

Capacitor Bank Protection Principles

FUSES FOR EXTERNAL SHUNT CAPACITOR CIRCUIT PROTECTION

Inter-Teknik HV current-limiting fuses are commonly installed in series of shunt capacitors or capacitor banks to safely disconnect the capacitor circuits from supply system in the event of catastrophic failures e.g. external flashover or breakdown of capacitor insulation.

Current-limiting fuse operation is vital to minimise disturbances in the supply system as well as it may prevent capacitor case rupture. Specific contactors take over load switching under normal operating conditions and disconnection of capacitive overloads or unbalanced capacitors.

Fuse Selection Parameters

Fuses shall by no means operate under the influence of capacitor **inrush currents** as they may not be able to safely deal with.

Therefore, selecting a fuse rated current for the protection of shunt capacitors or capacitor banks is governed by two major requirements:

- **To withstand high transient currents** during energizing in order to avoid premature operation and
- to continuously carry load currents significantly higher than their rated current.

FUSE SELECTION PRINCIPLES

1- Rated Current of the Fuses

For single capacitor banks, a line fuse having **twice the rated current of the capacitor bank** will represent a good choice with respect to thermal and inrush stress.

As a rule, sufficient thermal rating will provide sufficient inrush withstand capability in inductor-capacitor units.

2- Rated Voltage of the Fuses

The **rated voltage** of fuse-links in series to shunt capacitor(banks) shall **be 1,25 times the capacitor rated voltage**. Higher voltage ratings up to twice the capacitor rated voltage may be applicable in case of inductor-capacitor units.

Note: The switching voltage of the fuses must not exceed the system insulation

voltage in order to avoid insulation damage or surge arrester failure. Selection of higher voltage ratings is limited by the insulation voltage of the system.

Fuse selection, particularly where there are several capacitor banks, may be challenging. We'll be glad to conduct the technical evaluation whenever you may require assistance.

IMPORTANT

Thermal protection feature is highly adopted and recommended in this application; particularly due to repeated charging and overheating caused by overcurrents.

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