# Inductors

Power line chokes
Current-compensated ring core chokes

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## General

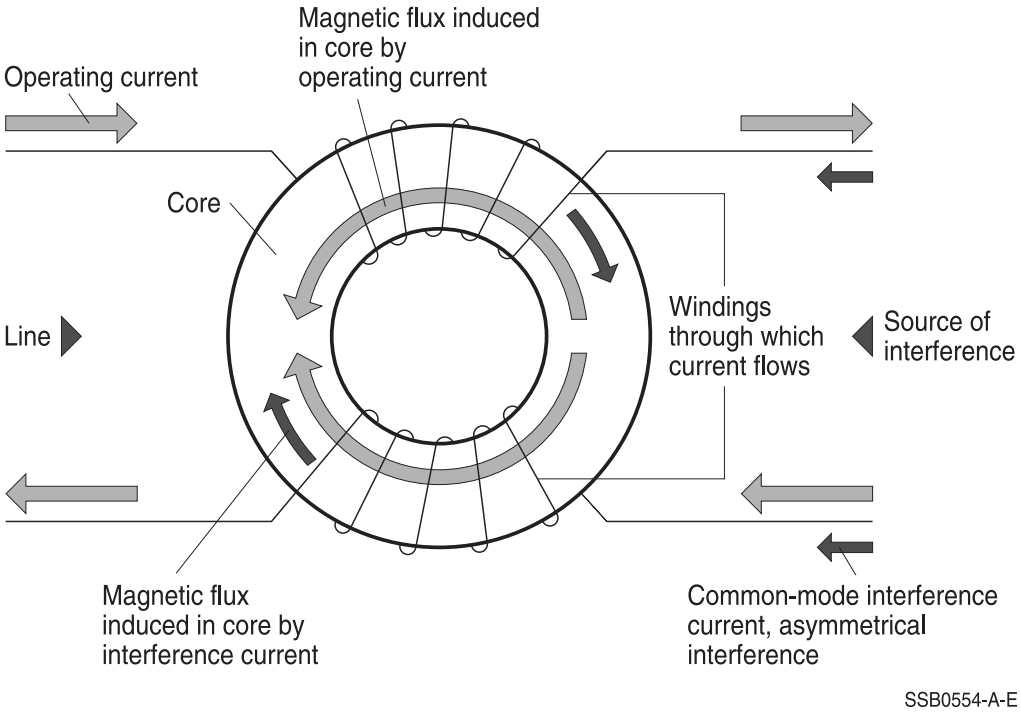


Figure 1 Current-compensated ring core choke
Double choke shown as an example

Compact electrical and electronic equipment primarily generates common-mode interference. In order to be able to meet the safety requirements (keeping within the leakage current limits and thus limiting the capacitance of Y capacitors) specified in the safety standards, chokes with a high asymmetrically effective inductance must be used.

Current-compensated chokes with a closed core topology are especially suitable for this purpose. The problem of core material saturation due to the operating current is solved in these designs by winding two windings with equal numbers of turns on the core. These windings are connected in such a way that the magnetic flux induced by the operating current flowing in the upper winding is opposite to that induced by the current flowing through the lower winding, so that the two fluxes cancel, i.e. compensate one another (cf. figure 1).

This enables the use of highly permeable ring cores, so that high inductance ratings per winding are obtained. When current-compensated double chokes with ferrite cores are used, the full inductance attenuates common-mode interference.

The operating current is only affected by the stray inductance (order of magnitude: 1% of the rated value) and the ohmic resistance, which is generally low. As a result, the suppression of differential-mode interference by current-compensated chokes is accordingly low. In many cases, a combination with symmetrically connected capacitors or powder core chokes is therefore required.

In comparison to I core chokes, current-compensated chokes have higher inductances, very low stray fields and smaller dimensions at comparable current ratings.

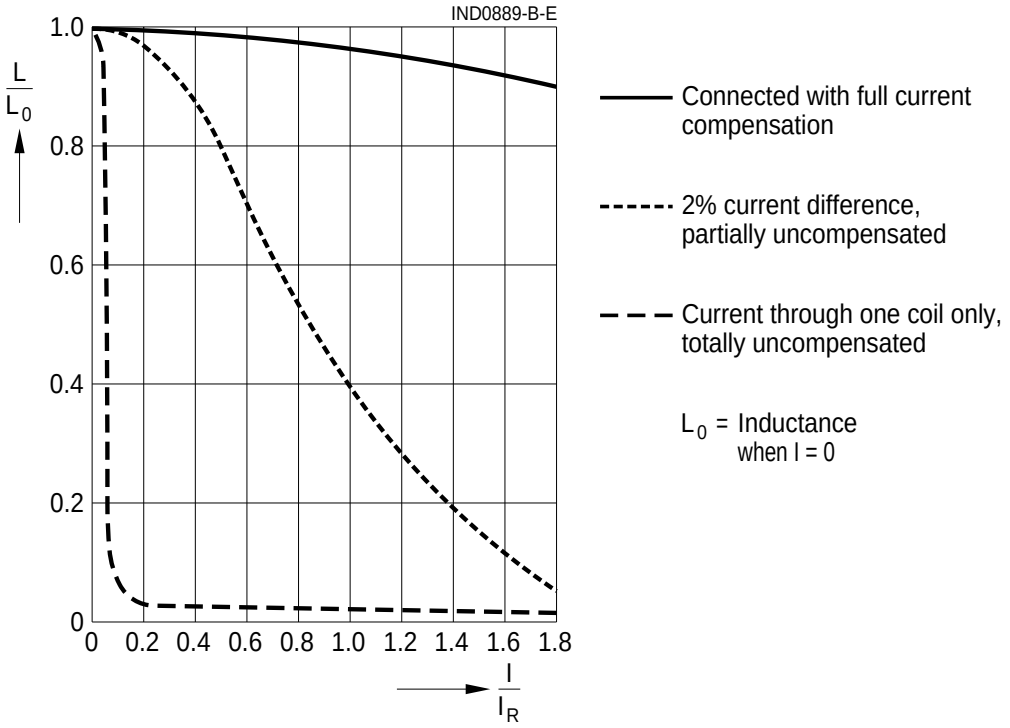


Figure 2 Effect of current differences on current compensation

When using current-compensated chokes, care must be taken to ensure that the sum of all currents flowing through the choke (added vectorially) is zero, i.e. that the entire current flows to the load through the choke and from the load back through the choke. If only a small percentage of the rated current is conducted along another path, e.g. via the ground connection, the choke is no longer compensated and the core will be at least partially saturated. This causes a drop in the inductance.

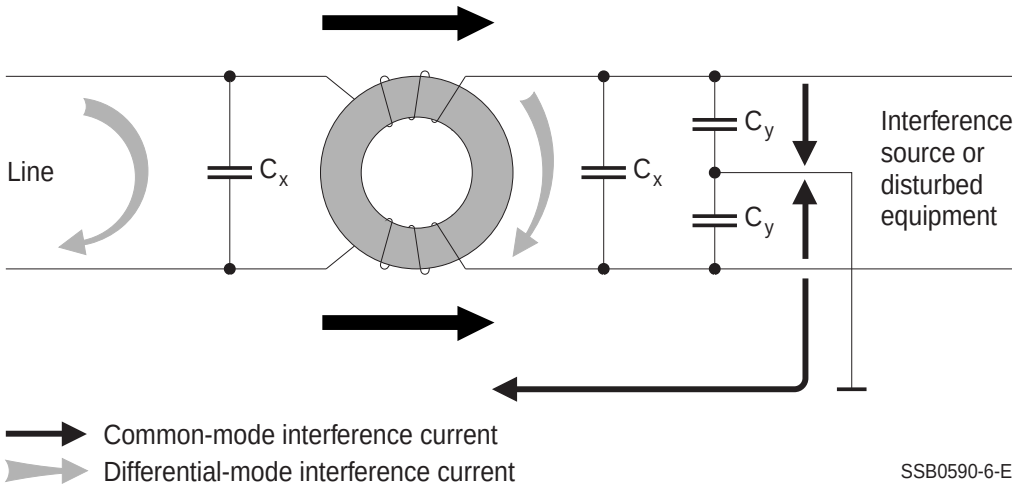


Figure 3 Interference suppression filter circuit with a current-compensated choke

These chokes are available as double current-compensated chokes for ac equipment and as triple and quadruple chokes with current compensation for three-phase equipment without or with connected N conductor.