

ORGANIZATION OF ELECTRICAL SAFETY RULES IN UNIVERSITY COMPUTER ROOMS

Bakhridinov Nuriddin Sadriddinovich

*Dotsent of Namangan State Technical University,
Republic of Uzbekistan, Namangan, I. Karimov st.12*

Mamadzhanov Zokirjon Nematzhanovich

*Dotsent of Namangan State Technical University,
Republic of Uzbekistan, Namangan, I. Karimov st.12*

Mamadaliyev Adkhamjon Tukhtamirzaevich

*Dotsent of Namangan State Technical University,
Republic of Uzbekistan, Namangan, I. Karimov st.12*

Abstract: This article is devoted to the development of electrical safety rules in university computer rooms, and discusses the need to ensure the safety of workers and comply with safety regulations when it becomes necessary to operate, repair, install, and perform preventive maintenance on computer equipment

Key words: Electric current, voltage block, repair, electric shock, accident, mental work, safety equipment, computer equipment, grounding

Labor is the basis for the formation and social development of a person, the creation of material wealth. Properly organized labor leads to the physical, intellectual and spiritual development of people. State measures to ensure the safety and health of employees during work are called labor protection. In the conditions of scientific and technical development, all types of professional activities are increasingly taking on the role of creative elements. Mental labor includes work related to the reception and processing of information, the activation of attention, memory, as well as the process of thinking within the emotional framework.

In organizations using electricity, by order of the head of the organization, an employee responsible for electrical safety must be appointed from among the

engineering and technical personnel, and this employee must have the appropriate qualification group in electrical safety.

In higher educational institutions and industrial enterprises, all electrical devices operating on alternating current with a voltage of 380 V and above and on direct current with a voltage of 440 V and above, as well as highly dangerous external devices operating on alternating current with a nominal voltage of more than 42 V but less than 380 V and on direct current with a voltage of more than 110 V but less than 440 V, must be grounded or grounded.

Electrical devices operating at a nominal voltage of up to 42 V alternating current and up to 110 V direct current do not require zeroing or grounding, control cables installed in metal structures, metal sheaths of power cables, and electrical devices in rooms with a risk of explosion.

There is always a risk of damage to computer devices when they come into contact with an electrical network operating at a voltage of 36 V, and also 220 V. This can occur in cases of careless contact with exposed current-carrying conductors, most often due to various reasons (current surges, poor-quality insulation, mechanical damage). During use, damage to the insulation of live parts, including live wires, as a result of which unintentional contact with them can lead to injury, and in severe cases even death.

There is a zone of increased electrical safety, where electrical outlets are placed on the floor, which is not necessary, in addition, overloading them beyond their capacity can damage their insulation and lead to a short circuit. To eliminate this situation, or rather, to minimize electrical injuries, it is necessary to comply with the requirements of the “Rules for the Use of Electrical Appliances by Consumers” and “Rules for the Safety of Consumers in the Use of Electrical Appliances” and “Rules for the Installation of Electrical Equipment”.

To prevent electrical injuries when working with a computer, additional protective devices must be installed to ensure that no one comes close to live parts, and a transformer can be used to reduce the risk of injury from the mains voltage.

In any case, a protective grounding circuit is necessarily created in electrical appliances.

When using electrical equipment, in addition to strictly following the above rules, it is necessary to take all technical measures related to de-energizing, i.e., turning off the equipment in the area designated for work and taking measures against spontaneous or inadvertent connection, if necessary, erecting barriers, hanging posters and warning signs in the workplace, checking that the power is turned off, performing grounding, etc. All electrical installation and repair work related to computer equipment should be carried out by two people at a time. In the event of an electrical injury, there should be a person who turns off the power and provides assistance until the first doctor arrives. The adjuster must be on a rubber mat and check the electrical circuit without touching the case and live wires.

When repairing computer equipment, the following are prohibited:

- using wires with damaged insulation to connect units and devices;
- soldering and installing parts on a device that is connected to the power supply;
- checking current and voltage with uninsulated wires and clamps;
- connecting units and devices to devices that are under voltage;
- replacing the fuse of a device that is connected to the power supply;
- working on high-voltage devices without protective devices.

In order to eliminate the possibility of an accident due to unbalanced voltage in other electrical devices in the power supply network, to reliably disconnect computer devices from the power supply, and to ensure the electrical safety of equipment and workers, it is necessary to comply with a number of installation requirements:

First, the power supply of all computers and peripherals must be disconnected.

Secondly, the grounding of the system unit case and peripherals must be carried out through a separate external circuit.

Fourthly, a single protective circuit breaker and a circuit breaker must be used to disconnect computer devices.

Let's consider in more detail the connection of the computer power supply unit to the network through a network filter. The function of the filter is to transfer the high-frequency components of the current in the network to the ground by connecting capacitors to zero and phase. For this, a three-pin plug and socket are used. The "earthing" wire is connected to the circuit, it is allowed to connect to the zero of the voltage network. In practice, both are the same, the difference is noticeable only under heavy use.

If the "ground" wire of a computer (or other device) is not connected anywhere, an alternating voltage of 110 V will appear on the device case, since the filter capacitor acts as a voltage divider, and since their capacitances are equal, it will divide the 222 V voltage by two.

At the same time, touching the unpainted metal parts of the computer and any metal structures connected to the ground, for example, heating batteries, will result in a current circuit that is dangerous to human life. This same voltage is the source of the potential difference between the devices, which affects the interface circuits.

If the connecting devices are firmly grounded or grounded with separate wires to the common circuit, the potential difference problem will not arise.

If two connected devices are not grounded, and voltage is supplied from one phase of the network, a potential difference is created that is not much larger than the capacitances of the capacitors distributed across the various filters, but the danger to humans remains in any case. If ungrounded devices are connected to different phases, the potential difference increases and reaches 190 V, which leads to very bad consequences for humans. One of the most serious cases is the connection of ungrounded devices with high-voltage blocks to grounded devices.

Certain problems arise in devices equipped with a two-pole plug and a network filter for the power supply unit. Such filter capacitors have a small capacitance, so the short-circuit current is relatively small - a few milliamperes.

Safety problems during connection are solved by using Pilot-type or similar filters with a three-pole socket connected to ground or neutral. If all devices connected to the interface are connected to such a three-pole plug and socket filter or their chains, then the problem of potential difference is also solved.

Uninterruptible power supplies (UPS) are currently used to protect against poor-quality voltage sources (increased and decreased, sharp drops and jumps in voltage, frequency overload, etc.), which are the main cause of computer malfunctions (hanging, inability to read or write from a disk). Their main function is to provide power in the event of an accident in the main network. When using a grounding switch, the protective circuit (ground) and neutral wire must be laid separately. At the same time, poor-quality grounding reduces protection against interference with the electromagnetic field directed from the source to the device (monitor). In addition, it is not recommended to connect laser printers to the grounding switch, since when the printer heats up, it draws more current than the nominal value, which can lead to the failure of the grounding switch. Compliance with electrical safety rules and requirements provides maximum protection for the user from electric shock. However, if an accident occurs, the first thing to do is to immediately stop the current flow by any means (turn off the switch, remove the electrical cord from the victim with a dry stick or similar object, and immediately call a doctor). If the victim is not unconscious and feels unwell, he should be provided with peace, fresh air and warmth until the doctor arrives.

If the victim is in a serious condition (unconscious, without a pulse, breathing heavily), it is necessary to immediately begin artificial respiration using the "mouth-to-mouth" method at a rate of 12-15 times per minute and massage the heart with one compression per second and continue until the patient regains consciousness (the diameter of the pupil is restored, i.e., it decreases to normal, the pulse returns, and breathing normalizes). After the person regains consciousness, the assistance provided should be continued for 5-10 minutes, then he should be placed in a warm room and given more hot tea. In any case, it is necessary to provide qualified medical assistance.

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