

A613

DIGITAL C METER OPERATION MANUAL

1. FEATURES

- ✧ Easy and correct readout.
- ✧ High measuring accuracy.
- ✧ Measurements are possible even under a strong magnetic field.
- ✧ LSI-circuit provides high reliability and durability.
- ✧ Input overload protection is provided.
- ✧ LCD display for low power consumption and clear readout even in bright ambient light conditions.
- ✧ In-line pushbuttons allow one hand operation.
- ✧ Light-weight and compact construction for easy operation.
- ✧ Low battery condition is indicated on the LCD display.
- ✧ Backlight
- ✧ Automatic discharge
- ✧ Data hold

2. SPECIFICATIONS

2-1.GENERAL SPECIFICATIONS

Display	:LCD (Liquid Crystal Display) Max Indication 1999.
Measurement	:C (Capacitance)
Range	:single 9 position, whole range value (from 0.1pF to 20000uF)
Zero Adjustment	:Manual at 200pF range (range:±20pF)
Over-input	:Display shows "1".
Sampling Time	:0.5~5second
Operating Temp	:0°C to 40°C.
Operating Humidity	:80% MAX.R.H.
Power Supply	: 9V 6F22 ×1 pc

Typical consumption current :3~4mA (200pF-200uF)

Standard Accessories: Test alligator clips (red & black)...1 pair.

Instruction manual.....1 pc.

2-2. ELECTRICAL SPECIFICATION

Accuracy is ±(percentage of reading + number of digit) at 23 ±5°C, <80%RH.

Range	Accuracy	Resolution	Test Frequency	Max indication value
200pF	±(0.5%+5d)	0.1pF	820Hz	199.9pF
2nF		1pF		1.999nF
20nF		10pF		19.99nF
200nF		100pF		199.9nF
2uF		1000pF		1.999uF
20uF	±(4.0%+5d)	0.01uF	82Hz	19.99uF
200uF		0.1uF	8.2Hz	199.9uF
2000uF		1uF		1999uF
20mF		10uF		19.99mF
		±(5.0%+5d)		

pF= Pico Farad($10^{-12}F$), nF= nan Farad($10^{-9}F$), uF= micro Farad($10^{-6}F$)

Zero Error: ±20pF

Excitave voltage: Max.2.8Vrms

Transistor hFE Test

Range	Test Range	Test Current / voltage
NPN & PNP	0-1000	$I_b=10\mu A / V_{ce}=3V$

3.CONSIDERATION OF MEASUREMENT

- (1) This C METER is intended for measuring the capacitance value of a capacitor. It is not intended for determining the "Q" factor for above reactive components. Misleading readings may be obtained if the measurement of capacitance of a resistor is attempted.
- (2) When measuring components within circuit that circuit must be switched off and de-energized before connecting the test leads.
- (3) Do not close (black & red) test leads.
- (4) Instruments used in dusty environments should be stripped and cleaned periodically.
- (5) Do not leave the instrument exposed to direct heat from the sun for long periods.
- (6) Before removing the battery and fuse compartment cover, ensure that the instrument is disconnected with any circuit and the power switch is in the off position.
- (7) For all measurements, should connect BLACK test lead into "-" terminal and RED test lead into "+" terminal.

4.CAPACITANCE(C) MEASURING PROCEDURE

- (1) Press POWER key, turn on the power.
- (2) Select the range switch for the maximum expected capacitance.
- (3) Check "0" indication: If test range is 200pF, 2nF, 20nF, should check "0" indication before test.
- (4) Observe polarity when connecting polarized capacitors.
- (5) Full discharge any capacitors.
- (6) Connect the alligator clips to the capacitors leads.
- (7) Read the display. The value is direct reading in the electrical unit (pF, nF, uF) indicated at the selected range switch. If DISPLAY show "1", It indicate on Out-of-Range measurement. If the display indicates one or more leading zeros, shift to the next lower range scale to improve the resolution of the measurement.

NOTE:

- (a) If the capacitance value is unmarked, start from the 200pF range and keep increasing until the over-range indication goes off and a reading is obtained.
- (b) A shorted capacitor will read over-range on all ranges. A capacitance with

low voltage leakage will read over range, or a much higher value than normal.

An open capacitor will read zero on all ranges (possibly a few pF on 200pF range, due to stray capacitance of the instrument).

- (c) Very low capacitance measurement should be performed by using extremely short leads in order to avoid introducing any stray inductance.
- (d) When using the optioned test leads, remember that the leads introduce a measurable capacitance to the measurement. As a first approximation, the test capacitance is measured by opening the leads at the trips, recording the open circuit value and subtracting that value.
- (e) Capacitors, especially electrolytic, often have notoriously wide tolerances. Do not be surprised if the measured value is greater than the value marked on the capacitor, unless it is a close tolerance type. However, value is seldom drastically below the rated value.
- (f) If changing range, measured value will be changed, leakage-voltage capacitors will be checked also. Leakage-resistance will be decreased in lower range.

5.Transistor Testing

- 5.1 Set the rotary switch at "hFE" position.
- 5.2 Determine whether the transistor under testing is NPN or PNP and locate the emitter, base and collector leads. Insert the leads into proper holes of hFE socket on the front panel.
- 5.3 Read the approximate hFE value at the testing condition of base current I_b10uA and $V_{ce} 3V$.

6. ATTACHED FUNCTION

- 6.1. "☼" Key
Push the key to open the backlight, about 10 second after the backlight will auto wink.
- 6.2. "HOLD" Key
Push the key to lock display value, and the DATA-H symbol will appear, push it again to exit.

7. MAINTENANCE

- 1) 9V-Volt batteries replacement
 - a. Ensure the instrument is not connected to any external circuit. Set the selector switch to OFF position and remove the test leads from terminals.
 - b. Remove the screw on the bottom case and lift the bottom case.
 - c. Remove the spent battery and replace it with a battery of the same type.