POWERCAD™

Electrical engineering design software

PART 2 OF A SERIES:
SUPPLY CIRCUIT DISCRIMINATION – COMPLIANCE CHECKING TO AS/NZS3000:2007 UTILISING ELECTRICAL DESIGN SOFTWARE.

The purpose of discrimination is to disconnect only the faulty circuit from the distribution network while maintaining the upstream electrical installation active.

Discrimination can be either Total or Partial: Discrimination is said to be Total if discrimination between the upstream and downstream protective devices is provided up to the value of the maximum prospective short-circuit current at the downstream protective device. Example: Figure 1 – For a prospective fault current of 19.6kA at Switchboard SB-03 with a 250amp frame MCCB upstream and a 25amp MCB downstream will provide Total discrimination.

Discrimination is said to be Partial if discrimination between the upstream and downstream protective devices is provided up to the value of below that of the maximum prospective short-circuit current at the downstream protective device. Example: Figure 2 – Increasing the prospective fault current to 23kA at Switchboard SB-03 with the same protective device combination, the 25amp MCB downstream will only provide Partial discrimination up to 20kA.

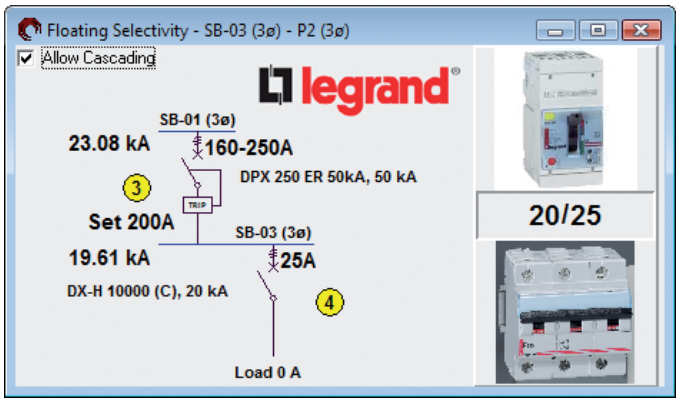

Figure 1

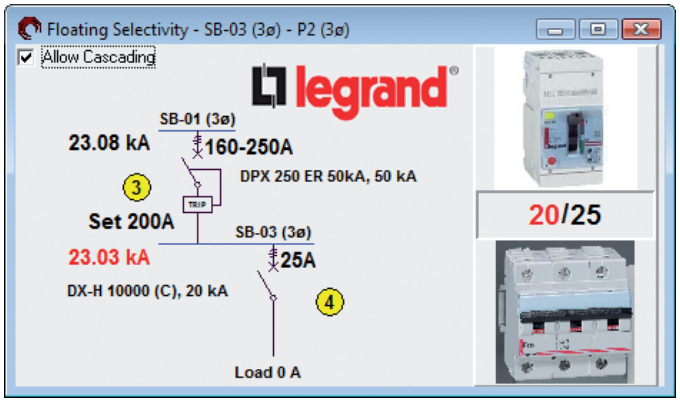

Figure 2

RELIABILITY OF SUPPLY

AS/NZS 3000:2007 (clause 2.5.7 Reliability of supply) requires the electrical installation to be designed to provide a reliable supply by dividing the electrical distribution installation into appropriate circuits and selecting protective devices with appropriate discrimination so that in the event of a fault occurring, the loss of supply resulting from the operation of a protective device is minimised.

GENERAL SUPPLY CIRCUIT DISCRIMINATION

For circuit breaker protective devices AS/NZS 3000:2007 defines the various degree of separation between the upstream protective device and the downstream device by the rating of the downstream device. For each rating category, greater than or equal to 800A, greater than or equal to 250A, and for less than 250A the degree of Partial discrimination is defined (i.e. up to and including the instantaneous setting of the upstream protective device or only between the overload curve of the protective device with a recommended separation up to the instantaneous section of the upstream time-current curve).

TIME– CURRENT CURVES

PowerCad-5™ electrical engineering design software allows engineers to rapidly check for discrimination compliance with AS/NZS3000:2007 throughout the electrical installation based on the time-current curves of each protective device in the installation.

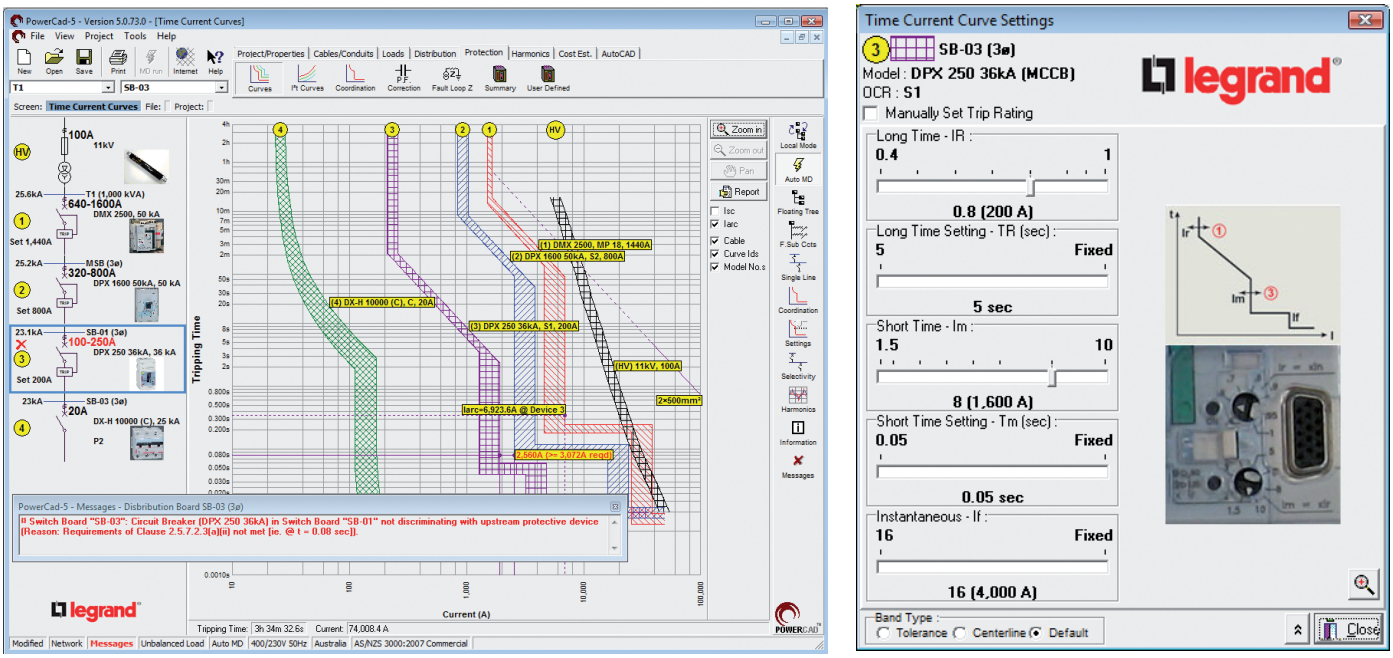

Figure 3

The software high lights non-compliance areas on the protective device time-current curves. The respective protective device OCR can be adjusted with the required separation dynamically displayed. Example: Figure 3 notes the required separation to the standard as 3kA where as the unadjusted separation is 2.5kA. By adjusting the short-time threshold of the OCR for device 3 the separation time between device 2 and 3 can be increased to allow compliance.