Line Protection Principles

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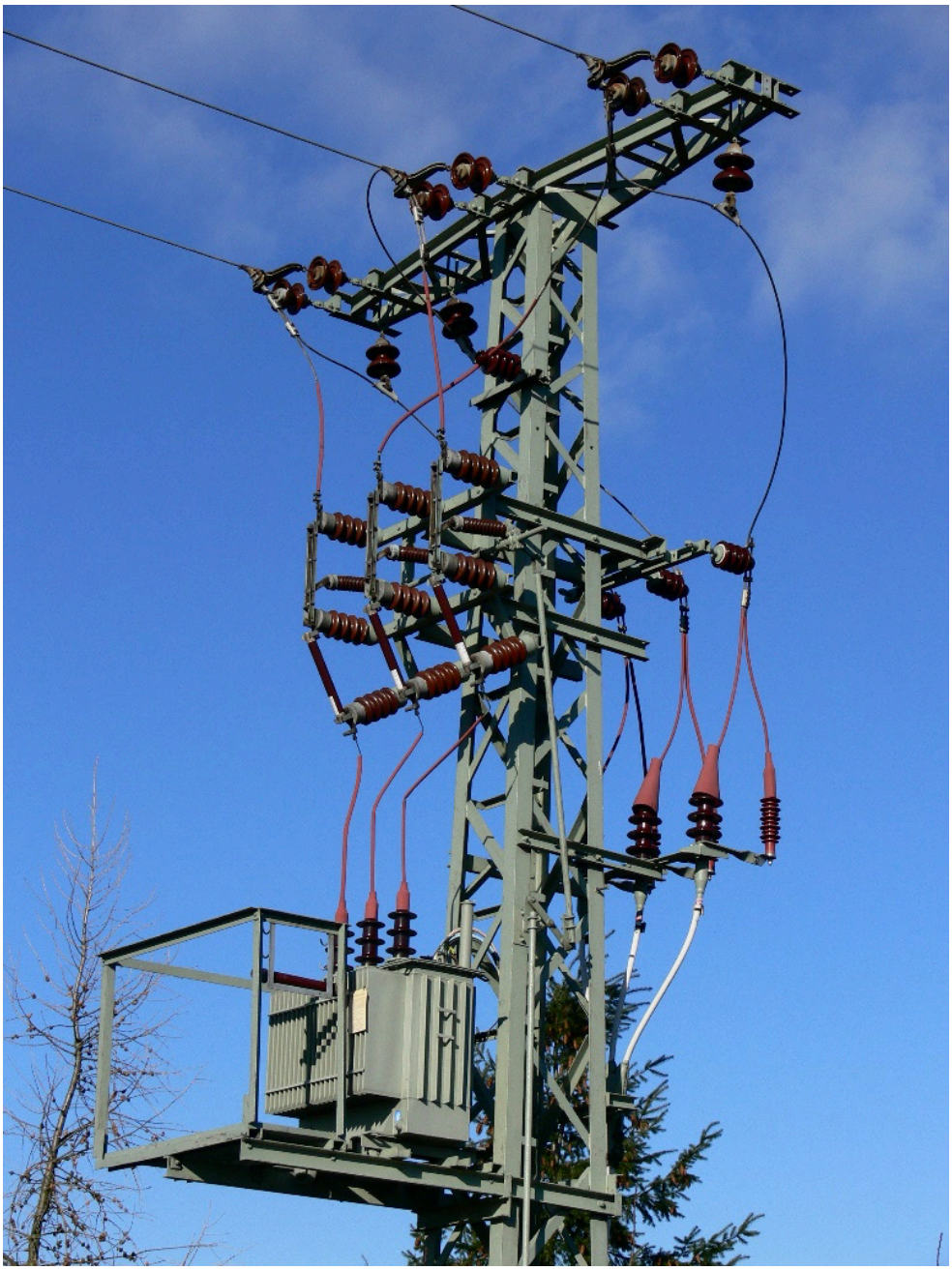
INTER-TEKNIK CURRENT-LIMITING FUSES FOR YOUR MV DISTRIBUTION LINES



Current-limiting HV fuses are commonly used to protect branch lines in MV distribution systems in the event of short-circuit faults. Their application is specifically useful to protect overhead lines in areas of frequent thunderstorms. By rapid disconnection of a faulted branches and spur lines, they ensure optimum availability of power in neighbouring systems connected to the same feeder line.

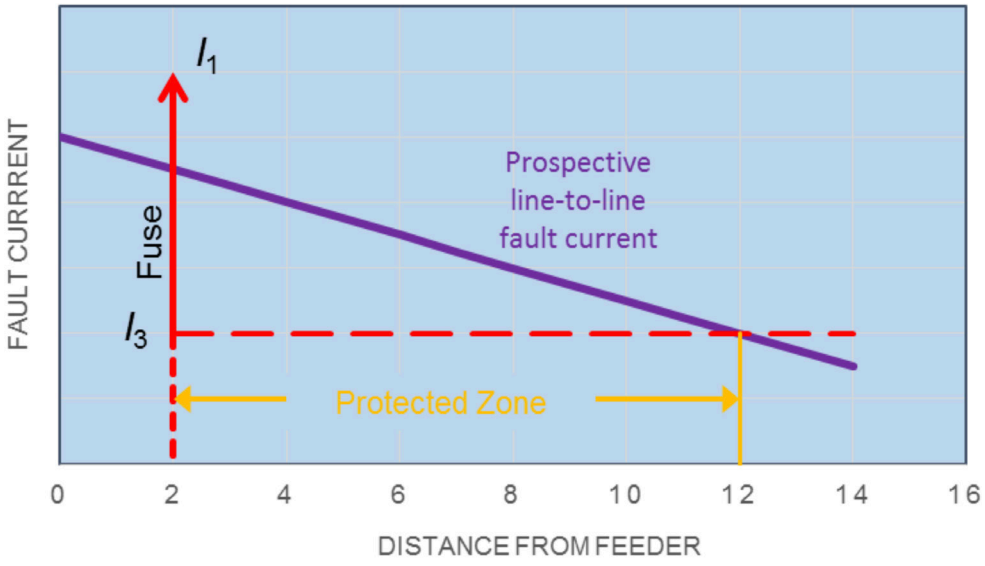
Note: Unlike non-current-limiting expulsion fuses, according to IEC 60282-2, current-limiting fuses do not emit any flames or hot gases that may cause brush fires.

Selection Criteria

In addition to the normal load criteria, rated currents of line fuses are selected with regard to the range of fault currents that may occur downstream the location of the fuse in a network. The maximum prospective fault currents usually are well below the breaking capacity of current-limiting fuses, therefore it's not a vital parameter in the line protection applications.

On the other hand, **the minimum breaking current** has to be selected according to the **lowest prospective line-to-line fault current.** With the distance from feeding substation the line impedance increases and consequently, the fault level decreases. Therefore, **the length of the line** protected by a fuse of a certain rating is limited by the minimum breaking current I_3 of that fuse. Please refer to the graph for a better understanding.

Note: Full range of protection may be provided by a fuse-switch combination. Such combinations offer the additional advantage of three-pole disconnection of a faulted line.



Some line protection applications have proven to be tricky for the distribution utilities. As always, we will be glad to provide you with our technical evaluation, in case you need assistance.

Selectivity

Selectivity to downstream fuses e.g. installed in RMUs connected to the line is given when the rated current of the latter is less than half of the line fuse rating (selectivity ratio 1 : 2). This ratio is also applicable to upstream fuses if any. In most applications, the main feeder line will be protected by circuit-breakers in the substation and specific co-ordination rules apply.

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