

УДК 681.584.7

Andriy Bondarenko<sup>1</sup>, Olena Syvachuk<sup>2</sup>

<sup>1</sup> student of group E-419a NU “Zaporizhzhia Polytechnic”

<sup>2</sup> senior teacher NU “Zaporizhzhia Polytechnic”

### **APPLICATION OF AN ELECTROMAGNETIC RELAY**

An electromagnetic relay is a relay in which a ferromagnetic anchor or core is attracted when a current of a certain magnitude passes through its winding. In other words, it is like a switch that can be switched between states.

As a rule, electromagnetic relays are used for switching loads at alternating current with a voltage of 220V or at direct current in the voltage range of 5-24V and switching currents of 10-16 A. Standard loads for high-power relays are heaters, electromagnets, low-power electric motors (for example, servos), other active, inductive and capacitive consumers of electric energy with a power range of 1 W-3 kW.

The main types of electromagnetic relays. According to the design features of the actuators, electromagnetic relays are divided into contact (ones that provide circuit switching) and contactless (ones that affect the circuit by drastically changing its parameters).

According to the scope of application, electromagnetic relays are divided into: alarms, protection, control circuits.

The electromagnetic relays themselves are AC and DC. The latter are divided into polarized (those that react to the polarity of the control signal) and neutral (those that react equally to the direct current flowing through its winding of any polarity). It is worth pointing out that the electromagnetic AC relay has one significant drawback – it is the vibration of the core, and in order to use an electromagnetic DC relay it is necessary to mount the power supply separately.

Advantages of an electromagnetic relay over its semiconductor analogs are as follows:

1. It can provide switching to power grids up to 4 kW, and be small in size.

2. It ensures resistance to interference, as well as overvoltage and pulsations.
3. There is no direct electrical contact.
4. There is a slight decrease in voltage on closed contact groups, as well as a slight release of heat from closed contacts.
5. It is low cost compared to semiconductor devices.

Thanks to these advantages, relay protection instantly disconnects damaged areas when wires break, or they are short-circuited to the ground.

Electromagnetic relays are highly valued for their quick response to changes in the input parameters of the connected lines. Also, it is appreciated for durability at working under high voltage and resistance to electrical interference. Electromagnetic relays can also operate with immunity to emerging parasitic potential.

However, despite this, they also have disadvantages, such as:

1. low performance,
2. short service life,
3. the appearance of radio interference during circuit switching,
4. problems when connecting and disconnecting high-voltage DC loads and inductive consumers.

The operating voltage and current in the relay coil should not exceed the maximum permissible values, since a decrease in these values will greatly reduce the reliability of contacting, and their increase will lead to overheating of the coil, which will reduce the reliability of the relay at the maximum permissible values of positive temperature.

But despite all the disadvantages, electromagnetic relays are very actively used in everyday life. For example, it can be found in washing machines and the same refrigerators. The electromagnetic relay is also used at substations, ensuring trouble-free operation.

Considering all the above-mentioned, it is necessary to summarize that an electromagnetic relay can be very useful in the situations when the use of semiconductor elements does not give the necessary result.