AC/DC DIGITAL CLAMP METER

DCM 2000AD

INSTRUCTION MANUAL

This manual describes the clamp meter DCM2000AD, an AC/DC digital clampmeter for low voltage circuits.

Prior to using your new meter, please read this manual thoroughly to ensure safe use.

Please keep this manual together with the meter.

sanwa
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[1] SPECIFICATIONS

Measuring current: AC/DC clamp CT. / Max. conductor diameter to clamp: ø55mm
Measuring method : Integral method.
Display : 3.5 digits, max. display [3999], with a unit sign.
Measuring ranges : ~A (50/60Hz), ⎓ A ---- 40A/ 400A/ 2000A (manual)
: ~V (50/60Hz), ⎓ V ---- 400mV~600V (auto/manual)
: Ω---- 400Ω ~40MΩ (auto/ manual) : •))---- (0~40Ω)
: Hz ---- 100Hz~1000kHz (auto) : -▶|-

Overload: Most significant digit "4" flicker (except for 600V and 2000A ranges)
Date hold:"DH" mark lights and the display held.
Polarity: "—" is indicated only when the input polarity of ⎓A, ⎓V is reversed.
Auto power off: The power is turned off in about 10 minutes after the power switch was turned on.
Zero adjustment: Quick zero adjustment using the Zero adjuster. ("A" function only)
Low battery indication: " ⊟ " mark lights when battery is below approx 1.3V
Sample Rate : Twice / sec.
Working circuit voltage : 600 VAC max.

Environmental conditions:
• Indoor use • Altitude up to 2000m
Definition of OVERVOLTAGE CATEGORY :
• IEC 1010-2 OVERVOLTAGE CATEGORY III* AC, DC600V max. Pollution degree 2

⚠* OVERVOLTAGE CATEGORY III: Distribution level, fixed installation, with smaller transient overvoltages than OVERVOLTAGE CATEGORY IV.

Withstand voltage: 5550V AC / 60sec (Iron core ~ Rear case)

Operating temperature and humidity : 5~31°C, 80%RH max.
31<~40°C, 80~50%RH (decreasing linearly)
Storage temperature and humidity : -10~60°C, 70%RH max.
Power supply : RO 3 (1.5V) x 2
Power consumption : Approx. 14 mW. (continuously 100 hours)
Dimensions . Weight: 240(H) x 84 (W) x 34(D)mm . Approx. 390g
Accessories : Carrying case··1, Instruction manual··1, Test leads (type TL21)··1.

⚠ SYMBOL

The symbol ⚠ attached on the meter and used in the manual means the following.
① ⚠ **WARNING** : May cause personal injury such as burn and electrical shock. Be sure to follow the instructions when handling the areas marked by this symbol.
② ⚠ **CAUTION** : If the instructions are not followed, the meter may be damaged.

Measuring range and Accuracy (23°C ± 5°C, 80%RH max, no condensation)

Function / Range		Accuracy	Max. overload protection input	Remarks
~ A (50/60 Hz) ⎓ A	40 A	± 2%rdg ± 8 dgt	~ / ⎓ 2200 A (3 ses)	Mean value rectifying type (Effective value calibration)
	400 A	± 1.5%rdg ± 8 dgt		
	2000 A			
~ V (50/60 Hz) ⎓ V	400 mV	± 1.2%rdg ± 8 dgt	~ / ⎓ 600 Vrms	
	4 V			
	40 V			
	400 V			
	600 V			
Ω (OHM)	400 Ω	± 1.5%rdg ± 8 dgt	250 Vrms (10 sec)	Open voltage 0.4 V
	4 k			
	40 k			
	400 k			
	4000 k			
	40 M	± 3%rdg ± 10 dgt		
•)) (Continuity check)	400 Ω	< 40 Ω	"	
-▶|- (Diode test)	3 V	± 10%rdg ± 3 dgt	"	
Hz (frequency)	100 Hz	± 0.5%rdg ± 3 dgt	~ / ⎓ 600 Vrms	
	1 kHz			
	10 kHz			
	100 kHz			
	1000 kHz			

- rdg : reading, dgt : digit
- ~ A : Place a conductor to measure in the center of the CT.
- When the 40 A range is used (~A, ⎓ A), the unit digit shows several counts even when the input is 0A, but this is not a problem. (0~ 0.1A : unguarantee)
- For ⎓ A measurement, adjust the zero.
- AC400mV and 4V ranges accuracy : 0~20mV is unguarantee.

Safety	Immunity
EN61010-2-032 : 1995	EN50082-1(EN61000-4-2) : 1997
Emission	EN50082-1(EN61000-4-3) : 1997
EN50081-1(EN55022) : 1992	EN50082-1(ENV50204) : 1997

⚠ CAUTION - GENERAL PRECAUTIONS FOR HANDLING

① Vibration and shock : it is a cause of failure.
② Environment: Do not keep the meter for long hours in places under direct sunlight or hot (over 60°C) or humid (over 85%) places or places where condensation will occur.
③ Battery replacement : Setting the batterys with their polarities (⊕ , ⊖) reversed may damage the circuit components in the meter.
④ When the meter is not used for measurement, be sure to keep the power switch at OFF.

[2] ⚠ WARNINGS, ⚠ PRECAUTIONS

⚠ WARNING — PRECAUTIONS FOR SAFE MEASUREMENT

Prior to using the meter, please read this manual to prevent personal injury such as electrical shock.
① Use the meter in a cable run of low voltage (600V or below). Never try to measure cable runs exceeding 600V.
② Measure only coated cables. Never clamp bare cables.
③ Do not handle the meter with wet hands or in humid places.
④ If the body case is damaged or if the battery cover is removed, do not attempt to make measurement. Do not use damaged test leads.
⑤ Do not overhaul the meter.
⑥ For safety, never try to measure voltages in large capacity cable runs exceeding 250V. It is a very dangerous practice.
⑦ When replacing the batteries, disconnect the test leads from the measuring circuit. Otherwise, the meter may be damaged.
⑧ Never apply a voltage to the resistance measurement range or the diode test range. It is a cause of failure.
⑨ Indoor use.

⚠ — PRECAUTIONS FOR MEASURING CURRENT

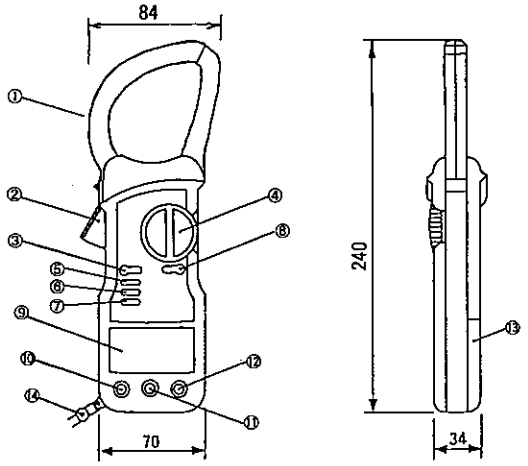
① Place a conductor to measure in the center of the CT.
② During measurement, close the ends of the CT (iron core) completely.
③ Use the meter in a frequency range from 50Hz to 60Hz.
④ An error will occur in display when measuring alternating current other than sine waves.
⑤ Clamp only one conductor for measument. Clamping 2 or more conductors leads to erroneous measurement.
⑥ If large current is applied, vibration noise may be heard from the CT. It is not a problem.

⚠ WARNING — FOR MEASURING CURRENT

- Be sure to disconnect the test lead from the measuring terminals for preventing electric shock.
- If an excessively large current is applied to the meter during current measurement, it will be heated and may be damaged. (2000A range : 1200~2000A/cont inuously 30 sec. Do not use the meter for measurement of current above 2000A)

[3] COMPONENT DEVICES OF THE METER

① **Clamp type CT :** Clamp type current detect sensor.
② **Open lever :** When this is pushed inward, the clamp opens.



③ **Power switch :** When a switch is pressed, the power is turned on and the indicator lamp lights. When it is pressed again, the power is turned off, The auto power off function turns off the power in about 10 minutes after the power was turned on.
④ **Rotary switch :** A switch to change among the voltage, current, resistance or frequency.
⑤ **Range switch :** Press this switch to change the range from auto to manual when using the voltage or resistance range. In the manual range, each time this switch is pressed, the ranges are changed. To return the manual range to the auto range, keep pressing this switch for one second or longer.
⑥ **Function switch :** Use this switch to change between the AC (~) and the DC (⎓) when measuring voltage and current. This switch is also used for resistance measurement (Ω) and continuity check (⏜).
⑦ **Zero adjuster :** A switch to adjust the zero when using the ⎓ A function. When this switch is pressed, "ZERO-ADJ" is displayed and the display is cleated to zero.
⑧ **Data hold switch :** When this switch is pressed on, the measured value is maintainted. When the switch is pressed again, the data hold is reset.
⑨ **Display :** An LCD to show measurements in digits and battery status.
⑩~⑫ **Measuring terminals**
⑬ **Battery cover :** Remove the cover to set and replace the batteries.
⑭ **Hand strap**

[4] BATTERY REPLACEMENT

⚠ WARNING (Hazard of electrical shock)

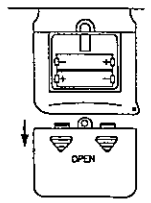
① Do not attempt to replace the batteries while the meter is clamping a wire or measuring a voltage.
② Do not use the meter with the battery case removed.

⚠ CAUTION

① If the batteries are consumed and drop below the operating voltage, the symbol " ⊟ " lights in the display. Immediately replace the batteries with new ones.
② Do not use the different type of batteries together.
③ If the meter is not used for a long time, remove the batteries, If they are left in the meter, the liquid may leak to damage the meter.

How to replace

① Using a screwdriver, remove the screw fixing the battery case located at the bottom on the back of the meter and slide to remove the battery case to the arrowed direction.
② Take out the two consumed batteries .
③ Set new batteries with their polarities facing the correct directions. (type of battery : RO 3)
④ Attach the battery case and fix it with the screw.

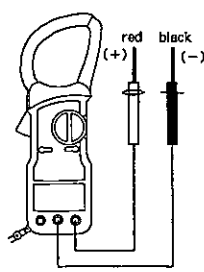


[5] MEASUREMENT PROCEDURE

(Note) If input is exceeding the range, only the most significant digit " 4 " is flickering.

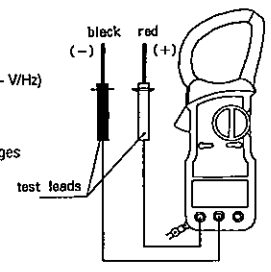
5 -1 Testing Diode -▶|-

1) Press the power switch ③to on.
2) Set the rotary switch ④ to a " -▶|- " position.
3) Plug the test lead pins into the measuring terminals. (COM — Ω/ -▶|-)
4) (forward voltage)
Apply the black test pin to the cathode of the diode and the red test pin to the anode.
Normal diodes are measured in a range of 0.4V to 0.7V.
5) (revers voltage)
Apply the red test pin to the cathode of the diode and the black test pin to the anode.
Normal diodes revers voltage : approx 3.000V (Battery voltage)



5 - 2 Measuring ACV (~V)

1) Press the power switch ③to on.
2) Set the rotary switch knob ④to an V position.
3) Press the function switch ⑥to the " ~V" function.
4) Plug the test lead pins into measuring terminals. (COM – V/Hz)
5) Apply the test lead tips to measured target.
6) Read the indicated value.
(Note) In the manual range, each time this is pressed, the ranges are changed as follows.
4 V → 40V→ 400V→ 600V→ 400mV



5 - 3 Measuring DCV (⎓ V)

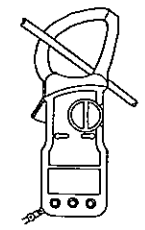
1) ~ 2) The same "Measuring ACV (~V)" —
3) Press the function switch ⑥to the " ... V" function.
4) Plug the test lead tips into measuring terminals. (COM - V/Hz)
5) Apply the test lead tips to measured target.
6) Read the indicated value.
(Note 1) "—" is indicated before measured value when the polarity of input is reverse to that of measuring terminals.
(Note 2) In the manual range. each time this is pressed, the ranges are changed as follows.
400mv → 4 V → 40V → 400V → 600V

5 - 4 Measuring Frequency (Hz)

1) Press the power switch ③to on.
2) Set the rotary switch knob ④to a "Hz" position.
3) Plug the test lead pins into measuring terminals. (COM- V/Hz)
4) Using the range switch, set the input sensitivity.
When the power is turned on, the meter is set in the auto range mode. When the range switch is pressed, it is changed to the manual range mode. Then each time the switch is pressed, the input sensitivity changes in the order of 10mV → 100mV → 1 V → 10mV.
5) Apply the test lead tips to measured target.
6) Read the indicated value.

5 - 5 Measuring ACA (~A)

1) Press the power switch ③to on.
2) Set the rotary switch knob ④to the proper A range.
3) Press the function switch ⑥to the "~ A" position.
4) Open the CT, clamp a cable to measure and close the clamp completely.
5) Read the indicated value. If a value is hard to read due for example to dark illumination, use the "Data hold" function.



5 - 6 Measuring DCA (⎓ A)

1) ~ 2) The same "Measuring ACA (~A)"
3) Press the function switch ⑥to the " ⎓ A" position.
4) Press the ZERO adjuster ⑦once to set it to zero (0)
5) Open the CT, clamp a cable to measure and close the clamp completely.
6) Read the indicated value. If a value is hard to read due for example to dark illumination, use the data hold function.
(Note) • When the 40A range is used, the display will not become zero (0) even when the input is 0 A, but this is not a plobrem. Press the Zero adjuster ⑦to set the zero.
• When the zero is set, the over range changes.
For example, if the zero is 1.00A is displayed in the 40A range, the range is exceeded at current of 39.00A.
• To reset the Zero-ADJ mode, keep pressing the Zero adjuster for one second or longer.
• If the current direction disaccords with direction mark, the polarity indication of "-" appears.

5 -7 Measuring Ω, check Continuity ⏜

1) Press the power switch to on.
2) Set the rotary switch knob to a "Ω" position.
3) Press the function switch to the Ω or ⏜ range.
4) Apply the test lead tips to measured target.
5) Read the indicated value.
(Note) In the manual range, each time this is pressed, the ranges are changed as follows.
40Ω → 400Ω → 4 kΩ → 40 kΩ → 400kΩ → 4000kΩ