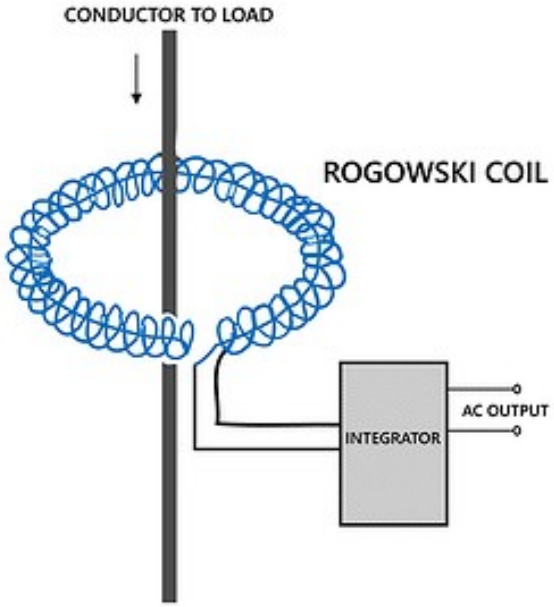
TBWC TECH TALK

OPTIMIZING PERFORMANCE FROM ROGOWSKI COIL CURRENT TRANSFORMERS

WHAT IS A ROGOWSKI COIL?

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 to provide an output signal that is proportional to the 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:

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

WHY CHOOSE A ROGOWSKI COIL CURRENT TRANSFORMER?

Flexible Rogowski Coils, such as the DENT RoCoil, are designed for easy placement around cable bundles, large busbars, or within tight breaker panels. Their design has several advantages over traditional split core current transformers including:

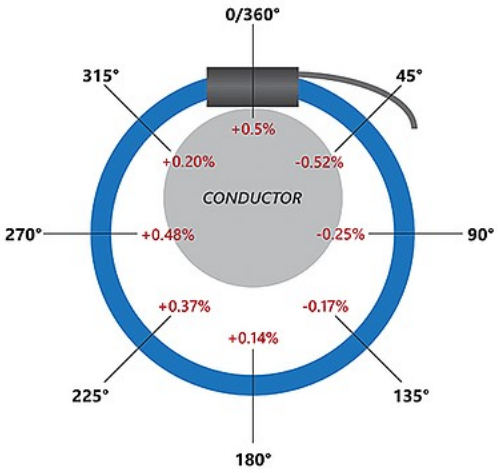
1. Open-ended, flexible design allows it to be wrapped around live conductors without disturbing it.
2. Rogowksi coils feature an air core rather than an iron core, which results in low inductance and faster response time to changing currents.
3. Highly linear, even when subjected to large currents such as those used in electric power transmission, welding, or pulsed power applications.
4. Largely immune to electromagnetic interference.

Additional information available at www.TBWCtechnology.com or call (888) 562-1810.

OPTIMIZING PERFORMANCE FROM A ROGOWSKI COIL (cont'd)

HOW TO MAXIMIZE PERFORMANCE FROM A ROGOWSKI COIL CURRENT TRANSFORMER

Rogowski coil accuracy is usually calibrated with the conductor centered in the CT window. In practice, however, the CT typically hangs on the conductor which can introduce measurement errors. Note that the error is greatest when the CT connector hangs on the conductor. The following diagram is an example of the type of error that could be introduced simply by moving the conductor to different positions within the opening of the Rogowski coil.



Best practice for Rogowski coil installation is to center the conductor as best as conditions allow. In addition, it's a good idea to keep any other conductors (those you do not wish to measure) as far away from the Rogowski coil as is practical.

Keep in mind while a Rogowski coil is ideal for large amperage loads, accuracy of the coil may be reduced on smaller loads (<20A). Additionally, meters may "snap to zero" when the load is very low, resulting in "0" energy being recorded under low load conditions (such as during after-hours or weekends in a facility when most loads are shut off).

TBWC TECHNOLOGY PART NUMBERS

"FLEXIBLE ROPE" CT's	Rogowski Coil Type CTs. ANSI Accuracy 0.60% @ FLA Rating
1800A-FRCT-5.0-7M	16" Rogowski Flexible Rope CT, (~5.0" Opening). 50 to1800A Rated. Lead length: 23' (7M).
4000A-FRCT-7.5-7M	24" Rogowski Flexible Rope CT, (~7.5" Opening). 50 to 4000A Rated. Lead length: 23' (7M)..
4000A-FRCT-11.0-7M	36" Rogowski Flexible Rope CT, (~11.0" Opening). 50 to 4000A Rated. Lead length: 23' (7M).
4000A-FRCT-15.0-7M	47" Rogowski Flexible Rope CT, (~15.0" Opening). 50 to 4000A Rated. Lead length: 9' (7M).

Bulk UL2808, 100% shielded & twisted pair #26/2, 1000V lead length eztension cable available on request. Maximum lead length for FRCT Flexible Rope CTs is 100 feet.

SNAP THRESHOLDS

The signal-to-noise ratio of the PSHD is above 80 dB at full scale (1 part in 10,000). When the signal amplitude becomes so small that it is indistinguishable from noise, it is often better to record 0 than a small, random value. Snap Threshold registers (*Advanced* tab in ViewPoint HD) tell the meter when to record 0 instead of the measurement result. The factory defaults for CTs are expressed in percent and have a default value of 0.04% Full Scale. The voltage thresholds are in absolute value, the recommended minimum voltage is 1.0 volt.

Changing the current Snap Threshold may affect the ANSI C12.20 compliance.