

Read this owner's manual thoroughly before use and save.

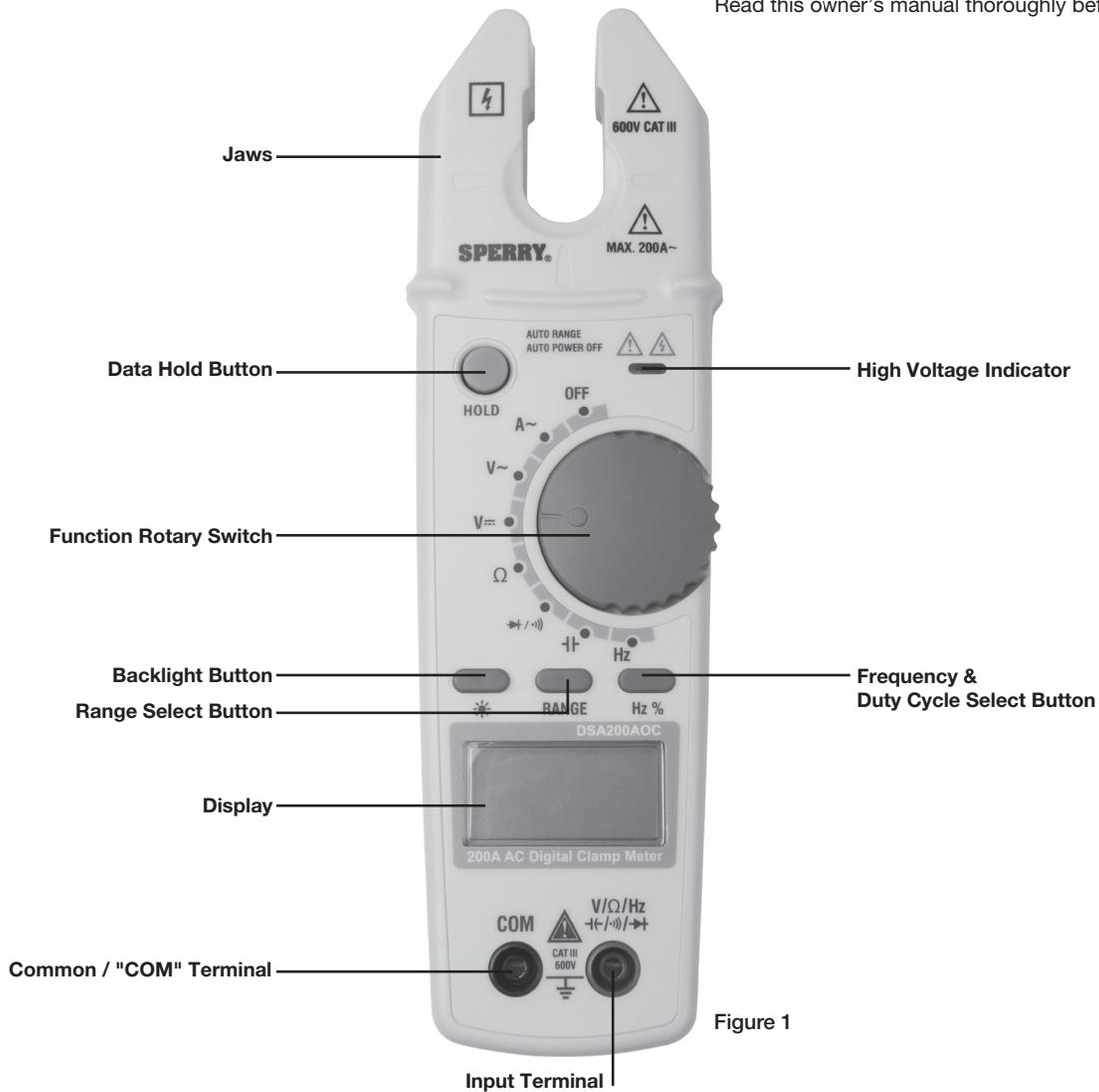


Figure 1

I. DISPLAY FUNCTIONS & SYMBOLS

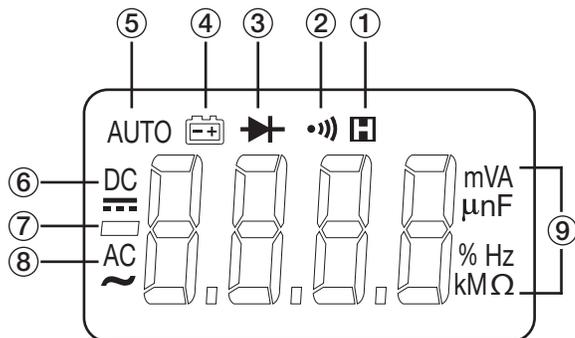


Figure 2

1.		Data Hold is enabled	5.	AUTO	Autorange mode is selected
2.		Continuity test is selected	6.		DC
3.		Diode test is selected	7.		Negative sign
4.		The batteries are low and must be replaced	8.		AC
Units of Measure					
mV, V	Unit of voltage, mV: Millivolt; V: Volt, 1V=1000mV				
mA, A	Unit of current, μA: Microamp; mA: Milliamp; A: Amper, 1 A = 10 ³ mA = 10 ⁶ μA				
Ω, kΩ, MΩ	Unit of resistance, 0: Ohm; kO: Kilohm; MO: Megohm, 1 MΩ = 10 ³ kΩ = 10 ⁶ Ω				
nF, μF	Unit of capacitance, nF: Nanofarad; μF: Microfarad, 1F = 10 ⁶ μF = 10 ⁹ nF = 10 ¹² pF				
Hz, kHz, MHz	Unit of frequency Hz: Hertz; kHz: Kilohertz; MHz: Megahertz 1 MHz = 10 ³ kHz = 10 ⁶ Hz				
%	Unit of duty cycle, %: Percent				

II. SAFETY WARNINGS

- This instruction manual contains warnings and safety rules which must be observed by the user to ensure safe operation of the instrument and retain it in safe condition.
- Read through and understand the instructions contained in this manual before using the instrument.
- Keep the manual at hand to enable quick reference whenever necessary.
- The instrument is to be used only in its intended applications.
- Understand and follow all the safety instructions contained in the manual.
- It is essential that all safety instructions are adhered to.
- Failure to follow the safety instructions may cause injury, instrument damage

The symbol  indicated on the instrument means that the user must refer to the related parts in the manual for safe operation of the instrument. It is essential to read the instructions wherever the symbol appears in the manual.

 **DANGER** is reserved for conditions and actions that are likely to cause serious or fatal injury.

 **WARNING** is reserved for conditions and actions that can cause serious or fatal injury.

 **CAUTION** is reserved for conditions and actions that can cause injury or instrument damage.

DANGER

- Never make measurement on a circuit in which voltage over 600V exists.
- Do not exceed the CAT rating of the measuring device
- Do not attempt to make measurement in the presence of flammable gases.
The use of the instrument may cause sparking, which can lead to an explosion.
- Transformer jaw tips are designed to not short the circuit during a test. If equipment under test has exposed conductive parts extra precaution should be taken to minimize the possibility of shorting.
- Never use the instrument if its surface or your hand is wet.
- Do not exceed the maximum allowable input of any measuring range.
- Never open the battery cover during a measurement.
- The instrument is to be used only in its intended applications or conditions.
Use in other than as intended may cause instrument damage or serious personal injury.

WARNING

- Never attempt to make any measurement if any abnormal conditions are noted, such as broken case, cracked test leads and exposed metal part.
- Do not turn the function selector switch with plugged in test leads connected to the circuit under test.
- Do not install substitute parts or make any modification to the instrument.
Return the instrument to your distributor for repair or recalibration.
- Do not try to replace the batteries if the surface of the instrument is wet.
- Always switch off the instrument before opening the battery compartment cover for battery replacement.

CAUTION

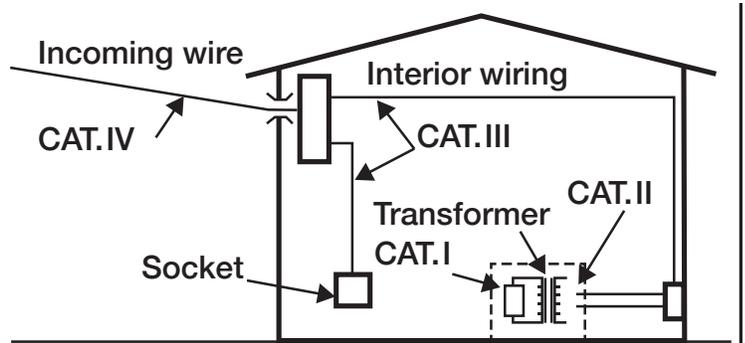
- Set the Function Switch to an appropriate position before starting measurement.
- Firmly insert the test leads.
- Disconnect the test leads from the instrument for current measurement.
- Do not expose the instrument to the direct sun, high temperature and humidity or dewfall.
- Be sure to power off the instrument after use. When the instrument will not be in use for a long period, place it in storage after removing the batteries.
- Use only a soft cloth dampened with water or neutral detergent for cleaning the meter.
Do not use abrasives, solvents or harsh chemicals. Allow to dry thoroughly before use.

Measurement categories (Over-voltage categories)

To ensure safe operation of measuring instruments, IEC61010 establishes safety standards for various electrical environments, specified as CAT I through CAT IV, and called measurement categories. Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measuring instrument designed for CAT III environments can endure greater momentary energy than one designed for CAT II.

- CAT I: Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.
- CAT II: Primary electrical circuits of equipment connected to an AC electrical outlet by a power cord.
- CAT III: Primary electrical circuits of the equipment connected directly to the distribution panel, and feeders from the distribution panel to outlets.
- CAT IV: The circuit from the service drop to the service entrance, and to the power meter and primary over current protection device (distribution panel).

Symbols	
	Caution, risk of danger, refer to the operating manual before use
	Caution, risk of electric shock
	AC (Alternating Current)
	DC (Direct current)
	AC/DC Selectable (Alternating Current/Direct Current)
	Earth (ground) Terminal
	The equipment is protected throughout by double insulation or reinforced insulation
	Application around and removal from hazardous live conductors is permitted.
	Conforms to Standards of European Union
	Designates the product as recyclable electronic waste per WEEE Directive



III. GENERAL SPECIFICATION

Display: 3 3/4 digit LCD, with a max. reading of 3999

Overrange indication: "OL" shown on the display

Sampling rate: About 2 - 3 times/sec

Negative Polarity Indication: Negative sign "-" shown on the display automatically

Jaw Opening Capability: 13mm

Max. Measurable Conductor: Ø13mm

Low Battery Indication:  shown on display

Battery: 1.5V battery, AA or equivalent, two pieces

Operating Environment: Temperature: 0°C to 40°C

Relative Humidity: < 75%RH

Storage Environment: Temperature: -10°C to 50°C

Relative Humidity: < 85%RH

Dimensions: 212x66x33mm

Weight: About 205g (Including batteries; no leads)

IV. OPERATING INSTRUCTION

A. Data Hold Mode

1. Press the **□** button to hold the present reading on the display, "□" will appear on the display as an indicator. To exit Data Hold mode, just press this button again. "□" disappears.

B. Manual Ranging and Autoranging

The meter defaults to autorange mode in measurement functions which have both autorange mode and manual range mode. When the meter is in autorange mode, the symbol "AUTO" is displayed.

1. Press the **RANGE** button to enter manual range mode. The symbol "AUTO" disappears. Each press of the **RANGE** button increases the range. After the highest range, the meter wraps to the lowest range.
2. To exit the manual range mode, press and hold down the **RANGE** button for more than about 2 seconds. The meter returns to the autorange mode and "AUTO" is displayed.

NOTE: Only voltage and resistance functions have both autorange mode and manual range mode.

C. Measuring DC Voltage

1. Connect the black test lead to the "COM" terminal and the red test lead to the "VΩHz $\frac{+}{-}$ " terminal.
2. Set the rotary switch in "V $\frac{+}{-}$ " position. The meter defaults to autorange mode. You can select manual range mode by pressing the **RANGE** button. If you use manual range mode and do not know the magnitude of the voltage to be measured beforehand, select the highest manual range first, and then reduce it range by range until satisfactory resolution is obtained.
3. Connect test leads across the source or circuit to be tested.
4. Observe the reading on the display, The polarity of the red lead connection will be indicated as well.

D. Measuring AC Voltage

1. Connect the black test lead to the "COM" terminal and the red test lead to the "VΩHz $\frac{+}{-}$ " terminal.
2. Set the rotary switch in "V~" position. The meter defaults to autorange mode. You can select manual range mode by pressing the **RANGE** button. If you use manual range mode and do not know the magnitude of the voltage to be measured beforehand, select the highest manual range first, and then reduce it range by range until satisfactory resolution is obtained.
3. Connect the test leads across the source or circuit to be tested.
4. Observe the reading on the display.

E. Measuring AC Current

1. Set the rotary switch in "A~" position.
2. Place the conductor (wire) in the jaws. Make sure the wire is centered between the marks on the meter as shown in figure 3. Only place 1 wire in the jaws at a time.
3. Observe the reading on the display.

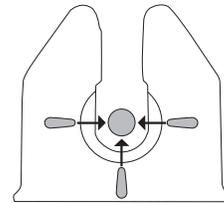


Figure 3

F. Measuring Resistance

1. Connect the black test lead to the "COM" terminal and the red test lead to the "VΩHz $\frac{+}{-}$ " terminal.
2. Set the rotary switch in "Ω" position.
3. The meter defaults to autorange mode. You can select a desired manual range with the **RANGE** button.
4. Connect the test leads across the object to be tested.
5. Observe the reading on the display.

NOTE:

1. For measurements > 1 MΩ, the meter may take a few seconds to stabilize the reading. This is normal for high resistance measuring.
2. When the input is not connected, i.e. at open circuit, "OL" will be shown on the display as an overrange indication.
3. Before measurement, disconnect all power to the circuit to be tested and discharged all capacitors thoroughly.
4. When you perform a low resistance measurement, short the two test leads's probes together and read the resistance value on the display. Subtract this value from the measurement result of the object to be tested. This can improve the accuracy of low resistance measurement.

G. Measuring Capacitance

1. Connect the black test lead to the "COM" terminal and the red test lead to the "VΩHz $\frac{+}{-}$ " terminal. (Note: The polarity of the red lead is positive "+".)
2. Set the rotary switch in "C" position.
3. Connect the test leads across the capacitor to be tested. Be sure that the polarity of connection is observed when you measure an electrolytic capacitor.
4. Wait until the reading on the display is stable, then observe the reading.

NOTE:

When the test leads are not connected to a capacitor, the display may show a reading other than zero, this is normal because of the stray capacitance of the test leads and input circuit of the meter. You should subtract this reading from the measurement result of the capacitor.

H. Measuring Frequency

1. Connect the black test lead to the "COM" terminal and the red test lead to the "VΩHz $\frac{f}{\text{Hz}}$ " terminal.
2. Set the rotary switch in "Hz" position. Then press the "Hz%" button until "Hz" appears on the display.
3. Connect the test leads across the source or circuit to be tested.
4. Observe the reading on the display.

NOTE:

The input voltage should be between 1V rms and 10V rms. If the voltage is more than 10V rms, the error of reading may be out of the specified accuracy range.

I. Measuring Duty Cycle

1. Connect the black test lead to the "COM" terminal and the red test lead to the "VΩHz $\frac{f}{\text{Hz}}$ " terminal.
2. Set the rotary switch in "Hz" position. Then press the "Hz%" button until "%" appears on the display.
3. Connect the test leads across the circuit to be tested.
4. Observe the reading on the display.

J. Continuity Test

1. Connect the black test lead to the "COM" terminal and the red test lead to the "VΩHz $\frac{f}{\text{Hz}}$ " terminal.
2. Set the rotary switch in " \rightarrow/\bullet " position. Then press the RANGE button until the symbol " \bullet " appears on the display.
3. Connect the test leads across the circuit to be tested.
4. If the resistance is less than about 50Ω, the built-in buzzer will sound and the Light Indicator will light.

NOTE:

Before testing, disconnect all power to the circuit to be tested and discharged all capacitors thoroughly.

K. Diode Test

1. Connect the black test lead to the "COM" terminal and the red test lead to the "VΩHz $\frac{f}{\text{Hz}}$ " terminal.
(Note: The polarity of the red lead is positive "+") ..
2. Set the rotary switch in " \rightarrow/\bullet " position. Then press the RANGE button until the symbol " \rightarrow " appears on the display.
3. Connect red test lead to the anode of the diode to be tested an
4. Read the approximate forward voltage drop of the diode on the display. If the connections are reversed, "OL" will be shown on the display.

L. Auto Power Off

1. If you have not operated the meter for about 15 minutes, the meter will sound 5 short beeps and a long beep and turn off automatically.
2. If you want to turn it on again, set the rotary switch to the "OFF" position first and then set it to a desired position.

M. Backlight Button

1. Press and hold down this "☼" button for more than 2 secs to turn on the backlight.
To turn off the backlight, press this button.

N. RANGE Button

1. With the rotary switch in voltage or resistance measurement position, this "RANGE" button can be used to switch between autorange mode and manual range mode as well as to select desired manual range.
2. With the rotary switch in the " \rightarrow/\bullet " position, you can press this "RANGE" button to switch between diode and continuity test functions.

O. High Voltage Indicator

1. When the hold button is press this indicator should light briefly.
2. If the indicator fails to light when the hold button is pressed discontinue use of the meter.
3. When the AC voltage being measured is more than 750V or the DC voltage being measured is more than 1000V, this indicator will light as a warning.
4. During a continuity test this indicator will light if the resistance being measured is less than about 50Ω.

V. ACCURACY SPECIFICATIONS

Accuracy is specified for a period of one year after calibration and at 18°C to 28°C, with relative humidity <75%.

DC VOLTAGE

RANGE	RESOLUTION	ACCURACY
400mV	0.1mV	± (0.8% + 3)
4V	1mV	± (0.7% + 1)
40V	10mV	
400V	100mV	
600V	1V	± (0.8% + 3)

- Input impedance: 10MΩ
- Overload Protection: DC/AC 600V

AC VOLTAGE

RANGE	RESOLUTION	ACCURACY
4V	1mV	± (0.8% + 5)
40V	10mV	
400V	100mV	
400V	1V	±(1%+10)

- Input impedance: 10MΩ
- Frequency Range: 40Hz - 400Hz
- Response: Average, calibrated in rms of sine wave
- Overload Protection: DC/AC 600V

AC CURRENT

RANGE	RESOLUTION	ACCURACY
200A	0.1A	± (3.0% + 3)

- Overload Protection: Max. 240A, within 60 seconds.
- Frequency Range: 50Hz - 400Hz
- Response: Average, calibrated in rms of sine wave

RESISTANCE

RANGE	RESOLUTION	ACCURACY
400Ω	0.1Ω	± (1.2% + 3)
4kΩ	1Ω	± (1.0% + 2)
40kΩ	10Ω	
400kΩ	100Ω	
4MΩ	1kΩ	± (1.2% + 2)
40MΩ	10kΩ	± (2.0% + 3)

- Overload Protection: 250V DC/AC rms

FREQUENCY

RANGE	RESOLUTION	ACCURACY
10Hz	0.01Hz	± (1.5% + 1)
100Hz	0.1Hz	
1kHz	1Hz	
10kHz	10Hz	
100kHz	100Hz	

- Input Voltage: 1V rms - 10V rms
- Measurement Range: 1 OHZ - 1 OOkHz
- Overload Protection: 250V DC/AC rms

CAPACITANCE

RANGE	RESOLUTION	ACCURACY
4nF	1pF	not specified
40nF	10pF	± (4% + 10)
400nF	100pF	
4μF	1nF	
40μF	10nF	± (8% + 10)
100μF	100nF	

- Overload Protection: 250V DC/AC rms
- For range 1001,1F, measurement time> 30 seconds.

TIP:

If you want to measure a capacitor whose capacitance is less than 40nF, you can measure another capacitor whose capacitance is about 1 nF and get a reading, then connect the two capacitors in parallel and measure them for the total capacitance reading, subtract the first reading from the total capacitance reading, the result is the capacitance value of the capacitor which you want to measure. The measuring method mentioned above has the advantage of better linearity so that the accuracy of measurement in the 4nF range can be better than ± (5%+10).

DUTY CYCLE

RANGE	RESOLUTION	ACCURACY
1%-99%	0.1%	1 Hz - 10kHz: ± (2% + 5) >10kHz: not specified

Input Voltage: 3Vp-p - 10Vp-p

DIODE AND CONTINUITY TEST

RANGE	DESCRIPTION	REMARK
	The approximate forward voltage drop of the diode will be displayed.	Open Circuit Voltage: about 1.48V
	If the resistance is less than about 50Ω, the built-in buzzer will sound. If the resistance is between 50Ω and 120Ω, the buzzer may or may not sound. If resistance is more than 120Ω, the buzzer won't sound.	Open Circuit Voltage: about 0.45V

VI. MAINTENANCE

WARNING

Unless you are replacing the battery, never attempt to repair or service this meter.
Store the meter in a dry place when not in use. Don't store it in an intense electromagnetic field environment.

A. General Maintenance

Periodically wipe the case with a damp cloth and a little mild detergent. Do not use abrasives or solvents.
Dirt or moisture in the terminals can affect readings. Clean the terminals as follows:

1. Set the rotary switch to the OFF position and remove all the test leads from the meter.
2. Shake out any dirt which may exist in the terminals.
3. Soak a new swab with alcohol.
4. Work the swab around in each terminal.

B. Battery Replacement

WARNING

To avoid false readings, which could lead to possible electric shock or personal injury, replace the batteries as soon as the low battery indicator () appears.

Before opening the case or battery cover, disconnect the test leads and turn off the meter.

To replace the batteries, remove the screws on the battery cover and remove the battery cover.
Replace the exhausted batteries with new ones of the same type, make sure that the polarity connections are correct.
Reinstall the battery cover and the screws.

VII. ACCESSORIES

Test Lead: One pair, 10A, with removable caps
Test Leads with caps - CAT IV 600V, CAT III 1000V
Test Leads without caps - CAT II 1000V

SPERRY INSTRUMENTS LIMITED LIFETIME WARRANTY

Subject to the exclusions and limitations detailed below, Sperry Instruments provides a limited lifetime warranty on products of its manufacture will be free from defects in materials and workmanship under normal use and service.

Limited

Limited means that Sperry Instruments warrants to the original purchasers of products from Sperry Instruments authorized distributors at the time of shipment such products shall be free of defects in material and workmanship while the tool is used under normal working conditions. Standard wear and tear, dulling over time, overloading, misuse, and acts of God are not covered under warranty. This warranty does not cover batteries, fuses, or test leads.

When a warranty claim arises, the purchaser must contact Sperry Instruments. If the defect comes under the terms of this limited warranty, Sperry Instruments will arrange, at its sole discretion, one of the following options:

- Product will be replaced

The purchaser is solely responsible for determining the suitability of Sperry products for the purchaser's use or resale, or for incorporating them into articles or using them in the purchaser's applications. The distributor is authorized to extend the foregoing limited warranty to its original purchasers in connection with the sales of Sperry products, provided that such products shall not have been altered by the distributor. The distributor shall be fully responsible for any warranties the distributor makes to its purchasers which are broader or more extensive than Sperry's limited warranty.

Lifetime Warranty

Warranty Limitation: The foregoing warranties are exclusive and are in lieu of all other express and implied warranties whatsoever, including but not limited to implied warranties of merchantability and fitness for a particular purpose. The foregoing warranties do not cover ordinary wear and tear, abuse, misuse, overloading, alterations, products which have not been installed, operated or maintained in accordance with Sperry's written instructions. Test leads, fuses, batteries and calibration are not covered under any implied warranty. "Lifetime" of products that are no longer offered by Sperry will be either repaired or replaced with an item of Sperry Instruments choice of similar value. Lifetime is defined as 5 years after Sperry discontinued manufacturing the product, but the warranty period shall be at least ten years from date of purchase. Original proof of purchase is required to establish original ownership of product.

No warranty will be honored unless an invoice or other proof of purchase date is provided to Sperry Instruments. Hand written receipts or invoices will not be honored.

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- See more at: <https://www.sperryinstruments.com/en/Resources/Warranty-Information>

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