

High-voltage (HV) fuses in particular applications

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HV fuses, often named also HH fuses are High-voltage High-rupturing capacity fuses designed for alternating voltages >1 kV.

Protection of transformers for power distribution networks is the most widely spread application of HV fuses. With only a few exceptions back-up fuses are used for short-circuit protection of the primary side of power transformers. As international standard **IEC 60282-1** and the **harmonised German Standard VDE 0670, Part 4** do not specify any time-current characteristics for HV fuses, and even rated currents are only defined by the specified temperature rise of the contact pieces. **Thus, rated currents of HV fuses from different manufacturers cannot directly be compared to each other.** Selection of such fuses is based alone on manufacturer's data. The purpose of this article is to show to the readers proper principle of MV Back-up fuse-link selection for power transformer protection.

IEC 60282-1 – three classes of current-limiting fuses are defined according to the range in which they can be used

Full-Range fuse

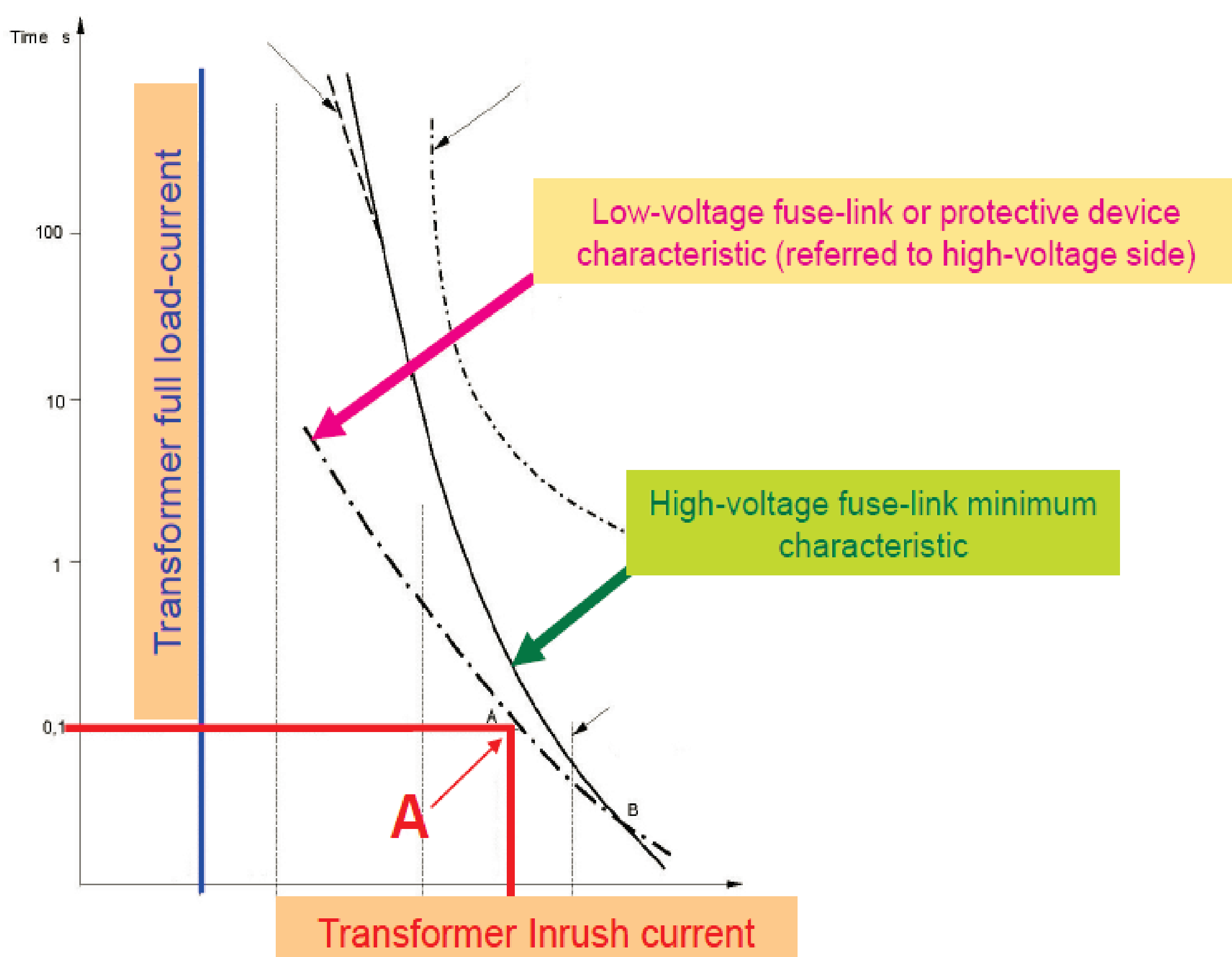
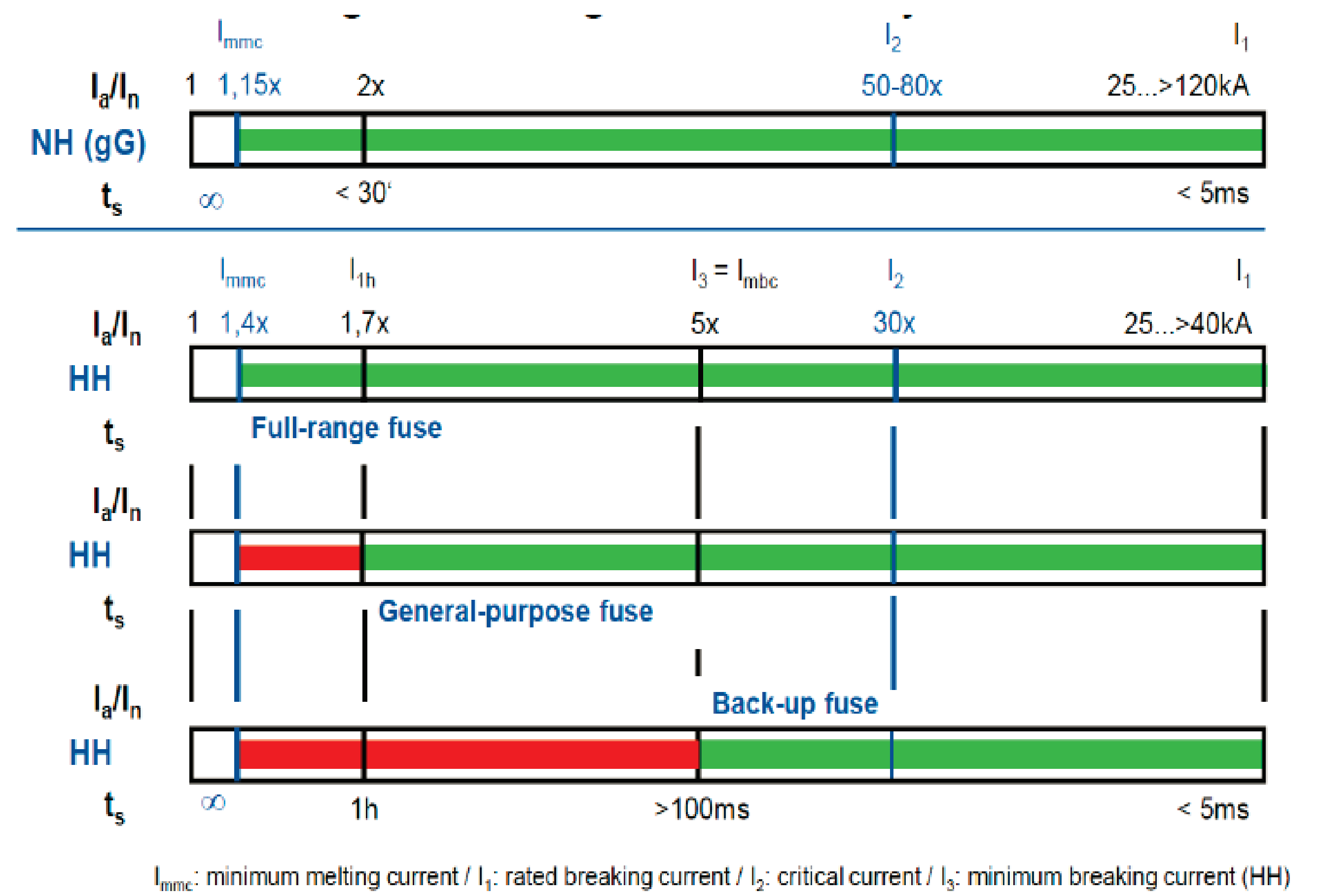
current-limiting fuse capable of breaking, under specified conditions of use and behaviour, all currents that cause melting of the fuse element(s), up to its rated maximum breaking current (see 6.6.1.1, test duty 3)

General-Purpose fuse

current-limiting fuse capable of breaking, under specified conditions of use and behaviour, all currents from the rated maximum breaking current down to a low value equal to the current that causes melting of the fuse element in 1 h

Back-Up fuse

current-limiting fuse capable of breaking, under specified conditions of use and behaviour, all currents from the rated maximum breaking current down to the rated minimum breaking current



Fuse-link time-current characteristics

The time-current characteristics of HV fuse-links for transformer circuit applications should have the following features:

- relatively **high operating current in the 0,1 s region** so as to withstand transformer inrush current and give good coordination with protection devices on the secondary side
- relatively **low operating current in the 10 s region** so as to:
 - ensure rapid clearance of transformer winding faults, secondary side faults and, if applicable, primary side earth faults
 - give good coordination with up-stream overcurrent protective devices (source side).

