

UT204A

Operating Manual



Digital Clamp Multimeter

I. Overview

Warning

Please read the manual and "Safety Information" and Warnings carefully before using the meter.

UT204A is a 4000-count AC/DC digital clamp meter with stable performance, high degree of safety and reliability. It is designed with large-scale integrated circuits and dual integral A/D converter as its core, overload protection for all ranges and novel structure, which make it a superb tool for electricians. The meter can measure AC/DC voltage, AC/DC current, resistance, diode, continuity, capacitance, frequency and temperature, etc.

II. Unpacking Inspection

Please open the package box and take instrument out. Please check if following items are deficient or damaged or not.

1. Operating Manual	1 pc
2. Test Probes	1 pair
3. Temperature probe	1 pc
4. Guarantee certificate	1 pc

Please contact your supplier instantly if any item is deficient or damaged

III. Safety Information

The instrument is designed and manufactured in compliance with GB4793, IEC61010-1 and IEC 1010-2-032: Double Insulation, Overvoltage CAT II 600V & CAT III 300V and Pollution Degree 2.

A Warning identifies conditions and actions that may pose hazards to the user, or cause damage to the Meter or equipment under test. Please pay attention to Δ warnings and use the meter as specified as follows, otherwise the protection offered by the clamp meter would be impaired.

- Please inspect clamp meter and test leads before use to avoid damage or abnormal use. Please do not use the clamp meter again if test leads or shell insulation is damaged obviously with LCD display failure or clamp meter cannot operate normally.
- It is strictly prohibited to use clamp meter before covering rear cover and battery cell to avoid electric shock.
- Fingers cannot exceed the finger guard of probe during measurement. Do not touch nude electric wires, connector, unused input end or circuits during measurement to avoid electric shock.
- Function switch must be in correct position before measurement. It is strictly prohibited to change ranges during measurement to avoid damage of clamp meter.
- Do not exert more than 600V between terminal of clamp meter and grounding to avoid electric Shock or damage of clamp meter.
- To operate the instrument carefully under DC 60V or AC 30V to avoid electric shock.
- Do not measure voltage or current which is more than permissible input value. Be sure to place

function range switch to the maximum range position if scope of measured value cannot be determined. Be sure to cut off circuit power and discharge all capacitors before measuring of online resistance, diode or circuit. Disconnect probe and measured circuit then remove probe from input end of clamp meter and cut off power after measurement.

- Replace the battery when "EOL" shows on the LCD to ensure the measuring accuracy. To take battery out if clamp meter has not been used for a long time.
- Please do not alter internal wiring of clamp meter randomly to avoid instrument damage and safety danger.
- Do not store or use clamp meter in environment of high-temperature, high-humidity, flammables, explosives and strong current magnetic Field.
- Please clean the instrument shell by soft cloth and neutral detergent during maintenance. Do not use abrasive or solvent to avoid shell corrosion which may cause any damage to the clamp meter or personal injury.

IV. Electrical Symbols

	Double Insulated		Grounding
	AC		DC
	Diode		Low battery Indication
	Warning prompt		Buzzing ON/OFF
	AC or DC		
	To meet European Union standard.		

V. The Meter Structure (See Figure 1)

- Input end;
- LCD digit display;
- Function key: To select basic functions;
- Measurement function knob: White mark is initially set value; Blue mark is validated after selecting blue key;
- Clamp head trigger: To press the trigger to loosen clamp head. Clamp head will be tightened again if loosening the trigger;
- Hand protection: It prevents users from touching any dangerous area.
- Clamp head: It is a device to measure AC/DC current to convert current to voltage. Single conductor of measured current must pass through center of clamp head perpendicularly;

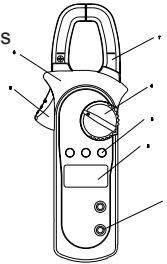


Figure 1

VI. Display Symbols (See Figure 2)

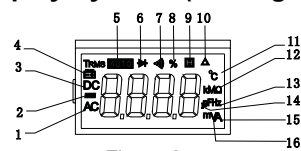


Figure 2

- Indicator for AC Measurement;
- Indicates negative polarity;
- Indicator for DC Measurement;
- Low Battery Indication;
- under Auto-Ranging Mode;
- Indicator for Diode Test;
- Indicator for Continuity Test;
- Indicator for Duty Cycle Test;
- Data Hold is Active;
- Indicator for Relative Measurement;
- Temperature Unit (°C);
- Resistance Unit (Ω , K Ω and M Ω);
- Frequency Unit (Hz);
- Capacitance Unit (nF and μ F);
- Current Unit (A);
- Voltage Unit (mV and V)

VII. Key Functions and Automatic Shutdown

1. HOLD

It is to maintain displayed reading by triggering. Displayed value will be locked for constant display by pressing the key once. It can be pressed again to release locking status and return to common measurement status.

2. REL Δ

Press down the key to use current reading as the reference value and reset the display to "0". This reference value is subtracted every time from measuring results until you press the key again to exit the mode.

3. SELECT

To switch over between V , V , V , V , V , V . Note: Automatic shutdown function will be cancelled if pressing SELECT key to wake up the meter from the sleep mode.

4. Automatic Shutdown

Clamp meter will "power off automatically" (under sleeping status) to save electric energy if function key and knob switch fail to operate within 15 minutes during measurement. Clamp meter will "start up automatically" (under working status) by rotating function key under automatic shutdown status. (Please refer to Item 6 for effective key operation.)

Note: Automatic shutdown function will be cancelled by pressing SELECT key for wake-up under sleeping status.

5. Buzzer

Buzzer will beep if pressing any effective function key under any measurement range. It will not ring if the key is invalid. Buzzer will issue 5 warning voices continuously about 1 minute before automatic shutdown. It also will issue a long-term voice before power off.

6. Key validity

Not all keys are valid under any range. As indicated below, corresponding functions or to wake up the meter can be achieved only when the keys are valid.

Key	SELECT	REL	HOLD
V	●	●	●
V	●	●	●
Hz	N/A	N/A	●
$^{\circ}\text{C}$	N/A	●	●
40A	●	●	●
600A	●	●	●

VIII. Measurement Instructions

1. DC voltage measurement (V) (See Figure 3)

Δ Warning: Clamp meter cannot be used for conductive object of which voltage exceeds AC/DC 600V.

- To set knob. Please place function knob to " V ".
- To select key functions. The clamp meter defaults at DC Voltage and auto-ranging mode. Press REL Δ to access relative mode.
- To connect load. To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

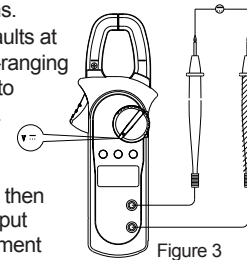


Figure 3

2. AC voltage measurement (V) (See Figure 4)

Δ Warning: Clamp meter cannot be used for conductive article of which voltage exceeds AC/DC 600V.

- To set knob. Please place function knob to " V ".
- To select key functions. Press SELECT button to select AC voltage mode, it defaults at auto-ranging. Press REL Δ to access relative mode.
- To connect load. To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

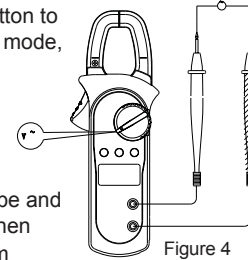


Figure 4

3. Resistance measurement (Ω) (See Figure 5)

Δ Warning: Be sure to cut off circuit power and discharge residual charge of all capacitors before load connection.

- To set knob. Please place function knob to " Ω ".
- To select key functions. It defaults at Ω mode and in auto-ranging. Press REL Δ to access relative mode.
- To connect load.

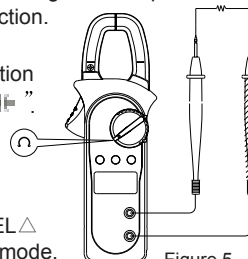


Figure 5

To gain excellent measured result by separating element from circuit.

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

4. Diode measurement (V) (See Figure 6)

Δ Warning: Be sure to cut off circuit power and discharge residual charge of all capacitors before load connection.

- To set knob. Please place function knob to " V ".
- To select functions. To select diode detection by pressing SELECT key;
- To connect load.

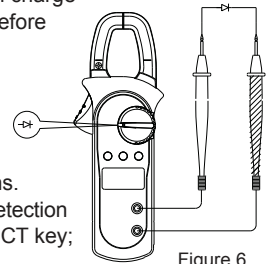


Figure 6

To gain excellent measured result by separating element from circuit.

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

5. Continuity Test (V) (See Figure 7)

Δ Warning: Be sure to cut off circuit power and discharge residual charge of all capacitors before load connection.

- To set knob. Please place function knob to " V ".
- To select functions. To select conductance detection by pressing SELECT key;
- To connect load. Buzzer will ring if measured resistance is less than 10 Ω . It can ring or not ring if measured resistance exceeds 10 Ω . To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

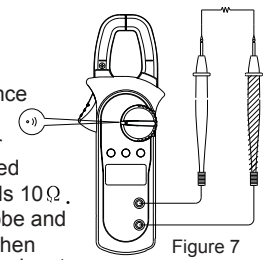


Figure 7

6. Capacitance measurement (V) (See Figure 8)

Δ Warning: Be sure to cut off circuit power and discharge residual charge of all capacitors before load connection.

- To set knob. Please place function knob to " V ".
- To select functions. To select capacitance detection by pressing SELECT key;
- To connect load. Measurement notice: 1) Be sure to reset by pressing REL key before measurement. 2) Instrument reading will delay for about 30 seconds normally when measuring large capacitance.

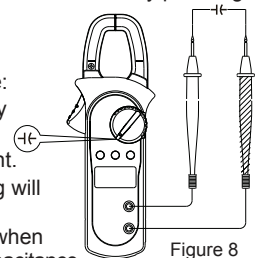


Figure 8

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

7. Frequency measurement (Hz) (See Figure 9)

Δ Warning: Clamp meter cannot be used for conductive objects of which voltage exceeds AC/DC 600V.

- To set knob. Please place function knob to "Hz".
- To select key functions.
- To connect load.

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

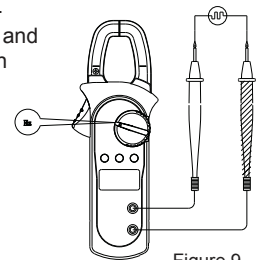


Figure 9

8. Temperature measurement (°C) (See Figure 10)

- To set knob.
To place function knob to "°C"
- To select functions.
- To connect load.

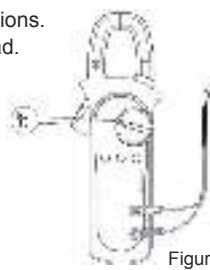


Figure 10

- 1) LCD will display "OL" if failing to insert temperature sensor. Clamp meter will display current indoor temperature after user inserting temperature sensor.
- 2) The protection for the temperature range is 1KΩ resistor(R59). any conductor with voltage present cannot be inserted into input jack to avoid.

9. DC current measurement (A) (See Figure 11)

- To set knob.
To place function knob to "40A" or "600A"
- To select functions.
The meter defaults at DC Current Mode.
- To connect load.

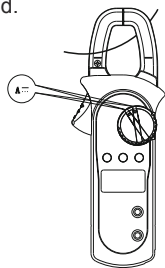


Figure 11

Please do not loosen trigger suddenly. As a sensitive device, Hall element will be sensitive to heat and mechanical stress to different extents in addition to magnetic sensitivity. Collision will cause short-term reading variation. Please open the clamp head by pressing trigger then fetch measured conductor by clamp head and loosen trigger slowly until it is closed completely. Please check if measured conductor is in the middle of clamp head or not. Additional error may be caused if failing to place it in the middle of clamp head. Clamp meter can measure a current conductor once and measurement reading error may be caused if measuring two or more current conductors at the same time.

10. AC current measurement (A) (See Figure 12)

- To set knob.
To place function knob to "40A" or "600A"
- To select functions.
To press SELECT key for AC current measurement;
- To connect load.

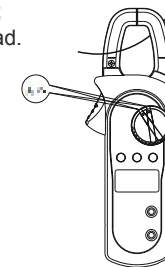


Figure 12

Please do not loosen trigger suddenly. As a sensitive device, Hall element will be sensitive to heat and mechanical stress to different extents except magnetic sensitivity. Collision will cause short-term reading variation. Please open the clamp head by pressing trigger then fetch measured conductor by clamp head and loosen trigger slowly until it is closed completely. Please check if measured conductor is in the middle of clamp head or not. Additional error may be caused if failing to place it in the middle of clamp head. Clamp meter can measure a current conductor once and measurement reading error may be caused if measuring two or more current conductors at the same time.

IX. Technical Indicators

1. General specification

LCD display: 4000 counts;
Polarity display: Automatic display;
Overload display: To display "OL" or "-OL",
Low Battery Indication: "BAT" shows as battery voltage is less than required working voltage.
Sampling rate: 3 times/second;
Sensor category: Hall effect sensor for DC/AC measurement;
Error of testing position: ±1.0% of additional reading error may be caused if failing to place measured source to center of clamp head during current measurement;
Shock-resistant: pass 1m drop test;
Max. clamp Opening: 28mm diameter;
Max. Tested Conductor: 26mm diameter;
Influence of electromagnetic field: Device used near electromagnetic field may display unstable or incorrect reading;

2. Environment limitation

Indoor use
The altitude height: 2,000m
Safety rules: ICE 1010-1 CAT.II 600V
CAT.III300V
Pollution degree: 2
Operation temperature & humidity: 0°C to 30°C (not more than 80%R.H.)
30°C to 40°C (not more than 75%R.H.)
40°C to 50°C (not more than 45%R.H.)
Storage temperature & humidity: -20°C to +60°C (not more than 80%R.H.)

3. Electrical specification

Accuracy: ±(a% readings + b digits)
Calibration period for 1 year
Ambient temperature: 23°C ±5°C
Ambient humidity: Not more than 80% R.H.
Temperature coefficient: 0.1*precision/1°C

(1) DC voltage (V)

Range	Resolution	Accuracy	Overload protection
400.0mV	0.1mV	±(0.8%+3)	600V DC/AC
4.000V	1mV	±(0.8%+1)	
40.00V	10mV		
400.0V	100mV		
600V	1V		

Input impedance: 10MΩ

(2) AC voltage (V)

Range	Resolution	Accuracy	Overload protection
4.000V	1mV	±(1%+5)	600V DC/AC
40.00V	10mV		
400.0V	100mV		
600V	1V		

Input impedance: 10MΩ //not less than 100pF

Frequency response: 40Hz~400Hz
AC conversion type:
AVG response, RMS value for sinewave input.

(3) Resistance (Ω)

Range	Resolution	Accuracy	Overload protection	
400.0Ω	100mΩ	±(1.2%+2)	600Vp	
4.000KΩ	1Ω	±(1%+2)		
40.00KΩ	10Ω			
400.0KΩ	100Ω			
4.000MΩ	1KΩ			±(1.2%+2)
40.00MΩ	10KΩ			±(1.5%+2)

(4) Diode test (→|←)

Range	Resolution	Accuracy	Overload protection
	1mV	To display approximate positive pressure drop. (Open circuit voltage is about 1.48V.)	600Vp

(5) Continuity test (•|•)

Range	Resolution	Accuracy	Overload protection
	0.1Ω	Buzzer will ring if it is less than or equal to 10Ω. (Open circuit voltage is about 0.45V.)	600Vp

Note: Buzzer will ring or not ring if measured resistance exceeds 10Ω

(6) Capacitance (—|—)

Range	Resolution	Accuracy	Overload protection
4nF	0.001nF	±(4.0%+3)	600Vp
40nF	0.01nF		
400nF	0.1nF		
4μF	0.001μF		
40μF	0.01μF		
100μF	0.1μF	±(5.0%+10)	

To measure under RELATIVE measurement mode;

(7) Frequency (Hz)

Range	Resolution	Accuracy	Overload protection	
10Hz	0.001Hz	±(0.5%+3)	600Vp	
100Hz	0.01Hz			
1kHz	0.1Hz			
10kHz	1Hz			
100kHz	10Hz			
1MHz	100Hz			
10MHz	1kHz			(Reading is only for reference.)

Sensitivity: ≥300mV rms if ≤100kHz;
≥600mV rms if >100kHz;
≥800mV rms if >1MHz;

Input amplitude a:

10Hz~100kHz: 30V rms ≥ a ≥300mV rms
100kHz~10MHz: 30V rms ≥ a ≥600mV rms

(8) Temperature (°C)

Range	Accuracy	Overload protection
-40°C~1,000°C	±(8%+5) 0°C~400°C ±(2.5%+3) 400°C~1,000°C ±(3.0%+3)	Plug-in resistance of 1KΩ

Note:

- 1) There is no voltage protection for temperature ranges. It is not allowed to insert electrified conductor into jack to avoid burnout of 1KΩ resistance;
- 2) K type thermocouple (Ni-Cr~Ni-Si) is only suitable to temperature measurement of less than 230°C. Rod type temperature sensor shall be used for temperature measurement of more than 230°C.

(9) DC current (A)

Range	Resolution	Accuracy	Overload protection
40.00A	0.01A	±(2%+5)	600A DC/AC
600A	1A		

Note:

Current measurement function must be operated between 0°C and 40°C. Current direction is from bottom to top for positive reading during DC current measurement. (As shown in Figure 11, panel is on the top and bottom cover is on the bottom.) Please do not loosen the trigger suddenly after pressing. As a sensitive device, Hall element will be sensitive to heat and mechanical stress to different extents addition to magnetic sensitivity. Collision will cause short-term reading variation. More correct measurement can be guaranteed by following operation methods:

- ① Press the trigger and open clamp head to fetch measured conductor by clamp head then loosen trigger slowly until clamp head is closed completely. Please check if measured conductor is in the middle of clamp head or not. Additional reading error of ±1.0% may be caused if failing to place it in the middle of clamp head;
- ② To remove clamp head away from the current conductor;
- ③ To press REL Δ key for display resetting;
- ④ To repeat step ①;
- ⑤ To gain more correct reading by above measurement steps;

(10) AC current (A)

Range	Resolution	Accuracy	Frequency response	Overload protection
40.00A	0.01A	±(2.5%+8)	50Hz~60Hz	600A DC/AC
600A	1A	±(2.5%+5)		

Note:

Current measurement function must be fulfilled between 0°C and 40°C. Frequency response: 50Hz~60Hz;
Instable or incorrect inductive reading with less than 10 words may be displayed in AC current gear and it will not influence measurement result. Please do not loosen trigger suddenly. As a

sensitive device, Hall element will be sensitive to heat and mechanical stress to different extents in addition to magnetic sensitivity. Collision will cause short-term reading variation.

AC conversion type:
AVG response; RMS value for sinewave input.

X. Maintenance(See Figure 13)

⚠ Warning: Please remove testing rod before opening bottom cover to avoid electric shock.

1. General maintenance

- A. The clamp meter must be repaired and served by qualified professional repair personnel or designated repair department.
- B. To clean the shell periodically by dry cloth. However, it is not allowed to use detergent with abrasive or solvent.

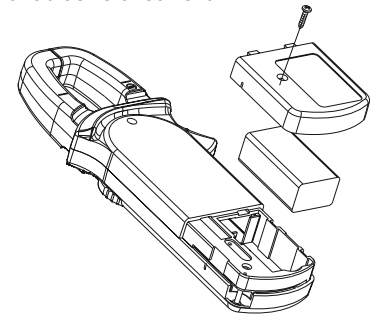


Figure 13

- 2) Battery installation or replacement 16F22 9V battery shall be supplied for the product. Please install or replace the battery by following sequence:
 - a. Please remove testing rod in the input end during shutdown.
 - b. To let panel face downwardly, loosen screws on the cell box, extract cell cover then remove cell box.
 - c. To remove old battery from cell box for installation of new battery according to polarity instructions.
 - d. Please use the same model of battery. Please do not install improper battery.
 - e. To install cell cover and lock screws after installation of new battery.

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