

„Improper usage of protecting devices“

An important factor in safety usage of the electrical energy is the correct usage of modern high technical parameters devices protecting electric wirings. To such devices, among other things, belong over-current switches, differential-current protective switches and fuse cut-outs, which not always are correctly installed.

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At present, differential-current protective switches are one of main elements of modern protective systems used in electric wirings installations. Their correct assembly, i.e. conforming with suitable regulations, with the assembly and usage instruction ensure protection against the indirect touch and the supplementary protection against the first-hand touch. How points out the title of the present article, they are presented however few to be sure cases of the unprofessional installation and the unsuitable usage of this switches, what can lead to their damage and consequently cause their unnecessary operation or worse, not to cause power-offs in case of voltage appearance on the casing of the protective device, increasing the threat of the electric shock. One in several cases, which had places during start-up of electric wirings installation in apartment buildings, were drastic cases of the clamps {connectors} damages caused in differential-current switches, (Fig. 1) due to not screwing tight the clamp {the connector} by the installing person, thereupon after loading the switch by current, clamps {connectors} become overheated, causing the casing to melt.

Fig. 1
Differential-current switch
with burned phase clamp
Wstawić foto
EFI-4 - F

Fig. 2
Differential-current switch with
burned neutral clamp
Wstawić foto
EFI-4 – N

In one from presented on the photo (Fig. 2) cases, from the same reasons the clamp {connector} of the neutral track was damaged, what caused lack its operational continuity. As an effect, in sockets of the installation housing appeared voltage of approx. 400 V, causing burn off of many electric devices in the household- refrigerators, computers, washing machines etc. In this case person installing switches in the switch box suffered the painful pecuniary loss through his own unconcernedness and inaccuracy. Also the case of burned over-current switch - Fig. 3 - results the lack of precision during assembly in the switch box

Fig. 3 Over-current switch with
burned clamp
Wstawić foto
Wyl. Nadpr.cdr

Shown on the photo (Fig. 3) single-polar switches were connected into multi-polar set insulated by three-phase bridge rail with peg ledges. These ledges are placed in clamps yokes with the line. In this case one of the ledges was not situated directly in yoke, but under a yoke (red pointer) and was not tightened with a screw to the clamp {the connector} including a line. Loaded current, in

consequence of the lack of the proper contact point, what caused high temperature rise which led to the thermal deformation of switches causing their damages. This was not fortunately a source of the fire, because casings were made from inflammable material - self-extinguishing, but to the damage surrendered the all switch box, because melted liquid material flowed to the bottom lines of the modular equipment and the switch box casing.

Protection degree of the electric devices

Thereby, that modular protective devices are intended to be used by persons with not special qualifications, suitable objective norms enforce on manufacturers of these devices suitable protections - against the first-hand touch of parts being live and against the penetration inwards of these devices by foreign matters and water. This last protection of the device, defines its protection degree - IP40 - Fig. 4. IP 40 means, that the switch casing protects the device against solids penetrations to its interior with diameter above 1 mms (number - 4) and does not protect the device against the water penetration to its interior (number - 0). However there are cases of bad interpreting of this mark by installing persons, or even worse - omitting them.

Fig. 5 Disassembled front switch panel during painting works
Wstawić foto - 001.jpg

Fig. 4 Differential-current switch covered with construction dust.
Wstawić foto -EFI-4 -pył.jpg

Fig. 6 Modular devices covered with plaster dust, during painting works
Wstawić foto - 002.jpg

The example of the improper dealing with the housing switch box with modular devices are showed on the Fig. 5. In the new room was carried out the new electric wiring installation and afterwards were performed works of plastering and polishing walls at the open switch box. It is difficult to demand from painters, that they take care for the protection of electric devices and so that they be awake to threats of their damage. As result of of this, all differential-current and over-current switches were covered with a moist plaster dust- Fig. 6, which penetrated to the inside of switches and caused damage. Symptoms of these damages were:

- blocking differential-current switches TEST buttons and the lack of the possibility to validate their activity
- exceeded values of the switch off current I_{Δ} during measurement procedures
- blocking switches internal mechanisms during their powering on and off
- lack of the current flow through enclosed poles

In described above case, the damage of devices could be easily avoided, if the installing person foresaw the beginning of painter's works after the end of electrical installation works and properly protected installed electric devices not resistant to the plaster dust and water penetration.

As a specialist who knows dedication of protective devices and the impending danger in case of their damage, should also inform the investor or the owner apartment about necessities of the protection of earlier installed electric devices. He should also instruct apartment users about the safe use of these devices and about necessities of the periodic check of the correctness of the activity of differential-current switches using the TEST button. One from technical problems of the exploitation of electric wirings in apartment buildings are measuring works of these installations. They are conducted more than once in polished apartments, while in neighboring apartments still

lasts the builder's repair works as destroying and rearranging of walls. Arranged earlier electric conductors become avulsed from the plaster, all accessories, such as sockets, switches and non insulated bunches of wires are disassembled and splashed with paint stand from the wall. In such conditions measurement results of diagnostic installations such as: the resistance measurement of the loop of the short-circuit, insulation resistance, startup time of the fuse and current values measurements are not always positive. Described above cases are fortunately sporadically, however they should be pointed out to all, from which the electric wirings installation quality and safety of their usage depends.

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