

DESCRIPTION

Introduction

Capacitor and inductor usage is extensive, encompassing all facets of industrial and consumer electronics. Very few circuits lack either of these components. Because the transistor gave way to the IC, and the IC gave way to the LSIC, capacitor and inductor usage continues to increase rapidly since neither of these components can be physically incorporated into ICs on a broad basis. Though they have changed some in physical size, capacitors still perform the same basic functions. But in today's circuits, more than ever before, the tolerances and parameters of capacitors and inductors are critical to proper circuit operation.

Capacitor value and tight tolerance is just one important parameter. In today's high performance circuits, leakage, dielectric absorption, and ESR are necessary indicators of a capacitor's ability to perform properly in circuit. Inductors too, require tight tolerances and quality checks. Unless all of these parameters can be thoroughly analyzed, troubleshooting becomes a guessing game.

The Sencore LC77 "AUTO-Z" takes the guess work out of capacitor and inductor testing. It provides automatic tests of capacitor value, leakage, ESR, and a patented dielectric absorption test. Inductors are automatically analyzed for value and quality with patented tests. The LC77 is a complete, automatic, microprocessor-controlled capacitor and inductor analyzer. Its features make it ideally suited for both single component analyzing in service or maintenance work, or for large volume batch testing in a lab or incoming inspection.

Features

The Sencore LC77 "AUTO-Z" is a dynamic, portable, automatic capacitor and inductor tester. It is designed to quickly identify defective components by simply connecting the capacitor or inductor to the test leads and pushing a test button. The test result is readily displayed on an LCD readout in common terms. All capacitor and inductor test results may also be displayed as good/bad compared to standards adopted by the Electronic Industries Association (EIA). User defined limits may also be programmed into the LC77 for the good/bad comparison.

In addition to testing capacitors for value up to 20 Farads, the LC77 checks capacitors for leakage at their rated working voltage, up to 1000 volts. ESR is checked with a patent-pending test, and an automatic, patented test checks capacitor dielectric absorption. A patented inductance value test provides a fast, accurate test of true inductance. A patented ringing test checks coils, deflection yoke, switching power supply transformers, and other non-iron core inductors with a fast, reliable good/bad quality test.

Automatic lead zeroing balances out test lead capacitance, resistance, and inductance for accurate readings on small capacitors and inductors. The LC77 is protected from external voltages applied to the test leads by a fuse in the TEST LEAD JACK and special circuitry which locks out all test buttons when voltage is sensed on the test leads.

Battery operation makes the LC77 completely portable for on-location troubleshooting in all types of servicing from industrial equipment to avionics to cable fault locating. An optional SCR & Triac tester extends the LC77 test capabilities to provide a fast, accurate test of these components. The LC77 may be interfaced into any IEEE 488 Bus system for fully automatic, computer controlled testing in a laboratory or incoming inspection area.

Specifications

DIGITAL READOUT

TYPE: .45", 6 digit, 7 segment LCD

READINGS: Fully autoranged with auto decimal placement. One or two place holding zeros added as needed to provide standard value readouts of pF, uF, F, uH or mH.

ANNUNCIATORS: pF, uF, F, uH, mH, H, uA, mA, %, V, kΩ, MΩ, OHMS, RINGS, SHORT, OPEN, WAIT, GOOD, BAD.

CAPACITORS (Out of circuit)

Dynamic test of capacity value is determined by measuring one RC time constant as capacitor is charged to +5 V through:

1.5 Megohms for 0 - .002 uF

15 Kilohms for .002 uF - 2 uF

Values above 2 uF are charged with a constant current of:

60 mA for 2uF - 2000uF

416 mA for 2000 uF - 19.99 F

Maximum voltage across capacitors larger than 2000 uF limited to 1.75 V.

ACCURACY: $\pm 1\%$ $\pm 1\text{pF}$ ± 1 digit for values to 1990 uF. $\pm 5\%$ $\pm .1\%$ of range full scale for values 2000 uF to 19.99 F.

RESOLUTION AND RANGES: 1.0 pF to 19.99 F, fully autoranged:

.1 pF —	1.0 pF to	199.9 pF
1 pF —	200 pF to	1999 pF
.00001 uF —	0.00200 uF to	0.01999 uF
.0001 uF —	0.0200 uF to	0.1999 uF
.001 uF —	0.200 uF to	1.999 uF
.01 uF —	2.00 uF to	19.99 uF

.1 uF —	20.0 uF to	199.9 uF
1 uF —	200 uF to	1,999 uF
10 uF —	2,000 uF to	19,990 uF
100 uF —	20,000 uF to	199,900 uF
.001 F —	0.200 F to	1.999 F
.01 F —	2.00 F to	19.99 F

CAPACITOR LEAKAGE

READOUT: User selectable between leakage current and resistance.

ACCURACY: $\pm 5\%$ ± 1 digit.

APPLIED VOLTAGE: Keyboard entry; 1.0 to 999.9 volts in .1 volt steps; accuracy $\pm 0 - 5\%$. Short circuit current limited to 900mA, power limited to 6 watts.

RESOLUTION AND RANGES: .01 uA to 20 mA, fully autoranged:

.01 uA —	0.01 uA to	19.99 uA
.1 uA —	20.0 uA to	199.9 uA
1 uA —	200 uA to	1999 uA
.01 mA —	2.00 mA to	19.99 mA

CAPACITOR ESR (Test patent pending)

ACCURACY: $\pm 5\%$ ± 1 digit.

CAPACITOR RANGE: 1 uF to 19.99 F.

RESOLUTION AND RANGES: .10 ohm to 2000 ohms, fully autoranged:

.01 ohm —	0.10 ohms to	1.99 ohms
.1 ohm —	2.0 ohms to	19.9 ohms
1 ohm —	20 ohms to	199 ohms
10 ohm —	200 ohms to	1990 ohms

CAPACITOR D/A (U.S. Patent # 4,267,503)

ACCURACY: ± 5 counts.

RANGE: 1 to 100%.

CAPACITOR RANGE: .01 uF to 19.99 F.

INDUCTORS (In or out of circuit)

A dynamic test of value determined by measuring the EMF produced when a changing current is applied to the coil under test. (U.S. Patent # 4,258,315)

CURRENT RATES: automatically selected

50 mA/uSec —	0 uH to	18 uH
5 mA/uSec —	18 uH to	180 uH
.5 mA/uSec —	180 uH to	1.8 mH
50 mA/mSec —	1.8 mH to	18 mH
5 mA/mSec —	18 mH to	180 mH
.5 mA/mSec —	180 mH to	1.8 H
.05 mA/mSec —	1.8 H to	19.99 H

ACCURACY: $\pm 2\%$ ± 1 digit

RESOLUTION AND RANGES: .10 uH to 20 H, fully autoranged

.01 uH —	0.10 uH to	19.99 uH
.1 uH —	20.0 uH to	199.9 uH
1 uH —	200 uH to	999 uH
.001 mH —	1.000 mH to	1.999 mH
.01 mH —	2.00 mH to	19.99 mH
.1 mH —	20.0 mH to	199.9 mH
1 mH —	200 mH to	999 mH
.001 H —	1.000 H to	1.999 H
.01 H —	2.00 H to	19.99 H

RINGING TEST

A dynamic test of inductor quality determined by applying an exciting pulse to the inductor and counting the number of cycles the inductor rings before reaching a preset damping point. (U.S. Patent # 3,990,002)

INDUCTOR RANGE: 10 uH and larger, non-iron core
ACCURACY: ± 1 count on readings between 8 and 13.

RESOLUTION: ± 1 count.

EXCITING PULSE: 5 volts peak; 60 Hz rate.

GENERAL

TEMPERATURE: Operating range: 32° to 104°F (0° to 40°C) Range for specified accuracy (after 10 minute warmup): 50° to 86°F (10° to 30°C)

POWER: 105-130V AC, 60Hz, 24 watts max. with supplied PA251 power adapter. Battery operation with optional BY234 rechargeable battery. 210-230V AC operation with optional PA252 Power Adapter.

AUTO OFF: Removes power during battery operation if unit sits idle longer than 15-20 minutes.

BATTERY LIFE: 8 hours typical inductor testing; 7 hours typical capacitor testing.

SIZE: 6" x 9" x 11.5" (15.2cm x 22.9cm x 29.1cm) HWD

WEIGHT: 6 lbs. (2.7kg) without battery, 7.6 lbs (3.4kg) with battery.

GOOD/BAD INDICATION: Functions on all tests. Requires user input of component type and value, or input of desired limits.

IEEE: Requires the use of Sencore IB72 Bus Interface Accessory.

The following interface codes apply: SH1, AH1, T8, L4, SRO, RLO, PPO, DCO, DTC, CO. All readings are test accuracy ± 1 count.

Specifications subject to change without notice

ACCESSORIES

SUPPLIED:

39G143 Test Leads
39G144 Test Lead Adapter
39G201 Test Button Hold Down Rod
64G37 Test Lead Mounting Clip
PA251 AC Power Adapter/Recharger

OPTIONAL:

39G85 Touch Test Probe
FC221 Field Calibrator
BY234 Rechargeable Lead Acid Battery
SCR250 SCR/Triac Tester
CC254 Carrying Case
CH255 Component Holder
CH256 Chip Component Test Lead
IB72 Bus Interface Accessory
PA252 220V AC Power Adapter/Recharger