OLE WOLFF

Mastering Signal Integrity - The Role of Common Mode Chokes in Modern Data Lines

WP04

May 2026

Scope

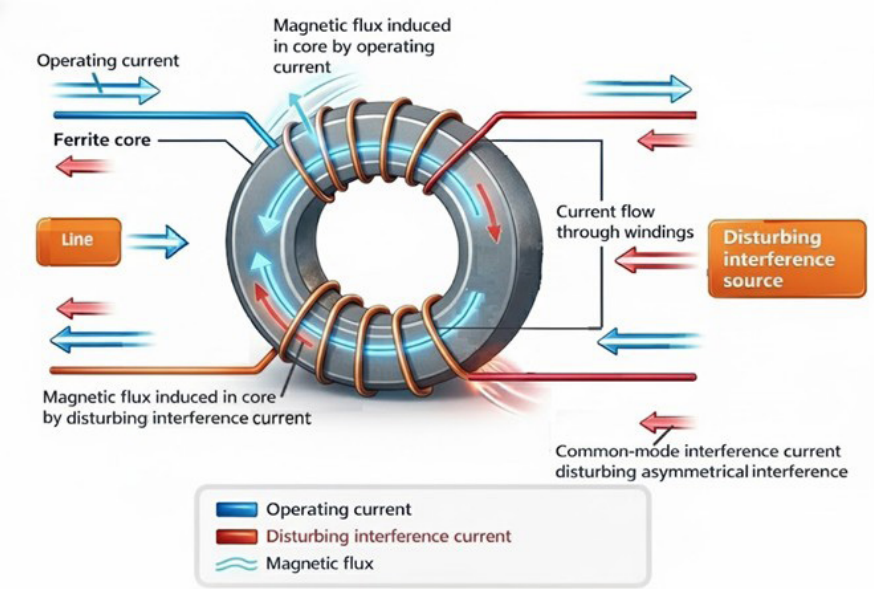
In the rapidly evolving world of electronics, as data rates continue to rise and product designs become more compact, the demand for faster data transmission and smaller device footprints is at an all-time high. However, with increased speed comes an increased susceptibility to **Electromagnetic Interference (EMI)**, data transmission errors and degraded signal integrity.

At Ole Wolff, we understand that maintaining signal integrity isn't just a technical requirement. Our Common Mode Chokes (CMC) are wound on carefully selected magnetic cores to deliver **high impedance to common mode noise** while maintaining **very low impedance to differential data signals**, help to ensure consistent system performance.

What is a Common Mode Choke?

At its core, a Common Mode Choke is an electrical filter designed to block high-frequency noise common to two or more data power lines, while allowing the desired differential signal to pass through unimpeded with minimal impact on rise time or bandwidth.

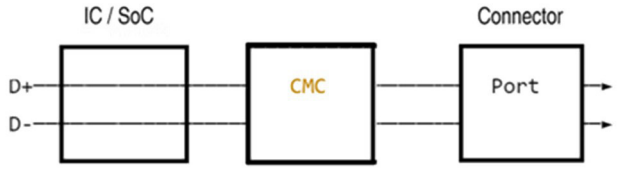
- **Differential Mode (The signal):** Data signals travel in opposite directions. The magnetic fields created by these signals cancel each other out within the choke, allowing the data to pass with minimal attenuation.
- **Common Mode (The noise):** EMI or "noise" usually travels in the same direction on both lines. The choke creates high impedance against these signals, effectively "choking" the noise and preventing it from disrupting the circuit.



Key applications: Where precision matters

Data line filters are essential in environments where high-speed communication meets potential interference. Ole Wolff's range of Common Mode Chokes are specifically engineered for:

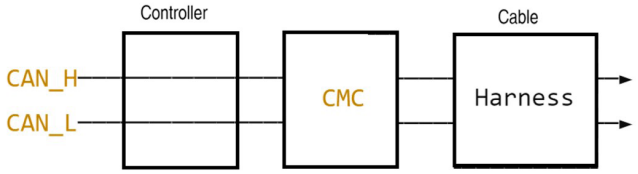
- **Consumer electronics:** From laptops, power tools and robotic lawnmowers to switch-mode power supplies in mobile phones, clocks etc. and televisions, audio equipment and e-bike chargers — all of these consumer devices rely on CMCs to ensure stable, interference-free operation.



High-Speed Interfaces (USB, HDMI, DisplayPort)

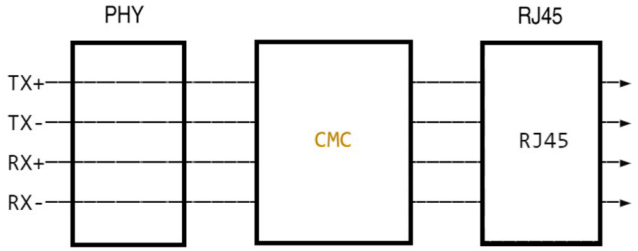
- **Industrial automation:** Almost all electronic industrial controls require common mode chokes, both in the signal- and powerlines; filters are needed for power levels ranging from a few milliwatts to the high kilowatt range.

- **Automative electronics:** Common mode chokes are essential for interference-free communication within vehicles, and all devices must be protected from electromagnetic interference.
  Modern hybrid and electric vehicles rely on a range of DC/DC power converters, which must not interfere with surrounding electronics.
  These are just a few examples of where common mode chokes are required.



Industrial & Automotive Data Networks

- **Communications:** Ensuring high-speed networking equipment and routers, Ethernet (10/100/1000/10G Base-T, PoE) operate without packet loss due to external RF interference.



Ethernet & Communicatioin Ports

Why choose Ole Wolff solutions?

Not all chokes are created equal. When integrating a CMC into your design, parameters like **cutoff frequency, DC resistance (DCR), and current-carrying capacity** are critical.

Advantages choosing Ole Wolff:

1. **High-frequency performance:** Our chokes are designed to handle the steep rise times of modern digital signals.
2. **Miniaturization:** We specialize in compact footprints (down to 0402 and 0603 sizes) without sacrificing impedance performance.
3. **Acoustic & Magnetic synergy:** As experts in both acoustics and magnetic components, we offer a unique holistic perspective on how components interact within your housing, preventing unwanted resonance or interference.

OW standard Common Mode Chokes:

DR + RI core	H-core type		H + I core type	SQ CMC	Bobbin type CMC	
Wire wound DR + RI core type	Wire wound H-core type	Wire wound H + I core type	Wire wound H + I core type	Flat wire wound + SQ core	UU bobbin type CMC	ET bobbin type CMC

Toroid type Common Mode Chokes - Low voltage & High Current				
0603 - 0805	0904 - 1006 C/T	1609 & 1909	1060 - 1570	SFT0905L
Toroid core + different winding + different base; different winding method impact CMC performance, manually assembled				

Find all CMC products here

Conclusion

Ole Wolff common mode chokes for data line filters provide a robust, space-efficient solution to EMI challenges in modern electronics.

By combining effective noise suppression with excellent signal transparency, we help our customers achieve **faster compliance, higher reliability, and superior product performance**.