Selectivity

فصل الجزء الي فيه Fault بس

→ **Types of selectivity :**

1. Current selectivity .

استقائية من خلال التيار

2. Time selectivity .

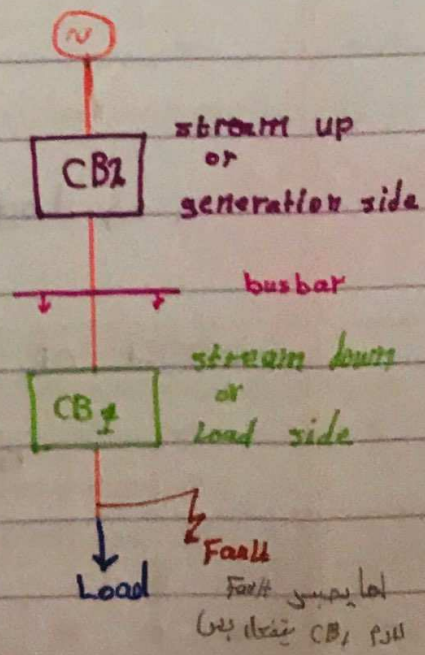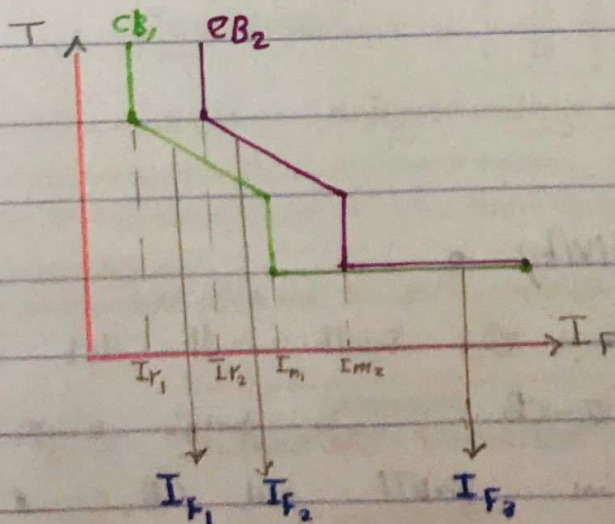انتقائية من خلال الزمن

3. Logical selectivity .

تكون في تواصل بين CB

→ **Selectivity by :**

نعمل انتقائية بطريقتين

1. Characteristic curve of CB .

2. Selective Table .

من الشبكة المحمية الـ CB

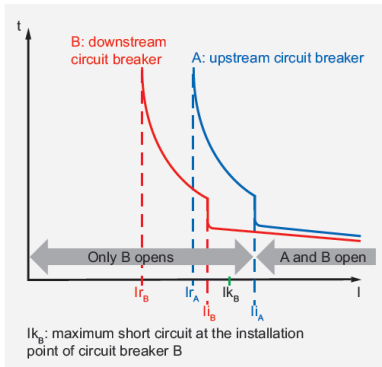✗ **By characteristic curve :**

Current selectivity

المنحنيات متقاطعة لوا

Time selectivity

المنحنيات متقاطعة لوا

بس في فارق زمني

ماهي
Selectivity

اما يمسي Fault
تحت CB, تحتاج بس

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stream up
or
generation side

busbar

stream down
or
load side

Load

Fault

CB2

CB1
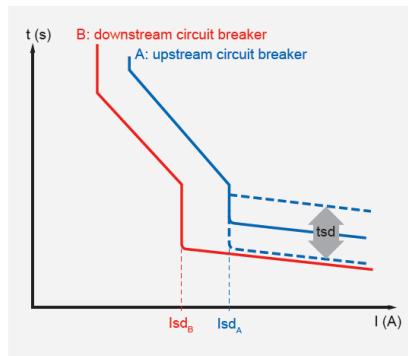
Selectivity means that,when a fault occurs,only the part of the installation concernednby this fault is isolated. It is required when several protection devices are installed in series and when it is justified by safety or operating requirements.

Current sensing selectivity

t

B: downstream circuit breaker

A: upstream circuit breaker

Only B opens   A and B open

Ir_B Ir_A Ik_B

Ii_B Ii_A

I

Ik_B: maximum short circuit at the installation point of circuit breaker B

Time selectivity

t (s)

B: downstream circuit breaker

A: upstream circuit breaker

tsd

Isd_B Isd_A

I (A)

Logic selectivity

FAULT 1: SHORT CIRCUIT DOWNSTREAM OF B

Circuit breakers A and B detect the fault. Circuit breaker A receives a signal from downstream circuit breaker B and therefore remains closed, keeping to the programmed delays. As it does not receive any signal from the circuit breakers at the lower levels, circuit breaker B trips immediately, resetting any programmed delays (Tsd and/or HIGH) to zero.

FAULT 2: SHORT CIRCUIT DOWNSTREAM OF A

Only circuit breaker A detects the fault. As it does not receive any signal from the circuit breakers at the lower levels, circuit breaker A trips immediately, resetting any programmed delays (Tsd and/or HIGH) to zero.
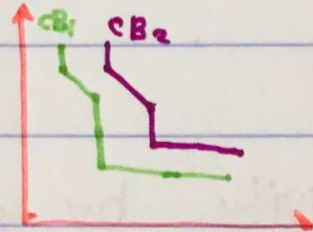
← ما هي Selectivit بع I_{m_2}

غير هاي الحالة بكون ـ
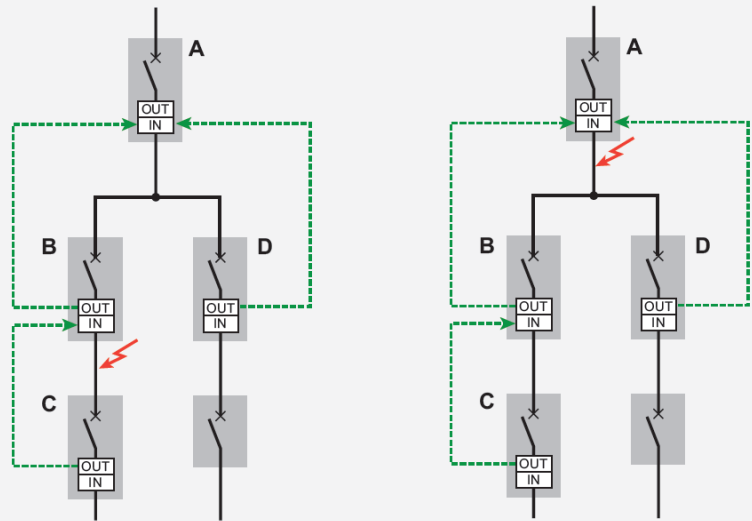
partial selectivity

لحتى تكون Total لازم م 2- curves

ما يلتقوا .

→ Total selectivity

لحتى يمين عندي Total selectivity بعمل shift

لـ CB_2 – Curve لليمين ▦

وهاي الحالة بكون اسمها Energy selectivity

ومنث مطلوبة . المعروفة بتم عن طريق

بكبرها او بغير ← قديم ← CB

TU

بكبر ... Trip unit ← حديث ← بكسر ل

. وبزيد I_{m_2}

→ Logical selectivity 8

اذا الـ Fault وقع لمنطقة CB_2

بتواصل بين 2-CB ، فبعبث CB_1 اشارة

ل CB_2 انه Fault لمنطقتك ▦ .

How to Interpret the Selectivity Tables

Example 1—Total Selectivity

For this example, we will consider a selectivity study between two circuit breakers: 140G-J, 90 A and 1492-SPM, 8 A (Figure 1).

Figure 1 - Selectivity Between Line Side 140G-J 90 A and Load Side 1492-SPM 8 A Circuit Breakers

(handwritten: $\left(\frac{I_n}{I_{m_2}}\right)$ حو يكون partial او total يعني اذا طلع ... موجود إذا كان ... selectivity)

(handwritten: I_n Line side , I_n Load side تشغيل شرط)

140G, J-Frame — Line side

Load side — 1492-SPM

Table Legend: Numerical Values = Selectivity Limit [kA] T = Total Selectivity (for definitions, see page 2)			Line Side - 415V Incoming Breaker Type: 140G J-Frame Molded Case Circuit Breaker Ultimate Breaking Capacity I_{cu} [kA] = 36, 50, 70, 120 Thermal-magnetic Trip								
Load Side			**Rated Current I_n [A]**								
Breaker Type	Ultimate Breaking Capacity I_{cu} [kA]	Rated Current I_n [A]	25	30	35	40	50	60	70	80	90
Bulletin 1492-SPM Miniature Circuit Breaker	I cut اكبر تيار CB يسمح اردني	0.5…4	T	T	T	T	T	T	T	T	T
		6	—	6	6	6	7.5	10	10	T	T
		8		—	—	—	6	7.5	10	10	T
	15	10	—	—	—	—	6.5	7.5	7.5		9
		13	—	—	—	—	—	—	7.5	8	8
		16	—	—	—	—	—	—	—	8	8

(handwritten left: قطع كهربائي راسب)

From the coordination tables, we can determine that there is total selectivity (T) between the two circuit breakers. *(handwritten: T= total selectivity)*

This means that there is selectivity up to 15 kA, the lower of the two I_{cu} values. The maximum possible short-circuit current at the point o installation of the 1492-SPM 8A circuit breaker will be less than or equal to 15 kA.

Example 2—Partial Selectivity ←

Figure 2 - Selectivity Between 140G-J 60 A and 1492-SPM 8 A Circuit Breakers

(handwritten: 10 A)

140G, J-Frame

1492-SPM

Table Legend: Numerical Values = Selectivity Limit [kA] T = Total Selectivity (for definitions, see page 2)			Line Side - 415V Incoming Breaker Type: 140G J-Frame Molded Case Circuit Breaker Ultimate Breaking Capacity I_{cu} [kA] = 36, 50, 70, 120 Thermal-magnetic Trip								
Load Side			**Rated Current I_n [A]**								
Breaker Type	Ultimate Breaking Capacity I_{cu} [kA]	Rated Current I_n [A]	25	30	35	40	50	60	70	80	90
Bulletin 1492-SPM Miniature Circuit Breaker		0.5…4	T	T	T	T	T	T	T	T	T
		6	—	6	6	6	7.5	10	10	T	T
		8	—	—	—	6	7.5	10	10	T	T
	15	10	—	—	—	—	—	7.5	7.5	9	9
		13	—	—	—	—	—	—	7.5	8	8
		16	—	—	—	—	—	—	—	8	8
		20	—	—	—	—	—	—	—	—	—

(handwritten left:
$I_{m_2} = 7.5A$ يعني
15 — 7.5 من
selectivity و لو
"partial" *)*

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→ Type of system 8

    1. Radial system .

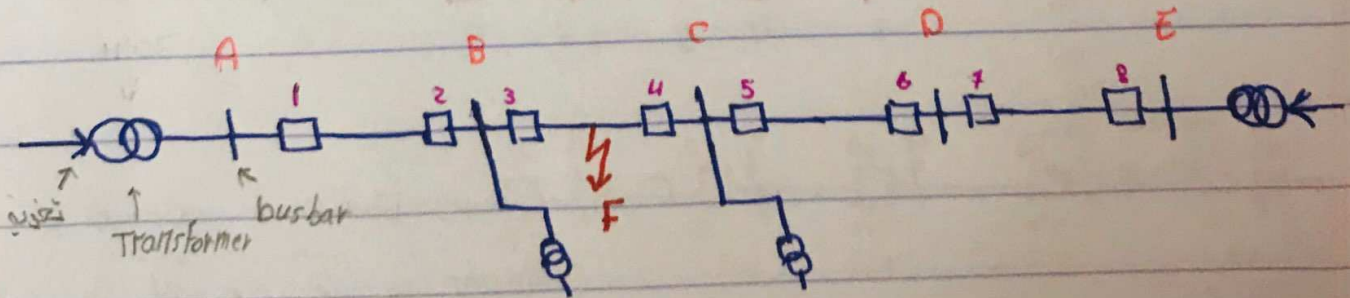بكون فيو source واحد 6 بعدي كل

ال‍ system

→ Ring system .

بكون فيه اكثر من 6 source

'أي Load بكون ينعذى من مكانين .

← افضل 8

لانه اذا صار قطع 6 الـ loads
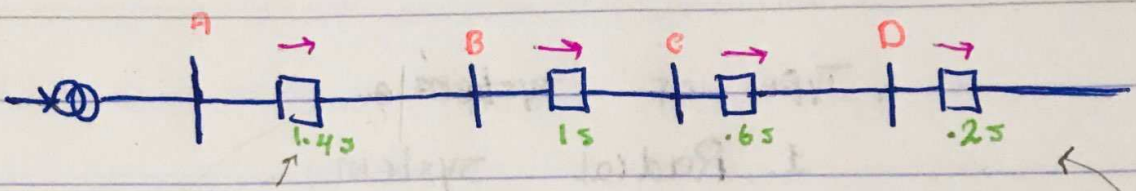
الباقية بتتغذى من الـ source الثاني .

※ Example 8~

تغذية ↑ Transformer ↗ busbar

← قبل استغلنا ع الاتجاه عشان الـ selectivity

وى نشتغل بهاد المثال ع الاتجاه والأ‍ .

← بما انه في 2-source 6 بنشتغل super position .

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A → B → C → D →

1.4s   1s   .6s   .2s

CB
Direction الى اتجاه نفس الى رسمت يى

الوغ بيبلش حذ ابعد واحد جد $T = .2s$ و بكبين بمير ازبد .4s .

✗ ← active only ⊖

← B   ← C   ← D   ← E

.2s   .6s   1s   1.4 s

← هبذه بكون تحددت زعن واتجاه لكل CB 8.

A 1.4s   .2s B 1s   .6s C .6   1s D .2s   1.4s E

2   3   4   5   6   7   8

اول
CB بنى
Direction نس زيم.

← لو صار في Fault بين B, C

main → 3 , 4

↓ backup   backup

1   6 , 8

Scanned with CamScanner
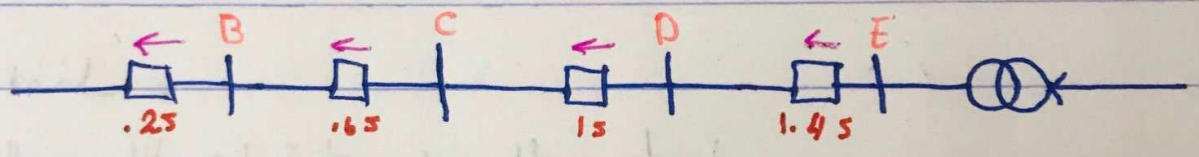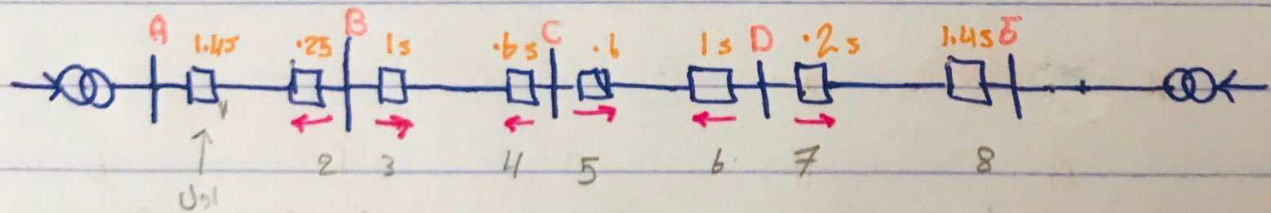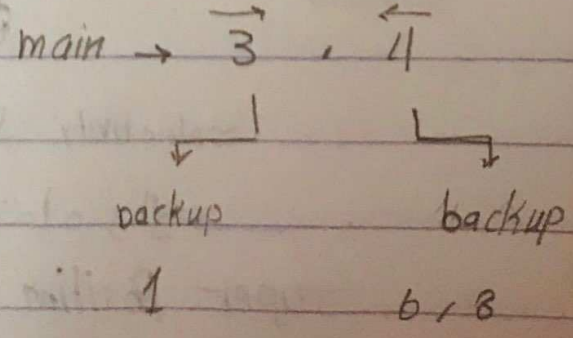
*Example 8~

Ring System ...

Solution ...

in Feed

A	A₂	B	B₂	C	C₂	D	D₂	E	E₂
	1.85		1.45		1s		.65		.25

B₁	B	C₁	C	D₁	D	E₁	E	A₈	A
	.25		.65		1.5		1.45		1.85

InFeed