

RPS50

Multiscale single Rogowski coil converter

- Three scales selectable by dip-switches
- Equalization and 90° shifting of the Rogowski coil signal
- 1 or 3 VRMS full scale output for instantaneous value
- DC output for rms value
- Compact DIN rail enclosure
- 80...250 VAC power supply



» General description

RPS50 is a multiscale Rogowski coil integrator, in a compact DIN rail enclosure, powered directly from the mains. An integrator is essential to equalize and shift by 90° the output signal from the Rogowski coils. It consists of an active electronic circuit with negligible offset and a good linearity. RPS50 can be combined with any model and size of MFC150 Rogowski coils. The module is available in the standard configuration with one of the 3 following full scales: 0.5 - 2.5 - 10 kA or 2.5 - 10 - 50 kA or 10 - 50 - 250 kA.

Two different outputs are available:

- the standard output carrying out the instantaneous value, with 1 or 3 VRMS full scale.
- an optional DC output carrying out the RMS value of the measured current.

RPS50 and a Rogowski current transducer is a very flexible system, suitable for high power load analysis, impulsive current monitoring, DC ripple measurement, etc.

Due to its specific features, flexible Rogowski coil is an extremely comfortable solution for current measurement and can be used in a number of cases where traditional current transducer is not the adequate solution.

» Benefits

- Since the Rogowski coil output is proportional to the frequency of the measured current, the signal equalization ensure a linear response on a wide frequency range. RPS50 allows to use coils on different electrical network frequencies, keeping the same output level over the frequencies.
- The 90° correction give the correct phase for power and energy measurements. RPS50 can be used in conjunction with power meters allowing to take advantage of the great measuring linearity of the Rogowski coils.
- The availability of different selectable scales give the possibility to use the same coil on a extremely wide range of current values.
- The configuration and calibration controls accessible from the front panel increase the flexibility of the module and make it more comfortable in use.

» Applications

- Measuring devices, lab instrumentation
- Power monitoring & control systems
- Harmonics and transients monitoring
- DC ripple measurement
- Welding machine control
- High current measurement

» Related Products

- MFC150

» What is a Rogowski coil?

Rogowski coils have been used for the detection and measurement of electric currents for decades. They are based on a simple principle: an "air-cored" coil is placed around the conductor in a toroidal fashion and the magnetic field produced by the current induces a voltage in the coil. The voltage output is proportional to the rate of change of current. This voltage is integrated, thus producing an output proportional to the current.

By using precision winding techniques, especially developed for the purpose, the coils are manufactured so that their output is not influenced by the position of the conductor within the toroid, and to reject interference from external magnetic fields caused, for example, from nearby conductors. Basically, a Rogowski coil current measuring system consists of a combination of a coil and conditioning electronics. Rogowski coil current transducers are used for the AC measurement.

They can be used in similar circumstances to current transformers but for many applications they have considerable advantages:

- Wide dynamic range. The same coil can be used to measure currents from mA to hundred of kA, it is enough to change the RC value in the integrator.
- High linearity. According to the manufacturing (size, inductance value,...) the maximum measurable frequency can range up to hundreds of kHz and in some special models also MHz.
- Very useful with large size or awkward shaped conductors or in places with limited access. Thanks to the structure without hard core, the coil can be easily manufactured according to the application or to the available space.
- Unlike traditional current transducers, there is no danger from open-circuited secondaries.
- They cannot be damaged by large overloads.
- They are non-intrusive. They draw no power from the main circuit carrying the current to be measured.
- They are also light weighted and in some applications are light enough to be suspended on the conductor being measured.

The transducer does not measure direct currents but, unlike a current transformer, it can carry out accurate measurements of AC component even if there is a large superimposed DC component, since there is no iron core causing saturation. This feature is particularly useful for measuring ripple currents for example in battery charging systems.

» Specifications

POWER SUPPLY	
Rated voltage:	80...250 VAC 50/60 Hz
Consumption:	1.5 VA max
ELECTRICAL CHARACTERISTICS	
Input:	1 for Rogowski coil
Input level (RMS) (1):	100mV/1kA@50Hz (only if purchased without MFC150 coil)
Output 1:	1 VRMS (max crest factor 4.5) 3 VRMS (max crest factor 1.5)
Output 1 load:	> 10 kOhm
Output 2:	0...10 VDC (on request: 0...20 mA, 4...20 mA)
Full scales values:	0.5 - 2.5 - 10 kA 2.5 - 10 - 50 kA 10 - 50 - 250 kA
Accuracy (2):	better than ±1% of full scale (not guaranteed for full scale ≤10 mV)
Frequency range (3):	8 Hz to 100 kHz@-3dB
ENVIRONMENTAL CONDITIONS	
Operating temperature:	from -10°C to +50°C
Storage temperature:	from -25°C to +70°C
Relative humidity:	80% max without condensation
MECHANICAL CHARACTERISTICS	
Material:	plastic enclosure
Protection degree:	IP20
Size / weight:	115x100x23 mm / approx 117 g
STANDARDS COMPLIANCE	
Safety:	73/23/EEC and 93/68/EEC directives, EN61010.1 safety standard
EMC:	89/366/EEC directive and following modifications 93/31/EEC and 93/68/EEC, EN50081-2, EN50082-2, EN61326/A1

(1) The Rogowski coil output is proportional to the rate of change of current. The calculation formula is: Ampere rms x Hertz x K x 10⁻⁶, where K depends on manufacturing. The K value is 2 for 100 mV models.

(2) RPS50 is delivered with the specified accuracy. Moreover, the calibration of each scale is adjustable by user to achieve the maximum accuracy in conjunction with the coil.

(3) The low limit is approximate and it is determined by noise effect on very low signals.

ORDER CODE	POWER SUPPLY	FULL SCALE VALUES			OUTPUT 1		OUTPUT2
	80...250VAC	0.5-2.5-10kA	2.5-10-50kA	10-50-250kA	1V RMS	3V RMS	0...10VDC
FOR NO. 1 MFC150 ROGOWSKI COIL (not included)							
2102.0002.0001	•	•			•		
2102.0004.0001	•		•		•		
2102.0006.0001	•			•	•		
2102.0008.0001	•	•				•	
2102.0010.0001	•		•			•	
2102.0012.0001	•			•		•	
2102.0038.0001	•	•			•		•
2102.0040.0001	•		•		•		•
2102.0042.0001	•			•	•		•
2102.0044.0001	•	•				•	•
2102.0046.0001	•		•			•	•
2102.0048.0001	•			•		•	•

OPTIONS available only on request, to be indicated together with the selected order code from the list above:

- Custom full scale values (value/s to be specified)
- 100mV/1kA@50Hz input sensitivity (only if purchased without MFC150 coil)
- Different values on Output 2: 0...20mA, 4...20mA

LEGEND

- 1V RMS:** Max crest factor 4.5.
3V RMS: Max crest factor 1.5.

NOTE: Subject to change without notice



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