Powertek

RCT*rms* rated current, output and overloads

Rated Current

The rated current for a given model of RCT*rms* is selectable by a dual range switch.

For example the RCT*rms*/6 has a rated current of either

x1 range	5,000 Arms
x2 g	10,000 Arms

Rated Output

For a given rated current the rated output of the RCT*rms* is either

4 to 20mA	4.0mA representing 0A 20.0mA representing rated current
0 to 5Vdc	5Vdc representing rated current

The type of output is specified at purchase.

Output limit

The output limit for the RCT*rms* is 150% x the rated current – the transducer will be able to operate on a continuous basis at this output.

Peak di/dt (rate of change of current) rating

This is the maximum di/dt above which the transducer will fail to correctly measure the current. The values for the RCT*rms* are listed below

Type	Range	Rated current (A)	Peak di/dt (kA/µs)
RCT*rms* / 2 RCT*rms* / 3 RCT*rms* / 4 RCT*rms* / 5	either range	From 250A to 5000A	0.8
RCT*rms* / 6	either range	From 5kA to 10kA	1.6
RCT*rms* / 7	either range	From 10kA to 20kA	3.2
RCT*rms* / 8	either range	From 25kA to 50kA	8.0

Absolute maximum (peak) di/dt – 10.0kA/µs

The transducer can be damaged by excessive di/dt due to the voltage generated in the coil.

The absolute maximum peak di/dt rating for all RCT*rms* transducers is 10.0kA/µs which must not be exceeded.

Absolute maximum (rms) di/dt – 0.55kA/µs

The RCTrms can also be damaged by sufficiently high repetitive di/dt even though the peak di/dt rating is not exceeded. A damping resistor is used to provide correct termination of the Rogowski coil and cable to prevent reflections (seen as high frequency damped oscillations) appearing on the measured waveform. A high repetitive di/dt will cause excessive power to be dissipated in this resistor.

For sinusoidal waveforms provided your current/frequency product is in the safe operating region outlined below the RCTrms will not be damaged.
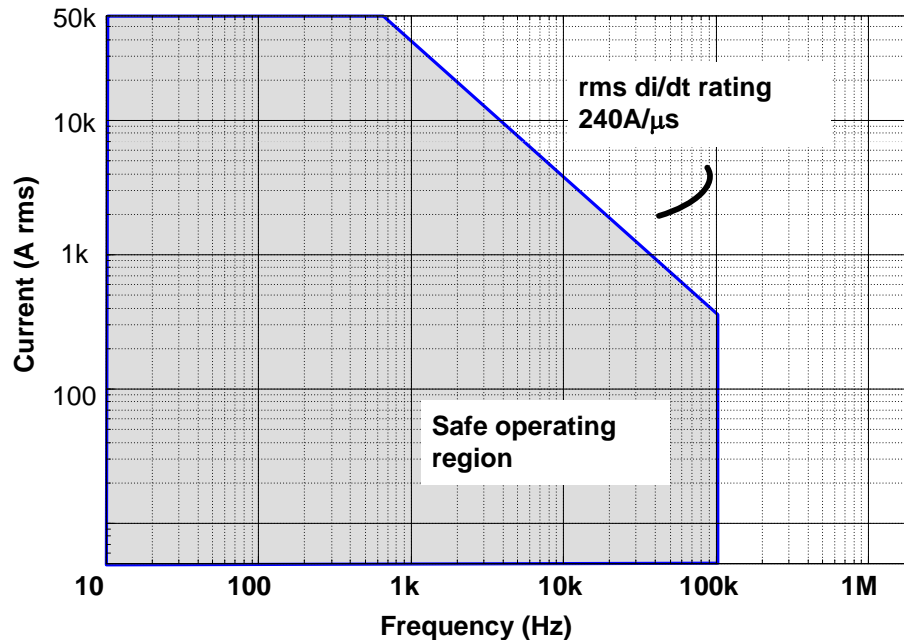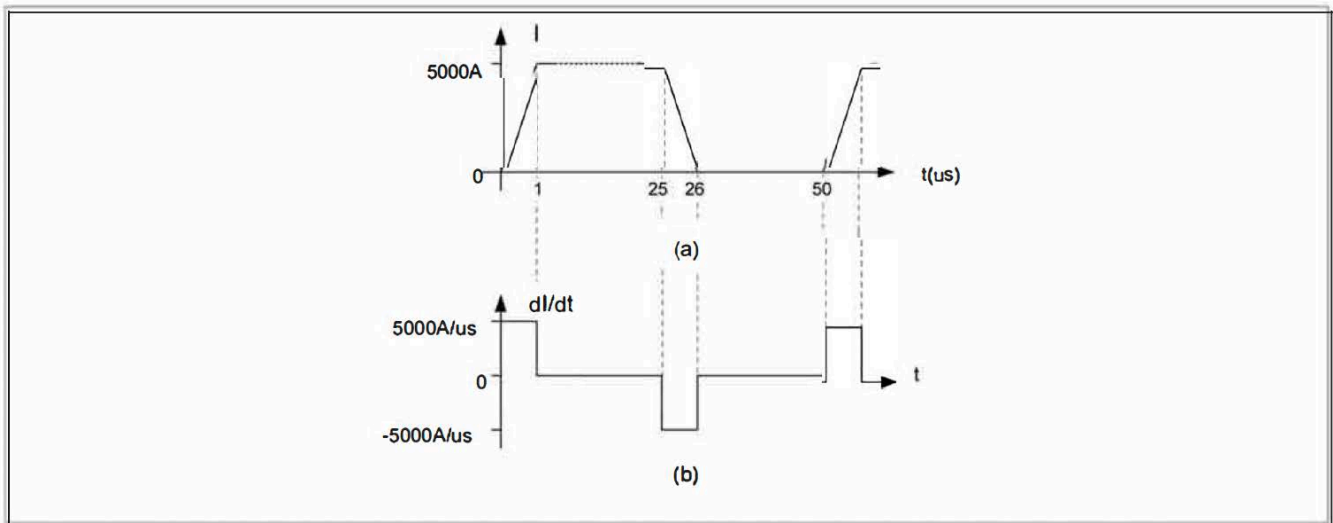

Figure 5. Safe operating area for the RCTrms for a sinusoidal current

For **pulsed waveforms** an example of how to calculate the di/dt rms is shown below,

Consider the current waveform shown in Figure (a) with a repetition frequency of 20kHz. Figure (b) shows the corresponding dI/dt waveform. The rms dI/dt is given by 5000 A/µs x $(1µs/25µs)^{0.5}$ = 1 kA/µs rms.