

ELECTRICAL SAFETY IN THE PROCESS OF REPAIRING COMPUTER EQUIPMENT

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Abstract: *This article is dedicated to the development of electrical safety in the process of repairing computer devices, and it is considered to observe the rules of safety equipment for employees in the process of using personal computing devices, in the event of the need to perform repair, assembly and preventive work.*

Key words: *Mental work, computer equipment, grounding, accident, electric shock, safety equipment.*

The main source of energy in today's production is electricity. In terms of field of application, electricity is used in almost all machine tools, lighting, tower cranes, air exchangers, belt conveyors, escalators, etc. This, in turn, requires the study of specific safety aspects of electricity. The main reason for this is that electrical injuries account for one percent of all industrial injuries and 20-30% of all fatal accidents. As a result of the investigations, it became known that almost 80% of the accidents that ended in death occurred in electric machines and devices working with electric current up to 1000 V.

In the explanation of electrical safety of labor protection, the types of electric current are fully explained, along with the ways of correct use of electric current, the harmful effects of electric current on the human body. To explain the types of electric currents, we first need to remember electrical networks. The reason is that electricity is the main source of energy for industrial production. Electricity is also used for household services in enterprises and organizations.

In short, electrical safety is a system of organizational and technical measures and tools that ensure the protection of people from the harmful and dangerous effects of electric current, electric arc, electromagnetic fields, and static electric currents.

When dividing electric current into types, it is divided into high (over 1000 V) and low (up to 1000 V) voltage types, based on the areas of their use in industrial enterprises. Low-voltage, mainly 380 V, 220 V electric currents are widely used in manufacturing enterprises.

There is always a risk of injury when computer equipment is in contact with a 36 V, in addition to 220 V power supply. This can happen due to a variety of reasons (voltage, poor insulation, mechanical damage) in cases of careless contact with open current conductors. In the course of use, damage to the insulation of live parts, including live wires, resulting in accidental contact with them can cause injury and, in severe cases, even death.

It is an enhanced electrical safety zone, where electrical devices are placed with sockets on the floor, and there is no way to do this, in addition to overloading them moreover, overloading them will damage their insulation and cause a short circuit.

In order to eliminate such a situation, and more precisely, to minimize electric injuries, it is necessary to comply with the requirements of "Rules for the use of electrical devices by consumers" and "Rules for technical safety of consumers in the use of electrical devices" and "Rules for devices of electrical equipment".

To prevent electric shock when working with a computer, additional blocking devices should be installed to ensure that you do not come close to live parts, and a dividing transformer can be used to reduce the risk of injury from the main voltage source. In any case, in electrical devices, a protective earthing circuit is necessarily created.

In the process of using personal computing devices, there is a need to carry out repair, assembly and preventive works. In pre-school education institutions and educational institutions, it is prohibited to carry out repairs of VDT and HT directly in the classrooms according to SanQvaM 2.2.2.542-96.

During the use of electrical devices, in addition to strictly following the above-mentioned rules, take all technical measures related to turning off the voltage, that is, turning off the devices in the section allocated for work and taking measures against spontaneous or inadvertent connection, if necessary, placing barriers, posters and it is necessary to hang warning signs, check that the current is turned off, and perform grounding.

All electrical installation and repair work related to computing equipment should be done by two people at a time, in case of electrical injury, there should be a person to switch off the current and help until the first doctor arrives, the adjuster must be on a rubber mat and check the electrical circuit without touching the body and live wires.

During the repair of computing equipment, the following is prohibited:

- use wires with poor insulation to connect blocks and equipment;
- welding of the device connected to the rope and installation of details;
- checking the current and voltage with uninsulated wires and clamps;
- connecting blocks and equipment to live devices;
- replacement of the fuse of the connected device;
- work on high-voltage devices without protective devices.

It is necessary to observe a number of installation requirements in order to reduce the probability of an accident due to asymmetric voltage in other electrical devices in the voltage network, to reliably turn off computer devices from the mains, and to ensure the electrical safety of equipment and workers:

First, it is necessary to turn off the power supply of all ShEXM and external devices. Second, grounding of the system unit body and external devices must be done through a separate external circuit.

Fourth, to turn off computer devices, you need to use a circuit breaker and a circuit breaker.

Let's take a closer look at the connection of the computer's power supply unit to the network through a network filter. The function of the filter is to transfer the barriers of high-frequency components of the current in the network to the ground by connecting the capacitors to zero and phase. A three-way plug and socket is used for this. 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 the computer (or other devices) is not connected anywhere, then 110 V alternating voltage will appear in the case of the device, because the filter capacitor acts as a voltage divider, since its capacitances are equal, it will divide the voltage of 222 V in half.

At some point, the computer gets into a life-threatening current circuit as a result of touching unpainted metal parts and some metal constructions connected to the ground, for example, heating batteries. The same voltage is the source of potentials between the devices affected by the interface circuits.

Potential difference problems do not occur if the bonding devices are solidly zeroed or earthed with separate wires to the common circuit.

If the two connecting devices are not connected to the ground, if voltage is supplied from one phase of the network, a potential difference that is not much greater than the capacitances of the capacitors spread over the various filters will occur, but in any case the danger to a person remains. If ungrounded devices are connected to different phases, the potential difference increases to 190 V, which has very bad consequences for humans. One of the most difficult cases is connecting ungrounded devices with a large voltage block to grounded devices.

Certain problems arise in devices equipped with a two-pole plug and a mains filter. Such filter capacitors have a small capacity, therefore, 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 interfaced devices are connected with such a three-pole plug and socket filter or their circuits, the problem of potential difference is also solved.

Uninterruptible power supplies (UPS) are currently used to protect against poor quality power supply (surges and sags, voltage spikes, jumps, frequency overload, etc.) that are the main cause of computer failures (hanging, unable to read or write from disk)) is used. Their main task is to provide electricity in the event of an accident in the main network.

When using UKM, the protective circuit (ground) and neutral wire must be routed separately. At the same time, poor-quality grounding reduces the protection against interference to the electromagnetic field directed from the source to the device

(monitor). In addition, it is not recommended to connect laser printers to the UKM, because the printer requires more current than the nominal value when it heats up, which can cause the UKM to fail.

Compliance with electrical safety rules and requirements provides maximum protection for the user from electric shock. However, if an accident occurs, first of all, it is necessary to immediately stop the electric current by any means (turn off the switch, remove the electric cable from the victim with a dry piece of wood or something similar, call a doctor immediately). If the victim has not lost consciousness and feels discomfort, it is necessary to provide him with peace, fresh air and heat until the doctor arrives.

If the victim is in a serious condition (passed out, has no pulse, long breathing), it is necessary to immediately start artificial respiration with the "mouth-to-mouth" method 12-15 times per minute and massage the heart with one click per second, and until the patient regains consciousness (eyes the diameter of the pupil is restored, that is, it shrinks to a normal state, the pulse returns, breathing becomes normal) is continued. After the person regains consciousness, the assistance is continued for another 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 care.

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