

**kaise**

## AC/DC Digital Clamp Meter

Instruction Manual

**SK-7682**

KAISE CORPORATION

### FOR SAFETY MEASUREMENT

To avoid an electrical shock hazard to the operator and/or damage to the instruments, read carefully the **WARNINGS** with the symbol ⚠ in this instruction manual.



The symbol listed in IEC 1010 and ISO 3864 means "Caution (refer to instruction manual)".



The symbol in this manual advises the user of an electrical shock hazard that could result in serious injury or even death.



The symbol in this manual advises the user of an electrical shock hazard that could cause injury or material damages.



Measurement on High Power Line is very dangerous. It sometimes includes High Surge Voltage that could cause dangerous arcs of explosive short in the instrument and could result in serious injury to the operator. For dangerous voltage measurement on High Power Line or High Voltage Circuit, always keep the instrument away from your body without holding it in your hands. Do not touch the Clamp Meter, its Test Leads, and any part of the circuit.

### INTRODUCTION

Thank you for purchasing KAISE "SK-7682 AC/DC DIGITAL CLAMP METER". To obtain the maximum performance of this instrument, read this Instruction Manual carefully, and take safe measurement.

### 1. UNPACKING AND INSPECTIONS

Confirm if the following items are contained in the package in good condition. If there is any damage or missing items, ask your local dealer for replacement.

- |                          |        |                            |        |
|--------------------------|--------|----------------------------|--------|
| 1. Digital Clamp Meter   | 1 pce. | 4. Batteries 1.5V R6P (AA) | 2 pcs. |
| 2. Test Leads (100-57)   | 1 set  | 5. Instruction Manual      | 1 pce. |
| 3. Alligator Clips (940) | 1 set  | 6. Carrying Case (1011)    | 1 pce. |

### 2. SPECIFICATIONS

#### 2-1. GENERAL SPECIFICATIONS

- Display ( LCD )
  - Numerical Display : 4000 count, Max. reading 4050, 12mm high
  - Units and Symbols : A, mV, V, Hz, %,  $\overline{\text{---}}$ ,  $\sim$ ,  $\sim$ , AUTO, BAT, APO, DH, PH, DIFF, MAX, MIN, OL, and decimal points
- Operating Principle :  $\Sigma \Delta$  Conversion
- Range Selection : Auto Range
- Sampling Rate : 3 times / sec.
- Polarity : Auto (  $-$  symbol when minus )
- Overrange Indication : OL indication (not indicated in 600V AC/DC ranges)
- Battery Warning : BAT indication
- Display Hold : LCD indications are held by DH Key
- MAX/MIN : Maximum and Minimum measurement by MAX/MIN Key
- Peak Hold : Peak value measurement up to 400A DC (in PH mode, 10m sec. Peak measurement)
- Difference : Difference Measurements is activated by DIFF Key

- Overload Protection : Current:700A AC/DC (600V line), Voltage:1000V AC/DC
- Operating Temp. & Humidity : 0°C to 40°C, less than 80% RH in non-condensing
- Storage Temp. & Humidity : -20°C to 60°C, less than 70% RH in non-condensing
- Dielectric Strength : 3.7kV AC for 1 minute (between case and input terminals)
- Safety Level : IEC-1010-1 CAT III 300V, EMC test passed
- Power Supply : 1.5V R6P (or AA) batteries x 2 pcs
- Power Consumption : 10mA or less, continuous operation: approx. 90 hours
- Auto Power Off : Automatic turn off after a lapse of 12 minutes (cancelable)
- Conductor Diameter : 19mm  $\phi$
- Dimension & Weight : 196x59x30mm, 180g

#### 2-2. MEASUREMENT SPECIFICATIONS

(23°C  $\pm$  5°C, less than 80% RH in non-condensing)

##### 1. CURRENT MEASUREMENT ( $\overline{\text{---}}$ A / $\sim$ A / Hz )

###### 1-1. DC Current ( $\overline{\text{---}}$ A )

Range	Accuracy	Resolution	Max. Input
40.00A	$\pm 1.5\% \text{rdg} \pm 3 \text{dgt}$	0.01A	400A DC
400.0A	40A~200A : $\pm 2.0\% \pm 3 \text{dgt}$ 200A~400A : $\pm 4.0\% \pm 3 \text{dgt}$	0.1A	

###### 1-2. AC Current ( $\sim$ A )

True RMS

Range	Accuracy (50/60Hz, 0.5A or more)	Resolution	Max. Input
40.00A	$\pm 1.5\% \text{rdg} \pm 5 \text{dgt}$	0.01A	400A DC
400.0A	36.0A~200A : $\pm 2.0\% \pm 5 \text{dgt}$ 200.0A~400A : $\pm 5.0\% \pm 5 \text{dgt}$	0.1A	

40Hz~400Hz : 40A ; add 0.5%, 400A ; add 1%  
Crest Factor : 200A > ; 3, 200A~400A ; 1.5

###### 1-3. Frequency ( Hz )

Range	Accuracy	Resolution	Input Sensitivity	Max. Input
5.00Hz~49.99Hz	$\pm 0.2\% \text{rdg} \pm 2 \text{dgt}$	10m Hz	10A rms	400A rms
50.0Hz~499.9Hz		100m Hz		
0.500kHz~1.000kHz		1 Hz		

###### 1-4. Peak Hold ( in $\overline{\text{---}}$ A Function )

Range	Accuracy	Resolution	Maximum Input
400.0A	$\pm 5.0\% \text{rdg} \pm 5 \text{dgt}$	0.1A	400A DC

#### 2. VOLTAGE MEASUREMENT ( $\overline{\text{---}}$ V / $\sim$ V / Hz / % )

##### 2-1. DC Voltage ( $\overline{\text{---}}$ V )

Range	Accuracy	Resolution	Input Impedance	Max. Input
400.0mV	$\pm 1.0\% \text{rdg} \pm 3 \text{dgt}$	0.1mV	$\geq 100 \text{M}\Omega$	600V DC
4.000V		1mV	$\approx 11 \text{M}\Omega$	
40.00V	$\pm 1.0\% \text{rdg} \pm 2 \text{dgt}$	10mV	$\approx 10 \text{M}\Omega$	
400.0V		100mV		
600.0V		1V		

##### 2-2. AC Voltage ( $\sim$ V )

True RMS

Range	Accuracy (more than 0.1V)	Resolution	Input Impedance	Max. Input
4.000V	$\pm 1.5\% \text{rdg} \pm 5 \text{dgt}$ (40~400Hz)	1mV	$\approx 11 \text{M}\Omega$	600V AC
40.00V		10mV	$\approx 10 \text{M}\Omega$	
400.0V		100mV		
600V		1V		

Crest Factor : 3

##### 2-3. Frequency ( Hz )

Range	Accuracy	Resolution	Input Impedance	Max. Input
1.000Hz~4.999Hz	$\pm 0.2\% \text{rdg} \pm 2 \text{dgt}$	1mHz	3V rms	300V rms
5.00Hz~49.99Hz		10mHz		
50.0Hz~499.9Hz		100mHz		
0.500kHz~4.999kHz		1Hz		
5.00kHz~49.99kHz		10Hz		

##### 2-4. Duty Cycle ( % )

Range	Accuracy	Resolution	Input Impedance	Max. Input	Frequency Range
0.0%	$\pm 0.5\% \text{rdg} \pm 5 \text{dgt}$	0.1%	3V rms	600V rms	1Hz~1kHz
$\sim 99.9\%$					

### 3. SAFETY PRECAUTIONS

Correct knowledge of electric measurements is essential to avoid unexpected danger such as operator's injury or damage to the instrument. Read carefully and observe the following precautions for safety measurements.

#### 3-1. WARNINGS

##### ⚠ WARNING 1. Checks of Body and Test Lead

Before measurement, confirm the body of this instrument and handle insulators of the Test Lead have no cracks or any other damages. Dust, grease and moisture must be removed.

##### ⚠ WARNING 2. Warning for High Power Line Measurements

High Power Line (High Energy Circuits) such as Distribution Transformers, Bus Bars and Large Motors are very dangerous. High Power Line sometimes includes High Surge Voltage that could cause explosive short in the instrument and could result in shock hazard. For voltage measurement of High Power Line, do not touch Clamp Meter, its Test Leads, and any part of the circuit.

##### ⚠ WARNING 3. Warning for High Voltage Measurements

Even for Low Energy Circuits of electric/electronic appliances, such as heating elements, small motors, line cords and plugs, High Voltage Measurements are very dangerous. Do not touch Clamp Meter, Test Leads, and any part of the circuit. Generally, shock hazard could occur when the current between the circuit, that involves more than 33V rms or 46.7V DC or peak, and ground goes up to 0.5mA or more.

##### ⚠ WARNING 4. Dangerous Voltage Measurement Procedure

For dangerous voltage measurement, strictly observe the warnings below. (refer to fig.1)

- Do not hold Clamp Meter and test leads in your hands. Keep safety distance from power source or circuit to be measured not to touch the dangerous voltage.
- Attach black and red alligator clips to test lead pins.
- Turn off the power of the circuit to be measured when connecting test leads.
- After measurement, before detaching alligator clips (test leads), turn the circuit power off and discharge the all capacitors.

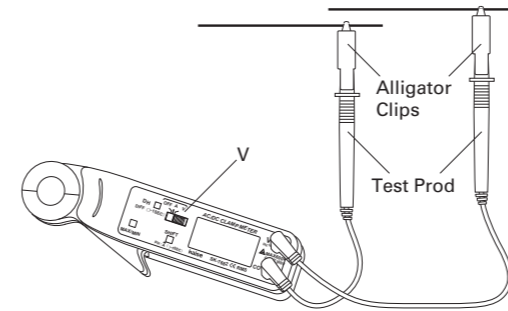


fig. 1

In case of live-line measurement, strictly observe the warnings below (refer to fig.2.)

- Do not hold Clamp Meter in your hands. Keep safety distance from power source or circuit to be measured not to touch the dangerous voltage.
- Black test lead : Attach black alligator clip and connect to  $-$  (earth) side of the circuit.
- Red test lead : Hold with one hand and connect to  $+$  (positive) side of the circuit.

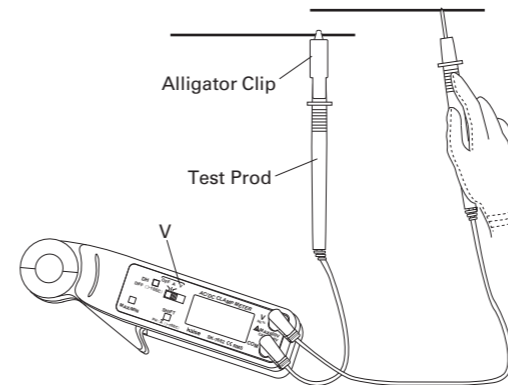


fig. 2

##### ⚠ WARNING 5. Correct Selection of FUNCTION Switch

Make sure that FUNCTION Switch is set to the correct position. Do not measure voltage on A position.

##### ⚠ WARNING 6. Maximum Input Observance

Do not measure voltage or current that exceed the specified maximum input values.

##### ⚠ WARNING 7. Test Lead Detachment

Detach test leads from the measuring circuit before switching measurement functions or removing battery case cover for battery replacement.

##### ⚠ WARNING 8. Safety Line

Do not put your fingers over the safety line while current measurement.

### 3-2. GENERAL WARNINGS AND CAUTIONS

- ⚠ WARNING 1.** Children and the persons who do not have enough knowledge about electric measurements must not use this instrument.
- ⚠ WARNING 2.** Do not measure the electricity naked or barefooted to protect yourself from electrical shock hazard.
- ⚠ WARNING 3.** Be careful not to get hurt with the sharp test lead pins.
- ⚠ CAUTION 1.** Do not polish the case or attempt to clean it with any cleaning fluid like gasoline or benzene. If necessary, use silicon oil or anti-static fluid.
- ⚠ CAUTION 2.** Avoid the clamp meter from hard mechanical shock or vibration, high temperature and strong magnetic field.
- ⚠ CAUTION 3.** Remove the batteries when the clamp meter is out of use for a long time. The exhausted batteries might leak electrolyte and corrode the inside.

### 4. NAME ILLUSTRATION

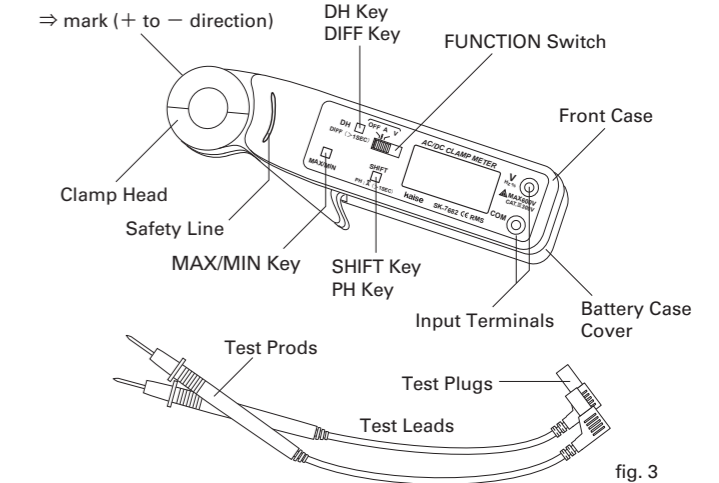


fig. 3

#### 1. CLAMP HEAD

Open CLAMP HEAD and clamp on a single conductor. When measuring DC current, make sure of the polarity so that the current should flow in the conductor from Front Case (+) to Rear Case ( $-$ ) according to the  $\Rightarrow$  (arrow) mark on the CLAMP HEAD.

**NOTE :** If two or three conductors are clamped into CLAMP HEAD at a time, the measurement becomes impossible.

#### 2. FUNCTION Switch

Set FUNCTION Switch to a desired position, A or V position, and set it to OFF position when measurements are finished.

#### 3. SHIFT Key : $\overline{\text{---}}$ $\rightarrow$ $\sim$ $\rightarrow$ Hz $\rightarrow$ %

Press this Key to select  $\overline{\text{---}}$  (DC) or  $\sim$  (AC). After that press this Key to select Hz and %. (% is only available in Voltage range.)

**NOTE :** When continuous measurements more than 10 minutes are necessary, set Function Switch to A or V position with SHIFT Key pressed on for less than one second.

APO symbol is not displayed on LCD and Auto Power Off does not work during measurements.

#### 4. PH Key : Peak Value Measurements up to $\overline{\text{---}}$ 400A

4-1. Clamp Head is placed away from conductor and Input is zero. Set FUNCTION Switch to A position.

4-2. Under this condition, press PH Key for more than 1 second. About 30 digits (3.0A) and PH symbol are shown on LCD.

4-3. Open Clamp Head and clamp on a single conductor and read Peak Value on LCD.

4-4. Remove Clamp Head from the conductor and press PH Key for more than 1 second. PH symbol disappears and PH Key is canceled.

#### 5. DH Key : Display Hold

Press this Key for less than 0.5 second. DH symbol is shown and display is held. To cancel this Key, press it again.

#### 6. DIFF Key : Difference Measurements

Press this Key for more than one second and DIFF symbol is shown on LCD. LCD will show 0 $\pm$ 1 digit when measurement value is stable. To cancel DIFF Key, press this Key for more than one second again.

**NOTE :** When PH Key or MAX/MIN Key is on, DIFF Key cannot operate.

## 7. MAX/MIN Key : Maximum and Minimum Measurements

1. Press this Key when taking measurements. LCD shows MAX MIN symbol and measurement value then.
2. Each press of this Key shows Maximum value, Minimum Value and the measuring value then in turn.
3. To cancel this Key, press this Key for more than 1 second and MAX MIN symbol disappears.

## 8. Auto Power Off Cancellation

To make long time, continuous measurements more than 10 minutes, set FUNCTION Switch to A or V position with pressing SHIFT Key for less than 1 second.

APO symbol does not appear on LCD.

Also, long time measurements are available when MAX/MIN Key is operating.

## 9. LCD

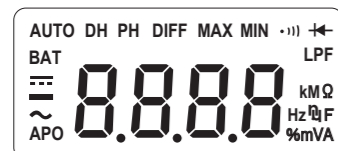


fig. 4

AUTO	: Auto-ranging
BAT	: Battery Warning
⎓	: Direct Current (DC) on Current and Voltage
-	: Minus symbol automatically shown when minus polarity
~	: Alternating Current (AC) on Current and Voltage
APO	: Auto Power Off
DH	: Display Hold
PH	: Peak Hold
DIFF	: Difference Measurements
MAX MIN	: MAX/MIN Measurements
MAX	: Maximum Value
MIN	: Minimum Value
mV, V	: Units of Voltage
A	: Unit of Current
Hz	: Frequency
%	: Duty Cycle

## 10. Input Terminals

To measure DC/AC Voltage, use COM and V Terminals. Insert Black Test Plug of Test Leads into COM Terminal and Red Test Plug of Test Leads into V Terminal.

# 5. MEASUREMENT PROCEDURES

## 5-1. PREPARATION FOR USE

### 1. INSTRUCTION MANUAL

Prior to use, read INSTRUCTION MANUAL carefully and acquaint yourself with the specifications and functions of the instrument. Especially, read and observe strictly "3. SAFETY PRECAUTIONS".

### 2. BATTERIES

Two 1.5V R6P batteries are furnished with this instrument. Before placing the Clamp Meter into use, open Battery Case Cover and install the batteries making sure of the polarity. Refer to "6-1. BATTERY REPLACEMENT".

### 3. TEST LEADS

1. One pair of Test Leads which consists of a Red Test Lead and a Black Test Lead is furnished with this instrument.
2. Each Test Lead consists of one Test Plug of a short insulator and one Test Prod of a long handle insulator.
3. The Test Plugs fit in the Terminals on the lower side of the case and the Test Prods are used to make contact with the circuit to be measured. It is good practice to use Black Test Lead for COM Terminal (-polarity) and Red Test Lead for V Terminal (+ polarity).

### 4. OVERRANGE INDICATION

If an input more than  $\approx 400A$  is measured, OL symbol is displayed on LCD. If the input voltage more than 600V is applied, OL symbol does not appear on LCD.

## WARNING

Do not attempt to make any measurements that might exceed the maximum value of the function ( $\approx 400A$  or 600V) to avoid electrical shock hazard and/or damage to the instrument.

## 5. AUTO POWER OFF

After about 12 minutes of last operation of FUNCTION Switch or the other Keys, power turns off automatically (goes down in sleep condition and 1 to 2 $\mu A$  consumption) with LCD display off. This function prevents battery consumption when power off is forgotten.

## 6. SYMBOL MARK

The following symbols shown on the instrument and in the instruction manual are listed in IEC 1010 and ISO 3864.

$\triangle$ : Caution (refer to instruction manual).	$\approx$ : DC and AC
$\Rightarrow$ : Direct Current (DC)	$\nabla$ : Diode
$\sim$ : Alternating Current (AC)	$\oplus$ : Earth (Ground) Terminal
	$\text{---}$ : Fuse
	$\square$ : Double Insulation

## 7. POWER-ON INITIALIZE

The instrument performs POWER-ON INITIALIZE automatically when turning on the power.

This function is effective when turning on the power without any inputs. If any inputs are applied to the instruments, it does not work correctly. LCD will display 0 $\pm 1$  digit when INITIALIZE was done correctly. If LCD does not display it, turn the power on again or press DH Key.

**NOTE** : INITIALIZE sometimes does not work correctly due to some CPU error even if no inputs are applied. If LCD displays 3 digits or more, use DH Key.

**NOTE** : For current measurements near the high current conductor, INITIALIZE does not work correctly. In this case, take the instruments away from the conductor, and turn the power on again.

## 5-2. CURRENT ( $\Rightarrow A$ / $\sim A$ / Hz ) MEASUREMENT

## WARNING

Maximum Current is  $\approx 400A$  ( $\approx 600V$  Line). Do not attempt to make any current measurements that might exceed  $\approx 400A$ , the Maximum Current. Prior to measurements, read carefully "3. SAFETY PRECAUTIONS" of this instruction manual to avoid electrical shock hazard and/or damage to the instrument.

1. Set FUNCTION Switch to A position.

## WARNING

Test Leads are not required for Current Measurements. For safety, remove Test Leads from INPUT Terminals. For safety, Finger-tips must be placed on the instrument not to exceed the LIMIT Indicator. Do not touch any part of the Power Line or the Circuit while it is on.

2. Press SHIFT Key to select  $\Rightarrow$  (DC) or  $\sim$  (AC).  
On DC, if 3 digits or more is indicated on LCD, press DIFF Key to show 0 $\pm 1$  digit. On AC, LCD shows random digits, but this does not matter with the specified accuracy.
3. Open CLAMP HEAD and clamp on a single conductor.  
**NOTE** : If two or three conductors are clamped on at a time, the measurement cannot be made.  
**NOTE** : ARROW Mark on the right side of CLAMP HEAD shows + to - polarity of current flow. In case of DC Current, clamp on a conductor so that Front Case should face to + polarity.
4. Read the current on LCD.
5. Press SHIFT Key to measure Hz.
6. Display Hold : Press DH Key once and the display is held with DH symbol shown on LCD. To cancel Display Hold, press it again.
7. MAX/MIN : To measure Maximum and Minimum Values, press MAX/MIN Key while making measurements and start measurements. When a required time passed, press DH Key to hold MAX and MIN Values.  
**NOTE** : In case measurement time is longer than 10 minutes, cancel AUTO POWER OFF and make measurements.  
**NOTE** : If MAX/MIN Key is pressed before clamping a conductor, Minimum value becomes zero.
8. PH (Peak Hold) : up to  $\approx 400A$ . To measure Peak Value, set FUNCTION Switch to A position before clamping on a conductor. Clamp on a single conductor and start measurements. To hold Peak Value, press DH Key once.
9. DIFF : To measure Difference Values, press DIFF Key for 1 second and longer while making measurements. The measuring value is stored and converted to read 0 $\pm 1$  digit with DIFF symbol displayed on LCD.
10. When measurements are finished, remove CLAMP HEAD from the conductor and set FUNCTION Switch to OFF position.

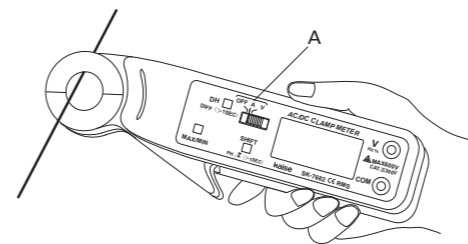


fig. 5

## 5-3. VOLTAGE ( $\Rightarrow V$ / $\sim V$ / Hz / % ) MEASUREMENT

## WARNING

Maximum Input Voltage of V function is  $\approx 600V$ . Do not attempt to measure voltage that might exceed  $\approx 600V$ . Prior to measurements, read carefully "3. SAFETY PRECAUTIONS" of this instruction manual to avoid electrical shock hazard and/or damage to the instrument.

1. Insert Black test plug into COM terminal and Red test plug into V terminal.
2. Set FUNCTION Switch to V position.
3. Press SHIFT Key to select  $\Rightarrow$  (DC) or  $\sim$  (AC).  
LCD reads random digits on DC and AC. But measurements are made within specified accuracy.
4. Connect Black Test Prod to the negative (earth) side of the circuit to be measured and Red Test Prod to the positive (high potential) side of the circuit.  
**NOTE** : When taking voltage measurements, connect the instrument IN PARALLEL with the circuit being measured.

## WARNING

When measuring dangerous voltage more than 220V, turn off power to the circuit to be measured and connect Test Prods to the circuit using Alligator Clips. Do not touch the Clamp Meter, its Test Leads or any part of the Circuit while it is on. Refer to "WARNING 4. Dangerous Voltage Measurement Procedure" in page 3.

5. Read the voltage on LCD.
6. Press SHIFT Key to measure Hz and %.
7. Display Hold : Press DH Key once and the display is held with DH symbol shown on LCD. To cancel Display Hold, press it again.
8. MAX/MIN : To measure Maximum and Minimum Values, press MAX/MIN Key while making measurements. When an adequate time passed, press DH Key to hold MAX and MIN Values.  
**NOTE** : In case measurement time is longer than 10 minutes, use MAX/MIN Key to cancel AUTO POWER OFF.
9. DIFF : To measure Difference Values, press DIFF Key for more than 1 second while making measurements.  
The measuring value is stored and converted to read 0 $\pm 1$  digit with DIFF symbol displayed on LCD.
10. When measurements are finished, remove Test Prods from the circuit and set FUNCTION Switch to OFF position.

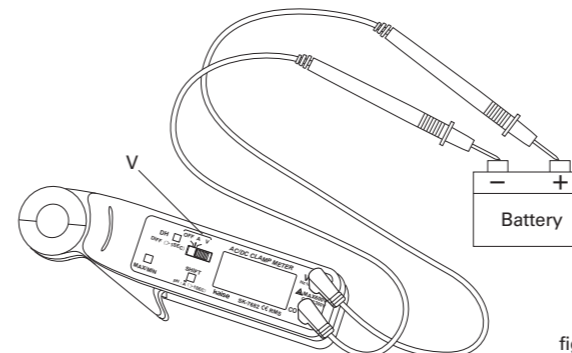


fig. 6

## 6. MAINTENANCE

### 6-1. BATTERY REPLACEMENT

## WARNING

To avoid electrical shock, observe the following precautions when to replace the batteries.

- Detach instrument and test leads from circuit.
- Remove test leads from input terminals, and turn the instrument off.

1. If the batteries are consumed and BAT symbol is shown on LCD, replace the batteries.
2. Remove both Test Leads from the circuit and from the Terminals.
3. Set FUNCTION Switch to OFF position.
4. Unscrew the screw on the Battery Case Cover.
5. Replace the consumed batteries with the new 2 pcs of 1.5V R6P batteries.  
**NOTE** : Place the batteries in the correct polarity.
6. Replace Battery Case Cover and screw. Refer to the fig. 7.  
**NOTE** : Remove the batteries when the clamp meter is out of use for a long time. The consumed batteries might leak electrolyte and corrode the inside.

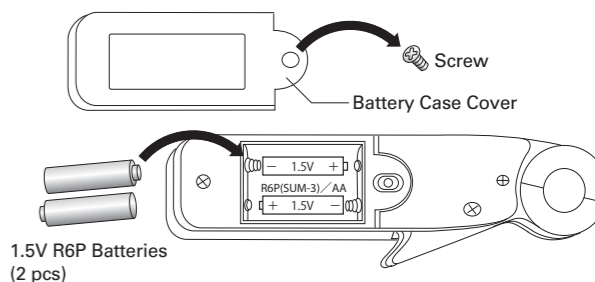


fig. 7

## 6-2. PERIODICAL CHECK AND CALIBRATION

Periodical check and calibration is necessary to make safety measurements and to maintain the specified accuracy. The recommended check and calibration term is once a year and after the repair service. This service is available at KAISE AUTHORIZED SERVICE AGENCY through your local dealer.

## 6-3. REPAIR

Repair service is available at KAISE AUTHORIZED SERVICE AGENCY through your local dealer. Pack the instrument securely with your name, address, telephone number and problem details, and ship prepaid to your local dealer.

Check the following items before asking repair service.

1. Check the battery connection, polarity, and capacity.
2. Confirm that the FUNCTION Switch is set correctly.
3. Confirm if the over input which is exceeding the specified range value is not applied.
4. Confirm that measured accuracy is adopted in the operating environment.
5. Confirm that the body of this instrument and test leads have no cracks or any other damages.
6. Check if the instrument is not affected by the strong noise generated from the equipment to be measured or measuring surroundings.

## WARRANTY

SK-7682 is warranted in its entirety against any defects of material or workmanship under normal use and service within a period of one year from the date of purchase of the original purchaser. Warranty service is available at KAISE AUTHORIZED SERVICE AGENCY through your local dealer. Their obligation under this warranty is limited to repairing or replacing SK-7682 returned intact or in warrantable defect with proof of purchase and transport charges prepaid. KAISE AUTHORIZED DEALER and the manufacturer, KAISE CORPORATION, shall not be liable for any consequential damages, loss or otherwise. The foregoing warranty is exclusive and in lieu of all other warranties including any warranty of merchantability, whether expressed or implied. This warranty shall not apply to any instrument or other article of equipment which shall have been repaired or altered outside of KAISE AUTHORIZED SERVICE AGENCY, nor which have been subject to misuse, negligence, accident, incorrect repair by users, or any installation or use not in accordance with instructions provided by the manufacturer.

KAISE AUTHORIZED DEALER

## KAISE CORPORATION

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Product specifications and appearance are subject to change without notice due to continual improvements.