

I.Safety Information

The following safety information must be observed to insure maximum personal safety during the operation at this meter:

- Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.
- Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material.
- Turn off power to the circuit under test before cutting, unsoldering, or breaking the circuit. Small amounts of current can be dangerous.
- Use caution when working above 60V dc or 30V ac rms. Such voltages pose a shock hazard.
- When using the probes, keep your fingers behind the finger guards on the probes.
- Measuring voltage which exceeds the limits of the multimeter may damage the meter and expose the operator to a shock hazard. Always recognize the meter voltage limits as stated on the front of the meter.

SAFETY SYMBOLS



Indicates operators must refer to the explanation in this manual.



Indicates terminals at which dangerous voltage maybe present.

WARNING

To avoid electrical shock hazard or damage to the meter, Don't apply input which exceed the limit shown below:

Function	Terminal	Input limits
DCV/ACV	“V/Ω/Hz”	600V dc or ac rms.
Ω/Continuity/Diode/Cap.	“V/Ω/Hz”	250V dc or ac rms.
Freq / Duty	“V/Ω/Hz”	250V dc or ac rms.

II. Features

1. Accurate DC/AC digital clamp meter for current measurement.
2. 10mA high resolution on 40A DC/AC range.
3. One touch zero adjustment for DC Current measurement.
4. 23mm diameter jaw.
5. 4000 counts LCD display with function indication
6. 40A, 200A DCA/ACA clamp meter with function of DCV, ACV, OHM, Frequency, Duty cycle, Diode, Capacitance and Continuity measurements.
7. Auto-ranging for DC/AC voltage, Resistance, Frequency, Duty cycle and Capacitance measurement.
8. Auto power off
9. Data Hold function

III. Panel Description

1. Transformer Jaw

This is used to pick up current signal. To measure DC/AC current, conductor must be enclosed by the jaw

2. Transformer Trigger

This is used to open the jaw

3. Function Selector Switch

This is used to select the function user desired, such as DCA, ACA, DCV, ACV, Hz/Duty, Ohm / Diode / Continuity / Capacitance measurement.

4. ON/OFF Switch

This is used to turn the power on or off

5. Data Hold Button

Once this button is pushed, reading shall be held on the LCD, Press again to release it.

6. Zero Button

Once this button is pressed, the current reading shall be set to zero.

The function is also used to remove offset value caused by the residual magnetism remained in the core for the DC current measurement.

7. LCD

This is a 3 3/4 digit Liquid Crystal Display with maximum 3999 counts and function indication.

8. Low Battery Symbol

When this symbol appears, it means the battery voltage drops below the minimum required voltage. Refer to Section V for battery replacement

9. V Ω Hz Input Terminal

This terminal is used as input for voltage, Ohm/ Frequency, Duty cycle, Diode, Capacitance and Continuity measurements.

10. COM Terminal

This terminal is used as common reference input

11. Hand Strap

Put your hand through the hole of hand strap to avoid.

IV. Specification (22°C~28°C)/(71°F~82°F)

Maximum Voltage: 600V rms. (Between any terminal and earth ground)

Safety: Designed to Protection Class II requirement of EN61010-1 over-voltage Category II (CAT II).

Display: 4000 counts LCD display with function indication

Polarity: Automatic, (-) negative polarity indication.

Overrange: "OL" mark indication.

Low battery indication: The "BAT" is displayed when the battery voltage drops below the operating level.

Measurement rate: 2 times per second, nominal.

Auto power off : Meter automatically shuts down after approx. 30 minutes of inactivity.

Operating environment: 0°C to 50°C at <70% relative humidity.

Storage temperature: -20°C to 60°C at <80% relative humidity.

Power: One 9V, NEDA1604, IEC6F22 Battery.

Dimensions: 181.0x43.0x30.3mm

Weight: Approx.: 225g.

Accuracy is given at 23°C ± 5°C, less than 70% RH

DC Current:

Range		Resolution	Accuracy
40A	0-20A	10mA	± 3.0% ± 6dgts
	20A-40A	10mA	± 5.0% ± 6dgts
200A		100mA	± 3.5% ± 3dgts

One touch Zero for offsets adjustment

Maximum Input: 200A DC Max.

AC Current:

Range	Resolution	Accuracy			
		50~60Hz	60~100Hz	100~400Hz	400~1000Hz
0-20A	10mA	± 3% ± 4dgts	± 3% ± 7dgts	± 3% ± 10dgts	± 3% ± 30dgts
20-40A	10mA	± 5% ± 4dgts	± 5% ± 7dgts	± 5% ± 10dgts	± 5% ± 30dgts
200A	100mA	± 3.5% ± 4dgts	± 3.5% ± 7dgts	± 3.5% ± 10dgts	± 3.5% ± 30dgts

Frequency Range: 40 to 1000 Hz

Maximum Input: 200A AC rms. Max.

DC Voltage (Auto-ranging)

Range	Resolution	Accuracy
400.0mV	0.1mV	± 0.8% of rdg ± 2 dgts
4.000V	1mV	
40.00V	10mV	± 1.0% of rdg ± 2 dgts
400.0V	100mV	
600V	1V	± 1.5% of rdg ± 2 dgts

Input Impedance: 10M Ω .

Maximum Input: 600V dc or 600V ac rms.

AC Voltage (Auto-ranging)

Range	Resolution	Accuracy
4.000V	1mV	± 1.5% of rdg ± 3 dgts
40.00V	10mV	
400.0V	100mV	
600V	1V	± 2.0% of rdg ± 4 dgts

Input Impedance: 10M Ω .

Frequency Range: 40 to 400Hz

Maximum Input: 600V dc or 600V ac rms.

Resistance (Auto-ranging)

Range	Resolution	Accuracy
400.0 Ω	0.1 Ω	± 1.2% of rdg ± 4 dgts
4.000k Ω	1 Ω	± 1.2% of rdg ± 2 dgts
40.00k Ω	10 Ω	
400.0k Ω	100 Ω	
4.000M Ω	1k Ω	± 2.0% of rdg ± 3 dgts
40.00M Ω	10k Ω	

Input Protection: 250V dc or 250V ac rms.

Capacitance (Auto-ranging)

Range	Resolution	Accuracy
4.00nF	1pF	$\pm 6.0\%$ of rdg ± 15 dgts
40.00nF	10pF	$\pm 6.0\%$ of rdg ± 10 dgts
400.0nF	0.1nF	$\pm 3.5\%$ of rdg ± 5 dgts
4.000uF	1nF	
40.00uF	10nF	
200.0uF	0.1uF	$\pm 6.0\%$ of rdg ± 10 dgts

Input Protection: 250V dc or 250V ac rms.

Frequency (Auto-ranging)

Range	Resolution	Accuracy
9.999Hz	0.001Hz	$\pm 1.2\%$ of rdg ± 8 dgts
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999kHz	1Hz	$\pm 0.8\%$ of rdg ± 3 dgts
99.99kHz	10Hz	
999.9kHz	100Hz	
9.999MHz	1kHz	$\pm 2.0\%$ of rdg ± 8 dgts

Sensitivity: 0.8V RMS min. at >20%, <80% duty cycle and <100kHz;

5.0V RMS min. at >20%, <80% duty cycle and > 100kHz;

Effect Reading: More than 100 digits at pulse width > 2uSec.

Overload protection: 250V dc or ac rms.

Duty Cycle

Range	Resolution	Accuracy
0.1%-99.9%	0.1%	$\pm 1.2\%$ of rdg ± 2 dgts

Pulse width: >100us, <100ms.

Overload protection: 250V dc or ac rms.

Diode Test

Test current	Resolution	Accuracy
0.3 mA typical	1 mV	$\pm 10\%$ of rdg ± 5 dgts

Open circuit voltage: 1.5V dc typical

Overload protection: 250V dc or ac rms.

Audible continuity

Audible threshold: Less than 30 Ω

Test current: <0.3mA

Overload protection: 250V dc or ac rms.

V. Operation Instructions

Before taking any measurements, read the Safety Information Section.

Always examine the instrument for damage, contamination (excessive dirt, grease, etc.) and defects. Examine the test leads for cracked or frayed insulation. If any abnormal conditions exist do not attempt to make any measurements.

ZERO BUTTON:

For DCA, ACA and Capacitance Zero & offset adjustment.

It also can be used on DCV 400.0mV and ACV 4.000V range for offset adjustment.

Hz/% OR OHM/DIODE/CONTINUITY/CAPACITANCE SELECTING BUTTON:

Push this button to select ohm/diode/continuity/capacitance measuring function when the function switch is set at ohm/diode/buzzer/capacitance position.

Push this button to select Hz/%(duty cycle) measuring function when the switch is set at Hz/% duty cycle position.

DATA HOLD BUTTON:

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

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

DC/AC Current Measurements

WARNING: Make sure that all the test leads are disconnected from the meter’s terminals for current measurement

1. DC Current

- a. Set the rotary switch at 40A DC or 200A DC.
- b. Push the Zero Button to stop the reading at zero. If the reading is not stopped at zero, release the button a while and push it again.
- c. Press the trigger to open the jaw and fully enclose the conductor to be

measured. No air gap is allowed between the two half jaws.

- d. Read the measured value from the LCD display.
- e. Make sure that the offset value caused by the residual magnetism is still removed. If the new offset value is produced, remove it with the zero button and make a new measurement again according to the “c” and “d” (If the current to be measured is larger than the current to be measured before, or the direction of current changes, the new offset value will be produced)

2. AC Current

- a. Set the rotary switch at 40A AC or 200A AC.
- b. Press the trigger to open the jaw and fully enclose the conductor to be measured. No air gap is allowed between the two half jaws.
- c. Read the measured value from the LCD display.

DC/AC Voltage Measurements (Auto-ranging)

1. DC Voltage

- a. Set the rotary switch at DCV.
- b. Insert the test leads into the input jack.
- c. Connect the test probe in parallel to the circuit to be measured.
- d. Read the measured value from the LCD display.

2. AC Voltage

- a. Set the rotary switch at VAC.

- b. Insert the test leads into the input jack.
- c. Connect the test probe in parallel to the circuit to be measured.
- d. Read the measured value from the LCD display.

WARNING: Before taking any in-circuit resistance measurement, remove power from the circuit being tested and discharge all the capacitors.

Resistance, Diode, Continuity and Capacitance Measurement

1. Set the rotary switch at “ Ω /diode/continuity/capacitance” position
2. Insert the test leads into the input jack.
3. Connect the test probes to the two ends of the resistor/diode/capacitor or circuit to be measured.
4. Make sure all the power of the circuit to be measured is off.
5. To select the diode/continuity/capacitance test, touch the mode selection switch (ohm/diode/continuity/capacitance) and the “diode/continuity/nF” mark will be indicated on the display. When you touch the switch again, the mode will be changed to another test mode.
6. Read the measured value from the LCD display.
7. When on the continuity range, a beeping sound shall be heard if the resistance is lower than $100\ \Omega$.

8. When measuring the forward voltage across diode a normal diode will indicate 0.4V to 0.7V and the reverse voltage will indicate “OL” (same as on open condition). For a short-circuited diode, a value near 0 mV will be displayed.
9. When checking in-circuit capacitance, be sure that the circuit has all power removed and all capacitor are fully discharged. The range control mode in capacitance measurement is auto-ranging.

Frequency Measurement

1. Connect the black test lead to the COM jack and the red test lead to the “V/ Ω /Hz” jack.
2. Set the function switch to “Hz/% duty” range.
3. Connect the test leads to the circuit to be measured. The range will change that will display the measured frequency with the best resolution.
4. When you push the “HZ/%” button, the mode changes to the duty cycle check mode.

NOTE:

The input voltage should be between 800mV and 10V rms. ac. If the voltage is more than 10V rms., reading may be out of the accuracy range.

Duty Cycle measurement

1. Connect the black test lead to the COM jack and the red test lead to the “V/ Ω /Hz” jack.

2. Set the function switch to “Hz/% duty”.
3. Push the “Hz/%” button changing the function to % duty cycle.
4. Connect the test leads to the circuit to be measured. The range will change that will display the measured duty cycle with the best resolution.

NOTE:

The input voltage should be between 900mV and 10V rms. If the voltage is more than 10V rms., reading may be out of the accuracy range.

VI. Battery Replacement

When the low battery symbol is displayed on the LCD, replace the old battery with one new battery.

- A. Turn the power off and remove the test leads from the clamp meter
- B. Remove the screw of the battery compartment.
- C. Slide off the battery compartment.
- D. Remove the old battery.
- E. Insert one 9V NEDA1604, IEC6F22 battery.
- F. Replace the battery compartment and secure the screw

DCAC CLAMP METER

Model 9702

OPERATING INSTRUCTION

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