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BREAKER CURVES, SETTINGS AND DISCRIMINATION STUDY

Project: Sample office building - LT distribution

Client: Sample client

Date: 19 November 2026

1. Recommended protection settings

No	Breaker / fault point	Location	Upstream	Type	In (A)	Make and release	Ik (kA)	Icu >= (kA)	Ir	tr	Isd	tsd (s)	Ii	Ig	tg (s)
1	A	-	Incomer	ACB	2000	ABB: Ekip Dip LSIG (SACE Emax 2)	50.00	50	1 x In = 2000 A	72 s at 3 Ir	1 x In = 2000 A	0.5	OFF	0.1 x In = 200 A	0.1
2	B	-	A	MCCB	630	Siemens: ETU550 LSI with display (3VA2)	30.00	36	1 x In = 630 A	12 s at 6 Ir	2.1 x In = 1323 A	0.35	12 x In = 7560 A	-	-
3	C	-	B	MCCB	250	Legrand: S10 electronic protection (DPX3 250 HP / 630 / 1600)	14.00	16	1 x In = 250 A	10 s at 6 Ir	4 x Ir = 1000 A	0.24	15 x In = 3750 A	0.2 x In = 50 A	0.2
4	D	-	C	MCCB	100	L&T (Lauritz Knudsen): MTX3.0 LSIG (DN2 / DN3 / DN4 MCCB)	7.00	10	1 x In = 100 A	4 s at 6 Ir	6 x Ir = 600 A	0.1	8 x In = 800 A	0.1 x In = 10 A	0.1

2. Discrimination check

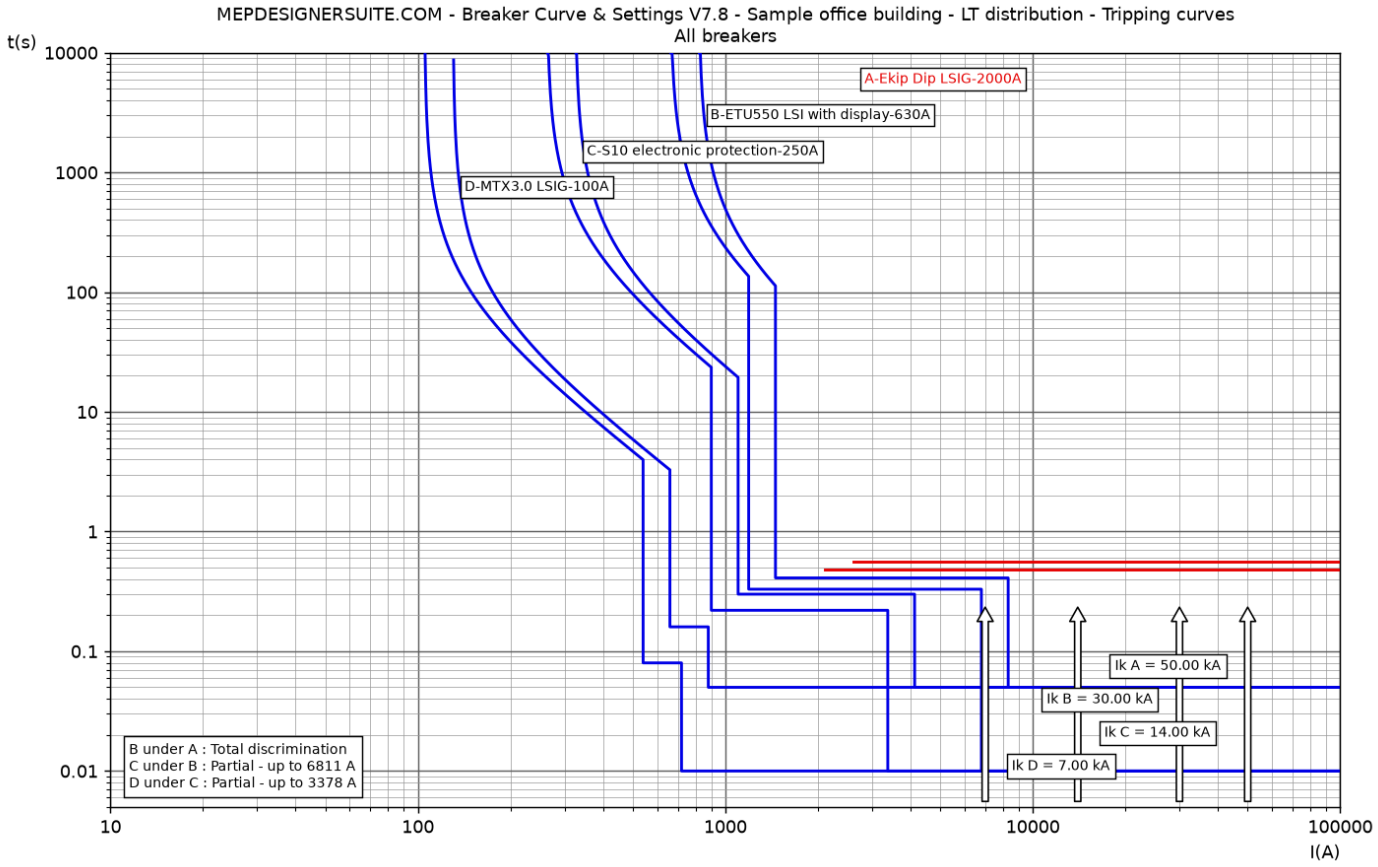
Upstream	Downstream	Result	Detail
A	B	TOTAL	Selective up to the fault level at B (30.00 kA)
B	C	PARTIAL	Selective up to 6811 A only; fault level is 14.00 kA (upstream instantaneous operates)
C	D	PARTIAL	Selective up to 3378 A only; fault level is 7.00 kA (upstream instantaneous operates). Earth fault: graded (50 A / 0.2 s over 10 A / 0.1 s)

3. Releases used and where their setting steps come from

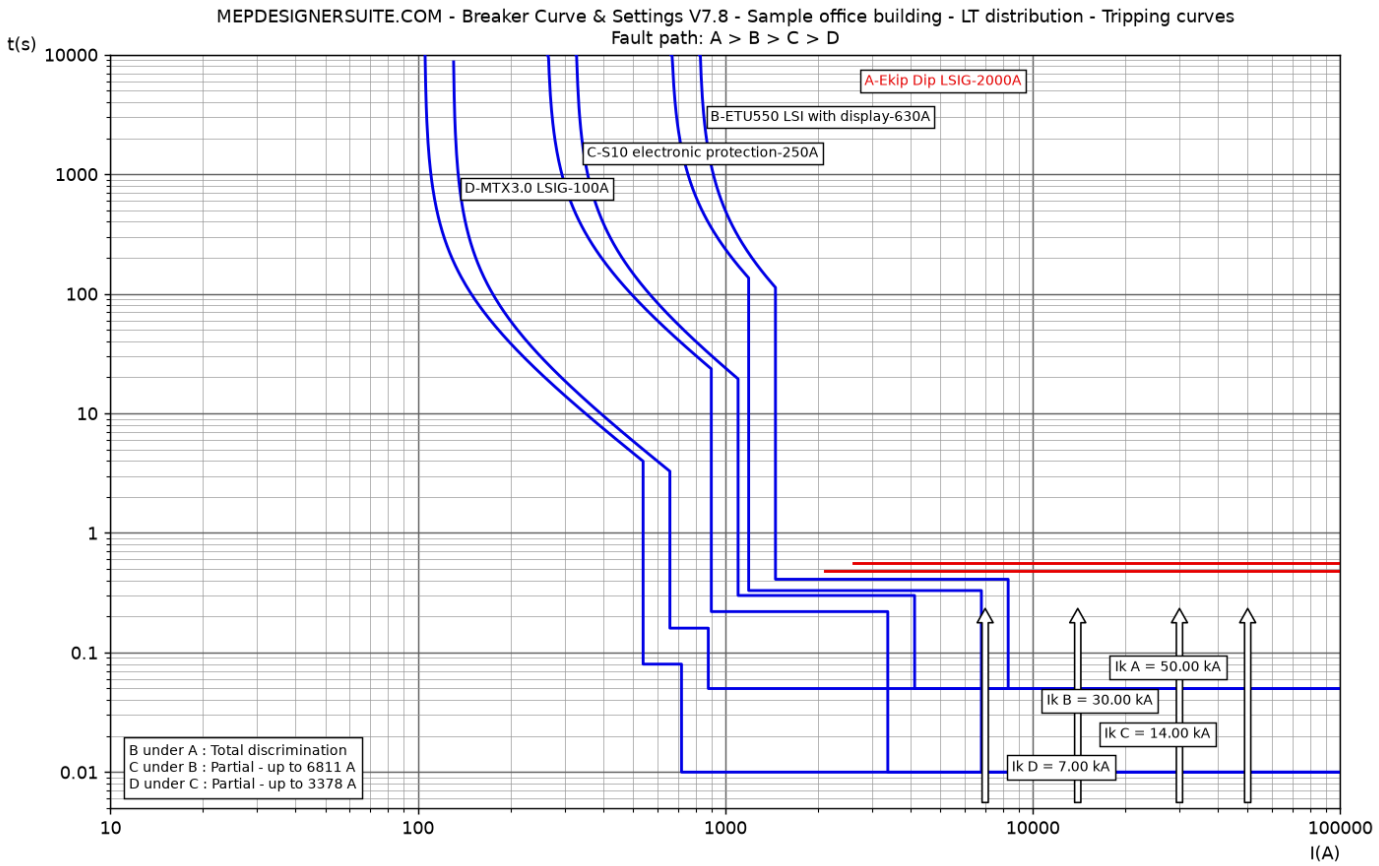
Make and release	Setting steps	Source
ABB: Ekip Dip LSIG (SACE Emax 2)	Manufacturer's table	ABB SACE Emax 2 manuals 1SDH000999 / 1SDH001000 (Ekip Dip, Ekip Touch). All dip-switch steps from the Emax 2 protection-function table. t1 is the trip time at 3 x I1; I2, I3, I4 are multiples of In. t2 is read at 10 x In when the S curve is set to I2t; t4 at 3 x In when the G curve is set to I2t.
Siemens: ETU550 LSI with display (3VA2)	Manufacturer's table	Siemens 3VA2 data sheets (ETU350: 3VA2010-5HN32, ETU560: 3VA2010-6JQ32) and 3VA product overview. From the Siemens 3VA2 ETU550 data sheets: Ir 0.4 to 1 x In, tr 0.5 to 25 s at 6 x Ir (frame limit: 20 s at 160 A, 17 s at 400 A, 15 s at 250 A, 12 s at 630 A class H), Isd 0.6 to 10 x In (0.6 to 9 x In on some 630 A units), tsd 0.05 to 0.5 s, Ii 1.5 to 12 x In. No earth-fault function.
Legrand: S10 electronic protection (DPX3 250 HP / 630 / 1600)	Manufacturer's table	Legrand DPX3 catalogue (India) p. 7; technical sheet F04059EN/02; instruction sheets LE12999AA / LE13196AA. Ir in 1 A steps; tr at 6 x Ir (DPX3 250 HP stops at 15 s); tsd 40-480 ms; Ii set from software/app only; tg 0.1/0.2/0.5/1 s. From Legrand DPX3 catalogue.
L&T (Lauritz Knudsen): MTX3.0 LSIG (DN2 / DN3 / DN4 MCCB)	Manufacturer's table	Lauritz Knudsen DN / D-sine MCCB catalogue (MTX releases). tr adjustable in 0.1 s steps on the unit (shown in 0.5 s). 2/0.4/0.5/0.7 x In, text 10-50 % in 5 % steps) and tg (table 100/200 ms, text 100-500 ms).

4. Tripping curves and settings sheets

All breakers



Fault path: A > B > C > D



Settings	Dial	Value	Dial	Value	Dial	Value	Dial	Value
Make		ABB		Siemens		Legrand		L&T (Lauritz Knudsen)
Circuit-breaker		A (ACB)		B (MCCB)		C (MCCB)		D (MCCB)
Trip unit / curve		Ekip Dip LSIG		ETU550 LSI with display		S10 electronic protection		MTX3.0 LSIG
Rating	2000.00	2000 A	630.00	630 A	250.00	250 A	100.00	100 A
Long-time								
Ir	1	2000.0 A	1	630.0 A	1	250.0 A	1	100.0 A
tr	72	72 s at 3 Ir	12	12 s at 6 Ir	10	10 s at 6 Ir	4	4 s at 6 Ir
Short-time								
Im / Isd	1 x In	2000.0 A	2.1 x In	1323.0 A	4 x Ir	1000.0 A	6 x Ir	600.0 A
I2t (delay)	-		-		-		-	
tm / tsd	0.5	0.50 s	0.35	0.35 s	0.24	0.24 s	0.1	0.10 s
Instantaneous								
Ii		OFF	12	7560.0 A	15	3750.0 A	8	800.0 A
Earth fault								
Ig	0.1 x In	200.0 A			0.2 x In	50.0 A	0.1 x In	10.0 A
tg	0.1	0.10 s			0.2	0.20 s	0.1	0.10 s
Discrimination								
Limit		Upstream device		Total discrimination		Partial - up to 6811 A		Partial - up to 3378 A

Each breaker is drawn as a tolerance band: the left / lower line is the earliest tripping (non-tripping limit) and the right / upper line is the latest tripping (total clearing). The upstream device is red and the downstream devices are blue. Discrimination is TOTAL when the upstream non-tripping line stays above the downstream total clearing line up to the fault level. Schneider bands are taken from the Micrologic user manual; the other makes use the IEC 60947-2 band (long-time 1.05 to 1.30 x Ir, pickups +/-10 %, delay -20 ms / +60 ms).