CM57 TRMS AC SMART CLAMP MULTIMETER

INSTRUCTION MANUAL

MARTINDALE ELECTRIC

Keeping You Safe

ALWAYS READ THESE INSTRUCTIONS BEFORE PROCEEDING

Thank you for buying one of our products. For safety and a full understanding of its benefits please read this manual before use. Technical support is available from +44 (0)1923 441717 and support@martindale-electric.co.uk

CONTENTS

1. SAFETY INFORMATION: Always read before proceeding.

⚠ REMEMBER: SAFETY IS NO ACCIDENT

These instructions contain both information and warnings that are necessary for the safe operation and maintenance of this product. It is recommended that you read the instructions carefully and ensure that the contents are fully understood. Failure to understand and to comply with the warnings and instructions can result in serious injury, damage or even death.

Particular attention should be paid to the Warnings, Precautions and Technical Specifications.

Please keep these instructions for future reference. Updated instructions and product information are available at: www.martindale-electric.co.uk

1.1 Meaning of Symbols and Markings

⚠ **Caution - risk of danger & refer to instructions**

⚠ **Caution - risk of electric shock**

Equipment protected by double or reinforced insulation (Class II)

Application around and removal from hazardous live conductors is permitted.

CAT II **(Measurement Category II)** is applicable to test and measuring equipment connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation.

CAT III **(Measurement Category III)** is applicable to test and measuring equipment connected to the distribution part of the building's low-voltage MAINS installation.

CAT IV **(Measurement Category IV)** is applicable to test and measuring equipment connected at the source of the building's low-voltage MAINS installation.

For further information on measurement categories see page 15 or visit www.martindale-electric.co.uk/measurement_categories.php

Equipment complies with relevant directives

Equipment complies with relevant UK Conformity Assessed marking

End of life disposal of this equipment should be in accordance with relevant directives

1.2 Precautions

This product has been designed with your safety in mind, but please pay attention to the following warnings and cautions before use.

⚠ Warnings

In order to avoid the danger of electrical shock, it is important that proper safety measures are taken when working with voltages exceeding the extra low voltage (ELV) limit of 50V AC RMS or 120V DC.

Where applicable other safety measures such as the use of protective gloves, goggles etc. should be employed.
The clamp meter must only be used by a skilled and competent person who is familiar with the relevant regulations, the safety risks involved and the consequent normal safe working practices, and under the conditions and for the purposes for which it has been constructed and specified.

Before each use the clamp meter and any associated test leads and accessories should be examined for damage, cracks, cuts or scratches. **Do not use** if damaged in any way.

Make sure the clamp meter and test leads are dry, clean and free from dust, grease and moisture while in use to avoid the danger from electric shock due to surface leakage.

Always test this unit on an appropriate proving device or a known good voltage source before and after using it to determine if a hazardous voltage exists in a circuit to be tested. **Do not use** the unit if it does not function correctly during proving.

Measuring / testing for a voltage / current that exceeds the specified limits of the unit may damage the unit and may expose the operator to a shock hazard. Always check the unit's specified limits before use.

If the clamp meter is used in a manner not specified by Martindale Electric, the protection provided by the clamp meter may be impaired.

As a clamp meter or multimeter the unit must only be used on CAT III and CAT II installations up to 600V to earth, and within the operating temperature and humidity range specified.

If the removable probe tip caps are not fitted to the probes of the test leads, their measurement category becomes CAT II 1000V, and they **must not be used** on CAT III or CAT IV installations to avoid the risk of shorting high energy circuits and arc flash.

When this unit is used in combination with test leads, the measurement category of the combination is the lower measurement category of either this unit or the test leads used. Likewise if test lead accessories such as crocodile clips are also used, the measurement category will be the lowest measurement category in that combination.

Do not use if the battery compartment cover is not fitted.
When using test leads, **always** keep your fingers behind the finger guard on the test lead probe.

When positioning the clamp jaws around a hazardous live conductor **always** keep your fingers behind the clamp safety protection barrier.

When making current measurements using the clamps, disconnect the test leads from the clamp meter terminals.

⚠ Cautions

Avoid severe mechanical shock or vibration and extreme temperature.

When using test leads avoid excessive stresses to the cable entry points at the probe and 4mm plug connector.

To avoid possible corrosion from leaking batteries, remove the batteries when the unit is not in use for an extended period.

2. INTRODUCTION

2.1 Inspection

Examine the shipping carton for any sign of damage. Inspect the unit and any accessories for damage. If there is any damage then consult your distributor immediately.

2.2 Description

The Martindale CM57 has a SMART function that automatically detects if AC or DC voltage is being measured when set to the voltage function. The SMART function also automatically determines if resistance or capacitance is being measured or if a diode is being tested.

The Martindale CM55 has the following measurement functions:

- True rms AC current to 600A
- True rms AC voltage to 600V
- DC voltage to 600V
- Resistance to 6MΩ
- Capacitance to 600μF

- Frequency to 100kHz
- Continuity with audible indication
- Diode testing

Further functions are:
- Non-contact voltage detector
- Display hold
- Auto power off
- Auto ranging
- Display backlight

2.3 Accessories
The CM57 comes with the following accessories:
- Carrying case
- Set of TL16 test leads
- 2 x 1.5V AAA batteries
- Instructions

2.4 Battery Installation
Refer to section 4.1 (Battery Replacement) for the battery installation instructions.

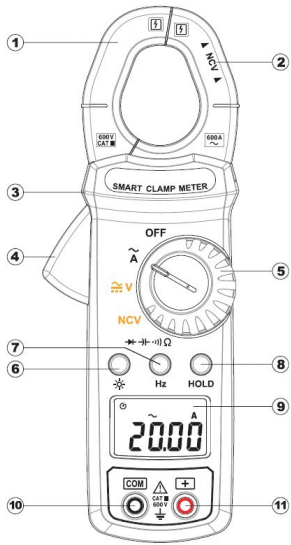
3. OPERATION

3.1 General
If the clamp meter displays **OL** then the measurement limits of the range have been exceeded.

3.2 Low Battery Indication
If the  symbol is displayed, the batteries need replacing as measurement accuracy can no longer be guaranteed (see section 4.1 Battery Replacement).

3.3 Description of Clamp Meter Elements

1	Clamp current sensing jaws
2	NCV sensing area
3	Clamp safety protection barrier
4	Clamp trigger
5	Rotary function selector switch
6	Backlight button
7	Frequency selector button
8	Hold button
9	Liquid crystal display
10	COM input terminal
11	Positive input terminal

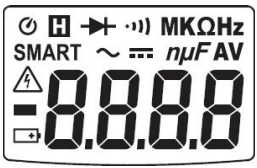


3.4 Description of Press Buttons

☼	Selects backlight
Hz	Selects frequency measurement
HOLD	Selects display hold

3.5 Description of LCD Symbols

Figure 1



	Auto power off is activated
H	Display hold is activated
	Diode test function is selected
	Continuity function is selected
SMART	SMART function is active
	Indicates AC measurement
	Indicates DC measurement
A, V, Ω, kΩ, MΩ, Hz, nF, μF	Units of measurement being displayed
	Indicates >30V present between terminals
	Indicates low battery

3.6 Auto Power Off

If the clamp meter is inactive for a period of 10 minutes it will automatically power off.

If any button is pressed after the clamp meter has automatically powered off, the clamp meter will turn back on.
To disable the auto power off function hold the ☼ or **Hz** button at the same time as turning the rotary switch from **OFF** to any position. The symbol will no longer be displayed on the LCD.

3.7 Backlight

Press the ☼ button to turn on the backlight. Press again to turn the backlight off. The backlight will automatically turn off after 30 seconds to conserve the battery.

3.8 Display Hold

To hold a displayed value, press the **HOLD** button. The LCD will display **HOLD**. Press again to exit display hold.

3.9 Use of the TL16 Test Leads

Before use, always check the continuity of the test leads.

Where access to test points may require extended probe tips, the probe tip caps may be removed by gently pulling them forward until they unclip from the probe body.

3.10 AC Current Measurements

1. Set the rotary switch to the Ã position.
2. Taking all necessary safety precautions, press the clamp meter trigger to open the clamp jaws, position the jaws around the conductor to be measured, and release the trigger to close the jaws.
3. Position the clamp meter so the conductor is central within the clamp jaws.
4. Read the measured ac current from the display.

Note. Clamping around more than one conductor will result in an incorrect measurement.

3.11 Voltage Measurements

1. Connect the black test lead to the COM terminal and the red test lead to the ⊞ terminal.
2. Set the rotary switch to the ≂ **V** position. The LCD will display **SMART**.
3. The smart function will automatically detect if an AC or DC voltage is present at the terminals.
4. Taking all necessary safety precautions connect the test leads to the circuit being measured and read the measured AC or DC voltage from the display.

3.12 Frequency Measurements

When measuring AC current or AC voltage, the frequency of the current or voltage can be measured by pressing the **Hz** button. The LCD will display **kHz**. To revert back to current or voltage measurement, press the **Hz** button again.

3.13 Resistance Measurements and Continuity Testing

1. Connect the black test lead to the COM terminal and the red test lead to the ⊞ terminal.
2. Set the rotary switch to the ⊣▶⊢ Ω position. The LCD will display **SMART**.
3. Taking all necessary safety precautions connect the test leads to the circuit being measured or tested.
4. The smart function will automatically detect if resistance is present at the terminals.
5. Read the measured resistance from the display.
   If the resistance is ≤ 30Ω, the buzzer will sound continuously.

3.14 Capacitance Measurements

Be sure the capacitor being tested is completely discharged before connecting the test leads.

1. Connect the black test lead to the COM terminal and the red test lead to the + terminal.
2. Set the rotary switch to the ⊣⊢ •)) Ω position. The LCD will display **SMART**.
3. Taking all necessary safety precautions connect the test leads to the circuit being measured.
4. The smart function will automatically detect if capacitance is present at the terminals.
5. Read the measured capacitance from the display.

3.15 Diode Testing

1. If the diode to be tested is in circuit, be sure the circuit power is switched off.
2. Connect the black test lead to the COM terminal and the red test lead to the + terminal.
3. Set the rotary switch to the ⊣⊢ •)) Ω position. The LCD will display **SMART**.
4. Taking all necessary safety precautions connect the test leads to the diode being tested.
5. The smart function will automatically detect if a diode is present at the terminals.

If the diode is good a forward bias will give a display reading of around 0.6 V (silicon diode) and a reverse bias will give a display of **OL**. If the diode is shorted or open circuit the display will indicate approx. 0V or **OL** respectively for both forward and reverse bias.

3.16 Use as a Non-contact Voltage Detector

Non-contact voltage detector testing is not suitable to determine if a circuit is **not** hazardous live. A double pole voltage test should always be used for that purpose.

Before and after each use, the non-contact voltage detector function must be proven using a suitable proving device or a known good voltage source. **Do not use** if the unit fails to operate correctly during proving.

1.Set the rotary switch to the **NCV** position. The LCD will display **EF**.
2. Position the area of the clamp jaw marked **NCV** between the △ marks toward the conductor to be tested for the presence of a live voltage.
3. As the source of a live voltage is approached the buzzer will sound intermittently and “-” will be displayed on the LCD.

Depending on the voltage level, the closer the proximity of the unit to the voltage source, the more rapidly the buzzer sounds, until it become continuous. The display will change from “-” to “- - - -” one step at a time.

4. MAINTENANCE

4.1 Battery Replacement

To avoid shock or injury, disconnect the clamp meter from any external circuits and remove the test leads before proceeding.

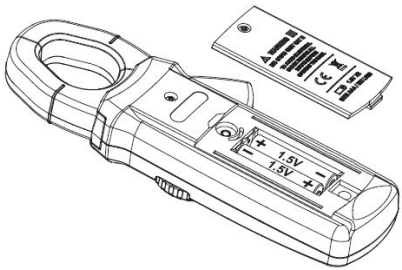


Figure 2

Referring to figure 2, the battery compartment is underneath the unit and can be accessed by removing the screw and lifting off the cover.

Fit 2 new 1.5V, AAA alkaline batteries (IEC LR03, NEDA 24A) observing correct polarity. Replace the battery compartment cover and screw.

Note: Do not mix old and new batteries.

4.2 Test Lead Replacement

If the test leads become damaged they should be replaced.

The replacement test leads must have the same (or better) overvoltage category rating as the TL16 test leads supplied.

4.3 Calibration

To maintain the integrity of measurements made using your instrument, Martindale Electric recommends that it is returned at least once a year to an approved Calibration Laboratory for recalibration and certification.

Martindale Electric is pleased to offer you this service.
Please contact our Service Department for details.
Email: service@martindale-electric.co.uk
Tel: +44 (0)1923 650660

4.4 Cleaning

To reduce the risk of surface leakage, this instrument must be kept in a clean condition.

Prior to cleaning, ensure that the instrument is disconnected from any voltage source.

If contamination is found, clean with a damp soft cloth and if necessary a mild detergent or alcohol. Do not use abrasives, abrasive solvents, or detergents which can cause damage to the unit. If a mild detergent is used, the unit should subsequently be thoroughly cleaned with a water dampened soft cloth. After cleaning, dry and allow to remain in a dry environment for 2 hours before use.

4.5 Repair & Service

There are no user serviceable parts in this unit other than those that may be described in section 4. Return to Martindale Electric if faulty. Our service department will quote promptly to repair any fault that occurs outside the guarantee period.

Before the unit is returned, please ensure that you have checked the unit, batteries, leads and for poor connections.

4.6 Storage Conditions

The instrument should be kept in warm dry conditions away from direct sources of heat or sunlight, and in such a manner as to preserve the working life of the unit. It is strongly advised that the unit is not kept in a tool box where other tools may damage it.

5. WARRANTY AND LIMITATION OF LIABILITY

This Martindale product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is 2 years and begins on the date of receipt by the end user. This warranty extends only to the original buyer or end-user customer, and does not apply to fuses, disposable batteries, test leads or to any product which, in Martindale's reasonable opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation, handling or storage.

Martindale authorised resellers shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of Martindale.

Martindale's warranty obligation is limited, at Martindale's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to Martindale within the warranty period.

This warranty is the buyer's sole and exclusive remedy and is in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. Martindale shall not be liable for any special, indirect, incidental or consequential damages or losses, including loss of data, arising from any cause or theory.

Since some jurisdictions do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any part of any provision of this warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision or other part of that provision.

Nothing in this statement reduces your statutory rights.

MEASUREMENT CATEGORIES

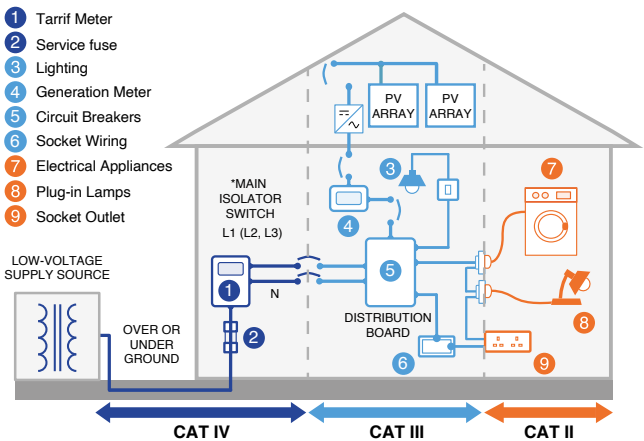
CAT Ratings
BS EN61010-1 Installation Categories (CAT ratings) define the risks from hazardous transient impulses and potentially lethal short circuit currents on the mains supply system based on where you are working.

Voltage Ratings
Test equipment used for measuring mains circuits will have a CAT rating to show where it can be used. Each category also has a voltage rating to show the maximum safe phase to earth system voltage, normally 50V, 100V, 150V, 300V, 600V or 1000V.

Stay safe - Match your test equipment safety rating to the installation category.

CAT II: Socket outlets and similar points of the mains installation.
CAT III: The distribution part of the building's mains installation.
CAT IV: The supply side source of the building's mains installation.

Testers, leads and accessories all need safety ratings equivalent to, or higher than the installation category and voltage rating for the location to be safe.



MARTINDALE ELECTRIC

Keeping You Safe

Specification
CM57
AC Smart Clamp Meter

ELECTRICAL

All specified accuracies are at 23°C ± 5°C, <80% RH for 1 year.

Temperature coefficient:

Add 0.1 x (specified accuracy) per °C.
(0°C to 18°C, 28°C to 40°C).

All accuracies below are expressed as ± (percentage of reading + digits)

DC Voltage

Range	Resolution	Input impedance	Accuracy
6V	0.001V	10MΩ	1.0% + 3
60V	0.01V		
600V	0.1V		

Overload protection: 660V DC or AC rms

AC Voltage

Range	Resolution	Input impedance	Accuracy (50 to 400Hz)
6V	0.001V	10 MΩ	1.2% + 5
60V	0.01V		
600V	0.1V		

Minimum AC voltage measurement: 0.3V rms
Crest factor: <1.8
Overload protection: 660V DC or AC rms

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Specification
CM57
AC Smart Clamp Meter

AC Current

Range	Resolution	Accuracy	
		(50 to 60Hz)	(60 to 400Hz)
60A	0.01A	1.9% + 5	3.0% + 5
600A	0.1A		

Crest factor: <1.8

Overload protection: 660A DC or AC rms

Resistance

Range	Resolution	Open circuit voltage	Accuracy
600Ω	0.1Ω	-1.5V DC	1.2% + 3
6kΩ	0.001kΩ		
60kΩ	0.01kΩ		
600kΩ	0.1kΩ		
6MΩ	0.001MΩ		

Overload protection: 450V DC or AC rms

Continuity

Open circuit voltage	Audible indication
-1.5V DC	≤30Ω

Overload protection: 450V DC or AC rms

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Specification
CM57
AC Smart Clamp Meter

Frequency

Measurement function	Range	Resolution	Sensitivity	Accuracy
AC current	6kHz	0.001kHz	3A rms	0.2% + 2
	10kHz	0.01kHz	5A rms	
AC voltage	6kHz	0.001kHz	5V rms	
	60kHz	0.01kHz		
	100kHz	0.1kHz		

Capacitance

Range	Resolution	Max. test voltage	Accuracy
6nF	0.001nF	-1.5V DC	3.0% + 30
60nF	0.01nF		3.0% + 10
600nF	0.1nF		
6μF	0.001μF		
60μF	0.01μF		
600μF	0.1μF		

Minimum capacitance measurement: 0.3nF
Overload protection: 450V DC or AC rms

Non-Contact Voltage Indicator

Range: 90V to 600V (50Hz to 60Hz).

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Specification
CM57
AC Smart Clamp Meter

Diode Test

Resolution	Max test current	Test voltage
1mV	<1mA	<1.2V

Overload protection: 450V DC or AC rms

GENERAL

Display: Liquid crystal display with maximum reading 5999
Sample rate 2 times/sec
Polarity: automatic, positive implied, '-' for negative polarity indication
Overrange: (OL) is displayed
Power: 2 x 1.5V, AAA alkaline batteries (IEC LR03, NEDA 24A)
Battery life (alkaline): 160 hours typical
Low battery indication:  symbol is displayed
Auto power off: after 10 minutes
Jaw opening capability: 25.4mm
Dimensions: 203 x 75 x 32mm
Weight: 270g approx, including batteries
Includes: carrying case, set of TL16 test leads, 2 x 1.5V AAA batteries, instructions

ENVIRONMENTAL

Location: Indoor use only, or outdoor use in dry weather
Temperature & Humidity:
(Operating): 0°C to 40°C <80% R.H., non-condensing
(Storage): -10°C to 60°C < 70% R.H., batteries removed
Altitude: up to 2000m
Pollution degree: 2

MARTINDALE ELECTRIC

Keeping You Safe

Specification
CM57
AC Smart Clamp Meter

SAFETY

Conforms to: BS EN 61010-1, BS EN 61010-2-032, CAT III 600V, CAT IV 300V. Class II, double insulation

EMC

Conforms to BS EN 61326-1

SPECIFICATION FOR TL16 TEST LEADS

Maximum voltage: 1000V AC/DC
Maximum current: 10A continuous
Connector: 4mm banana plug with fixed shroud

Environmental

Temperature: (Operating & Storage): 0°C to 40°C
Altitude: up to 2000m
Pollution degree: 2

Safety

Conforms to: BS EN 61010-031, CAT IV 600V, CAT III 1000V, 10A (Probe tip covers fitted), CAT II 1000V, 10A (Probe tip covers removed), Class II, double insulation

Check out what else you can get from Martindale:

- 18th Edition Testers
- Accessories
- Calibration Equipment
- Continuity Testers
- Electricians' Kits
- Environmental Products
- Full Calibration & Repair Service
- Fuse Finders
- Digital Clamp Meters
- Digital Multimeters
- Labels
- Microwave Leakage Detectors
- Safe Isolation Kits
- Multifunction Testers
- Non-trip Loop Testers
- Pat Testers & Accessories
- Phase Rotation Testers
- Proving Units
- Socket Testers
- Thermometers & Probes
- Test Leads
- Voltage Indicators
- Specialist Metrohm Tester
- Specialist Drummond Testers

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