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OSCILLOSCOPES

USER MANUAL

MODEL NO.: ET828

VEVOR[®]

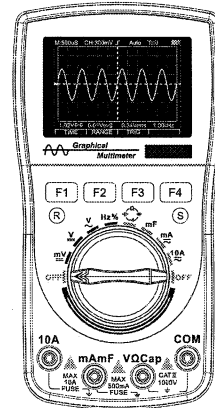
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MODEL NO.: ET828



NEED HELP? CONTACT US!

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
This is the original instruction, please read all manual instructions carefully before operating. VEVOR reserves a clear interpretation of our user manual. The appearance of the product shall be subject to the product you received. Please forgive us that we won't inform you again if there are any technology or software updates on our product.

 **WARNING:**


Please read this manual carefully before using the product. Failure to do so may result in serious injury. **SAVE THIS MANUAL**

This digital oscilloscope multimeter is designed in conformity with the safety specifications of IEC1010-1. The second category of over-voltage measurement: CAT III - 1000V; pollution protection level: Level 1.



1. Before use, please check the machine shell first to see if there are cracks or if any required plastic part is missing. Do not use an instrument with a broken shell. Special attention shall be paid to the insulating layer of test leads and connecting lines. When using test leads, do not touch the metal part of the probe of test leads with your finger;
2. Do not operate the multimeter in high-temperature, moist, rainy, inflammable and explosive environments or when the instrument is wet;
3. Never apply any voltage or current which exceeds the maximum limit of the instrument;

Function	Use input	Maximum limit
mV DC	V/Ω/Cap, COM	250V DC+AC peak value, within 10 seconds
V DC	V/Ω/Cap, COM	1000V DC+AC peak value, within 10 seconds
V AC	V/Ω/Cap, COM	750V DC+AC effective value, within 10 seconds
Hz%	V/Ω/Cap, COM	250V DC/AC effective value, within 10 seconds
mAAC/ DC	mAmF, COM	500mA DC/AC effective value, 250V/500mA fuse type protective tube
AAC/ DC	10A, COM	10A DC/AC effective value, within 30 seconds, 15-minute cooling interval . 250V/10A fuse type protective tube
	V/Ω/Cap, COM	250V DC/AC effective value, within 10 second
mF	V/Ω/Cap, mAmF	250V DC/AC effective value, within 10 second

4. When changing measuring function, please make sure the probe of test leads is taken away from the test point before plugging in/out the plug of test leads and before switching on/off the device;

5. Pay attention to the safety warning signal displayed on the instrument: When the measured voltage exceeds the "safety voltage" (24V), a warning information "  " is displayed to remind you;
6. When the voltage to earth on the reference end "COM" of the instrument reaches 500V, please do not make voltage measurement;
7. Please do not make AC current measurements of circuits with a voltage of over AC 250V;
8. When measuring functions are pointed at the gears of current, resistance, continuity test, diode, capacitance etc., never bridge the test leads over the two ends of the probe of voltage;
9. Before the test of resistance, diode/continuity test, the power of the equipment to be tested must be cut off and make sure the capacitor of the circuit must be fully discharged;
10. Before opening the back cover of instrument for replacement of protective tube, the power of the instrument must be turned off and the test lead should be kept away from the circuit to be tested; protective tube of the same specification must be used for replacement;
11. Do not alter or dismantle the product or its accessories or use them for purposes other than the purpose for which the product is designed. No accessory and attachment may be replaced casually;
12. Do not let children use this device or use it as a toy.
13. **Electrostatic Prevention** Operate in an electrostatic discharge protective area environment to avoid damages induced by static discharge. Always ground both the internal and external conductors of the cable to release static before connecting.
14. **Use Proper Overvoltage Protection** Make sure that no overvoltage (such as that caused by a thunderstorm) can reach the product, or else the operator might be exposed to danger of electrical shock
15. **Handling Safety** Please handle with care during transportation to avoid damages to buttons, knob interfaces and other parts on the panels.

Safety signs

	Caution, danger! This sign appears near other signs or socket terminals to remind users that the instruction of the manual must be followed during operation, so as to prevent damage to the instrument/personal injury.
	Caution, electricity shock! This sign appears near one or more terminals to indicate that there may be hazard voltage in the terminal(s) during use. To ensure utmost safety, please avoid touching the testing end of test leads when there is voltage in the terminal(s).
Instruction!	Instruction suggests that special attention should be paid during operation, as wrongful operation will result in incorrect measurement results or damage of accessories.
Attention!	Attention suggests that the operation must be done very carefully, as wrongful operation or violation may result in damage to the product or other property.
Warning!	Warning suggests that high concentration is required during operation, as wrongful operation or violation may result in personal injury or even endangering of life.

TECHNICAL SPECIFICATIONS

Model	ET828
Main Material	ABS
Product Dimensions(L*W*H)	83*160*32 mm
Packing Size(L*W*H)	192*140*45 mm
Net Weight (kg)	0.292
Gross Weight (kg)	0.4

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General features

Display	240 × 320 Color screen	Observation area	49.0 mm x 36.7 mm
Backlight	Constantly on	Input resistance	About 10MΩ
Battery	AA batteries*3	Auto shutdown	15 minutes or disabled
Working current	About 65mA	Sleep current	About 35uA
usage time	More than 10 hours	Storage capacity	100*data , 10*waveform
Use	0°C~+40°C;<75% RH	Storage	-10°C ~ +60°C ; <90%RH

Oscilloscope characteristics

Analog bandwidth	1MHz (Only for oscilloscopes with ACV)	Max real-time sampling rate	2.5Mpsps
Channel	1	Input resistance	About 10MΩ
Vertical sensitivity range	300mV ~ 100V per grid	Time base range	2.5us ~ 10s per grid
Vertical amplitude accuracy	±(5%+ 0.2div)	Time base accuracy	±(0.01% + 0.1div)
Scan mode	Auto/normal/single	Trigger edge selection	Rising/falling edge
Auto configuration	Auto set time base and vertical amplitude	Automatic measurement function	Vp-p, Vavg, Vrms, HZ

* The analog bandwidth is reduced from 1MHz to 5db.

Multimeter features

Function	Range	Resolution	Uncertainty
DC voltage	400mV	0.1mV	± (1.5%rdg + 10dgt)/1000V
	4V/40V/400V/1000V	1mV/10mV/100mV /1V	

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AC voltage	400mV (Manual range)	0.1mV	50Hz~1kHz ± (2.0%rdg + 10dgt)(More than 1kHz is not evaluated)
	4V/40V/400V	1mV/10mV/100mV	50Hz~400Hz ± (1.0%rdg + 10dgt) 400Hz~20kHz ± (5.0%rdg + 10dgt)
	750V	1V	50Hz~1kHz ± (1.5%rdg + 10dgt)(More than 1kHz is not evaluated)
DC current	40mA /400mA	10μA /100μA	± (1.2%rdg + 10dgt)
	4A/10A	1mA/10mA	
AC current	40mA /400mA	10μA /100μA	50Hz~5kHz ± (1.5%rdg + 10dgt)(More than 5kHz is not evaluated)
	4A/10A	1mA/10mA	
Resistance	400Ω/4KΩ/40KΩ/400KΩ/4MΩ	0.1Ω/1Ω/10Ω/100Ω/1KΩ 10kΩ	± (1.0%rdg + 5dgt) ± (3.0%rdg + 5dgt) / 40MΩ
Capacitance	51.2nF/512nF/5.12μF/51.2μF	10pF/100pF/1nF/10nF	± (3.0%rdg + 10dgt)
	100μF	100nF	
	10mF	1μF	

The uncertainty of all ranges is expressed as: ± (a% reading + word count). The correction period is one year. The environmental conditions with guaranteed uncertainty are: 23°C±5°C, <75%RH.

Frequency	5Hz~5M Hz	Amplitude ≥ 2 Vp-p	± (1.0%rdg + 5dgt) (more than 5M for reference only)
Diode / continuity test	Open circuit voltage is about 1.5 V; judgment resistance: about 50Ω		
Fuse specifications	500mA/250V, 10A/250V		

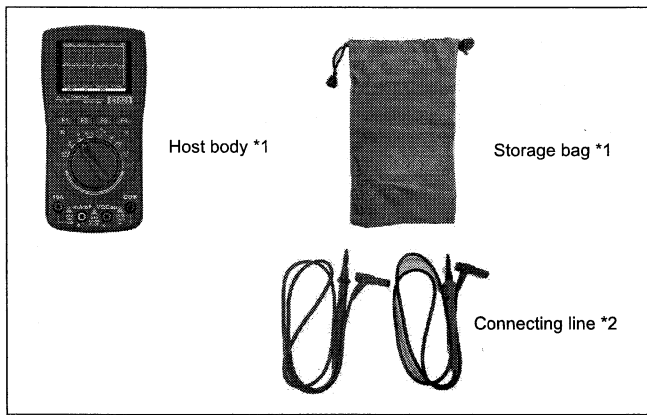
Display symbols and icons

*Products such as specifications, the appearance and the

DC	Direct-current	AC	Alternate current
A	Ampere	mA	Milliampere
V	Volt	mV	Millivolt
F	Farad (Unit of capacitance)	mF	Millifarad (unit of capacitance)
nF	Nanofarad (unit of capacitance)	μF	Microfarad (unit of capacitance)
ms	Millisecond	μs	Microsiemens (unit of conductivity)
Hz	Hertz (Unit of frequency)	Ω	Ohm (unit of resistance)
AUTO	Auto measuring range/auto scanning/auto setting	P-H	Peak value holding
REL	Relative value	REST	Reset or back to centered position
MAX	Max value	MIN	Minimum value
STOP	Stop the "MIN/MAX" function	EXIT	Exit current state or option menu
COM	Reference end of measurement	avg	Average value
ERASE	Erase record	LEVEL	Trigger level
SAVE	Save current signal to memory	RESET	Trigger level to zero
Normal	Normal trigger means	Single	Single-time waveform
Auto	Automatic trigger mode	Trig	Scan trigger
Wait	Ready to wait for trigger	Stop	Hold waveform
TIME	Time base	RANGE	Amplitude

designaresubject to modification without prior notice.

PACKAGE CONTENTS



PRODUCT FUNCTIONS

Button functions

buttons	Name	Function
F1 F2 F3 F4	F1 ~ F4	The actual function varies with the measuring range and work mode. The option menu displayed on the LCD serves as the prompt for action.
(R) (S)	R	Multimeter status Manual range Oscilloscope state Automatic capture
	S	Data lock and save

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	OFF	Instrument switch
	\overline{mV}	DC millivolt voltage
	\overline{V}	DC voltage
	$\sim V$	AC voltage/frequency/duty cycle file
	Hz%	Frequency/Duty Cycle
	\square	Resistance/diode/continuity test/capacitance
	mF	Millifara capacitance
	\overline{mA}	AC/DC mA
10A	AC/DC 10A	

Basic operation

Power on and off

Rotate the rotary knob to desired measurement gear and the power is connected to the instrument; rotate the rotary knob to OFF position to turn off the power.

Attention	<ul style="list-style-type: none"> Be sure to move the test probe away from the test point before shutting down. After the instrument is used, the power must be turned off in time.
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Automatic sleep

If there is no operation for a set period of time, the instrument will get into automatic sleep. To turn off the function of automatic sleep, user may press the "F1" button and then rotate the rotary knob to turn on the instrument. In this way, the instrument is set to continuous working mode.

Silent mode

Silent mode is turned off by default. Press and hold the "F4" key and then turn the knob to turn it on. Silent mode will turn off automatically when it is

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turned off.

Oscilloscope operation

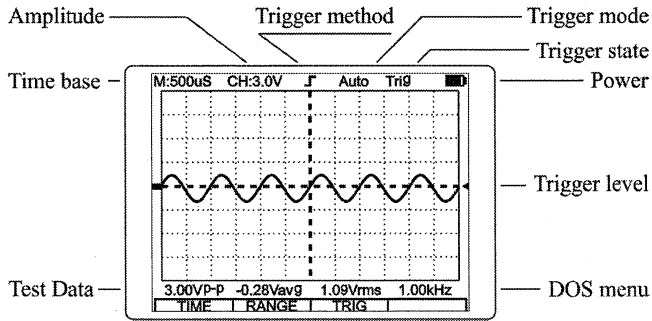
Enter oscilloscope mode

In multimeter mode (DMM) mode voltage, current range, press the "R" key for 2 seconds to enter the oscilloscope (OSC) mode. In oscilloscope (OSC) mode. Press the "R" key for 2 seconds to enter the multimeter mode (DMM) mode. The range control mode will be switched to manual mode.

1. DCmV, DCV, DCmA, DCA, the oscilloscope (OSC) mode, can only observe the change of level.

2. The current range impedance is small, the oscilloscope (OSC) mode, within 5KHZ is for reference only. Not tested above 5kHz.

Basic display content in oscilloscope mode



Function buttons and main option menu

The function buttons of F1~F4 are located at the lower of the LCD screen. With the option menu on the screen, these buttons will enable users to realize several functions. Some functions are provided with sub-option menu for further operations. Please refer to relevant later sections for the usage of these

main option menu and sub-menus.

The main option menu provides the instructions for basic operations of the instrument and the details are as follows:

Time base adjustment	Amplitude adjustment	Trigger control
TIME	RANGE	TRIG
F1	F2	F3

1. Press the F1 key (TIME) to enter the time base adjustment sub-menu, adjust the time base and trigger position.
2. Press the F2 key (RANGE) to enter the amplitude adjustment sub-menu, adjust the vertical amplitude and waveform position.
3. Press the F3 key (TRIG) to enter the trigger control sub-menu, adjust the trigger edge/mode/level.

Time base adjustment

Under the main menu of the oscilloscope, press the F1 key (TIME), the meter enters the time base adjustment sub-menu:

Back	Time base adjustment	
EXIT	◀	▶
F1	F2	F3

1. Press the F1 key (EXIT) to exit the time base adjustment sub-menu and return to the main menu.
2. Press the F2 key (◀), F3 key (▶) to adjust the time base (t/div).

Instructions!	<ul style="list-style-type: none"> • When measuring a signal whose frequency is unknown, user has to try to collect the waveform from the fastest time base and then gradually select the slower time base until the signal can be displayed correctly. Otherwise, due to "aliasing effect", waveform may fail to correctly reflect the actual situation of the signal. • There are several ways to avoid aliasing effect: adjust the time base or press "R" button.
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Amplitude adjustment

Under the main option menu of oscilloscope mode, press F2 key (RANGE)

to enter into the sub-option menu of vertical control:

Back	Amplitude adjustment		
EXIT	X1X3	X10	
F1	F2	F3	

1. Press the F1 key (EXIT) to exit the amplitude adjustment sub-menu and return to the main menu.

2. Press the F2 key (X1X3). The F3 key (X10) is used to adjust the vertical amplitude (V/div).

Note: The F2 key (X1X3) is to switch back and forth between X1 and X3,



When X1, CH displays 1V, 10V, 100V, 1000V, 100mA, 10A;

When X3, CH displays 300mV, 3V, 30V, 300V, 30mA, 3A;



The F3 key (X10) switches from small to large cyclically.

Trigger control

In the main menu of the oscilloscope mode, press the F3 key (TRIG) to enter the trigger control sub-menu:

Back	Trigger edge	Trigger Mode	Trigger level
EXIT	 	MODE	LEVEL
F1	F2	F3	F4

1. Press the F1 key (EXIT) to exit the trigger control sub-menu and return to the main menu.



2. Press the F2 key ( " or  ") to select the rising edge or falling edge trigger.

3. Press the F3 key (MODE) to select the trigger mode.

4. Press the F4 key (LEVEL) to enter the trigger level adjustment sub-menu.



Trigger level adjustment

Under the trigger setting sub-menu, press the F4 key (LEVEL) to enter the trigger level adjustment sub-menu:

Back	Trigger level adjustment	Trigger level reset	
EXIT			RESET
F1	F2	F3	F4

1. Press the F1 key (EXIT) to exit the trigger level adjustment sub-menu and

return to the trigger control sub-menu.

2. Press the F2 key () and F3 key () to decrease or increase the trigger level. The position corresponding to the current trigger level will be marked on the display.

3. Press the F4 key (RESET) to reset the trigger level to zero.

About trigger mode

Auto : Even if no trigger condition is detected, the oscilloscope can still acquire waveforms. If there is no trigger condition, after the oscilloscope waits for a certain period of time, it will trigger itself and start collecting data. Since there is no correct trigger, the waveform displayed by the oscilloscope scrolls on the screen because it cannot be synchronized. Once a legal trigger signal is detected, the waveform can be stabilized on the screen. Users can use this mode to monitor low-frequency random signals or observe the amplitude of signals, such as the waveform of a DC power supply.

Normal : The waveform data is collected only after the trigger signal is detected. If no trigger occurs, the oscilloscope will not acquire a new waveform. The display content will not be refreshed.

Single : In single mode, once the trigger condition is detected, the oscilloscope starts waveform data acquisition. When new data is acquired, the latest waveform will be automatically maintained.

About automatic waveform capture

1. Automatic waveform capture is only available in AC gear, and the automatic waveform capture time is about 5-15 seconds.

2. Automatic waveform capture signal requirements: amplitude greater than 0.3VPP. frequency greater than: 10Hz.

Reminder of scanning status

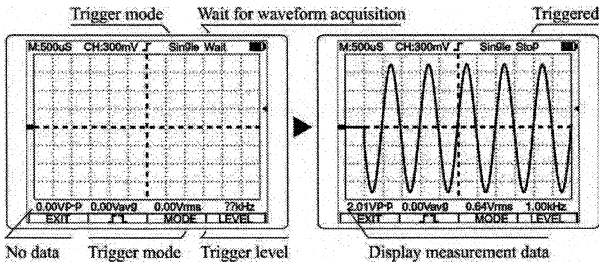
Auto	In automatic mode, waveforms can be acquired without triggering conditions.
wait	Wait for the trigger condition.
Trig	The trigger condition has been detected.

Stop	Keep locked
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Single scan trigger operation

The steps for single-triggered data collection are as follows:

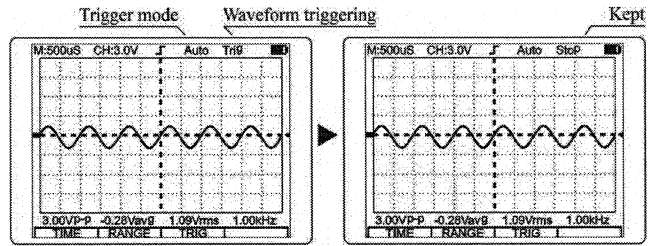
1. Adjust the vertical amplitude V/div and horizontal amplitude s/div to suit the waveform to be acquired.
2. Select the appropriate trigger level, trigger edge and select Single trigger mode Single.
3. Once the signal appears, the oscilloscope will be triggered and captured.



Holding of the signal waveform

When collection of data is continuing, the waveform of signals will be constantly refreshed. When the data collection is stopped, the display content will be held. The main purpose of holding waveform is to hold the current data or waveform to make close observation easier. There are two methods for holding waveform data: Press "S" button or use single trigger scanning mode.

Press "S" button to start or stop the collection of waveform data. The last waveform on the screen can be maintained immediately after pressing the "S" key. Once the collection of waveform data by the oscilloscope is ceased, the display is held.



Storage and reading of waveform of signals

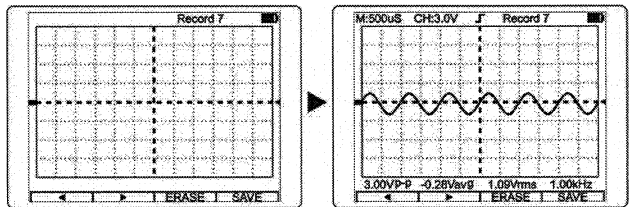
The OSC database of the instrument is provided with a memory space for 10 OSC waveform data. The operation method of the storage is as follows:

1. Press the "S" key to keep the current waveform.
2. Press the "S" key and stay for 2 seconds to enter the database, press the F1 key (◀) / F2 key (▶) to select the storage location, press the F4 key (SAVE) to save the current waveform.
3. Press the "S" key again and stay for 2 seconds to exit the database.

The menu of DATABASE are as follows:

Page up	Page down	Delete	Save
◀	▶	ERASE	SAVE
F1	F2	F3	F4

- a. Press F1 key (◀) to select the previous data location.
- b. Press F2 key (▶) to select the next page data location.
- c. Press F3 key (ERASE) to delete the waveform at current page.
- d. Press F4 key (SAVE) to save current and held waveform on current page.



The operation of multimeter

Enter multimeter mode

Turn on the default multimeter mode (DMM) mode, or press the "R" key for a long time to switch modes.

Warning!	<ul style="list-style-type: none"> • Please read, understand and follow the safety rules and operating methods indicated in the following. • When changing the measurement function, please be sure to remove the probe of the test lead from the test point first.
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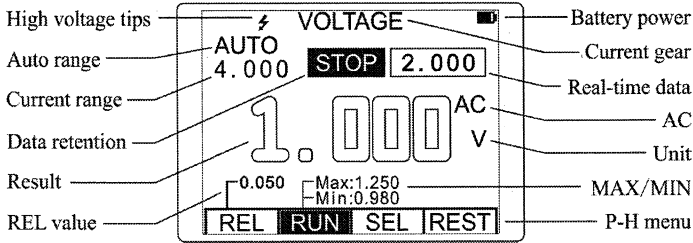
Basic content displayed under multimeter mode

Please note that the symbols in the picture do not include the entire character set of the instrument and that these symbols do not necessarily appear at the same time.

Switching measurement function

Rotate rotary button for selection of test function. The switching of measurement function follows the following circulation order: DCmV/DCV/ACV/HZ/%/Resistance/Diode/Continuity/mF/mA(AC/DC)/10A(AC/DC).

For multi-function gear, press the F3 key (SEL) to switch functions.

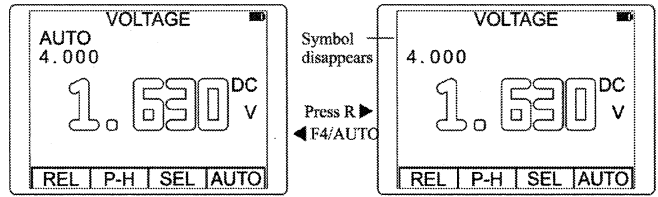


Selection of manual/automatic measuring range

The initial state after powering on or switching the measurement function is auto range. For most applications, this is the most convenient measurement

method. When you need to fix a certain range, you can use as the following operations:

1. Press the "R" key, the auto range mark "AUTO" will disappear, and the meter will enter the manual range state.
2. Each time the "R" key is pressed, the meter switches to the next range.
3. Press the F4 key (AUTO) to return to the auto range state.



Relative value measuring mode

Relative value mode is a measuring mode that displays the difference between the actual measurement value and the reference value.

1. Press F1 key (REL) and the current displayed measurement value will be saved as the reference value.
2. The result is the difference between the current measured value and the expected reference value.
3. Press F1 key (REL) to exit relative value mode.
4. After entering into relative value mode, the measuring range control mode of the instrument will be automatically switched to manual mode.
5. When the measuring function or range is changed, the relative value mode will be automatically removed.

Peak hold (P-H) mode

Peak hold mode can display the measured maximum and minimum values. These values are continuously updated with each new measurement result. Press the F2 key (P-H) to activate this function. The maximum and minimum peaks of the measured data will be displayed on the LCD.

The menu functions of peak hold mode are as follows:

Exit the peak value holding	Run measurement	Stop measurement	Reset peak value
EXIT	RUN	STOP	REST
F1	F2	F3	F4

- Press the F1 key (EXIT) to exit the peak hold mode.
- Press the F2 key (RUN) to perform peak hold measurement.
- Press the F3 key (STOP) to stop refreshing the peak measurement, The Max/Min value no longer changes.
- Press the F4 key (REST) to reset the measured peak value, In order to start a new measurement.

Instructions!	<ul style="list-style-type: none"> After entering into peak value holding mode, the measuring range control mode of the instrument will be automatically switched to manual mode. When measuring function, gear, or measuring range is changed or when relative value mode is selected in mid way, the peak value holding mode will be automatically relieved.
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AC and DC voltage measurement

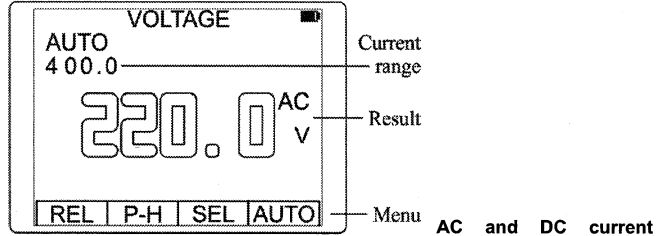
Instructions!	When the measured voltage exceeds the "safety voltage" (24V), the warning information " " will be displayed to remind users of "safety".
Warning!	To avoid damage to the instrument, never apply 700V AC or 1000V DC voltage on the measuring end for more than 10 seconds.

- Plug the plug of the black test line into the negative "COM" socket and the plug of the red test line into the positive "VΩCap" socket.
- Rotate the rotary knob to select the " \underline{mV} " or " \underline{V} " or " \underline{V} " function. A sign of "VOLTAGE" will appear on the top of the screen to remind user that the function of voltage measurement is currently available.
- Press the F3 key (SEL) to switch the Voltage/Hz/% measurement mode (After switching the measurement mode, the meter will automatically switch the range control mode to manual mode).
- Touch the test point with the test pen. Read the voltage value displayed on the meter.

The menu for voltage measurement is:

Relative value mode	Peak value holding mode	Extended function	Auto range
REL	P-H	SEL	AUTO
F1	F2	F3	F4

- Press the F1 key (REL) to enter the relative value mode.
- Press the F2 key (P-H) to enter peak hold mode.
- Press the F3 key (SEL) to switch V/Hz/%.



(400mA, 10A) measurement

warning	<ul style="list-style-type: none"> To avoid electricity shock, never perform current measurement for circuit with a voltage of 250V or higher. When measuring large current with 10A gear, the measurement duration in every 15 minutes shall not exceed 30 seconds. Otherwise, damage to the instrument and the connecting lines of test leads.
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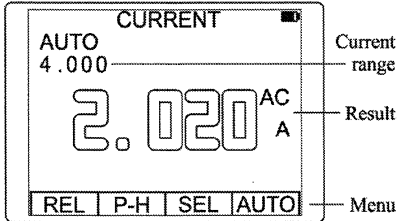
- Plug the banana plug of the black test line into the negative "COM" socket and Insert the banana plug of the red test lead into the positive "mA" or "10A" socket.
- Rotate the rotary knob to select " \underline{mA} " or " $\underline{10A}$ " function. Then, a sign of "CURRENT" will appear on the top of the screen to remind user that the function of current measurement is currently available.
- Press the F3 key (SEL) button to switch to DC, AC, measuring mode.

- Put the test lead into the circuit. The instrument will display the digital of current, decimal point and polarity etc.

The option menu of current measurement is as follows:

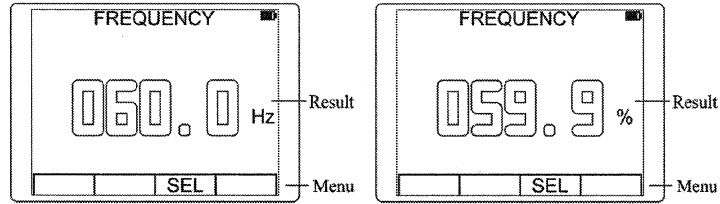
Relative value mode	Peak value holding mode	Extended function	Auto range
REL	P-H	SEL	AUTO
F1	F2	F3	F4

- Press the F1 key (REL) to enter the relative value mode.
- Press the F2 key (P-H) to enter the peak hold mode.
- Press the F3 key (SEL) to select extended functions: DC, AC.



Frequency counting and measurement of duty ratio

- Insert the banana plug of the black test lead into the negative "COM" socket, and the red plug into the positive "VΩCap" socket as required for measurement.
- Rotate the knob to select the "Hz%" file.
- Press the F3 key (SEL) to select extended functions: frequency and duty cycle.



Attention! During frequency and duty cycle measurement, the signal must reach a certain amplitude: the voltage signal amplitude is 500mVp-p; for signals close to 5MHz or higher frequency, a signal with a higher amplitude may be required.

Attention! You cannot use the manual method when performing frequency measurement and duty cycle measurement!

Resistance measurement

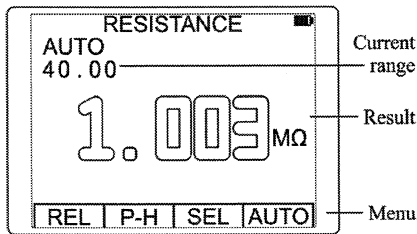
Warning! To avoid electric shock, when measuring resistance, please cut off the power supply first of the device under test (remove the battery/unplug the power cord) and discharge the capacitor in the power supply.

- Insert the banana plug on the black test lead wire into the negative "COM" socket; the banana plug on the red test lead wire into the positive "VΩCap" socket.
- Rotate the knob to select the "Ω" measurement function, the word "RESISTANCE" will appear at the top of the screen, indicating that it is already in the resistance measurement function.
- Connect the test leads across the circuit or component under test. It is best to disconnect the one which is under the testing and the original to ensure other parts not affect the accuracy of the reading.
- Read the resistance value and unit, decimal point, etc. displayed by the meter.

The operation menu for the resistance measurement function is:

Relative value mode	Peak value holding mode	Extended function	Auto range
REL	P-H	SEL	AUTO
F1	F2	F3	F4

- Press the F1 key (REL) to enter the relative value mode.
- Press the F2 key (P-H) to enter the peak hold mode.
- Press the F3 key (SEL) to enter the extended function: diode detection, Continuity test and capacitance.

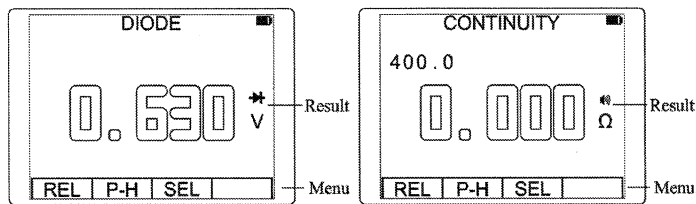


Diode detection

Warning!	To avoid electric shock, the diodes carrying voltage must not be tested.
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- Insert the banana plug on the black test lead wire into the negative "COM" socket; the banana plug on the red test lead wire into the positive "VΩCap" socket.
- Rotate the knob to select the "⚡" measurement function, the word "RESISTANCE" will appear at the top of the screen, indicating that it is already in the resistance measurement function.
- Press the F3 key (SEL) to select the diode detection function. The word "DIODE" will appear at the top of the screen, indicating that it is in the diode measurement function.
- Connect the test leads across the diode or semiconductor PN junction under

test. (Silicon tube is about 0.5-0.7V, germanium tube is about 0.15-0.25V).



Continuity test

Warning!	In order to avoid electric shock, the continuity test must not be carried out on the line carrying voltage.
----------	---

- Insert the banana plug on the black test lead wire into the negative "COM" socket; the banana plug on the red test lead wire into the positive "VΩCap" socket.
- Rotate the knob to select the "⚡" measurement function, the word "CONTINUITY" will appear at the top of the screen, indicating that it is in the resistance measurement function.
- Press the F3 key (SEL) to select the continuity test function.
- Touch the circuit under test with a test lead. If the resistance is less than 50Ω, the buzzer will sound.

Capacitance measurement

Warning!	In order to avoid electric shock, the capacitor carrying voltage shall not be tested.
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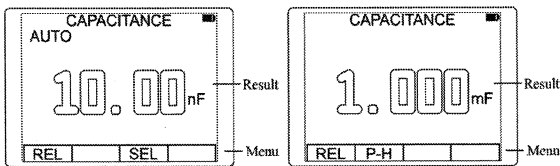
- Insert the banana plug on the black test lead cable into the negative "COM" socket; the banana plug on the red test lead cable into the positive "VΩCap" socket.
- Rotate the knob to select the "⚡" measurement function, the word "RESISTANCE" will appear at the top of the screen, indicating that it is already in the resistance measurement function.

- Press the F3 key (SEL) to select the capacitance measurement function. The word "CAPACITANCE" will appear at the top of the screen, indicating that it is already in the capacitance measurement function.
- Touch the test pen to the measured capacitance, and read the capacitance, decimal point and unit.

Warning!	Capacitance/mF capacitance measurement function cannot use manual range!
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10mF capacitance measurement

- Insert the banana plug on the black test lead wire into the negative "COM" socket; the banana plug on the red test lead wire into the positive "mAmF" socket.
- Rotate the knob to select the "mF" measurement function. After selection, the word "CAPACITANCE" will appear at the top of the screen, indicating that it is already in the capacitance measurement function.
- Touch the test pen to the measured capacitance, read the capacitance, decimal point and unit, etc. It takes a long time to stabilize the reading when measuring mF capacitance, please be patient!



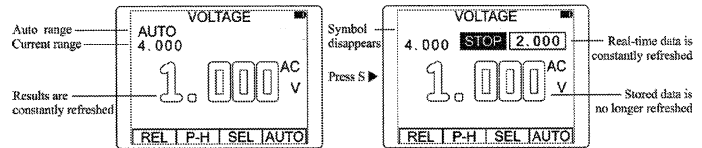
The holding of measurement data

Press the data to hold key "S", the reading being displayed will be held down, at this time the LCD screen will display the data hold icon "STOP". Press the "S" key again to resume normal operation.

- In the data holding state, a small window (dynamic data window) will appear on the upper right of the instrument's display. The data in this window remains refreshed.
- Once the meter enters the data holding state, the range control mode will be

switched to manual mode.

- When switching the range or changing the measurement function, the meter will automatically exit the hold state.



Measurement data storage and reading

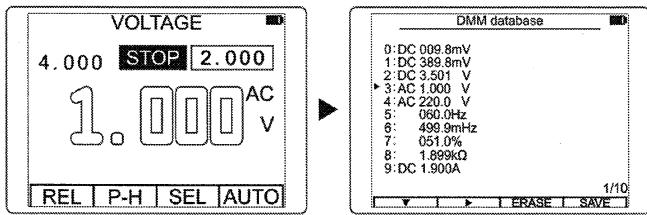
The database of this instrument can save 100 DMM measurement data.

- Press the "S" key to keep the current data, then press the "S" key and stay for 2 seconds to enter the database, press the F key (SAVE) to save the current data.
- In the database, the LCD will list the 10 storage locations on the first page and indicate whether there is a current storage location for the data stored in these locations.
- If data is stored at a certain location, the value and unit of this data will be listed. Press the "S" key again and stay for 2 seconds to exit the database function.

The menu operation of the database is as follows:

Choose where to record	Select adjacent page	Record deletion	Save the data that has been kept
▼	▶	ERASE	SAVE
F1	F2	F3	F4

- Press the F1 key (▼) to select the mark and point to the next storage location.
- Press the F2 key (▶) to select the mark and point to the next page.
- Press the F3 key (ERASE) to delete the current record.
- Press the F4 key (SAVE) to save the saved data in the currently selected storage location.



Daily maintenance and troubleshooting

Keep the instrument dry

If the instrument is wet, please wipe it until it's dry. If you are not sure whether it's dry, please do not use it.

Please store and use the instrument in ambient temperature

Extreme ambient temperature will reduce the service life of electric components, deform plastic parts or even cause non-availability for use of the instrument.

Handle the instrument carefully

Fall may cause damage to liquid crystal display, electric components or shell.

Keep the instrument clean

Use a piece of wet cloth dipped with a little of detergent to wipe the shell of the instrument often. Do not use rough objects, chemical solutions or alcohol etc.

Replacement of protective tube

1. Remove the probe from test point and shut down the power.
2. Loosen the fixing screw and take off the back cover. The protective tube is at the back side of the test socket.
3. Take out the burnt protective tube and replace it with a new one of the same specification: for 500mA current, the 500mA /250V fuse type protective tube is used; for 10A current, the 10A/250V fuse type protective tube is used. Put back the back cover and fixed it with screws.

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Repair and maintenance of the instrument

1. This is a precision instrument. Without the authorization of the products center of the company, please do not alter any circuit, replace any component or perform any calibration or repair of the product.
2. All test leads, accessories or optional fittings of the instrument cannot be replaced, repaired or substituted randomly.

Warning!	Before opening the battery back cover, be sure to disconnect the probe from any voltage source. Do not use the instrument until the cover is closed and fixed.
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Troubleshooting

If your instrument fails, you may wish to check it yourself as follows before you determine that the instrument must be repaired.

No display on screen, no response from buttons

1. If there is no power supply, please make sure that the battery in the device is not exhausted and the battery and battery slice are intact and correctly connected.
2. Turn the knob to the shutdown position and then to the measurement position.


Not measurable

Please check the goodness of the test leads (the test leads are short-circuited on and off).

Current cannot be measured

The fuse is blown. You should replace the fuse.

Replacement battery

When the LCD display shows a red "  " prompt, the battery should be replaced in time (battery specification: AA1.5Vx3), otherwise the measurement accuracy may be affected.

Steps:

1. Remove the test leads and set the position to "OFF"; open the battery cover and take out the old battery (take the middle battery first).
2. Replace 3 new batteries (battery specifications: AA1.5Vx3), install the

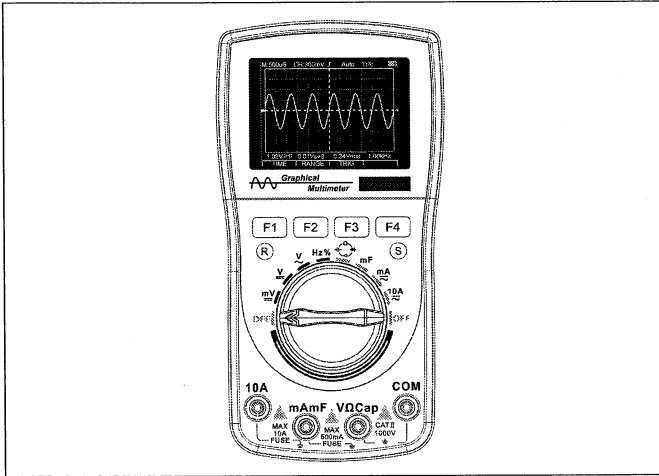
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batteries on both sides, and restore the battery cover.

3. When not used for a long time, the battery should be taken out. To prevent battery leakage from damaging a pack.

Note:The contents of the manual are subject to change without notice.

COMPLETION



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