

Using the Model 2450 to Measure Resistance Using TSP Commands

The Model 2450 has three methods for measuring resistance:

1. Source Voltage and Measure Current, Set Measure Units to Ohms
2. Source Current and Measure Voltage, Set Measure Units to Ohms
3. Measure Resistance – Using Auto-Ohms (Ohmmeter) Mode

These three modes will be explained in more detail with TSP examples for each. In each case, a 100k Ω resistor is used as the DUT. All the program examples were written using Test Script Builder.

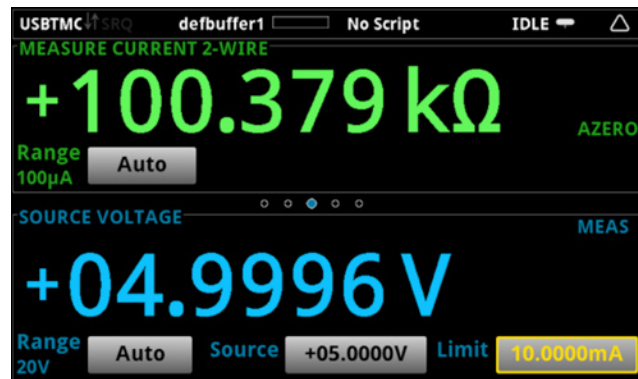
1. Source Voltage and Measure Current, Read Ohms:

Here is an example if the user wants to take resistance readings by sourcing voltage and measuring current. Specifically, this program takes five readings by sourcing 5V, measuring current with autorange enabled, and setting the measure units to ohms. Offset compensation is turned on. The source and measure values are retrieved.

```

reset()
smu.measure.func = smu.FUNC_DC_CURRENT
smu.measure.autorange = smu.ON
smu.measure.unit = smu.UNIT_OHM
smu.measure.count = 5
smu.source.func = smu.FUNC_DC_VOLTAGE
smu.source.level = 5
smu.source.ilimit.level = 0.01
smu.source.output = smu.ON
smu.measure.read(defbuffer1)
for i=1, defbuffer1.n do
    print(defbuffer1.relativetimestamps[i],
defbuffer1[i])
end
smu.source.output=smu.OFF
  
```

The result of executing the code is shown in the screen capture shown below. Notice that even though the measurement units are in ohms, the measurement range is 100 μ A.



2. Source Current and Measure Voltage, Read Ohms:

Here is an example if the user wants to take resistance readings by sourcing current and measuring voltage. Specifically, this program takes five readings by sourcing 5e-6 A, measuring voltage with autorange enabled, and setting the measure units to ohms. Offset compensation is enabled. The source and measure values are retrieved.

```

reset()
smu.measure.func = smu.FUNC_DC_VOLTAGE
smu.measure.autorange = smu.ON
smu.measure.unit = smu.UNIT_OHM
smu.measure.count = 5
smu.source.func = smu.FUNC_DC_CURRENT
smu.source.level = 5e-6
smu.source.vlimit.level = 10
smu.source.output = smu.ON
smu.measure.read(defbuffer1)
for i=1, defbuffer1.n do
    print(defbuffer1.relativetimestamps[i],
defbuffer1[i])
end
smu.source.output=smu.OFF
  
```

The result of executing the code is shown in the screen capture shown below. Notice that even though the measurement units are in ohms, the measurement range is 2V.

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3. Auto-Ohms or Ohmmeter Mode

In this mode, the Model 2450 measures resistances by sourcing current. The unit automatically sets the magnitude of the current source, voltage compliance, and the measure range. This mode is the same as the Ohmmeter QuickSet function. Here is a program that uses the resistance function to take five readings.

```

reset()
smu.measure.func = smu.FUNC_RESISTANCE
smu.measure.autorange = smu.ON
smu.measure.count = 5
smu.source.output = smu.ON
smu.measure.read(defbuffer1)
for i=1, defbuffer1.n do
    print(defbuffer1.relativestamps[i],
defbuffer1[i])
end
smu.source.output=smu.OFF
    
```

The result of executing the code is shown in the screen capture shown below. Notice that the measuring range is 200kΩ. The test current is automatically set to 10μA.



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