Dawson DCM201A

Digital Clamp Meter

User's Manual

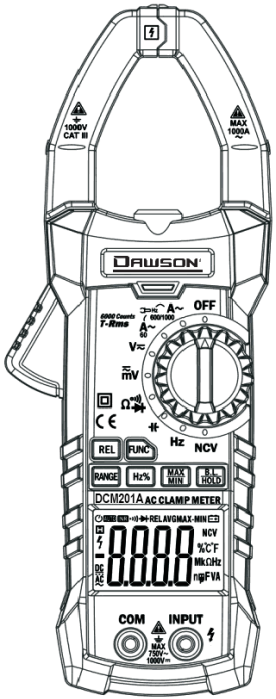


Table of Contents

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This instrument from Dawson Tools Inc. will be free from defects in workmanship and material for three years from the date of original purchase. This warranty does not cover defects resulting from damage caused by the user such as drops, neglect, misuse, unauthorized alteration, usage outside of specified conditions, contamination, or improper repair/maintenance. To receive service on the instrument if it becomes necessary during the warranty period, contact your nearest Dawson authorized service center at (800) 898-6991 or visit www.DawsonTools.com to obtain a return authorization (within the US only). A return authorization is necessary before returning any instrument to Dawson; no service will be provided without a return authorization. The user is responsible for properly packing the unit and charges such as shipping, freight and insurance charges. The extent of Dawson's liability is limited solely to the repair/replacement of the instrument. The above warranty in its entirety is inclusive and no other warranties, written or oral, are expressed or implied.

Out of the Box

Check the Meter and accessories thoroughly before using the Meter. Contact your local distributor if the Meter or any components are damaged or malfunction.

Accessories

- 1000V 10A Test Leads 1pc
- User's Manual 1pc
- 6F22 9Volt Battery 1pc
- Case 1pc

Safety Information

⚠ **WARNING**

TO REDUCE THE RISK OF FIRE, ELECTRICAL SHOCK, PRODUCT DAMAGE OR PERSONAL INJURY, PLEASE FOLLOW THE SAFETY INSTRUCTIONS DESCRIBED IN THE USER MANUAL. READ THE USER MANUALS BEFORE USING THE METER.

⚠ **WARNING**

TO ENSURE SAFE OPERATION AND LIFE OF THE METER, DO NOT PLACE THE METER IN ANY ENVIRONMENT WITH HIGH PRESSURE, HIGH TEMPERATURE, DUST, EXPLOSIVE GAS OR VAPOR.

The DCM201A meter meets GB/T 13978-92 Digital Clamp Multimeter General technical requirements standard, GB4793.1-1995 (IEC-61010-1, IEC-61010-2-032) electronic measuring instrument safety standard，pollution 2 standard，with Over-Voltage categories of CAT IV 600 and CAT III 1000V.

Safety Symbols

⚠	Important safety message
CE	Conforms to relevant European Union directives

Warning Symbols

⚠ **WARNING**	Risk of danger; Important information. See User's Manual
⚠ **Caution**	Statement identifies conditions and actions that failure to follow the instructions could result in false readings, damage the Tester or the equipment under test

Introduction

Overview

DCM201A is a portable, hand-held yet professional meter that features an LCD with backlight, overload protection and low battery indicator. These Meters are easy to use with one hand, suitable for professional users or amateurs, and ideal for school or home use.

Preparations:

Users must follow the standard safety instructions while using the meter:

1. Once the Meter is out of the package, check for any damage to the Meter before using.
2. Double check the Meter to make sure the components are in good condition.
3. Check the test leads before operation. Leads must be in good condition, check if leads are well covered by insulator; wires should not be exposed.
4. Use the original test leads included in the package for best performance and safety, if necessary, use the compatible leads with same specifications of the originals.

Operations:

1. Make sure to set the meter to the correct functions and measuring range.
2. Do not use the Meter on a circuit where the measuring range is over the capable range specified in the User's manual.
3. Do not touch the tips of test leads when performing measurement.
4. If the measurement is above 60V DC or 30V AC, make sure keeping hands below the tactile barrier and finger guards.
5. Do not use the Meter on a circuit if the voltage is above 750V AC.
6. In Manual Mode, if the circuit value is unknown, start the

Meter from maximum range and then adjust accordingly.

7. Remove the leads from the circuit first before switching between functions.
8. Do not power the circuit when measuring resistance, capacitance or diodes.
9. Do not measure the capacitance before the capacitor is discharged.
10. Do not operate the Meter near explosive gas, vapor or under dust.
11. Stop the operation if the Meter or test leads appeared damaged or do not function properly.
12. Unless the battery cover and the Meter case are firmly closed, do not use the Meter.
13. Do not expose the Meter to direct sunlight, heat, or moisture.

Components and Buttons

Symbols

⚠ Risk of danger. (Important information. See User's Manual)

May be used on hazardous live conductors.

Double insulation（type II）

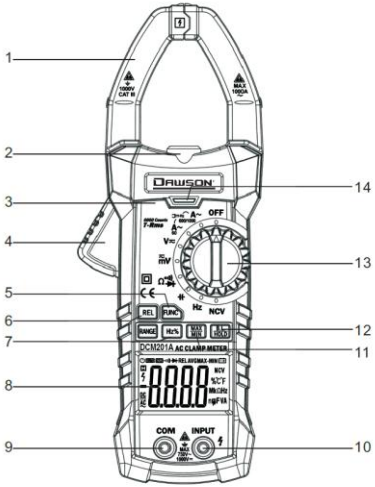
CAT III Conforms to IEC-61010-1Over-Voltage standard categories III.

CE Conforms to relevant European Union directives

Earth ground

Names of the Components

1. Clamp Jaws：Measure Current
2. Clamp Light
3. Panel
4. Clamp trigger
5. Function Button (FUNC）
6. Relative Button (REL)
7. Frequency/Duty Ratio Button (Hz/%)
8. LCD Display
9. Common Input Terminals
10. Resistance, Capacitance, Voltage, Frequency, Diodes and continuity Input Terminal
11. Min Max Button(MAX/MIN)
12. Display Hold / Back Light Button(B.L/ HOLD)
13. Rotary Switch
14. NCV Indicator



Switches and Buttons

B.L/HOLD button: to hold the reading or to turn on backlight

FUNC button: to switch between functions

RANGE button: to switch range in manual mode

REL button**:** for relative reading measurement

Hz/% button: to switch between Frequency and Duty Ratio.

MAX/MIN button: to switch between Maximum and Minimum measurement.

OFF: power off

INPUT: Resistance, Capacitance, Voltage, Current, Frequency, Diodes and continuity Input Terminal

COM: Common Input Terminals

Rotary Switch: switch between measurements

LCD Display Features

AC、DC	Alternating Current, Direct Current
、	Diode, Continuity
AUTO	Auto Mode
MAX	Maximum Measurement Displayed
MIN	Minimum Measurement Displayed
REL	Relative Measurement Mode
	Auto Power Off
	Battery Low
H	Display Hold
%	Percentage (Duty Ratio)
mV, V	MilliVolt, Volt (Voltage)
A	Amp (Current)
N,µF,mF	Nanofarads, Microfarads, Millifarads
Ω,kΩ, MΩ	Ohms, Kilohms, Megaohms
Hz kHz,MHZ	Hertz, Kilohertz, Megahertz
NCV	Non-Contact Voltage

Specifications

The Meter should be calibrated annually between 18℃ ~ 28℃ and a relative humidity less than 75%.

1.3.1 General Specifications

- Manual and Auto Mode
- Power Overload Protection
- Maximum Voltage Between Circuit and Ground: 1000V DC or 750V AC
- Maximum Working Height: 2000m
- Display: LCD
- Maximum Display Number: 5999
- Auto Polarity Indication, '-'Indicates Negative
- Overload Indication: '0L' Or '-0L'
- Sampling Frequency: 3 Times / Sec
- Units Display: Display Functions and Units.
- Auto Power Off: 15 Minutes
- Input Power : 9V DC
- Battery Type: 9V NEDA 1604, 6F22
- Low Battery Indication: LCD Display"  "
- Working Environment Temperature: 18℃ ~28℃
- Storage Temperature:-10℃ ~50℃
- Size：238×92×50mm
- Weight: ~420g (Include Battery)

Technical Specifications

Temperature: 23±5℃ Relative Humidity: <75%

AC Current

Range	Resolution	Accuracy
60A	0.01A	± (2.5% + 8 Counts）
600A	0.1A	
1000A	1A	

- Maximum Input Current: 1000A AC or 1000A DC
- Frequency Range @ 0~600A : 40 ~ 400Hz ;
  @ 600A~1000A : 40 ~60Hz

DC Voltage

Range	Resolution	Accuracy
60mV	0.01mV	±(0.5% + 5 Counts)
600mV	0.1mV	
6V	0.001V	
60V	0.01V	
600	0.1V	
1000V	1V	±(0.8% + 4 Counts）

- Input Resistance: 10MΩ
- Maximum Input Voltage: 750V AC (RMS) or 1000V DC

Attention:

During small voltage measurements, the Meter may display fluctuating readings when the test leads are not connected to the circuit. This is normal due to the high sensitivity of the Meter and will not affect the measurement.

AC Voltage

Range	Resolution	Accuracy
60mV	0.01mV	±(0.6% + 5 Counts)
600mV	0.1mV	
6V	0.001V	
60V	0.01V	
600V	0.1V	
750V	1V	±(0.8% + 4 Counts)

- Input Resistance: 10MΩ
- Maximum Input Voltage: 750V AC (RMS) or 1000V DC
- Frequency Range: 40 ~ 400Hz

Attention:

During small voltage measurements, the Meter may display fluctuating readings when the test leads are not connected to the circuit. This is normal due to the high sensitivity of the Meter and will not affect the measurement.

Frequency

Frequency Through Clamp Measuring (A Mode)

Range	Resolution	Accuracy
99.99Hz	0.01Hz	±(1.5% + 5 Counts)
999.9Hz	0.1Hz	

- Measure Range: 10Hz ~ 1kHz
- Input Range: ≥ 20A AC (RMS) Input current should increase as circuit frequency increase
- Maximum Input Current: AC 1000A(RMS)

Frequency Through "V" mode

Range	Resolution	Accuracy
99.99Hz	0.01Hz	±(1.5% + 5 Counts）
999.9Hz	0.1Hz	
9.999kHz	0.001kHz	

- Range: 10Hz~ 10kHz
- Input Range: ≥ 20mV AC (RMS) Input voltage should increase as circuit frequency increase
- Input Resistance:10MΩ
- Maximum Input Voltage:750V AC (RMS)

Frequency Through "HZ/DUTY" Mode

Range	Resolution	Accuracy
9.999Hz	0.001Hz	±(0.3% + 5 Counts)
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999kHz	0.001kHz	
99.99KHZ	0.01kHZ	
999.9KHZ	0.1KHZ	
9.999MHZ	0.001MHZ	

- Overload Protection: 250V DC or AC (RMS)
- Input Voltage Range: ≥ 2V Input voltage should increase as circuit frequency increase

Duty Ratio

Range	Resolution	Accuracy
0.1 – 99.9%	0.1%	± 0.3%

Duty Ratio through "A" Mode (Clamp)

- Frequency Response: 10 ~ 1kHz
- Input Current Range: ≥20A AC(RMS)
- Maximum Input Current: AC 1000A

Duty Ratio through "V" Mode

- Frequency Response: 10 ~10kHz
- Input Volatage Range: ≥ 60mV AC
- Input Resistance: 10MΩ
- Maximum Input Voltage: 750V AC (RMS)

Duty Ratio through "HZ/DUTY" Mode

- Frequency Response:10 ~10MHz
- Input Voltage Range: ≥ 2V AC (RMS) Input voltage should increase as circuit frequency increase
- Maximum Input Voltage: 250V AC (RMS)

Resistance

Range	Resolution	Accuracy
600Ω	0.1Ω	±(0.8% + 3 Counts)
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	±(1.2% + 3 Counts)
60MΩ	0.1MΩ	±(2.0% + 5 Counts)

- Open Circuit Voltage: ~0.4V
- Over-voltage protection: 250V DC/AC (RMS)

Continuity

Function	Resolution	Description
•))	0. 1Ω	The Meter will beep if measure less than 50Ω.

- Over-voltage protection: 250V DC or AC (RMS)

Capacitance

Range	Resolution	Accuracy
9.999nF	0.001nF	± (3.0% + 5 Counts)
99.99nF	0.01nF	
999.9nF	0.1nF	
9.999μF	0.001μF	
99.99μF	0.01μF	
999.9μF	0.1μF	
9.999mF	0.001mF	
99.99mF	0.01mF	

- Over-voltage protection: 250V DC or AC (RMS)

Diodes

Symbol	Resolution	Description
	0.001V	Display voltage reads

- Forward biased AC current: 1mA
- Backward AC Voltage: 3.3V
- Over-Voltage Protection: 250V DC or AC (RMS)

Using the Meter

Display Hold

During the measuring, press the "**B.L./HOLD**" button once to hold the reading, press again to release hold.

Manual Measurement

- When switching between positions on the rotary switct, the default range type is Auto. Press "**RANGE**" button to enter Manual mode. Each press increases the measuring range and will return to minimum range after maximum has been reached.
- Hold "**RANGE**" for 2 seconds to switch back to Auto mode.

Attention:

Manual Measurement Mode is disabled when performing capacitance or frequency measurement.

Frequency and Duty Ratio

- When the Meter is on AC Voltage or AC Current Mode. Press "**Hz/%**" button once to measure the frequency of the circuit. Press "**Hz/%**" button again to measure the duty of the circuit. If the Meter is on HZ/DUTY mode, "**Hz/%**" button will switch between Hz and Duty.
- Press"**Hz/%**" button again to measure voltage or current

Attention：

"**Hz/%" is off when the Meter is measuring Max/Minimum of the circuit.**

Setting MAX/MIN Recording

1. Press "**MAX/MIN**" button once to measure the maximum, press "**MAX/MIN**" button again to measure the minimum, press "**MAX/MIN**" button a third time to show the difference between maximum and minimum. Press "**MAX/MIN**" button again to go back to maximum measurement, and repeat.
2. In Max/Min mode, measurement is saved automatically.
3. Press "**MAX/MIN**" button for 2 seconds to set the Meter back to normal measurement.

Attention:

- The Meter is set to Manual mode when using Max/Min measurement.
- The Meter cannot perform Max/Min measurements when it is in Frequency/Duty Mode.

Switching Between Functions

- When rotary switch is on Resistance, Diode, and continuity mode, press "**FUNC**" button to switch between those three.
- When rotary switch is on Voltage and Current mode, press "**FUNC**" button to switch between AC and DC.

REL/INRUSH Measurement

1. Press "**REL"** button to enter relative measurement mode. When in this mode the current reading will be stored and the display shows the difference of the current reading and the stored reading; i.e. REL△(Output) = (current reading) – (reading when button is pressed) .
2. "**REL**" only performs in manual mode.

Backlight and clamp light

1. Press "**B.L/HOLD**" button for 2 seconds to turn on display backlight, the backlight will stay on for 30 seconds before it is automatically turned off.
2. When backlight is on, hold "B.L/ HOLD" button for 2 seconds to manually turn off backlight.
3. In Current Mode, turning on backlight will also trigger the clamp light.

Attention:

- The Meter uses an LED as a backlight; even though the light is set to auto off after 30 seconds, use only when needed to conserve the power.
- When battery voltage is less than 7.2V, the Meter will display "  " to indicate low voltage. This "" may also appear when backlight is on. This is normal as backlight consume extra power, no battery change is necessary. (when "" is on, accuracy of reading is not guaranteed) Change the battery when "" is on without backlight is on.

Auto Power Off

1. When not in use, the Meter will automatically turn off after 15 minutes. The Meter will beep 5 times 1 minute before it turns off and a long beep right before it turns off.
2. After Auto Off, press any button to bring power back on.
3. To disable Auto Off, hold "**FUNC**" when turning on the Meter.

Measuring Preparation

- Turn on the Meter by turning the rotary switch. If "⊟" appears, replace the battery.
- "⚠" indicates input voltage or current should not exceed the indicated value; this is to protect the Meter from damage.
- Turn the rotary switch to the proper position.
- When connecting to the circuit, connect **COM** input first before connecting to power. Remove the power lead first when disconnecting from the circuit.

Current (AC/DC) Measurements

⚠ **WARNING**

TO AVOID ELECTRICAL SHOCK AND INJURY, PLEASE REMOVE TEST LEADS BEFORE MAKING CURRENT MEASUREMENTS.

1. Turn the rotary switch to AC current "**A**"
2. Choose "**A 1000**" range first if the target value is unknown. Adjust the range if necessary.
3. When measuring AC current, the measured wire should be properly seated within the clamp jaws and centered within the clamp. Also note that currents moving in different directions will cancel each other, so one wire must be measured at a time for a correct measurement.
4. Read the measurement on the LCD Display.

Attention:

- Measure two or more wires together will cause false reading.
- The wire being measured should be centered within the clamp.
- "⚠" indicates the maximum input AC Current is 1000 A。
- For higher accuracy, when measuring DC current if Display shows none zero, press "**REL**" button to reset the reading to zero.

Voltage (AC/DC) Measurements

⚠ **WARNING**

USE CAUTION WHEN MEASUREING HIGH VOLTAGE CIRCUITS TO AVOID ELECTRICAL SHOCK AND INJURY. DO NOT MEASURE INPUT VOLTAGES HIGHER THEN 750V AC.

1. Insert the black test leads into "**COM"** Input and red test lead into "**INPUT"** input, choose proper range.
2. Turn the rotary switch to V≂ or mV. This indicates DC voltage measurement; to measure AC voltage, press "**FUNC**" button once to enter AC Voltage measurement.
3. Connect the test leads to voltage source or load.
4. The Meter reading appears on the display.

Attention：

- When measuring low voltage sources, the reading will fluctuate on the display when the test leads are not connected to the circuit. This is normal due to the high sensitivity of the Meter. The Meter will display correct reading once the leads are connected to the circuit.

- In relative mode, auto measuring cannot be used.
- "⚠"indicates the maximum input voltage is 750V AC or 1000V DC. In "**mV**" range, the maximum input voltage is 600mV DC or AC.
- The Meter will beep if the reading is greater than 750V RMS AC.

Frequency and Duty

Clamp Jaws Measurement (Current Mode) :

⚠ **WARNING**

REMOVE THE TEST LEADS FROM THE METER WHEN PERFORMING A CURRENT MEASUREMENT WITH THE CLAMP JAWS TO AVOID ELECTRICAL SHOCK AND INJURY.

1. Turn the rotary switch to "**A"** (current) mode.
2. Open the jaws by holding the trigger, place the wire in the jaws.
3. Press "**Hz/%**" button to measure frequency.
4. Read the measurement from the display.
5. Press "**Hz/%**" again to measure duty.

Attention：

- Measuring two or more wires together will cause false readings.
- The accuracy of the reading is guaranteed between 10Hz ~ 1kHz. Below or above this range is still measurable, but the reading is not guaranteed.
- Duty range is10 ~ 95%.
- "⚠"indicates the maximum input current is 1000A AC (RMS).

Measuring in Voltage Mode:

⚠ **WARNING**

DO NOT MEASURE INPUTS OF MORE THAN 750V AC TO AVOID ELECTRICAL SHOCK AND INJURY.

1. Insert the black lead into "**COM"** input and the red lead into "**INPUT**" input.
2. Turn the rotary switch to V≂ or mV≂, press "**FUNC**" button to enter AC Voltage mode.
3. Press "**Hz/%**" button to switch to frequency mode.
4. Connect the test leads to the voltage source or between loads.
5. Read the measurement from the display.
6. Press "**Hz/%**" button to switch to duty mode.

Attention ：

- The accuracy of reading is guaranteed between 10Hz ~ 10kHz. Below 10Hz a "00.0" will show, above 10kHz range is still measurable, but the reading is not guaranteed.
- Range of Duty is 10 ~ 95%.

- "⚠"indicates the maximum input voltage is 750V AC (RMS).

Measuring in "HZ/DUTY" Mode:

> ⚠ **WARNING**
>
> **DO NOT MEASURE INPUTS OF MORE THAN 250V AC TO AVOID ELECTRICAL SHOCK AND INJURY.**

1. Insert the black lead into **"COM"** input and the red lead into "**INPUT**" input.
2. Turn the rotary switch to "**HZ"**.
3. Connect the test leads to the voltage source or between loads.
4. Read the measurement from the display.
5. Press **"Hz/%**" button again to switch to duty mode.

Attention:

- The accuracy of reading is guaranteed between 10Hz ~ 10kHz. Below 10Hz a "00.0" will show. Above 10kHz range is still measurable, but the reading is not guaranteed.

Resistance Measurement

> ⚠ **WARNING**
>
> **AVOID ELECTRICAL SHOCK AND INJURY. POWER OFF THE CIRCUIT AND DISCHARGE THE CAPACITANCE BEFORE MEASURING THE RESISTANCE.**

1. Insert the black lead into "**COM"** input and the red lead into "**INPUT**" input.
2. Turn the rotary switch to  , this mode measures the resistance.
3. Connect the test leads across the circuit or resistors.
4. Read the measurement from the display.

Attention:

- When the circuit is open, the Meter displays "**OL**".
- The Meter will take several seconds to give a reading if the circuit has a resistance of more than 1MΩ.

Diode Measurement

1. Insert the black lead into **"COM"** input and the red lead into "**INPUT"** input.
2. Turn the rotary switch to  .
3. Press "**FUNC**" button twice to switch to Diode () mode.
4. Connect the black lead to the cathode (-) and the red lead to the anode (+).
5. Read the measurement from the display.

Attention:

- The Meter displays the forward biased value.
- If the diode is connected backwards or is an open circuit, the Meter will display **"OL"**.

Continuity

> ⚠ **WARNING**
>
> **AVOID ELECTRICAL SHOCK AND INJURY. POWER OFF THE CIRCUIT AND DISCHARGE THE CAPACITANCE BEFORE MEASURING THE CONTINUITY.**

1. Insert the black lead into "**COM"** input and the red lead into "**INPUT"** input.
2. Turn the rotary switch to  .
3. Press **"FUNC"** button to switch to continuity ( ) mode.
4. Connect leads to the circuit terminals.
5. The Meter will beep if the reading is below 50Ω.
6. Read the measurement from the display.

Attention:

The Meter displays **"OL"** if the circuit is open or resistance is larger than 600Ω.

Capacitance Measurement

> ⚠ **WARNING**
>
> **AVOID ELECTRICAL SHOCK AND INJURY. DISCHARGE THE CAPACITOR BEFORE PERFORMING THE MEASURING.**

1. Insert the black lead into "**COM"** input and the red lead into "**INPUT"** input.
2. Turn the rotary switch to  .
3. Place leads at the terminals of the capacitor after it is discharged.
4. Read off the measurement from the display.

Attention：

To improve the accuracy of measurements below 10nF, subtract the distributed capacitance of the meter and cable.

Maintenance

General Maintenance

- To avoid possible electric shock or personal injury, repairs or servicing not covered in this manual should be performed only by qualified personnel.
- To avoid electrical shock, remove any input signals before cleaning.
- To avoid false readings that could lead to possible electric shock, replace the batteries as soon as the low battery indicator "  " appears.
- Clean the instrument case with a damp cloth and mild detergent. Do not use aromatic hydrocarbons or chlorinated solvents for cleaning.

- Turn the rotary switch to **"OFF"** and remove the test leads from the terminals when not used.
- Remove the battery if meter is not going to be used for long periods.

Battery Replacement

> ⚠ **WARNING**
>
> **REMOVE THE TEST LEADS FROM THE METER BEFORE REMOVING THE BATTERY CASE TO AVOID ELECTRICAL SHOCK AND INJURY.**

1. Replace new batteries if the Meter displays "".
2. Loosen the battery compartment door screw and remove the door from the case bottom.
3. Remove and replace the battery.
4. Reattach the battery compartment door to the case bottom and tighten the screw.

Attention：

Double check the polarities of the battery.

Test Leads Replacement

> ⚠ **WARNING**
>
> **REPLACE THE TEST LEADS WITH IDENTICAL OR COMPATIBLE LEADS. LEAD SPEC：1000V 10A.**

Replace new leads if the current leads are worn.

Contact Dawson

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Do not recycle

(Back Page)

Features

- LCD Display
- Jaw Opening
- Auto Ranging
- Auto Power Off
- Relative Measurement
- Diode Test
- Continuity Buzzer
- MAX/MIN
- Data Hold
- Work Light
- Back Light
- Low Battery Indicator
- True RMS
- Non-Contact Voltage Detector