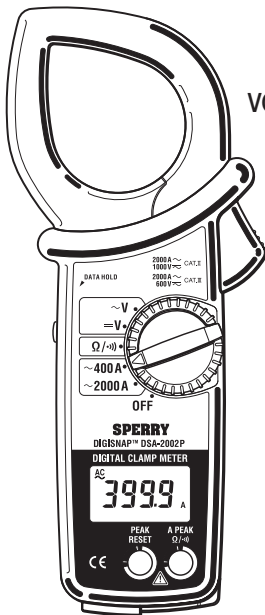


**OPERATING  
INSTRUCTIONS****MODEL DSA-2002P**  
**DIGISNAP™**  
**3 3/4 DIGIT**  
**DIGITAL AC**  
**SNAP-AROUND**  
**VOLT-OHM-AMMETER**  
**WITH PEAK HOLD****A.W. SPERRY INSTRUMENTS INC.****The Professional's Choice®**

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## 1 . Safety Warnings



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- This instrument has been designed and tested according to IEC Publication 61010 ; Safety Requirements for Electronic Measuring Apparatus. 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. Therefore, read through these operating instructions before starting using the instrument.


### **WARNING**


- Read through and understand instructions contained in this manual before starting using the instrument.
- Save and keep the manual handy to enable quick reference whenever necessary.
- Be sure to use the instrument only in its intended applications and to follow measurement procedures described in the manual.
- Be sure to understand and follow all safety instructions contained in the manual.

Failure to follow the above instructions may cause injury, instrument damage and/or damage to equipment under test.







- The symbol  indicated on the instrument means that the user must refer to related parts in the manual for safe operation of the instrument. Be sure to carefully read the instructions following each  symbol in this 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 minor injury or instrument damage.

Following symbols are used on the instrument and in the instruction manual. Attention should be paid to each symbol to ensure your safety.

-  Refer to the instructions in the manual.  
This symbol is marked where the user must refer to the instruction manual so as not to cause personal injury or instrument damage.
-  Indicates an instrument with double or reinforced insulation.
-  Indicates that this instrument can clamp on bare conductors when measuring a voltage corresponding to the applicable Measurement category, which is marked next to this symbol.
-  Indicates AC (Alternating Current).
-  Indicates DC (Direct Current).
-  Indicates AC and DC.

### **DANGER**

- Never make measurement on a circuit above 750VAC or 1000VDC.
- Do not attempt to make measurement in the presence of flammable gasses, fumes, vapor or dust. Otherwise, the use of the instrument may cause sparking, which can lead to an explosion.
- Transformer jaw tips are designed not to short the circuit under test. If equipment under test has exposed conductive parts, however, extra precaution should be taken to minimize the possibility of shorting.
- Never attempt to use the instrument if its surface or your hand is wet.
- Do not exceed the maximum allowable input of any measurement range.
- Never open the battery compartment cover when making measurement.
- Never try to make measurement if any abnormal conditions, such as broken Transformer jaws or case is noted.
- The instrument is to be used only in its intended applications or conditions. Otherwise, safety functions equipped with the instrument doesn't work, and instrument damage or serious personal injury may be caused.

### **WARNING**

- Never attempt to make any measurement, if the instrument has any structural abnormality such as cracked case and exposed metal part.
- Do not turn the function selector switch with test leads connected to the instrument.
- Do not install substitute parts or make any modification to the instrument. Return the instrument to your distributor for repair or re-calibration.
- 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

- Make sure that the function selector switch is set to an appropriate position before making measurement.
- Always make sure to insert the plug of each lead fully into the appropriate terminal on the instrument.
- Be sure to set the function selector switch to the "OFF" position after use. When the instrument will not be in use for a long period of time, place it in storage after removing the batteries.
- Do not expose the instrument to the direct sun, extreme temperatures or dew fall.
- Use a damp cloth and detergent for cleaning the instrument. Do not use abrasives or solvents.

### ○ Measurement categories (Over-voltage categories)

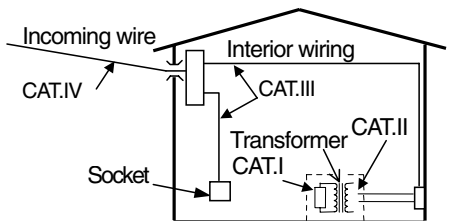
To ensure safe operation of measuring instruments, IEC61010 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called measurement categories. Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measuring 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).



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## 2. Features

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- Tear-drop-shaped jaws for ease of use in crowded cable areas and other tight places.
- Provides a wide measuring range from 0 up to 2000A.
- Terminal cover to avoid the use of an incorrect terminal.
- Measures current variation as short as 10 msec with peak-hold feature.
- Provides output to a chart recorder for current variation recording.
- Designed to CAT. III 600VAC,DC / CAT. II 750VAC,1000VDC and pollution degree 2 specified by the international safety standard IEC 61010-1.
- Data hold function to allow easy readings in dimly lit or hard-to-read locations.
- Sleep feature to conserve battery power.
- Permits easy continuity check with a beeper.
- Provides a dynamic range of 4,000 counts full scale.
- Provides wide measuring range of voltage and resistance in auto-ranging.
- Wide frequency range from 40Hz to 1kHz (Current measuring range: 0-1500A).
- Transformer jaws fitted with guard to further improve safety.

### 3. Specifications

- Measuring Ranges and Accuracy (at  $23 \pm 5^\circ\text{C}$ , relative humidity 45-75%)  
 AC Current  $\sim 400\text{ A}$ ,  $\sim 2000\text{ A}$

Range	Measuring Range	Resolution	Accuracy (Frequency Range)	Maximum Measurement Time
400 A	0 ~ 400.0 A	0.1 A	$\pm 1.0\% \text{rdg} \pm 3 \text{dgt}$ (50/60Hz) $\pm 2.0\% \text{rdg} \pm 3 \text{dgt}$ (40 ~ 1 kHz)	Continuous
2000 A	0 ~ 1000 A	1 A	$\pm 1.0\% \text{rdg} \pm 3 \text{dgt}$ (50/60Hz)	
	1000 ~ 1500 A		$\pm 3.0\% \text{rdg} \pm 3 \text{dgt}$ (40 ~ 1 kHz)	
	1500 ~ 2000 A		$\pm 3.0\% \text{rdg}$ (50/60Hz)	15min 5 min

#### AC Voltage ( $\sim \text{V}$ ) Auto-ranging

Range	Measuring Range	Resolution	Accuracy (Frequency Range)
40 V	0 ~ 40.00 V	0.01 V	$\pm 1.0\% \text{rdg} \pm 2 \text{dgt}$ (50/60Hz)
400 V	15.0 ~ 400.0 V	0.1 V	$\pm 1.5\% \text{rdg} \pm 3 \text{dgt}$ (40 ~ 1 kHz)
750 V	150 ~ 750 V	1 V	

Initially set to the 40V range. Input impedance is about 10M $\Omega$ .

#### DC Voltage ( $\equiv \text{V}$ ) Auto-ranging

Range	Measuring Range	Resolution	Accuracy
40 V	0 ~ $\pm 40.00\text{ V}$	0.01 V	$\pm 1.0\% \text{rdg} \pm 2 \text{dgt}$
400 V	$\pm 15.0 \sim \pm 400.0\text{ V}$	0.1 V	
1000 V	$\pm 150 \sim \pm 1000\text{ V}$	1 V	

Initially set to the 40V range. Input impedance is about 10M $\Omega$ .

#### Resistance (Auto-ranging)

Range	Measuring Range	Resolution	Accuracy
400 $\Omega$	0 ~ 400.0 $\Omega$	0.1 $\Omega$	$\pm 1.5\% \text{rdg} \pm 2 \text{dgt}$
4k $\Omega$	0.150 ~ 4.000k $\Omega$	1 $\Omega$	
40k $\Omega$	1.50 ~ 40.00k $\Omega$	10 $\Omega$	
400k $\Omega$	15.0 ~ 400.0k $\Omega$	100 $\Omega$	

Initially set to the 400 $\Omega$  range. In the continuity check mode, fixed to the 400 $\Omega$  range and when the reading is not more than  $50 \pm 35\Omega$ , the buzzer beeps.

#### OUTPUT (AC Current Ranges)

DC Output: 100.0mV per 1000 counts (Output impedance: about 10k $\Omega$ )

Range	Output Voltage/Measuring Range	Accuracy (Frequency Range)
400 A	0 ~ 400.0mV / 0 ~ 400 A	$\pm 1.5\% \text{rdg} \pm 0.5\text{ mV}$ (50/60Hz) $\pm 2.5\% \text{rdg} \pm 0.5\text{ mV}$ (40 ~ 1 kHz)
2000 A	0 ~ 150.0mV / 0 ~ 1500 A	$\pm 1.5\% \text{rdg} \pm 0.5\text{ mV}$ (50/60Hz) $\pm 3.5\% \text{rdg} \pm 0.5\text{ mV}$ (40 ~ 1 kHz)
	150.0 ~ 200.0mV / 1500 ~ 2000 A	$\pm 3.5\% \text{rdg}$ (50/60Hz)

- Electromagnetic compatibility (Radiated RF immunity & IEC 61000-4-3)

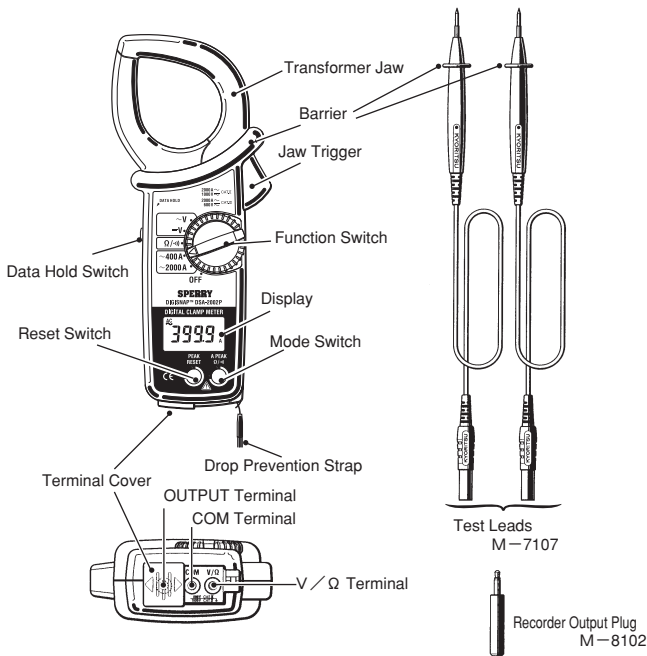
RF field strength =  $\leq 1\text{ V/m}$ , total accuracy : specified accuracy

RF field strength =  $3\text{ V/m}$ , total accuracy : specified accuracy + 2 % of range

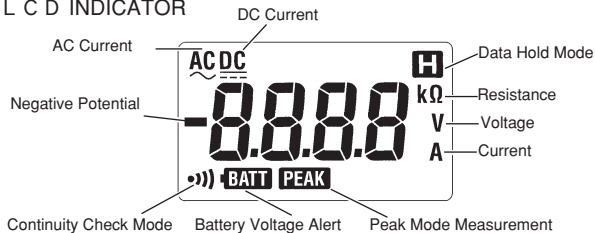
● Operating System	Dual Integration
● Display	Liquid crystal display with a maximum count of 4000
● Low Battery Warning	"BATT" symbol is displayed on the digital display.
● Overrange Indication	"OL" is displayed where input exceeds the upper limit of a range
● Response Time	Approx. 2 seconds
● Sleep function	Automatically powered down in about 10 minutes after the last switch operation
● Data Hold	Available in all ranges provided the peak measurement mode is deactivated.
● Location for use	Indoor use, Altitude up to 2000m
● Storage Temperature and Humidity	—20~60°C, relative humidity up to 85% without condensation
● Operating Temperature and Humidity	0~40°C, relative humidity up to 85% without condensation
● Conductor Size	Approx. 54.5mm diameter max.
● Overload Protection	2400A AC for 10sec 1200V AC/DC for 10sec 600V AC for 10sec
● Withstand Voltage	5550V AC for 1 minute between electrical circuit and housing cases or metal parts of jaws
● Insulation Resistance	10MΩ or greater at 1000V between electrical circuit and housing cases or metal parts of jaws
● Safety Standard	IEC 61010-1: Measurement CAT. III 600VAC, DC / CAT. II 750VAC, 1000VDC, pollution degree 2.
● Dimensions	247(L) × 105(W) × 49(D) mm
● Weight	Approx. 470g (battery included)
● Power Source	Two R6P (DC 1.5V) batteries or equivalent
● Current Consumption	Approx. 5mA max. (Approx. 20μA in the sleep mode)
● Accessories	Test leads M-7107 Two R6P batteries Instruction manual Recorder Output Plug M-8201 Carrying case M-9094 Output Probe M-7014 Recorder M-5100A, etc.
● Optional Accessories	



## 4. Instrument Layout



### ● L C D INDICATOR



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## 5. Preparation for Measurement

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### 5 — 1 Checking Battery Voltage

- ① Set the function selector switch to any position other than "OFF".
- ② When the display is clear without "BATT" showing, proceed to measurement.
- ③ When the display blanks or "BATT" is indicated, replace the batteries according to section 8: battery replacement.

#### NOTE

- It is possible that display is kept in blank while the function selector switch is set to a position other than "OFF". This is due to sleep function which automatically powers the instrument down in a certain period of time after the last switch operation. To operate the instrument in this case, set the switch back to the "OFF" position, then to the desired position, or press any button.

### 5 — 2 Checking Switch Setting and Operation

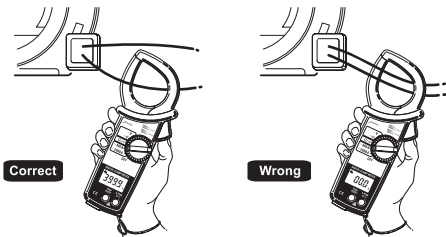
Make sure that the function selector switch is set to the correct position, the instrument is set to the correct mode and the data hold function is deactivated. Otherwise, desired measurement cannot be made. (See section 6 for measurement instructions and section 7 for notes on functions.)

## 6. Measurement

### 6 — 1 Current Measurement

#### **⚠ WARNING**

- Do not make measurement on a circuit above 750V AC. This may cause shock hazard or damage to the instrument or equipment under test.
- Transformer jaw tips are designed not to short the circuit under test. If equipment under test has exposed conductive parts, however, extra precaution should be taken to minimize the possibility of shorting.
- Do not make measurement with the battery compartment cover removed from the instrument.
- Do not make current measurement with the test leads connected to the V/ $\Omega$  and COMMON terminals.
- When measuring current is not less than 1000A, make sure to stop measurement within the maximum measuring time shown below. Otherwise, transformer jaws may heat to cause a fire or deformation of molded parts, which will degrade insulation.  
1000~1500 A : 15min. 1500~2000 A : 5 min.
- Keep your fingers and hands behind the barrier during measurement.



#### 6 — 1 — 1 AC Current Measurement (Normal Mode)

- ① Set the function selector switch to the " $\sim$ 400A" or " $\sim$ 2000A" position and make sure that the current under test does not exceed the upper limit of the measuring range you are selecting.
- ② Press the trigger to open the transformer jaws and clamp them onto the conductor under test.

③Take the reading on the display.

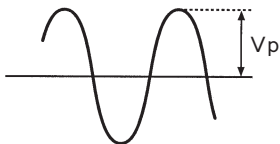
## NOTE

- During current measurement, keep the transformer jaws fully closed. Otherwise, accurate measurement cannot be made. The maximum measurable conductor size is 54.5mm in diameter.
- When measuring a larger current, the transformer jaws may buzz. This is not a fault and does not affect the accuracy at all.

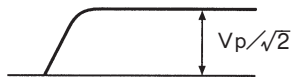
### 6 — 1 — 2 Peak Current Measurement

- ①Set the function selector switch to the " $\sim 400A$ " or " $\sim 2000A$ " position.
- ②Press the mode button to select the peak mode. "PEAK" will be shown on the display.
- ③Press the trigger to open the transformer jaws and clamp them onto the conductor under test. Then, press the reset button.
- ④The display shows the current's crest value divided by the square root of two. Therefore, when the current is sinusoidal, the reading equals RMS value.
- ⑤To reset the display, press the reset button.  
(Note: When this is done, the reading goes off for about one second.)

INPUT Current



Peak Hold



- ⑥After the measurement is over, press the mode button to return to the normal mode.

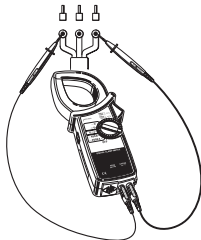
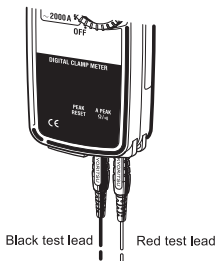
## NOTE

In the peak measurement mode, the data hold feature is disabled.

## 6 — 2 Voltage Measurement

### **⚠ WARNING**

- Do not make measurement on a circuit above 750V AC or 1000V DC. This may cause shock hazard or damage to the instrument or equipment under test.
- Do not make measurement with the battery compartment cover removed.
- Keep your fingers and hands behind the barrier during measurement.



### 6 — 2 — 1 DC Voltage Measurement

- ① Set the function selector switch to the " $\text{---} V$ " position.
- ② Slide the terminal cover to the left. Plug the red test lead into the  $V/\Omega$  terminal and the black test lead into the COM terminal.
- ③ Connect the other end of the test leads to the circuit under test. Take the reading on the display. When the red lead is the negative potential, the " $-$ " sign is shown on the display.

### 6 — 2 — 2 AC Voltage Measurement

- ① Set the function selector switch to the " $\sim V$ " position.
- ② Slide the terminal cover to the left. Plug the red test lead into the  $V/\Omega$  terminal and the black test lead into the COM terminal.
- ③ Connect the other end of the test leads to the circuit under test. Take the reading on the display.

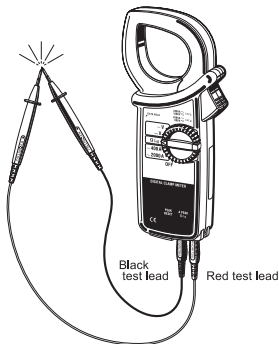
### NOTE

- For high sensitivity, there are parts which do not indicate "0".

## 6 — 3 Resistance Measurement

### **⚠ WARNING**

- Before attempting to make measurement, make sure that the circuit under test is not live. The instrument is protected against a voltage up to 600V.
- Do not make measurement with the battery compartment cover removed.
- Keep your fingers and hands behind the barrier during measurement.



### 6 — 3 — 1 Resistance Measurement (Normal Mode)

- ① Set the function selector switch to the " $\Omega / \cdot \text{}$ " position.
- ② Slide the terminal cover to the left. Plug the red test lead into the V/ $\Omega$  terminal and the black test lead into the COM terminal.
- ③ Short the tip of the test leads and check whether the display reads "0".
- ④ Connect the tip of the test leads to the circuit under test. Take the reading on the display.

#### NOTE

- When shorting the tip of the test leads, the display may read a very small resistance instead of "0." This is the resistance of the test leads, not a fault.
- If one of the test leads is open, the display reads "OL".

## 6 — 3 — 2 Continuity Check

- ① Set the function selector switch to the " $\Omega / \cdot \cdot \cdot$ " position.
- ② Slide the terminal cover to the left. Plug the red test lead into the V/ $\Omega$  terminal and the black test lead into the COM terminal.
- ③ Press the mode button to set the instrument to the continuity check mode. The measuring range is fixed to 400 $\Omega$  and the " $\cdot \cdot \cdot$ " symbol is shown on the display.
- ④ Short the tip of the test leads and make sure that the display reads "0" and the buzzer beeps.
- ⑤ Connect the tip of the test leads to the circuit under test. The display reads the resistance and the buzzer beeps when the reading is not more than about 50 $\Omega$ .

### NOTE

- When shorting the tip of the test leads, the display may read a very small resistance instead of "0". This is the resistance of the test leads, not a fault.
- If one of the test leads is open, the display reads "OL".

---

## 7. Notes on Functions

---

### 7 – 1 Data Hold

This is a function used to freeze the measured value on the display.

- ① Press the data hold button. The reading becomes frozen and the "H" symbol is shown on the display, indicating the instrument in the data hold mode.
- ② To exit the data hold mode, press the data hold button again to release it.

### NOTE

- When the function selector switch is turned while the instrument is in the data hold mode, the data hold function remains activated. To make measurement in this case, release the data hold button by pressing it and exit the data hold mode.
- The data hold function is disabled in the peak measurement mode on the AC current range.
- When the sleep function is activated, the data hold mode turns to the normal mode.

### 7 – 2 Sleep Function

This is a function to prevent the instrument from being left powered on in order to conserve battery life.

- ① The instrument automatically enters the sleep (powered-down) mode about 10 minutes after the last switch operation.
- ② To exit the sleep mode, press the data hold, reset or mode button or turn the function selector switch back to "OFF", then to any other position.

### [How to Exit the Sleep Mode ]

- ① Turn the function selector switch from "OFF" to another position with the data hold button pressed. Then, "P.OFF" is shown on the display. This disables the sleep function and enables continuous use of the instrument.



- ② To enable the sleep function, turn the function selector switch back to "OFF", then to any other position.

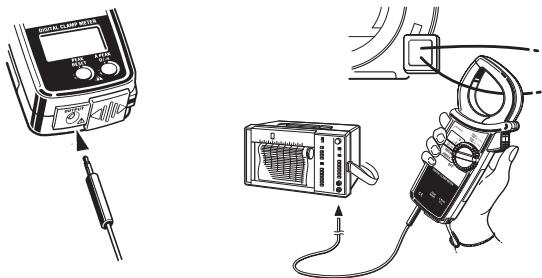
## NOTE

- The instrument consumes small amount of current in the sleep mode. When the instrument is not in use, make sure to set the function selector switch to "OFF".

### 7 — 3 Recorder Output

Only on the " $\sim 400\text{A}$ " or " $\sim 2000\text{A}$ " range, DC voltage proportional to the input current is output from the OUTPUT terminal.

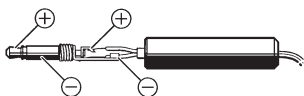
- ① Set the function selector switch to the " $\sim 400\text{A}$ " or " $\sim 2000\text{A}$ " position.
- ② Slide the terminal cover to the right and insert the recorder output plug into the OUTPUT terminal for connection with a recorder or other recording device.



## NOTE

- Output voltage is  $1\text{mV/A}$  on the " $\sim 400\text{A}$ " range and  $0.1\text{mV/A}$  on the " $\sim 2000\text{A}$ " range. Set an appropriate input sensitivity on the recorder.
- The peak hold function does not apply to the recorder output even if the instrument is in the peak hold mode.
- For long term measurement, disable the sleep function. (See section 7◆-2 for sleep function.)

[How to attach a pair of leads to the recorder output plug]



Attach one end of the leads to the recorder output plug observing correct polarity, then connect the other end to the recorder.

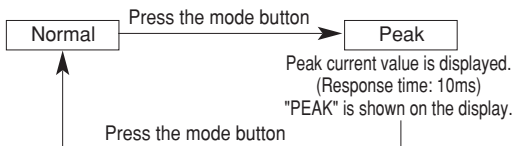
**! DANGER**

Never apply voltage to the output terminal.

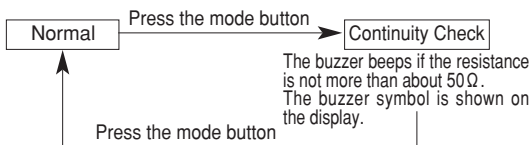
#### 7 - 4 Mode Switching Function

On a AC current ("~400A" or "~2000A") or the resistance( $\Omega/\cdot$ ) range, press the mode button to cycle through the measurement modes. The instrument is initially set to the normal mode and can be switched to the peak or continuity check mode by means of the mode button. (See section 6-1-2 for peak current measurement and section 6-3-2◆ for continuity check.)

«AC Current Range(400A or 2000A)»



«Resistance Range»



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## 8. Battery Replacement

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### WARNING

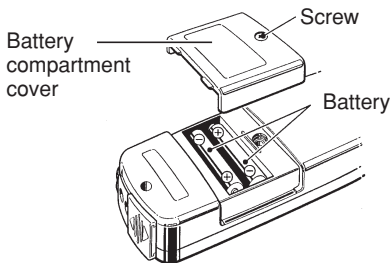
- To avoid electric shock hazard, make sure to set the function selector switch to "OFF" and remove the test leads from the instrument before trying to replace batteries.

### CAUTION

- Do not mix new and old batteries.
- Make sure to install batteries in correct polarity as indicated in the battery compartment.

### NOTE

- If the instrument is powered on, but the display blanks or "BATT" is shown on the display, replace the batteries.
- ① Set the function selector switch to the "OFF" position.
  - ② Unscrew and remove the battery compartment on the bottom of the instrument.
  - ③ Replace the batteries observing correct polarity. Use two new R6P batteries.
  - ④ Replace and screw the battery compartment cover.



MEMO

# MEMO

# MEMO

## **Lifetime Limited Warranty**

The attention to detail of this fine snap-around instrument is further enhanced by the application of A.W. Sperry's unmatched service and concern for detail and reliability. These A.W. Sperry snap-arounds are internationally accepted by craftsmen and servicemen for their unmatched performance. All A.W. Sperry's snap-around instruments are unconditionally warranted against defects in material and workmanship under normal conditions of use and service; our obligation under this warranty being limited to repairing or replacing free of charge, at A.W. Sperry snap-around instrument that malfunctions under normal operating conditions at rated use.<sup>1</sup>

### **Replacement procedure**

Securely wrap the instrument and its accessories in a box or mailing bag and ship prepaid to the address below. Be sure to include your name and address, as well the name of the distributor, with a copy of your invoice from whom the unit was purchased, clearly identifying the model number and date of purchase.

**A.W.SPERRY INSTRUMENTS INC.  
ATT: Customer service dept.  
2150 Joshua's Path, Suite 302,  
Hauppauge, NY 11788**

<sup>1</sup>The warranty is not applicable if the instrument has been: misused, abused, subjected to loads in excess of specifications, has had unauthorized repair or has been improperly assembled or used.

\*Note: Recommended calibration interval should not exceed one year. Calibration service charges are not covered terms and conditions of warranty.

**A.W. SPERRY INSTRUMENTS INC.**  
**The Professional's Choice®**

2150 Joshua's Path, Suite 302, Hauppauge, NY 11788

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