Analog Multitesters (circuit testers)

What is Analog Multitester?

Analog multitesters basically make measurements of DC voltage, AC voltage, DC current and resistance. Except some special products, they have no function to measure the AC current. Characteristics of recent analog multitesters include the extended measuring range function (particularly for fine voltage and current) with an amplifier installed, the function to allow the measurement of capacitor capacity, and the zero-center meter function. To enhance operability and usability, some products include the auto range function, automatic polarity switching function, and a structure integrating a case to allow the storage of a test lead. There are some testers that allow the measurement of hFE (DC current amplification factor) of a transistor and temperature measurement using a temperature sensor, which is offered as an optional accessory.

Advantages of analog multimeters

1. Easy to read the mean value of values changing in short cycles.
   ∗ A digital tester does not give stable value determination.
2. No need for the operating power supply except for resistance range (excluding Model EM7000 integrating an amplifier, and CX506a integrating an oscillator) and zero-center function.
3. Suited for judgment based by intuition (in continuity test etc.).

Four key points in choosing a suitable model

1. What are the necessary measuring functions?

Choose the necessary measuring functions in addition to voltage and resistance.

→ Need for the measurement of current (0.25A, 0.3A, 30A), DC only.
→ Measurements for remaining dry battery capacity, capacitor, and frequency.
→ Measurement of DC high voltage with the use of an optional accessory.

2. Other necessary functions

1) The needle occasionally swings to the opposite direction in DC voltage measurement.
   → Check the polarity by the zero-center meter function.
2) Hard to check for continuity.
   → Use an LED light-up type in noisy places CONT. LED
   → Use a buzzer type to verify with sounds.

3. Graduation of scale

There are two general types of graduation of the measuring range:

① 2.5, 5, 10, 50, 250, 500V
② 3, 12, 30, 120, 600V

For measurement of a car battery (24V), measurement in the 30V range of ② is suitable. Choose a type suitable for your intended application.

4. Other functions

Other types are furnished with an auto range function allowing the automatic optimal setting of voltage and resistance. There are also types integrating a transistor transmitter and others integrating a current-limiting fuse with breaking capacity of 100kA for enhanced safe operation.

Basic measuring method

Check the range before making a measurement

Most problems with a tester are caused by overcurrent and drop of the tester. Failures due to overcurrent are most frequently caused by voltage applied to a current range and resistance range with lower internal resistance (thereby causing overcurrent of tens to hundreds times to run through the circuit). Although some testers include a meter protector and a circuit protector using a diode, it is recommended to check the range before measuring.

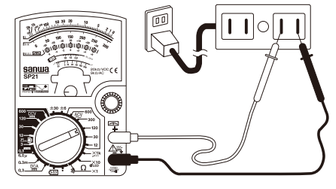
For measuring unknown values

In measuring unknown current and voltage values, find an approximate value at the maximum range first and then make adjustments to the optimum range (1000V to 250V range in case of voltage measurement). This method prevents a failure caused by incorrect range adjustment.

∗ Do not change the range during measurement.

Examples

AC100V plug outlet



Battery voltage