

УДК 620.91

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WHAT HAPPENS WITH ELECTRICAL DEVICES DURING SHORT CIRCUIT

Short circuit is the circuit with dangerously high amperage. It has negligibly little resistance, therefore at the same voltage value of the current flowing through conductors is extremely high.

Usually it occurs when a live wire is connected to ground bypassing any load. Short circuits may occur between two phases as well. A short can happen unintentionally, for example, when insulation breaks. Also, it can happen between ground and neutral wire or between two wires of the same phase yet the hazardous current may not arise as quickly. In such situations the short circuit (SC) can be undetected.

To prevent high current from flowing through the wire, single-use fuses or multi-use circuit breakers are applied. Fuses mustn't be replaced by other conductive materials because they can't melt upon action of SC! In that case all working electrical devices will accept the impact. At first, wires' temperature will increase extremely high. Next, wires can burn, causing risk of fire or more powerful shortage. Even electric arc may occur. Lightning strike can damage devices as well, so lightning protection is very important too. Short may happen deliberately by some specialists. They use a special device to disable a certain part of the circuit.

Depending on place and time of shortage, it can impact a device or make the entire electrical system unusable. As mentioned above, SC has low or zero resistance. That's why at the same voltage current arises to dangerously high values and keeps growing.

If during shortage fire begins spreading, it must be extinguished. But make sure that power went down, because it can cause more hazards. Then limit access of oxygen to fire by covering burning wire or device by a blanket or thick cloth. One mustn't extinguish flames with water because it leads to high risk of injury or another SC when power is on! Then you should find the place, where the short occurred. It can be detected visually or by smell.

SC often occurs in a socket. In that case it can be fixed without difficulties if you have some experience. But if it happened somewhere in wires, it can be hard to detect without a multimeter. A short circuit in the wall will lead to replacement of the damaged wires. To avoid such risks, it is necessary to lay wires in advance that correspond to the expected load. Experienced electricians advise to lay them in special skirting boards - this eliminates many problems in case of their failure.

Summarizing all the above, I want to add that all causes of short circuit can be successfully dealt with if you follow some rules:

1. Do not use old wires with inadequate insulation.
2. Be careful when carrying out electrical work. Do not drill or cut walls where the power cable is laid.
3. Carefully remove the insulation during installation, do not cut the wire with a knife along the cores.
4. Make sure that the electricity is disconnected when working with it. On the dashboard, you need to hang out a sign "work is in progress, do not turn on the electricity" or leave a person there.
5. Install protective shutdown devices - circuit breakers, residual current devices.
6. Regularly monitor the condition of electrical points - sockets and switches. Replace them immediately if necessary.
7. Do not use damaged electrical appliances that emit sparks.
8. When installing the wiring, do not lead the wires in one large bundle, it is better to run them side by side in parallel or use special boxes.