

## OPERATOR'S INSTRUCTION MANUAL DIGITAL CLAMP METER

MODEL:



### WARNING

READ AND UNDERSTAND THIS MANUAL  
BEFORE USING THE INSTRUMENT.

### 1. INTRODUCTION

This manual provides all safety information, operation instruction, specifications and maintenance for the meter, which is compact, handheld, and battery operated.

This instrument performs AC/DC voltage, AC Current, Resistance, Audible Continuity, Diode and Temperature measurements. It is a 3 3/4 digits, 4000 counts auto ranging digital clamp multimeter.

It has the functions of polarity indication, data hold, maximum value hold, over range indication and automatic power-off. It can be operated easily and is an ideal instrument tool.

DT202 series digital clamp multimeter has been designed according to EN61010-1 oncoming electronic measuring instruments with an over voltage category (CAT II 600V) and Pollution degree 2.

#### 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.
- Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding.
- The rotary switch should be placed in the right position and no any changeover of range shall be made during measurement is conducted to prevent damage of the Meter.

- 2 -

- When the Meter 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, explosive, inflammable 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 or diodes.
- Replace the battery as soon as the battery indicator "E3" appears. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.
- Remove the connection between the testing leads and the circuit being tested, and turn the Meter power off before opening the Meter case.
- When servicing the Meter, use only the same model number or identical electrical specifications replacement parts.
- The internal circuit of the Meter shall not be altered at will to avoid damage of 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 power 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

- 3 -

has been using for some time, replace the battery as soon as leaking appears. A leaking battery will damage the Meter.

### 2. GENERAL CHARACTERISTICS

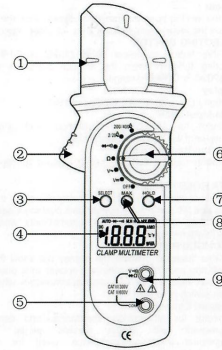
Display : LCD, 4000 counts updates 2/sec  
Polarity Indication : "C" displayed automatically  
Over-range Indication : "OL" displayed  
Low Battery Indication : "E3" displayed  
Range select : auto  
Operation Temperature : 0°C to 40°C, less than 80%RH  
Storage Temperature : -10°C to 50°C, less than 85%RH  
Battery Type : 1.5V x 2, AAA size  
Dimension(H×W×D) : 213×52×31mm  
Weight : Approx 190g

### 3. ELECTRICAL SYMBOLS

DC (Direct Current).  
AC (Alternating Current).  
DC or AC  
Important safety information.  
Refer to the manual.  
Dangerous voltage maybe present.  
Earth ground.  
Low battery  
Diode  
Continuity test  
Centigrade  
Fahrenheit  
Conforms to European Union directive.  
Double insulated.

- 4 -

### 4. PANEL DESCRIPTION



- 5 -

### 5. SPECIFICATIONS

Accuracy is guaranteed for 1 year 23°C±5°C less than 80%RH

#### 5-1. DC VOLTAGE (Auto ranging)

Range	Resolution	Accuracy
200mV	0.1mV	±(0.8% of rdg + 5dgt)
2V	1mV	
20V	10mV	±(0.5% of rdg + 2dgt)
200V	100mV	
600V	1V	±(1.0% of rdg + 5dgt)

Input Impedance: 10MΩ

Overload Protection: 600V DC/AC rms

Max. Input voltage: 600V DC

#### 5-2. AC CURRENT (Auto ranging)

Range	Resolution	Accuracy
2A	1mA	±(2.5% of rdg + 10dgt)
20A	10mA	
200A	100mA	
400A	1A	±(2.0% of rdg + 5dgt)

Measuring voltage drop: 200mV

Frequency Range: 40 to 200Hz

#### 5-3. AC VOLTAGE (Auto ranging)

Range	Resolution	Accuracy
200mV	0.1mV	±(1.2% of rdg + 5dgt)
2V	1mV	
20V	10mV	±(1.2% of rdg + 3dgt)
200V	100mV	
600V	1V	±(1.2% of rdg + 8dgt)

Input Impedance: 10MΩ

Frequency Range: 40Hz ~ 400Hz

- 7 -

Overload Protection: 600V DC/AC rms

Response: Average, calibrated in rms of sine wave

Max. Input voltage: 600V AC rms

#### 5-4. TEMPERATURE (DT202C only)

Range	Resolution	Accuracy
40 ~	1°C	-40°C~150°C:±(1% + 4)
1370°C		150°C~1370°C:±(2% + 3)
-40 ~	1°F	-40°F~302°F:±(5% + 4)
2000°F		3°F~2000°F:±(2% + 3)

Overload Protection: 250V DC/AC rms

#### 5-5. RESISTANCE (Auto Ranging)

Range	Resolution	Accuracy
200Ω	0.1Ω	
2KΩ	1Ω	
20KΩ	10Ω	±(1.5% of rdg + 3dgt)
200KΩ	100Ω	
2MΩ	1KΩ	
20MΩ	10KΩ	

Open Circuit Voltage: about 0.25V

Overload Protection: 250V DC/AC rms

#### 5-6. Diode and Continuity

Range	Introduction	Remark
→	The approximate forward voltage drop will be displayed	Open circuit voltage: about 1.5V
⚡	The built-in buzzer will sound if the resistance is less than about 30Ω	Open circuit voltage: about 0.5V

Overload Protection: 250V DC/AC rms

For continuity test: When the resistance is between 30Ω and

- 8 -

100Ω, the buzzer may sound or may not sound. When the resistance is more than 100Ω, the buzzer won't sound.

#### 5-3. Capacitance

Range	Resolution	Accuracy
4nF	1pF	
40nF	10pF	
400nF	100pF	±(3.0% of rdg + 5dgt)
4μF	1nF	
40μF	10nF	
400μF	100nF	±(3.5% of rdg +10dgt)
4mF	1μF	±(4.0% of rdg +15dgt)

### 6. OPERATION INSTRUCTION

#### 6-1. Measuring Voltage

- Connect the BLACK test lead to the "COM" jack and the RED to the "VΩ" jack.
- Set the function switch to V~ or Vrms range.
- Connect the test leads across the source or load to be measured.
- Read LCD display. The polarity of the RED lead connection will be indicated when making a DC measurement.

#### Note:

- In small range, the meter may display an unstable reading when the test leads have not been connected to the load to be measured. It is normal and will not affect the measurements.
- To avoid damage to the meter, don't measure a voltage which exceeds 600Vdc (for DC voltage measurement) or 600Vac (for AC voltage measurement).

- 9 -

#### 6-2. Measuring AC Current

- Set Function/Range Switch to the AC 200/400A range. If the display indicates one or more leading zeros. Shift to the 2/20A range to improve the resolution of the measurement.
- Press the trigger to open the transformer jaws and clamp one conductor only if it is impossible to make measurements when two or three conductors are clamped at the same time.
- Display reading is flowing the conductor AC current.

#### 6-3. Measure Resistance

- Connect the BLACK test lead to the "COM" jack and the RED to the "VΩ" jack (Note: The polarity of the red test lead is positive "+").
- Set the range switch to "Ω" range.
- For DT202C: Press the "SELECT" Button to select resistance measurement mode, and the symbol "Ω" will appear as an indicator.
- Connect the test leads across the load to be measured.
- Read the reading on the display.

#### Note:

- For resistance measurements >1MΩ, the meter may take a few seconds to stabilize reading. This is normal for high-resistance measurement.
- When the input is not connected, i.e. at open circuit, the symbol "OL" will be displayed as an over range indicator.
- Before measuring in-circuit resistance, be sure that the circuit under test has all power removed and all capacitors are fully discharged.

#### 6-4. Continuity Test

- Connect the BLACK test lead to the "COM" jack and the RED to the "VΩ" jack (Note: The polarity of the red

- test lead is positive "+").
- Set the range switch to "Ω" range.
- Press the "SELECT" Button to select continuity measurement mode, and the symbol "⚡" will appear as an indicator.
- Connect the test leads across the load to be measured.
- If the circuit resistance is lower than about 30Ω, the built-in buzzer will sound.

#### 6-5. Diode Test

- Connect the BLACK test lead to the "COM" jack and the RED to the "VΩ" jack (Note: The polarity of the red test lead is positive "+").
- Set the range switch to "→" range.
- Press the "SELECT" Button to select continuity measurement mode, and the symbol "→" will appear as an indicator.
- Connect the red test lead to the anode of the diode to be tested and the black test lead to the cathode.
- The Meter will show the approximate forward voltage of the diode. If the connections are reversed, "OL" will be shown on the display.

#### 6-6. Measuring Temperature(DT202C only)

- Set the range switch to "C/F" range.
- Press the "SELECT" button to select "C" or "F" mode, and the symbol "C" or "F" will appear as an indicator.
- Insert the black (or "-") plug of the K type thermocouple to the "COM" jack, and the red (or "+") plug to the "VΩ" jack.
- Carefully touch the end of the thermocouple to the object to be measured.
- Wait a while, read the reading on the display.

#### ①Transformer Jaws

Pick up the AC Current flowing through the conductor.

#### ②Trigger

Press the level to open the transformer jaws when the finger press on the level is released the jaws will close again.

#### ③SELECTING BUTTON

Push this button to select → (202C is Ω/→/→) measuring function when the function switch is set at → (202C is Ω/→/→) range.

#### ④Display

3 1/2 digit LCD, with a max. reading of 1999

#### ⑤COM Input Jack

Low input for all voltage, resistance, and continuity measurement will accept banana plugs.

#### ⑥Function/Range Switch

This switch can be used to select desired function and range.

#### ⑦DATA HOLD BUTTON

When this button is pushed, the display will show the last reading and "H" symbol will appear until pushing it again.

Data holding will be cancelled automatically when the function switch is rotated.

#### ⑧MAX HOLD BUTTON

When this button is pushed, the display will show the last Max reading and "M.H" symbol will appear until pushing it again. Max hold will be cancelled automatically when the function switch is rotated.

#### ⑨VΩ Input Connector

High input for all voltage, resistance, and continuity measurement will accept banana plugs. When measurement insulation resistance, used for accept insulation tester unit VΩ banana plugs.

- 6 -

#### 6-7 CAPACITANCE MEASUREMENT

##### Warning

To avoid damage to the Meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance. Use the DC voltage function to confirm that the capacitor is discharged.

- Set the range switch to "F" range. Or Press the "Select" button to "F" mode.
- Connect the red test and black test lead to the Two ends of the capacitance to be measured.
- The monitor reads the capacitance.

#### 7. Auto Power Off

If you don't operate the meter for about 15 minutes, it will turn off automatically. To turn on it again, just rotate the range switch or press a button.

If you press the "HOLD" button to arouse the meter after it turns off automatically, the automatic power-off function will be disabled.

#### 8. BATTERY REPLACEMENT

If the sign "E3" appear on the display, it indicates battery should be replaced. Remove screws and open the back case, replace the exhausted battery with new batteries (Size AAA, 1.5V x2 or equivalent).

#### 9. ACCESSORIES

Owners manual: 1 piece  
Test leads: 1 pair  
K type thermocouple: 1 piece (DT202C only)

#### DISPOSAL OF THIS ARTICLE

Dear Customer,  
If you as some point intend to dispose of this article, then please keep in mind that many of its components consist of valuable materials, which can be recycled. Please do not discharge it in the garbage bin, but check with your local council for recycling facilities in your area.



- 11 -



#### 4. Rotary Switch:

A rotary switch is used to select measurement Function and Range switch.

#### 5. Display:

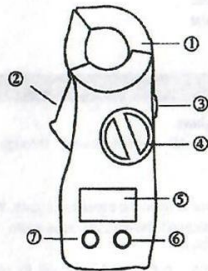
3½ digit (1999), decimal point, minus polarity, overrange and LO BAT indicators.

#### 6. V.Ω. -> Input Connector:

High Input for all voltage, diode, continuity, measurement will accept banana plugs

#### 7. COM Input Connector:

Low Input for all voltage resistance, diode, continuity, measurement will accept banana plugs.



•5•

The meter is completely portable, LCD, 3½ digit clamp meter. It has rugged design, is easy to hold in operator's hand and convenient to use.

#### 1. Safety Information

- 1.1 Read the following safety information carefully before attempting to operate or service the meter.
- 1.2 To avoid damages to the instrument do not exceed the maximum limits of the input values show in the technical specifications tables.
- 1.3 Never measure current while the test leads are inserted into the input jacks.
- 1.4 Do not use the meter or test leads if they look damaged. Use extreme caution when working around bare conductors or bus bars.
- 1.5 Caution when working with voltages above 60VDC or 30VAC RMS. Such voltages pose a shock hazard.

#### 2. Operating Features

AC Current	0.01A to 400A
AC Voltage	1V to 450V
DC Voltage	1V to 600V

The meter display is a liquid crystal assembly providing a readable display in all light conditions. The decimal point is automatically positioned, and the polarity sign (minus) is lighted for negative DC

•1•

#### 4.1 AC Current Measurement

1. Make sure that "Data Hold" switch is not pressed.
2. Set the range switch to 2, 20A, 200A or 400A
3. Press the trigger to open the transformer jaws and clamp one conductor only. It is impossible to make measurements when two or three conductors are clamped at the same time.

#### 4.2 AC/DC Voltage Measurement

1. Connect the black test lead to the COM jack and the red test lead to the V-Ω- jack.
2. Set the range switch to AC450V or DC600V.
3. Touch the tips of the test leads to the circuit under test.

#### 4.3 Diode/Continuity measurement

1. Connect the black test lead to the COM jack and the red test lead to the V-Ω- jack.
2. Set the range switch to "Diode" ->.
3. Diode measurement the meter will show the approx forward voltage of the diode. If the lead connection is reversed, only figure "1" displayed.

#### 4.4 Resistance Measurement

1. Connect the black test lead to the com jack and the red test lead to the VΩ -> jack.
2. Set the rotary switch at desired Ω position and test

•6•

measurement (plus is understood if no sign appears), so that the display is direct reading in units selected at the rotary switch. Overrange measurements are indicated by blanking all but the MSD, decimal point, and polarity sign (if negative). In addition the display includes a low battery indication. If low battery is indicated, operator should replace the used battery with new one.

#### 3. Specifications

The following Specifications assume a one year calibration cycle and an operating temperature of 64°F to 82°F (18°C to 28°C) at relative humidity up to 80% unless otherwise noted.

##### 3.1 AC Current (Average sensing, calibrated to rms of sine wave)

Range	Resolution	Accuracy(50Hz - 60Hz)
20A	10mA	± (3% of reading +5 digits)
200A	100mA	± (2.5% of reading +5 digits)
400A	1A	± (3% of reading +5 digits)

(Overload protection: 400A on all ranges)

##### 3.2 AC Voltage (Average sensing, calibrated to rms of sine wave)

Range	Resolution	Accuracy(50Hz - 500Hz)
450V	1V	± (2% reading +4 digits)

Input impedance: 9MΩ

Overload protection: 450V AC/DC on all ranges.

•2•

leads across the resistor under measurement.

#### NOTE:

1. If the resistance being measured exceeds the maximum value of the range selected or the input connected, an overrange indication "1" will be displayed.

2. When checking in - circuit resistance, be sure circuit under test has all power removed and that all capacitors have been discharged fully.

#### 4.5 How to Use Date Hold Function

On all ranges, you can hold a reading on the display using Date Hold function.

1. While making measurement, press the Date Hold switch. The last reading remains held on the display, with a Hold symbol (an arrow mark) shown on the display.
2. Press the Date Hold switch again to exit from Date Hold function.

•7•

#### 3.3 DC Voltage

Range	Resolution	Accuracy
600V	1V	± (1.2% reading +3 digit)

Overload protection: 600V DC/peak AC on all ranges

Input impedance: 9MΩ

#### 3.4 Diode Test

Test current: <1.2mA

Open circuit voltage: ≤ 3.2V

Overload protection: 300V DC/peak AC

Application: Semiconductor P - N junction good or bad test

Display reading approx diode forward voltage value.

#### 3.5 Continuity Test:

Buzzer sound: <75Ω

Overload Protection: 300V DC/peak AC

#### 3.6 Resistance

Range	Resolution	Accuracy
200KΩ	± (1.5% of reading +5 digit)	100Ω

#### 3.7 Environment

Temperature

Normal operation: 18°C to 28°C (64°F to 82°F)

Usable condition: 0°C to 50°C (32°F to 122°F)

Storage: -20°C to 60°C (-30°F to 140°F)

battery removed and < 80% RH

Relative Humidity: max 80%

#### 3.8 Function characteristics

Measurement method: Dual slope integration

•3•

## Digital Clamp - on Multimeter MODEL 87



### Instruction Manual

Reading Rate : 3 reading/sec

Polarity: Automatic, indicated minus, assumed plus  
Overload indication: Blanking of all digits, except MSD, decimal point and sign

Power requirements: 1.5V x 2

Battery indication: Display indicates **LO BAT** when approximately 20% of battery life remains

Display: LCD, 3½ digit (1999 count)

Data hold: All function and ranges with this feature

Dimension: 150 x 63 x 28mm (L x W x H)

approx

Weight: 145 grams (including battery, approx)

#### 3.9 Accessories

Instruction manual

Test leads

AAA 1.5V x 2

#### 4. Operation and Recalibration

##### 1. Transformer Jaws:

Pick up the AC current flowing through the conductor.

##### 2. Trigger:

Press the lever to open the transformer jaws. When the lever is released, the jaws will close again.

##### 3. Data Hold Switch:

A push switch, (push on, do not pull to select function). All function and ranges with this feature.

•4•