

# 7 Application Data

## What Is Discrimination?

Discrimination, also called selectivity, is the co-ordination of protective devices such that a fault is cleared by the protective device installed immediately upstream of the fault, and by that device alone.

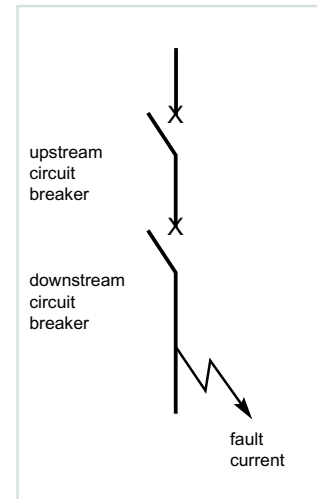
### Total discrimination

Discrimination is said to be total if the downstream circuit breaker opens and the upstream circuit breaker remains closed. This ensures maximum availability of the system.

### Partial discrimination

Discrimination is partial if the above condition is not fulfilled up to the prospective short-circuit current, but to a lesser value, termed the selectivity limit current ( $I_s$ ).

Above this value both circuit breakers could open, resulting in loss of selectivity



## How To Read The Discrimination Tables

Boxes containing the letter “T” indicate total discrimination between the relevant upstream and downstream circuit-breakers. Total discrimination applies for all fault levels up to the breaking capacity of the upstream or the downstream circuit breaker, whichever is the lesser.

For the other boxes, discrimination is either partial or there is no discrimination.

### Worked Examples

Q (1) A main switchboard requires a 1600A ACB feeding a 400A MCCB. The fault level is 65kA. What combination of protective devices would provide total discrimination?

A (1) A *TemPower2 ACB* AR216S feeding a *TemBreak2* S400GJ would provide total discrimination up to 65kA. See page 69

Note: Discrimination would be total whether the *TemPower2 ACB* had an integral or external protection relay because  $I_{cw}(1s) = I_{cs}$ . Most other ACBs have  $I_{cw}(1s) < I_{cs}$ .

## Discrimination Table

Upstream: *TemPower2 ACB* with or without Integral Protection Relay

Downstream: *TemBreak2 MCCB*

| Frame           |                   |       | Upstream ACB |        |        |        |        |        |        |        |        |        |        |        |        |        |
|-----------------|-------------------|-------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                 |                   |       | 800A         |        | 1250A  |        |        | 1600A  |        | 2000A  |        | 2500A  |        | 3200A  |        | 4000A  |
| Model           | Breaking Capacity |       | AR208S       | AR212S | AR212H | AR216S | AR216H | AR220S | AR220H | AR325S | AR325H | AR332S | AR332H | AR405B | AR650S | AR663H |
|                 |                   |       | 65kA         | 65kA   | 80kA   | 65kA   | 80kA   | 65kA   | 80kA   | 85kA   | 100kA  | 85kA   | 100kA  | 100kA  | 100kA  | 120kA  |
| 125A            | E125NJ            | 25kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S125NJ            | 36kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S125GJ            | 65kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | H125NJ            | 125kA | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | L125NJ            | 200kA | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
| 160A/<br>250A   | S160NJ            | 36kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S160GJ            | 65kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | E250NJ            | 25kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S250NJ            | 36kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S250GJ            | 65kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S250PE            | 70kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | H250NJ            | 125kA | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | L250NJ            | 200kA | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
| 400A/<br>630A   | E400NJ            | 25kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S400CJ            | 36kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S400NJ            | 50kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S400NE            | 50kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S400GJ            | 70kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S400GE            | 70kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | H400NJ            | 125kA | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | H400NE            | 125kA | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | E630NE            | 36kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S630CE            | 50kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | S630GE            | 70kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
| 800A            | XS800NJ           | 65kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | XH800SE           | 65kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | XH800PJ           | 100kA | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | XS800SE           | 50kA  | T            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
| 1250A/<br>1600A | XS1250SE          | 65kA  | -            | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |
|                 | XS1600SE          | 85kA  | -            | -      | -      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      | T      |

- Notes: 1. All ACB's have  $f_t$  set at NON, MCR ON. 4. External relay can be used - Contact Terasaki for further details. T= Total Selectivity  
 2. Assuming ACB time settings are greater than MCCB. 5. All values shown at 415V AC.  
 3. The above table is in accordance with IEC 60947-2, Annex A.