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MAIN TYPES OF RELAY PROTECTION

Annotation: *the article discusses the main types of relay protection. We considered classification according to the principle of protection. We examined the requirements for protection. Current protection was also considered.*

Key words: *voltage and current amplitude, power, phase, medium pressure, line resistance, quality of electricity, enter into the work.*

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ОСНОВНЫЕ ВИДЫ РЕЛЕЙНОЙ ЗАЩИТЫ

Аннотация: *В статье рассматриваются основные виды релейной защиты. Также классификации по принципу защиты. Рассматриваются требования к защите. Более конкретно можно изучить классификацию и требования к токовой защите.*

Ключевые слова: *амплитуда напряжения и тока, мощность, фаза, давление среды, сопротивление линии, качество электроэнергии, ввод в работу.*

At all technological stages of production, transmission and distribution of electric power, accidents may occur that can destroy technical equipment or lead to the death of service personnel in a very short time, calculated in fractions of a second.

The human body is simply not capable of responding to such short-term events. Therefore, only special technical devices operating in automatic mode according to pre-prepared algorithms can control deviations of nominal parameters of electrical installations, identify the initial stage of creating an accident and take effective measures to eliminate it.

Historically, there has been a tradition to call them defenses. And because they have worked for a very long time on the relay base, then they firmly entrenched this additional definition.

Formation of relay protection.

The quality of electricity is strictly regulated by technical standards:

- voltage and current amplitude;
- network frequency;
- the shape of the sinusoidal harmonic and the presence of extraneous noise in it;
- direction, magnitude and quality of power;
- the phase of the signal and some other parameters.

For each of these characteristics, certain types of relay protection are created. After they enter into the work:

- constantly monitor the status of one or more network parameters by the measuring body — relay. For example, current, voltage, frequency, phase, power and continuously compare its value with a pre-set range called the setpoint;
- in the case of the controlled value beyond the normalized limit, the measuring body is activated and switches the position of its contacts commutes the circuit of the connected logical part;
- depending on the tasks to be solved, the logic of the scheme is configured for certain algorithms. It performs their impact on the switching device, for example, the solenoid switch off the primary equipment of the electrical circuit;
- the power switch eliminates the fault in the circuit by removing the power from it.

By type of controlled protection parameter is divided into:

- current,
- voltages;
- distance (line resistance);
- frequencies;
- powers;
- phases and others.

Classification by principle of action

The measuring body of any protection is adjusted to a certain setpoint, which delimits the coverage area, protection operation. It can include multiple sites (primary and backup) or only one.

Protection can respond to all possible types of damage occurring in the protected area or only to any individual, specific manifestations.

On the responsible protected area of the power supply circuit, not one protection is usually installed, but several varieties of it, which complement and reserve the mutual action. They are classified into:

1. basic;
2. backup.

To the main protection impose 3 requirements:

1. action on all possible arising malfunctions in a working zone or on their most part;

2. protection coverage of the entire controlled area in full, not a fraction of it;

3. faster response to an emerging fault than other protections.

Not suitable under these conditions of protection carry to reserve and carry out them reservation:

1. near;

2. far.

In the first case the reserve of the main protections operating on the fixed zone is carried out. For the second option, in addition to the neighbor, a reservation of adjacent working zones is created in case their own defenses fail.

Types of current protection:

- Maximum current protection and current cut-off;
- Differential protection.

Types of voltage protection:

- The protection of the minimum and maximum voltage;
- Minimum voltage protection;
- Protection, controlling the electrical resistance of the power circuit.

Any power line is created from metal conductors, which have, though minimal, but very real resistance. It is constantly increasing with increasing length of the highway-distance.

When at some distance from the end of the line of one of the substations, there is a short circuit, then on the principle of measuring the value of the electrical resistance to the place of the formed fault, protections work, which are called remote.

These types of devices are used to equip transformers, reactors and other similar structures operating inside oil tanks. When malfunctions occur in them, a high temperature is created, accompanied by the release of dissolved gases from the oil, the decomposition of its chemical composition, a decrease in dielectric properties.

Mechanical designs of the relay react to such malfunctions, taking into account the occurrence of gases and oil decomposition products in the tank environment. After closing their contact, a command is given to operate the logic circuit and turn off the switches.

This type of protection refers to relay, but it is based on the measurement of mechanical, not electrical parameters of the operating equipment.

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