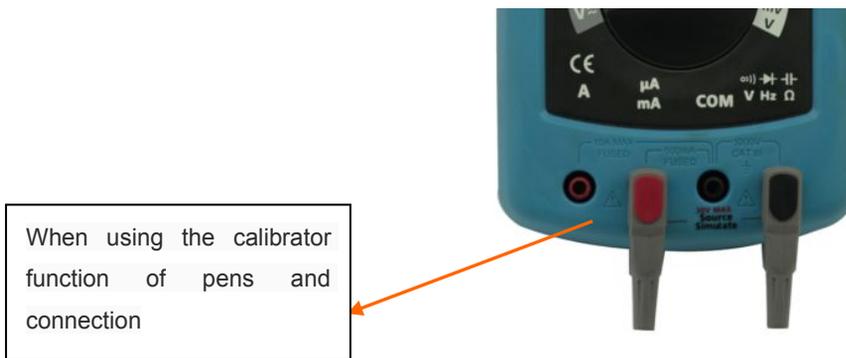
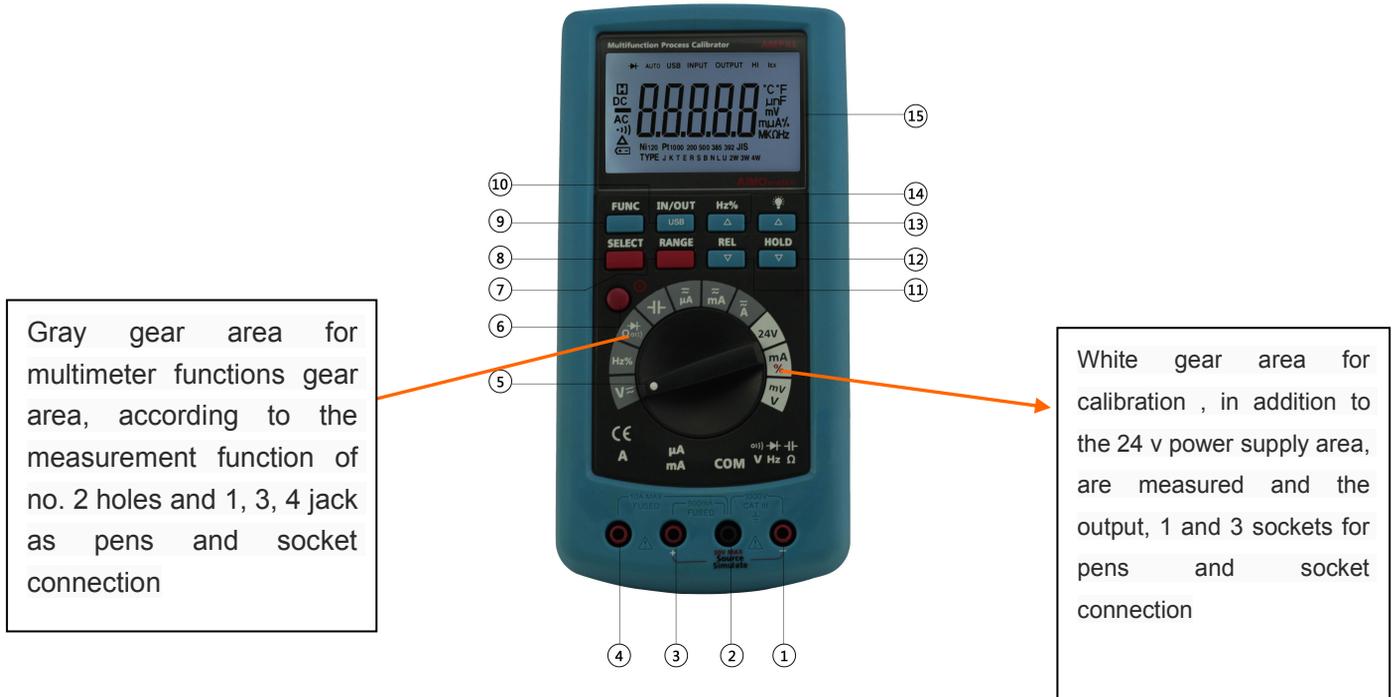


AMPX1 Quick Start Guide

AMPX1 is a source and measurement tool . Is used to 0 -24 mA / 4-20 mA current loop and 0 - 10 V / 0-100 mV output , also has 4,000 counts integrated multimeter function.



⚠ Warning

To avoid possible electric shock or personal injury:

- Never apply more than 30V between any two jacks In the calibrator functions .

(1) VΩHz end

In the multimeter functions, it is the input end for all measurement functions except for current measurement, connected with a red meter probe.

In the calibration instrument functions, it is the negative jack, connected with a red meter probe.

(2) COM end

In the multimeter functions, it is the negative input end for all measurements, connected with a black meter probe.

(3) μA/mA end

In the multimeter functions, it is the positive end for measurement of μA or mA current, connected with a red meter probe.

In the calibration instrument functions, it is the positive jack, connected with a red meter probe.

(4) A end

In the multimeter functions, it is the positive input end for measurement of 0.5A-10A current, connected with a red meter probe.

(5) Rotary switch

Used for selecting measurement functions such as voltage, current, resistance and Capacitance.

(6) POWER switch

Used for putting on or off the operating power for the meter.

(7) RANGE key

In the multimeter functions, for various kinds of measurements it is used manually to select range. Under the automatic range state (AUTO displaying), it will enter manual range state with a press on RANGE. When the RANGE key being released after pressing for two seconds the meter will return back to the automatic state.

(8) SELECT key

In the multimeter functions, when setting the rotary switch to a measurement function, the meter will enter its first measurement mode, while pressing the SELECT key it is possible to select the second or the third measurement mode. However, there is only one for the Capacitance measurement.

(9) FUNC key

In the calibrator functions, it is V mV conversion key and mA mA% conversion key

(10) IN/OUT key

In the multimeter functions, it is switch for turning on/off USB transmission.

In the calibrator functions, it is Input/output conversion key.

(11) REL key

In the multimeter functions, it is to enter or exit the relative status .

In the calibrator functions, it is to reduce more value .

(12) HOLD key

In the multimeter functions, Used to maintain the measurement data unchanging, by pressing the key again it will resume the measurement. .

In the calibrator functions, it is to reduce less value .

(13) LIGHT key

In the multimeter functions, by pressing this key for a time, the backlight of the LCD screen will be on , after thirty seconds the meter will turn off the backlight automatically . It also can turn off the backlight by pressing the LIGHT key.

In the calibrator functions, it is to increase less value .

(14) HZ% key

In the multimeter functions,during the voltage or current measurement, by pressing \sim Hz key the meter will enter the linear frequency measurement status. the frequency of voltage or current is measured at this time . By pressing this key again, will exit the linear frequency measurement status.

In the calibrator functions,it is to increase more value .

(15)LCD screen

Used for displaying the measuring results,value of signal and various symbols.

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Chapter 1 Safety Information



Warning

- Before use of the meter firstly, Check up if there is any crack on the outer shell or if it lacks any plastic part, and check up whether the test probes are damaged or has any exposed metal. The meter can be used only if no any insulating problem be found.
potential during measuring. The body should be kept insulated from ground with dry insulating shoes, insulating pads or insulating clothes.
- Never apply more than 30V between any two jacks In the calibrator functions .
- Probe should be in good condition. Before use, please check whether the insulation is damaged.
- When performing measurement with a test probe ,your fingers should be put behind a finger-protector.
- Use the probe provided with the meter to ensure safety. If necessary, it should be replaced with another identical probe or one with the same capacity.
- To avoid possible damage to the meter:
- Make sure choose the right jack and range, before use the meter to measurement or calibrate.
- Take away the meter from the test circumstance, before operate the meter or turn off the meter.

Usage

- When using, select the correct function and measuring range.
- Don't exceed the indicated maximum of each measuring range.
- When measuring circuits with the meter connected, do not touch the probe tip (metal part).
- When measuring, if the voltage to be measured is more than 60 V DC or 30 V AC (RMS), always keep your fingers always behind finger protection device.
- Don't measure voltage higher than 600 V.
- For manual measuring range, when the value to be measured is unknown, select the highest measuring range.
- Before rotating conversion switch to change measuring function, remove probe from the circuit to be measured.
- Don't measure resistors, capacitors, diodes and circuit connections with power.
- During tests of current, resistors, capacitors, diodes and circuit connections, avoid connecting the meter with voltage source.
- Do not measure capacitance before discharged completely.
- Do not use the meter in explosive gas, vapor or dusty environment.
- If you find any abnormal phenomena or failure on the meter, stop using it immediately.
- Do not use the meter unless the bottom case and the battery cover are completely fastened in their original places.
- Don't store or use the meter in direct sunlight or high temperature and high humidity conditions.
- Must not make any voltage measurement when the test probe being inserting into the current hole.
- Repair and calibration of the meter must be carried out by experienced professionals, unprofessionals should not repair and calibrate the meter by themselves.

Limited Guarantee and the Liability Scope

Accessories of AMPX1

1. a pair of Test Leads T3018
2. A pair of alligator clips C27262
3. The spare fuse: 500mA/1000V 2PCS, 10A/500V 2PCS
4. An USB flash installed driver, software, User manual and quick start guide.

If the meter is broken or short of some accessories, please contact the supplier.

This company will undertake repairs freely for any quality problem of the meter which if should be found within 36 months from the date at which it was bought, but which not including replacement of fuse and batteries as well as any damage caused by negligence, wrong use, pollution, change of circuit and non-normal use.

For maintenance beyond the 36 months guarantee period, the company will charge a certain repair fee and materials cost.

Chapter 2 Introduction to the Meter

AMPX1 is a source and measurement tool . Is used to 0 -24 mA / 4-20 mA current loop and 0 - 10 V / 0-100 mV output , also has 4000 counts integrated multimeter function.

1. 0.02% high accuracy of DC V/A input and output.
2. Double injection molding process provides users a better feel and improve product durability.
3. The application of 24 bits a high-precision AD and low zero drift op-amp.
4. The four levels of gold-plated circuit board,.Signals of input and output designed separately, to ensure that the small signal stability.
5. High-class probes, long-term use, will not be damaged easily.

Explanation on Front Panel

The front panel is shown as in Figure 2-1,
explanation being as follows:



(1) VΩHz end

In the multimeter functions, it is the input end for all measurement functions except for current measurement, connected with a red meter probe.

In the calibration instrument functions, it is the negative jack, connected with a red meter probe.

(2) COM end

In the multimeter functions, it is the negative input end for all measurements, connected with a black meter probe.

(3) μA/mA end

In the multimeter functions, it is the positive end for measurement of μA or mA current, connected with a red meter probe.

In the calibration instrument functions, it is the positive jack, connected with a red meter probe.

(4) A end

In the multimeter functions, it is the positive input end for measurement of 0.5A-10A current, connected with a red meter probe.

(5) Rotary switch

Used for selecting measurement functions such as voltage, current, resistance and Capacitance.

(6) POWER switch

Used for putting on or off the operating power for the meter.

(7) RANGE key

In the multimeter functions, for various kinds of measurements it is used manually to select range. Under the automatic range state (AUTO displaying), it will enter manual range state with a press on RANGE. When the RANGE key being released after pressing for two seconds the meter will return back to the automatic state.

(8) SELECT key

In the multimeter functions, when setting the rotary switch to a measurement function, the meter will enter its first measurement mode, while pressing the SELECT key it is possible to select the second or the third measurement mode. However, there is only one for the Capacitance measurement.

(9) FUNC key

In the calibrator functions, it is V mV conversion key and mA mA% conversion key

(10) IN/OUT key

In the multimeter functions, it is switch for turning on/off USB transmission.

In the calibrator functions, it is Input/output conversion key.

(11) REL key

In the multimeter functions, it is to enter or exit the relative status .

In the calibrator functions, it is to reduce more value .

(12) HOLD key

In the multimeter functions, Used to maintain the measurement data unchanging, by pressing the key again it will resume the measurement. .

In the calibrator functions, it is to reduce less value .

(13)  key

In the multimeter functions, by pressing this key for a time, the backlight of the LCD screen will be on , after thirty seconds

the meter will turn off the backlight automatically . It also can turn off the backlight by pressing the LIGHT key.

In the calibrator functions,it is to increase less value .

(14) HZ% key

In the multimeter functions,during the voltage or current measurement, by pressing \sim Hz key the meter will enter the linear frequency measurement status. the frequency of voltage or current is measured at this time . By pressing this key again, will exit the linear frequency measurement status.

In the calibrator functions,it is to increase more value .

(15)LCD screen

Used for displaying the measuring results,value of signal and various symbols.

Understanding Display Screen :

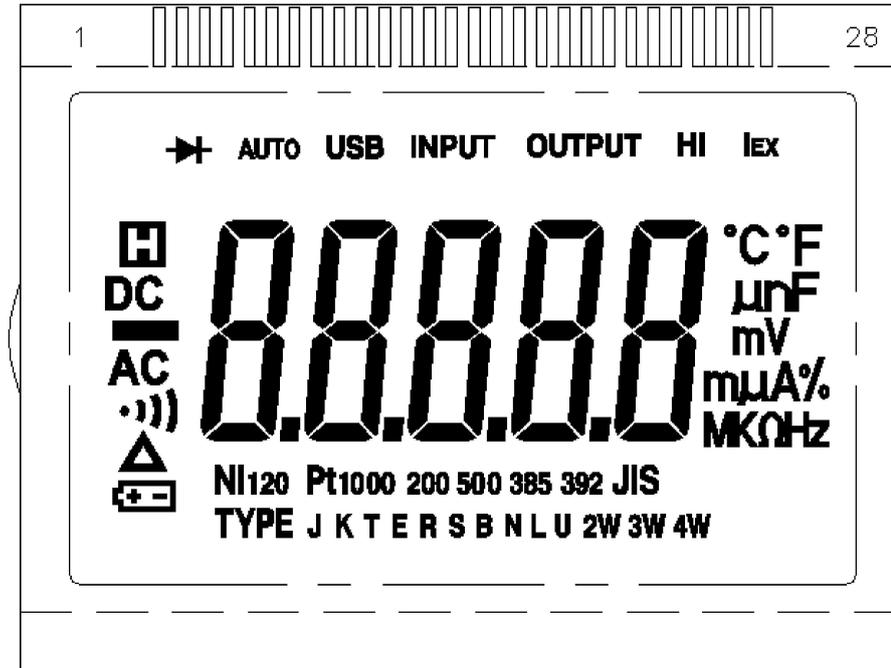


Figure 2—2

Display screen as Figure2 – 2, with its every symbol's meaning shown as in the Table 1

Number	Symbol	Functions
1	°C °F	Indicating the measurement unit being °C or °F of temperature
1	µnF	Indicating the measurement unit being µF or nF of Capacitance
1	mµA	Indicating the measurement unit being µA, mA or A of current
1	mV	Indicating the measurement unit being mV and V of voltage
1		Indicating it is now in the diode measurement state,
2	MKΩHz	Indicating the measurement unit being MΩ, KΩ and Ω of resistance or MHz, KHz and Hz of frequency
3	AUTO	Indicating the measurement being automatic range
4		Indication to low voltage of the batteries, showing the energy of batteries will be exhausted soon
5		Indicating the measurement being relative measurement while the displayed value being relative value
6	·)))	Indicating it is now performing the continuity measurement
7	AC	Indicating it is now in the AC measurement state

Tabel1 (continue)

8		Indicating the measurement value being negative
9	DC	Indicating it is now in the DC measurement state
10		Indicating it is now in the data-holding state
11	OUTPUT	Indicating it is now in the Output state
12	INPUT	Indicating it is now in the input state
13	USB	USB Indicates that USB real time data uploading is enabled
14		The display zone for the meter's measurement value, showing all the measurement values

Multimeter Function Descriptions

Along with the conventional measurement functions this meter also possesses some special functions which being described as follows:

- Automatic and manual ranges: When turning on the meter's power switch the meter defaults the automatic range state(AUTO displaying), and simultaneously it will automatically select the proper range according to the measured electric parameters. If OL being displayed under automatic range, it indicates the measured value exceeding the meter's maximum range. Pressing the RANGE key under the automatic range the meter will enter the manual range(MANUAL displaying), then pressing the RANGE key again it will be possible to select the required range. The indicator for range will display the maximum value of this range. If OL displaying under the manual range, it indicates the measured value exceeding the selected range. Press the RANGE key under the manual range for two seconds and then release it, the meter will go back to the automatic range state.
- Linear frequency measurement: Pressing the Hz% key when the meter performing measurements on AC voltage or current as well as on mixture signal of AC and DC, it will be capable to measure the frequency of the AC component. However it has a certain requirements on the amplitude of the AC component.
- Logic impulse duty ratio measurement: logic impulse duty ratio refers to: $(\text{high level width}/\text{impulse cycle})\times 100\%$
- Diode measurement: during diode measurement the meter is indicating to the forward voltage drop of the diode
- Relative measurement: during relative measurement the meter remembers internally the instantaneously measured value(called initial value)when pressing the REL Δ key, and the later displaying value being:**present value – initial value**
- The relative measurement value reflects the changes of the measured value. It also can be used to take off the errors brought about by lead resistance or distributed capacitance during measuring low resistance and low capacitance. Due to subtraction calculation, negative value may appear during measuring AC current, resistance and capacitance.
- Low voltage detection: when the meter detecting the total voltage of the batteries lower than 6.8V, the  symbol on the LCD screen will be lighted to prompt the batteries should be replaced.

Chapter 3 Calibrator Operation Methods



Never apply more than 30V between any two jacks in the calibrator functions .

DCV measurement

This function for the high precision measurement under the calibrator, the maximum voltage up to 10 V, two range with 10 v and 100 mv

1. Turn on the power switch
2. set the rotary switch to the position mV/V.
3. Press the input/output conversion key to get the input indicator .
4. Press the V/mV conversion key , make it indicate VDC or mVDC ,at the range of measure you need.
5. Put the red test lead in + jack 3, black one to the - jack1, shown as in Figure 3-1.
6. Connect the red test lead with the positive of voltage which is waiting for measurement, black one to the negative(ground).
7. The value of result show 1.5.



Figure 3-1
DCV measurement of Calibrator

DC V output

1. Turn on the power switch
2. Set the rotary switch to the position of mV/V.
3. Press the input/output conversion key to get the output indicator .
4. Press the V/mV conversion key, make it indicate VDC or mVDC ,at the range of measure you need.
5. Press the value adjust key make the value you want.
6. Put the red test lead in + jack 3, black one to the - jack1, shown as in Figure 3-2.
7. Connect the red test lead with the positive of voltage which is waiting for measurement, black one to the negative(ground).
8. If you want to change the output value or range, then press the value adjust key or the V mV conversion key .

NOTE:Never apply voltage between any two jacks



Figure 3-2
DCV output of Calibrator

DC mA measurement

1. Turn on the power switch
2. Set the rotary switch to the position of mA %.
3. Press the input/output conversion key to get the input indicator .
4. Press the mA/mA % conversion key, make it indicate mA or mA%,at the range of measure you need.
5. Put the red test lead in + jack 3, black one to the - jack1, shown as in Figure 3-3.
6. Connect the red test lead with the positive of current which is waiting for measurement, black one to the negative(ground).
7. The value of result show 15.



Figure 3-1
DCmA measurement of Calibrator

DCmA outpute

1. Turn on the power switch
2. Set the rotary switch to the position of mA %.
8. Press the input/output conversion key to get the output indicator .
3. Put the red test lead in + jack 3, black one to the + jack1, shown as in Figure 3-4.
4. Connect the red test lead with the positive of current , black one to the negative(ground).
5. Press the mA/mA %conversion key, make it indicate mA or mA%,at the range of measure you need.
6. Press the value adjust key make the value you want.
7. If you want to change the output value or range, then press the value adjust key or the mA/mA % conversion key .

Note 1: If the LCD display  symbol in the process of output current, batteries driving ability is insufficient, please replace batteries.

Note 2: when OUTPUT is higher than 0.1 mA, if OUTPUT symbol flashing, it means OUTPUT current is not correct. Please turn off the meter, check whether the circuit loop formation, eliminate circuit fault before new operation (including check fuse).

NOTE1:Never apply voltage between any two jacks



Figure 3-4
DCmA output

24 v output voltage source

1. Turn on the power switch
2. Set the rotary switch to the position of 24v.
3. Put the red test lead in + jack 3, black one to the + jack1, shown as in Figure 3-5.



Figure 3-5
DC 24 v output

Chapter 4 Multimeter Operation Methods

ACV/DCV Measurement

The measurement is shown as in Figure 4-1, with voltage range being of AC or DC $0V \sim 600V$ and the measurement methods being as follows:

1. Turn on the power switch and set the rotary switch to the position of **V**.
2. Insert the red and black test probes into **VΩHz** end and **COM** end respectively.
3. Select the **ACV** or **DCV** measurement mode with the **SELECT** key. Connect the meter to the two ends of the measured voltage with the red and black probes.
4. Read value from the display screen. When OL displaying on the meter, it indicates the measured voltage exceeding the meter's range and it is necessary to remove both the red and black probes from the measured circuit immediately.
5. By pressing the **RANGE** key it is possible to select range manually. Indicator of range displays range. While displaying OL during manual range measurement, it is necessary to select a larger range. When OL displaying under the maximum range, it indicates the voltage exceeding 600V, so it is necessary to remove both the red and black probes from the measured circuit immediately.

Notes: in case of probe hanging in the air, the voltage inducted by the testing line may cause unstable readings on the display screen, but that will not affect the accuracy of measurement.



Figure 4-1
Not try to measure a voltage
higher than 600V

Logic Frequency/Duty Ratio Measuremeat

The testing chart is shown in the Figure 4-2. The frequency range is of 5Hz~4MHz ($V_p 2.5\sim 5V$), while the duty ratio measurement range being of 10%~95%. And the measurement methods are as follows:

1. Turn on the power switch and set the rotary switch to the position Hz% .
2. Insert the red testing line into the **VΩHz** end and the black testing line into the **COM** end.
3. Press the **SELECT** key to select the logic frequency(Hz) or duty ratio Hz% modes.
4. Connect the red testing line to high logic level, the black one to low logic level.
5. Read the measured value from the display screen. If the frequency of the measured signal is lower or higher than the meter's measurement range, the reading will be displayed as zero. If the amplitude of signal is too low or the low level is larger than 1 volt, the reading will also displayed as zero.
6. This measurement is of automatic range, it is null to press the **RANGE** key.



Figure 4-2
Logic Frequency/Duty Ratio
Measurement

Resistance/continuity/diode Test

The test chart is seen in Figure 3-6. the measurement range of resistance is of $0.1\Omega \sim 40M\Omega$ and the measurement methods are as follows:

1. Turn on the power switch and set the rotary switch to the position .
2. Insert the red and black testing lines into the $V\Omega H$ input end and the COM input end respectively.
3. Press the SELECT key to select resistance or the continuity or the diode modes.
4. For the resistance measurement, connect the red and black probes to the two ends of resistor and read the resistance value from the display screen. If OL displaying, it indicates the resistor is larger than $50M\Omega$. As for the continuity measurement, connect the red and black probes to the two measured points respectively. In case of the resistance between the two points being less than about $50\Omega \sim 60\Omega$, the buzzer will sound while the display screen displaying the value of resistance. If OL displaying, it indicates the resistance between the two points is larger than 500Ω .
5. When the resistance measurement mode being implemented, it is possible to select range by pressing the RANGE key. The indicator of range indicates the value of range. If OL displaying during manual range measurement, it is necessary to select a larger range. Under the continuity measurement mode it is null to press the **RANGE** key.
1. Connect the red probe to the positive polarity of the diode and the black probe to its negative polarity, while the display screen will display the forward voltage drop.

Notes: In case of performing diode or **Resistance** test on circuit board, it is necessary firstly to turn off the power of the circuit board and then perform the measurement. As there may be other parallel circuits, so the displayed value of test is not surely the results listed in items 3 and 4.



图 4-3
Resistance/continuity/diode Test

Capacitance Measurement

The measurement chart is seen in figure 4-4. the measurement range of capacitance is of $10\text{PF}\sim 100\mu\text{F}$ and the measurement methods are as follows:

1. Turn on the power switch and set the rotary switch to the position  .
2. Insert the red and black testing lines into the **VΩHz** input end and the **COM** input end respectively.
3. If exists voltage in the capacitor, connect the two ends of the capacitor for a short time to discharge.
4. Connect the red and black probes to the two ends of the capacitor, if the measured capacitor is heteropolar, it is necessary to connect the red probe to the positive polarity of the capacitor and the black probe to its negative polarity.
5. Read the capacitance from the display screen. If capacitance value $>100\mu\text{F}$, the meter will display OL, while capacitance value $<10\text{PF}$, it will display zero.
6. It is possible to select range manually by pressing the **RANGE** key. The indicator of range indicates the value of range. If OL displaying during manual range measurement, it is necessary to select a larger range. If it has been the largest range, which means capacitance value $>100\mu\text{F}$.



图 4-4
Capacitance Measurement

DC μ A/AC μ A Measurement

The measurement is seen in Figure 4-5, the measurement range of current is of AC or DC $0.1\mu\text{A} \sim 4000\mu\text{A}$, and the measurement methods are as follows:

1. Turn on the power switch and set the rotary switch to the position **μA** .
2. Insert the red testing line into the **mA/ μ A** input end and the black testing line into the **COM** input end.
3. Press the **SELECT** key to select the **Dc μ A, Ac μ A** measurement modes.
4. Turn off the power of the measured circuit, connect the red and black probes to the measured circuit in serial way and then turn on the power of the measured circuit.
5. Read the measured value from the display screen. If it displays as positive during the DC measurement, it means the current is flowing into the meter from the red testing line, while it displaying as negative, it means the current is flowing into the meter from the black testing line. If it displays as OL, it means current exceeding range.
6. During measurement of **DC μ A or Ac μ A**, it is possible to select range manually by pressing the **RANGE** key.



Figure 4-5,
DC μ A/AC μ A Measurement

DC mA/AC mA Measurements

The measurement is seen in the Figure 4-6. The measurement range of current is of AC or DC $10\ \mu\text{A} \sim 400\text{mA}$ and the measurement methods are as follows:

1. Turn on the power switch and set the rotary switch to the position **mA**.
2. Insert the red testing line into the **mA/μA** input end and the black testing line into the **COM** input end.
1. Press the **SELECT** key to select the **Dc mA, Ac mA** measurement modes.
2. Turn off the power of the measured circuit, connect the red and black probes to the measured circuit in serial way and then turn on the power of the measured circuit.
3. Read the measured value from the display screen. If it displays as positive during the DC measurement, it means the current is flowing into the meter from the red testing line, while it displaying as negative, it means the current is flowing into the meter from the black testing line. If it displays as OL, it means current exceeding range.
4. During measurement of **DC mA or Ac mA**, it is possible to select range manually by pressing the **RANGE** key.



Figure 4-6
DCmA /ACmA Measurements

DC A/AC A Measurement

The measurement is seen in Figure 4-7, the measurement range of current is of AC or DC 1mA ~10A and the measurement methods are as follows:

1. Turn on the power switch and set the rotary switch to the position A .
2. Insert the red testing line into the **A** input end and the black testing line into the **COM** input end.
3. Press the **SELECT** key to select the **DcA, AcA** measurement modes.
4. Turn off the power of the measured circuit, connect the red and black probes to the measured circuit in serial way and then turn on the power of the measured circuit.
5. Read the measured value from the display screen. If it displays as positive during the DC measurement, it means the current is flowing into the meter from the red testing line, while it displaying as negative, it means the current is flowing into the meter from the black testing line. If it displays as OL, it means current exceeding range.
6. During measurement of **DCA or Ac A**, it is possible to select range manually by pressing the RANGE key.

NOTE:When measuring current is greater than 1A, the continuous measurement time should not be more than 20 seconds. After measuring, disconnect the current.



Figure 4-7
DCA/ACA Measurement

Linear Frequency Measurement

The measurement is seen in the Figures 4-1, 4-6, 4-7 and 4-8. The measurement range is of 5Hz~200kHz and the measurement methods are as follows:

1. When performing voltage or current measurement, in case of measured value being AC or including AC elements, it is possible to measure and display the alternating frequency by pressing the **Hz%** key. However it has a certain requirements for the amplitude of alternating signal and the meter has varied requirements for signal amplitude when it is in different ranges.
2. If the position of rotary switch is in ACV , after pressing **Hz%** key the indicator of range will indicate the meter's present voltage range. In addition, it is possible to change the range by pressing the **RANGE** key to meet the different voltages.
3. Press **Hz%** key again to exit linear frequency

Relative Value Measurement

Except for frequency、 duty ratio and diode measurements, all other measurements can employ relative measurement. Press **REL** key to enter relative measurement and the meter will record the initial value when pressing the key. And the later displayed value is:

$$\text{Displayed value} = \text{present measurement value} - \text{Initial value}$$

Press **REL** again to exit relative measurement. When measurement over, OL will display instead of showing the relative value.

Backlight Control

Pressing the  key, the LCD display screen's backlight will be lighted and after thirty seconds it will automatically go out. It is also possible to turn off the backlight by pressing the  key before the thirty seconds.

Data Hold

By pressing the **HOLD** key it is possible to hold the measurement value and the state at the moment of pressing the **HOLD** key. While pressing the key again data measurement will be resumed.

Connected to Computer USB Interface

Pressing the **USB** key , the meter will begin to send the measured data and state to computer while the LCD display screen displaying . Then it will be able to record、analyze、draw and print all the measurement on computer as long as you insert one end of the **USB** cable (options) into the front socket of the meter and another end into the computer **USB** interface and run the record and graphics software (options).And press the **USB** key again, the meter will stop to send data to computer,symbol **USB** on the LCD display screen will disappear. When the meter sends data to computer, it will cause the increase of the electricity consumption.So should be turned off when no need to transmit data.

Note: **USB function only can be active with multimeter function**

Chapter 5 Technological Specifications

General Features

- Voltage between the measurement end and ground is of 600V AC/DC. 600V CAT IV, 2th pollution grade.
- Six AAA batteries X 1.5V. (Support used AAA NIMH battery)
- Infrared coupling USB interface.
- Operating temperature: 0°C~30°C (relative humidity 0~80%)
31°C~51°C (relative humidity 0~50%)
- Storage temperature: -20°C~60°C (relative humidity <= 80%)
- Altitude: operation less than 2000m,
 storage less than 10000m
- Volume: 200mm X 100mm X 40mm
- Weight: 560g

Range and accuracy of the calibration function

The below-listed accuracy under different ranges refer to those which are guaranteed by the meter within one-year calibration, with normal use under the operating temperature of 20°C-30°C and relative humidity less than 75%.

DCV Input and Output

function	Range	Resolution	Accuracy
DCV Input	0 ~ 100 mV	0.01 mV	0.02 % + 2
	0 ~ 10 V	0.001 V	
DCV output	0 ~ 100 mV	0.01 mV	
	0 ~ 10 V	0.001 V	

Input impedance: **2M Ω (nominal) , < 100pF**

Over voltage protection: **30 V**

Voltage driver capability: **1 mA**

DC mA Input and Output

function	Range	Resolution	Accuracy
DCmA Input and Output	0 ~ 24 mA	0.001 mA	0.02 % + 4
	0 ~ 24mA	0.001 mA	

Percent display: 0%=4mA, 100%=20mA

Range and accuracy of the Multimeter function

The below-listed accuracies under different ranges refer to those which are guaranteed by the meter within one-year calibration, with normal use under the operating temperature of 20°C-30°C and relative humidity less than 75%.

Measuring range	Resolution	Accuracy
400mV	0.1mV	$\pm(0.8\% \text{ reading} + 5 \text{ digits})$
4.0V	0.001V	$\pm(0.8\% \text{ reading} + 5 \text{ digits})$
40V	0.01V	
400V	0.1V	
600V	1V	

- Input impedance: 10M Ω
- Overload protection: 400mV measuring range: 250V DC or AC (RMS), 4.0V-600V measuring range: 600V DC or 600V AC (RMS))
- Maximum input voltage: 600V DC

● **DC voltage**

Measuring range	Resolution	Accuracy
400mV	0.1mV	$\pm(1\% \text{ reading} + 5 \text{ digits})$
4V	0.001V	$\pm(0.8\% \text{ reading} + 5 \text{ digits})$
40V	0.01V	
400V	0.1V	
600V	1V	$\pm(1.2\% \text{ reading} + 3 \text{ digits})$

- Input impedance: 10M Ω
- Maximum input voltage: 600V AC (RMS)
- Frequency range: 50 ~ 60Hz
- Response: Average

● **Resistance**

Measuring range	Resolution	Accuracy
400 Ω	0.1 Ω	$((1\% \text{ reading} + 5 \text{ digits})$
4k Ω	0.001k Ω	
40k Ω	0.01k Ω	
400k Ω	0.1k Ω	
4M Ω	0.001Mk Ω	
10M Ω	0.1M Ω	$((1.2\% \text{ reading} + 15 \text{ digits})$

- Open circuit voltage: about 0.4V
- Overload protection: 250V DC or AC (RMS)

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● Capacitance

Measuring range	Resolution	Accuracy
40nF	0.01nF	±(4.0% reading + 2 digits)
400nF	0.1nF	
4μF	0.01μF	
40μF	0.01μF	
100μF	0.1μF	

- Overload protection: 250V DC or AC (RMS)

● Circuit continuity test

Measuring range	Resolution	Function
400Ω	0.1Ω	If the resistance of circuit to be measured is less than 30Ω, the meter's built-in buzzer will sound.

- Open circuit voltage is about 1.2V

- Overload protection: 250V DC or AC (RMS)

● Diode test

Measuring range	Resolution	Function
1.5V	0.001V	Display approximate diode forward voltage value

- Forward DC current is about 1mA

- Backward DC voltage is about 3.3V

- Overload protection: 250V DC or AC (RMS)

● **Logic Frequency**

Measuring range	Resolution	Accuracy
5Hz	0.01Hz	±(0.5% reading + 2 digits)
50Hz	0.1Hz	
500Hz	0.001kHz	
5kHz	0.01kHz	
50kHz	0.1kHz	
500kHz	1kHz	
4MHz	10kHz	

Overload protection: 250V DC or AC (RMS) - measurement signal: Vpp3V AC signal

● **Duty ratio**

Measuring range	Resolution	Accuracy
10 - 95%	0.1%	± 2.0%

Overload protection: 250V DC or AC (RMS) -

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● DC current

Measuring range	Resolution	Accuracy
400 μ A	0.1 μ A	$\pm(0.8\%$ reading + 2 digits)
4000 μ A	1 μ A	
40mA	10 μ A	
400mA	100 μ A	
10A	10mA	$\pm(1.2\%$ reading + 2 digits)

● AC current

Measuring range	Resolution	Accuracy
400 μ A	0.1 μ A	$\pm(1.5\%$ reading + 2 digits)
4000 μ A	1 μ A	
40mA	10 μ A	
400mA	100 μ A	
10A	10mA	$\pm(3.0\%$ reading + 5 digits)

Chapter 5 Maintenance

Replacement of Batteries

If symbol  appears on the LCD screen during measurement, it indicates the total voltage of batteries being lower than 6.8V. For ensuring measurement accuracy, it is necessary to replace the batteries. Before the replacement, must take off the red and black testing lines from the measured circuit and turn off the power of the meter. Open the cover of the batteries on the back of the meter and take out all the old batteries, replacing them with the AAA batteries. Take care to put in the batteries as the polarity specified on the shell of the meter. The meter must not be used until the cover of batteries being put properly and locked in.

shown in Figure 5-1

Replacement of Fuse

It must take off the red and black testing lines from the measured circuit and turn off the power of the meter before replacement of fuse. It should only use fuse of the same model and the same electric specifications. Two fuses must not be put wrong in positions during their replacement. And the meter must not be used until the cover of fuses being put properly and locked in.

The fuse specification: 500mA/1000V and 10A/500V fast acting fuse

Notes: generally, fuses will not be blown under the normal use of the meter. In case of blowing it is necessary first to find out the reasons for the blowing and then take an account on the use of the meter. Generally, blowing may attribute to:

- Perform voltage measurement when the rotary switch being in the position of current.
- Current exceeds range.

shown in Figure 5-1

Others

- In case of any default being found this meter must not be used continuously.
- When the meter needs repair, please send it to experienced professionals or the appointed maintenance department for repairing.
- It should use soft cloth but not organic solvents which have corrosive and dissolving effect on the shell of meter to clean the meter, and it should guard against water dropping into the meter.

Figure 5-1

