

## Modern Electrical Measuring Instruments

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### Annotation

This article provides information about modern electrical measuring instruments and their types.

**Keywords:** physics, electricity, instruments, electrical energy, measuring instruments.



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Nowadays, we measure all objects with special instruments to know the level of accuracy. Especially in the field of physics, measuring various quantities using electrical measuring instruments and tools is possible only through a thorough study of the issues related to them. For this reason, any current science or scientific field, whether natural or social, is directly related to the supply of electrical energy. Therefore, knowing the basics of electrical measurements, understanding it within the scope of one's specialty and applying it in practice is one of the important factors in the training of specialists in each field of physics or technology.

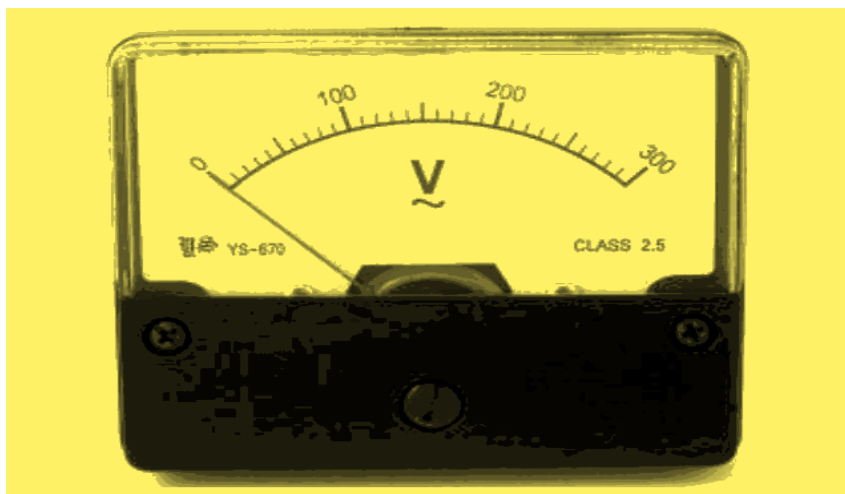
Measuring instruments are measuring instruments designed to obtain values of a measured physical quantity within a specified range. Often, a measuring device is a measuring instrument for generating a signal of measurement data in a form that can be directly perceived by the operator.

Nowadays, especially in production management, the development of science and technology, the development of products that meet world standards, and ensuring their competitiveness are considered one of the most important issues. In addition to generating and sending electricity to consumers, it is necessary to check the quantity and quality of the energy received by them. For example, current is measured with an ammeter, voltage with a voltmeter, power with a wattmeter, and current frequency with a frequency meter. We are now going to provide some important information about some electrical measuring instruments. Current is measured with an ammeter. The ammeter is connected in series with the resistance. The purpose of measuring current with an ammeter is to obtain the actual current using the ammeter. An ammeter should never be connected in parallel with the power supply. Because when an ammeter is connected in parallel with a resistance, its internal resistance is much smaller, and a much larger current flows through it, and it can burn out or fail without being able to withstand this current.



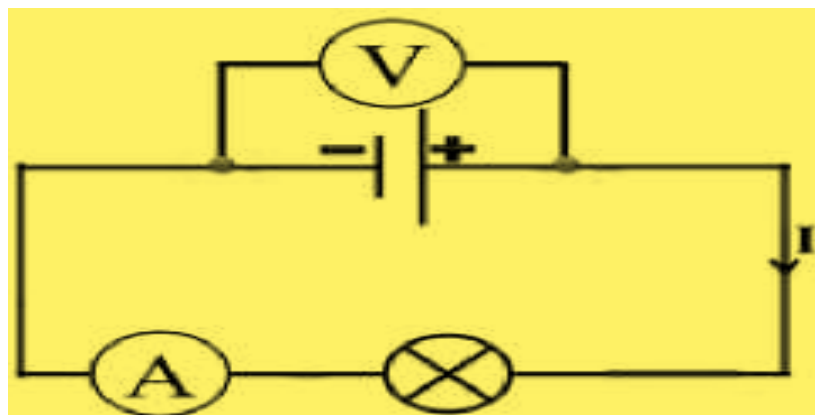
**1-picture. Ammeter connection diagram.**

Voltage is measured with a voltmeter. The voltmeter is connected in parallel with a resistor. Usually, the internal resistance of the voltmeter is chosen to be much larger than the resistance of the consumers. Since the voltmeter is connected in parallel with the resistor, the voltage on it is equal to the voltage of the source.



**2-picture. Voltmeter instrument**

Voltmeter can never be connected in series with a power supply. Because, due to its large internal resistance, it will absorb all the voltage from the source and the voltage applied to the consumer will be very small. As a result, the working process of the consumer will completely change, and may even cause damage.



**3-picture. Above is a parallel connection of a voltmeter**

Multimeter is a multi-function, multi-range measuring instrument. Typically, multimeters can measure DC current, DC voltage, AC voltage, resistance and volume, etc. Some can measure AC current, capacitance, inductance and some parameters of semiconductors. These measuring

instruments vary in size, features, and price, and are designed to be carried or used on a bench, depending on their intended use. Types of multimeters include:

Analog multimeter (learn how to read one here)

Digital multimeter, Fluke multimeter, Clamp multimeter, Auto multimeter

A multimeter is one of the most commonly used measuring instruments today. However, beginners often have difficulty identifying the symbols on a multimeter.

A multimeter consists of three main parts: a meter head, a measuring circuit and a switch.



#### 4-picture. Multimeter instrument

Multimeter is a basic measuring instrument that can measure various electrical properties such as voltage, resistance, and current. The device is also known as a volt-ohm-millimeter (VOM) because it functions as a voltmeter, ammeter, and ohmmeter.

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