

# Flexible Rogowski Coils: Principles of Operation

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## Introduction

A Rogowski coil, named after Walter Rogowski, is an electrical device for measuring alternating current (AC) or high speed current pulses. It consists of a helical coil of wire with the lead from one end returning through the center of the coil to the other end, so that both terminals are at the same end of the coil. The whole assembly is then wrapped around the straight conductor whose current is to be measured. Since the voltage that is induced in the coil is proportional to the rate of change of current in the straight conductor, the output of the Rogowski coil is usually connected to an electrical (or electronic) integrator circuit in order to provide an output signal that is proportional to current. The relationship between voltage and rate of change of current is explained in the following equation where  $V$  is voltage and  $M$  is a constant.

$$V = M \frac{di}{dt}$$

## Advantages

- Can be made open-ended and flexible, allowing it to be wrapped around a live conductor without disturbing it.
- Since a Rogowski coil has an air core rather than an iron core, it has a low inductance and can respond to fast-changing currents.
- Highly linear even when subjected to large currents, such as those used in electric power transmission, welding, or pulsed power applications.
- Largely immune to electromagnetic interference.

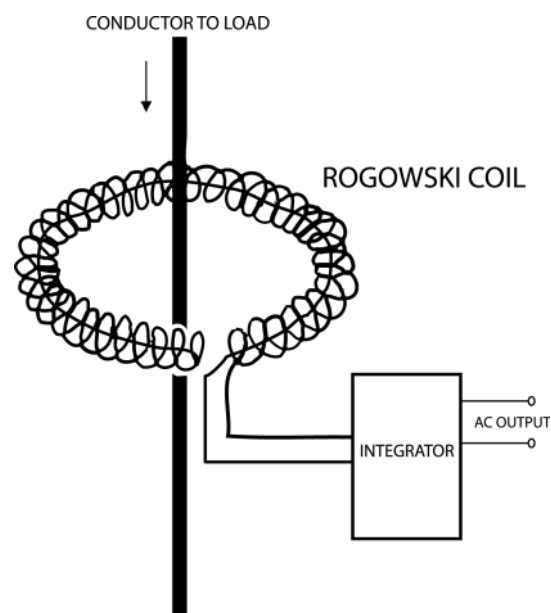
Rogowski coils with an amplifier/integrator (such as the RoCoil mV<sup>ac</sup>) need to be externally powered. RoCoil mV<sup>ac</sup> CTs can be powered by an adapter connected to a legacy Line-Powered ELITE<sup>pro</sup> (PX-ADPT), or wall transformer.

RoCoil CTs without an amplifier/integrator do not require external power and can be used with a PowerScout or ELITE<sup>pro</sup> SP instrument without any extra adapters or wall transformers.

Visit the DENT website or contact us for further information.



DENT's RoCoil Current Transformers. 16", 24", and 36" lengths pictured.



Information courtesy of Wikipedia: [http://en.wikipedia.org/wiki/Rogowski\\_coil](http://en.wikipedia.org/wiki/Rogowski_coil)