Calculating short circuit current

Maximum short circuit current downstream of an MV/LV transformer
Selecting CBs supplied by one or more MV/LV transformers

Maximum short circuit current downstream of an MV/LV transformer

The values indicated in the table below correspond to a bolted 3 phase short circuit across the LV terminals of an MV/LV transformer connected to a network with a short circuit power of 500 MVA.

transformer kVA rating															
433 V (1)	50	100	160	250	315	400	500	630	750	1000	1250	1500	2000	2500	3150
In (A)	66.7	133.3	213.3	333.3	420.0	533.3	666.7	840	1000	1333	1667	2000	2667	3333	4200
Isc (kA)	1.7	3.3	5.3	8.3	10.5	13.3	16.7	21.0	22.2	26.7	30.3	33.3	41.0	47.6	60.0
Usc (%)	4	4	4	4	4	4	4	4	4.5	5	5.5	6	6.5	7	7

Selecting incoming or outgoing circuit breakers according to the number and kVA rating of source transformers

The selection of a circuit breaker protecting a circuit mainly depends on:

> the rated current of the source or of the load which determines the rating of the equipment,
> the maximum short circuit current at the point of installation which determines the minimum breaking capacity of the equipment.

Case with several transformers
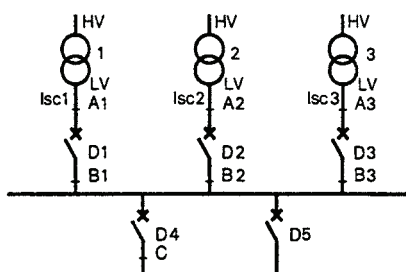
E.g. If transformers 1, 2 & 3 were rated at 630kVA each, circuit breakers D1, D2 & D3 must have a breaking capacity u 42kA.

Circuit breakers D4 & D5 must have a breaking capacity u 63kA.

(**Note**: Special precautions to be taken when cascading with several transformers
in parallel).

For the case involving several transformers in parallel (2):

> the incoming circuit breaker D1 must have a breaking capacity higher than the larger of the following two values:
>   > either Isc1 (for a short circuit in B1),
>   > or Isc2 + Isc3 (for a short circuit in A1),
> the outgoing circuit breaker D4 must have a breaking capacity higher than Isc1 + Isc2 + Isc3.

Notes
(1) Rated voltage between phases of the transformer under no-load conditions.
(2) To connect several transformers in parallel, the transformers should have the same Usc, the same transformation ratio and the same coupling.
     The power ratio between the two transformers should be a maximum of 2.