

sanwa



CD731a

DIGITAL MULTIMETER

取扱説明書
INSTRUCTION MANUAL

CE

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[1] SAFETY PRECAUTIONS : Before use, read the following safety precautions

This instruction manual explains how to use your multimeter CD731a safely. Before use, please read this manual thoroughly. After reading it, keep it together with the product for reference to it when necessary.

The instruction given under the heading "**⚠WARNING**" "**⚠CAUTION**" must be followed to prevent accidental burn or electrical shock.

1-1 Explanation of Warning Symbols

The meaning of the symbols used in this manual and attached to the product is as follows.

⚠ : Very important instruction for safe use.

- The warning messages are intended to prevent accidents to operating personnel such as burn and electrical shock.
- The caution messages are intended to prevent damage to the instrument.

⚡ : Dangerous voltage (Take care not to get an electric shock in voltage measurement.)

⎓ : DC

~ : AC

Ω : Resistance

哔 : Buzzer

→ : Diode

⏚ : Ground

+ : Plus

— : Minus

fuse : Fuse

□ : Double insulation

1-2 Warning Instruction for safe use

⚠ WARNING

To ensure that the meter is used safely, Be sure to observe the instruction when using the instrument.

1. Never use meter on the electric circuit that exceed 6k VA.
2. Pay special attention when measuring the voltage of AC 33 Vrms (46.7 Vpeak) or DC 70V or more to avoid injury.
3. Never apply an input signals exceeding the maximum rating input value.
4. Never use meter for measuring the line connected with equipment (i.e. motors) that generates induced or surge voltage since it may exceed the maximum allowable voltage.

5. Never use meter if the meter or test leads are damaged or broken.
6. Never use uncased meter.
7. Be sure to use a fuse of the specified rating or type. Never use a substitute of the fuse or never make a short circuit of the fuse.
8. Always keep your fingers behind the finger guards on the probe when making measurements.
9. Be sure to disconnect the test pins from the circuit when changing the function or range.
10. Never use meter with wet hands or in a damp environment.
11. Never open tester case except when replacing batteries or fuse. Do not attempt any alteration of original specifications.
12. To ensure safety and maintain accuracy, calibrate and check the tester at least once a year.
13. Indoor use.

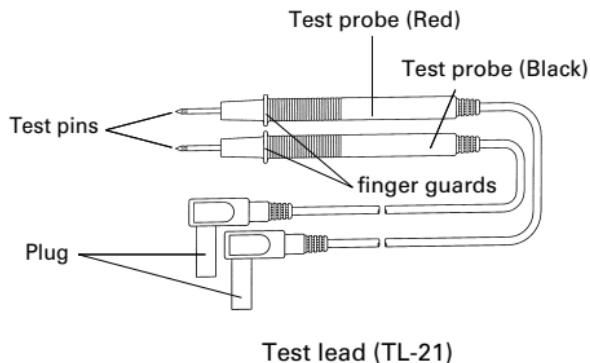
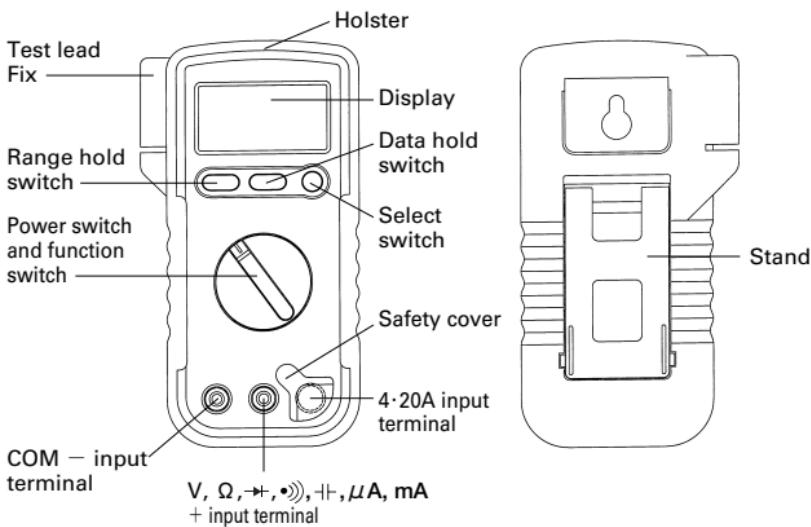
⚠ CAUTION

1. Correct measurement may not be performed when using the meter in the ferromagnetic / intense electric field such as places near a transformer, a high-current circuit, and a radio.
2. The meter may malfunction or correct measurement may not be performed when measuring special waveform such as that of the inverter circuit.

1-3 Maximum Overload Protection Input

Function	Input	Maximum rating input value	Maximum overload protection value
DCV	COM (—)	DC1000V	DC1000V, AC750V
ACV		AC750V	or peak max. 1000V
Ω / \rightarrow / \bullet	⋮	⚠ Voltage and current input prohibited	DC500V, AC500V
\perp	⋮		or peak max. 700V
DC / AC 400 · 4000 μ A	V, Ω , \rightarrow \bullet , \perp	DC, AC 4000 μ A	500mA/250V Fuse protection
DC / AC 40 · 400mA	μ A, mA (+)	DC, AC 400mA	
DC / AC 4 · 20A	COM(—) ⋮ 4 · 20A	DC, AC 20A	20A/250V Fuse protection

3-2 Multimeter, Test leads



〔Fig 2〕

[4] Description of Functions

4-1 Switch and description

○ Power switch and function switch

Turn this switch to turn on and off the power and to select the functions of V , Ω , $\text{--}/\text{--}/\text{--}$, -- , μA , mA , A .

○ Range hold switch

Pressing this switch once sets the manual mode and the range is fixed. ("AUTO" on the display disappears)

Once the manual mode is set, the range moves each time this switch is pressed. Checking the unit on the display and the place of the decimal point, select a desired range. To return to the auto mode, keep pressing this switch until "AUTO" on the display appears.

○ Data hold switch

When this switch is pressed, the data display at that time continues ("DH" lights on the display). When the measuring input changes, the display will not change.

When this switch is pressed again, the hold status is canceled you can return to the measuring status. ("DH" on the display disappears.)

○ Select switch

When this switch is pressed (\rightarrow), the each modes change as follows.

$V\text{--}/\text{--}$	-- \rightarrow -- \rightarrow -- \rightarrow --
$\Omega\text{--}/\text{--}/\text{--}$	Ω \rightarrow -- \rightarrow -- \rightarrow Ω
--	(See 5-6 Capacity Measurement)
$400 \cdot 4000 \mu\text{A}\text{--}/\text{--}$	
$40 \cdot 400\text{mA}\text{--}/\text{--}$	-- \rightarrow -- \rightarrow -- \rightarrow --
$4 \cdot 20\text{A}\text{--}/\text{--}$	

⚠ WARNING

Do not change over the function switch with a voltage applied to the measuring terminals.

○Auto power off, Auto powersave

This device incorporates auto-power-off function that turns off the display in about 30 minutes to save battery draining. There is a little battery draining even if the auto power save function is activated, therefore be sure to return the Power/Function knob to OFF after measurement. Press the data hold switch before the auto-power-save function is activated to use the device continuously. To deactivate the auto-power-save function, turn the meter ON while pressing the SELECT button.

○Over Limit (O.L) indication

In case of excess input to this device, the indicator displays O.L. If O.L is displayed during the voltage function, stop the input immediately.

4-2 How to Use the Stand

Please use the stand that there is on the side of rear case like a figure.



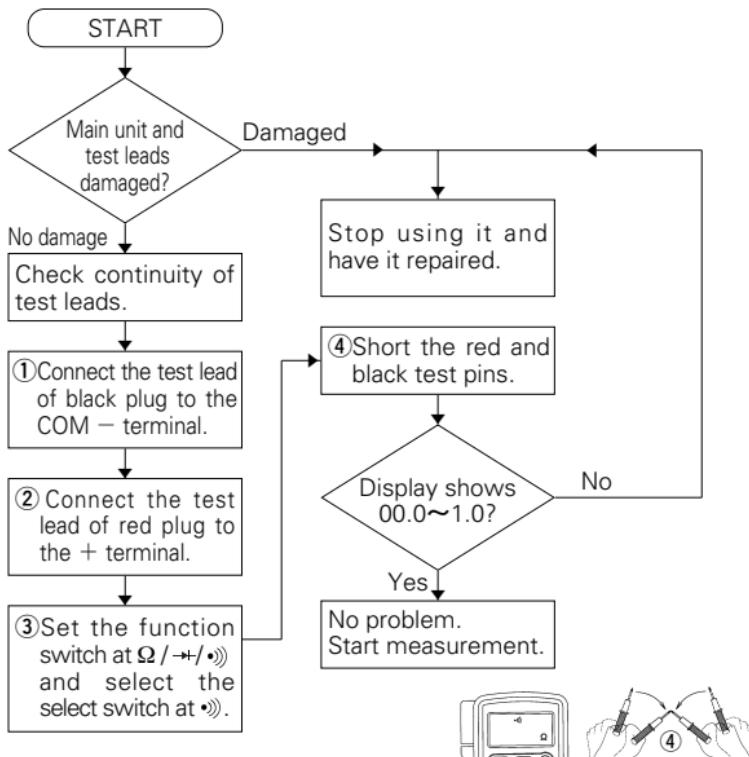
[Fig 3]

[5] MEASUREMENT PROCEDURE

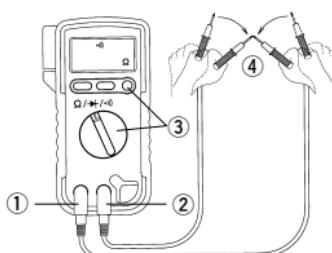
5-1 Start-up Inspection

! WARNING

1. Never use meter if the meter or test leads are damaged or broken.
2. Make sure that the test leads are not cut or otherwise damaged.



[Fig 4]



5-2 Voltage Measurement Maximum rating input value 1000VDC or 750VAC

⚠ WARNING

1. Never apply an input signals exceeding the maximum rating input value.
2. Be sure to disconnect the test pins from the circuit when changing the function.
3. Always keep your fingers behind the finger guards on the probe when making measurements.

1) Applications

DCV: Measures batteries and DC circuits.

ACV: Measures sine-wave AC voltage as lighting voltages.

2) Measuring ranges

DCV: 400mV~1000V (5 ranges)

ACV: 4V~750V (4 ranges)

3) Measurement procedure (See Fig 5 or 6, page 9)

- ① Connect the black plug of the test lead to the COM – input terminal and the red plug to the + input terminal.
- ② Set the function switch at "V == / ~" function.
- ③ Select the select switch at " == " (DC) or " ~ " (AC).
- ④ Apply the black test pin to the negative potential side of the circuit to measure and the red test pin to the positive potential side.
- ⑤ Read the value on the display.
- ⑥ After measurement, remove the red and black test pins from the circuit measured.
- ⑦ Turn the function switch to the position OFF.

- In the AC4V range, a figure of about 3~9 counts will stay on even if no input signal is present. But it is not malfunction.
- In the manual mode of the ACV function, the CD731a can be set to the 400mV range and shows an approximate value. But its accuracy is not guaranteed.
- Since this instrument employs the means value system for its AC voltage measurement circuit, AC waveform other than sine wave may cause error.

5-3 Resistance Measurement (Ω)

⚠ WARNING

Never apply voltage to the input terminals.

1) Application

Resistance of resistors and circuits are measured.

2) Measuring ranges

$400\Omega \sim 40M\Omega$ (6 ranges)

3) Measurement procedure (See Fig 7, page 10)

- ① Connect the black plug of the test lead to the COM – input terminal and the red plug to the + input terminal.
- ② Set the function switch at " $\Omega/\rightarrow/\bullet\circ$ " function.
- ③ Select the select switch at " Ω " ($M\Omega$).
- ④ Apply the black and red test pin to measured circuit.
- ⑤ Read the value on the display.
- ⑥ After measurement, remove the red and black test pins from the circuit measured.
- ⑦ Turn the function switch to the position of OFF.

- If measurement is likely to be influenced by noise, shield the object to measure with negative potential (test lead black).
- If a test pin is touched by a finger during measurement, measurement will be influenced by the resistance in the human body to result in measurement error.
- The input terminals release voltage is about 0.4V.

5-4 Testing Diode (\rightarrow)

⚠ WARNING

Never apply voltage to the input terminals.

1) Application

The quality of diodes is tested.

2) Measurement procedure (See Fig 8, page 11)

- ① Connect the black plug of the test lead to the COM – input terminal and the red plug to the + input terminal.
- ② Set the function switch at " $\Omega/\rightarrow/\bullet\circ$ " function.

- ③Select the select switch at " \rightarrow ".
- ④Apply the black test pin to the cathode of the diode and the red test pin to the anode.
- ⑤Make sure that the display shows a diode forward voltage drop.
- ⑥Replace the red and black test pins, make sure that the display is the same as that when the test leads are released.
- ⑦After measurement, release the red and black test pins from the object measured.
- ⑧Turn the function switch to the position of OFF.

Judgement

When the items ⑤ and ⑥ are normal, the diode is good.

- The input terminals release voltage is about $1.1 \sim 1.5V$.

5-5 Checking Continuity ($\bullet\bullet$)

⚠ WARNING

Never apply voltage to the input terminals.

1) Application

Checking the continuity of wiring and selecting wires.

2) Measurement procedure (See Fig 9, page 12)

- ①Connect the black plug of the test lead to the COM – input terminal and the red plug to the + input terminal.
- ②Set the function switch at " $\Omega/\rightarrow/\bullet\bullet$ " function.
- ③Select the select switch at " $\bullet\bullet$ ".
- ④Apply the red and black test pins to a circuit or conductor to measure.
- ⑤The continuity can be judged by whether the buzzer sounds or not.
- ⑥After measurement, release the red and black test pins from the object measured.
- ⑦Turn the function switch to the position of OFF.

- The buzzer sounds when the resistance in a circuit to measure is less than about $10 \sim 120\Omega$.
- Even if the buzzer does not sound, a resistance value up to $10 \sim 120\Omega$ will be displayed.

- The input terminals release voltage is about 0.4V.
- When a resistance value is in a range of 20 and 40Ω , noise will be mixed in the buzzer sound. But it is not malfunction.

5-6 Capacity Measurement (Hz)

△ WARNING

1. Never apply voltage to the input terminals.
2. Be sure to discharge the capacitor prior to measurement.

1) Application

Measures capacitance of capacity.

2) Measuring ranges

$40nF \sim 100\mu F$ (5 ranges) * $1000nF = 1\mu F$

3) Measurement procedure (See Fig 10, page 13)

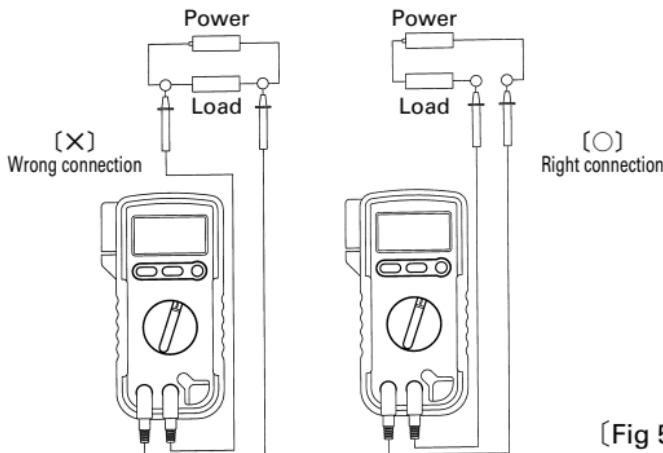
- ① Connect the black plug of the test lead to the COM — input terminal and the red test lead to the + input terminal.
- ② Set the function switch at "Hz" function.
- ③ Press the select switch to make the display show 00.00nF.
(The "REL" mark illuminates in the upper right area of the display.)
- ④ Apply the red and black test pins to capacitor.
- ⑤ Read the value on the display.
- ⑥ After measurement, release the red and black test pins from the object measured.
- ⑦ Turn the function switch to the position of OFF.

- The "Hz" function can be set to the auto range, but not to the manual range.
- In $4nF$ and $40nF$ ranges, large value is left, especially when disconnecting measuring terminals. This is not malfunction.
- For measurement of $100nF$ ($0.1\mu F$) or below, the display will not stabilize due to the influence of ambient noise and floating capacity. It is therefore recommended that an object to measure (capacitor) be directly connected between the (+) and (-) measuring terminals of the CD731a.
- As the capacitance increases, the measuring time becomes longer.
Example: 2 to 4 seconds at $10\mu F$ 5 to 8 seconds at $50\mu F$
13 to 16 seconds at $100\mu F$

5-7 Current Measurement (μA , mA , A)

⚠ WARNING

1. Never apply voltage to the input terminals.
2. Be sure to make a series connection via load.
(please see to above drawing)
3. Do not apply an input exceeding the maximum rated current to the input terminals.



[Fig 5]

5-7-1 Current Measurement (μA , mA)

Maximum rating input value DC/AC 4000 μA · 400mA

1) Applications

Current in DC and AC circuit is measured.

2) Measuring ranges

DCA:400·4000 μA , 40·400mA (4 ranges)

ACA:400·4000 μA , 40·400mA (4 ranges)

3) Measurement procedure (See Fig 12, page 15)

- ① Connect the black plug of the test lead to the COM - input terminal and the red plug to the + input terminal.
- ② Set the function switch at "400·4000 μA " or "40·400mA" function.
- ③ Select the select switch at "—" (DC) or "—" (AC).
- ④ Apply the black test pin to the negative potential side of the circuit to measure and the red test pin to the positive potential side.

- ⑤Read the value on the display.
- ⑥After measurement, remove the red and black test pins from the circuit measured.
- ⑦Turn the function switch to the position of OFF.
- If the display will not change when an input signal is applied (measurement is not possible), a probable cause is a blown fuse.
- Since this instrument employs the means value system for its AC voltage measurement circuit, AC waveform other than sine wave may cause error.

5-7-2 Current Measurement (A) Maximum rating input value DC/AC 20A

WARNING

1. Never apply voltage to the input terminals.
2. Finish measurement within 10 seconds to prevent heat generation.
3. Provide intervals 5 minutes or longer between measurements to prevent heat generation. (Continuous measurement: max 5A)
4. Perform measurement with the leads kept straight to prevent overheat.

1) Applications

Current in DC and AC circuit is measured.

2) Measuring ranges

DCA: 4·20A (2 ranges), ACA: 4·20A (2 ranges)

3) Measurement procedure (See Fig 13, page 16)

- ①Slide the safety cover of the CD731a to the left and insert the red plug of the test leads to the 4·20A measuring terminal and the black plug to the COM (−) terminal.
- ②Set the function switch at "4·20A ---/~" function.
- ③Select the select switch at "---" (DC) or "~~" (AC).
- ④Apply the black test pin to the negative potential side of the circuit to measure and the red test pin to the positive potential side.
- ⑤Read the value on the display.
- ⑥After measurement, remove the red and black test pins from the circuit measured.
- ⑦Turn the function switch to the position of OFF.

- If the display will not change when an input signal is applied (measurement is not possible), a probable cause is a blown fuse.
- Since this instrument employs the means value system for its AC voltage measurement circuit, AC waveform other than sine wave may cause error.

5-8 How to use optional products

⚠ WARNING

Never apply an input signals exceeding the maximum rating input value of optional products.

5-8-1 AC Clamp Probe (CL-20D) Maximum measurement value AC200A

<Measurement procedure> (See Fig 14, page 17)

- ① Connect the black plug of the current probe to the COM – input terminal and the red plug to the + input terminal.
- ② Set the function switch at "V---/~" function.
- ③ Select the select switch at "~~" and set the 4V range with the range hold switch.
- ④ Select either 20A or 200A with selector knob of clamp probe.
- ⑤ Open the clamp part, have electric line (one line) clamped.
- ⑥ Read the value on the display in A unit and when current probe of the 20A range after multiplying indicated value by 10, and the 200A range after multiplying indicated value by 100.
- ⑦ After measurement, open the clamp part and release clamp probe from the electric wire.
- ⑧ Turn the function switch to the position of OFF.

5-8-2 DC·AC Clamp Probe (CL-22AD) Maximum measurement value DC/AC200A

<Measurement procedure> (See Fig 15, page 18)

- ① Connect the black plug of the current probe to the COM – terminal and the red plug to the + terminal.
- ② Set the function switch at "V---/~" function.
- ③ Select the select switch at "---" (DC) or "~~" (AC).
- ④ Set the 400mV range (at DC measurement) or 4V range (at AC measurement) with range hold switch.
- ⑤ Select either 20A or 200A with selector knob of clamp probe. probe to make the display of the CD731a show "000.0".
- ⑥ Open the clamp part, have electric wire (one line) clamped.

⑦Read the value on the display as follows.

DC20A : multiplying by 0.1 AC20A : multiplying by 100

DC200A : multiplying by 1 AC200A : multiplying by 1000

⑧After measurement, open the clamp part and release clamp probe from the electric wire.

⑨Turn the function switch of multimeter and selector knob of clamp probe to the position of OFF.

5-8-3 DC Clamp Probe (CL33DC) Maximum measurement value DC300A

<Measurement procedure> (See Fig 16, page 19)

①Connect the black plug of the current probe to the COM – input terminal and the red plug to the + input terminal.

②Set the function switch at "V==/~/" function.

③Select the select switch at "==" (DC) and set the 400mV range with the range hold switch.

④Select either 30A or 300A with selector knob of clamp probe.

⑤Open the clamp part, have electric line (one line) clamped.

⑥Read the value on the display in A unit and when current probe of the 30A range after multiplying indicated value by 0.1, and the 300A range after multiplying indicated value by 1.

⑦After measurement, open the clamp part and release clamp probe from the electric wire.

⑧Turn the function switch of multimeter and selector knob of clamp probe to the position of OFF.

5-8-4 HV Probe (HV-60)Maximum measured voltage: DC30kV

<Measurement procedure> (See Fig 17, page 20)

WARNING

- 1.The probe is designed for the measurement of very small DC circuit. Never use the probe to measure high voltage in power lines, Such as transmission and distribution lines; it is very dangerous.
- 2.Never apply an input signals exceeding the maximum rating(30kV)of HV prove.
- 3.Be sure to disconnect the test pins from the circuit when changing the function.
- 4.Always keep your fingers behind the finger guards on the probe when making measurement.

- 1) Measurement item
Anode voltage of cathode ray tube, high focusing voltage, and voltage of high-impedance circuit
- 2) Measurement range : DC1000V range
(Set manually in the manual mode)
- 3) Measuring method
 - ①Insert the red plug of the high-voltage probe into the V input terminal and the black plug into the COM terminal.
 - ②Set the function switch to V, select DC with the SELECT switch, and set the RANGE HOLD switch to the 1000 V range.
 - ③Connect the black clip to the ground line of the circuit under test and touch the measuring position with the pin at the end of the probe.
 - ④Read the indicator and multiply the reading by 0.1 for kV.
 - ⑤After measurement, release the pin from the circuit under test and then remove the clip.
- HV-60 cannot be used for AC voltage measurement.

【6】 MAINTENANCE

⚠ WARNING

1. This section is very important for safety. Read and understand the following instruction fully and maintain your instrument properly.
2. The instrument must be calibrated and inspected at least once a year to maintain the safety and accuracy.

6-1 Maintenance and inspection

1. Appearance
 - Is the appearance not damaged by falling?
2. Test leads
 - Is the cord of the test leads not damaged?
 - Is the core wire not exposed at any place of the test leads?

If your instrument falls in any of the above items, do not use it and have it repaired or replace it with a new one.

●Make sure that the test leads are not cut, referring to the section.

6-2 Calibration

The calibration and inspection may be conducted by the dealer. For more information, please contact the dealer.

6-3 How to Replace Battery and Fuse (See Fig 18, page 22)

⚠ WARNING

1. If the rear case is removed with input applied to the input terminals, you may get electrical shock. Before starting the work, always make sure that no inputs is applied.
2. Be sure to use the fuse is same rating so as to ensure safety and performance of tester.
3. When operator remove the rear case, do not touch the internal parts or wire with hand.

<How to replace the battery>

- ① Remove the holster.
- ② Remove the rear case screw with a screwdriver.
- ③ Remove the rear case.
- ④ Take out the battery and replace it with a new one.
- ⑤ Attach the rear case and fix it with the the screw.
- ⑥ Attach the holster.

* Do not use mix new and old batteries together.

<How to replace the fuse>

Fuse of the Specified Rating and Type

(Fuse with arc-extinguishing agent)

500mA/250V ϕ 5×20mm Blowout capacity:1500A

20A/250V ϕ 6.3×32mm Blowout capacity:200kA

- ① Remove the holster.
- ② Remove the rear case screw with a screwdriver.
- ③ Remove the rear case.
- ④ Pull out the fuse out of holder on the circuit board and replace it.
- ⑤ Put back rear case where it was and tighten the screw.
- ⑥ Check and see whether or not indications of respective ranges are normal.
- ⑦ Attach the holster.

6-4 Cleaning and Storage

 **CAUTION**

1. The panel and the case are not resistant to volatile solvent and must not be cleaned with thinner or alcohol.
For cleaning, use dry, soft cloth and wipe it lightly.
2. The panel and the case are not resistant to heat. Do not place the instrument near heat-generating devices (such as a soldering iron).
3. Do not store the instrument in a place where it may be subjected to vibration or from where it may fall.
4. For storing the instrument, avoid hot, cold or humid places or places under direct sunlight or where condensation is anticipated.

Following the above instructions, store the instrument in good environment.

【7】SPECIFICATIONS

7-1 Measurement Range and Accuracy

Accuracy assurance range : $23 \pm 5^\circ\text{C}$ 80%RH MAX. No condensaiton.

Function	Range	Input Resistance	Accuracy	Remarks	
DCV	400.0mV	$\geq 100\text{M}\Omega$	$\pm(0.5\%\text{rdg}+2\text{dgt})$		
	4.000V	Approx. $11\text{M}\Omega$	$\pm(0.9\%\text{rdg}+2\text{dgt})$		
	40.00V	Approx. $10\text{M}\Omega$	$\pm(1.0\%\text{rdg}+2\text{dgt})$		
	400.0V				
	1000V				
ACV	4.000V	Approx. $11\text{M}\Omega$	$\pm(1.2\%\text{rdg}+9\text{dgt})$	Accuracy in the case of sin wave 40~500Hz	
	40.00V	Approx. $10\text{M}\Omega$	$\pm(1.2\%\text{rdg}+5\text{dgt})$		
	400.0V		$\pm(1.5\%\text{rdg}+5\text{dgt})$		
	750V				
DCA	400.0 μA	Approx. 100Ω	$\pm(1.5\%\text{rdg}+2\text{dgt})$	20A range : Continuous measurement : max 5A	
	4000 μA	Approx. 1Ω			
	40.00mA	$\pm(2.0\%\text{rdg}+2\text{dgt})$			
	400.0mA	Approx. 0.01Ω	$\pm(1.8\%\text{rdg}+5\text{dgt})$		
	4.000A				
ACA	20.00A	Approx. 100Ω	$\pm(1.2\%\text{rdg}+4\text{dgt})$	Accuracy in the case of sin wave 40~500Hz 20A range : Continuous measurement : max 5A	
	400.0 μA				
	4000 μA	Approx. 1Ω	$\pm(1.8\%\text{rdg}+2\text{dgt})$		
	40.00mA				
	400.0mA	Approx. 0.01Ω	$\pm(2.5\%\text{rdg}+5\text{dgt})$		
Ω	400.0 Ω	$\pm(1.5\%\text{rdg}+5\text{dgt})$	Open voltage Apporox 0.4V		
	4.000k Ω				
	40.00k Ω	$\pm(1.2\%\text{rdg}+4\text{dgt})$			
	400.0k Ω				
	4.000M Ω	$\pm(1.8\%\text{rdg}+2\text{dgt})$			
	40.00M Ω				
\bullet		Open voltage Approx Buzzer sound at approx. $10 \sim 120\Omega$ max.			
\rightarrow		Open voltage Approx 1.5V			
\dashv	40.00nF	$\pm(5.0\%\text{rdg}+6\text{dgt})$	Auto range only		
	400.0nF				
	4.000 μF				
	40.00 μF				
	100.0 μF				

rdg : reading dgt : digits

△ CAUTION:

If there is presence of strong magnetic field generated by conductor fed large current, motors or strong radio wave, a measurement may not be accurate.

Specifications and external appearance of the product described above may be revised for modification without prior notice.

7-2 General Specifications

Measuring Method : $\Delta \Sigma$ method

Display : 4000 counts

Range selection : Auto and manual ranges

Over display : "O.L" is displayed
(except DC/AC20A, DC1000V, AC750V ranges)

Polarity : Automatic selection (only "—" is displayed)

Battery discharge display
: If the internal battery has been consumed and the voltage drops, the display shows.

Sampling rate : Approx. 3 times/sec.

Accuracy assurance temperature /humidity range
: $23 \pm 5^\circ\text{C}$ 80%RH max. No condensation.

Operating temperature /humidity range
: $0 \sim 40^\circ\text{C}$ 80%RH max. No condensation.

Storage temperature /humidity range
: $-10 \sim 50^\circ\text{C}$ 70%RH max. No condensation.

Environmental condition
: Operating altitude <2000m, pollution degree Ⅱ

Power supply : R6 (IEC) dry battery, 2 pieces

Power consumption : Approx. 7mW TPY. (at DCV)

Battery life : Approx. 400 hours at DCV

Fuse protection : 500mA/250V Fast acting fuse ($\phi 5 \times 20\text{mm}$)

$\left(\begin{array}{l} \text{Fuse with} \\ \text{arc-extinguishing} \\ \text{agent} \end{array} \right)$ Blowout capacity, 1500A
20A/250V Fast acting fuse ($\phi 6.3 \times 32\text{mm}$)
Blowout capacity, 200kA

Dimension and weight : $167(\text{H}) \times 90(\text{W}) \times 48(\text{D})\text{mm}$
Approx. 315g (holster attached.)

Safety : IEC 61010-1 (EN61010-1)
 $\leq \text{DC-AC } 600\text{V}$: Measurement category Ⅲ (CAT. Ⅲ)
requirement of IEC 61010-1, Pollution degree Ⅱ.
 $\leq \text{DC1000V-AC } 750\text{V}$: Measurement category Ⅱ (CAT. Ⅱ)
requirement of IEC 61010-1, Pollution degree Ⅱ.

EMC : EN50081-1 (EN55022) EN50082-1(EN61000-4-2)
EN50082-1 (EN61000-4-3) EN50082-1(EVN50204)

Accessories : Instruction manual, Test leads(TL-21), Holster (H-70)

MEASUREMENT CATEGORY

- CAT I : Secondary electrical circuit connected to an AC electrical outlet through a transformer or similar device.
- CAT II : Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord.
- CAT III : Primary electrical circuits of heavy equipment connected directly to the distribution panel, and feeders from the distribution panel to outlets.

Factory -preinstalled built-in battery

A battery for monitoring is preinstalled before shipping, therefore it may run down sooner than the battery life specified in the instruction manual.

※The "battery for monitoring" is a battery to inspect the functions and specifications of the product.

7-3 Optional accessories

- Clip adapter CL-11 · HV probe HV-60
- Current probe CL-20D, CL-22AD, CL33DC · Carrying case C-SP

[8] After-Sales Service

8-1 Warranty and Provision

Sanwa offers comprehensive warranty services to its end-users and to its product resellers. Under Sanwa's general warranty policy, each instrument is warranted to be free from defects in workmanship or material under normal use for the period of one (1) year from the date of purchase.

This warranty policy is valid within the country of purchase only, and applied only to the product purchased from Sanwa authorized agent or distributor.

Sanwa reserves the right to inspect all warranty claims to determine the extent to which the warranty policy shall apply. This warranty shall not apply to fuses, disposables batteries, or any product or parts, which have been subject to one of the following causes:

1. A failure due to improper handling or use that deviates from the instruction manual.
2. A failure due to inadequate repair or modification by people other than Sanwa service personnel.
3. A failure due to causes not attributable to this product such as fire, flood and other natural disaster.

4. Non-operation due to a discharged battery.
5. A failure or damage due to transportation, relocation or dropping after the purchase.

8-2 Repair

Customers are asked to provide the following information when requesting services:

1. Customer name, address, and contact information
2. Description of problem
3. Description of product configuration
4. Model Number
5. Product Serial Number
6. Proof of Date-of-Purchase
7. Where you purchased the product

1) Prior to requesting repair, please check the following:

Capacity of the built-in battery, polarity of installation and discontinuity of the test leads.

2) Repair during the warranty period:

The failed meter will be repaired in accordance with the conditions stipulated in 8-1 Warranty and Provision.

3) Repair after the warranty period has expired:

In some cases, repair and transportation cost may become higher than the price of the product. Please contact Sanwa authorized agent / service provider in advance.

The minimum retention period of service functional parts is 6 years after the discontinuation of manufacture. This retention period is the repair warranty period. Please note, however, if such functional parts become unavailable for reasons of discontinuation of manufacture, etc., the retention period may become shorter accordingly.

4) Precautions when sending the product to be repaired:

To ensure the safety of the product during transportation, place the product in a box that is larger than the product 5 times or more in volume and fill cushion materials fully and then clearly mark "Repair Product Enclosed" on the box surface. The cost of sending and returning the product shall be borne by the customer.

8-3 SANWA web site

<http://www.sanwa-meter.co.jp>

E-mail: exp_sales@sanwa-meter.co.jp

sanwa

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