

Transformer Protection Principles & Selection Table

INTER-TEKNIK BACK-UP FUSE-LINKS FOR TRANSFORMER PROTECTION

Inter-Teknik MV Back-Up fuse-links are primarily used to protect distribution type transformers from overheating in case of internal and external short-circuit faults.

Accordingly, fuse-link selection is based on two criteria (see fig. 1):

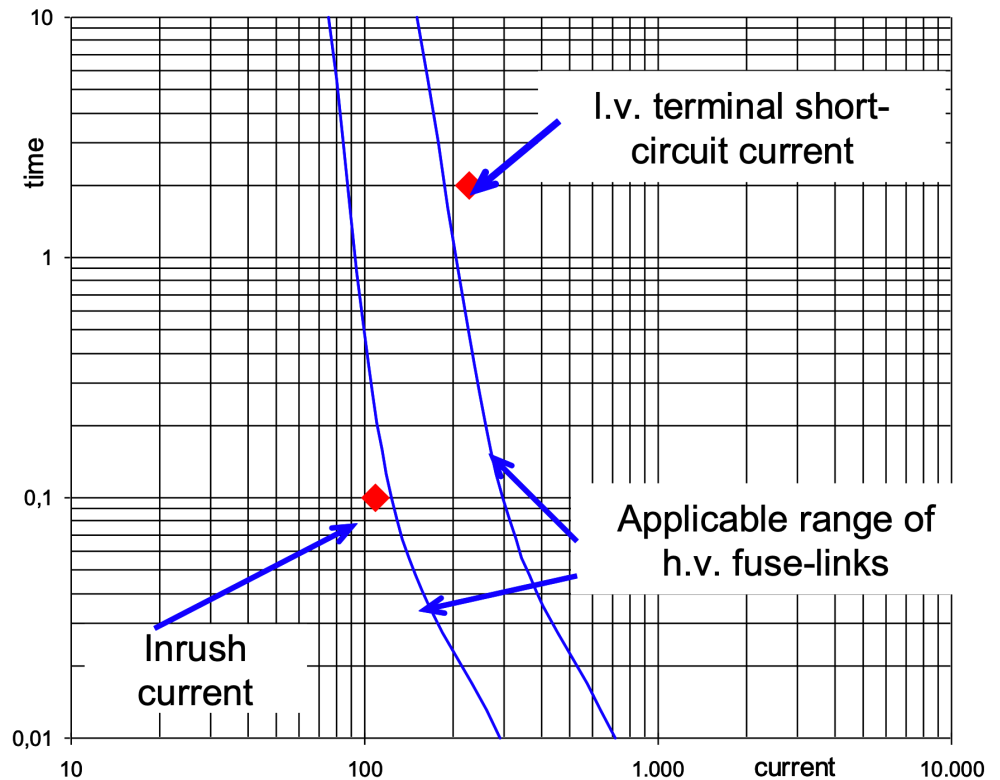


Fig 1. Transformer Protection

■ The fuse-links shall interrupt a three-phase bolted short-circuit current (I_{sc}) on the l.v. terminals within 2 s corresponding to the transformer withstand time. I_{sc} is calculated as follows;

$$I_{sc} = I_{nTr} / u_k$$

■ The fuse-links must not operate nor single fuse-elements be damaged by **transformer inrush currents** (magnetizing currents). A representative value for distribution type transformer inrush currents has been found 12 times transformer rated current for a duration of 100 ms.

Selection: All you need to do is to mark I_{sc} and **transformer inrush current**; shown with red dots on Fig 1. Then, you can check which fuses' **time-current curves** lie in between these values. Note that there may be more than one applicable fuse for a given application.

IMPORTANT

Selection is as simple as this! However, when fuses are combined with on-load switches, additional requirements come into play.

Operating Voltage	0,4 kV	0,4 kV	6kV	10kV	20kV	30kV						
SNkVA	uz [%]	Rated current of l.v. gTr fuse [A]	Rated current of l.v. gG fuse [A]	Transformer rated current [A]	Fuse rated current [A]	Transformer rated current [A]	Fuse rated current [A]	Transformer rated current [A]	Fuse rated current [A]	Transformer rated current [A]	Fuse rated current [A]	Fuse rated current [A]
Transformer apparent power / gTr fuse rating	50	4	72	63	4,8	16	2,9	10	1,45	6,3	0,95	4
	100	4	144	125	9,6	2025	5,8	16	2,9	10	1,9	6,3
	125	4	180	160	12	2531,5	7,2	16	3,6	10	2,4	10
	160	4	231	224	15,4	31,540	9,2	2025	4,6	16	3,1	10
	200	4	289	250	19,2	4050	11,5	2531,5	5,8	16	3,8	16
	250	4	361	315	24,1	5063	14,4	31,540	7,2	1625	4,8	1620
	315	4	455	400	30,3	6380	18,2	4050	9,1	25	6,1	2025
	400	4	577	500	38,5	80100	23,1	5063	11,5	2531,5	7,7	25
	500	4	722	630	48,1	100125	28,9	6380	14,4	31,540	9,6	2531,5
	630	4	909	800	60,6	125160	63,4	63100	18,2	4050	12,1	31,540
	800	4	1.155	1.000	77,1	160	46,2	100	23,1	5063	15,4	31,540
	1.000	4	1.443	1.250	96,3	160200	57,7	100125	28,9	6380	19,3	4050
	500	6	722	630	48,1	80100	28,9	5063	14,4	31,5	9,6	25
	630	6	909	800	60,6	100125	36,4	6380	18,2	4050	12,1	2531,5
	800	6	1155	1.000	77,1	125160	46,2	80100	23,1	5063	15,4	31,540
	1.000	6	1443	1.250	96,3	160200	57,7	100125	28,9	63	19,3	4050
	1.250	6	*)	1.600	120,4	-	72,1	125160	36,1	80	24,1	5063
	1.600	6	*)	*)	144,2	-	92,4	160200	46,2	80100	30,8	63
	2.000	6	*)	*)	192,6	-	115,4	160200	57,8	100125	38,6	80
	2.500	6	*)	*)	240,8	-	144,3	-	72,3	125160	48,3	100

No NH fuse-links available

Table 1 - Fuse selection for the protection of distribution transformers

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