

Whitepaper

Short-circuit power and short-circuit resistance

Short-circuit power is the theoretical current that will run in the event of a short circuit if the protection has not yet intervened. This theoretical short-circuit current at the point of the voltage junction depends on the impedance of the voltage source (power-supply transformer, generator, etc.).

The short-circuit power can be calculated, but this can be difficult because not all data on the electrical installation is available in many cases. The standard value lies between 6 kA and 60 kA. However, as much as 150 kA must be taken into account for a voltage junction in a substation close to the power-supply transformer.

When a short circuit occurs, a short-circuit current will occur which varies according to the total resistance between the point of the short circuit and the power-supply transformer. Generally speaking, a short-circuit protection is included in the supply lines, and the short-circuit current will therefore be cut off within 5 milliseconds. However, before this protection cuts the current off, a high short-circuit current will occur. When the components in an electrical installation are insufficiently short-circuit proof, a short circuit can cause a lot of damage, even if the short-circuit current exists only briefly. This can cause a fire due to an electric arc or damage due to exploding components caused by the short-circuit current running through them. It is therefore extremely important to take the short-circuit capacity of an electrical installation and the short-circuit resistance of the components used into account.

The connection for the measuring voltage on the meter is often created on compact connecting terminals. Due to the compact connection and often relatively thin measuring wire (0.5 to 1.5 mm²), the connection looks quite harmless. However, this 'harmless' looking measuring connection is usually connected to an installation with a short-circuit power that can cause a dangerous electric arc.

Because the voltage junction is directly connected to the mains before measuring, it must be secured with a fuse. In the measuring setup, the short-circuit power of the installation to be monitored must be taken into account for the fuse. After all, in the event of a short circuit at the meter, the short-circuit capacity is directly over the fuse. Secure the measuring wire as close as possible to the voltage junction. A measuring wire that runs unsecured from a voltage junction through the installation is a huge potential hazard. Namely, in the event of a short circuit these thin measuring wires are subjected to the full short-circuit power, guaranteeing an explosion and electrical arcing.

Please feel free to call ELEQ at +31 (0)521 533 333 for more information or send an email to info@eleq.com



Installation after short-circuit



For more information on how to determine the short-circuit power of an electrical installation, please refer to the 'Measurements Category' white paper. For more information on a safe voltage junction please refer to the 'Safe Voltage Junction' white paper.