UNI-T

UT203/204
Operating Manual

Digital Clamp Multimeters

Overview

This Operating Manual covers information on safety and cautions. Please read the relevant information carefully and observe all the **Warnings** and **Notes** strictly.

⚠ Warning

To avoid electric shock or personal injury, read the "Safety Information" carefully before using the Meter.

Model UT203/204 (hereafter referred to as "the Meter") is 4000-count stable, safe and reliable digital clamp multimeter. They are designed with large-scale integrated circuits and A/D converter as the core as well as the overload protection and novel structure, which make them a superb tool for electricians.

The Meter can not only measure AC/DC Voltage, AC/DC Current, Frequency, Duty Cycle, Resistance, Diodes, Continuity but also it has Data Hold, Sleep Mode and Relative Mode features.

UT204 has an extra True RMS feature.

Unpacking Inspection

Open the package case and take out the Meter. Check the following items carefully for any missing or damaged part:

Item	Description	Qty
1	English Operating Manual	1 pc
2	Test Leads	1 pair
3	Carrying Bag	1 pc
4	9V Battery (NEDA1604, 6F22 or 006P)	1 pc

In the event you find any missing or damaged part, please contact your dealer immediately.

Safety Information

This Meter complies with the standard IEC61010: Pollution Degree 2, Overvoltage Category (CAT. II 600V, CAT. III 300V) and Double Insulation.

CAT. II: Local level, appliance, PORTABLE EQUIPMENT etc., with smaller transient overvoltages than CAT. III.
CAT. III: Distribution level, fixed installation, with smaller transient overvoltages than CAT. IV

Use the Meter only as specified in this operating manual, otherwise the protection provided by the Meter may be impaired.

In this manual, a **Warning** identifies conditions and actions that pose hazards to the user, or may damage the Meter or the equipment under test.

A **Note** identifies the information that user should pay attention to.

⚠ Warning

To avoid possible electric shock or personal injury, and to avoid possible damage to the Meter or to the equipment under test, adhere to the following rules:

- **Before using the Meter inspect the case. Do not use the Meter if it is damaged or the case (or part of the case) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connectors.**
- **Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads with identical model number or electrical specifications before using the Meter.**
- **Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding. If the value to be measured is unknown, use the maximum measurement position and reduce the range step by step until a satisfactory reading is obtained.**
- **When measurement has been completed, disconnect the connection between the test leads and the circuit under test, remove the testing leads away from the input terminals of the Meter and turn the Meter power off.**
- **The rotary switch should be placed in the right position and no any changeover of range shall be made when measurement is conducted to prevent damage of the Meter.**
- **Do not carry out the measurement when the Meter's back case and battery compartment are not closed to avoid electric shock.**
- **Do not input higher than 600V between the two Meter's input terminal to avoid electric shock and damages to the Meter.**
- **When the Meter is working at an effective voltage over 60V in DC or 30V rms in AC, special care should be taken for there is danger of electric shock.**
- **Use the proper terminals, function, and range for your measurements.**
- **Do not use or store the Meter in an environment of high temperature, humidity, explosives, inflammables and strong magnetic field. The performance of the Meter may deteriorate after dampened.**
- **When using the test leads, keep your fingers behind the finger guards.**
- **Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity and diode.**
- **Replace the battery as soon as the battery indicator appears. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.**
- **When servicing the Meter, use only use the replacement parts with the same model or identical electrical specifications.**
- **The internal circuit of the Meter shall not be altered at will to avoid damage to the Meter and any accident.**
- **Soft cloth and mild detergent should be used to clean the surface of the Meter when servicing. No abrasive and solvent should be used to prevent the surface of the Meter from corrosion, damage and accident.**
- **The Meter is suitable for indoor use.**
- **Turn the Meter off when it is not in use and take out the battery when not using for a long time.**
- **Constantly check the battery as it may leak when it has been using for some time, replace the battery as soon as leaking appears. A leaking battery will damage the Meter.**

Safety Information

~	AC (Alternating Current)
⎓	DC (Direct Current)
≂	AC or DC
⏚	Grounding
⧈	Double Insulated
⚠	Warning. Refer to the Operating Manual
	Low Battery Indication
•))	Continuity Test
⊣⊢	Diode
	Fuse
	Risk of Electric Shock
CE	Conforms to Standards of European Union

The Meter Structure (See Figure 1)

1. Input Terminals
2. LCD Display
3. Functional Buttons
4. Rotary Switch
5. Trigger: press the lever to open the transformer jaws. When the pressure on the lever is released, the jaws will close.
6. Hand Guards: to protect user's hand from touching the dangerous area.
7. Transformer Jaw: designed to pick up the AC and DC current flowing through the conductor. It could transfer current to voltage. The tested conductor must vertically go through the Jaw center.

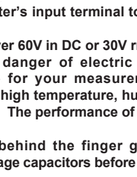

Figure 1

Rotary Switch

Below table indicated for information about the rotary switch positions.

Rotary Switch Position	Function
OFF	Power is turned off
V≂	AC or DC voltage measurement
Ω	Resistance measurement
⊣⊢ / •))	⊣⊢ : Diode test •)) : Continuity test
Hz / Duty%	Frequency Measurement and Duty Measurement
40A≂ & 400A≂	AC and DC current measurement range

Functional Buttons

Below table indicated for information about the functional button operations.

Button	Description
HOLD	● Press **HOLD** to enter the Hold mode in any mode, the Meter beeps. ● Press **HOLD** again to exit the Hold mode, the Meter beeps.
REL△	At V≂ and Ω range: ● Press to select manual ranging measurement mode. The Meter is default to auto ranging measurement mode. ● When the Meter is at manual ranging measurement mode, press to step down the range. **At A≂ range:** ● Press to enter the REL mode. ● It subtracts a stored value from the present measurement value and displays a result. At **Hz/Duty%** range: ● Press to switch between Hz measurement mode and Duty % measurement mode.
SELECT	● Press **SELECT** button to select the alternate functions marked in blue colour on the Meter's faceplate including V≂ , ⊣⊢ •)) , 40A≂, and 400A≂ . ● After the Meter entering Sleep Mode, press and hold **SELECT** to turn the Meter on, it will disable the Sleep Mode feature.

The Effectiveness of Functional Buttons

Not every functional buttons can be used on every rotary switch positions. Below table describe which functional buttons can be used on which rotary switch positions

Rotary Switch Positions	Functional Buttons		
	SELECT	REL△	HOLD
V≂	●	●	●
Ω	N/A	●	●
⊣⊢ / •))	●	N/A	●
Hz / Duty%	N/A	●	●
40A≂	●	●	●
400A≂	●	●	●

Display Symbols (See Figure 2)

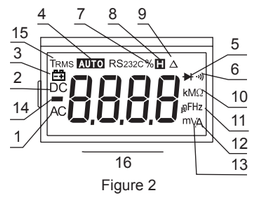

Figure 2

Number	Symbol	Description
1	AC	Indicator for AC voltage or current
2	DC	Indicator for DC voltage
3		The battery is low. **Warning: To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator appears.**
4	AUTO	The Meter is in the auto range mode in which the Meter automatically selects the range with the best resolution.
5	⊣⊢	Test of diode
6	•))	The continuity buzzer is on
7	%	Indicator for Duty.
8	H	Data hold is active
9	△	Indicator for REL mode
10	Ω,kΩ,MΩ	Ω: Ohm. The unit of resistance. kΩ: Kilohm. 1x10^3 or 1000 ohms MΩ: Megohm. 1x10^6 or 1,000,000 ohms
11	Hz	The unit of Frequency
12	A	Amperes (amps). The unit of current.
13	mV, V	Volts. The unit of voltage. mV: Millivolt. 1x10^{-3} or 0.001 volts
14	−	Indicates negative reading
15	TRMS	Indicator for TRMS mode
16	OL	The input value is too large for the selected range

Measurement Operation

A. Measuring DC/AC Voltage (See Figure 3)

⚠ Warning

To avoid harm to you or damage to the Meter from eletric shock, do not attempt to measure voltages higher than 600V AC/DC, although readings may be obtained.

The DC Voltage ranges are:
400mV, 4V, 40V, 400V and 600V.

The AC Voltage ranges are:
4V, 40V, 400V and 600V.

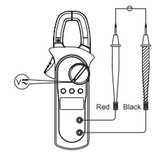

Figure 3

To measure DC/AC voltage, connect the Meter as follows:

1. Insert the red test lead into the Hz Duty% •)) ⊣⊢ VΩ terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to V≂. DC mesaurement mode and auto ranging is a default. Press **SELECT** to switch to AC measurement mode or press **REL**△ to switch to manual ranging measurement mode.
3. Connect the test leads across with the object being measured. The measured value shows on the display.

Note

- When DC/AC voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads from the input terminals.

B. Measuring Resistance (See Figure 4)

⚠ Warning

To avoid damage to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring resistance.

The resistance ranges are:
400Ω, 4kΩ, 40kΩ,400kΩ,4MΩ and 40MΩ.

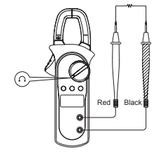

Figure 4

To measure resistance, connect the Meter as follows:

1. Insert the red test lead into the Hz Duty% •)) ⊣⊢ VΩ terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to Ω. Resistance measurement is default to auto range mode, press **REL**△ to switch to manual ranging measurement mode.
3. Connect the test leads across with the object being measured. The measured value shows on the display.

Note

- To obtain a more precise reading, you could remove the objects being tested from the circuit when measuring.
- When resistance measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads from the input terminals.

C. Testing Diodes (See Figure 5)

⚠ Warning

To avoid damage to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before testing diodes.

Use the diode test to check diodes, transistors, and other semiconductor devices. The diode test sends a current through the semicondutor junction, then measure the voltage drop across the junction. A good silicon junction drops between 0.5V and 0.8V.

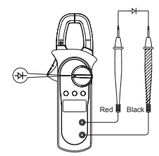

Figure 5

To test the diode out of a circuit, connect the Meter as follows:

1. Insert the red test lead into the Hz Duty% •)) ⊣⊢ VΩ terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to ⊣⊢ •)) . Diode measurement mode is a default or presss **SELECT** to select ⊣⊢ measurement mode.
3. For forward voltage drop readings on any semiconductor component, place the red test lead on the component's anode and place the black test lead on the component's cathode.

Note

- To obtain a more precise reading, you could remove the objects being tested from the circuit when measuring.
- When diode testing has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads from the input terminals.

D. Testing for Continuity (See Figure 6)

⚠ Warning

To avoid damage to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring continuity.

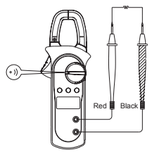

Figure 6

To test for continuity, connect the Meter as follows:

1. Insert the red test lead into the Hz Duty% terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to and press **SELECT** button to select measurement mode.
3. The buzzer sounds if the resistance of a circuit under test is less than 50Ω
   The buzzer may or may not sounds if the resistance of a circuit under test is between 50Ω to 100Ω
   The buzzer does not sound if the resistance of a circuit under test is higher than 100Ω

Note

- When continuity testing has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads from the input terminals.

E. Measuring Frequency (See Figure 7)

⚠ Warning

To avoid harm to you or damage to the Meter from eletric shock, do not attempt to measure voltages higher than 600V AC/DC, although readings may be obtained.

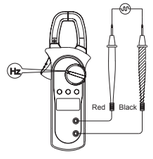

Figure 7

The frequency ranges are:
10Hz, 100Hz, 1kHz, 10kHz, 100kHz, 1MHz and 10MHz.

To measure frequency, connect the Meter as follows:

1. Insert the red test lead into the Hz Duty% terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to **Hz**.
3. Connect the test leads across with the object beingmeasured.
   The measured value shows on the display.

Note

- When frequency measurement has been completed, disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminals of the Meter.

F. Measuring Duty Cycle(See Figure 8)

⚠ Warning

To avoid harm to you or damage to the Meter from eletric shock, do not attempt to measure voltages higher than 600V AC/DC, although readings may be obtained.

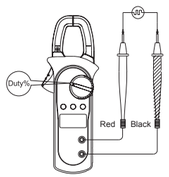

Figure 8

The duty cycle range is: 0.1%~99.9%.

To measure duty cycle, connect the Meter as follows:

1. Insert the red test lead into the Hz Duty% terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to **Hz** and press **REL△** to select Duty Cycle measurement mode.
3. Connect the test leads across with the object beingmeasured.
   The measured value shows on the display.

Note

- When duty cycle measurement has been completed, disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminals of the Meter.

G. Measuring DC/AC Current (See Figure 9)

The current ranges are: 40.00 **A** and 400.0 **A**.

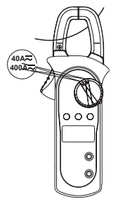

Figure 9

To measure current, do the following:

1. Set the rotary switch to 40 **A** or 400 **A**. DC measuremnet mode is a default. Press **SELECT** to switch between DC and AC measurement mode.
2. Hold the Meter tight, don't release. The Hall components are very senstive not only to the magnet but also to heat and machines reaction force. Any shock will cause the changing in reading in the short time.
3. Press the trigger to open the transformer jaw.
4. Center the conductor within the transformer jaw, then release the Meter slowly until the trasnformer jaw is completely closed, Make sure the conductor to be tested is placed at the center of the transformer jaw, otherwise it will casue deviation. The Meter can only measure one conductor at a time, measuring more than one condutor at a time will cause deviation..

Note

- Press **REL△** to subtract a stored value from the present measurement value and displays a result.
- When current measurement has been completed, disconnect the connection between the conductor under test and the jaw, and remove the conductor away from the transformer jaw of the Meter.

Sleep Mode

To preserve battery life, the Meter automatically turns off if you do not turn the rotary switch or press any button for around 15 minutes.

The Meter can be activated by turning the rotary switch or pressing the button based on '**The Effectiveness of Functional Buttons"** on section. Pressing **SELECT** to activate the Meter will disable the Sleep Mode feature.

The Meter beeps 5 times in about 1 minute before entering Sleep Mode and will have a 1 long beep just before entering Sleep Mode.

To disable the Sleep Mode function, press and hold **SELECT** button while turning on the Meter.

General Specifications

- Maximum Voltage between any Terminals and grounding: Refer to different range input protection voltage.
- Display: 3 3/4 digits LCD display, Maximum display 3999
- Polarity: Automatically display.
- Overloading: Display **OL** or **–OL**
- Low Battery Indication: Display
- Measurement Speed: Updates 3 times/second.
- Measuremnet Deviation: The conductor being meaured is not placed in the center of the jawt during AC/DC current measurement, it will cause extra ±1% deviation based on the stated accuracy.
- Drop Test: 1 meter drop test passed.
- Max. Jaw Opening: 28mm diameter.
- Max. Tested Current Conductor: 26mm diameter.
- Electro-Magnetic: When carrying out measurement near the electro-magnetic, it may cause unstable or wrong reading.
- Power: 1 x 9V battery (NEDA1604 or 6F22 or 006P)
- Battery Life: typically 150hours (alkaline battery)
- Sleep Mode (can be disabled)
- Dimensions (H x W x L): 208mm x 76mm x 30mm.
- Weight: Approximate 260g (battery included)
- The Meter is suitable for indoor use.
- Altitude: Operating: 2000m
  Storage: 10000m
- Safety/ Compliances: IEC 61010 CAT.II 600V, CAT.III 300V "CAT.III300V and Double Insulation"
- Temperature and humidity:
  Operating: 0ºC~30ºC (≤ 85%R.H);
  30ºC~40ºC (≤ 75%R.H);
  40ºC~50ºC (≤ 45%R.H);
  Storage: -20ºC~+60ºC (≤ 85%R.H)

Accuracy Specifications

Accuracy: ±(a% reading + b digits), guarantee for 1 year.
Operating temperature: 23ºC ± 5ºC
Relative humidity: ≤ 85%R.H
Temperature coefficient: 0.1x(specified accuracy)/1ºC

A. DC Voltage

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	±(1%+3)	

Remarks: Input impedance: 10MΩ

B. AC Voltage

Range	Resolution	Accuracy	Overload protection
4.000V	1mV	±(1%+5)	600V DC/AC
40.00V	10mV		
400.0V	100mV		
600V	1V	±(1.2%+5)	

Remarks:
- Input impedance: 10MΩ
- Frequency response: 40Hz~400Hz.

- **AC Conversion Type:**
  - **UT203:**
    Average-responsed. Input sinewave and the reading is RMS value.
  - **UT204:**
    AC-coupled and TRUE RMS-responsed. Sinewave is input. Non-sine wave must follow the accuracy below:
    Peak factor: 1.4~2.0, add 1.0% on the stated accuracy
    Peak factor: 2.0~2.5, add 2.5% on the stated accuracy
    Peak factor: 2.5~3.0, add 4.0% on the stated accuracy.

C. Resistance

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)	

D. Diode

Range	Resolution	Accuracy	Overload protection
	1mV	Display approximate forward voltage drop	600Vp

Remark: Open circuit voltage approximate 1.48V.

E. Continuity

Range	Resolution	Accuracy	Overload protection
	100mΩ	Around ≤ 10Ω , the buzzer beeps	600Vp

Remark:
- Open circuit voltage approximate 0.45V.
- The buzzer may or may not beep when the resistance of a circuit under test is between 10Ω~100Ω
- The buzzer will not beep when the resistance of a circuit under test is > 100Ω.

F. Frequency

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

Remark:
Input Sensitivity as follows:
When ≤ 100kHz: ≥ 300mV rms;
When > 100kHz: ≥ 600mV rms
When > 1MHz: ≥ 800mV rms

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

G. Duty Cycle

Range	Resolution	Accuracy	Overload protection
0.1%~99.9%	0.1%	For reference only	600Vp

H. DC Current

Range	Resolution	Accuracy	Overload protection
40.00A	0.01A	±(2%+5)	400A DC/AC
400.0A	0.1A	±(2%+3)	

⚠ Warning

The operating temperature must be 0ºC ~40ºC when measuring current.

Remark:
- If the reading is positive, the current direction is from bottom to up. See figure 10, the front case face up while the bottom case face down. Hold the Meter tight, do not release suddenly. The built-in Hall components are very sensitive not only to the magnet but also to heat and machines reaction force. Any shock will cause the changing in reading in the short time. Following the below procedure to measure AC current will obtain a more precise reading:

1. Hold the Meter tight and press the trigger to open the transformer jaw. Center the conductor within the transformer jaws, then release the Meter slowly until the transformer jaw is completely closed. Make sure the conductor to be tested is placed at the center of the transformer jaw, otherwise it will cause +1.0% deviation based on the stated accuracy.
2. Remove the transformer jaw.
3. Press **REL△** to display zero.
4. Repeat Step 1
5. The obtained reading will be more precise.

I. AC Current

Range	Resolution	Accuracy	Frequency Response	Overload protection
40.00A	0.01A	±(2.5%+8)	50Hz ~ 60Hz	400A DC/AC
400.0A	0.1A	±(2.5%+5)		

⚠ Warning

The operating temperature must be 0ºC ~40ºC when measuring current.

Remark:
- It may have 10 digits or less unstable or wrong digits, it will not affect measurement result.
- Hold the Meter tight, do not release suddenly. The built-in Hall components are very sensitive not only to the magnet but also to heat and machines reaction force. Any shock will cause the changing in reading in the short time. Following the below procedure to measure AC current will obtain a more precise reading:
  1. Hold the Meter tight and press the lever to open the transformer jaw. Center the conductor within the transformer jaws, then release the Meter slowly until the transformer jaw is completely closed. Make sure the conductor to be tested is placed at the center of the transformer jaw, otherwise it will cause +1.0% deviation based on the stated accuracy.
  2. Remove the transformer jaw.
  3. Press **REL△** to display zero.
  4. Repeat Step 1
  5. The obtained reading will be more precise.

- **AC Conversion Type:**
  - **UT203:**
    Average-responsed. Input sinewave and the reading is RMS value.
  - **UT204:**
    AC-coupled and TRUE RMS-responsed. Sinewave is input. Non-sine wave must follow the accuracy below:
    Peak factor: 1.4~2.0, add 1.0% on the stated accuracy
    Peak factor: 2.0~2.5, add 2.5% on the stated accuracy
    Peak factor: 2.5~3.0, add 4.0% on the stated accuracy.

Maintenance

This section provides basic maintenance information including battery replacement instruction.

⚠ Warning

Do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service information.

To avoid electrical shock or damage to the Meter, do not get water inside the case.

A. General Service

- Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- To clean the terminals with cotton bar with detergent, as dirt or moisture in the terminals can affect readings.
- Turn the Meter power off when it is not in use.
- Take out the battery when it is not using for a long time.
- Do not use or store the Meter in a place of humidity, high temperature, explosive, inflammable and strong magnetic field.

B. Replacing the Battery (See Figure 10)

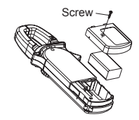

Figure 10

⚠ Warning

To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator " " appears. Make sure the transformer jaw and the tets leads are disconected from the circuit being tested before opening the case bottom.

To replace the battery:

1. Turn the Meter off and remove all the connections from the input terminals
2. Turn the Meter's front case down.
3. Remove the screw from the battery compartment, and separate the battery compartment from the case bottom.
4. Take out the old battery and replace with a new 9V battery (NEDA1604, 6F22 or 006P).
5. Rejoin the case bottom and the battery compartment, and reinstall the screw.

UNI-T
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** END **