



## INTRODUCTION

Metravi Digital Micro Ohm meter Model 53C-II, is a compact high reliability 3 ½ digit instrument suitable for measurement of resistivity of copper wires from 7/0 SWG to 50 SWG, resistance of cables, windings coils, heater elements and contact resistances of switches, relays etc. Emphasis in the design of this instrument has been to provide quick, stable and repeatable readings of resistance. The instrument uses a 4 terminal measurement so that resistance of test leads and contacts is eliminated from test results. Actual value of resistor is directly displayed in the seven segment 12.5mm display.

## SPECIFICATION GENERAL

**Range of Measurement :** 1 micro Ohm to 19.99 K Ohm in eight ranges.

| Range (Ohms) | Nominal Test Current | Accuracy           |
|--------------|----------------------|--------------------|
| 0-1999u      | 1.50 A               | +/- 0.3% +2 Digits |
| 0-19.99m     | 0.75 A               | +/- 0.2% +2 Digits |
| 0-199.9m     | 0.75 A               | +/- 0.2% +2 Digits |
| 0-1.999      | 75mA                 | +/- 0.2% +2 Digits |
| 0-19.99      | 7.5mA                | +/- 0.2% +2 Digits |
| 0-199.9      | 0.75mA               | +/- 0.2% +2 Digits |
| 0-1999       | 0.075mA              | +/- 0.2% +2 Digits |
| 0-19.99K     | 0.075mA              | +/- 0.2% +2 Digits |

**Warm-up Time:** For rated accuracy is 3 minutes.

**Input Voltage :** 230V AC +/- 10% , 10W approx.

**Over Range :** Three most significant digits Blank and '1' appears.

## Test Procedure:

### 1. To Determine the Resistivity of Copper Wires.

Zero Setting: Connect the test leads -V & +V only. Do not connect -I & +I leads. Selector switch should be in 1999u Ohm position. Switch 'ON' power and stabilise instrument for 3 Minutes. Set Zero by zero setting knob. Best Zero setting is when '-' sign blinks. During measurement, zero setting may be made by removing +I lead even while the other leads are connected to the unit under test. Range of 199.9m Ohms and 19.99 Ohms do not need Zero setting and stabilization.

Connect sample conductor in 4 terminal connection as follows:



-I & +I = Current Leads , -V & +V = Potential Leads.

L= the instrument indicates resistance of conductor in Length L, the distance between Potential leads should be kept 1 metre for convenience. Keep current leads well away from potential leads.

Take care that clip -I should NOT touch -V & +V directly except through conductor.

## 2. Measurement of Resistance of Transformers, Motors etc.

Connect leads in 2 or 4 terminal arrangement. Switch 'ON' power. Change range if Required. Wait for a few seconds for a stable reading. Switch off power and disconnect leads and change over to next measurement. Do not disconnect leads when instrument is 'ON'.

## 3. Calculation of Heater Resistance.

$V^2/W = R$ ..... where V = Heater operating voltage  
W = Wattage of heater  
R = Resistance of heater.

## 4. Measurement of Temperature Rise.

Of copper windings by increase in resistance (IS-9678-1980).

$$T_2 + 235 R_2$$

$$T_1 + 235 R_1 \text{ where}$$

$T_2$  = Temperature in Deg. C of winding at the end of the test.

$R_2$  = Resistance of winding at the end of the test.

$T_1$  = Temperature in Deg. C of winding (cold) at the moment of initial resistance measurement, and

$R_1$  = Initial resistance of winding.

## 5. Instrument Adjustment & Calibration.

Test instruments required:

1. Std. 200mV DC meter of 4 ½ digit of known accuracy.
2. Std. resistance of 1m Ohms, 10m Ohms, 100m Ohms, 1 Ohm, 10 Ohms, 1K Ohm & 10K Ohms

### Procedure:

Connect 10 Ohms std resistor to the instrument. Switch 'ON' Power. Clip Std voltmeter across clips -V & +V. Adjust test current by preset P5 so that Std Voltmeter reads 75mV. Adjust instruments indication by preset on DPM to read value of std 10 Ohms resistor. Change range to 1.999 Ohms, Connect 1 Ohm std resistor. Adjust test current by adjusting preset P4 so that the instrument displays value of std 1 Ohms resistor. Set all other ranges likewise. All ranges must be adjusted by connecting resistors in 4 Terminal connection. Please recheck calibration using the same resistors. Please send this manual with the instrument whenever it is sent to a laboratory for re calibration. Recommended re calibration cycle is 1 Year.

## 6. Operational Safety.

Extreme care must be taken while calibrating the instrument as there are dangers of high voltage inside the instrument.