CM69 TRMS AC EARTH LEAKAGE CLAMP METER

INSTRUCTION MANUAL

MARTINDALE ELECTRIC

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.

⚠

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 01923 441717 and support@martindale-electric.co.uk

CONTENTS

For further information on measurement categories see page 17 or visit www.martindale-electric.co.uk/measurement_categories.php

CE **Equipment complies with relevant EU Directives**

End of life disposal of this equipment should be in accordance with relevant EU 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 30V AC rms, 42V AC peak or 60V 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.

As a clamp meter or multimeter the unit must only be used on CAT IV installations up to 300V and 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.

- DC voltage to 600V
- Resistance to 600kΩ
- Continuity with audible indication

Further functions are:
- Display hold
- Peak indication
- Zero function
- Selectable low pass filter
- Auto power off
- Auto ranging
- Display backlight

2.3 Accessories
The CM69 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.

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 CM69 has the following measurement functions:
- True rms AC current to 60A
- True rms AC voltage to 600V

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	Clamp safety protection barrier
3	Backlight button
4	Clamp trigger
5	Rotary function selector switch
6	Zero button
7	Peak and •))/Ω selector button
8	Hold & LPF button
9	Liquid crystal display
10	COM input terminal
11	Positive input terminal

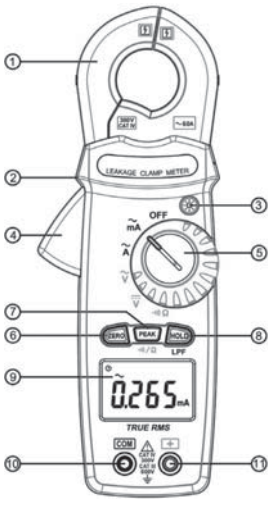
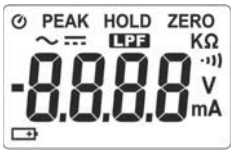


Figure 1

3.4 Description of Press Buttons

☼	Selects backlight
ZERO	Zero's display offsets
PEAK	Selects peak function Selects continuity or resistance functions
HOLD	Selects hold function Selects low pass filter when AC current functions selected

3.5 Description of LCD Symbols



⏲	Auto power off is activated
PEAK	Peak function is activated
HOLD	Display hold is activated
ZERO	Zeroing is activated
~	Indicates AC measurement
⎓	Indicates DC measurement
LPF	Low pass filter is selected
mA, A, V, Ω, kΩ	Units of measurement being displayed
•))	Continuity function is selected
▭+	Indicates low battery

3.6 Auto Power Off

If the clamp meter is inactive for a period of 30 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, press HOLD 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 ☼ 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 HOLD. The LCD will display **HOLD**.

Press again to exit display hold.

3.9 Zero Function

Press ZERO to remove a displayed offset. The LCD will display **ZERO**.

Press again to exit the zero function.

3.10 Peak Function

Press PEAK to select the peak function.

The peak function will record the peak or maximum measured value.

Press PEAK again to exit the peak function.

3.11 Low Pass Filter

A low pass filter may be selected when the clamp is set for AC current measurement.

Press HOLD for 2 seconds to select the low pass filter. The LCD will display **LPF**.

Press again for 2 seconds to remove the low pass filter.

3.12 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.

CAT III 1000V
CAT IV 600V

CAT II 1000V **ONLY DO NOT USE ON CAT III or CAT IV** installations

3.13 AC Current Measurements

Set the rotary switch to the **mA** or **A** position depending on the magnitude of the current to be measured.

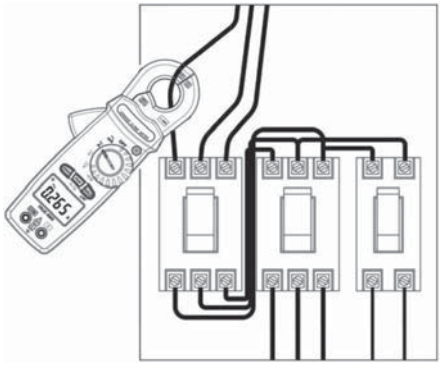
Taking all necessary safety precautions and referring to figure 2, press the clamp meter trigger to open the clamp jaws, position the jaws around the conductor to be measured, and release the trigger to close the jaws.

Position the clamp meter so the conductor is central within the clamp jaws.

Read the measured ac current from the display.

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

Figure 2



3.14 Out of Balance (differential) AC Leakage Current Measurements

Set the rotary switch to the **mA** or **A** position depending on the magnitude of the current to be measured.

Taking all necessary safety precautions and referring to figures 3 and 4, press the clamp meter trigger to open the clamp jaws, position the jaws around the conductors to be measured, and release the trigger to close the jaws.

Position the clamp meter so the conductors are central within the clamp jaws.

Read the measured ac leakage current from the display.

Figure 3 3-Phase 3-Wire System

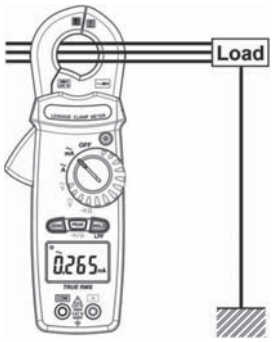
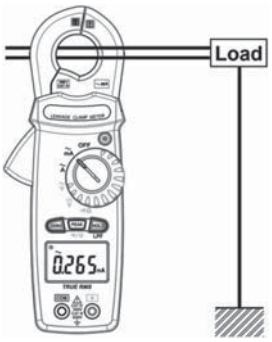


Figure 4 Single Phase 2-Wire System



3.15 AC Voltage Measurements
Connect the black test lead to the COM terminal and the red test lead to the ⊣+⊢ terminal.

Set the rotary switch to the $\tilde{V}$ position. The smart function will automatically detect if an AC or DC voltage is present at the terminals.

Taking all necessary safety precautions connect the test leads to the circuit being measured.

Read the measured AC voltage from the display.

3.16 DC Voltage Measurements
Connect the black test lead to the COM terminal and the red test lead to the ⊣+⊢ terminal.

Set the rotary switch to the $\overline{\tilde{V}}$ position.

Taking all necessary safety precautions connect the test leads to the circuit being measured.

Read the measured dc voltage from the display.

3.17 Resistance Measurements
Connect the black test lead to the COM terminal and the red test lead to the ⊣+⊢ terminal.

Set the rotary switch to the •))) Ω position and press the •))) / Ω button. The •))) symbol will no longer be displayed on the LCD.

Taking all necessary safety precautions connect the test leads to the circuit being measured.

Read the measured resistance from the display.

3.18 Continuity Testing
Connect the black test lead to the COM terminal and the red test lead to the ⊣+⊢ terminal.

Set the rotary switch to the •))) Ω position. The •))) symbol will be displayed on the LCD.

Taking all necessary safety precautions connect the test leads to the circuit being tested.

If the resistance is <55Ω±10Ω, the buzzer will sound continuously. The resistance value will be displayed if ≤660Ω.

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.

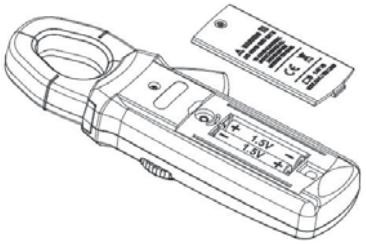


Figure 5

Referring to figure 5, 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: 01923 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.

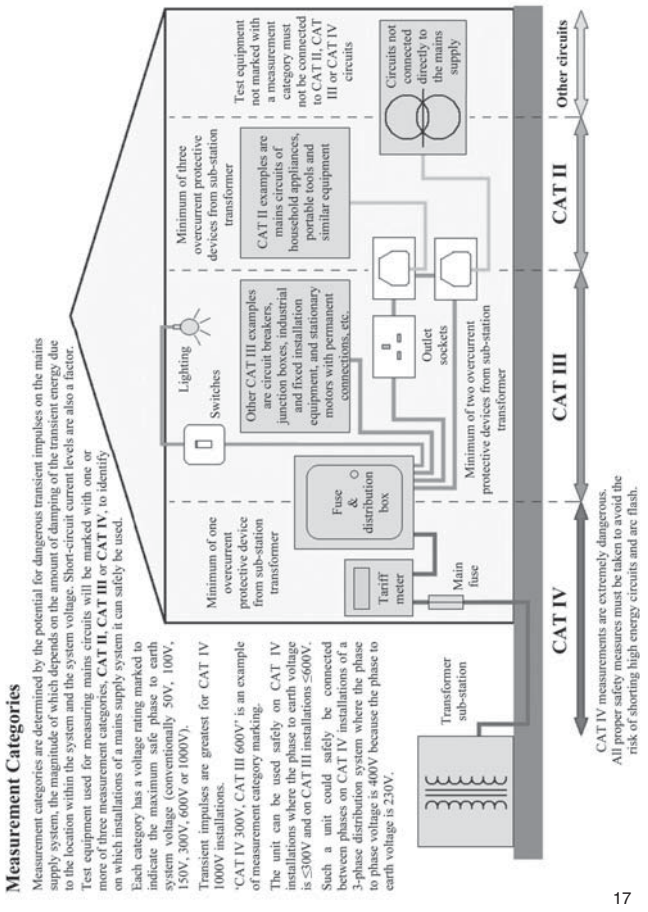
4.5 Repair & Service

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.

MARTINDALE ELECTRIC

Specification
CM69 TRMS AC Earth Leakage 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
60V	0.01V	2MΩ	1.0% + 2
600V	0.1V		

Overload protection: 660V DC or AC rms

AC Voltage (True RMS)

Range	Resolution	Input impedance	Accuracy (50 to 500Hz)
60V	0.01 V	2MΩ	1.0% + 3
600V	0.1 V		

Crest factor: 2.0

Overload protection: 660V DC or AC rms

Specification
CM69 TRMS AC Earth Leakage Clamp Meter

AC Current (True RMS)

Range	Resolution	Accuracy	
		(50 to 60Hz)	60 to 500Hz or LPF selected
6mA	0.001mA	1.0% + 8	2.0% + 8
60mA	0.01mA	1.0% + 5	2.0% + 5
600mA	0.1mA		
6A	0.001A		
60A	0.01A		

Crest factor: 2.0
Overload protection: 100A DC or AC rms
Low pass filter
Cut-off frequency: 160Hz approx
Attenuation characteristic: -24dB/octave approx

Resistance

Range	Resolution	Open circuit voltage	Accuracy
600Ω	0.1Ω	2.2V dc	1.0% + 2
6kΩ	0.001kΩ		
60kΩ	0.01kΩ		
600kΩ	0.1kΩ		

Overload protection: 600V DC or AC rms

Continuity

Open circuit voltage	Audible indication
2.8V dc	<55±10Ω

Overload protection: 600V DC or AC rms

Specification
CM69 TRMS AC Earth Leakage Clamp Meter

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

Specification
CM69 TRMS AC Earth Leakage Clamp Meter

GENERAL

Display: Liquid crystal display with maximum reading 6000
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): 40 hours typical for ACV, ACmA and ACA ranges
60 hours typical for DCV and resistance ranges
Low battery indication: ▭+ symbol is displayed
Auto power off: after 30 minutes
Jaw opening capability: 23mm
Dimensions: 206 x 76 x 33.5mm
Weight: 262g approx. including batteries
Includes: carrying case, set of TL16 test leads, 2 x 1.5V AAA batteries, instructions

ENVIRONMENTAL
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

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

EMC
Conforms to BS EN 61326-1

Check out what else you can get from Martindale:

- 17th 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
- Motor Maintenance Equipment
- Multifunction Testers
- Non-trip Loop Testers
- Pat Testers & Accessories
- Phase Rotation Testers
- Proving Units
- Socket Testers
- Thermometers & Probes
- Test Leads
- Voltage Indicators
- Specialist Metrohm Testers (4 & 5kV)
- Specialist Drummond Testers

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