

Technical Note – Sigen power sensor with Rogowski coil

Revision History

Version 1.0, Feb, 2026 – Initial release

1. Introduction

Rogowski Coil Meter is designed for a wider range of C&I applications. The three-phase 40 mA Rogowski coil kit is a current sensing solution composed of a Rogowski coil and an integrator, forming a current sensor for AC current measurement. It outputs a maximal 40 mA AC current signal, which can be directly connected to smart meter terminals, providing a perfect replacement for traditional current transformers (CTs). It also addresses typical challenges such as limited switchboard/cabinet space where CTs cannot be installed, as well as high-current sampling requirements. In addition, it can withstand harsher overcurrent protection scenarios.

Key features include:

- Split-type, openable installation: compact size and lightweight, ideal for retrofit projects or irregular busbars
- Stronger overcurrent/short-circuit withstand capability vs. CT: extremely low signal distortion
- Ultra-wide frequency response: covering 30 Hz to 5 kHz
- Wide current range: 300 A / 1000 A / 3000 A options, suitable for 0.2 MVA to 2 MVA commercial and industrial applications
- Class B energy accuracy: industrial-grade measurement performance
- 50 ms data refresh: powerful anti-backflow capability
- The standard cable length is 6 m. Up to 4 m extension is supported on site, and the total length shall not exceed 10 m.



2. Basic Information

Product Model	Dimensions (W/H/D)	Weight	Number of coil	Cablelength of coil
Sigen Sensor TP-RC300	18 / 100 / 65.5 mm	0.076 kg	3 pcs	6 m
Sigen Sensor TP-RC1000				
Sigen Sensor TP-RC3000				

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3. Working Principle of Rogowski coil

The three-phase 40 mA Rogowski coil kit consists of a Rogowski coil and an integrator. The Rogowski coil is an air-cored sensor installed around the primary conductor. A changing primary current produces a changing magnetic field, inducing a coil voltage proportional to the current's time derivative.

Since the raw coil output is proportional to di/dt , an integrator is required to reconstruct a signal proportional to the actual current $i(t)$.

The integrator reconstructs a signal proportional to the primary current and applies scaling/conditioning, delivering a standardized mA-level AC current output that can be directly connected to a smart meter current input (40 mA is the full-scale).

For three-phase systems, one coil is used per phase (L1/L2/L3). The integrator processes the three channels and outputs three independent AC current signals to the meter (I1/I2/I3). As an air-cored sensing solution, the Rogowski coil does not rely on a ferromagnetic core, which helps maintain stable measurement performance in high-current and overcurrent conditions.

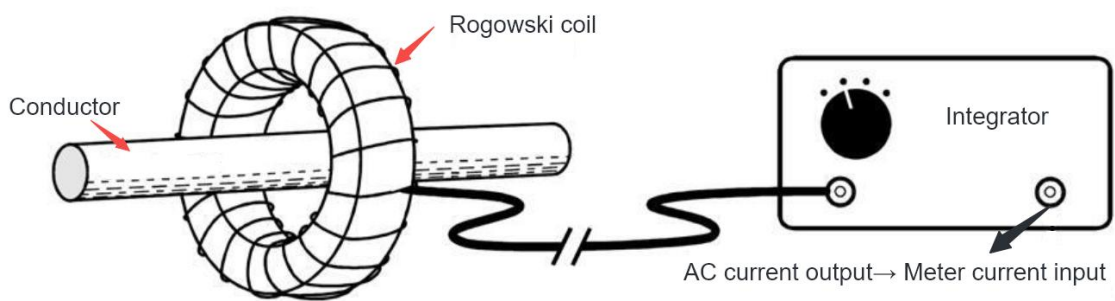


Figure 1. Rogowski coil working principle schematic. (The Rogowski coil is installed around the primary conductor. The coil signal is processed by an integrator to generate a maximal 40 mA AC secondary current, which is connected to the smart meter current input.)

The diagram above only illustrates a single phase, with a focus on the working principle. For use in Three-phase systems: one coil per phase (L1/L2/L3) to meter inputs (I1/I2/I3).

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3.1 CT comparison & Compatibility

A conventional current transformer (CT) uses a **ferromagnetic core** to convert primary current into a standardized secondary current that most meters can accept. This long-established standardization means CTs are generally highly interchangeable across different meter brands and systems, provided ratings and burden requirements are met.

A Rogowski coil system works differently: the coil is an **air-cored** sensor that produces a signal proportional to the rate of change of current. It therefore requires an integrator and signal conditioning stage to reconstruct a current-proportional waveform and output a defined interface. Because the measurement performance depends on the matched characteristics of the coil and integrator, the Rogowski-coil meters in today's industry is typically delivered as a paired solution.

Accordingly, the Sigenenergy Rogowski coil meters series is designed to be used with matched Rogowski coils. To ensure accuracy, stability, and correct scaling, users **must install the designated Rogowski coil set with the corresponding meter/integrator**, rather than mixing coils from other suppliers.

4. Compatible models

Series	Specific model
Sigen PV MI	Sigen PV 50/60/80/100/110/125MI
Sigen PV MI-HYA	Sigen PV 50/60/80/100/110/125MI-HYA
Sigen PV MI-HYB	Sigen PV 50/60/80/100/110MI-HYB
SigenStor EC TP	SigenStor EC 5.0/6.0/8.0/10.0/12.0/15.0/17.0/20.0/25.0/30.0 TP