User Manual

TRIPLETT

CM1070

TRMS AC/DC Clamp with Dual Type K and µA

CE

Introduction

Congratulations on your purchase of the CM1070 True RMS Clamp Meter. This meter measures AC Current, DC Current, AC/DC Voltage, Resistance, Capacitance, Frequency, Diode Test, Duty Cycle and Continuity. Special features include Dual Input Thermocouple Temperature and Non-Contact Voltage detector. The double molded case is designed for heavy duty use. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

Safety

International Safety Symbols

This symbol, adjacent to another symbol or terminal, indicates the user must refer to the manual for further information.

This symbol, adjacent to a terminal, indicates that, under normal use, hazardous voltages may be present

Double insulation

WARNING This **WARNING** symbol indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.

CAUTION This **CAUTION** symbol indicates a potentially hazardous situation, which if not avoided, may result damage to the product.

PER IEC1010 OVERVOLTAGE INSTALLATION CATEGORY

OVERVOLTAGE CATEGORY I

Equipment of OVERVOLTAGE CATEGORY I is equipment for connection to circuits in which measures are taken to limit the transient overvoltages to an appropriate low level.

Note – Examples include protected electronic circuits.

OVERVOLTAGE CATEGORY II

Equipment of OVERVOLTAGE CATEGORY II is energy-consuming equipment to be supplied from the fixed installation.

Note – Examples include household, office, and laboratory appliances.

OVERVOLTAGE CATEGORY III

Equipment of OVERVOLTAGE CATEGORY III is equipment in fixed installations.

Note – Examples include switches in the fixed installation and some equipment for industrial use with permanent connection to the fixed installation.

OVERVOLTAGE CATEGORY IV

Equipment of OVERVOLTAGE CATEGORY IV is for use at the origin of the installation.

Note – Examples include electricity meters and primary over-current protection equipment.

SAFETY NOTES

- Do not exceed the maximum allowable input range of any function.
- Do not apply voltage to meter when resistance function is selected.
- Set the function switch OFF when the meter is not in use.
- Remove the battery if meter is to be stored for longer than 60 days.

WARNINGS

- Set function switch to the appropriate position before measuring.
- When measuring volts do not switch to current/resistance modes.
- Do not measure current on a circuit whose voltage exceeds 600V.
- When changing ranges always disconnect the test leads from the circuit under test.

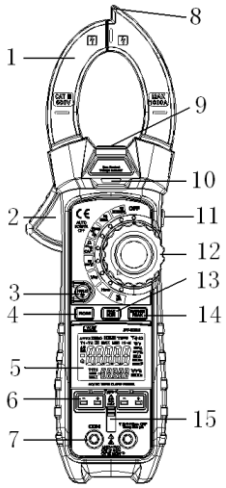
CAUTIONS

- Improper use of this meter can cause damage, shock, injury or death. Read and understand this user manual before operating the meter.
- Always remove the test leads before replacing the battery or fuses.
- Inspect the condition of the test leads and the meter itself for any damage before operating the meter. Repair or replace any damage before use.
- Use great care when making measurements if the voltages are greater than 25VAC rms or 35VDC. These voltages are considered a shock hazard.
- Always discharge capacitors and remove power from the device under test before performing Diode, Resistance or Continuity tests.
- Voltage checks on electrical outlets can be difficult and misleading because of the uncertainty of connection to the recessed electrical contacts. Other means should be used to ensure that the terminals are not "live".
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- This device is not a toy and must not reach children’s hands. It contains hazardous objects as well as small parts that the children could swallow. In case a child swallows any of them, please contact a physician immediately.
- Do not leave batteries and packing material lying around unattended; they can be dangerous for children if they use them as toys.
- In case the device is going to be unused for an extended period of time, remove the batteries to prevent them from draining.
- Expired or damaged batteries can cause cauterization on contact with the skin. Always, therefore, use suitable hand gloves in such cases
- See that the batteries are not short-circuited. Do not throw batteries into the fire.
- **Do not directly view or direct the laser pointer at an eye.** Low power visible lasers do not normally present a hazard but may present some potential for hazard if viewed directly for extended periods of time.

Function	**Maximum Input**
A AC,	1000A AC
V DC, V AC	600V DC/AC
Resistance, Capacitance, Frequency, Diode Test	250V DC/AC
μA	4000 μA
Type K Temperature	30V DC, 24V AC

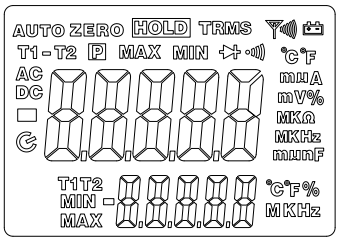
Description

Meter Description



1. Current clamp
2. Clamp opening trigger
3. HOLD/BACKLIGHT button
4. MODE / ºC/ ºF
5. Backlit LCD Display
6. Type K input jacks
7. Multimeter input jacks
8. Non-Contact Voltage Detector
9. LAMP
10. NCV LED indicator
11. LAMP/ZERO button
12. Function switch
13. MAX/MIN button
14. RANGE/PEAK / Thermocouple display button
15. Input shutter

Display icons Description



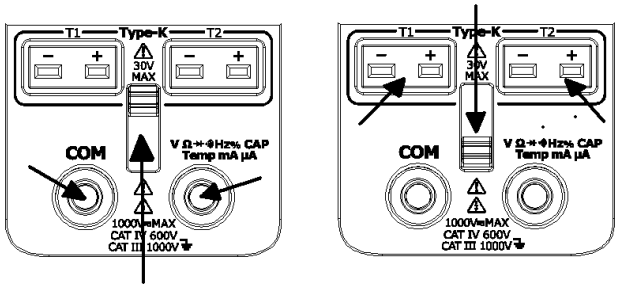
HOLD	Data Hold
	Auto Power Off
AUTO	Autoranging
P	Peak Hold
DC	Direct Current
AC	Alternating Current
MAX	Max reading
MIN	Min reading
	Low battery
ZERO	DCA or CAP zero
mV or V	Milli-volts or Volts (Voltage)
Ω	Ohms (Resistance)
A	Amperes (Current)
F	Farad (Capacitance)
Hz	Hertz (Frequency)
%	Duty Ratio
ºF and ºC	Fahrenheit and Celsius units (Temperature)
T_1, T_2, T_1-T_2	Therocouple 1, Thermocouple 2, Thermocouple difference
n, m, μ, M, k	Unit of measure prefixes: nano, milli, micro, mega, and kilo
•))	Continuity test
	Diode test

Operation

NOTES: Read and understand all **Warning** and **Caution** statements in this operation manual prior to using this meter. Set the function select switch to the OFF position when the meter is not in use.

Input Shutter

The Input Shutter inhibits simultaneous connection to the thermocouple jacks and the DMM input jacks. This is a safety feature which prevents a potentially hazardous condition from existing during high voltage measurements. Slide the shutter up for test lead measurements or slide it down for thermocouple temperature measurements.



Non-Contact Voltage Detector

WARNING: Risk of Electrocution. Before use, always test the Voltage Detector on a known live circuit to verify proper operation**.**

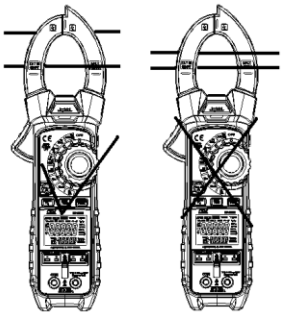
1. Rotate the Function switch to any measurement position.
2. Place the detector probe tip on the conductor to be tested.
3. If AC voltage is present, the NCV detector light will turn on with a steady red light.

NOTE: The conductors in electrical cord sets are often twisted. For best results, move the probe tip along a length of the cord to assure placing the tip near the live conductor.

NOTE: The detector is designed with high sensitivity. Static electricity or other sources of energy may randomly trip the sensor. This is normal operation.

AC/DC Current Measurements

WARNING: Disconnect the test leads before making clamp measurements.



1. Rotate the Function switch to the **1000A**$_{AC/DC}$ position
2. Press the **MODE** button to select AC or DC.
3. Press the trigger to open jaw. Fully enclose only one conductor.
4. Read the current value in the display.
5. If the value is less than 50A, rotate the function switch to the **50A**$_{AC/DC}$ position to improve resolution.

DCA Zero

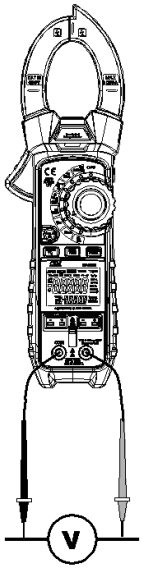
The Zero feature removes offset values and improves accuracy for DC current measurements. To perform a zero, select ADC and, with no conductor in the jaw, press and hold the MODE ZERO button for two beeps. The display will zero. The offset value is now stored and removed from all measurements.

Frequency

When ACV is selected, the measured frequency can be viewed in the lower display.

AC/DC Voltage Measurements

CAUTION: Do not measure voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.



1. Slide the input shutter to the up position.
2. Rotate the function switch to the **V** position.
3. Press the **MODE** button to select AC or DC Voltage.
4. Insert the black test lead banana plug into the negative **COM** jack.
   Insert the red test lead banana plug into the positive **V** jack.
5. Touch the black test probe tip to the negative side of the circuit.
   Touch the red test probe tip to the positive side of the circuit.
6. Read the voltage value in the display.

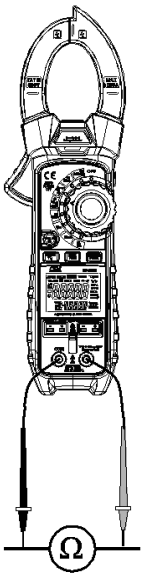
Frequency

When ACA is selected, the measured frequency can be viewed in th
e
lower display.

Resistance Measurements

Note: Remove power from the device under test before making resistance measurements

1. Slide the input shutter to the up position.
2. Set the function switch to the **Ω** position.
3. Insert the black test lead banana plug into the negative **COM** jack.
   Insert the red test lead banana plug into the positive **V** jack.
4. Touch the black test probe tip to one side of the device.
   Touch the red test probe tip to the other side of the device.
5. Read the resistance value in the display.



Continuity Test

1. Connect as described for resistance measurements.
2. Press the **MODE** button to select continuity **)))**.
3. Touch the test probe tips across the circuit or component under test.
4. If the resistance is < 50Ω, a tone will sound.

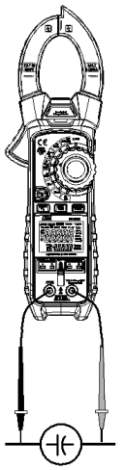
Diode Test

1. Connect as described for resistance measurements
2. Press the **MODE** button to select diode test ⊣◁ .
3. Touch the test probe tips to the diode or semiconductor junction under test. Note the meter reading.
4. Reverse the test lead polarity by reversing the red and black leads. Note this reading.
5. The diode or junction can be evaluated as follows:
   - If one reading displays a value (typically 0.400V to 01.800V) and the other reading displays **OL**, the diode is good.
   - If both readings display **OL** the device is open.
   - If both readings are very small or '0', the device is shorted.

Capacitance Measurements

WARNING: To avoid electric shock, discharge the capacitor before measuring.

1. Slide the input shutter to the up position.
2. Rotate the function switch to the ⊣⊢ capacitance position.
3. Insert the black test lead banana plug into the negative **COM** jack.
   Insert the red test lead banana plug into the positive ⊣⊢ jack.
4. Touch the black test probe tip to one side of the device.
   Touch the red test probe tip to the other side of the device.
5. Read the capacitance value in the display.



Note: For very large values of capacitance measurement time can be several seconds before the final reading stabilizes.

Note: The Zero feature removes stray test lead capacitance to improve the accuracy of low value capacitance measurements. To perform a zero, Press and hold the **MODE ZERO** button for two beeps. The display will zero. The offset value is now stored and is removed from all measurements.

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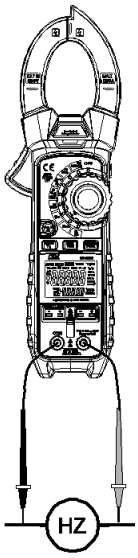
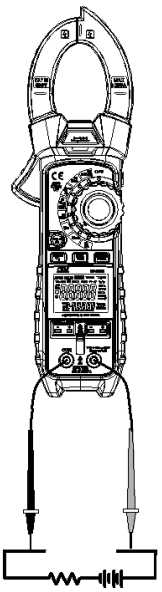
Frequency and Duty Ratio Measurements

1. Slide the input shutter to the up position.
2. Rotate the function switch to the **Hz %** Position.
3. Insert the black test lead banana plug into the negative **COM** jack.
   Insert the red test lead banana plug into the positive **Hz** jack.
4. Touch the black test probe tip to one side of the device.
   Touch the red test probe tip to the other side of the device.
5. Read the Frequency value on the upper large display.
   Read the Duty Ratio on the lower small display.
6. Press the **MODE** button to display the Duty Ratio on the large display.

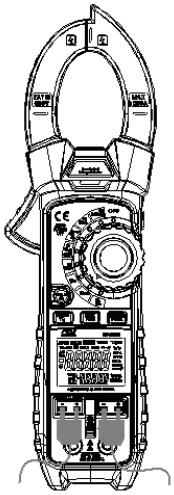


μA DC/AC Current Measurements



1. Slide the input shutter to the up position.
2. Rotate the function switch to the μ**A** position.
3. Press the **MODE** button to select AC or DC.
4. Insert the black test lead banana plug into the negative **COM** jack.
   Insert the red test lead banana plug into the positive **μA** jack.
5. Turn power to the circuit under test off and make a break in the circuit.
6. Insert the meter in series with the circuit;
   Touch the black test probe tip to the negative side of the break.
   Touch the red test probe tip to the positive side of the break.
7. Turn circuit power on.
8. Read the current value in the display.

Type K Temperature Measurements



1. Slide the input shutter to the down position.
2. Rotate the function switch to the **TYPE K** temperature position.
3. Press the MODE button to select °F or °C.
4. Insert the Temperature Probe(s) into the T1 and/or T2 type k sockets.
5. Place the temperature probe tip(s) where needed.
6. Read the temperature on the display.
7. Press the **T1-T2** button to step through the display combinations:

	Upper display	Lower display
a.	T1	T2
b.	T2	T1
c.	T1-T2	T1
d.	T1- T2	T2

Note: In case of an open input or a temperature overrange, the meter will display "**- - - -**" .

Data Hold

To freeze the LCD reading, press the **HOLD** button. While data hold is active, the **HOLD** icon appears on the LCD. Press the **HOLD** button again to return to normal operation.

MAX/MIN

1. Press the **MAX/MIN** button to activate the MAX/MIN recording mode. The display icon "**MAX**" will appear. The meter will begins recording and displaying the maximum value measured.
2. Press the **MAX/MIN** button and "**MIN**" will appear. The meter will display the minimum value measured during the recording session.
3. Press the **MAX/MIN** button and "**MAX MIN**" will appear. The meter will display the present reading, but will continue to update and store the max and min readings.
4. To exit MAX/MIN mode press and hold the **MAX/MIN** button for 2 seconds.

Peak Hold

When ACA or ACV is selected, press and hold **PEAK** button 2 seconds enables the peak capture circuit. The meter will now capture and display the maximum and minimum peaks of the waveform.

To exit Peak Hold mode press and hold the **Peak Hold** button for 2 seconds.

RANGE

In the Voltage, Resistance, Capacitance, Frequency or uA function the meter automatically selects the best range for the measurements being made. For measurement situations requiring that a range be manually selected, perform the following:

1. Press the **RANGE** button. The "**AUTO"** display icon will turn off.
2. Press the **RANGE** key to step through the available ranges. Observe the decimal point and units displayed until the preferred range is located.
3. To exit the Manual Ranging mode and return to Autoranging, press and hold the **RANGE** key for 2 seconds.

LCD Backlight

The LCD is equipped with backlighting for easier viewing, especially in dimly lit areas.

Press and hold the **HOLD/** button for 2 seconds to turn the backlight on. The backlight will automatically turn off after 30 seconds.

LAMP ON/OFF

Press and hold the ZERO button for 2 seconds to turn on/off the lamp.

Automatic Power OFF with Disable

In order to conserve battery life, the meter will automatically turn off after approximately 30 minutes. To turn the meter on again, turn the function switch to the OFF position and then to the desired function position.

To disable APO:

1. From the OFF position, hold the MODE button and rotate the FUNCTION switch to a measurement function.
2. *APO d* will appear in the display
3. Release the MODE button

4. APO is now disabled (APO icon is off) and will be reset when the Function switch is returned to the OFF position.

Low battery indication

When the  icon appears in the display, the battery should be replaced. Refer to the battery replacement procedure in the maintenance section.

Maintenance

WARNING: To avoid electrical shock, disconnect the meter from any circuit, remove the test leads from the input terminals, and turn OFF the meter before opening the case. Do not operate the meter with an open case.

Cleaning and Storage

Periodically wipe the case with a damp cloth and mild detergent; do not use abrasives or solvents. If the meter is not to be used for 60 days or more, remove the battery and store it separately.

Battery Replacement

1. Remove the Phillips head screw that secures the rear battery door
2. Open the battery compartment
3. Replace the 9V battery
4. Secure the battery compartment door
5.

You, as the end user, are legally bound (**Battery ordinance**) to return all used batteries and accumulators; **disposal in the household garbage is prohibited!**

You can hand over your used batteries / accumulators, gratuitously, at the collection points for our branches in your community or wherever batteries / accumulators are sold!

Disposal

Follow the valid legal stipulations in respect of the disposal of the device at the end of its lifecycle

Fuse Replacement

1. Remove the battery
2. Remove the Phillips head screws (2) that secures the rear cover.
3. Replace the fuse with one of equal rating. (500mA, 660V fast blow [SIBA 70-180-40])
4. Replace the rear cover and battery

Specifications

Function	Range& Resolution	Accuracy (% of reading)
AC Current True RMS (50Hz to 60 Hz)	50.00 AAC	± (2.5% +5digits)
	1000.0 AAC	
	All AC Current ranges are specified from 5% of range to 100% of range	
uA Current	500.00uA	DC: ±(1.0% + 6 digits)
		AC: ±(1.5% + 30 digits)
	5000.0uA	DC: ±(1.0% + 6 digits)
		AC: ±(1.5% + 30 digits)
DC Voltage	500.00 mVDC	± (1.0% + 8 digits)
	5.0000VDC	± (0.1% + 4 digits)
	50.000 VDC	
	500. 00 VDC	
	600.0 VDC	
AC Voltage True RMS (50 Hz to 1000 Hz)	500.00 mVAC	± (1.0% + 30 digits)
	5.0000 VAC	
	50.000 VAC	
	500. 00 VAC	
	0600.0 VAC	
	All AC voltage ranges are specified from 5% of range to 100% of range	
Resistance	500.00 **Ω**	± (1.0% + 9 digits)
	5.0000K**Ω**	± (1.0% + 5 digits)
	50.000K**Ω**	
	500.00K**Ω**	
	5.0000M**Ω**	± (2.0% + 10digits)
	50.000M**Ω**	± (3.0% + 10 digits)
Capacitance	500.00nF	±(3.5% reading + 40digits)
	5000.0nF	±(3.5% reading + 10digits)
	50.00.µF	
	500.0.µF	
	5.000mF	±(5% reading + 10 digits)
Frequency	50Hz	±(0.3% reading + 2 digits)
	500Hz	
	5KHz	
	50KHz	
	500KHz	
	5MHz	
	10MHz	
Duty Cycle	5.0 to 95.0%	± (1.0% reading + 2 digits)
	Pulse width: 100µs - 100ms, Frequency: 10Hz to 10kHz	
Temp(type-K) (probe accuracy not included)	-100.0 to 1000.0°C	±(1.0% reading + 2.5 °C)
	-148.0 to 1832.0°F	±(1.0% reading + 4.5°F)
	(probe accuracy not included)	

General Specifications

Clamp jaw opening	1.9" (48mm) approx.
Display	Dual 50,000/50,000 count backlit LCD
Continuity check	Threshold 50Ω; Test current < 0.5mA
Diode test	Test current of 0.3mA typical; Open circuit voltage **[** 2.8VDC typical
Low Battery indication	Battery symbol is displayed
Over-range indication	'OL' display
Measurement rate	2 readings per second, nominal
Peak detector	>1ms
Thermocouple sensor	Type K thermocouple required
Fuse	500mA, ceramic fast blow
Input Impedance	10MΩ (VDC and VAC)
AC bandwidth	50 to 400Hz (AAC and VAC)
AC response	True rms (AAC and VAC)
Crest Factor	3.0 in 40A and 400A ranges, 1.4 in 1000A range (50/60Hz and 5% to 100% of range)
Operating Temperature	5°C to 40°C (41°F to 104°F)
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Operating Humidity	Max 80% up to 31°C (87°F) decreasing linearly to 50% at 40°C (104°F)
Storage Humidity	<80%
Operating Altitude	7000ft. (2000meters) maximum.
Battery	One (1) 9V Battery (NEDA 1604)
Auto power OFF	After approx. 30 minutes, with disable
Dimensions & Weight	9.1x3.0x1.6" (230x76x40mm); 11.1 oz. (315g)
Safety	For indoor use and in accordance with the requirements for double insulation to IEC1010-1 (2001): EN61010-1 (2001) Overvoltage Category III 600V and Category II 1000V, Pollution Degree 2.
Approvals	CE

Warranty

Triplett / Jewell Instruments extends the following warranty to the original purchaser of these goods for use. Triplett warrants to the original purchaser for use that the products sold by it will be free from defects in workmanship and material for a period of (1) one year from the date of purchase. This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way or purchased from unauthorized distributors so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence, accident or which have had the serial numbers altered, defaced, or removed. Accessories, including batteries are not covered by this warranty.