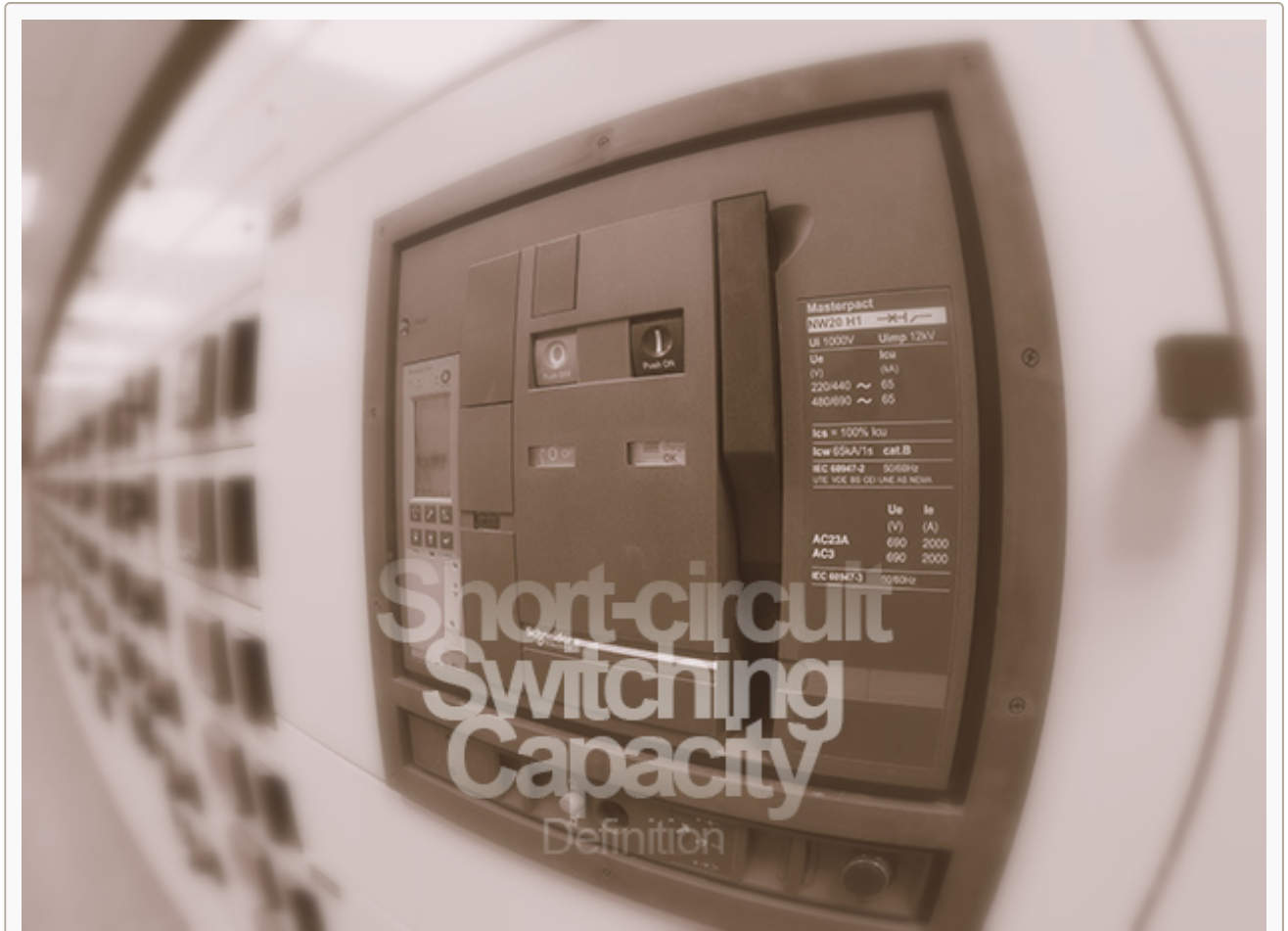


Short-Circuit Switching Capacity Definition

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Short-circuit Switching Capacity Definition (photo by M. Diskovic)

What is the switching capacity?

The **switching capacity** is the r.m.s value of a current at a given power factor $\cos\phi$ as well as a given rated voltage at which a **switchgear** or a fuse can still shut-off under specified conditions in an operationally safe way.

Both the **short-circuit making capacity** as well as the short-circuit breaking capacity of circuit breakers must be larger than or equal to the prospective short-circuit current at the place of installation.

If this is not the case, then a suitable backup protection (*for example a fuse*) should be provided to ensure the required switching capacity of the device combination.

Data regarding devices for backup protection are given in the technical documentation.

Rated short-circuit making capacity I_{cm}

The **rated short-circuit making capacity I_{cm}** is a quantity that according to regulations must be in a certain ratio to the rated ultimate short-circuit breaking capacity I_{cu} and that has to be guaranteed by the device manufacturer.

This is not a variable that must be considered by the user, however it ensures that a circuit breaker is in the position to connect onto a short-circuit and to **disconnect it subsequently**.

Rated short-circuit breaking capacity I_{cu} and I_{cs}

IEC 60947-2 makes distinction between the **rated ultimate short-circuit breaking capacity I_{cu}** and the **rated service short-circuit breaking capacity I_{cs}** :

- Rated ultimate short-circuit breaking capacity I_{cu}

I_{cu} is the **maximum breaking capacity** of a circuit breaker at an associated rated operational voltage and under specified conditions. I_{cu} is expressed in **kA** and must be at least as large as the prospective short-circuit current at the site of installation.

Circuit breakers that have switched-off at the level of the ultimate short-circuit breaking capacity, are reduced serviceable afterwards and should at least be checked regarding functionality. There may be changes in the **overload trip characteristic** and increased temperature rise due to the erosion of contact material.

- Rated service short-circuit interrupting capacity I_{cs}

I_{cs} values are usually lower than the values for I_{cu} . Circuit breakers that have been switching-off at the level of the service short-circuit breaking capacity continue to be serviceable afterward.

In plants in which interruptions to operations must be kept **as short as possible**, product selection should be carried-out based on I_{cs} .

- Breaking capacity of fuses

The same applies to fuses as to circuit breakers with respect to the I_{cu} : at the given rated operational voltage, the rated breaking capacity must be at least as large as the prospective short-circuit current at the site of installation.

Resource: *Low-Voltage Switchgear and Controlgear – Allen-Bradley*

Source :

<http://electrical-engineering-portal.com/short-circuit-switching-capacity-definition>