Choice of protection devices

3.1 Switching current

We saw earlier that the value of peak current on switching of a capacitor bank could be very high, particularly for an automatic step bank. In practice, the Rectiphase low voltage automatic capacitor banks are equipped with contactors with a resistor limiting switching current.

This resistor is used:
- to avoid reaching the maximum peak current acceptable to the capacitor banks,
- to avoid reaching the maximum switching current acceptable to the breaking devices (contactor, circuit-breaker or switch),
- to increase contactor lifetime.

3.2 Thermal sizing of the equipment (breaking devices and cables)

The permissible fluctuations in fundamental voltage and harmonic components may lead to a 30% to 45% current increase in capacitors.

Fluctuations due to tolerances on capacitor capacitance may result in an additional increase of 15% (according to standard IEC). With respect to Rectiphase capacitors, this additional increase is reduced to 5%.

The cumulated effect of the two phenomena means that equipment must be sized for the following currents:
- 1.3 x 1.15 = 1.5 times nominal current of capacitor banks in general,
- 1.3 x 1.05 = 1.36 times nominal current in the case of standard type or by coil protected Rectiphase capacitor banks (SAH type),
- 1.45 x 1.05 = 1.5 times nominal current in the case of reinforced Rectiphase capacitor banks (H type),

3.3 Choice and calibration of protection devices for Rectiphase capacitor banks

Low voltage capacitors can be protected by fuse or circuit-breaker.

- Protection by circuit-breaker:
  As mentioned above, rating must be greater than 1.36N_{nom}; the thermal threshold can be set at 1.36N_{nom}.

  The protection device must be sensitive to the rms value of the current (including the harmonics).

  The instantaneous tripping threshold must be set at 10N_{nom}.