



# **INSTRUCTION MANUAL FOR LCR COMPARATOR MODEL: LCO-2, LCO-2M & LCO-3**

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## 1. GENERAL

Some three decades ago, we committed ourselves to fill up the void in indigenous production-oriented test equipments for our fast growing electronic and electrical Industry, which was then dependent on costly imported equipment. Even the simplest of the equipments were being imported with the omnipresent menace of servicing problems.

True to our commitment, over the years, dedicated and hard-core professionals at Sivananda Electronics have come out with a wide range of test equipments to cater to the needs of the Indian Electronics and Electrical Components Industry. The types of equipment ranges from simple but vital equipments to the most sophisticated equipments, using the latest state of the art technology.

Prime design criteria are production orientation, speed, accuracy, ease of operation suitability for diverse climatic conditions and technical level of manpower. Ever-growing list of satisfied customers, shows that we have been successful in fulfilling our commitment.

Our constant endeavor is to update the present equipments and bring out new equipments as per International standards. A constant feedback from our customer is a source of encouragement in our endeavor.

As our equipments are production-oriented, every precaution is taken at each stage to ensure long life and trouble free operation. A well knit team of service engineers support our after sales programme , effectively.

*You have already selected a winner.*

*Read the manual carefully and proceed to use the equipment with confidence.*



## 2. INTRODUCTION

The Component Comparator Model LCO-2 is specially designed for high speed sorting of resistors, capacitors and inductors. The equipment is equally suitable for both component manufacturers and bulk consumers for production, inward inspection and quality assurance testing requirements..

The Model LCO-2 uses a Low Level, 1KHz test signal and bridge principle for measuring percentage deviation. In addition to percentage deviation a phase detector is used to measure tand for capacitors. Four ranges of 1% , 2.5% , 10% & 20% FSD for deviation and single range of 1% (0.01)FSD for tand is provided. The electronic Go-No-Go system is the regular features of Model LCO-2. These features make it a versatile, high speed component comparator. A speed of 1500 pieces per hour even by unskilled operator is normal. The equipment is immune to short circuits, wrong selection of ranges, voltage fluctuations and mishandling which is likely to occur during use by unskilled operator.

MODEL LCO-2M has the same features & specifications as LCO-2 but in addition to test frequency of 1KHz , a frequency of 100Hz is also provided.

In Model LCO-3 the test frequencies are 1KHz & 10KHz.

The component range for L & C extends on higher or lower side depending on test frequency.



### 3. TECHNICAL SPECIFICATIONS

#### 3.1 TEST SIGNAL

Test Voltage	:	1 VAC approximately.
Test Frequency	:	LCO-2 : 1KHz
		LCO-2M : 100Hz & 1KHz
		LCO-3 : 1KHz & 10KHz

#### 3.2 COMPONENT RANGE

Test Frequency	Range	Models
1 KHz	R – 5 ohm to 20 m ohm	LCO-2, LCO-2M & LCO-3
	C - 100 pF to 10 Mfd	
	L – 2 mH to 100H	
100Hz	R – 5 ohm to 20 m ohm	LCO-2M
	C - 1000 pF to 100 Mfd	
	L – 20 mH to 1000 H	
10 KHz	R – 5 ohm to 20 m ohm	LCO-3
	C - 10 pF to 1 Mfd	
	L – 0.2 mH to 10 H	

#### 3.3 TOLERANCE

F.S.D.	Resolution	Accuracy
± 1 %	0.02%	±1% ± Resolution
± 2.5 %	0.05%	
± 10 %	0.40%	
± 20 %	1.00%	

3.4 Tolerance Range : 120 mm Taut Band Meter

#### 3.4 Tan d

Range	:	1% F.S.D. (0.01)
Resolution	:	0.02% (0.0002)
Accuracy	:	±1 % of ± Resolution
Indication	:	100 mm Taut Band Meter

3.5 Power : 230 VAC, ±15%, 50Hz single Phase.

3.6 Go-NoGo : A 3 lamp electronic go-nogo indication for faster sorting with facility for individually setting –LIMIT, + LIMIT for deviation & upper limit for tan d.

3.7 Dimensions :

3.8 Weight :



#### 4. OPERATING CONTROLS , INDICATIONS & TERMINATIONS

DWG. REF	LEGEND	COMPONENT	FUNCTION
1	ON	Illuminated Switch	To switch the equipment ON/OFF
2	%	4 Way Band switch	To select the desired deviation range i.e. 1% , 2.5% ,10% or 20% FSD.
3	Function Selector Switch	6 Way Band switch	To select the desired function i.e. set tan d limit, -Limit, + Limit , Zero, Operate & Meter Off.
4	Set Zero MFD	POT	To set the zero on deviation meter (while keeping the function selector switch on zero position)
5	Set Zero Tan d	POT	To set the zero / tan d of standard capacitor (while keeping the function selector switch on Zero position)
6	Zs 2 NOS.	Screw Terminals	For connecting the known or standard component.
7	Zx 2 NOS.	Screw Terminals	For connecting unknown component under test.
8	LR/C	Toggle Switch	To keep this in a position depending on the type of component under test i.e. LR or C.
9	Tand LIMIT	POT	To set the limit for tan d while keeping function select or switch in tan d Limit position.
10	-LIMIT	POT	To set the lower limit for acceptance while keeping the function selector switch in -Limit position.



11	+LIMIT	POT	To set the higher limit for acceptance while keeping the function selector switch in + Limit position.
12	+ LIMIT	Red Lamp	When lit, indicates that the component under test is of higher value than the set limit for +ve tolerance.
13	Within Range	Green Lamp	When lit, indicates that the component under test is within Limits.
14	- LIMIT	Red Lamp	When lit, indicates that component under test if of lower value than the set lower limit.  Please also note that all the lamps glow simultaneously to indicate that the 'CAPACITOR' under test has tan d more than the set limit. In this case we can not say any thing about % deviation.
15	Tan d	100 mm Taut Band Meter	To indicate the tan d of the 'C' under test directly, if the zero of the meter is set to the known value of standard capacitor.
16	%	120mm taut Band Meter	Shows the percentage deviation of compound under test from the known component.
17	100Hz / 1KHz or 1KHz/10KHz	Band Switch	To select the desired test frequency. This feature is available on LCO-2M & LCO-3 only.
<b>ON THE BACK PANEL</b>			
18	230VAC	Three Pin Socket	To connect the power supply to instrument with the help of Mains cord provided
19	200mA	Fuse	To protect the instrument. Always replace the fuse with correct rating & type.



## **5. OPERATING PROCEDURE**

- 5.1 Connect the instrument to 230VAC  $\pm 15\%$ , 50Hz supply with the help of three pin mains cord provided.
- 5.2 Switch ON the instrument and allow 5 minutes time for warm up.
- 5.3 Select the desired FSD range for tolerance.
- 5.4 Put selector switch LR/C in desired position.
- 5.5 Put Test frequency selector switch in desired position i.e. 100Hz /1KHz or 1KHz /10KHz respectively for LCO-2M & LCO-3. this facility is not available for LCO-2 which has a single test frequency of 1KHz.

### **LIMITS & ZERO SETTING**

- 5.6 Put function selector switch in 'Tan d LIMIT' position and with the help of Tan d Limit Pot, bring the needle to the desired upper limit. This setting is required only in case of capacitors.
- 5.7 Put the function selector switch in -LIMIT position and with the help of -LIMIT POT, bring the deviation meter to desired position.
- 5.8 Similarly set the + Limit.
- 5.9 Please note the following
  - 5.9.1 The deviation settings corresponds to the percentage deviation FSD selector i.e. if we set the deviation limit at 0.4% at 1% FSD & then the same setting will mean 1% at 2.5% FSD.
  - 5.9.2 In case of Tan d, the meter shows directly the Tan d value if and only if the zero of the meter is set at the actual value of standard capacitor.
- 5.10 Now put the function selector switch zero position & set the deviation meter to read zero. Also set the tan d meter to read the actual tan d of standard capacitor.



- 5.11 Now connect standard to 'Zs' terminals & unknown component to 'Zx' terminals.
- 5.12 Put function selector switch to operate position. Read deviation & actual tan d (in case of capacitors) on respective meters.
- 5.13 Indication of electronic GO-NOGO system is as follows:
  - 5.13.1 -LIMIT Red Lamp glowing indicates that the value of unknown component is less than set -Limit.
  - 5.13.2 +LIMIT Red Lamp glowing indicates that the component value is more than the set +LIMIT.
  - 5.13.3 Green Lamp glowing indicates that the value of the component under test is with in the set limits.
  - 5.13.4 All lamps glowing indicates that tan d is more that the set limit. It does not indicate any thing about the value. However the same may be checked on deviation meter.
- 5.14 Now keep on testing unknown & note the results & sort.
- 5.15 If only electronic GO-NO-GO is used for faster sorting then the function selector switch may be put on M -OFF position.