General Warranty

We warrants that the product will be free from defects in materials and workmanship for a period of three years from the date of purchase of the product by the original purchaser from our company. And the warranty period of accessories such as probe, battery, adapter is one year. This warranty only applies to the original purchaser and is not transferable to the third party. If the product proves defective during the warranty period, we either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by our company for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of our company.

In order to obtain service under this warranty, Customer must notify our company of the defect before the expiration of the warranty period. Customer shall be responsible for packaging and shipping the defective product to the service center designated by our company, and with a copy of customer proof of purchase.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. We shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than our company representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of not our supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

Please contact the nearest Sales and Service Offices for services.

Excepting the after-sales services provided in this summary or the applicable warranty statements, we will not offer any guarantee for maintenance definitely declared or hinted, including but not limited to the implied guarantee for marketability and special-purpose acceptability. we should not take any responsibilities for any indirect, special or consequent damages.

Table of Contents

2. SAFETY INFORMATION ····· 4

2.1 Safety Symbols and Terms ····· 4

2.1.1 Safety Symbols ····· 4

2.1.2 Safety Terms ····· 4

2.2 General Safety Information ····· 4

3. GENERAL CHARACTERISTICS ····· 7

4. PERFORMING THE GENERAL INSPECTION ····· 8

4.1 Performing the General Inspection ····· 8

4.1.1 Check whether there is any Damage on it Due to Transportation ····· 8

4.1.2 Make a Check on Accessories ····· 8

4.1.3 Make a Check on the Complete Instrument ····· 8

5. INPUT CONNECTIONS ····· 9

5.1 Input Connections ····· 9

5.1.1 Input connections ····· 9

5.1.2 The connection of 1 kHz/5 V Square-wave test signal ····· 10

5.2 Front Panel and Keys Overview ····· 10

6. USING THE OSCILLOSCOPE ····· 13

6.1 About this Chapter ····· 13

6.2 Powering Up the Oscilloscope ····· 13

6.3 Oscilloscope Operation Window ····· 13

6.4 Menu Description ····· 14

6.5 Manually Setting the Vertical System, Horizontal System and Trigger Position ····· 15

6.5.1 Setting the Vertical System ····· 15

6.5.2 Setting the Horizontal System and Trigger Position ····· 15

6.6 Recall factory settings ····· 17

6.7 Input Connections ····· 17

6.8 Displaying an Unknown Signal with Auto Set ····· 17

6.9 Automatic Measurements ····· 17

6.10 Freezing the Screen ····· 18

6.11 Using Average for Smoothing Waveforms ····· 18

6.12 Selecting AC-coupling ····· 18

6.13 Using Waveform Mathematics Functions ····· 18

7. USING THE MULTIMETER ····· 19

7.1 About this Chapter ····· 19

7.2 Making Meter Connections ····· **19**
7.3 Multimeter Operation Window ····· **19**
7.4 Making Multimeter Measurements ····· **20**
7.4.1 Measuring Resistance Values ····· 20
7.4.2 Measuring Diode ····· 21
7.4.3 On-off Test ····· 21
7.4.4 Measuring Capacitance ····· 21
7.4.5 Measuring DC Voltage ····· 21
7.4.6 Measuring AC Voltage ····· 22
7.4.7 Measuring DC Current ····· 22
7.4.8 Measuring AC Current ····· 22
7.5 Freezing the Readings ····· **23**
7.6 Taking a Relative Measurement ····· **23**
7.7 Selecting Automatic/ManualRange Adjustment ····· **24**

8. TROUBLE SHOOTING ····· **25**

9. APPENDIX ····· **26**

Maintenance ····· 26
Storage of Oscilloscope ····· 26
Replacing the Lithium Battery Unit ····· 26

1. Package Contents

See the picture below. This picture is only for your reference. If any discrepancy found between certain picture and product, please look the actual product.

#	Description	Standard	Optional
1	Oscilloscope and Battery	●	
2	AC-DC adapter	●	
3	Oscilloscope Probe × 2 (grey)	●	
4	Multimeter test lead × 2 (black and red)	●	
5	USB Mass Storage connect cable	●	
6	Extension module for capacitance measurement	●	
7	Probe adjustment tools	●	
8	USB communication cable or RS-232C communication cable	●	
9	Quick Guide	●	
10	CD-ROM (software)	●	
11	Metal carrying case		●
12	Soft carrying case		●
13	The output terminal of 1 kHz 5 V square-wave test signal	●	



Figure 1: Digital Oscilloscope Parts

2. Safety Information

In order to ensure the correct using and the best efficient service, please carefully read this user's manual.

2.1 Safety Symbols and Terms

2.1.1 Safety Symbols

These symbols may appear in this manual or on the instrument.

Warning: "Warning" identifies conditions and actions that pose hazards to the users.

Caution: "Caution" identifies conditions and actions that may damage the product or other properties.

DANGER: High Voltage	Refer to the Manual	Protective Conductor Terminal	Chassis Ground	Earth (ground) Terminal
				

2.1.2 Safety Terms

The following terms may appear on the instrument:

Danger: The term "Danger" is used in this manual to indicate that when you read this mark, personal injury may be caused to you immediately.

Warning: The term "Warning" is used in this manual to indicate that when you read this mark, personal injury may not be caused to you immediately, but you need to be cautionary.

Notice: The term "Notice" is used in this manual to indicate that damages may be caused on this product or other properties.

2.2 General Safety Information

Carefully read the following safety information in order to avoid any personal injury and damage on this product or any products connected with it. This product can only be used in the specified applications to prevent any possible dangers.

Warning:

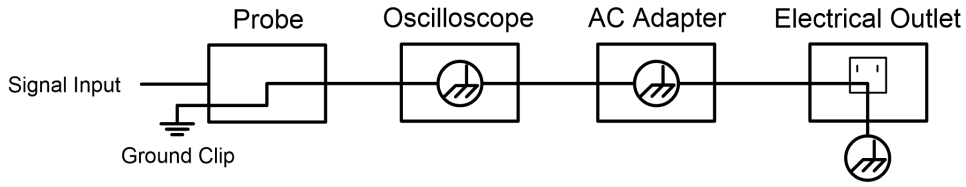
To avoid fire or electrical shock, please use proper power adapter. Use only the power adapter appointed by the manufacturer and subject to approval of being used in the user's country.

Warning:

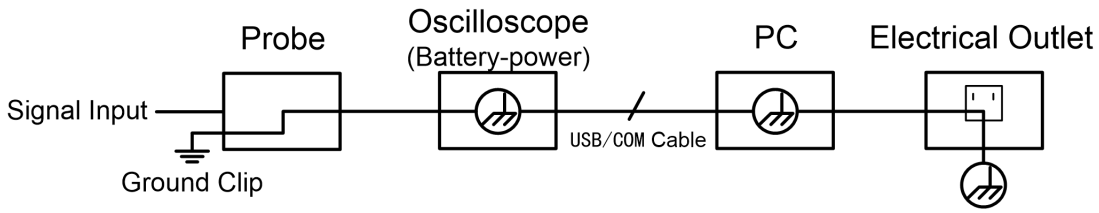
The two channels of the oscilloscope are non-isolated electrically. The channels should adopt common basis during measuring. To prevent short circuits, the 2 probe ground must not be connected to 2 different non-isolated DC level.

Warning:

The channels should adopt common basis during measuring. To prevent short circuits, the 2 probe ground must not be connected to 2 different non-isolated DC level.
The diagram of the oscilloscope ground wire connection:



The diagram of the ground wire connection when the battery-powered oscilloscope is connected to the AC-powered PC through the ports:



It is not allowed to measure AC power when the oscilloscope is AC powered through the adapter, or when the battery-powered oscilloscope is connected to the AC-powered PC through the ports.

Warning:

To avoid fire or electrical shock if a test tool input is connected to more 42V peak (30Vrms) or on circuits of more than 4800VA:

- **Use only insulated voltage probes, test leads and adapter supplied with the test tool, or indicated by us as suitable for the Oscilloscope & Multimeter.**
- **Before use, inspect voltage probes, test leads and accessories for mechanical damage and replace when damaged.**
- **Remove all probes, test leads and accessories that are not in use.**
- **Always connect the power adapter first to the AC outlet before connecting it to the**

Oscilloscope & Multimeter.

- **Do not apply voltages that differ more than 400 V from earth ground to any input when measuring in a CAT Ⅱ environment.**
- **Do not apply voltages that differ more than 400 V from each other to the isolated inputs when measuring in a CAT Ⅱ environment.**
- **Do not apply input voltages above the rating of the instrument Use caution when using 1:1 test leads because the probe tip voltage will be directly transmitted to the Oscilloscope & Multimeter.**
- **Do not use exposed metal BNC or banana plug connectors.**
- **Do not insert metal objects into connectors.**
- **Always use the Oscilloscope & Multimeter only in the manner specified.**
- **Voltage ratings that are mentioned in the warning are giver as limits for "working voltage". The represent V ac rms (50-60Hz) for AC sine wave applications and as V dc for DC applications. Overvoltage Category Ⅱ refers to local level , which is applicable for appliances and portable equipment .**

Only qualified technical personnel are permitted to perform maintenance.

Pay attention to the nominal values of all terminals: To avoid fire or electric shock, please keep a watchful eye on all nominal values and marks specified for this product. Before any connection performed on this product, carefully read the user's manual of the product for further information of nominal values.

No operation is allowed without the instrument cover plate: If the cover plate or panel has been removed, do not perform any operation on this product.

No touch is allowed on bare conductors: When the product is powered on, do not touch any bare joints or parts of the scope meter.

Operation is prohibited in case of any undetermined failure: When in doubt any damage on this product, consult the qualified personnel for checking on it.

Keep ventilation in good condition: Refer to the user manual for detail installation instructions in order to fix this product correctly and provide it with good ventilation conditions.

No operation is allowed under a humid environment.

No operation is allowed under an explosive environment.

Keep clean and dry on the product surface.

The method which stipulated according to the factory does not use the equipment, possibly can damage the protection which the equipment provides.

3. General Characteristics

Oscilloscope

- 2 in 1 (Multimeter function support);
- Record length of 6,000 points for each channel;
- Reading-out with the cursor;
- Twenty automatic measurement functions;
- Autoscale function;
- Color liquid crystal display of high resolution and high contrast with adjustable back light;
- Storage and call-out of waveforms;
- Automatic setting function provided capable of fast setting;
- Multiple-waveform calculation function;
- Implementation of detecting the average and peak values of the waveform;
- Edge, video and alternate triggering function;
- RS232 or USB communication ports;
- Multiple Language User Interface.

Multimeter

- 3 and 3/4 digits;
- Volts, Amps, Ohms, Diode, Capacitance, Continuity measurement;
- 10A maximum amplitude;
- Isolated inputs between oscilloscope and multimeter.

4. Performing the General Inspection

4.1 Performing the General Inspection

When you have got a new oscilloscope, it is suggested that you should perform a general inspection on the instrument according to the following steps.

4.1.1 Check whether there is any Damage on it Due to Transportation

If the packing boxes or foam cushions are found in serous damage, keep them in a proper place until the complete instrument and accessories have passed the electrical and mechanical tests.

4.1.2 Make a Check on Accessories

The accessory list has been described in the picture of Digital Oscilloscope Parts of this manual. You can make a check and find whether there is any accessory loss with reference to the Appendix. In case of any accessory loss or damage, consult the our dealer responsible for such a business or the local office of our company.

4.1.3 Make a Check on the Complete Instrument

If the instrument is damaged in its appearance or it fails in normal operation or performance test, consult the our dealer responsible for such a business or the local office of our company. If the instrument is damaged due to transportation, keep the packing in a proper place and consult the transportation department and the our dealer responsible for such business, who will provide an instrument replacement or maintenance.

5. Input Connections

5.1 Input Connections

5.1.1 Input connections



Figure 1：Input connections

Description:

1. The power adapter is supplied for AC power supply and battery recharging.
2. Multimeter test lead.
3. Multimeter input jacks, including four circular banana jacks. The first jack measuring the current 2 A-10A, the second jack on the current Measurement, the third COM ground input, and the fourth measuring voltage, resistance, Capacitance input.
4. Oscilloscope probes.
5. Oscilloscope channel inputs: the upper one is for Channel 1 (CH1), while the lower one is for Channel 2 (CH2).
6. The output terminal of 1 kHz/5 V square-wave test signal.

5.1.2 The connection of 1 kHz/5 V Square-wave test signal

At the left side of the oscilloscope, it is a port for testing 1 kHz/5 V square-wave signal which is used to adjust the probe.

5.2 Front Panel and Keys Overview



Figure 2：Front Panel

Description:

1. AC adapter Port
2. RS-232C Port.
3. USB Port.
4. USB Mass Storage Port.
5. Power switch.
6. F1 - F5: Switch or Adjust options for each menu.
7. AUTO SET: Under DSO mode, automatically selects the horizontal scales, vertical scale, and trigger level according to the input signal.
8. **COPY**: Press to save the waveform data into the USB Mass Storage Device.
9. ▲ (red): Adjust voltage scale or vertical position in Channel 1.
10. VOLTS POSITION (red): Switch between voltage scale and vertical position in Channel 1.
11. ▼ (red): Adjust voltage scale or vertical position in Channel 1.
12. ▲ (blue): Adjust voltage scale or vertical position in Channel 2.
13. VOLTS POSITION (blue): Switch between voltage scale and vertical position in Channel 2.
14. ▼ (blue): Adjust voltage scale or vertical position in Channel 2.
15. RUN/STOP: key for running or stopping the operation
16. LIGHT: Light switch.
17. DMM/OSC: Operation mode switching key between oscilloscope and multimeter.
18. MENU ▲: Choose the upper item on the menu list.
19. MENU: Show / Hide the menu
20. MENU ▼: Choose the lower item on the menu list.
21. OPTION: the key for DSO setting and combines with four arrow keys. Then to set main time base, trigger horizontal position and trigger vertical position. Furthermore the keys possible to adjust the display multiplying factors of M waveform (CHMath Volts/Div) and display vertical position (CHM Zero) during waveform calculation and to adjust cursor 1 (V1 or T1) and cursor 2 (V2 or T2) position during cursor measurement.
22. ▲ (yellow): Oscilloscope display upward adjustment key.
23. ▼ (yellow): Oscilloscope display downward adjustment key.
24. ► (yellow): Oscilloscope right-direction adjustment key.
25. ◄ (yellow): Oscilloscope left-direction adjustment key.

26. **A**: Selects DMM current measurement
27. **V**: Selects DMM voltage measurement
28. **R**: Selects DMM impedance, diode, continuity and capacitance measurement
29. **SET**: convert AC and DC during measure current or voltage in Multi-meter; convert resistance, diode, on-off and capacitance measure during resistance measuring.

6. Using the Oscilloscope

6.1 About this Chapter

This chapter provides a step-by-step introduction to the scope functions. The introduction does not cover all of the capabilities of the scope functions but gives basic examples to show how to use the menus and perform basic operations.

6.2 Powering Up the Oscilloscope

Connect oscilloscope to AC power via AC-DC adapter. (The oscilloscope may still work with built-in Li-ion battery even without AC power supply).

Turn the oscilloscope on by pressing down the power on/off key ⏻.

The instrument then performs self checking after power on. A greeting window and a sentence "Press any key to continue." will display on the screen when the system finishes self checking. The users can press any key to enter the measuring function.
The oscilloscope is powered up in its last setup configuration.

6.3 Oscilloscope Operation Window

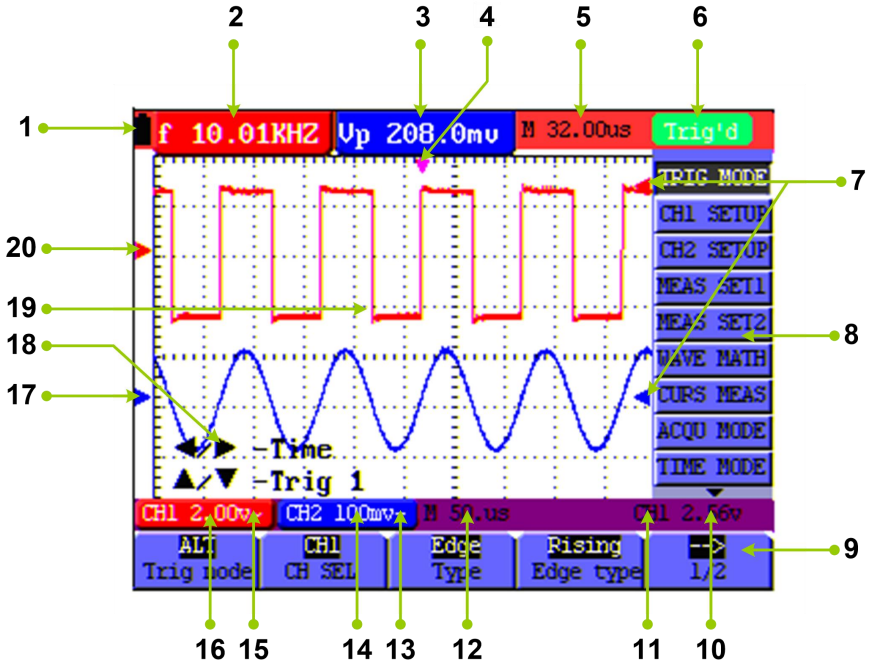


Figure 3: Oscilloscope Operation Window

Description:

1. Battery electric quantity indicating symbols.
2. Auto measurement window 1.
3. Auto measurement window 2.
4. The pointer indicates the horizontal triggering position.
5. This reading gives the Time Difference between the horizontal triggering position and the screen centerline. It reads zero when the pointer is in the center of the screen.
6. The trigger state.
7. Red and blue index display triggers vertical position during alternate trigger and triggers index become green when it reaches edge trigger or video trigger.
8. A hidden-style menu: With the **MENU** key pressed, you can view or hide the menu.
9. Menu setting options: There are different setting options for different menus.
10. It reads the value of trigger voltage level.
11. The display shows the trigger signal source.
12. The reading gives the value of primary time base.
13. These graphics present the coupling modes of channel 2(CH2). The graphic "～" indicates AC, the graphic "－" indicates DC, the graphic " ⏚ " indicates GND.
14. This reading shows the vertical Voltage Unit Scale of CH2.
15. These graphics show the coupling mode of CH1, among which the graphic "～" express indicates AC, the graphic "－" indicates DC, the graphic " ⏚ " indicates GND.
16. This reading shows the vertical Voltage Unit Scale of CH1.
17. The blue pointer gives the grounding datum point of the waveform on CH2, which is the zero position of CH2. No display of this pointer indicates that the channel has not been opened.
18. OPTION operation prompt: There are different prompts for different OPTION operations.
19. Waveform display area. Red waveform represent CH1, blue waveform represent CH2.
20. The red pointer gives the grounding datum point of the waveform on CH1, which is the zero position of CH1. No display of this pointer indicates that the channel has not been opened.

6.4 Menu Description

The following example shows how to use the tool's menus to select a function.

1. Press the **MENU** key to display the Function Menu on the right of the screen and the corresponding optional settings on the bottom. Press **MENU** again will hide the Function Menu.
2. Press the **MENU** ▲ or **MENU** ▼ key to select different function menus.
3. Choose one key from **F1** to **F5** and press it to change function setting.

6.5 Manually Setting the Vertical System, Horizontal System and Trigger Position

6.5.1 Setting the Vertical System

To set the vertical system of CH1:

(1) Press **VOLTS POSITION (red)** key to toggle between bellows displayed at the bottom left of the screen:

▲/▼ – CH1 Zero

▲/▼ – CH1 Volts/Div

(2) When "**▲/▼ – CH1 Zero**" is displayed, **▲ (red)** and **▼ (red)** can be used to adjust the vertical position of CH1; the relevant information will be displayed.

(3) When "**▲/▼ – CH1 Volts/Div**" is displayed, **▲ (red)** and **▼ (red)** can be used to adjust the voltage scale of CH1; the relevant information will be displayed.

Note: A long press on the **VOLTS POSITION (red)** key can set the vertical display position of CH1 back to 0. (Only for some model)

To set the vertical system of CH2:

(1) Press **VOLTS POSITION (blue)** key to toggle between bellows:

▲/▼ – CH2 Zero

▲/▼ – CH2 Volts/Div

(2) When "**▲/▼ – CH2 Zero**" is displayed, **▲(blue)** and **▼(blue)** can be used to adjust the vertical position of CH2, the relevant information will be displayed;

(3) When "**▲/▼ – CH2 Volts/Div**" is displayed, **▲ (blue)** and **▼ (blue)** can be used to adjust the voltage scale of CH2, the relevant information will be displayed.

Note: A long press on the **VOLTS POSITION (blue)** key can set the vertical display position of CH2 back to 0. (Only for some model)

6.5.2 Setting the Horizontal System and Trigger Position

OPTION key is a multiple setting key to set trigger vertical position, main time base and horizontal position (trigger horizontal position) during edge trigger and video trigger; or to set

trigger vertical position for Horizontal time base and trigger vertical position and horizontal level position during alternate trigger.

The following example shows how to use **OPTION** key to make a setting.

The following guidance is for the operation on the mode of edge triggering and video triggering.

1. Press once the **OPTION** key; the following is displayed at the bottom left side of the screen.

   ◄/► – Time Base

   ▲/▼ – Trig

2. Press ◄ (yellow) or ► (yellow) to adjust the main time base; press ▲ (yellow) or▼ (yellow) to adjust trigger level position, press **R** key to "zero" the trigger level position.

3. Press **OPTION** again and left bottom side display as

   ◄/► – Time

   ▲/▼ – Trig

4. Press **◄(yellow)** or **►(yellow)** to adjust time base horizontal position, press **V** key to "zero" the horizontal position; press **▲(yellow)** or **▼(yellow)** to adjust trigger level position, press **R** key to "zero" the trigger level position.

5. Press **OPTION** again to back up operation 1.

The following guidance is for the operation on the mode of alternative triggering.

1. Press **OPTION** and left bottom display as:

   ◄/►—Time

   ▲/▼—Trig 2 (or Trig 1)

2. Press **◄ (yellow)** or **► (yellow)** to adjust time base horizontal position, press **V** key to "zero" the horizontal position; press **▲(yellow)** or **▼(yellow)** to adjust trigger level position in Channel 2 (or Channel 1), press **R** key to "zero" the trigger level position.

3. Press **OPTION** again and left bottom display as:

   ◄/►— Time Base

   ▲/▼— Trig 1 (or Trig 2)

4. Press **◄(yellow)** or **► (yellow)** to adjust main time base; press **▲(yellow)** or**▼(yellow)** to adjust trigger level position in Channel 1 (or Channel 2), press **R** key to "zero" the trigger level position.

5. Press **OPTION** again to back up operation 1.

6.6 Recall factory settings

If you want to reset the Oscilloscope to the factory settings, do the following:

1. Press **MENU** key and the function menu appears on the right side of the screen
2. Press the **MENU** ▲ or **MENU** ▼ key to select **FUNCTION** setting and three options are visible at the bottom of the screen.
3. Press **F1** key to select "**Recall Factory**" to recall the factory settings.
4. Press **F2** key to select "**Auto calibration**". If the ambient temperature variation is up to or larger than 5 Celsius degree, the Auto calibration function should be performed. But this will not affect the using and capability by the heat from LCD and electronic component.

6.7 Input Connections

See Figure 1 on P9.

Look at the bottom and the right of the Oscilloscope. The Oscilloscope has six signal inputs: two safety BNC jack inputs (CH1 and CH2) for scope measurements, four safety 4-mm banana jack inputs for Multimeter R, V and A measurements.

Isolated input allows independent floating measurements between Multimeters and Scopes.

6.8 Displaying an Unknown Signal with Auto Set

1. Connect the test probe to the tested signals.
2. Press the **AUTO SET** key and the Oscilloscope is under the automatic measurement condition. The tested signals appear on the screen.

6.9 Automatic Measurements

To choose a frequency for CHI1, do the following:

1. Press **MENU** key and the function menu appears on the right side of the screen.
2. Press **MENU** ▲ or **MENU** ▼ key to select **MEAS SET1**. Five items selectable are visible at the bottom of the screen.
3. Press **F1** key and select **Freq CH1** from the mean square root value item. The **measurement 1** window turns its color into red and shows the frequency for input CH1.

6.10 Freezing the Screen

You can freeze the screen (all readings and waveforms)

1. Press the **RUN/STOP** key to freeze the screen and **STOP** appears at top right side of the screen.
2. Press the **RUN/STOP** key once more to resume your measurement.

6.11 Using Average for Smoothing Waveforms

1. Press the **MENU** key and the function menu appears on the right side of the screen.
2. Press **MENU ▲** or **MENU ▼** key to select **ACQU MODE**, with four items selectable displayed at the bottom of the screen.
3. Press the **F3** key to select **Average**, then, press **F4** key to jump to **Averages 16** item. This averages the outcomes of 16 acquisitions and shows the final averaging result on the screen.

6.12 Selecting AC-coupling

1. Press **MENU** key and the function menu appear at the right side of the screen.
2. Press **MENU ▲** or **MENU ▼** key to select **CH1 SETUP.** Four items selectable are visible at the bottom of the screen.
3. Press the **F1** key and jump to **AC**. The bottom left side of the screen displays the ac-coupling icon.

6.13 Using Waveform Mathematics Functions

1. Press the **MENU** key and the function menu is displayed at the right side of the screen.
2. Press the **MENU ▲** or **MENU ▼** key to select the **WAVE MATH.** Five items selectable appears at the bottom of the screen.
3. Press **F3** key to select **CH1+CH2** and the calculated waveform **M** (green) appears on the screen.
4. Press OPTION until left bottom display as

   ◄/►—CHMath Volts/Div

   ▲/▼—CHM Zero
5. Press ▲ (yellow) or ▼ (yellow) to adjust vertical display position of waveform M.

   Press ◄ (yellow) or ► (yellow) to adjust display times factor of waveform M.
6. Press the **F3** key to close Waveform Calculation.

7. Using the Multimeter

7.1 About this Chapter

This chapter provides a step-by-step introduction to the multi-meter functions of the test tool hereafter. The introduction gives basic examples to show how to use the menus and perform basic operations.

7.2 Making Meter Connections

Use the four 4-mm safety banana jack inputs for the Meter functions: **10A, mA, COM, V/Ω/C.**

See Figure 1 on P9 for the connections.

7.3 Multimeter Operation Window

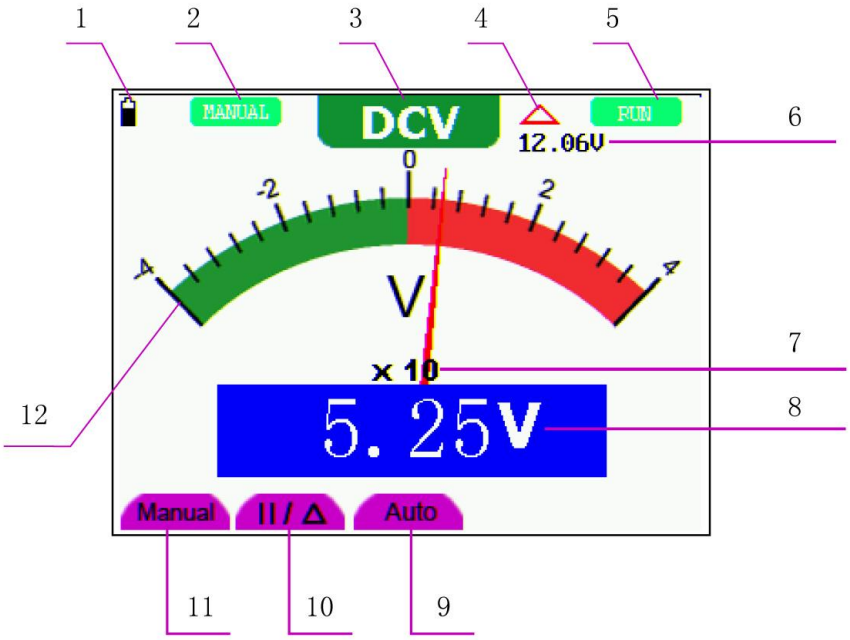


Figure 4: Multimeter Operation Window

Description

1. Battery electric quantity indicator.
2. Manual/Auto range indicators, among which the **MANUAL** means measuring range in manual operation mode and **AUTO** refers to the measuring range in automatic operation mode.

3. Measurement mode indicators:

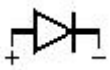
   DCV: Direct voltage measurement

   ACV: Alternating voltage measurement

   DCA: Direct current measurement

   ACA: Alternating current measurement

   R: Resistance measurement

    : Diode measurement

    : On/Off measurement

   C: Capacitance measurement

4. The relative magnitude measurement indicator.
5. Running state indicators, among which **RUN** expresses continuous update and **STOP** represents the screen locking.
6. The reference value of the relative magnitude measurement.
7. The multiplying power of the dial indication. To multiply the reading of dial pointer by multiplying power will get the measurement result.
8. The main reading of measurement
9. Automatic control measuring range.
10. Absolute/ relative magnitude measuring control: The sign "||" expresses the absolute magnitude measuring control and "△" represents the relative magnitude measuring control.

    Manually measuring range control.
11. Manual measurement control.
12. Test lead indicated the scale of test reading; different test modes display different colors.

7.4 Making Multimeter Measurements

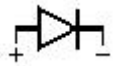
Press **DMM/OSC** key, the oscilloscope will switch to the multimeter measure; the screen will display the multimeter windows.

7.4.1 Measuring Resistance Values

1. Press the **R** key and **R** appears at the top of the screen.
2. Insert the black lead into the **COM** banana jack input and the red lead into the **V/Ω/C** banana jack input.

3. Connect the red and black test leads to the resistor. The resistor value readings are shown on the screen in Ohm.

7.4.2 Measuring Diode

1. Press the **R** key and **R** appears at the top of the screen.
2. Press **SET** key until the following is displayed on the screen .
3. Insert the black lead into the **COM** banana jack input and the red lead into the **V/Ω/C** banana jack input.
4. Connect the red and black leads to the resistor and the diode resistor readings are displayed on the screen in **V**.

7.4.3 On-off Test

1. Press the **R** key and **R** appears on the top of the screen.
2. Press the **SET** key until the following is shown on the screen. 
3. Insert the black lead into the **COM** banana jack input and the red lead into the **V/Ω/C** banana jack input.
4. Connect the red and black leads to the test point. If the resistance value of the tested point is less than 50Ω, you will hear beep sound from the test tool.

7.4.4 Measuring Capacitance

1. Press the **R** key and **R** appears on the top of the screen
2. Press the **SET** key until **C** appears at the top of the screen.
3. Insert the capacitance measurer of this multimeter to **COM** jack and **V/Ω/C** jack**.**
4. Insert the capacitance to the capacitance measurer, then screen shows the capacitance reading.

Notice: when measured value is less than 5 nF capacitance, please use relative value measuring mode to improve measuring precision. It will take about 30seconds if capacitance measurement is larger than 40uF.

7.4.5 Measuring DC Voltage

1. Press the **V** key and **DCV** appears at the top of the screen.
2. Insert the black lead into the **COM** banana jack input and the red lead into the **V/Ω/C** banana jack input.
3. Connect the red and black leads to the measured point and the measured point voltage value

is displayed on the screen.

7.4.6 Measuring AC Voltage

1. Press the **V** key and **DCV** appears at the top of the screen.
2. Press the **SET** key and **ACV** appears at the top of the screen.
3. Insert the black lead into the **COM** banana jack input and the red lead into the **V/Ω/C** banana jack input.
4. Connect the red and black leads to the measured points and the AC voltage values of measured points will be displayed on the screen.

7.4.7 Measuring DC Current

To measure a DC current which is less than 400 mA, do the following:

1. Press the **A** key and **DCA** appears at the top of the screen. The unit on the main reading screen is **mA. mA** and **10A** will display on the right bottom of screen, press **F4** and **F5** to switch the measurement between **mA** and **10A**. 400mA is acquiescently.
2. Insert the black lead into the **COM** banana jack input and the red lead into the **mA** banana jack input.
3. Connect the red and black leads to the measured points and the DC current values of measured points will be displayed on the screen.

To measure a DC current which is larger than 400 mA, do the following:

1. Press the **A** key and **DCA** appears at the top of the screen. The unit on the main reading screen is **mA**.
2. Press **F5** key change to **10A** measurement, the unit on the main reading screen is **A.**
3. Insert the black lead into the **COM** banana jack input and the red lead into the **10A** banana jack input.
4. Connect the red and black leads to the measured point and the **DC** current value of the measured point will be displayed on the screen.
5. Press **F4** return to 400 mA measure.

7.4.8 Measuring AC Current

To measure an AC current which is less than 400 mA, do the following:

1. Press the **A** key and **DCA** appears at the top of the screen. The unit on the main reading screen is **mA. mA** and **10A** will display on the right bottom of screen, press **F4** and **F5** to switch the measurement between **mA** and **10A**. 400mA is acquiescently.
2. Press the **SET** key once and **ACA** is visible at the top of the screen.

3. Insert the black lead into the **COM** banana jack input and the red lead into the **mA** banana jack input.
4. Connect the red and black leads to the measured point and the **AC** current value of the measured point will be displayed on the screen.

To measure an AC current which is larger than 400 mA, do the following:

1. Press the **A** key, an instruction prompt you to plug the multimeter test leads in the right position. After check, press any key to enter into multimeter measure and **DCA** appears at the top of the screen. The unit on the main reading screen is **mA.**
2. Press the **SET** key once and **ACA** is visible at the top of the screen.
3. Press **F5** to select **10A** measure, the unit of main reading window is **A.**
4. Insert the black lead into the **COM** banana jack input and the red lead into the **10A** banana jack input.
5. Connect the red and black leads to the measured point and the **AC** current value of the measured point will be displayed on the screen.
6. Press **F4** return to 400mA measure.

7.5 Freezing the Readings

1. Press the **RUN /STOP** key to freeze the screen and **STOP** will be displayed at the top right of the screen.
2. Again, press the **RUN /STOP** key, you can resume your measurement.

7.6 Taking a Relative Measurement

A currently measured result relative to the defined reference value is displayed in a relative measurement.

The following example shows how to take a relative measurement. At first, it is required to acquire a reference value.

1. Press **R** key and **R** is displayed on the top side of the screen.
2. Press the **SET** key until **C** appears at the top of the screen.
3. Plug capacitance extended module in capacitance measure jack.
4. When the reading leveling off, press **F2** key and △ is displayed on the top side of the screen. The saved reference value is displayed below △.
5. Plug capacitance, the displayed major reading on the screen is actual the capacitance value.

7.7 Selecting Automatic/ManualRange Adjustment

The defaulted range mode of the instrument is automatic range. To switch to the manual range, perform the following steps:

1. Press **F1** key and **MANUAL** is displayed on the top left side of the screen to enter the manual range mode.
2. Under the manual range mode, the measuring range is increased by a stage when pressing **F1** key each time, and when reaching the highest stage, it jumps to the lowest stage by pressing **F1** key once again. To multiply the reading of dial pointer by multiplying power and the unit of main reading on the screen will get the measurement result.
3. Press **F3** key and **AUTO** is displayed on the top left side of the screen to switch back to the automatic range mode.

Attention: capacitance measurement without manual range mode.

8. Trouble Shooting

1. **The oscilloscope does not power up**

   It may be caused by the dead battery. At this time, the oscilloscope will not start even if it is powered by the battery charger. Firstly, charge the battery and supply the oscilloscope with power through the battery charger. However, don't switch on the oscilloscope until waiting for 15 minutes. If the oscilloscope still cannot start, please contact us for service.

2. **The oscilloscope stops working only after operating for several seconds**

   Probably the battery is dead; Check the battery symbol at the upper left of the screen. The  symbol indicates that the battery has been run out of power and must be charged.

3. **The measurement type displays ERR when you switch to the Multimeter mode.**

   Probably you do not select the measuring mode. In this case, push down any key of the three keys A, V or R. Thus, the relative measuring mode will be shown on the screen. If the ERR is still displayed, restart the oscilloscope.

4. **The measured voltage amplitude value is 10 times larger or smaller than the real value under the oscilloscope mode.**

   Check whether the channel attenuation level matches the actual probe attenuation ratio.

5. **The waveform is displayed on the screen but is not stable under the oscilloscope mode.**

   - Check whether the signal item in the trigger mode menu matches the actually used signal channel.
   - Check on the trigger mode: The edge trigger mode is applicable to the universal single and the video trigger mode applicable to the video signal. Only when the proper trigger mode is applied, can the waveform be in stable.
   - Try to change the trigger coupling into the HF rejection and LF rejection to filter the HF or LF noise trigger by the interference. (Only for the models that have this function.)

6. **There is no display on the screen when you push down RUN/STOP key under the oscilloscope mode.**

   Check whether the trigger mode in the trigger mode menu is in normal or single shot and whether the trigger level is out of the waveform range.

   In such condition, adjust and make the trigger level in the middle or select the non-auto trigger mode. Additionally, press the **AUTO SET** key and complete the above setting

7. **When select the average sampling in the sampling mode or select a longer display time in the display mode under the oscilloscope, the display speed is slow.**

   It is normal in the above case.

9. Appendix

Maintenance

Do not store or place the instrument in locations where the liquid crystal display (LCD) may be directly exposed to the sunshine for a long time.

Be careful: Do not spray liquid into the instrument.

Cleaning

Inspect the instrument and the probe frequently in accordance with operating conditions. Clean the outer surface of the instrument according to the following steps:

1. Wipe off the floating dust outside of the instrument and the probe by using soft cloth. When cleaning the LCD, do not scuff the transparent LCD protective screen.
2. Wipe the instrument in power off status by soft cloth that is moist but not dripping. It is allowed to be cleaned by soft detergent or fresh water. Do not use any abrasive chemical detergent to avoid the instrument or the probe being damaged.

 **Warning:** Before running, please confirm that the instrument has been dried out so as to avoid electrical short circuit and personal injury caused by moisture.

Storage of Oscilloscope

If the test tool is to be stored for a long time, it is required to charge the lithium battery before storage.

Charging the oscilloscope

The lithium battery is possibly not charged when delivery. To make the battery with enough electric quantity, it must be charged for 4 hours (the test tool must be turned off during charging). The battery can supply power for 4 hours after being charged completely.

When supplying power by using the battery, a battery indicator is displayed on the top of the screen to show the consumption condition of electric quantity.  shows that the battery can only be used for about 5 minutes. To charge the battery and power the instrument, connect the oscilloscope using a power adapter according to Figure 1 to charge the battery. The charging speed can be increased by turning off the test tool.

Notice

To avoid superheat of battery during charging, the environment temperature is not allowed to exceed the permissible value given in technical specification.

Note:

No hazard will occur even connecting the charger for a long time, e.g. during a whole weekend. The instrument can automatically switch to slowly charging status.

Replacing the Lithium Battery Unit

It is usually not required to replace the battery unit. But when it is required to replace it, only qualified personnel can carry out this operation, and only use the same specification lithium battery.