The Application of MCCBs in DC Systems

Terasaki's MCCBs provide an excellent range of protection for DC installations. We offer MCC
of up to 1000A with DC overload protection and up to 2500A with DC short-circuit protectio

Protection Method

Current transformers require alternating current to generate magnetic flux thereby inducing cu
flow in the secondary winding. Any device which relies on current transformers for measureme
detection of current is therefore unsuitable for protection of DC systems. Most electronic MCC
into this category.

The most common method of detecting DC overloads is by the use of a thermal element. Short-circuit protection in DC circuits is provided by electromagnetic tripping elements.

Tripping Characteristics

The time-current characteristics of a thermal element, such as those published in Section 3, are
unaffected by the frequency of current applied. They hold good for both AC and DC currents.

A magnetic element operates on the instantaneous value of the current waveform. This means t
practice in an AC circuit, it will operate at the peak value of the sinusoidal waveform. Tripping
characteristics are published in AC root mean square (rms) Amperes (A). This means that the v
AC instantaneous current, I_p, which will operate the element is equal to the rms current multip
√2. Similarly, the value of DC instantaneous current which will operate the element is equal to
rms current multiplied by √2.

DC operating current of magnetic element = √2 x AC rms operating current of magnetic elem

Time Constant

Time constants associated with DC circuits prevent the voltage of the circuit from reacting immediately when a load current is suddenly interrupted.

The time constant, τ, of a circuit indicates how quickly voltage across capacitors and current th
inductors react to transient conditions.

The time constant of a capacitive circuit is the product of capacitance and resistance:
$\tau = RC$ (s).
The time constant of an inductive circuit is given by:
$\tau = L/R$ (s).