

ELCB TESTER

OPERATING INSTRUCTIONS

1.0 INTRODUCTION

- 1.1 The ELCB tester is menu assisted making it extremely user friendly.
- 1.2 It is a universal ELCB tester suitable for testing all ELCB's, including instantaneous, inverse time-delay and fixed time-delay types. Although primarily intended for the testing of industrial ELCB's it may be used to test 30mA ELCB's i.e. welding plugs.
- 1.3 The instrument is extremely versatile and easy to use. It is a two lead instrument and may be used on either 380V or 550V systems (220 or 317V L-E). It should be noted however that the maximum current attainable is proportional to the system voltage (1000mA at 550V / 700mA at 380V).
- 1.4 The operation of the unit is fully microprocessor controlled through a keypad. There are no switches or pushbuttons.
- 1.5 The tester has an auto-off feature and draws no current when off which increases to a minimal 8mA during operation. It operates off 8 X "C" cell batteries with a life of over 12 months in normal use.

IMPORTANT

To ensure the Auto-Off feature operates the tester may be left with any message on the display EXCEPT the following:

CLIP BLACK → EARTH

RED TO PHASE

TO RETURN THE TESTER TO THE MAIN MENU

PRESS ANY KEY TWICE.

2.0 ELCB TEST CRITERIA

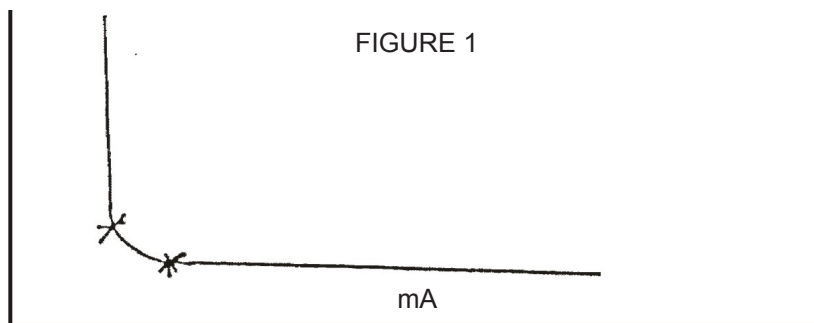
The basic procedure to test the three main types of ELCB's mentioned above is described below:

2.1 Instantaneous ELCB's

Instantaneous ELCB's are the easiest to test, especially with the ELCB tester, due to its fully automatic operation. Once the tester has been connected to earth, a gradually increasing fault (ramp current) is automatically applied as soon as the second lead (red probe) is touched to a line and voltage is detected. As the fault increases this may be clearly seen on the LCD display. On tripping, the reading freezes, indicating the sensitivity of the unit. To save time and reduce heat dissipation, the ramp starting current may be selected. DURING THIS TEST THE TIMER IS INOPERATIVE.

2.2 Inverse time-delay ELCB's

The correct operation of an inverse time-delay ELCB may only be ascertained if the characteristic curve of the ELCB in question is to hand. The operation of the ELCB is best assessed by checking the tripping time for given fault currents at a minimum of two points on the curve. These points should be on either side of the knee as shown in Figure 1.



The desired fault current is selected by simply keying this in via the key pad. When the unit is connected, the fault is injected and the timer starts. On tripping, the reading freezes. The Tripping time for the fault current applied may then readily be compared to published curves.

3.0 FIXED TIME-DELAY ELCB'S

This test may be divided into two portions.

- (a) Checking the time delay.
- (b) Checking the threshold current.

3.1 Checking the time-delay

The time-delay is first checked by introducing a fault current of at least TWICE the normal sensitivity of the unit, THREE TIMES the sensitivity is preferable. For example, if the unit under test has a sensitivity of 250mA, a fault current of at least 500mA should be introduced. The trip time should then normally be within 20% of the delay, i.e. If the delay is 250mS, the unit should trip at between 200 - 300mS. This may vary depending on the manufacturer's specification.

3.2 Checking the threshold current

The checking of the threshold current is normally complicated somewhat by the fact that the "knee" of the ELCB is very often not sharp and clearly defined. Ideally for a fixed time-delay unit having a sensitivity of say 250mA, below that current the unit should never trip while above it the unit should trip in the specified time. However that is in a perfect world and this does not happen in practice.

Generally at the nominal sensitivity of the unit, tripping will occur at between 2-3 times the time-delay. In other words, for a 250mA/250mS unit, with a fault current of 250mA, the unit will trip in 500 - 750mS.

What this means is that the THRESHOLD of the unit may be ascertained by determining THAT level of current at which the unit trips in this period of time (2-3 times the rated time-delay).

4.0 OPERATION.

The load should be disconnected when testing ELCB's. This is necessary due to complications which may arise if a fault is introduced with the tester on one phase while a genuine fault may be present on another.

4.1 Testing Instantaneous ELCB's

- (a) Switch the tester on by pressing the "ON" key.
- (b) Select ELCB type = INSTANT.(1) - press (PROCEED) key.
- (c) Select the ramp starting point (mA). This is retained in memory to speed up the subsequent testing of similar ELCB's but may be changed at any time using the (CLR) key.
- (d) As prompted connect the black clip to earth and touch the red probe to any time using the (CLR) key.
- (e) The ramp fault current will commence, starting from the value selected in step (c).
- (f) On tripping, the display will freeze indicating the sensitivity (mA) of the ELCB.
- (g) TO RETURN THE TESTER TO THE MAIN MENU PRESS ANY KEY TWICE.

4.2 Time-delay ELCB's

- (a) Switch the tester on by pressing any numeric key.
- (b) Select ELCB type = TIME DELAY (2) - press (PROCEED) key.
- (c) Select the desired earth fault current (mA). This is retained in memory to speed up the subsequent testing of similar ELCB's but may be changed at any time using the (CLR) key.
- (d) As instructed, connect the black clip to earth and touch the red probe to any line on the load side of the ELCB.
- (e) The fault current selected in (c) will immediately be introduced. On tripping, the display will freeze indicating the tripping time (mS) of the unit.

5.0 THERMAL OVERLOAD

- 5.1 If a considerable number of tests are done, to prevent overheating, the tester is protected by a thermal overload feature.
- 5.2 As the thermal overload condition is approached operation will become Erratic and then the message "OVER-TEMPERATURE" will appear on the display for 1,5 seconds, whereafter the tester will automatically switch off.
- 5.3 The tester may be re-awakened by depressing the "ON" key.
- 5.4 If the tester is still over temperature, the message "OVER-TEMPERATURE" will again be displayed.
- 5.5 It is recommended that operation should only be resumed when the tester has returned to the ambient temperature.

6.0 CALIBRATION

Calibration of the ELCB tester is facilitated by prompts from its own micro processor. The unit should be returned to the factory for calibration, or alternatively the detailed calibrations procedure is obtainable on request.

7.0 SPECIFICATION

Operating Volts (L-E):	60 - 370V
Fault Current (mA):	Maximum 100mA at 317V (proportional to voltage) Resolution 1mA
Ramp Speed (mA/Sec):	12mA/Sec
Timer Resolution (mS):	10mS
Battery:	8 x "C" cell batteries
Fuse:	1A 600V (5 x 20mm)
Current Consumption:	8mA while operating
Safety standard :	EN 61010-1 CAT III 600V EN 61326-1

Rated environmental conditions:

- (a) Indoor use.
- (b) Installation Category III.
- (c) Pollution Degree 2.
- (d) Altitude up to 2000 Meter.
- (e) Relative Humidity 80% Max.
- (f) Ambient Temperature 0~40°C.

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