# Test Equipment Required

Test programme - lcbmenu.exe
T318 – Battery Simulator.
T619 – Input Switch Box.
T946 – R.C.D. Current & Time Test.
T1709 – Calibrated Low Impedance Source.
T603 – Calibrated Loop Test.
T535 – Calibrated Voltage Source, (2000 Series or Equivalent).
Set-up Software 6139-154.

## Testing

Place instrument into **Test Mode**.
For an old instrument this will need to be enabled: Switch from OFF to the 150mA 40ms range holding the backlight key down. Press and hold the backlight key and then the I and Type (right hand) keys, and ***rSt*** will show on the display. Press the enter (left hand key) and the instrument will enter calibrate mode and ***CAL*** will show on the display. Press the I key to show ***Tes*** and then the enter key to place instrument into Test Mode.
**For an instrument in calibrate mode switch from OFF to the 150mA 40ms range holding the backlight key down and press the I key to show *Tes* and enter to place instrument into Test Mode**

## 1. Initial Conditions.

Connect instrument to T318 Battery Simulator, (8 – 10V D.C Supply).

Switch on and check backlight and external test key operation with an SP2.

## 2. Battery Consumption and low battery detection check.

Select Option 1 from the LCB Test Menu.

| Menu | Test Conditions | LCB Switch | Test Result |
|---|---|---|---|
| 1 | Battery @ 9V. | Loop L-PE | Battery-low symbol off. |
| 1 | | | Check battery drain current < 100mA. |
| 2 | Battery @ 5.76V. | | Battery-low symbol on. |
| | Switch to Standby **before** the next test. (hold left hand key) | | LCB switches off. |
| 3 | | | Check battery drain current < 500uA |

Switch instrument off.

Select Option 'M' to return to the LCB Test Menu.

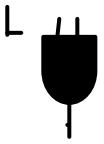
## 3. Voltage & Frequency Measurement.

Select Option 2 from the LCB Test Menu.

Connect LCB test lead to the Voltage Switch Box T619.

| Menu Option | LCB Switch Position | Voltage Switch Box Setting | Source | Nominal | Limits |
|---|---|---|---|---|---|
| 1 | Loop L-PE | L - E | 0V | 0V | < 2V |
| 2* | | | 480V 50Hz L-E | 480 | 473 – 487 |
| 3* | | | 240V 50Hz | 240 | 236 – 244 |
| 4* | | | 100V 50Hz | 100 | 97 – 103 |
| 5* | | | 50V 50 Hz | 50 | 48 – 52 |
| | | | Press Enter | 50.0 | 49.5 - 50.5 |
| 6 | Loop L-PE | N – E | 240V 50Hz N-E | 240 | 236 – 244 |
| 7 | | | 50V 50Hz N-E | 50 | 48 – 52 |
| | | | Press Enter | 50.0 | 49.5 - 50.5 |
| 8 | Loop L-N | L -N | 240V 50Hz L-N | 240 | 236 – 244 |

* Check that the plug symbol shows in top left-hand corner of the dispay :




Select Option ‘M’ to return to the LCB Test Menu.

## 4. Test Touch Button (100V).

Select Option 3 from the LCB Test Menu.

Connect LCB test lead to the Loop Test Box T603.

| Menu | Test Conditions | LCB Switch | Test Result |
|---|---|---|---|
| 1 | Apply 100V 50Hz to Touch Button contact using the probe | Loop L-PE | Check that the ‘touch’ symbol is displayed. |

Select Option ‘M’ to return to the LCB Test Menu.

## 5. Loop Resistance – High Current (L-PE, L-N).

Select Option 4 from the LCB Test Menu.

Connect LCB test lead to the Loop Test Box T603

| Menu Option | *Test Gear Configuration* | LCB Switch | Nominal Value | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| 1 | *L – N* | RCD 30mA Select trip test (I) | 2.097 k | >50 V | |
| 2 | *L – N* | Loop L-N | 10.06 | 9.71 | 10.41 |
| 3 | *L – N* | | 0.13 | 0.10 | 0.16 |
| 4 | *L – PE* | Loop L-PE | 2.107K | 2.01 | 2.21 |
| 5 | *L – PE* | | 953 | 899 | 1.01K |
| 6 | *L – PE* | | 165 | 154 | 175 |
| 7 | *L – PE* | | 86 | 82.2 | 89.8 |
| 8 | *L – PE* | | 20.07 | 18.9 | 21.3 |
| 9 | *L – PE* | | 10.06 | 9.71 | 10.41 |
| A | *L – PE* | | 1.10 | 1.04 | 1.16 |
| B | *L – PE* | | 0.13 | 0.10 | 0.16 |
| C | *Low Battery* | | 0.13 | 0.10 | 0.16 |
| D | *N – PE* | Loop L-PE | 10.06 | 9.71 | 10.41 |
| E | *N – PE* | | 0.13 | 0.10 | 0.16 |

Select Option ‘M’ to return to the LCB Test Menu.

## 6. Loop Tests – Low Current.

Select Option 4 from the LCB Test Menu.

Connect LCB test lead to the Loop Test Box T603

| **Menu Option** | *Test Gear Configuration* | **LCB Switch** | **Nominal Value** | **Lower Limit** | **Upper Limit** |
|---|---|---|---|---|---|
| 1* | *L – PE* | Loop L – PE (0.1Ω) | 86Ω | 83.7 | 88.3 |
| 2* | *L – PE* | | 10.06 | 9.58 | 10.54 |
| 3* | *L – PE* | | 1.085 | 0.82 | 1.35 |
| 4* | *N – PE* | | 86Ω | 83.7 | 88.3 |
| 5* | *N – PE* | | 1.085 | 0.82 | 1.35 |
| 6 | *L – PE* | Loop L – PE (0.01Ω / xtra) | 0.13 **R1** | 0.08 | 0.18 |
| | *L – PE* | Press Enter Key to show | **R2** | -0.04 | 0.04 |
| 7 | *L – PE* | | 9.95 **R1** | 9.51 | 10.39 |
| 8 | *N – PE* | | 0.13 **R1** | 0.08 | 0.18 |
| | *N – PE* | Press Enter Key to show | **R2** | -0.04 | 0.04 |
| 9 | *N – PE* | | 9.95 **R1** | 9.51 | 10.39 |
| A | *L – PE* | | **R1** | (Ignore) | |
| | *L – PE* | Press Enter Key to show | 9.96 **R2** | 9.51 | 10.39 |
| B | *L – PE* | | **R1** | (Ignore) | |
| | *L – PE* | Press Enter Key to show | 1.02 **R2** | 0.94 | 1.10 |
| C | *N – PE* | | **R1** | (Ignore) | |
| | *N – PE* | Press Enter Key to show | 9.96 **R2** | 9.51 | 10.39 |
| D | *L – PE* | RCD 30mA ½ I 165R | 5.5V | 5.2V | 5.8V |

* 2 out of 3 tests to lie within the limits given.

If the mains supply is too noisy to obtain repeatable results for the 0.1? Function, follow the alternative procedure in section 6.1

Select Option 'M' to return to the LCB Test Menu.

## 6.1 Alternative Low Current Test Method. (When mains noise is unacceptable)

### 6.1.1 Equipment Required:

T2068 – Stabilised Power Supply, set to 240Volts, 50Hz.
T1529 - Calibrated Loop Resistance.

LCB Test Lead Number 2:

- Supply Phase connected to Instrument Phase.
- Supply Neutral not connected.
- Supply Earth connected to Instrument Earth & Instrument Neutral.

LCB Test Lead Number 4:

- Supply Phase connected to Instrument Neutral.
- Supply Neutral not connected.
- Supply Earth connected to Instrument Earth & Instrument Phase.

### 6.1.2 Initial Conditions.

Ensure that the Calibrated Loop T1529 is connected to the Stabilised Supply.
Set the Stabilised Supply T2068, to 240V 50Hz.
Connect the Instrument to the 13A Loop Socket on T1529.

## 6.2 Test Low Current Loop.

Calibrate the Instrument to the targets shown in the table.

| Use Lead Number | Test Gear T1529 Switch | **LCB Switch** | **Nominal Value** | **Lower Limit** | **Upper Limit** |
|---|---|---|---|---|---|
| Lead 2 | L – PE | Loop L – PE (0.1Ω) | 85.3 | 83.0 | 87.6 |
| Lead 2 | L – PE | Loop L – PE (0.1Ω) | 10.4 | 9.9 | 10.9 |
| Lead 2 | L – PE | Loop L – PE (0.1Ω) | 1.2 * | 0.9 | 1.5 |
| Lead 4 | N – PE | Loop L – PE (0.1Ω) | 85.3 | 83.0 | 87.6 |
| Lead 4 | N – PE | Loop L – PE (0.1Ω) | 1.2 * | 0.9 | 1.5 |

* 2 out of 3 tests to lie within the limits given.

## 7. Loop 3 Phase Test.

Select Option 4 from the LCB Test Menu.

Connect LCB test lead to the Loop Test Box T603 using the 3 phase lead set.

Check rotation is 0?(anti-clockwise)

| Menu Option | *Test Gear Configuration* | LCB Switch | Nominal Value | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| 1 | *3Phase* | Loop L – N | 10.2Ω | 9.8 | 10.6 |

## 8. RCD Test Current & Trip Time.

Select Option 7 from the LCB Test Menu.

Connect LCB test lead to the RCD Test Box T946.

Using Type key, select d.c. sensitive RCD type for long tests for currents ≤30mA. For 300mA and 1000mA tests, use selective type.

| Menu Option | *Test Gear Configuration* | LCB Switch | Nominal Value | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| 1 | *10mA* | RCD 1/2I 10mA – Type DC | 4.75mA | 4.60 | 4.90 |
| 2 | *10mA* | RCD 10mA – Type DC | 10.5 | 10.2 | 10.80 |
| 3 | *100mA* | RCD 30mA – Type DC | 31.5 | 30.5 | 32.5 |
| 4 | *1A* | RCD 300mA – Type S | 315 | 305 | 325 |
| 5 | *1A* | RCD 500mA – Type S | 525 | 505 | 540 |
| 6 | *1A* | RCD 1000mA – Type S | 1050 | 1010 | 1080 |
| 7 | *Low Mains* | RCD 30mA – Type S | 31.5 | 30.5 | 32.5 |
| | *100mA* | | | | |
| 8 | *Trip Time 822mS* | RCD 10mA – Type S Press ‘Enter’ to view time. | 822 | 815 | 829 |
| 9 | *Trip Time 28mS* | RCD 10mA – Type S Press ‘Enter’ to view time. | 28 | 27 | 29 |

## 9. RS232 Tests (LCB2500 only)

Connect via RS232 lead to PC and check communication works both ways.
Use set-up software 6139-164 to set instrument and printer language.

| Product | Setup Code | 2nd Printer Language | Default Printer Language | Default Setup |
|---|---|---|---|---|
| UK | UK | German | 1 | b |
| RS | RS | French | 1 | b |
| EFG | FR | French | 2 | a |
| FDD | NL | Dutch | 2 | |
| SIP | IT | Italian | 2 | |
| FNS | FL | Finnish | 2 | |

## 10. Setup (LCB2000 only).

Switch to setup by holding down the 'Backlight' key whilst switching from OFF to 150mA 40ms position.
Press the 'I' or 'Type' keys to select Setup A, b or C as shown in table below:

| Product | Default Setup |
|---|---|
| UK | b |
| RS | b |
| EFG | A |
| FDD | A |
| SIP | A |
| FNS | A |
| APAVE | C |

Press the 'Enter' key to store the setting.

**On completion, confirm that the instrument is set to 'Customer' mode.**

**End of Tests.**