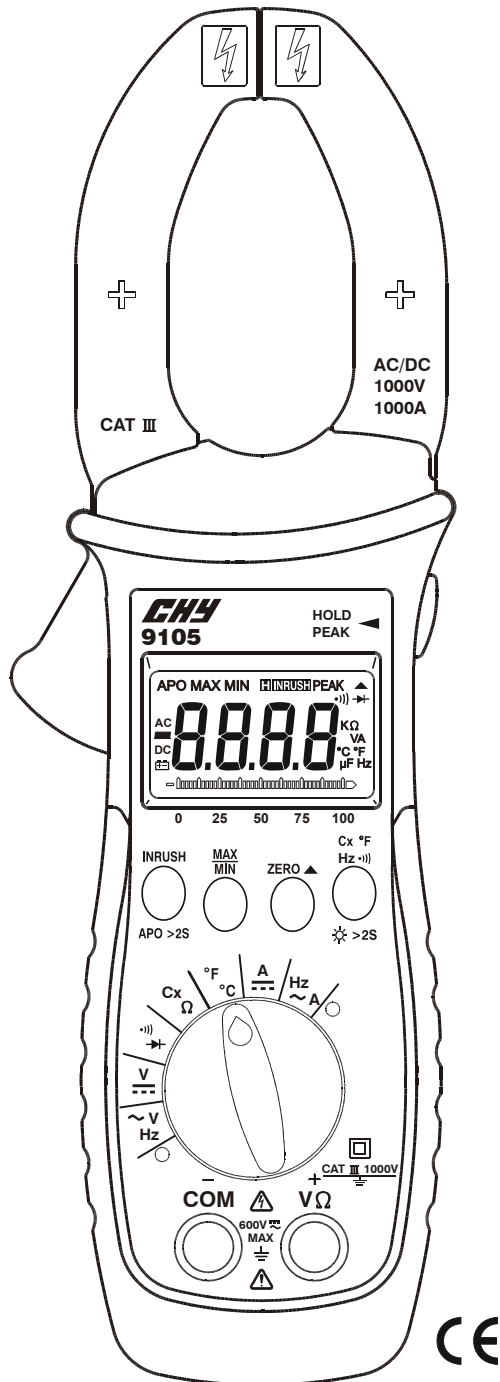


OPERATING INSTRUCTIONS MODEL 9105 **CE** DC/AC TRUE RMS CLAMP METER



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

To avoid possible electrical shock or personal injury while the AC input frequency is over 400Hz. Please measure the AC frequency before measuring the AC voltage where might present hazardous damage.

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.)

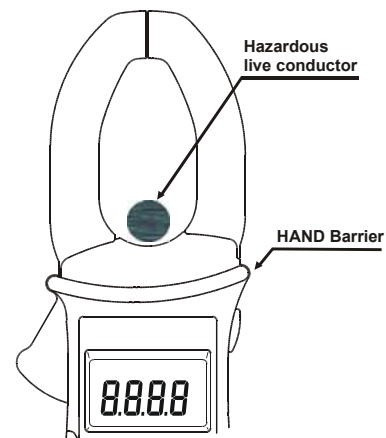








Figure 1.

	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: 4 digit liquid crystal display (LCD) with a maximum reading of 9999.

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.

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) out side the range of 18 to 28°C(65°F to 82°F)

Altitude up to 2000m.

MAX. Cable size: 34Ømm.

Safety Conformance:

All input are protected to EN61010-1, 1000V CAT III.

Pollution degree II.

EMC-instrument unspecified for use in EMC field > 0.5V/m.

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

Battery life: 50 hours typical with carbon-zinc.

Dimensions: 246mm (H) x 80mm (W) x 43mm (D).

Weight: Approx. 11.5 oz. (359g) including battery.

DC VOLTS

Ranges: 0 to 600.0V

Resolution: 0.1V

Accuracy: ±(1% rdg + 5dgts)

Input impedance: 1MΩ

Overload protection: 600V DC/AC rms

AC VOLTS

Ranges: 0 to 600.0V

Resolution: 0.1V

Accuracy:

±(1% rdg + 5dgts) on 20 to 100Hz

±(6% rdg + 5dgts) on 100 to 400Hz

Crest Factor <3 at 0 to 300V

<1.5 at 300 to 600V

Input impedance: 1MΩ

Overload protection: 600V DC/AC rms

AC CURRENT (Accuracy: At the center of CT)

Range: 0 to 999.9A

Accuracy:

±(2% rdg + 5dgts) on 20 to 100Hz

±(6% rdg + 5dgts) on 100 to 400Hz

Resolution: 0.1A

Crest Factor:

<3 at 0 to 500A

<2.5 at 500 to 600A

<1.42 at 600 to 999.9A

Overload protection: 1200A AC max for 1 minute

DC CURRENT (Accuracy: At the center of CT)

Range: 0 to 999.9A

Accuracy: ±(2% rdg + 5dgts)

Resolution: 0.1A

Overload protection: 1200A DC max for 1 minute

CONTINUITY

Audible indication: Less than 30Ω

Overload protection: 600V DC/AC rms.

RESISTANCE (Auto range)

Ranges: 0 to 999.9Ω, 1000 to 9999Ω

Accuracy: ±(1.5% rdg + 5dgts)

Resolution: 0.1Ω/1Ω

Overload protection: 600V DC/AC rms

DIODE TEST

Accuracy: ±(3.0% rdg + 3dgts)

Resolution: 0.001V

Test current: 0.2mA±0.1mA

Test Voltage: <3.0V DC

Overload protection: 600V DC/AC rms

CAPACITANCE

Range: 0 to 999.9µF

Resolution: 0.1µF

Accuracy: ±(5% rdg + 10dgts)

Overload protection: 600V DC/AC rms

TEMPERATURE (K-Type Thermocouple)

Ranges: -40°C to 1200°C, -40°F to 2200°F

Accuracy:

±(0.5% rdg + 1°C)

±(0.5% rdg + 2°F), (not including thermocouple error)

Resolution:

0.1°C on -40°C to 999.9°C

1°C on 1000°C to 1200°C

0.1°F on -40°F to 999.9°F

1°F on 1000°F to 2200°F

Overload protection: 600V DC/AC rms

FREQUENCY

Range: 20 to 400.0Hz

Resolution: 0.1Hz

Sensitivity: 5Vrms. TTL signal

≥5A at 20 to 100Hz

≥10A at 100 to 400Hz

Accuracy: ±(0.5% rdg + 5dgts)

Overload protection: 600V DC/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.

Power-ON the meter

Turn on the meter: To select power on option.

The range rotary set from “O” to any switch position. Turn off the meter: The range rotary set into “O” position to turn off the meter.

Automatic Power off

The display blanks and the meter to enter the APO mode if you have not changed the rotary switch position or pressed a button for 10 minutes. While in APO mode, change the rotary switch to turns the meter on.

INRUSH current & APO Function Button

In “INRUSH” current function, the meter takes a large number of samples precisely at the beginning of the starting current for a 100-millisecond period and then digitally filters and processes the samples to calculate the actual starting current. The “INRUSH” function is enabled at the ACA and DCA range.

1. Press the “INRUSH” button before the inrush current measurement and display was show “----” and the “INRUSH” is displayed.
2. Press the trigger to open transformer jaws and clamp onto one conductor only, and turn on the motor.
3. Read the INRUSH current directly from display. Press and hold down the “INRUSH” button for more than 2 seconds to disable/enable the APO mode.

MAX/MIN Function Button

Press the “MAX/MIN” button to enter the MAX, MIN-recording mode. (Displays the Maximum reading, Minimum reading)

To pause max/min function without erasing stored values, press “HOLD”. The “H” is displayed. Press “MAX/MIN” button and hold down the “MAX/MIN” button for more than 2 seconds or turn the rotary switch to exit the MAX/MIN function.

ZERO Δ Function Button

Press “ZERO Δ ” button to enter the relative mode and zero the display, and store the displayed as a reference value. In relative mode, the “ Δ ” is displayed. Press and hold down the “ZERO Δ ” button for more than 2 seconds to exit the relative mode.

Cx/°F/Hz/•) and \odot Function Button

Press the button to select alternate measurement functions on a rotary switch setting, e.g., to select Hz, diode test, Cx, °F, •).

Press and hold down the \odot button for more than 2 seconds to toggle the backlight on and off.

Display HOLD & PEAK Function Button

In Display HOLD mode, the meter holds the reading on the display.

In PEAK mode, the meter displayed the PEAK value of measurement value. PEAK function is enabled at ACV, DCV, ACA and DCA range.

Press “HOLD/PEAK” button to activate display HOLD. The “H” is displayed.

Press “HOLD/PEAK” button again to activate PEAK function. The “PEAK” is displayed.

Press “HOLD/PEAK” button again to resume normal operation.

Voltage Measurements

1. Connect the red test lead to the “V Ω ” 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.

Frequency Measurements

1. Set the range rotary to the Hz position, and press “Hz” button, the Hz is displayed.
2. In ACV range, connect the red test lead to the “V Ω ” 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.
4. In ACA range, refer to AC Current Measurement.
5. Read the frequency from the display.

Diode Tests

1. Set the range rotary to \rightarrow position.
2. Remove power from the equipment under test.
3. Touch probes to the diode. A forward-voltage drop is about 0.6V (typical for a silicon diode).
4. Reverse probes. If the diode is good, “OL.” is displayed. If the diode is shorted, “0.000” or another number is displayed.
5. If the diode is open, “OL.” is displayed, in both directions.
6. 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 \rightarrow position, and press \bullet) button. The “ \bullet)” is displayed.
2. Turn off power to the circuit under test. External voltage across the components causes invalid readings.
3. 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 30Ω .

Resistance Measurements

1. Set the range rotary to Ω 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.

Capacitance Measurements

1. Set the range rotary to the “ Ω ” position and press Cx button. The “ μF ” is displayed. Press (ZERO Δ) to zero the display.
2. Discharge capacitors before trying to measure it.
3. Connect the “+” lead to the “ $V\Omega$ ” jack and the “-” lead to the “COM” jack.
4. Read the capacitance directly from the display.

Temperature Measurements(K-type)

1. Set the range rotary to the $^{\circ}C$ position.
2. Use the socket to connect the thermocouple and $V\Omega$, COM jack.
3. Read the temperature from the display.

DC Current Measurement

1. Set the range rotary to “ Δ ”.
2. Press “ZERO Δ ” button to offset the residual magnetic of jaws. The “ Δ ” is displayed.
3. 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.

AC Current Measurement

1. Set the range rotary to “ $\sim A$ ”.
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.

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 “ B ” 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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