INSTRUCTION MANUAL
MANUAL DE INSTRUCCIONES
MANUEL D'INSTRUCTIONS

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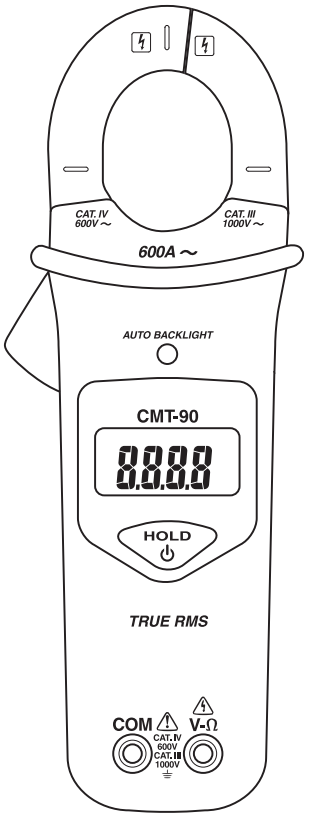
A Textron Company



CMT-90
Clamp-on Meter
Medidor con pinza
Contrôleur numérique à pinces

Read and **understand** all of the instructions and safety information in this manual before operating or servicing this tool.

Lea y **entienda** todas las instrucciones y la información sobre seguridad que aparecen en este manual, antes de manejar esta herramienta o darle mantenimiento.

Lire attentivement et **bien comprendre** toutes les instructions et les informations sur la sécurité de ce manuel avant d'utiliser ou de procéder à l'entretien de cet outil.

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Description

The Greenlee CMT-90 Digital Clamp-on Meter is a hand-held testing device with the following measurement capabilities: AC and DC voltage, AC current, and resistance. It also verifies continuity. The CMT-90 is a true RMS-reading meter.

This unit has data hold capability. It automatically determines measurement function based on input.

The display automatically illuminates for easy viewing in dark areas.

Safety

Safety is essential in the use and maintenance of Greenlee tools and equipment. This instruction manual and any markings on the tool provide information for avoiding hazards and unsafe practices related to the use of this tool. Observe all of the safety information provided.

Purpose of This Manual

This instruction manual is intended to familiarize all personnel with the safe operation and maintenance procedures for the Greenlee CMT-90 Digital Clamp-on Meter.

Keep this manual available to all personnel.

Replacement manuals are available upon request at no charge.

Do not discard this product or throw away!
F

KEEP THIS MANUAL

Important Safety Information

SAFETY ALERT SYMBOL

This symbol is used to call your attention to hazards or unsafe practices which could result in an injury or property damage. The signal word, defined below, indicates the severity of the hazard. The message after the signal word provides information for preventing or avoiding the hazard.

⚠DANGER

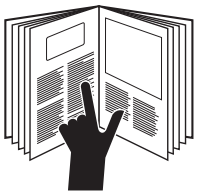
Immediate hazards which, if not avoided, WILL result in severe injury or death.

⚠WARNING

Hazards which, if not avoided, COULD result in severe injury or death.

⚠CAUTION

Hazards or unsafe practices which, if not avoided, MAY result in injury or property damage.



⚠WARNING

Read and **understand** this material before operating or servicing this equipment. Failure to understand how to safely operate this tool could result in an accident causing serious injury or death.

Important Safety Information

⚠WARNING

Electric shock hazard:

Contact with live circuits could result in severe injury or death.

⚠WARNING

Electric shock and fire hazard:

- Do not expose this unit to rain or moisture.
- Do not use the unit if it is wet or damaged.
- Use test leads or accessories that are appropriate for the application. Refer to the category and voltage rating of the test lead or accessory.
- Inspect the test leads or accessory before use. They must be clean and dry, and the insulation must be in good condition.
- Use this unit for the manufacturer's intended purpose only, as described in this manual. Any other use can impair the protection provided by the unit.

Failure to observe these warnings could result in severe injury or death.

⚠WARNING

Electric shock hazard:

- Do not apply more than the rated voltage between any two input terminals, or between any input terminal and earth ground.
- Do not contact the test lead tips or any uninsulated portion of the accessory.

Failure to observe these warnings could result in severe injury or death.

Important Safety Information

⚠WARNING

Electric shock hazard:

- Do not operate with the case or battery cover open.
- Before removing the case or battery cover, remove the test leads (or jaw) from the circuit and shut off the unit.

Failure to observe these warnings could result in severe injury or death.

⚠WARNING

Electric shock hazard:

- Unless measuring voltage or current, shut off and lock out power. Make sure that all capacitors are discharged. Voltage must not be present.
- Using this unit near equipment that generates electromagnetic interference can result in unstable or inaccurate readings.

Failure to observe these warnings could result in severe injury or death.

⚠CAUTION

Electric shock hazard:

- Do not attempt to repair this unit. It contains no user-serviceable parts.
- Do not expose the unit to extremes in temperature or high humidity. Refer to “Specifications.”
- Do not connect to voltage for longer than 30 seconds.

Failure to observe these precautions may result in injury and can damage the unit.

⚠CAUTION

Electric shock hazard:

Do not use the meter to measure voltages in circuits that could be damaged by the meter’s low input impedance (approximately 4 kΩ).

Failure to observe this precaution may result in injury and can damage the unit.

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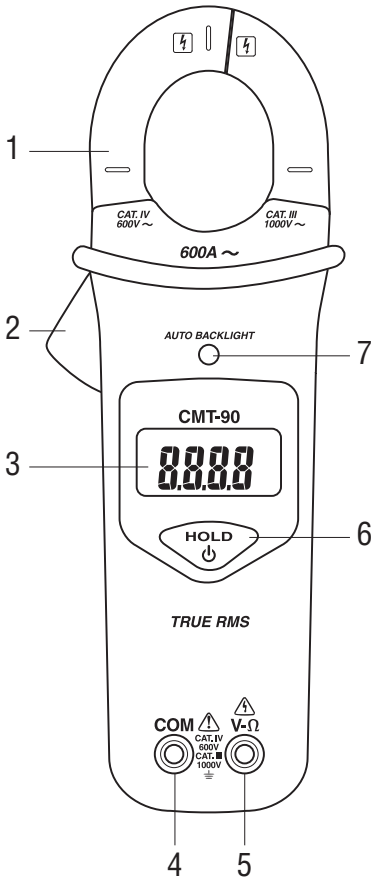
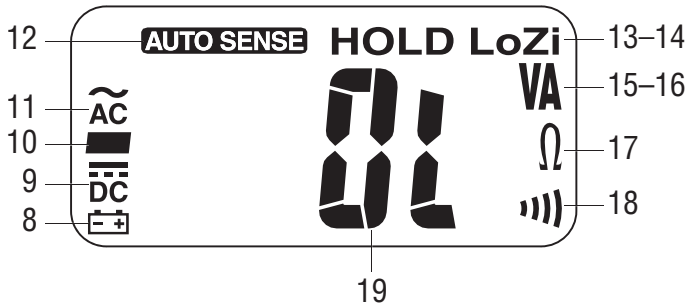
Identification

1. Jaw
2. Lever
3. Display
4. Common (COM) input terminal
5. Volts or resistance (V-Ω) input terminal
6. ON/OFF/HOLD button
7. Sensor for automatic backlit display



Display Icons

8. Low battery indicator
9. DC measurement is selected
10. – Polarity indicator
11. AC measurement is selected
12. AUTO SENSE Automatic selection is active
13. **HOLD** Hold function is enabled
14. **LoZi** Low input impedance is active
15. **V** Voltage
16. **A** Amperes
17. Ω Ohms
18. Continuity
19. ***OL*** Overload indicator



Note: Icons that appear on the display but are not identified are not used on this model.

Symbols on the Unit

- Warning—Read the instruction manual
- Electric shock hazard
- Double insulation
- Battery
- Recycle product in accordance with manufacturer's directions

AC Measurement

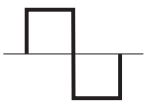
AC measurements are usually displayed as RMS (root mean squared) values. Two methods of AC measurement are *average-responding RMS calibrated* and *true RMS-reading.*

The average-responding RMS calibrated method takes the average value of the input signal, multiplies it by 1.11, and displays the result. This method is accurate if the input signal is a pure sine wave.

The true RMS-reading method uses internal circuitry to read the true RMS value. This method is accurate, within the specified crest factor limitations, whether the input signal is a pure sine wave, a square wave, sawtooth wave, half wave or signal with harmonics. The ability to read true RMS provides much more measurement versatility. The Greenlee CMT-90 is a true RMS meter.

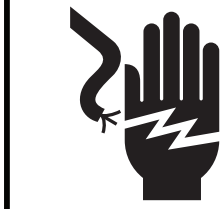
The Waveforms and Crest Factors table shows some typical AC signals and their RMS values.

Waveforms and Crest Factors

Waveform				
RMS Value	100	100	100	100
Rectified Value	90	100	87	64
Crest Factor* (ξ)	1.414	1	1.73	2

* The crest factor is the ratio of the peak value to the RMS value; it is represented by the Greek letter ξ.

Operation



⚠WARNING

Electric shock hazard:

Contact with live circuits could result in severe injury or death.

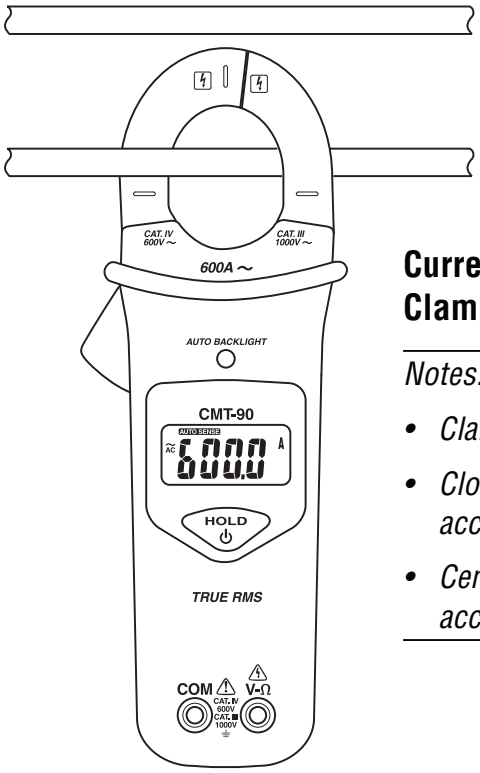
1. The meter automatically selects the proper measurement according to the following table.

Priority	Display	Conditions
1	AC volts or DC volts, whichever is greater	Input at terminals is 1.3 to 999.9 VAC 1.8 to 999.9 VDC –0.6 to –999.9 VDC
2	Resistance and continuity	Input at terminals is 0 to ∞ Ω 0 to 0.9 VAC 0.2 to 1.4 VDC –0.02 to –0.2 VDC
3	AC amps	AC current through jaw is 0.6 to 600.0 A

2. Refer to “Typical Measurements” for specific measurement instructions.
3. Test the unit on a known functioning circuit or component of the type you intend to measure.
   - If the unit does not function as expected on a known functioning circuit, replace the battery.
   - If the unit still does not function as expected, send the unit to Greenlee for repair. Refer to the instructions under the Warranty.
4. Take the reading from the circuit or component to be tested.

*Note: Momentarily press the **ON/OFF/HOLD** button to hold the present measurement on the display; momentarily press again to return to the normal display mode. Press and hold to turn the unit off.*

Typical Measurements



Current Measurement—Clamp Around Wire

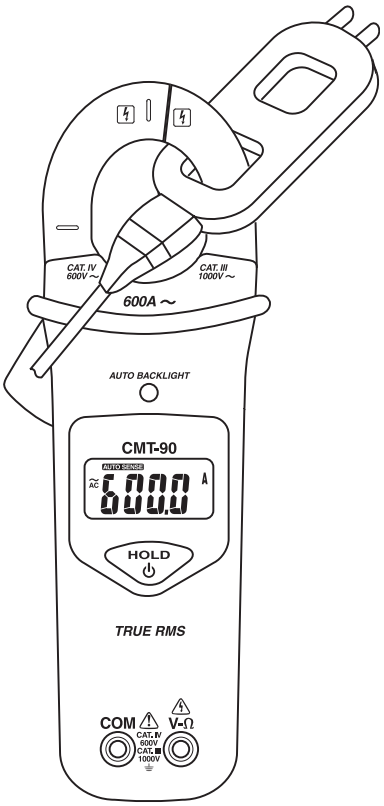
Notes:

- *Clamp the jaw around one conductor only.*
- *Close the jaw completely to ensure accurate measurement.*
- *Center the wire in the jaw for highest accuracy.*

Current Measurement—Clamp Around Line Splitter

Notes:

- *The Greenlee 93-30 Line Splitter is divided. One section renders amps; the other renders amps multiplied by 10.*
- *Close the jaw completely to ensure accurate measurement.*
- *Center the line splitter in the jaw for highest accuracy.*



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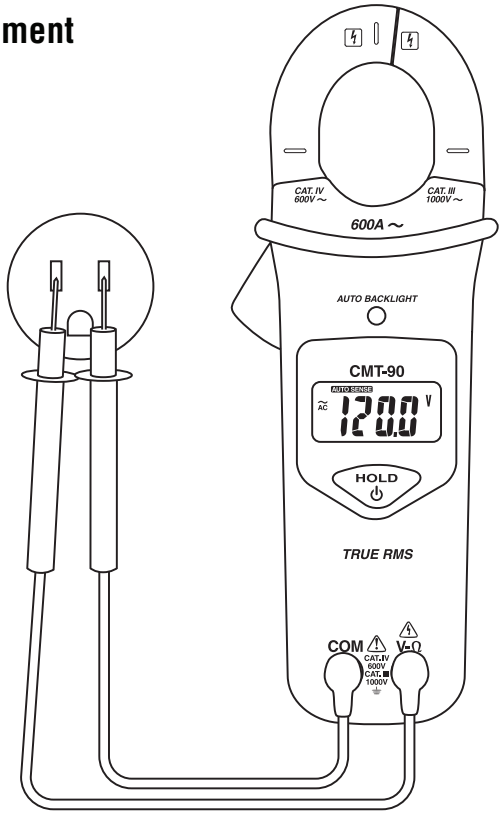
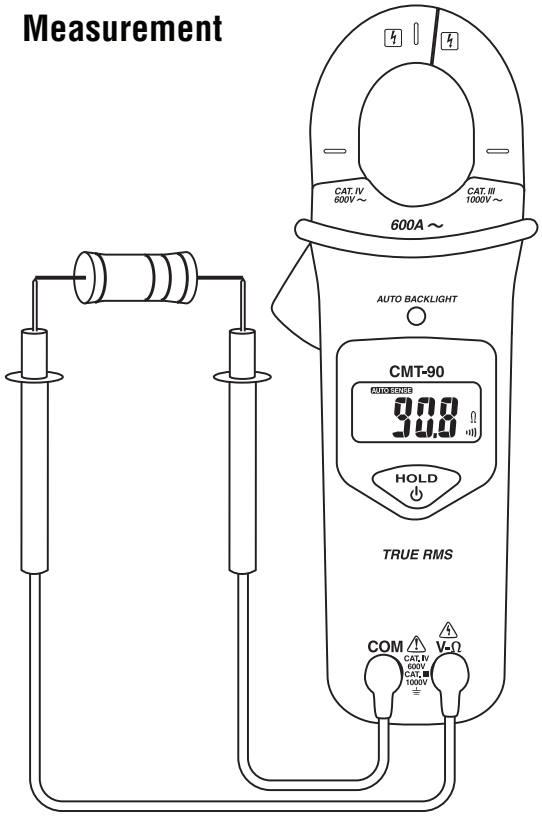
Typical Measurements

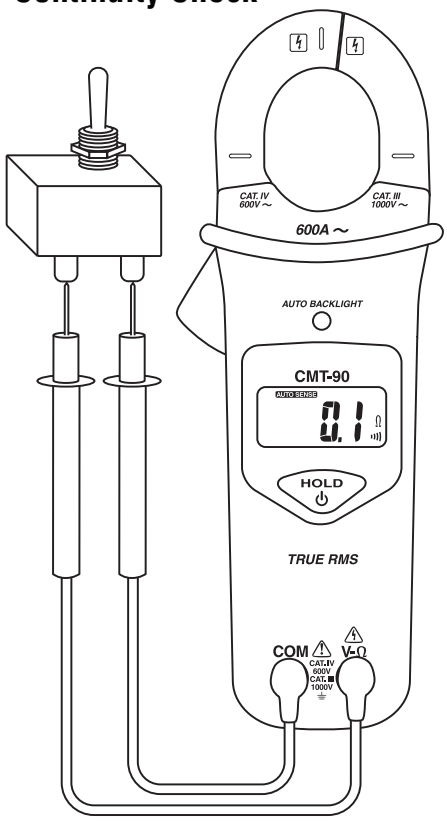
Voltage Measurement



Resistance Measurement



Continuity Check



Accuracy

Refer to “Specifications” for operating conditions and temperature coefficient.

Accuracy is specified as follows: ± (a percentage of the reading + a fixed amount) at 23 °C ± 5 °C (73.4 °F ± 9 °F), 0% to 80% relative humidity.

Accuracy for AC measurements is specified for input crest factors that do not exceed the values in the “Maximum Input Crest Factor” table on this page.

Accuracy Table

Characteristic	Range	Accuracy	Frequency Range
AC Current	0.6 to 170.0 A	± (1.9% + 1 A)	50 to 60 Hz
	170.1 to 600.0 A	± (1.9% + 2 A)	
AC Voltage*	1.3 to 999.9 V	± (1.5% + 0.3 V)	50 to 500 Hz
DC Voltage*	1.8 to 999.9 V	± (1.0% + 0.2 V)	N/A
	–0.6 to –999.9 V	± (1.0% + 0.4 V)	
Resistance**	0.0 to 99.9 Ω	± (2% + 1.0 Ω)†	N/A
	100 to 2000 Ω	± (2% + 2 Ω)†	

* Input impedance: 4 kΩ nominal at voltages up to 30 V; increases with voltage to approximately 277 kΩ at 1000 V

** Open circuit voltage: 1.5 V maximum

† Multiply temperature coefficient times 1.5 when operating temperature is above 40 °C.

Maximum Input Crest Factor

Maximum Crest Factor	Current Range	Voltage Range
1.414	0.6 to 6.0 A	1.3 to 3.0 V
3	6.1 to 20.0 A	3.1 to 10.0 V
5	20.1 to 500.0 A	10.1 to 250.0 V
Linear decrease from 5 to 1.5 over range shown	500.1 to 600.0 A	250.1 to 999.9 V

Continuity

Tone on: Circuit resistance is ≤ 25 Ω (approximately).

Tone off: Circuit resistance is ≥ 400 Ω (approximately).

Specifications

Display: 10,000-count LCD

Maximum Conductor Size: 33 mm (1.30")

Display update rate is 4 per second for voltage, 2 per second for resistance, and 1 per second for current

Duty Cycle (voltage above 30 V):
- 30 seconds ON (maximum)
- 2 minutes OFF (minimum)

Automatic Power Off: After approximately 30 minutes

Temperature Coefficient: 0.2 x (Accuracy) per °C below 18 °C or above 28 °C

Measurement Categories: Category III, 1000 V, and Category IV, 600 V

Operating Conditions:
- Temperature:
  - 0 °C to 30 °C (32 °F to 86 °F), 0% to 80% relative humidity
  - 30 °C to 40 °C (86 °F to 104 °F), 0% to 75% relative humidity
  - 40 °C to 50 °C (104 °F to 122 °F), 0% to 45% relative humidity
- Altitude: 2000 m (6500') maximum
- Indoor use only

Storage Conditions: –20 °C to 60 °C (–4 °F to 140 °F),
- 0% to 80% relative humidity
- Remove battery

Pollution Degree: 2

Battery: 9 V battery (NEDA 1604, JIS 006P or IEC 6F22)

Battery Life: Approximately 250 hours with alkaline battery

Measurement Categories

These definitions were derived from the international safety standard for insulation coordination as it applies to measurement, control, and laboratory equipment. These measurement categories are explained in more detail by the International Electrotechnical Commission; refer to either of their publications: IEC 61010-1 or IEC 60664.

Measurement Category I

Signal level. Electronic and telecommunication equipment, or parts thereof. Some examples include transient-protected electronic circuits inside photocopiers and modems.

Measurement Category II

Local level. Appliances, portable equipment, and the circuits they are plugged into. Some examples include light fixtures, televisions, and long branch circuits.

Measurement Category III

Distribution level. Permanently installed machines and the circuits they are hard-wired to. Some examples include conveyor systems and the main circuit breaker panels of a building's electrical system.

Measurement Category IV

Primary supply level. Overhead lines and other cable systems. Some examples include cables, meters, transformers, and other exterior equipment owned by the power utility.

Statement of Conformity

Greenlee Textron Inc. is certified in accordance with ISO 9000 (2000) for our Quality Management Systems.

The instrument enclosed has been checked and/or calibrated using equipment that is traceable to the National Institute for Standards and Technology (NIST).

Maintenance

⚠CAUTION

Electric shock hazard:

- Do not attempt to repair this unit. It contains no user-serviceable parts.
- Do not expose the unit to extremes in temperature or high humidity. Refer to “Specifications.”

Failure to observe these precautions may result in injury and can damage the unit.

Battery Replacement

⚠WARNING

Electric shock hazard:

Before removing the case or battery cover, remove the test leads (or jaw) from the circuit and shut off the unit.

Failure to observe this warning could result in severe injury or death.

1. Disconnect the unit from the circuit.
2. Remove the screws from the battery cover.
3. Remove the battery cover.
4. Replace the battery. Observe polarity.
5. Replace the cover and screws.

Cleaning

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

Lifetime Limited Warranty

Greenlee Textron Inc. warrants to the original purchaser of these goods for use that these products will be free from defects in workmanship and material for their useful life, excepting normal wear and abuse. This warranty is subject to the same terms and conditions contained in Greenlee Textron Inc.'s standard one-year limited warranty.

For items not covered under warranty (such as items dropped, abused, etc.), a repair cost quote is available upon request.

Note: Prior to returning any test instrument, please check replaceable batteries or make sure the battery is at full charge.

Garantía limitada válida durante la vida útil del producto

Greenlee Textron Inc. le garantiza al comprador original de estos bienes de uso, que los mismos estarán libres de defectos de materiales y fabricación durante su vida útil; excepto en el caso de que sean maltratados o hayan sufrido el deterioro normal. Esta garantía está sujeta a los mismos términos y condiciones de la garantía estándar limitada válida por un año, otorgada por Greenlee Textron Inc.

Puede obtener, previa solicitud, una cotización de precios de reparación para aquellos artículos que no están cubiertos bajo esta garantía (los que se han dejado caer o han sido maltratados).

Aviso: Antes de devolver un instrumento de verificación, revise si las pilas están bajas y es necesario reemplazarlas.

Garantie à vie limitée

La société Greenlee Textron Inc. garantit à l'acheteur d'origine de ces produits que ces derniers ne comportent aucun défaut d'exécution ou de matériau pour la durée de leur vie utile, sauf l'usure normale. Cette garantie est assujettie aux mêmes conditions que celles contenues dans les modalités et conditions de la garantie limitée standard d'un an de Greenlee Textron Inc.

Lorsque les articles ne sont pas protégés par une garantie (comme si l'appareil tombe, s'il est soumis à un usage abusif, etc.), une soumission pour le prix de réparation sera présentée sur demande.

Remarque : Avant de renvoyer un appareil de mesure, vérifier les piles remplaçables ou s'assurer que la pile est chargée au complet.

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