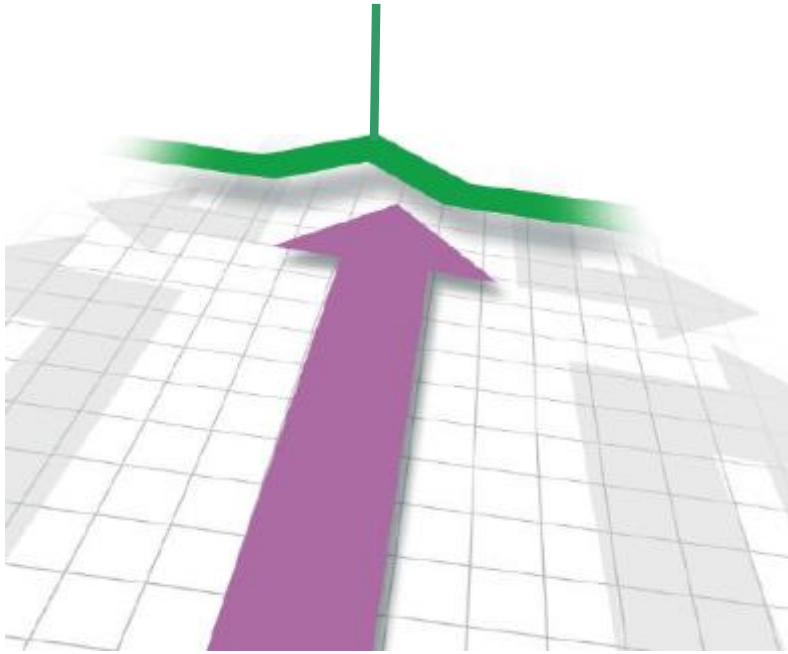


# Selectivity & Cascading



By  
**Ahmed Besheer**  
Senior Electrical Design Engineer  
at Schneider Electric

Schneider Electric Graduation Projects Sponsorship

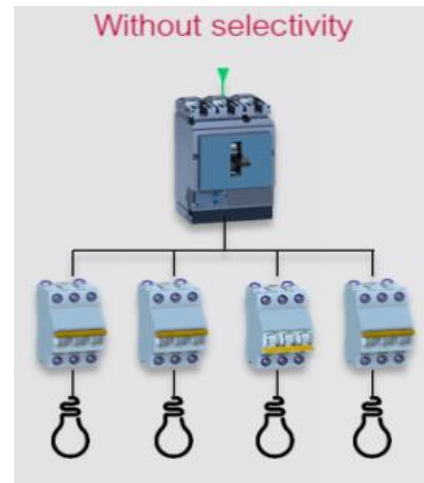
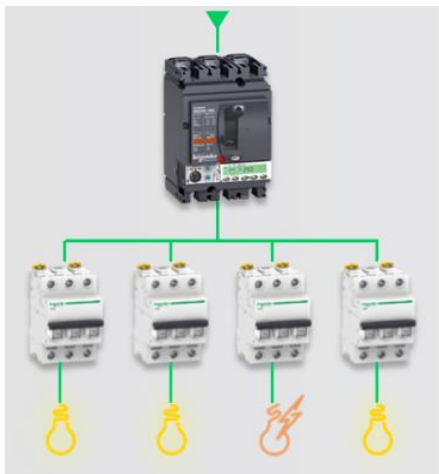
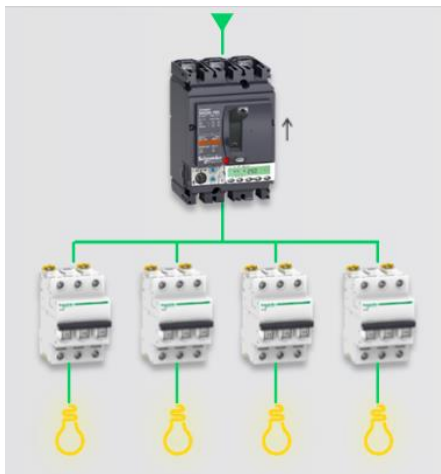
# At the End of this session:

You should be able to:

1. Explain Selectivity Definition & Benefits.
2. Explain types of selectivity.
3. Use Schneider Electric Complementary Technical Guide or online tool to check selectivity & design a selective L.V network.
4. Explain the meaning of limitation.
5. Explain the meaning of cascading.
6. Explain how selectivity can be enhanced by cascading.

# Introduction

2 Scenarios showing the behavior of circuit breakers when there is a fault in a branch circuit of L.V network



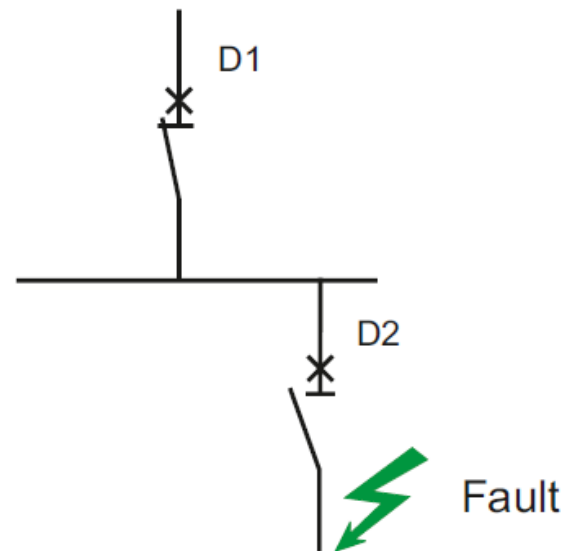
# What is Selectivity (discrimination) ?

According to IEC/EN 60947-2

It is the coordination of automatic cut-off for a fault that happens at any point in the network to be eliminated by the upstream circuit breaker.

The circuit breaker that is immediately upstream to the fault and by that circuit breaker alone!

The requirements for continuous electricity, make it necessary to verify The “discrimination/ Selectivity” between upstream and downstream protection devices.



*D1 and D2 in series.*

# Benefits of Selectivity

In selective LV networks:

- ✓ fault clearance is localized.
- ✓ Healthy circuits aren't affected by faulty circuits.

So below benefits are gained:

1. Continuity of service is ensured.
2. Downtime reduction is ensured so, Productivity is ensured.  
This Prevents Financial Losses (Data centers, Factories, ...etc.)
3. Life Safety is ensured (hospitals, high rise buildings, ...etc.)
4. Customer satisfaction is ensured (hotels, supermarkets, ...etc.)

# How can we check selectivity between pairs of C.Bs ?

To check selectivity, you should:

1. Know the calculated short circuit value at each level of the LV network.
2. Be able to read Current – time curve of a circuit breaker.
3. know the difference between total selectivity & partial selectivity.
4. Know Techniques used to achieve selectivity.
5. Know how to use documented selectivity tables “mentioned in SE Complementary technical Guide” which is stated based on testing pairs of breakers to check their selectivity.
6. Know how to use Online SE tool to check selectivity between pairs of circuit breakers.

1. Know the calculated short circuit value at each level (switchgear) at the LV network.

This is achieved through Manual Calculations or by using a software like E-TAP.

Parameters affecting short circuit calculations values:

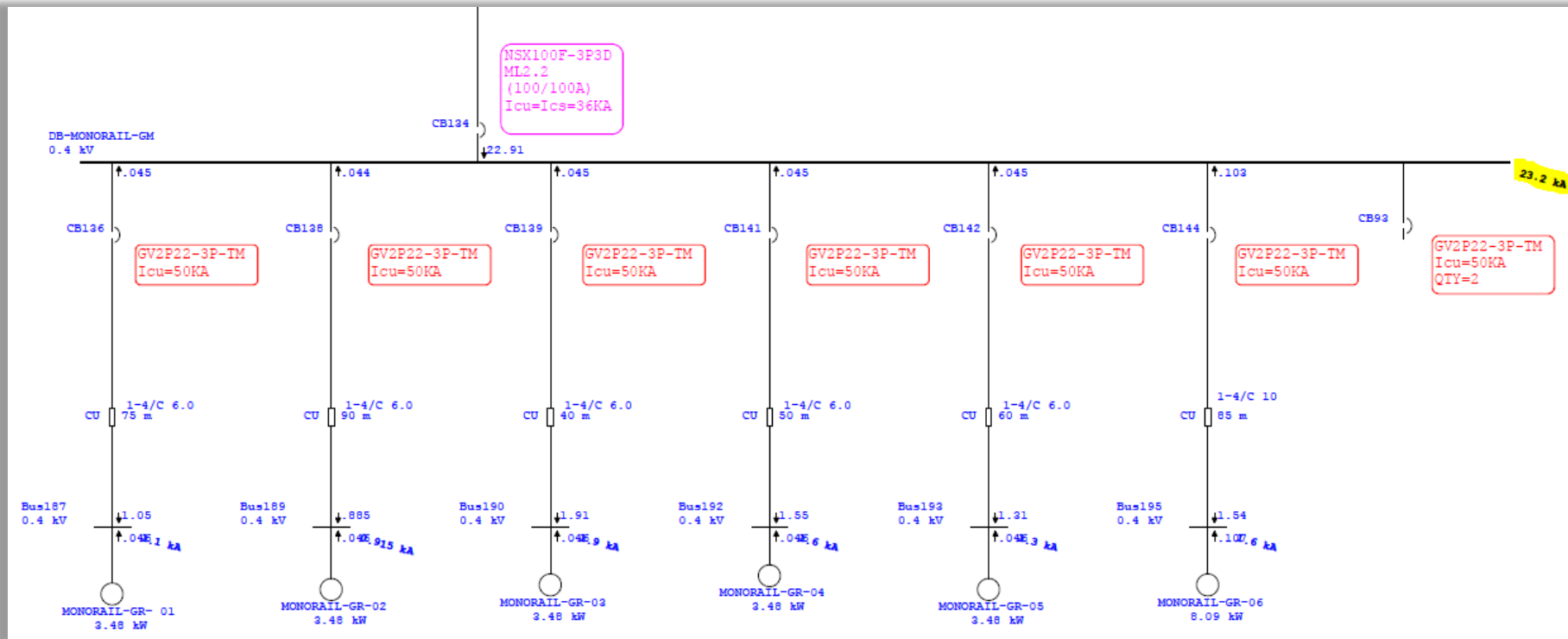
1. Power source type & its parameters.
  2. Power source rating.
  3. Cables / busways types.
  4. Cables C.S.A / Busways ratings.
  5. Length between power source & switchgears & loads.
- ... Etc.





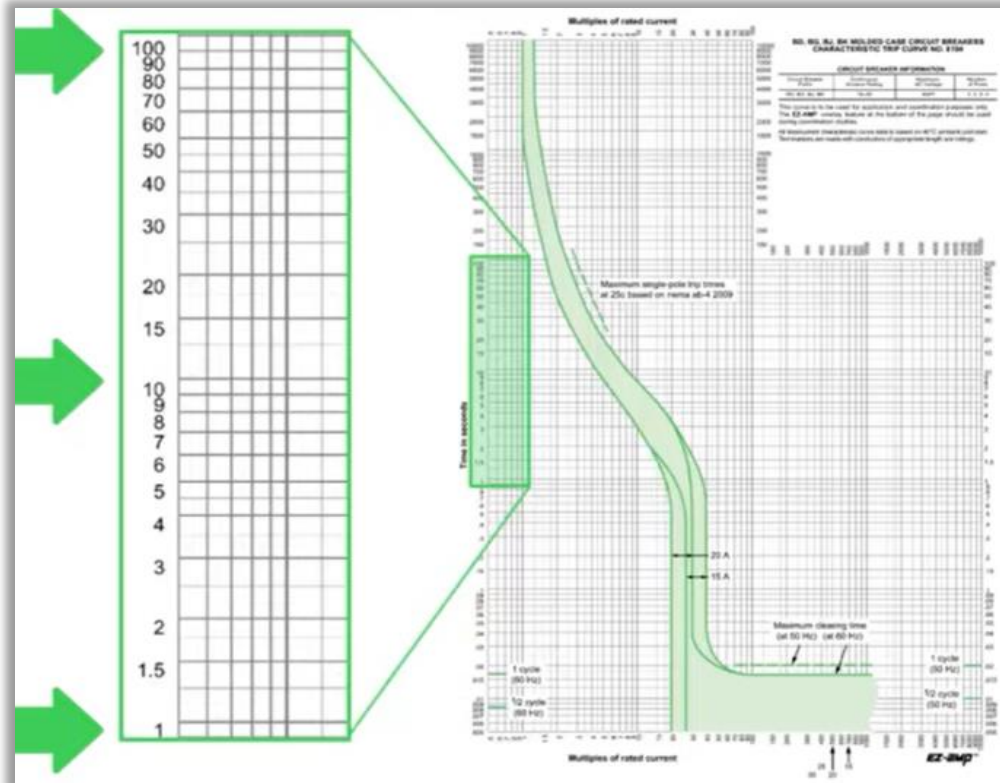
# 1. Know the calculated short circuit value at each level (switchgear) at the LV network.

Two Types of customers – 2<sup>nd</sup> type: Requests to provide short circuit & selectivity studies “using Software”.



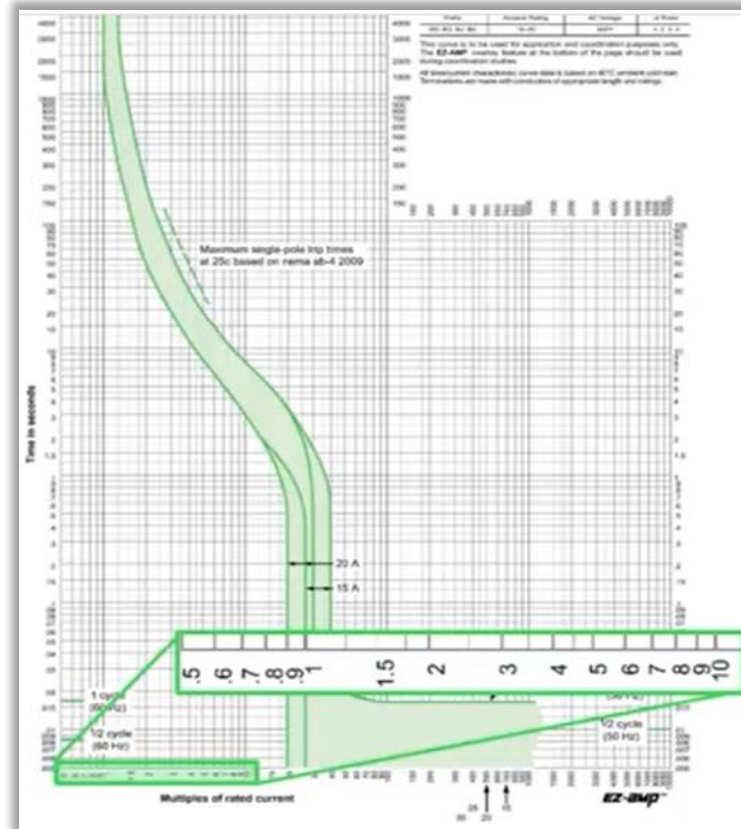
## 2. Be able to read Current – time curve of a circuit breaker.

Logarithmic Scale - Vertical Axis: Time in seconds

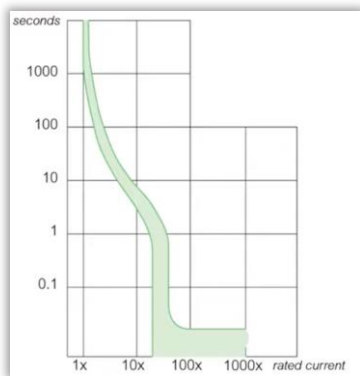


## 2. Be able to read Current – time curve of a circuit breaker.

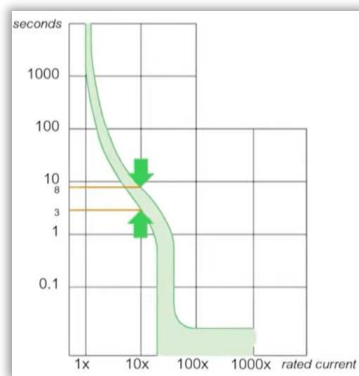
Logarithmic Scale - Horizontal Axis: Multiples of circuit breaker rated amperage



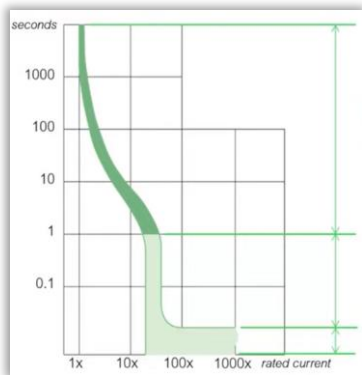
## 2. Be able to read Current – time curve of a circuit breaker.



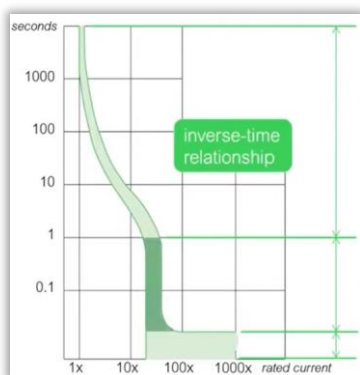
Current-Time Curve



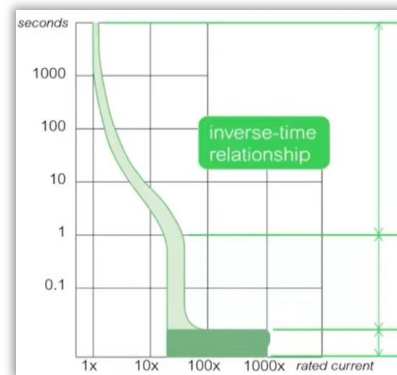
Upper-Lower Tripping time limits



Overload (Long time tripping)



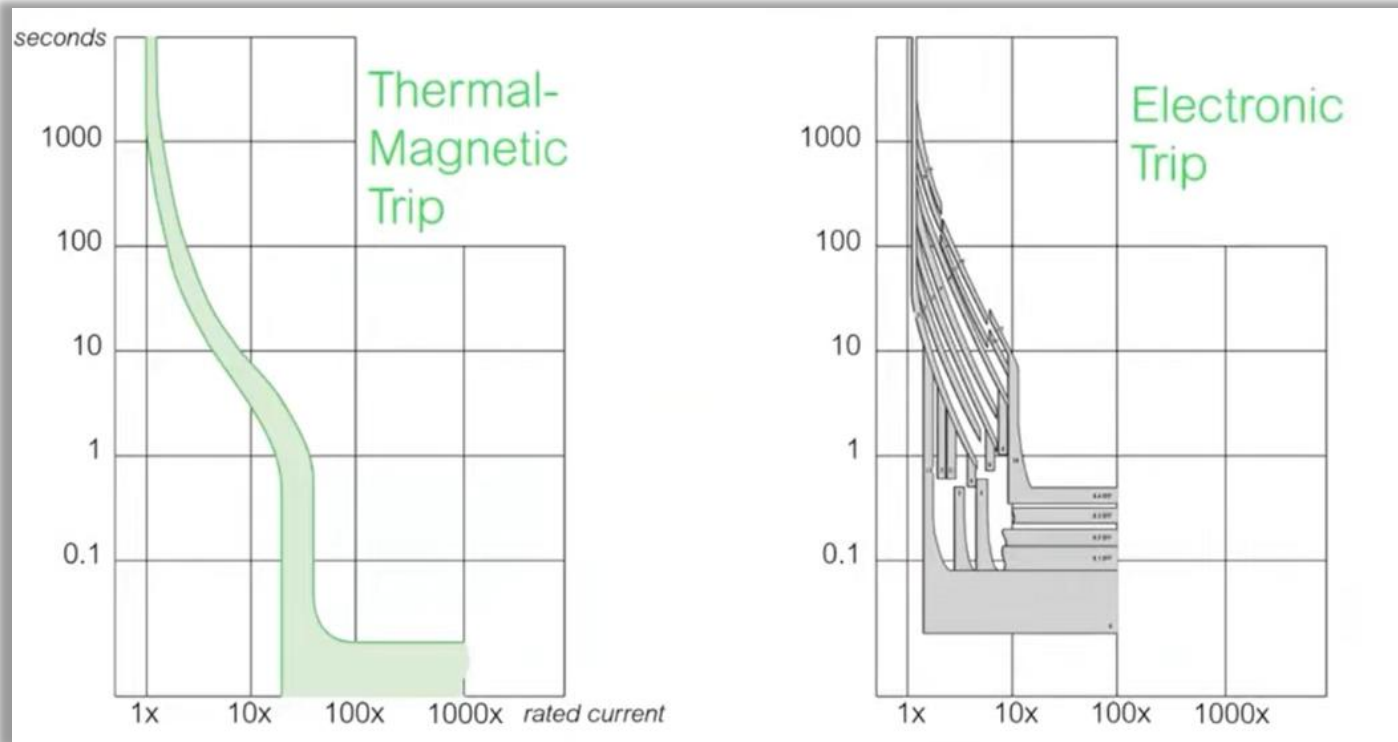
Short circuit (short time tripping)



Short circuit (Instantaneous tripping)

## 2. Be able to read Current – time curve of a circuit breaker.

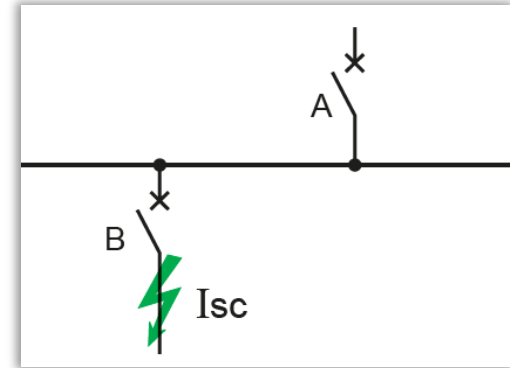
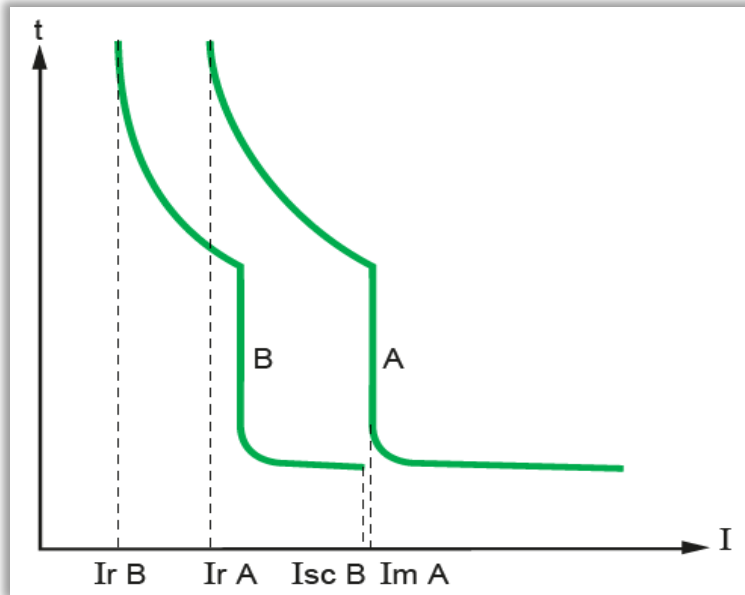
Current – Time curves are varying according to C.B type & Trip unit Type used.



### 3. know the difference between total selectivity & partial selectivity.

#### A. Total Selectivity:

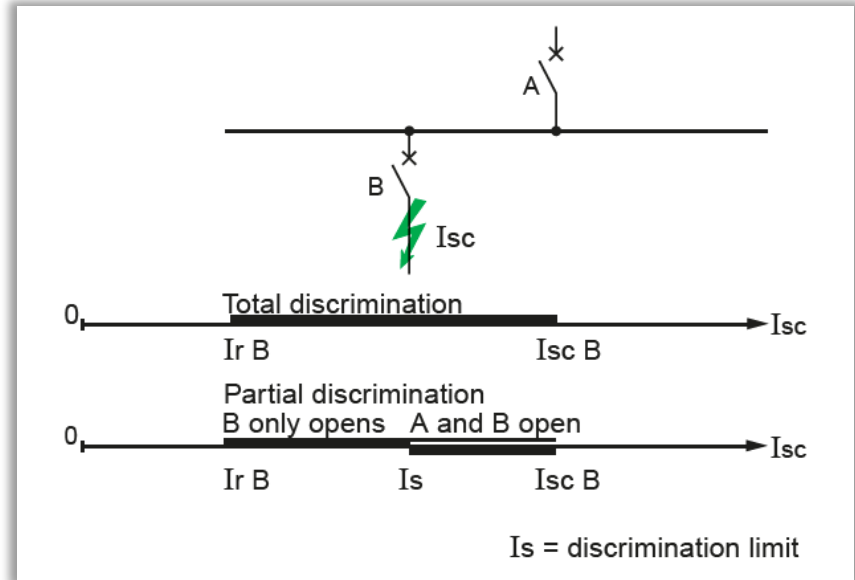
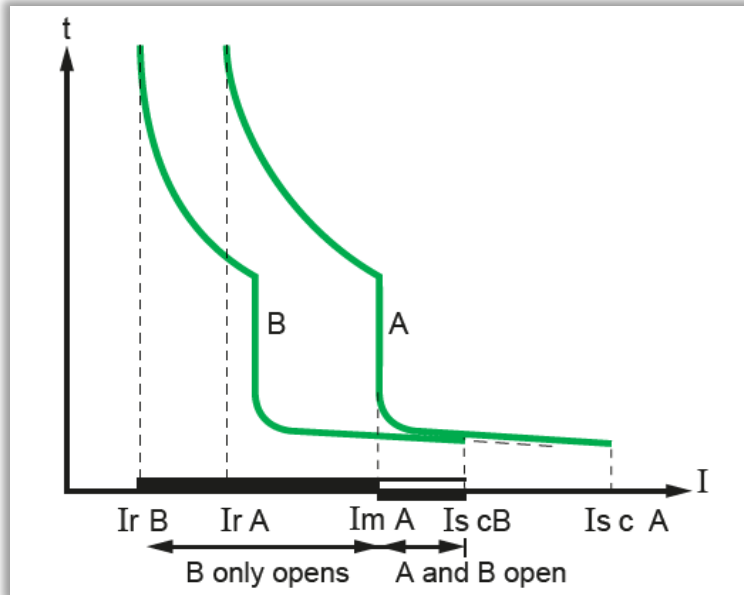
Discrimination between circuit-breakers A and B is **total** if the maximum value of short-circuit-current on circuit B ( $I_{sc} B$ ) does not exceed the short-circuit trip setting of circuit-breaker A ( $I_m A$ ).



### 3. know the difference between total selectivity & partial selectivity.

#### B. Partial Selectivity:

Discrimination between circuit-breakers A and B is **partial** if the maximum possible short-circuit current on circuit B ( $I_{sc B}$ ) exceeds the short-circuit trip-current setting of circuit-breaker A ( $I_m A$ ).

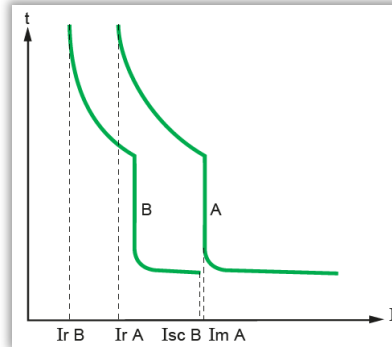
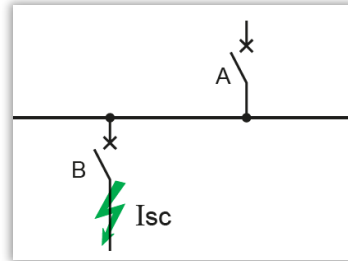
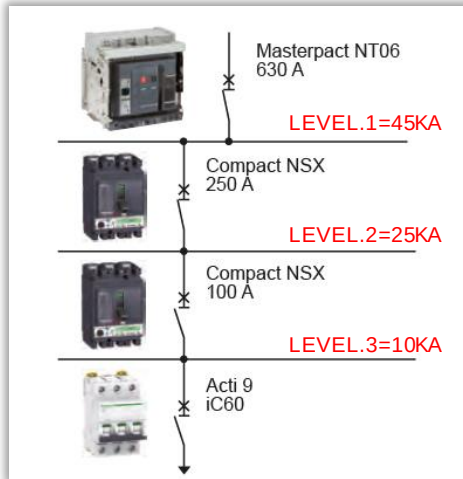


## 4. Know Techniques used to achieve selectivity.

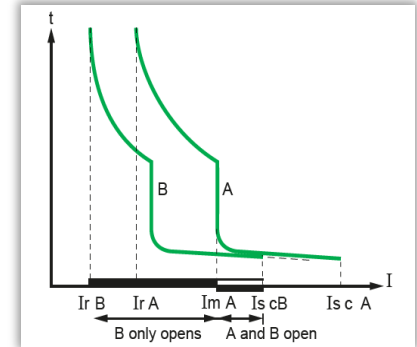
### A. Current Selectivity

This method is realized by setting successive tripping thresholds at stepped “shifted” levels, from downstream C.Bs (lower settings) towards the upstream C.Bs up to the source (higher settings).

Three-phase maximum short circuit current in kA 
$$I_{sc} = \frac{U_{20}}{\sqrt{3} \sqrt{R_T^2 + X_T^2}}$$



Total selectivity – Current selectivity



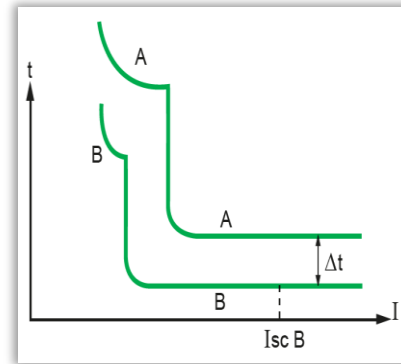
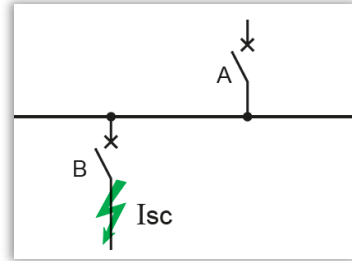
Partial selectivity – Current selectivity



## 4. Know Techniques used to achieve selectivity.

### B. Time Selectivity

This method is realized by setting successive tripping thresholds at stepped “shifted” levels, from downstream C.Bs (lower settings) towards the upstream C.Bs up to the source (higher settings). In the two-level arrangement shown, **upstream circuit-breaker A** is delayed sufficiently to ensure total discrimination with **circuit-breaker B**



Total selectivity – Time selectivity

## 4. Know Techniques used to achieve selectivity.

### C. Combination of Current & Time Selectivity

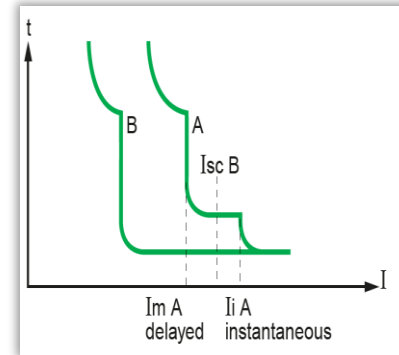
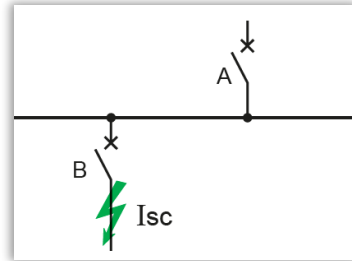
A time-delay added to a current level scheme can improve the overall discrimination performance.

The upstream CB has two high-speed magnetic tripping thresholds:

**Im A:** delayed magnetic trip or short-delay electronic trip

**Ii A:** instantaneous trip

**Discrimination is total if**  $I_{sc} B < I_i A$

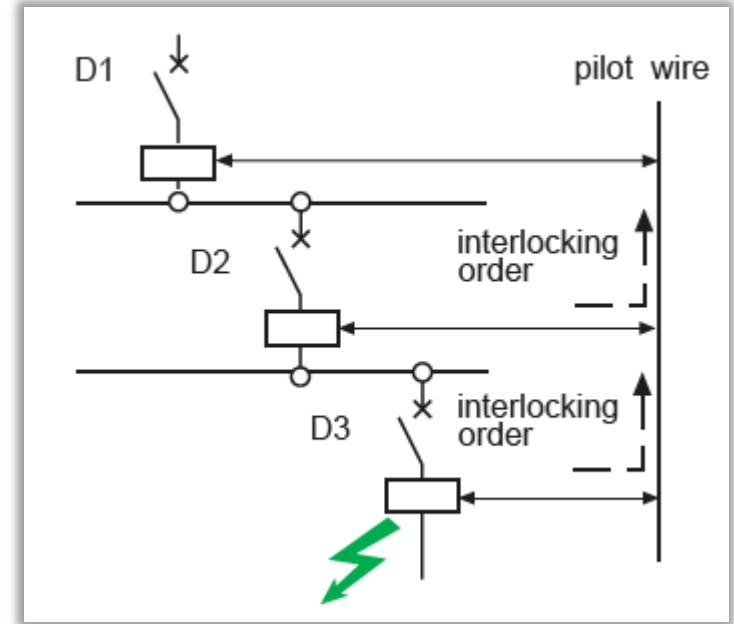


Partial selectivity –  
Current & Time selectivity

## 4. Know Techniques used to achieve selectivity.

### D. Logic discrimination (ZSI)

- > Circuit-breakers fitted out with electronic trip units
  - a pilot wire between upstream / downstream circuit-breakers
- > Implementation:
  - The trip unit of the breaker located directly upstream(D3)
    - gives the order to trip the breaker
    - send a signal to its upstream breaker (D2) to prevent its tripping
  - The upstream breaker (D2)
    - delay its tripping due to the signal sent by D3
    - send a signal to its upstream breaker (D1) to prevent its tripping
    - will trip only if the fault has not been eliminated after the delay
- > This technique
  - is easily implemented
  - reduces to a minimum constraints from delayed tripping of time discrimination



## 4. Know Techniques used to achieve selectivity.

### E. Energy Selectivity

To know the concept of Energy Selectivity, at first we will need to know what it means by:

#### ✓ Cat. A & Cat. B Circuit Breakers.



#### Utilization category A

Circuit-breaker not specifically intended for discrimination

- Without an intentional short-time delay
- Without short time withstand current ( $I_{cw}$ )



#### Utilization category B

Circuit-breaker specifically intended for discrimination:

- With intentional short-time delay (adjustable)
- With short time withstand current ( $I_{cw}$ )

## 4. Know Techniques used to achieve selectivity.

### E. Energy Selectivity

#### Cat. A & Cat.B Circuit Breakers

**Compact NSX250 HB2**

1: **Ui** 800 V      2: **Uimp** 8 kV

| 3: <b>Ue</b> (V) | 4: <b>Icu</b> (kA) | 5: <b>Ics</b> |
|------------------|--------------------|---------------|
| 500 ~            | 100                | 100           |
| 525 ~            | 100                | 100           |
| 660/690 ~        | 100                | 100           |

6: 50/60Hz      7: **cat A**

8:

9: IEC / EN 60947-2  
NEMA AB1      10: **HIC** (kA)

|      | <b>HIC</b> (kA) |
|------|-----------------|
| 480V | 100             |
| 600V | 100             |

**Schneider Electric**

**Masterpact NW20 H2a**

**Ui** 1000 V      **Uimp** 12 kV

| <b>Ue</b> (V) | <b>Icu</b> (kA) |
|---------------|-----------------|
| 220/440 ~     | 85              |
| 480/690 ~     | 65              |

**Ics** = 100% **Icu**

**Icw** 85 kA/1s      **cat.B**

**IEC 60947-2**      50/60 Hz

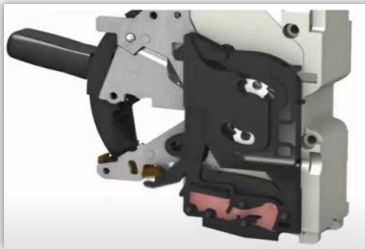
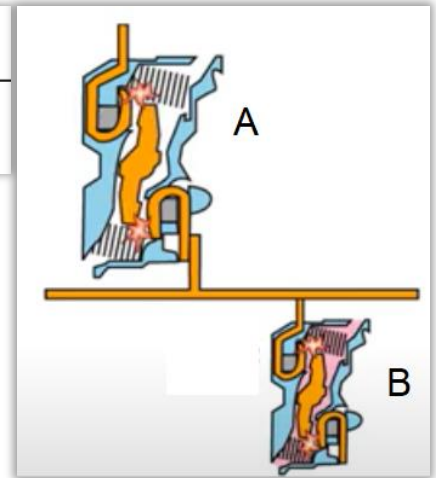
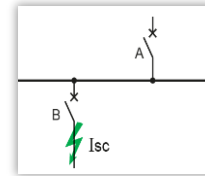
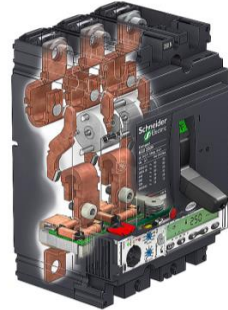
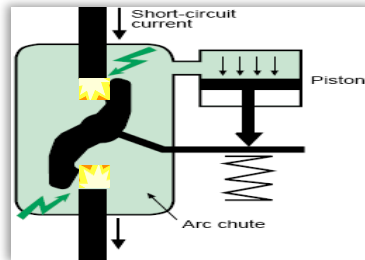
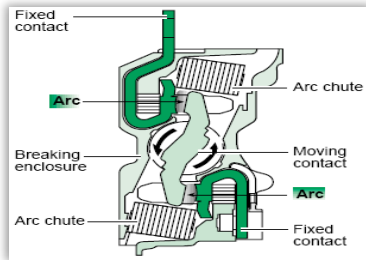
## 4. Know Techniques used to achieve selectivity.

### E. Energy Selectivity

This technology implemented in the Compact NSX range (current limiting circuit breaker) is extremely effective for achievement of total discrimination.

When a very high level short-circuit current is detected by the two circuit breakers A and B, their contacts open simultaneously. As a result, the current is highly limited.

- ✓ The very high arc-energy at level B induces the tripping of circuit-breaker B
- ✓ Then, the arc-energy is limited at level A and is not sufficient to induce the tripping of A



# Example on Selectivity from SE Technical Complementary Guide

Upstream Breaker: NSX160F With TM100D then with TM125D

Downstream Breaker: IC60N – 20A

Complementary  
technical information

$U_e \leq 440 \text{ V AC}$

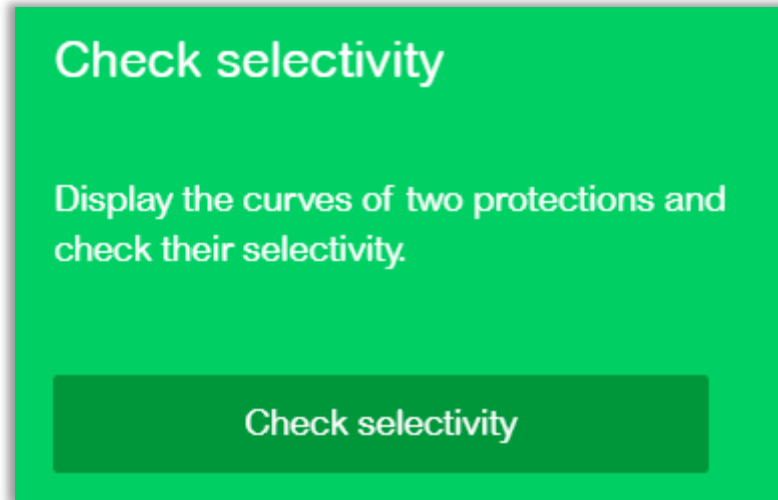
## Discrimination table

Upstream: Compact NSX100-250 TM-D

Downstream: iDPN, iC60, C120,  
NG125-160

| Upstream                         | NSX100B/F/NH/S/L/R |      |     |     |     |     |     |      | NSX160B/F/NH/S/L |      |     |     | NSX250B/F/NH/S/L/R |     |     |   |
|----------------------------------|--------------------|------|-----|-----|-----|-----|-----|------|------------------|------|-----|-----|--------------------|-----|-----|---|
| Trip unit                        | TM-D               |      |     |     |     |     |     |      | TM-D             |      |     |     | TM-D               |     |     |   |
| In (A)                           | 16                 | 25   | 32  | 40  | 50  | 63  | 80  | 100  | 80               | 100  | 125 | 160 | 160                | 200 | 250 |   |
| <b>Downstream</b>                |                    |      |     |     |     |     |     |      |                  |      |     |     |                    |     |     |   |
| <b>Discrimination limit (kA)</b> |                    |      |     |     |     |     |     |      |                  |      |     |     |                    |     |     |   |
| iDPN                             | ≤ 10               | 0.19 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
| Curves B, C                      | 16                 |      | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
|                                  | 20                 |      |     | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
|                                  | 25                 |      |     |     |     | 0.5 | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
|                                  | 32                 |      |     |     |     |     | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
|                                  | 40                 |      |     |     |     |     | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
| <b>Discrimination limit (kA)</b> |                    |      |     |     |     |     |     |      |                  |      |     |     |                    |     |     |   |
| iDPNN                            | ≤ 10               | 0.19 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
| Curves C, D                      | 16                 |      | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
|                                  | 20                 |      |     | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
|                                  | 25                 |      |     |     |     | 0.5 | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
|                                  | 32                 |      |     |     |     |     | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
|                                  | 40                 |      |     |     |     |     | 0.5 | 0.63 | 0.8              | 0.83 | 0.8 | T   | T                  | T   | T   | T |
| <b>Discrimination limit (kA)</b> |                    |      |     |     |     |     |     |      |                  |      |     |     |                    |     |     |   |
| IC60NH                           | ≤ 10               | 0.19 | 0.3 | 0.4 | 0.9 | 0.9 | 0.9 | 1.3  | 3                | 1.3  | 3   | T   | T                  | T   | T   | T |
| Curves B, C, D                   | 16                 |      | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 1    | 2                | 1    | 2   | T   | T                  | T   | T   | T |
|                                  | 20                 |      |     | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 1.5              | 0.63 | 1.5 | T   | T                  | T   | T   | T |
| iC60L                            | 25                 |      |     |     | 0.5 | 0.5 | 0.5 | 0.63 | 1.5              | 0.63 | 1.5 | T   | T                  | T   | T   | T |
| Curves                           | 32                 |      |     |     |     |     | 0.5 | 0.63 | 1                | 0.63 | 1   | T   | T                  | T   | T   | T |
| B-C-D-K-Z                        | 40                 |      |     |     |     |     | 0.5 | 0.63 | 1                | 0.63 | 1   | T   | T                  | T   | T   | T |
|                                  | 50                 |      |     |     |     |     |     | 0.63 | 0.8              | 0.63 | 0.8 | T   | T                  | T   | T   | T |
|                                  | 63                 |      |     |     |     |     |     | 0.8  |                  | 0.8  | 0.8 | T   | T                  | T   | T   | T |

# Using Online Tool to Check Selectivity between breakers



**Flow the below Link**

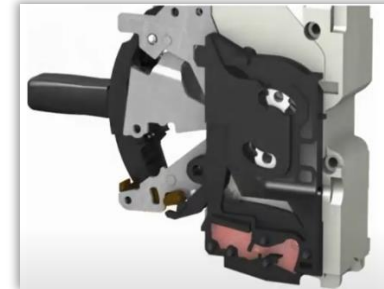
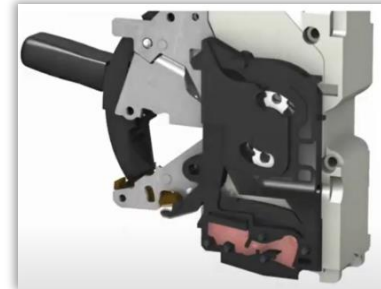
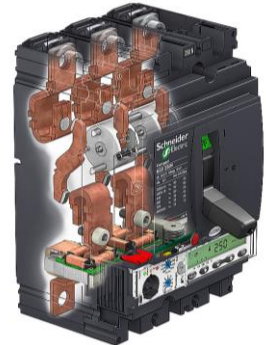
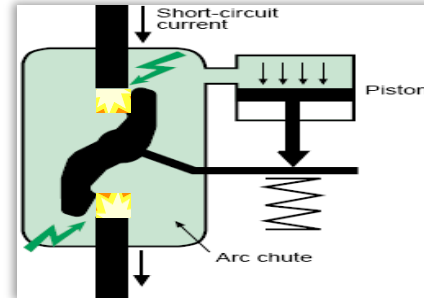
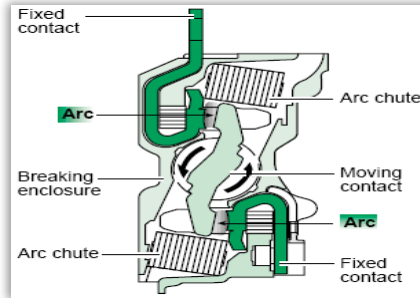
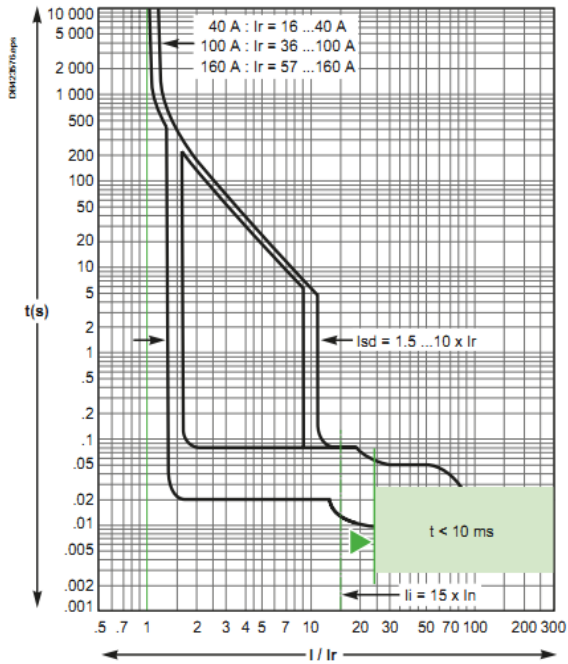
[https://hto.power.schneider-electric.com/cbt/app/index.html?code=1e8a5ed4-6b55-480b-aa66-a469b2d79fdd&client\\_id=cbt#/CheckDescrimination](https://hto.power.schneider-electric.com/cbt/app/index.html?code=1e8a5ed4-6b55-480b-aa66-a469b2d79fdd&client_id=cbt#/CheckDescrimination)



# Override current & Reflex Tripping

- ✓ According to short circuit level, Tripping action from trip unit can be overridden by Reflex tripping concept.

Micrologic 2.2 - 40... 160 A



# Limitation

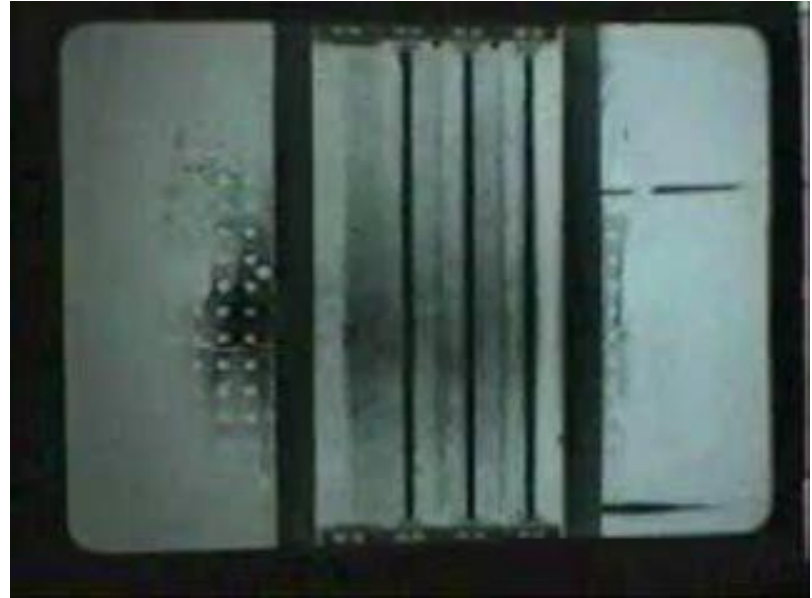
✓ During short circuit there are major two effects on the electrical network components

- Thermal effects ( $I^2 \cdot t$ ): Conductors (and therefore insulation) heating
- Mechanical effects: . Repulsion of cables, busbars

Cables electromagnetic repulsion during short circuit

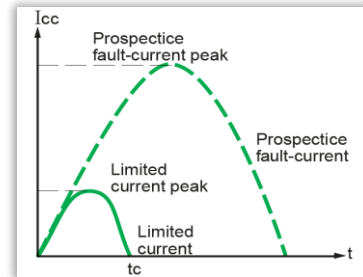
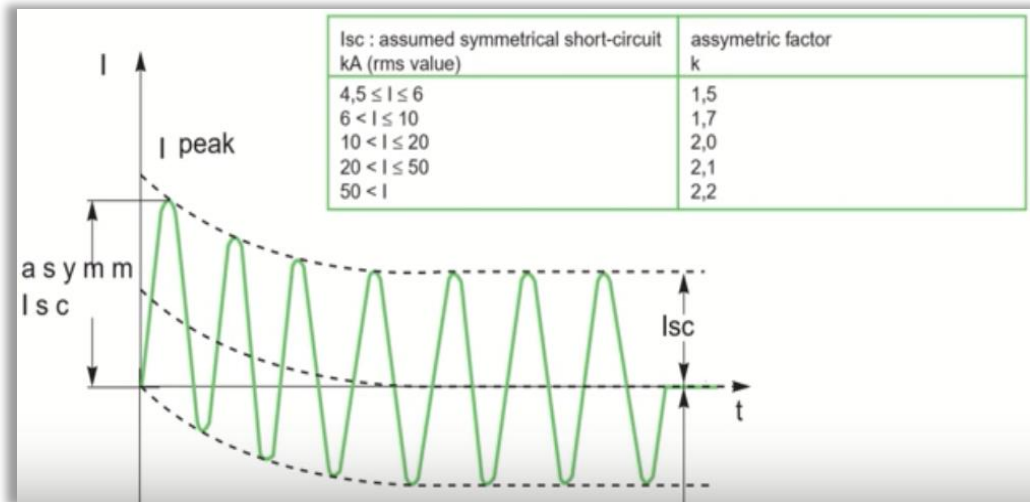


busbars electromagnetic repulsion during short circuit



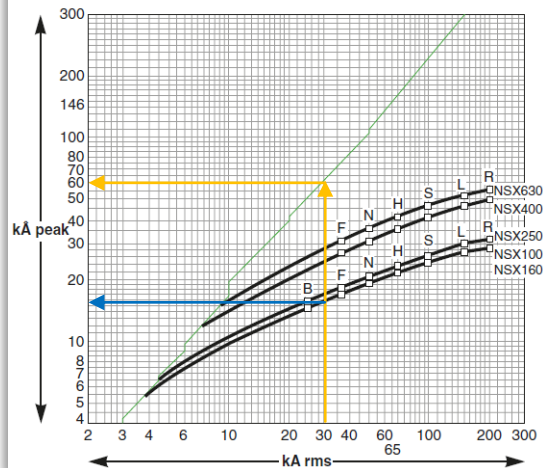
# Limitation

- ✓ Limitation curves of current limiter circuit breaker “NSX”



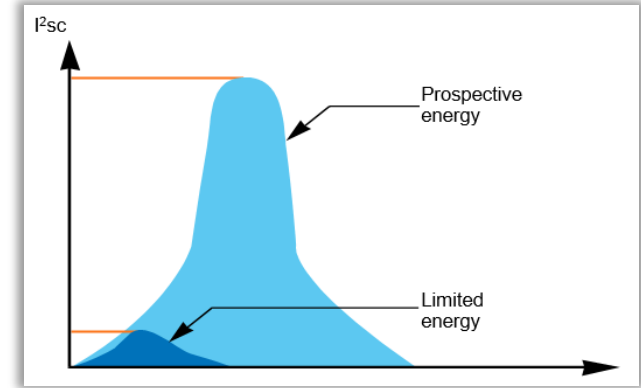
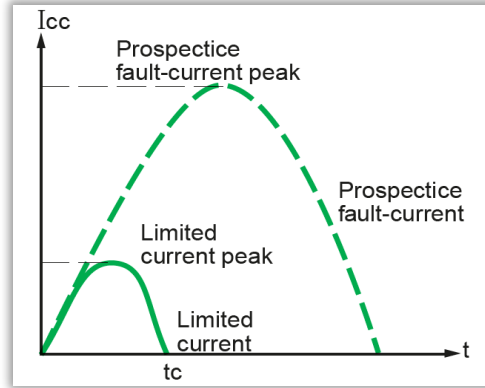
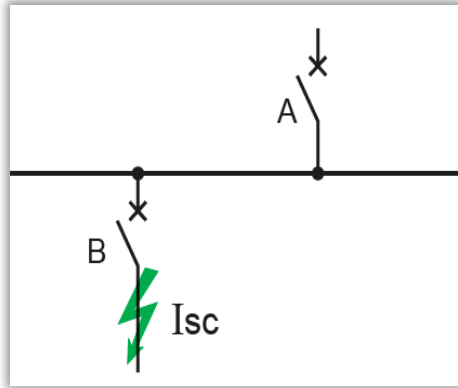
Voltage 400/440 V AC

Limited short-circuit current (kA peak)



# Limitation

- ✓ Prospective Short circuit Energy Vs Limited Short circuit Energy



# Limitation

## Conclusion:

✓ This is a feature in Cat. A circuit breakers only. We can name Cat. A circuit breaker as a “Current Limiting Circuit Breaker”

✓ The use of current-limiting CBs affords many advantages:

➤ **Reduction of thermal effects ( $I^2 \cdot t$ ):**

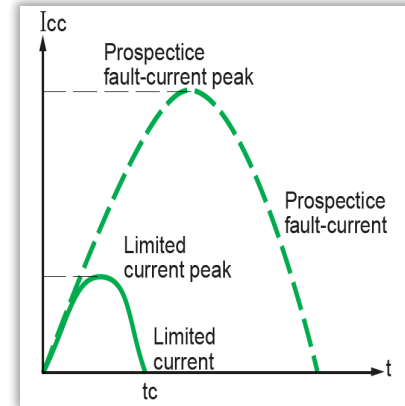
Conductors (and therefore insulation) heating is significantly reduced, so that the life of cables is correspondingly increased.

➤ **Reduction of mechanical effects:**

forces due to electromagnetic repulsion are lower, with less risk of deformation and possible rupture, excessive burning of contacts, etc.

➤ **Reduction of electromagnetic-interference effects:**

Less influence on measuring instruments and associated circuits, Telecommunication systems, etc.



These circuit-breakers therefore contribute towards improve & Optimize: Cables, wiring,

Prefabricated cable-trunking systems & Switchgears.

# Cascading

- ✓ Cascading is considered as one of the Limitation benefits.
- ✓ Cascading is the use of the current limiting capacity of circuit breakers at a given point to permit installation of lower-rated and therefore lower-cost circuit breakers downstream.
- ✓ The upstream Compact circuit breakers acts as a barrier against short-circuit currents. In this way, downstream circuit breakers with lower breaking capacities than the prospective short-circuit (at their point of installation) operate under their normal breaking conditions.
- ✓ Since the current is limited throughout the circuit controlled by the limiting circuit breaker, cascading applies to all switchgear downstream. It is not restricted to two consecutive devices.

Conclusion: The use of a **limiting upstream** circuit breaker “increases” the breaking capacity” of the downstream circuit breaker

# Cascading

- ✓ Example abstracts from cascading tables for a network 380/415 V.
- ✓ Cascading between NSX250L & IC60N - 40A:

| Upstream               | NSX250  |         |         |         |         |         |
|------------------------|---------|---------|---------|---------|---------|---------|
|                        | NSX250B | NSX250F | NSX250N | NSX250H | NSX250S | NSX250L |
| Breaking capacity (kA) | 25      | 36      | 50      | 70      | 100     | 150     |

| Downstream |            |          |                                   |    |    |    |    |    |
|------------|------------|----------|-----------------------------------|----|----|----|----|----|
|            | In Max (A) | Icu (kA) | Reinforced breaking capacity (kA) |    |    |    |    |    |
| iDPN       | 40         | 6        | 10                                | 10 | 10 | 10 | 10 | 10 |
| iDPNN      | 16         | 10       | 20                                | 20 | 20 | 20 | 20 | 20 |
|            | 40         | 10       | 16                                | 16 | 16 | 16 | 16 | 16 |
| iC60N      | 40         | 10       | 20                                | 25 | 30 | 30 | 30 | 30 |
|            | 63         | 10       | 20                                | 25 | 25 | 25 | 25 | 25 |
| iC60H      | 40         | 15       | 25                                | 30 | 30 | 30 | 30 | 30 |
|            | 63         | 15       | 25                                | 25 | 25 | 25 | 25 | 25 |
| iC60L      | 25         | 25       |                                   | 30 | 30 | 30 | 30 | 30 |
|            | 40         | 20       | 25                                | 30 | 30 | 30 | 30 | 30 |
|            | 63         | 15       | 25                                | 25 | 25 | 25 | 25 | 25 |
| C120N      | 125        | 10       | 25                                | 25 | 25 | 25 | 25 | 25 |
| C120H      | 125        | 15       | 25                                | 25 | 25 | 25 | 25 | 25 |

# Cascading

- ✓ Example abstracts from cascading tables for a network 380/415 V.
- ✓ Cascading between NSX250L & IC60N - 40A:

| Upstream               | NSX250  |         |         |         |         |         |
|------------------------|---------|---------|---------|---------|---------|---------|
|                        | NSX250B | NSX250F | NSX250N | NSX250H | NSX250S | NSX250L |
| Breaking capacity (kA) | 25      | 36      | 50      | 70      | 100     | 150     |

| Downstream |            |          |                                   |    |    |    |    |    |
|------------|------------|----------|-----------------------------------|----|----|----|----|----|
|            | In Max (A) | Icu (kA) | Reinforced breaking capacity (kA) |    |    |    |    |    |
| iDPN       | 40         | 6        | 10                                | 10 | 10 | 10 | 10 | 10 |
| iDPNN      | 16         | 10       | 20                                | 20 | 20 | 20 | 20 | 20 |
|            | 40         | 10       | 16                                | 16 | 16 | 16 | 16 | 16 |
| iC60N      | 40         | 10       | 20                                | 25 | 30 | 30 | 30 | 30 |
|            | 63         | 10       | 20                                | 25 | 25 | 25 | 25 | 25 |
| iC60H      | 40         | 15       | 25                                | 30 | 30 | 30 | 30 | 30 |
|            | 63         | 15       | 25                                | 25 | 25 | 25 | 25 | 25 |
| iC60L      | 25         | 25       |                                   | 30 | 30 | 30 | 30 | 30 |
|            | 40         | 20       | 25                                | 30 | 30 | 30 | 30 | 30 |
|            | 63         | 15       | 25                                | 25 | 25 | 25 | 25 | 25 |
| C120N      | 125        | 10       | 25                                | 25 | 25 | 25 | 25 | 25 |
| C120H      | 125        | 15       | 25                                | 25 | 25 | 25 | 25 | 25 |



# Selectivity Enhanced By Cascading

Complementary  
technical information

Ue: 380-415 V (Ph/N 220-240 V)

## Discrimination enhanced by cascading

Upstream: NSX250, Micrologic  
Downstream: iC60, C120, NG125,  
NG160, NSX100

| Upstream               | NSX250<br>NSX250B | NSX250F    | NSX250N    | NSX250H    | NSX250S    | NSX250L    |
|------------------------|-------------------|------------|------------|------------|------------|------------|
| Breaking capacity (kA) | 25                | 36         | 50         | 70         | 100        | 150        |
| Trip unit              | Micrologic        | Micrologic | Micrologic | Micrologic | Micrologic | Micrologic |

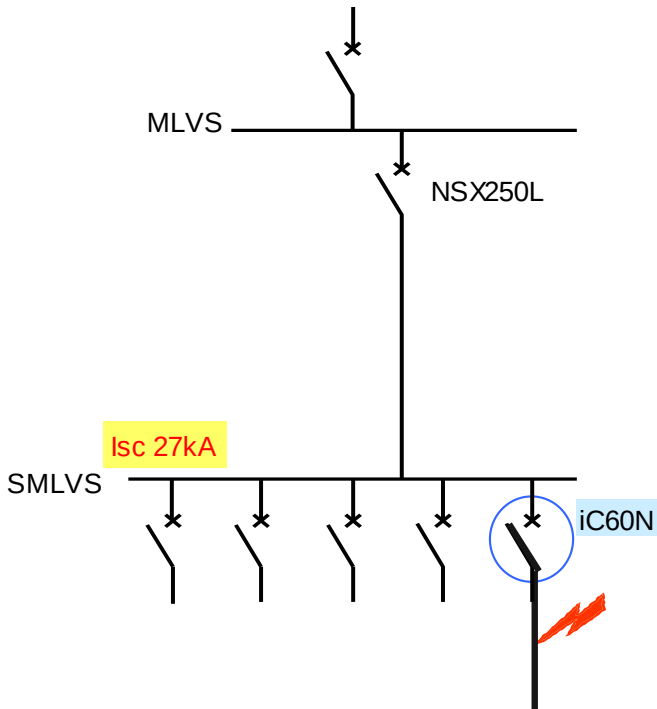
| Downstream |                        |    | 250                               | 250   | 250   | 250   | 250     | 250     |
|------------|------------------------|----|-----------------------------------|-------|-------|-------|---------|---------|
| Rating (A) |                        |    | Reinforced breaking capacity (kA) |       |       |       |         |         |
|            | Breaking capacity (kA) |    |                                   |       |       |       |         |         |
| iC60N      | ≤ 40 A                 | 10 | 20/20                             | 25/25 | 30/30 | 30/30 | 30/30   | 30/30   |
|            | 50-63 A                | 10 | 20/20                             | 25/25 | 25/25 | 25/25 | 25/25   | 25/25   |
| iC60H      | ≤ 40 A                 | 15 | 25/25                             | 30/30 | 30/30 | 30/30 | 30/30   | 30/30   |
|            | 50-63 A                | 15 | 25/25                             | 25/25 | 25/25 | 25/25 | 25/25   | 25/25   |
| iC60L      | ≤ 25 A                 | 25 |                                   | 30/30 | 30/30 | 30/30 | 30/30   | 30/30   |
|            | 32-40 A                | 20 | 25/25                             | 30/30 | 30/30 | 30/30 | 30/30   | 30/30   |
|            | 50-63 A                | 15 | 25/25                             | 25/25 | 25/25 | 25/25 | 25/25   | 25/25   |
|            |                        |    |                                   |       |       |       |         |         |
| C120N/H    | 10/15                  |    | 25/25                             | 25/25 | 25/25 | 25/25 | 25/25   | 25/25   |
| NG125N     | 25                     |    |                                   | 36/36 | 36/36 | 50/50 | 70/70   |         |
| NG125H     | 36                     |    |                                   |       | 40/40 | 50/50 | 70/70   | 100/100 |
| NG125L     | 50                     |    |                                   |       |       | 70/70 | 100/100 | 150/150 |

Total selectivity Up to (kA)

30/30

Upgraded  
Cascading  
Breaking  
capacity (kA)

# Selectivity Enhanced By Cascading Example



Complementary technical information

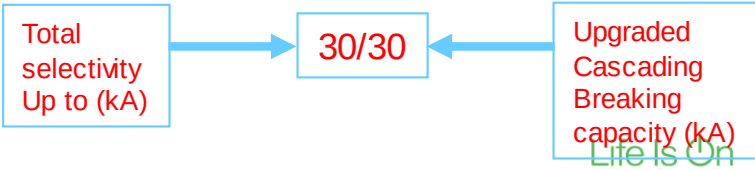
## Discrimination enhanced by cascading

Upstream: NSX250, Micrologic

Downstream: iC60, C120, NG125, NG160, NSX100

| Upstream               | NSX250<br>NSX250B | NSX250F    | NSX250N    | NSX250H    | NSX250S    | NSX250L    |
|------------------------|-------------------|------------|------------|------------|------------|------------|
| Breaking capacity (kA) | 25                | 36         | 50         | 70         | 100        | 150        |
| Trip unit              | Micrologic        | Micrologic | Micrologic | Micrologic | Micrologic | Micrologic |

| Downstream |                        | Reinforced breaking capacity (kA) |       |       |       |         |         |
|------------|------------------------|-----------------------------------|-------|-------|-------|---------|---------|
| Rating (A) | Breaking capacity (kA) | 250                               | 250   | 250   | 250   | 250     | 250     |
| iC60N      | ≤ 40 A                 | 20/20                             | 25/25 | 30/30 | 30/30 | 30/30   | 30/30   |
|            | 50-63 A                | 20/20                             | 25/25 | 25/25 | 25/25 | 25/25   | 25/25   |
| iC60H      | ≤ 40 A                 | 25/25                             | 30/30 | 30/30 | 30/30 | 30/30   | 30/30   |
|            | 50-63 A                | 25/25                             | 25/25 | 25/25 | 25/25 | 25/25   | 25/25   |
| iC60L      | ≤ 25 A                 |                                   | 30/30 | 30/30 | 30/30 | 30/30   | 30/30   |
|            | 32-40 A                | 25/25                             | 30/30 | 30/30 | 30/30 | 30/30   | 30/30   |
|            | 50-63 A                | 25/25                             | 25/25 | 25/25 | 25/25 | 25/25   | 25/25   |
| C120N/H    | 10/15                  | 25/25                             | 25/25 | 25/25 | 25/25 | 25/25   | 25/25   |
| NG125N     | 25                     |                                   | 36/36 | 36/36 | 36/36 | 50/50   | 70/70   |
| NG125H     | 36                     |                                   |       | 40/40 | 50/50 | 70/70   | 100/100 |
| NG125L     | 50                     |                                   |       |       | 70/70 | 100/100 | 150/150 |



Selectivity enhanced by cascading 100% guaranteed

# Thank You