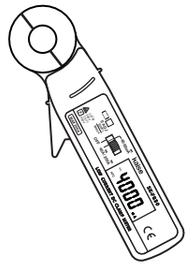
ET7830

LOW CURRENT DC CLAMP METER

INSTRUCTION MANUAL



endeavour

FOR SAFETY MEASUREMENTS!!

To prevent an electrical shock hazard to the operator and/or damage to the instrument, read this instruction manual carefully before using the Clamp Meter. WARNINGS with the symbol ⚠ on the Clamp Meter and this instruction manual are highly important.

Important Symbols

⚠ The symbol listed in IEC 61010-1 and ISO 3864 means "Caution (refer to instruction manual)".

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

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

INTRODUCTION

Thank you for purchasing **ET7830 LOW CURRENT DC CLAMP METER".** To obtain the maximum performance of this instrument, read this Instruction Manual carefully, and take safe measurements.

1. UNPACKING AND INSPECTIONS

Inspect the instrument and accessories for transport damage. If there is any damage or missing items, ask your local dealer for replacement.

Confirm that the following items are contained in the package.

1. Digital Clamp Meter 1pce.
2. Carrying Case (1011) 1pce.
3. Batteries (1.5V R6P) 2pcs.
4. Instruction Manual 1pce.

2. SPECIFICATIONS

2-1. GENERAL SPECIFICATIONS

1. DISPLAY (LCD)
- **a. Numerical Display :** 4000 count, Maximum reading 4050, 12mm high
- **b. Units and Symbols :** ⎓, ⎓, ∼, mA, A, mV, V, Ω, kΩ, MΩ, Hz, kHz, %, nF, μF, ⊣, •)) , DH, DIFF, PH, MAX, MIN, APO, BAT, AUTO, LPF and decimal point.

2. OPERATING PRINCIPLE : Σ-Δ conversion
3. SAMPLING RATE : 64 times / second(Display : 1time/second)
4. RANGE SELECTION : Manual-ranging(4000mA), Auto-ranging(40A/200A)
5. POLARITY : Auto-Polarity ("—" indication in minus)
6. OVERLOAD INDICATION : "OL" indication blinks
7. BATTERY WARNING : "BAT" indication at approx. 2.3V or less

8. DISPLAY HOLD : Hold indicating values by DH Key
9. ZERO-ADJUSTMENT (DIFFERENCE MEASUREMENT) : Adjust LCD into 0±1 digit and/or start Difference Measurement by 0 ADJ (DIFF) Key.
10. AUTO POWER OFF : Power turns off automatically after a lapse of following minutes.
- **a. 4000mA range :** Approx. 5 minutes
- **b. 40A/200A range :** Approx. 10 minutes

11. OVERLOAD PROTECTION : 400A AC/DC rms for 1 minute (50/60Hz)
12. DIELECTRIC STRENGTH : 3.54kV AC, 50Hz sine wave, for 1 minute (between iron core and case)
13. OPERATABLE TEMPERATURE & HUMIDITY : 0℃ to 40℃, 80%RH or lower in non-condensing.
14. STORAGE TEMPERATURE & HUMIDITY : -20℃ to 60℃, 70%RH or lower in non-condensing.
15. TEMPERATURE COEFFICIENT : Accuracy in 23℃±5℃×0.1/℃
16. SAFETY LEVEL : CE Marking approved (IEC-61010-1, CAT Ⅲ 300V, CAT Ⅰ 600V and EMC Test passed.)
17. POWER SUPPLY : 1.5V R6P (AA) batteries ×2
18. POWER CONSUMPTION : 26mA max.
19. CONTINUOUS OPERATING TIME : Approx. 60 hours (Alkaline cell), Approx. 30 hours (Manganese cell) (in 40A/200A range, 0A input)
20. CONDUCTOR DIAMETER : φ20mm max.
21. DIMENSIONS & WEIGHT : 203(H)×61(W)×30(D)mm, Approx. 230g (including batteries)
22. ACCESSORIES : 1011 Carrying Case, 1.5V R6P (AA) batteries ×2, Instruction Manual

2-2. MEASUREMENT SPECIFICATIONS

(23℃±5℃、＜80%RH in non-condensing)

1. DC CURRENT (⎓ mA, ⎓ A) *Accuracy after zero adjustment

Range	Accuracy	Resolution	Max.Input Current
4000mA	±1.5%rdg±5dgt (from 5mA)	1mA	4000mA DC
40.00A	(0 to 100A)±1.5%rdg±5dgt	10mA	200A DC
200.0A	(101 to 200A)±3.0%rdg±5dgt	100mA	

Overload Protection : 400A AC/DC rms (for 1 minute) (50/60Hz)
Range Selection : Manual-ranging / Auto-ranging

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 safe measurement.

3-1. WARNINGS

⚠ **WARNING 1. Checks of Clamp Meter Body**
Before measurement, confirm the body of this instrument has 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. For safety of high power line measurement, do not touch the live line and keep enough distance.

⚠ **WARNING 3. Maximum Input Observance**
Do not measure any current that might exceed the specified maximum input values.

⚠ **WARNING 4. Safety Line**
Do not put your fingers over the safety line while current measurement. (Refer to fig.1)

fig.1

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.

⚠**CAUTION 1.** Do not polish the case or attempt to clean it with any cleansing fluid like gasoline or benzine. If necessary, use silicon oil or antistatic 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.

⚠**CAUTION 4.** Do not measure AC high-frequency current. Clamp head becomes heated and could damage the instrument.

⚠**1 :** Do not make a measurement under large temperature difference. In case that the clamp meter moved into high temperature place from low temperature, turn the power on and leave it for a while to get it used to the surrounding temperature.

⚠**2 :** When measuring, open clamp head 15mm or wider and close it softly. Detach fingers from trigger after clamping a conductor.

4. NAME ILLUSTRATION

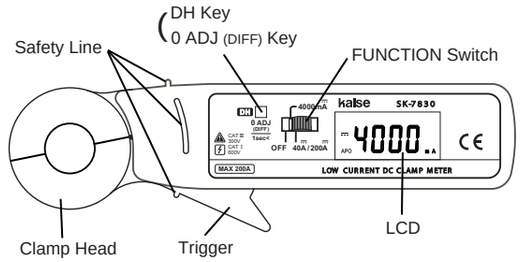
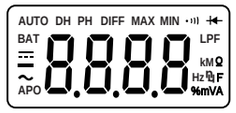


fig.2

4-1. LCD



AUTO : Lights up in auto-ranging measurement
BAT : Low battery warning
— : Lights up at minus
⎓ : Lights up in DC current measurement
APO : Auto power off indication
DH : Lights up in display hold function
DIFF : Lights up in zero-adjustment and difference measurement
mA, A : Lights up in current measurement

4-2. Clamp Head

Clamp on a single conductor to measure DC current.
NOTE : Unable to measure if several conductors are clamped.

4-3. Safety Line

The line to protect yourself against electrical shock hazard. Do not put your fingers over this line while measuring current.

4-4. FUNCTION Switch

Turns the power on and selects measurement functions. After measurement, turn it to "**OFF**".

4-5. DH Key : Display Hold

Holds indicating measurement values. ("**DH**" lights up)
To cancel it : Press **DH** key again.

4-6. 0 ADJ (DIFF) Key :

Zero-Adjustment : Press this key for 1 second or more when zero-point adjustment is necessary. LCD indications are adjusted into 0±1 digit.
Difference Measurement : Press this key for 1 second or more while measurement. Convert a measurement value into zero and indicate the relative values.
To cancel it : Press **0 ADJ (DIFF)** Key for 1 second or more.

4-7. Trigger

Opens and closes the clamp head. When measurement, open clamp head 15mm or wider and close it softly. Detach fingers from trigger after clamping a conductor.

5. MEASUREMENT PROCEDURES

5-1. PREPARATION FOR USE

1. INSTRUCTION MANUAL ⚠
Read INSTRUCTION MANUAL carefully to understand the specification and functions correctly. 「3. SAFETY PRECAUTIONS」is highly important for safe measurement.

2. BATTERY
Before using this instrument, install 2 of 1.5V R6P (AA) batteries refering to 「6-1. BATTERY REPLACEMENT」. Replace them in the same way when "**BAT**" lights up on LCD.

3. OVERLOAD INDICATION
"**OL**" lights up on LCD if measurement value exceeds maximum indicatable value of each measurement range (4050 digits or 2050 digits).

4. AUTO POWER OFF
Power turns off automatically after approx. 5 minutes (4000mA range) or after approx. 10 minutes (40A/200A range) of last **FUNCTION** Switch operation to conserve battery life. (Small-current-consumption remains. After measurement, be sure to set **FUNCTION** Switch to **"OFF"**.)
To cancel it (40A/200A range only) : Hold down **DH** Key and set **FUNCTION** Switch from **"OFF"** to **"40A/200A"**. Auto power off is canceled and **"APO"** disappears from LCD.
NOTE : Auto power off cannot be canceled in 4000mA range.

5. POWER-ON INITIALIZE
Automatic zero-adjustment function to adjust LCD indications into 0±1 digit when powered on.
NOTE : INITIALIZE does not work properly if some inputs are applied.
NOTE : Do not touch trigger when turning on the power. INITIALIZE does not work correctly if any pressure is applied to trigger or clamp head is opened.

6. SYMBOL MARK
The following symbol marks shown on the instrument and instruction manual are listed in IEC 61010-1 and ISO 3864.

⚠	Caution (refer to instruction manual.)
⚡	Caution for current-applied dangerous conductor
⎓	Direct Current (DC)
⧈	Double Insulation
CE	CE Marking Conformity

5-2. DC CURRENT MEASUREMENT (⎓ mA / ⎓ A) ⚠

⚠ WARNINGS

- Do not measure any current that might exceed maximum input value (200A DC / 600V line).
- Read 「3. SAFETY PRECAUTIONS」carefully to avoid electric shock hazard and serious damage to the instrument.
- Do not twist clamp head while measurement. Measurement should be incorrect if any pressure is applied to the clamp head.
- Do not touch any part of power line or the circuit to be measured.

1. Set **FUNCTION** Switch to " **4000mA̿** or **40A̿ / 200A̿** ".
   NOTE : Do not touch trigger nor open clamp head until POWER-ON INITIALIZE is completed and LCD indicates 0±1 digit.
2. Open clamp head 15mm or wider and close it softly. Detach fingers from trigger after clamping a conductor.
3. Read the measurement value on LCD.
   NOTE : 4000mA range needs a few seconds until LCD indications become stable.
4. After measurement, unclamp from the conductor and set **FUNCTION** Switch to **"OFF"**.

Supporting Functions :
Zero-Adjustment, Difference Measurement, Display Hold (Refer to 4-5 and 4-6).

NOTES : Following instructions are important to take an accurate measurement.

1. When taking measurement in 4000mA range, to reduce geomagnetic effect to the measurement, zero adjustment by POWER-ON INITIALIZE must be taken just in front of a conductor to be clamped, fixing the clamp head angle on measuring position.
   NOTE : LCD indication may not return to 0mA by geomagnetic effect if changing clamp head angle after measurement taking clamp head away from a measured conductor.
2. When measuring low current at 1000mA or lower, take zero adjustment by POWER-ON INITIALIZE for every measurement.
3. LCD indication may not return to "0" by magnetic effect, if high current is instantaneously applied during high current measurement at 100A or higher, or regular measurement in each range.
4. Under 4000mA range measurement, ±15mA current fluctuation from measuring value is not displayed on LCD by internal control.
5. Zero-point fluctuation occurs depending on temperature alteration of measurement environment that could cause LCD indication not to return to "0" or large measurement deviation.

● MEASUREMENT EXAMPLE 1.
Automobile Dark Current Measurement

Dark Current :
mA-level low current that is used after turning off the engine by such as car security system or audio settings back-up. Too much dark current causes battery depletion, but its measurement is difficult. ET7830 solves this problem and makes it quick and easy.

① Leave the car engine turned off for about 15 minutes after setting battery cable into the measurable condition. All electric components such as door lamp, room lamp, and headlight must be turned off. Lock the all doors if measuring car has remote-control door lock function.
NOTE : Leaving time is different depending on the car functions, especially for the cars that ECU or other electric components keep working for a certain period of time after turning off the engine, or have LCD fuel meter.

NOTE : Cool down the engine before measurement, in case that measuring cable is close to the engine.

② Put the clamp head close to a battery cable to be measured. Set **FUNCTION** Switch to **"4000mA̿"** without touching the trigger. POWER-ON INITIALIZE works to adjust LCD display into "0" automatically. (Refer to fig. 3)

fig.3


fig.4

③ Clamp-on a minus cable of car battery.
④ Read the measurement value on LCD.
NOTE : The values should be minus (−) if the current flows opposite direction of "⇒" mark on clamp head.
⑤ If measurement value is higher than the specified value, check if any of car lamps remain lighting.
NOTE : The specified dark current value becomes different if the optional electric components such as car navigation or security equipments are attached. In that case, refer to their user manuals for details.

● Example of Incorrect Measurement

① Turn the power on with clamp head opened.

POWER-ON INITIALIZE does not work properly.

fig.5

② Start measurement as soon as engine stopped.

Measurement value should be incorrect.
NOTE :
Especially for the cars that ECU or other electric components keep working for a certain period of time after turning off the engine, or have LCD fuel meter.


fig.6

③ Start measurement with any of car lamps remain lighting.

Cannot measure dark current.
Turn the all lamps off.


fig.7

● MEASUREMENT EXAMPLE 2.
Measurement of Car Alternator's Charging Current

Car Alternator:
Automobile engine generator that outputs DC electricity. Measuring its charging current is effective to find the trouble that might cause battery depletion or battery damage.

① Stop the car engine.
② Set **FUNCTION** Switch to " **40A̿ / 200A̿** " .
Be sure not to touch trigger. (Refer to fig. 8)
③ Clamp-on B-terminal cable from car alternator.


fig.8

④ Start the engine, and read the measurement value on LCD.
NOTE : The value should be minus (−) if the current flows opposite direction of "⇒" mark on clamp head.
⑤ Alternator has no problem if 20A to 40A is displayed first, and then it slowly becomes lower.
⑥ Alternator should be defective if no value is indicated, or high current value remains indicated.

6. MAINTENANCE

6-1. BATTERY REPLACEMENT

⚠ WARNING
To avoid electrical shock, detach instrument from circuit when replacing battery. Set **FUNCTION** Switch to "OFF".

Replace the batteries when "**BAT**" lights up on LCD.

1. Turn the power off.
2. Unscrew the Baterry Cover and remove exhausted batteries.
3. Insert 2 of new 1.5V R6P (AA) batteries in correct polarity.
4. Fix battery Cover and tighten the screw.

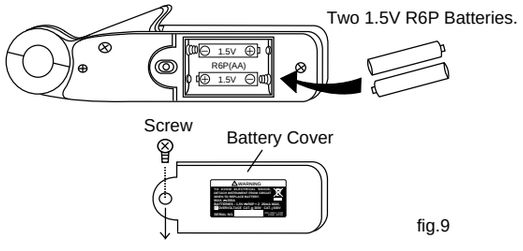


fig.9

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 a repair service. This service is available through your local dealer.

6-3. REPAIR

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

Check the following items before asking for repair service.

1. Check the battery connection, polarity, and capacity ("BAT" lights up or not).
2. Confirm that FUNCTION Switch is set to the correct position.
3. Confirm that measured accuracy is adopted in the operating environment.
4. Confirm that the body of this instrument has no cracks or any other damage.

WARRANTY

Endeavour Tools guarantees this unit against defects in material and workmanship for a period of twelve (12) months from the date of purchase.

A.Endeavour Tools warrants the quality of these goods against defects in material and workmanship only.
B. Defective goods shall only be replaced, repaired or purchase price refunded if:
a.The customer notifies Endeavour Tools by providing a full report describing the defect in writing within 7 days of the discovery of the defect; and
b.The notification above provided to Endeavour Tools is prior to the expiry of the warranty period;
c.The customer forwards the defective goods together with proof of purchase from Endeavour Tools; or its authorized distributor at their expense, within 14 days of any request by Endeavour Tools to do so;
d.The goods since the date of delivery to the customer have been properly maintained, stored and housed and the goods have not been abused or modified or the case opened;
C. Endeavour Tools may replace or repair the defective good (or part thereof) or refund the purchase price of the defective good at its option.
D. Endeavour Tools shall not be responsible for any loss or damage arising from or in any way connected with the use of the goods.
E.To the maximum extent permitted by law, a claim in respect to a defective good shall not be permitted in the event that the goods have not been installed, used, maintained, or housed in a proper and workmanlike manner or in accordance with the usual standards or manufacturers specifications or instructions or if the goods have been modified, repaired or altered by any person apart from Endeavour Tools.

Notwithstanding our warranty terms above, our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

The benefits under our warranty are in addition to other rights and remedies under law in relation to the goods.

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

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