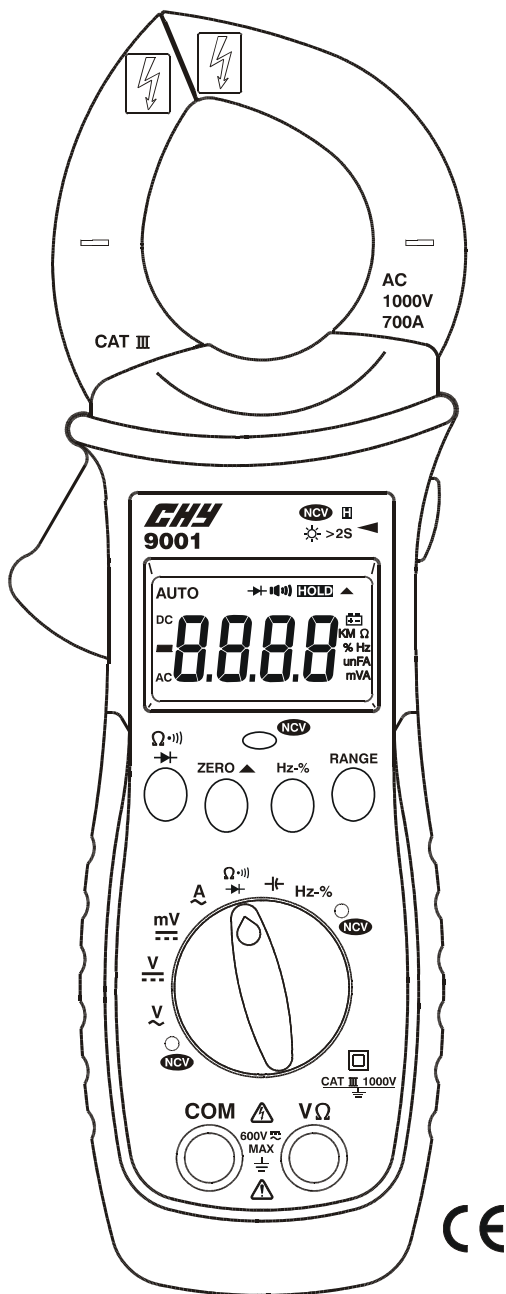


## OPERATING INSTRUCTIONS MODEL 9001 DIGITAL Clamp-On METER



## SAFETY INFORMATION

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

1. Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.
2. This meter is not recommended for high voltage industrial use; for example, not for measurements of 440V AC or 600V AC industrial power mains. The unit is intended for use with low energy circuits to 600V AC/DC or high energy circuit to 250V AC or DC.
3. Turn off power to the circuit under test before cutting, unsoldering, or breaking the circuit. Small amounts of current can be dangerous.
4. Use caution when working above 60V DC or 30V AC rms. Such voltages pose a shock hazard.
5. When using the probes, keep your fingers behind the finger guards on the probes.
6. 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.

### Warning

Typical meter applications are near exposed lethal voltages. Use caution when taking measurements. Before the meter is connected to any circuit, review the safety information. Always keep hands behind the meter HAND Barrier (see Figure 1.)

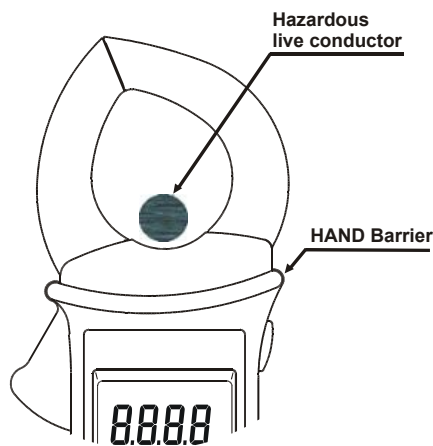


Figure 1.

	DANGEROUS VOLTAGE		SEE EXPLANATION IN MANUAL
	AC-ALTERNATING CURRENT		DOUBLE INSULATION (Protection Class II)
	DC-DIRECT CURRENT		GROUND

International Electrical Symbols

### Warning

Not to be exposed dripping or splashing environment.

## SPECIFICATIONS

**Display:** 3¾ digit liquid crystal display (LCD) with a maximum reading of 3999.

**Over-range:** "OL." mark indication.

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

**Measurement rate:** 2 times per second, nominal.

**Operating Environment:** 0°C to 50°C at < 70% R.H.

**Storage Temperature:** -20°C to 60°C at < 80% R.H. with battery removed from meter.

**Accuracy:** Stated at ambient temperature 18°C to 28°C (65°F to 82°F), <70% R.H.

**Temperature Coefficient:** 10% of applicable accuracy per °C (5% per °F) outside the range of 18 to 28°C (65°F to 82°F).

**Altitude up to 2000m.**

**MAX. Cable size:** 340mm.

**Safety Conformance:** All input are protected to EN61010-1, 1000V CAT III.

**Pollution degree II.**

**Power:** Single standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22.

**Battery life:** 200 hours typical with carbon-zinc.

**Dimensions:** 233mm (H) x 80mm (W) x 43mm (D)

**Weight:** Approx. 11oz. (344g) including battery.

### DC VOLTS

Ranges: 400mV(menu), 4V, 40V, 400V, 600V

Resolution: 1mV(0.1mV on 400mV range)

Accuracy:  $\pm(0.5\% \text{ rdg} + 1 \text{ dgt})$

Input impedance: >10MΩ

Overload & protection: 1000V DC or 750V AC rms.

### AC VOLTS (45Hz to 500Hz)\*

Ranges: 400mV(menu), 4V, 40V, 400V, 600V

Resolution: 1mV(0.1mV on 400mV range)

Accuracy:

$\pm(1.0\% \text{ rdg} + 4 \text{ dgt})$  on 4V to 600V (at 45Hz to 500Hz)

Input impedance: >10MΩ

Overload & protection: 1000V DC or 750V AC rms.

\* Range 400mV no specification.

**Note:** When measuring voltage of AC 4V/60Hz, due to the relatively high input impedance, the meter is sensitive to noise, and result in unstable at last digit.

### AC CURRENT (45Hz to 500Hz)

Ranges: 40A, 400A, 600A

Resolution: 0.01A

Accuracy:

$\pm(1.5\% \text{ rdg} + 10 \text{ dgt})$  at 50 to 60Hz

$\pm(3.5\% \text{ rdg} + 10 \text{ dgt})$  at 45 to 500Hz

Overload & protection: 700A AC max for 1 minute.

Accuracy at the center of CT.

### CONTINUITY

Audible indication: it beeps less than 5 ohms and turns off greater than 60 ohms.

Overload protection: 600V DC or AC rms

### RESISTANCE

Range: 400Ω, 4KΩ, 40KΩ, 400KΩ, 4MΩ, 40MΩ

Resolution: 0.1Ω

Accuracy:

$\pm(1.0\% \text{ rdg} + 3 \text{ dgt})$  on 400Ω to 4MΩ range

$\pm(3.0\% \text{ rdg} + 4 \text{ dgt})$  on 40MΩ range

Open circuit volts: 0.4V DC

Overload protection: 600V DC or AC rms.

### DIODE TEST

Accuracy:  $\pm(3.0\% \text{ rdg} + 3 \text{ dgt})$

Resolution: 1mV

Test current: 0.5±0.3mA

Test voltage: <1.6V DC

Overload protection: 600V DC or AC rms

### CAPACITANCE (Auto ranging)

Ranges: 40nF, 400nF, 4uF, 40uF, 100uF(15 sec.)

Resolution: 0.01nF

Accuracy:  $\pm(3.0\% \text{ rdg} + 10 \text{ dgt})$  (use zero)

Overload protection: 600V DC or AC rms

### NCV TEST

Test Range: 100 to 600V AC max to ground

Frequency: 50/60 Hz

Dielectric Strength: 2000V, 1 minute, 100uA or less during dielectric strength test

### FREQUENCY (Auto ranging)

Range: 5Hz, 50Hz, 500Hz, 5KHz, 50KHz, 500KHz, 5MHz

Resolution: 0.001Hz

Accuracy:  $\pm(0.1\% \text{ rdg} + 3 \text{ dgt})$  on 5Hz to 10KHz

Sensitivity:  $\geq 2 \text{Vrms (V}\Omega, \text{COM)}$  on 5Hz to 10KHz

$\geq 10 \text{Vrms (V}\Omega, \text{COM)}$  on 10K to 5MHz

TTL or SINE wave signal on all range

$\geq 5 \text{Arms}$  at 45 to 500Hz (at JAW)

Overload protection: 600V DC or AC rms.

### DUTY CYCLE (2Hz to 10KHz)

Ranges: 10% to 90%

Resolution: 0.1%

Accuracy:  $\pm(2\% \text{ rdg} + 5 \text{ dgt})$

Sensitivity: 2Vrms (VΩ, COM)

Overload protection: 600V DC or AC rms.

## OPERATION

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.

### Auto Power-down mode

When measurement exceeds 30 minutes without switching mode and pushing button, the meter will switch to off. When restart the meter, we have to press and hold  $\Omega/\rightarrow/\rightarrow$  button to disable Auto Power-off.

### $\Omega/\rightarrow/\rightarrow$ Function Button

Press  $\Omega/\rightarrow/\rightarrow$  function button to toggle to the alternate function (Audible continuity, and Diode).

### Hz-% Function Button

Press Hz-% button toggle between frequency and duty cycle mode.

**Note: In Hz function, Data Hold is disabled.**

### ZERO $\Delta$ Button

Press (ZERO  $\Delta$ ) to enter the relative mode, zero the display, and store the displayed reading as a reference value. In relative mode annunciator( $\Delta$ ) is displayed. Press (ZERO  $\Delta$ ) again to exit the relative mode.

**Note: When relative mode is active, auto range function is disable.**

### RANGE Button

Default is Auto Range when power is on. After power is on, press one time, and it will be in the manual mode. To press one time in the manual mode, it will jump one range up. If it is in the top range, it will jump to the lowest range; hold for 2 seconds and it will return to Auto Range. Due to the measuring method, Hz/Duty and Capacitance measurement cannot be switched to manual mode.

### Back-Light and Data-Hold Button ( $\times > 2\text{sec}$ ), (H):

Press this button briefly to activate Data-Hold mode. The "HOLD" annunciator is displayed. Press this button for 2 seconds to turn the Back-Light on. As this also activates the Data-Hold mode, briefly press the button to return to normal display, or press this button for 2 sec. To turn off Back-Light and return to normal display.

### Voltage Measurements

1. Connect the red test lead to the "V $\Omega$ " jack and the black test lead to the "COM" jack.
2. Set the range rotary to the desired voltage function.
3. Connect the test leads to the device or circuit being measured.
4. For DC, a (-) sign is displayed for negative polarity; positive polarity is implied.

### AC Current Measurement

1. Set the range rotary to  $\overline{A}$ .
2. Press the trigger to open transformer jaws and clamp onto one conductor only. Read the current directly on the display. It is recommended that the conductor be placed at the center of the closed jaws for maximum accuracy.

### Resistance Measurements

1. Set the range rotary to  $\Omega/\rightarrow/\rightarrow$  position.
2. Remove power from the equipment under test.
3. Connect the red test lead to the "V $\Omega$ " jack and the black test lead to the "COM" jack.
4. Touch the probes to the test points. In ohms, the value indicated in the display is the measured value of resistance.

### WARNING

The accuracy of the functions might be slightly affected, when exposed to a radiated electromagnetic field environment, eg, radio, telephone or similar.

### Diode Tests

1. Set the range rotary to  $\Omega/\rightarrow/\rightarrow$  position.
2. Remove power from the equipment under test.
3. To toggle the  $\Omega$ /continuity/diode modes, press  $\Omega/\rightarrow/\rightarrow$  button.
4. Touch probes to the diode. A forward-voltage drop is about 0.6V (typical for a silicon diode).
5. Reverse probes. If the diode is good, "OL." is displayed. If the diode is shorted, "0.000" or another number is displayed.
6. If the diode is open, "OL." is displayed, in both directions.
7. If the junction is measured in a circuit and a low reading is obtained with both lead connections, the junction may be shunted by a resistance of less than 1k $\Omega$ . In this case the diode must be disconnected from the circuit for accurate testing.

### Continuity Measurements

1. Set the range rotary to  $\Omega/\rightarrow/\rightarrow$  position.
2. Turn off power to the circuit under test. External voltage across the components causes invalid readings.
3. To toggle between the  $\Omega$ /continuity/diode modes, press  $\Omega/\rightarrow/\rightarrow$  button.
4. Connect the test leads to the two points at which continuity is to be tested. The buzzer will sound if the resistance is less than approximately 5 $\Omega$ .



### Frequency Measurements

1. Set the range rotary to the Hz-% position, and then press Hz-% to toggle between Hz and DUTY mode.
2. Connect the red test lead to the "V $\Omega$ " jack and the black test lead to the "COM" jack.
3. Connect the test leads to the point of measurement and read the frequency from the display.

### Duty Cycle Measurements

1. Set the range rotary to the Hz-% position, and then press Hz-% to toggle between Hz and DUTY mode.
2. Connect the red test lead to the “VΩ” jack and the black test lead to the “COM” jack.
3. Connect the test leads to the point of measurement. The display will indicate 10% to 90% of the frequency duty cycle.

### Capacitance Measurements

1. Set the range rotary to the “” position. Press (ZERO ) to zero the display.
2. Discharge capacitors before trying to measure it.
3. Connect the “+” lead to the “VΩ” jack and the “-” lead to the “COM” jack.
4. Read the capacitance directly from the display.

### NCV TESTS


1. Set the range rotary to the NCV position, and push “NCV” button.
2. Check device with a known live current source (wall receptacle or cord). The volt sensor is operative if the red LED light remains on and the beep sound continues in close proximity of a cord connected to a power source.
3. After checking the above performance, you may now test the circuitry in question.

## MAINTENANCE

### WARNING

Remove test leads before changing battery or fuse or performing any servicing.

### Battery Replacement

Power is supplied by a 9 volt “transistor” battery. (NEDA 1604, IEC 6F22). The “” appears on the LCD display when replacement is needed. To replace the battery, remove the one screw from the back of the meter and lift off the battery case. Remove the battery from battery contacts.

### Cleaning

Periodically wipe the case with a damp cloth and detergent, do not use abrasives or solvents.

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