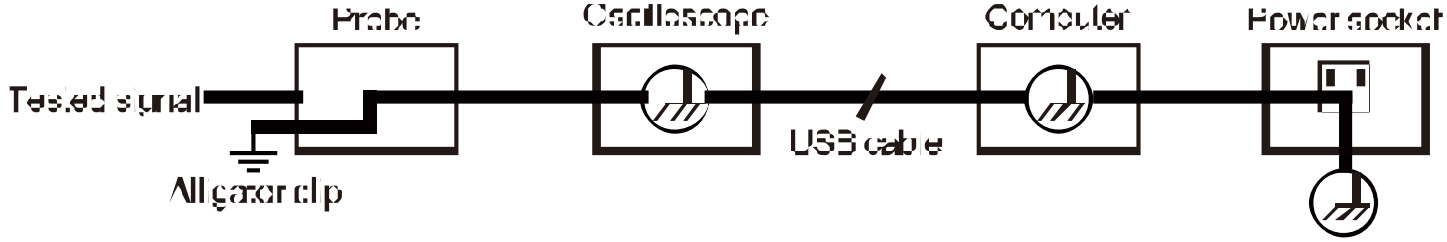
⚠ Warning

When measuring, the channel should use a common reference, otherwise it may cause a short circuit due to the ground connection of the oscilloscope probe

Schematic diagram of internal ground connection of oscilloscope:



Schematic diagram of internal ground connection when oscilloscope is connected to computer through port:



It is not allowed to measure the primary power supply of the power grid when the oscilloscope is powered by an adapter or connected to an AC powered computer through a port.

⚠ Warning

If the oscilloscope input port is connected to a circuit with a peak voltage higher than 42V (30V rms) or exceeding 4800 Va, to avoid electric shock or fire:

1) Only use voltage probes, test wires and adapters that come with the oscilloscope and have appropriate insulation, or accessories specified by our company for the oscilloscope instrument series products.
2) Before use, check if there is any mechanical damage to the multimeter test pen, oscilloscope probe, and accessories. If any damage is found, please replace them.
3) Remove all unused test pens, probes, and accessories (power adapters, USB, etc.).
4) First, plug the power adapter into an AC outlet, and then connect it to the oscilloscope.
5) When testing in CAT II environment, do not connect voltage above 400V above ground level to any input port.
6) When testing in CAT II environment, do not connect voltages with a voltage difference greater than 400V to isolated input ports.
7) Do not use input voltage higher than the rated value of the instrument. Special attention should be paid when using 1:1 test wires as the probe voltage will be directly transmitted to the oscilloscope.
8) Do not touch exposed metal BNC or banana plugs.
9) Do not insert metal objects into the connector.
10) Use the oscilloscope only in the specified manner.
11) The voltage rating mentioned in the 'warning' message is the limit value of the 'operating voltage'. They represent the V AC rms (50-60Hz) when applying AC sine waves; V DC in DC applications. CAT is the prefix, II refers to the level, and II refers to the low voltage high energy level, which refers to the local level applicable to electrical appliances and portable devices.
12) The GENOut output port of the signal source cannot input any electrical signals, voltages, currents, etc.

Only qualified technicians can perform repairs.

Attention to all terminal ratings: To prevent fire or electric shock hazards, please pay attention to all ratings and markings of this product. Before connecting this product, please read the user manual for further information on the rated values.

Do not operate without an instrument cover: If the cover or panel has been removed, do not operate this product.

Avoid contact with exposed circuits: Do not touch exposed contacts and components when the product is powered on.

Do not operate when there is a suspicious malfunction: If there is suspicion of damage to this product, please have qualified maintenance personnel inspect it.

Do not operate in damp environments.

Do not operate in explosive environments.

Keep the surface of the product clean and dry.

Using the equipment without following the manufacturer's prescribed methods may damage the protection provided by the equipment.

2. How to conduct general inspections

When you receive a new oscilloscope, it is recommended that you follow the steps below to check the instrument.

2.1. Check for damage caused by transportation

If the packaging carton or foam plastic protective pad is seriously damaged, please keep it until the whole machine and accessories pass the electrical and mechanical tests.

2.2. Check the whole machine

If the appearance of the instrument or accessories is found to be damaged, the instrument is not working properly, or it fails the performance test, do not use it.

3. Use an oscilloscope

Structure of oscilloscope

Front panel and buttons

The front panel and buttons of the oscilloscope are shown in Figure 1:

Instructions:

1. Signal generator output connector.
2. CH1 and CH2 tested signal input connectors.
3. Display Area.
4. Press the F1~F4 keys, multifunctional buttons. In each menu mode, press the corresponding button to select the corresponding menu item.
5. Save settings button/HOLD hold button (multimeter).
6. Oscilloscope, signal generator, and multimeter operation status switch button.
7. Press the return button to return to the previous menu. When the menu is at the first level, press the return button again to close the menu. When the measurement option is enabled, long press this key to turn on or off the display of measurement values.
8. Zoom or move buttons:

Press the "▲▼" directional key: used in the oscilloscope to move the waveform up and down, change the voltage level, move the voltage cursor, change the trigger level, and move the horizontal measurement cursor.

Press the "◀▶" directional key: used in the oscilloscope to move the waveform left and right, change the time base, move the time cursor, and move the vertical measurement cursor.

9. Input terminal of multimeter.
10. Measure the menu button (oscilloscope), long press this button to center the waveform horizontally.
11. ⏻ Power switch button.
12. Stop/run button (oscilloscope) or output/turn off signal source button; Relative value button (multimeter).
13. Automatic setting button (oscilloscope) or range switching button (multimeter).

Side panel (Figure 2):

Instructions:

1. Probe compensation 3V/1kHz square wave signal output.
2. Charging or USB communication interface.
3. Bracket.

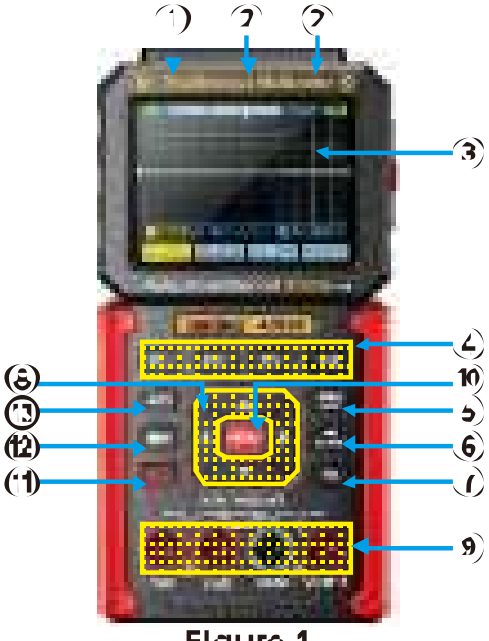


Figure 1



Figure 2

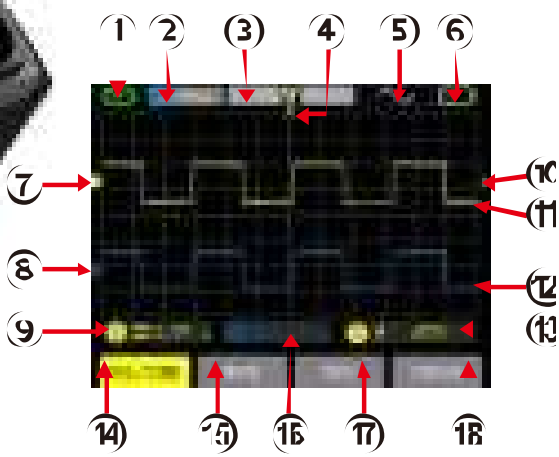


Figure 3

Introduction to the User Interface of Oscilloscope (Figure 3)
Instructions:

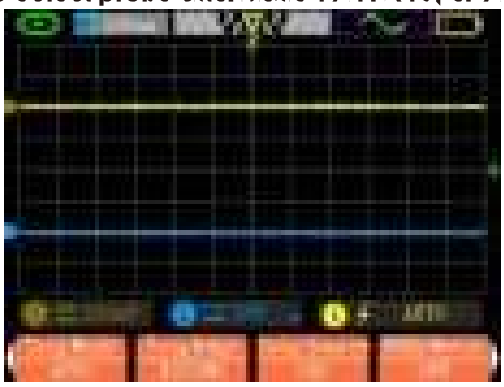
1	Running status display	▶ : Automatic waveform acquisition status, WAIT: Normal trigger mode flashing and waiting for trigger signal T-D : Trigger waveform data has been captured; ■: Lock the current waveform, acquisition has been stopped.
2	Time base scale	Display the current set horizontal time base scale value
3	Time base window	Display the current time base position within the storage depth
4	ave-triggered	Display the current triggered horizontal time base position
5	Signal generator status	Display corresponding square wave, pulse wave, sine wave, triangular wave shape symbols or turn off information based on the current output status of the signal generator.
6	Battery level	Display the current battery level status and charging display
7	CH1 channel vertical trigger	Yellow displays the vertical voltage position currently triggered by CH1 channel
8	CH2 channel vertical trigger	Blue displays the vertical voltage position currently triggered by the CH2 channel
9	CH1 channel voltage	Yellow displays the coupling mode, voltage scale, and probe attenuation of CH1 channel
10	Trigger channel vertical trigger	Green displays the vertical voltage position currently triggered by the triggering channel
11	CH1 channel displays waveform	Yellow displays the waveform of channel Ch1
12	CH2 channel displays waveform	Blue displays the waveform of CH2 channel
13	Trigger channel	Display the current trigger source, with yellow indicating CH1 channel and blue indicating CH2 channel. There are three triggering modes: automatic, normal, and one-time. There are two types of triggering edge modes: rising edge and falling edge
14	Voltage time base setting	The yellow background is used to set the CH1 channel voltage time base. The blue background is used to set the CH2 channel voltage time base,
15	Waveform movement	The yellow background is the waveform of the moving CH1 channel; The blue background is the waveform of the moving CH2 channel; Short press to switch channels, long press to control the waveform;
16	CH2 channel voltage	The coupling mode, voltage scale, and probe attenuation of the CH2 channel are displayed in blue
17	Trigger cursor movement	Vertical movement triggers the cursor, long press to control
18	Measure cursor movement	Long press the measurement cursor function to activate, short press to select the cursor and use the up, down, left, and right keys to move in the corresponding direction.

System Function Menu Settings

In the oscilloscope interface, short press the "MENU" button to bring up the system function menu, press the left and right arrow keys to switch, and then short press this button to exit.



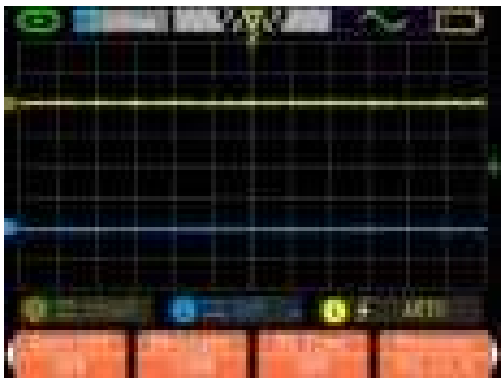
1. Channel: Short press F1 to switch between CH1 or CH2 and select the channel that needs to be set currently.
2. Switch: Short press F2 to select whether to turn on or off the current channel.
3. Coupling method: Short press F3 to select the coupling method as "AC" or "DC".
4. Probe attenuation: Short press F4 to select probe attenuation X1, X10, or X100.



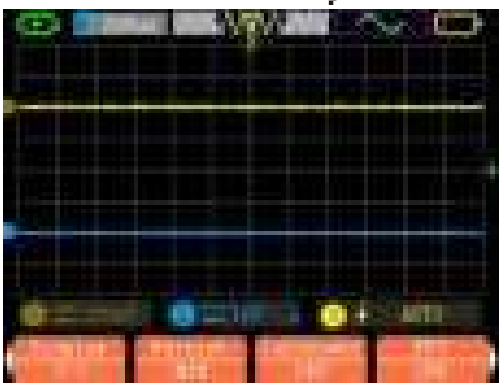
5. Trigger mode: Short press F1 to select three trigger modes: "AUTO", "NORMAL", and "SINGLE".
6. Trigger edge: Short press F2 to select the rising edge "▲" or falling edge "▼" in trigger.
7. Trigger source: According to the measurement requirements, short press the F3 key to switch between trigger sources CH1 or CH2. The yellow channel is CH1, and the blue channel is CH2.
8. Frequency meter: Short press F4 to turn on or off the frequency meter display.



9. Format: Short press F1 to format.
10. Recovery settings: Short press F2 to turn on or off the recovery settings. When turned on, short press the "MENU" key to restore the default factory settings.
11. Data saving: Short press F3 to enter USB mode.
12. Language selection: Short press F4 to select the system language as "Chinese" or "English".



13. Automatic shutdown: Short press F1 to select the automatic shutdown time as "1 minute", "10 minutes", "30 minutes", "60 minutes", "120 minutes" or "shutdown (no automatic shutdown)". If used for a short period of time, it is recommended to choose automatic shutdown after 10 or 30 minutes. If used continuously for a long time, you can choose to turn off automatic shutdown or 120 minutes.
14. Backlight brightness: Short press F2 to select the backlight brightness as "30%", "50%", "80%" or "100%".
15. Backlight time: Short press F4 to select the screen backlight display time as "30 seconds", "60 seconds", "120 seconds" or "off (backlight always on)".
16. Version number: Display the version number of the current system.



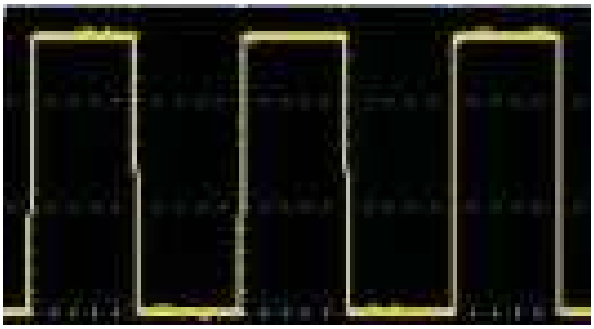
17. Display mode: Short press F1 to select the display mode as "Y-T" or "X-Y".
18. Afterglow time: Short press F2 to select the minimum, 500ms, 1S, 10S, or infinite afterglow time.
19. Baseline calibration: Short press F3 to select whether to turn on or off baseline calibration. When turned on, unplug the probe and short press the "MENU" button to start calibration.
20. Mathematical operations: Short press F4 to select mathematical operations as "FFT-CH1", "FFT-CH2", or "Off".



21. Sampling mode: Short press F1 to select the sampling mode as "Peak Detection" or "High Resolution".
22. Measurement cursor: Short press F2 to select the measurement cursor as "horizontal", "vertical", "horizontal and vertical" or "off".
23. Numerical display: Short press F3 to enter the numerical display settings. You can choose "peak to peak value", "maximum value", "minimum value", "root mean square", "average value", "duty cycle", "period", "frequency". Short press F3 on this page to switch between selecting "CH1" or "CH2", and short press the "↩" key to exit the page. Two channels can open a total of 9 numerical display settings.
24. Signal output: Short press F4 to enter the signal output interface. Please refer to the subsequent instructions for specific operations.

4. How to conduct functional checks

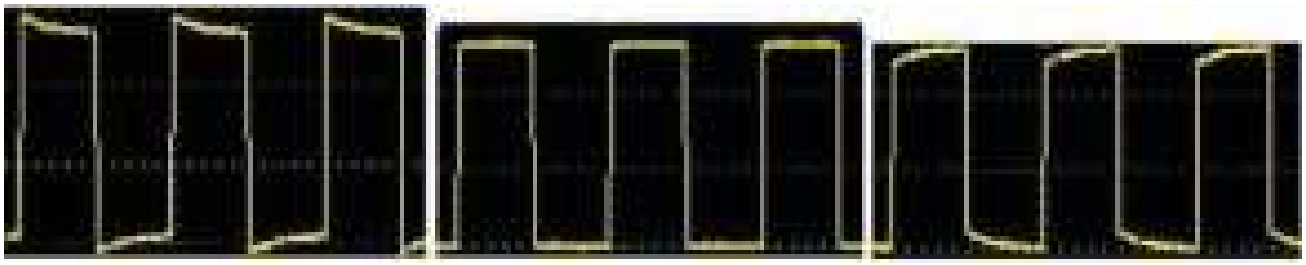
1. Connect the probe to the crocodile clip, then connect the probe to the analog channel, and connect the crocodile clip to the corresponding output interface.
2. Set the attenuation gear to X10 mode. (Note: this is the X10 and X1 selection switch on the probe, not the probe ratio setting on the oscilloscope.)
3. The signal generator is set to output a signal with a peak-to-peak value of 3.0V, a square wave signal type, and a frequency of 1KHz. Please refer to the "Signal Generator" section for the settings.
4. Press the "AUTO" button, and the waveform will be automatically searched for.
5. Observe the waveform on the oscilloscope display screen. Under normal circumstances, it should be as shown in the following figure:



5. How to perform probe compensation

When connecting the probe to any input channel for the first time, make this adjustment to match the probe with the input channel. Uncompensated or biased probes can lead to measurement errors or mistakes. For adjusting the probe compensation, please follow the steps below:

1. Set the attenuation coefficient of the probe menu to 10X, set the switch on the probe to 10X (see "How to Set the Attenuation Coefficient of the Probe"), and connect the oscilloscope probe to the CH1 channel. If using a probe hook-shaped head, ensure that it is inserted tightly with the probe. Connect the probe end to the signal output connector of the probe compensator, connect the reference wire clamp to the ground connector of the probe compensator, and then press the "AUTO" button.
2. Check the displayed waveform and adjust the probe until the compensation is correct. Refer to Figures 4 and 5.



Excessive compensation Compensation is correct Insufficient compensation

Figure 4: Probe compensation display waveform

3. If necessary, repeat the steps.



Figure 5: Probe adjustment



Figure 6: Probe attenuation switch



Figure 7: Probe finger safety ring

6. How to set the attenuation coefficient of the probe

The probe has multiple attenuation coefficients which can affect the vertical gain factor of the oscilloscope.
To change (check) the attenuation coefficient setting value of the probe in the oscilloscope menu, please follow the steps below:

(1) In the oscilloscope interface, short press the "MENU" key to bring up the system function menu on the screen, and then press the F1 key according to the channel used to switch between CH1/CH2.
(2) Press the F4 key to select the desired attenuation coefficient. This setting remains valid until it is changed again.

⚠ Note: The predetermined setting for the probe attenuation coefficient in the oscilloscope's factory menu is 10X. It is necessary to confirm that the attenuation switch setting on the probe is the same as the probe attenuation coefficient option in the oscilloscope menu.

The set values of the probe switch are 1X and 10X. See Figure 3.

⚠ Note: When the attenuation switch is set to 1X, the probe limits the bandwidth of the oscilloscope to 5MHz. When using the oscilloscope's full bandwidth, be sure to set the switch to 10X.

7. How to safely use the probe

The safety ring surrounding the probe body provides a finger barrier against electric shock. See Figure 7

⚠ Warning: To prevent electric shock when using the probe, please keep your fingers behind the safety ring on the probe body. To prevent electric shock when using the probe, do not touch the metal part of the probe head when connecting it to the voltage source. Before making any measurements, please connect the probe to the instrument and connect the grounding terminal to the ground.

8. Use a multimeter

About this chapter

This chapter gradually introduces the multimeter function of the oscilloscope, providing some basic examples on how to use menus and perform basic operations.

Instrument interface

The multimeter uses four safe banana socket input terminals: A, mA, COM, VΩ⊣◀

Multimeter interface:



Instructions:

1. Measurement type indication

⎓ Voltage	DCV/DCmV　DC voltage measurement
∼ Voltage	ACV/ACmV　AC voltage measurement
⎓ Current	DCmA/DCA　DC current measurement
∼ Current	ACmA/ACA　AC current measurement
Ω Resistance	RES　Resistance measurement
⊣◀ Diode	DIO　Diode measurement
•)) On-off	BEEP　On-off measurement
⊣⊢ Capacitance	CAP　Capacitance measurement

In oscilloscope mode, press the "MODE" button to enter the multimeter usage mode, and press this button again to exit the multimeter function and enter the next function.

Measurement function

After entering the multimeter function interface, there will be a measurement function indicator at the bottom of the screen. The measurement function can be selected through the F1-F7 function, including "DC/AC voltage", "resistance", "on-off", "diode", "capacitor", "DC/AC millivolt", "DC/AC milliampere", and "DC/AC ampere". 12 measurement functions to choose from.

Function key

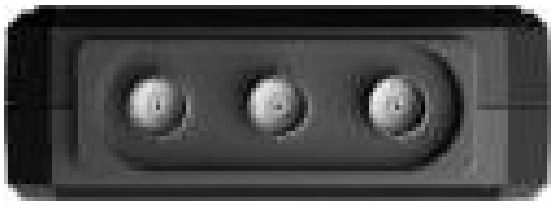
Short press "AUTO" to enter manual range; long press to return to automatic range.

Short press "HOLD/SAVE" to display data lock; short press again to unlock.

Attention: When measuring signals, please select the correct socket according to the label and do not measure voltage at the current socket.

The above product images and content are for reference only. In case of any discrepancies or updates, please refer to the actual product without further notice.

9. Use a signal generator



Press 'MODE' to switch or select the "Signal Output" mode as described in the "System Function Menu Settings". The output signal settings window will pop up and default to the "Waveform Type" setting. Press the left and right arrow keys to change the type of output waveform, including sine wave, square wave, triangular wave, trapezoidal wave, and sawtooth waveform outputs.



The signal output setting window has 4 sets of setting fields:

(1) Press F1 to select the waveform type and press the left and right arrow keys to select the waveform.

(2) Press F2 to select the output waveform amplitude setting, and press the up, down, left, and right directional keys to adjust. The output signal amplitude will be in the range of 0.3V-6V.

(3) Press F3 to select the output waveform frequency setting and press the up, down, left, and right directional keys to adjust the output signal frequency within the range of 1 Hz-2MHz.

(4) For square wave signals, press F4 to select the output waveform duty cycle setting, and press the up, down, left, and right directional keys to adjust the output signal duty cycle within the range of 1%-100%.

After setting the signal output parameters, connect the BNC probe to the "CEN OUT" signal output port and start using it. The signal output of "[symbol]" can be turned on or off, and there will be a prompt of "ON" or "OFF" in the upper left corner.

10. USB function

(1) Connect the oscilloscope's USB communication interface to the computer's USB interface using a USB cable for upgrading.

(2) Connect the USB power adapter for charging.

11. Fault handling

1. The oscilloscope cannot start.

It may be that the battery is completely depleted. At this point, even if powered by a power adapter, the oscilloscope still cannot start. First, you need to charge the battery and do not turn on the oscilloscope. Wait for about 15 minutes before attempting to turn on the oscilloscope. If you still cannot start, please contact us and we will be at your service.

2. After starting for a few seconds, the oscilloscope will shut down.

It may be that the battery has been depleted. Check the battery symbol in the upper left corner of the screen. The symbol "▭" indicates that the battery has been depleted and must be charged.

3. In oscilloscope mode, the measured voltage amplitude value is 10 times greater or less than the actual value.

Check if the channel attenuation coefficient matches the actual probe error rate used.

4.In oscilloscope mode, there is waveform display, but it cannot stabilize.

Check if the source item in the trigger mode menu matches the actual signal channel used.

Check if the trigger level has exceeded the waveform range. Only by setting parameters reasonably can the waveform be displayed stably.

5. In the oscilloscope state, pressing the "[symbol]" key does not display anything.

Check if the triggering mode of the menu is normal or single, and if the triggering level exceeds the waveform range. If it is "AUTO", control the trigger level or set the trigger mode to automatic. In addition, the button can automatically complete the above settings.

6.When in oscilloscope mode, the display speed slows down after a longer duration is set to average value sampling in acquisition mode or display setting. This is a normal phenomenon.

12. Technical specifications

Unless otherwise specified, the technical specifications used are applicable to probes with attenuation switches set to 1X and this series of oscilloscopes. Oscilloscopes must first meet the following two conditions in order to meet these specifications:

The instrument must run continuously for more than thirty minutes at the specified operating temperature

If the operating temperature change range reaches or exceeds 5 °C, the system function menu must be opened and the "Self Calibration" program must be executed (see "Baseline Calibration" menu function operation).

Oscilloscope technical specifications

Feature		Instructions
Measurement	Automatic measurement	Dual-channel
Measurement	Sampling method	Real time sampling
	Real time sampling rate	200M
Number of channels	2	Dual-channel
Input	Input coupling	DC, AC
	Input impedance	1MΩ ±16pf
	Probe attenuation	X1 X10,X100
	Maximum input voltage	X1 gear<150V, X10 gear<300V (DC+AC peak)
Level	Sampling rate range	1 to Sa/s 200MSa/s
	Waveform interpolation	(sin x)/x
	Scanning speed range	10ns/div–20s/div
	Trigger accuracy	20point
	Record length	Up to 128Kbyte
Vertical	Sensitivity	20mV/div 10V/div
	Displacement range	4 grids (positive and negative)
	Simulate bandwidth	50MHz
	Low frequency response	Greater than 10Hz
	Rise time	Less than 10ns
	DC gain accuracy	±3%
Measurement	Automatic measurement	Cycle, frequency, peak to peak value, maximum value, minimum value, root mean square, duty cycle, average value
Trigger	Trigger mode	Automatic, normal, single time
	Trigger edge	Rising edge, falling edge
Signal generator output		Sine wave, square wave, triangular wave, half wave, full wave, sawtooth wave
Display mode		YT、XY
Afterglow mode		Minimum, 500ms, 1S, 10S, Unlimited

Output of probe compensator:

Feature	Instructions
Output voltage (typical)	3Vp-p, high resistance
Frequency (typical)	Square wave 1K Hz (± 1%)

A multimeter:

Feature	Instructions
Digital display	25000 readings 9999 readings for capacitance
Measurement types	Voltage, current, resistance, capacitance, on-off, diode
Maximum input voltage	AC:750V DC:1000V
Maximum input current	AC:10A DC:10A

Function	Range	Resolution	Precision
DC voltage (mV)	25.000mV	0.001mV	±(0.05%+5)
	250.00mV	0.01mV	
DC voltage (V)	2.5000V	0.0001V	±(0.1%+10)
	25.000V	0.001V	
	250.00V	0.01V	
	1000.0V	0.1V	
AC voltage (mV)	25.000mV	0.001mV	±(0.1%+8)
	250.00mV	0.01mV	
AC voltage (V)	2.5000V	0.0001V	±(0.1%+10) ±(0.5%+10)
	25.000V	0.001V	
	250.00V	0.01V	
	750.0V	0.1V	
AC voltage frequency response: 40Hz~1kHz			
DC current (mA)	25.000mA	0.001mA	±(0.5%+10)
	250.00mA	0.01mA	
DC current (A)	2.5000A	0.0001A	
	10.000A	1mA	
AC current (μA/mA)	25.000mA	0.001mA	
	250.00mA	0.01mA	
AC current (A)	2.5000A	0.0001A	
	10.000A	0.001A	
AC voltage frequency response: 40Hz~1kHz			
Resistance	250.00Ω	0.01Ω	±(0.05%+10)
	2.5000kΩ	0.0001KΩ	
	25.000kΩ	0.001KΩ	
	250.00kΩ	0.01KΩ	
	2.5000MΩ	0.00001MΩ	±(1%+10)
	25.000MΩ	0.001MΩ	
	250.0MΩ	0.1MΩ	±(5%+20)
Capacitance	9.999nF	0.001nF	±(5%+20)
	99.99nF	0.01nF	
	999.9nF	0.1nF	
	9.999μF	0.001μF	
	99.99μF	0.01μF	
	999.9μF	0.1μF	
	9.999mF	0.001mF	±(5%+10)
	99.99mF	0.01mF	

Function	Range	Resolution	Precision
Frequency (can only be measured up to 100kHz in AC voltage range)	99.99 Hz	0.01Hz	±(0.1% 2)
	999.9 Hz	0.1Hz	
	9.999kHz	0.001kHz	
	99.99kHz	0.01kHz	
	999.9kHz	0.1kHz	
On-off	✓ (<50Ω)		
Diode	✓ (0-3V)		

Signal generator:

Feature	Instructions		
Frequency characteristics	Sine wave	1HZ~5MHZ	
	Square wave	1HZ~2MHZ	
	Triangle wave	1HZ~2MHZ	
	Half-wave	1HZ~2MHZ	
	Full wave	1HZ~2MHZ	
	Sawtooth wave	1HZ~300KHZ	
Real-time sampling rate	200MSa/s		
Amplitude (50Ω)		0.3Vpp - 5Vpp	0.3Vpp - 2.8Vpp
	Sine wave	1HZ~3.999999MHZ	1HZ~5MHZ
	Square wave	1HZ~2MHZ	1HZ~2MHZ
	Triangle wave	1HZ~1.7MHZ	1HZ~2MHZ
	Half-wave	1HZ~2MHZ	1HZ~2MHZ
	Full wave	1HZ~1.7MHZ	1HZ~2MHZ
	Sawtooth wave	1HZ~300KHZ	1HZ~500KHZ
DC offset range (high resistance)	0		
Frequency resolution	1HZ		
Channel	1		
Waveform length	256Byte		
Vertical resolution	8bit		
Output Impedance	50Ω		

General technical specifications

Display:

Feature	Instructions
Display type	3.2-inch color TFT display
Display resolution	320 horizontal x 240 vertical pixels
Display color	65536 colors

Environment

Feature	Instructions
Temperature	Working temperature: 0℃~40℃
	Storage temperature: -20℃~+60℃
Relative humidity	<80%

Feature	Instructions
Height	Operate 3000 meters
	Non-operational 15000 meters
Cooling method	Natural cooling

Adjustment Interval: It is recommended to calibrate the interval for one year.

Maintenance and cleaning

General maintenance

Do not store or place the instrument in a place where the LCD screen is exposed to direct sunlight for a long time.

Caution: Do not allow sprays, liquids and solvents to touch the instrument or probe to avoid damaging the instrument or probe.

Cleaning:

Regularly inspect the instruments and probes based on operational conditions. Clean the outer surface of the instrument according to the following steps:

1. Please use a soft cloth to wipe the floating dust on the outside of the instrument and probe. When cleaning the LCD display screen, be careful not to scratch the transparent LCD protective screen.

2. Use a damp but non-dripping soft cloth to wipe the instrument. It must be turned off to disconnect the power supply. You can use a gentle cleaner or clean water to scrub. Do not use any abrasive chemical cleaning agents to avoid damaging the instrument or probe.

⚠**Warning:** Before powering on again, please ensure that the instrument is completely dry to avoid electrical short circuits or even personal injury caused by moisture.

Battery charging and replacement

During long-term storage, the device may experience low battery power due to self-discharge of the lithium battery, causing it to fail to turn on. This is a normal phenomenon.

Please use the included adapter to pre-charge the device for 0.5-1 hour (depending on storage time) before turning it on. In addition, if the device is not used for a long time, it is recommended to charge it every once in a while to avoid over-discharging the lithium battery.

Battery charging

When leaving the factory, lithium batteries may not be fully charged. To ensure sufficient battery power, please refer to the following table for charging and discharging:

Charging duration	>7.5 hours
Discharge duration	>4 hours

The power and battery indicator symbols in the upper right corner of the screen are described as follows:

The symbol represents the charging status when turned on;

The symbol represents battery power supply;

The symbol indicates that there are only about five minutes left for use. Please follow the relevant prompts to charge as soon as possible to avoid damaging the battery.

Charging method

Charging the battery through a power adapter: Connect the oscilloscope to a power outlet using a randomly provided USB data cable and power adapter for charging.

Charging the oscilloscope through USB interface: Connect the oscilloscope to a computer or other device for charging through a USB data cable (pay attention to the load capacity of the power supply device to avoid abnormal device operation).

Attention: To avoid battery overheating during charging, the ambient temperature must not exceed the allowable value specified in the technical specifications.

Replace lithium battery pack: Usually, there is no need to replace the battery pack. But when there is such a need, only qualified personnel can replace it, and only lithium batteries of the same specification can be used.

The parameters in this manual are subject to change without prior notice. Our company does not assume responsibility for accidents and hazards caused by user errors;