

OEZ NEWS

2006



DEAR BUSINESS PARTNERS AND FRIENDS



The year 2005 is now behind us, and so to begin the new year you are receiving the fresh new edition of our Technical Bulletin, which this time is devoted to modern Varius fuse switch-disconnectors. These products provide for the safe disconnecting of both rated currents and overcurrents up to x-times the rated current.

Last year was one of restructuring OEZ's exports department. This brought new means of serving customers and a heightened emphasis on mutual communication and determining our clients' needs. Self-contained territories were created, and these will be served by specific regional export managers devoting themselves intensively to the existing customers, to knowing the given territories, and to creating conditions for selling OEZ's full range of products. All activities related to administering orders and deliveries, as well as communications with regard to those areas, were assigned to the Sales and After-Sales Department, which efficiently handles these activities for the entire company. The formal starting date for the new structure is 1 January 2006, which also is the date for switching over to a new information system that supports the planned changes.

OEZ also made progress in developing its subsidiary companies. A prerequisite for further growth in these strategic units was to have plenty of sales personnel on the ground. We have strengthened the personnel at our companies in Russia, Ukraine, Germany and Poland with experts in the electrical equipment area in order to cover the important industrial regions in those individual countries. The very successfully developing Slovak subsidiary achieved more new sales into the Hungarian market.

Of course, this development would not have been possible without you. I would like to thank you, therefore, for this successful cooperation and to wish you a successful and personally fulfilling 2006.

Pavel Schweiner
Director of Export, OEZ s.r.o.

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VARIUS SERIES WINS THE GOLD AT THE PLOVDIV FAIR

The VARIUS fuse switch-disconnector series was awarded a gold medal at the prestigious International Technical Fair in Plovdiv, Bulgaria. The fair, which was held from 26 September to 1 October 2005, was attended by 3,170 firms from 43 countries.

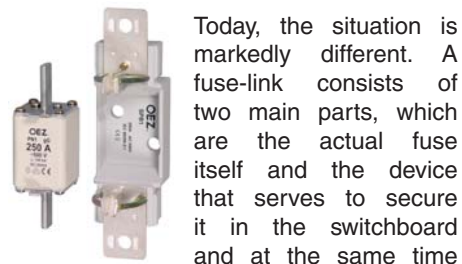


The winning product is already well established on the Czech and Slovak markets. "We have VARIUS fuse switch-disconnectors installed at the carmaker Škoda Auto, in the ČEZ energy group, at US Steel, Slovnaft, Kia Motors and many other firms," remarks Radim Adamec, sales director at OEZ s.r.o.

According to Pavel Schweiner, OEZ's director of foreign trade, VARIUS fuse switch-disconnectors, which were fully developed at OEZ, are high value-added products. "They have potential to earn a place in all of the world's markets."

THERE IS NO NEED TO FEAR FUSE-LINKS AND WORKING WITH THEM

The fuse-link as a protecting element has several electrical parameters that are demonstrably better than those of circuit breakers, despite the fact that, until recently, many service technicians have been apprehensive about handling fuse-links in the fuse-bases that were for many years the standard setup for switchboards using fuse-links for protection.



Today, the situation is markedly different. A fuse-link consists of two main parts, which are the actual fuse itself and the device that serves to secure it in the switchboard and at the same time

to the electrical connection. If we look in particular at Europe and the fuse-links most widely used here, that is to say those with blade contacts, it appears at first glance that through the years of their existence their visual appearance hasn't changed much. Their dimensions are similar, and they are always divided into individual sizes. Just two sizes have been added: the smallest and the largest. The smallest, which is designated 000, gradually are taking over the function of those sized 00. The role of fuse-links size 0, which are also falling out of use, is being taken over by the size 1 (sometimes designated as 01 or 1C), which has a smaller body but the same connecting dimensions. The largest to which we have become accustomed here is size 4a. So then, the sizes most commonly used are:

Size	000	00	1	2	3	4a
max. rated current	160 A	160 A	250 A	400 A	630 A	1600 A

Great progress has been achieved in that second part of the fuse, which is the device for affixing and connecting it into the switchboard. First there was the introduction of the already mentioned fuse-bases, which to a limited extent are still



used as replacements in existing applications, and especially because of their low prices. That is to say, these are devices that in their basic designs have no protection against unintended

contact with electrically charged parts. One can handle fuses in these only without current and using replacement handles, and this necessitates another breaking element in the circuit. All of these shortcomings are resolved by using the modern fuse switch-disconnector devices. These switch-disconnectors themselves combine two functions into one device: a switch-disconnector for breaking the circuit and a fuse disconnecter for safely disconnecting the circuit (isolation).

Using fuse switch-disconnectors can even increase safety for service personnel, due to the degree of protection for these devices, which is at least IP20. Combined with covering of the supply conductors with additional covers, it is possible to achieve a higher degree of protection for the entire switchboard and consequently a greater safety level. This degree of protection

can be reached also because of the broad range of options for connecting conductors to switch-disconnectors. In particular,

this refers to terminals that serve for directly connecting conductors without needing to use cable lugs. In order to increase safety for service personnel, it also helps, for example, to use rear connection, which is offered in VARIUS switch-disconnectors and is already known from MCCBs. This physically increases the distance between the service personnel and the



live conductor. It also avoids reducing the insulation strength of the air by ionised gases, which result from switching on and off. These gases rise to the space at the top of the device, but there is no conductor present there when a rear connection is used.

But let's come back to the option of using a fuse switch-disconnector for breaking and making an electrical circuit. The make and break itself is carried out by the fuse-link with its own contacts. While that was not possible when using fuse-bases, with switch-disconnectors it is a fundamental characteristic. The parameter known as utilisation category indicates the multiple of the rated current that it is possible to switch on and off. This utilisation category

Function		
Switching on and off	Isolation	Switching on and off and Isolation
Switch	Disconnecter	Switch-disconnector
Fuse combinations		
Switch with fuse	Disconnecter with fuse	Switch-disconnector with fuse
Fuse-switch	Fuse-disconnector	Fuse-switch-disconnector

is always established for a certain rated operating voltage. The highest category is AC-23B. That means that for voltages up to 400 V a.c. it is possible to use the switch-disconnector FH000 to turn off eight times the rated current and to turn on even 10 times the rated current. By contrast, the lowest category is AC-20B, in which case the device cannot be used for handling under load, so it is for use with a fuse disconnecter and not at all with a switch-disconnector. A complete overview of the utilisation categories is in the following table:

Utilisation category	Make	Break
AC-20B	0 × I _N	0 × I _N
AC-21B	1,5 × I _N	1,5 × I _N
AC-22B	3 × I _N	3 × I _N
AC-23B	10 × I _N	8 × I _N



Fuse Systems



There is an ever-increasing proportion of automation and diagnostic situations that necessitates the possibility for signalling of fuse conditions. Just as it was possible for fuse-bases to be outfitted with electromechanical signalling of the fuse-link condition, so is it possible to have such signalling when using fuse switch-disconnectors. In addition, we should point out the possibility for signalling the switch-disconnector cover position. Signalling of the fuse-link condition may be electronic or, as in the case of fuse-bases, electromechanical. Electromechanical signalling has one fundamental advantage, and that's price, as its cost is substantially lower than is that of electronic signalling of the fuse-link condition.

If we sum up the fundamental properties of switch-disconnectors, we will come up with a very broad sphere for their use. Various basic types of switch-disconnectors have been developed for various applications: fuse switch-disconnectors (wherein the fuse-links are placed side-by-side) and vertical fuse switch-disconnectors (wherein the fuse-links are positioned one above the other).

Fuse switch-disconnectors evolved historically from fuse-bases. In the case of 3-pole bases, fuse-links are placed

side-by-side and contacts are fastened to the common base. Gradually covering the fuse-base contacts and connection terminals brought the degree of protection to IP20, if fuse links with insulated gripping lugs were used. But it was never possible to work with the fuse-links under load. Work with fuse links was carried out using replacement handles, and therefore for each phase separately.

The introduction of fuse switch-disconnectors resolved all of these disadvantages. Not only did it become possible to handle fuse-links under load, but it also permitted turning on all three phases simultaneously. Changing fuses thus became much safer. Fuse-links are inserted into the cover of the switch-disconnector, which can be removed from the device. That means that you may remove the cover and carry it, for example, to a workbench. In the case of modern-design switch-disconnectors, you do not even need to touch the fuses – upon your pushing the release button, they fall out by themselves. That is one of the small but gratifying properties that has come with advancements in fuse-links in switch-disconnectors and in switching devices.

When fuse switch-disconnectors are for use in direct-current circuits and in TN-S networks, it is important to be able to put together either 2-pole or 4-pole devices. That means that 3-pole and 1-pole switch-disconnectors are produced, from which it is possible to assemble these combinations. Another standard



design that has come into existence is of devices for mounting either directly or using adapters onto busbar distributions (for example, with 60 mm spacing).

Vertical devices are intended for mounting onto a busbar system with spacing of 100 mm or 185 mm. Their dimensions have been predetermined especially for use in distribution switchboards. These switch-disconnectors are 50 or 100 mm wide and their outlets do not exceed that width. It is therefore possible to mount them side-by-side close to one another, which results in great space savings. Vertical switch-disconnectors come in two basic designs: 1-pole and 3-pole controlled devices. In the case of these devices, it also is important to have the possibility for a cable connection (or outlet) from both the bottom and top sides of the device.



Because vertical devices are used especially in distribution switchboards, it has become necessary to enable measuring of currents for individual consumption, that is the load on the busbars and individual phases. Measuring is carried out using a measuring current transformer that is located either on the base of the device or on an adapter.



And so what's the upshot of this article? The essential and foremost point is that fuse switch-disconnectors, in contrast to fuse-bases, are vastly increasing the applicability of fuse-links and the safety of working with them. And safety is always the highest priority.



SLOVAKIA'S LASR PUTS ITS MONEY ON FUSE-LINKS AND FUSE SWITCH-DISCONNECTORS

The company LASR s.r.o. was founded in 1990. From its very beginning, the company has been focused upon designing and implementing large-scale electrical installations. LASR is one of the most prominent firms in its field in the Slovak market. The company has carried out jobs for such customers as Coca-Cola, Matador, Slovnaft, Sony Slovakia, Transpetrol and other renowned multinational and domestic firms. It is currently working on an order for the Slovakia branch of Danfoss, a worldwide producer of refrigeration and air-conditioning technology. "We are completing switchboards that will be installed in a new manufacturing facility, and the devices will protect the production line in the thermostats division," explains Jozef Kapuš, switchboards production manager at LASR. Fuse-links and fuse switch-disconnectors play an important role in providing that protection.

"We especially use fuse-links in installations where we don't expect failures to occur frequently, such as from overload. Then, too, the choice to provide protection using fuse-links often results from our customers' economic demands. Of course, we also use fuse-links for protecting the outlets from transformer stations."

Why do you use fuse-links when many producers of circuit breaker devices recommend just circuit breakers?

To put it simply, there are two basic viewpoints as to why we use fuse-links. One is economical and the other technical. It is not possible everywhere to install circuit breakers. In switchboards where the short-circuit ratio is greater than 20 kA, for example, we would need to use a moulded case circuit breaker with a higher breaking capacity. Instead of circuit breakers, we choose fuse-links in fuse switch-disconnectors. We specifically prefer the VARIUS series. This solution turns out to be a lot less costly – so there's the economic reason. From the technical point of view, there is the capability of the use-links to limit short-circuit current in the circuits.

Among other important factors when we are considering to use fuse-links and fuse switch-disconnectors are the safe handling of the disconnectors, their adequate degree of protection, signalling, and the design of the devices itself.



Mr. Jozef Kapuš, switchboards production manager at LASR

What other experience do you have with fuse devices?

We have used OEZ switch-disconnectors for a long time. We are even more convinced since the new VARIUS series of switch-disconnectors came out, because its assortment is so broad, and there is also a wide range offered of the fuse-links themselves.

The extensive product assortment provides us flexibility and allows a choice of switch-disconnector sizes. So, for example, I can install a size 000 switch-disconnector where I can use fuse-links from sizes 000 up to 160 A, and that saves me space in the switchboard. In some cases, we even save a whole switchboard that way. We see additional advantages in the safety when connecting the circuit under load, in the extensive possibilities for signalling – signalling of a operated fuse-

link, signalling of cover opening, and others. I personally regard the fuse devices as optimal for providing safe and economical solutions.

What is your practical experience with the VARIUS fuse switch-disconnectors?

I'll try to sum it up in a few words:

- Secure disconnecting when inspecting, which is ensured by signalling of door opening, and at the same time the possibility to lock the cover. That gives you nearly 100% certainty that the device is not going to be used without authorisation.
- Disconnecting only of that certain part of the circuit where maintenance is going on. And that means that it's not necessary to shut down the entire circuit.
- With the supply of additional covers, it is possible to keep the degree of protection to IP20. That means safety for the service personnel.
- Increasing safety in servicing the switch-disconnector can be seen in the fact that there have been no accidents over the past three years where we have installed VARIUS fuse switch-disconnectors.



... and be
CERTAIN

FUSE SWITCH-DISCONNECTORS

VARIOUS

- *a wide range of connections*
- *1, 2, 3 and 4-pole designs*
- *economical remote signalling*
- *excellent fuse-link visibility in the switch disconnecter*

