State of the **ART**

now with
Class 0.5 accuracy

ART Series

Unique, IP67, flexible and thin 1 kV Rogowski coil

- Rated insulation voltage 1 kV CATIII
- Accuracy class 0.5 without calibration
- 2mm hole to pass security seal
- Electrostatic shield

PERFECT LOOP TECHNOLOGY
Patent
ref. WO 2009
/001185 A1

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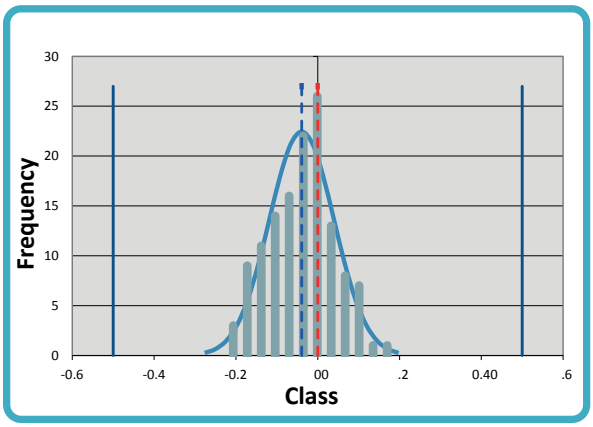
LEM FLEXIBLE ART ROGOWSKI COIL FOR MEASURING AC

LEM ART Class 0.5 (IEC 61869-2) is the most accurate coil on the market!

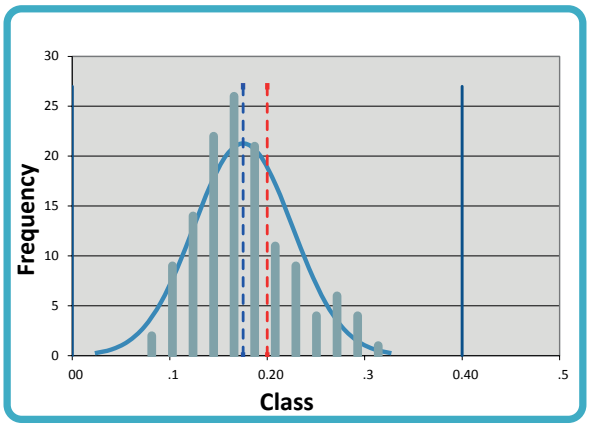
The recently released ART series has improved the transfer ratio accuracy compared with the former series; the tolerance is reduced from 1% to 0.5% (class 0.5). A new manufacturing process is used to reduce the centered transfer ratio and the positioning errors. Here below is an example of statistics on 130 pieces ART B22 D125 batch issued from the new process.

Centered transfer ratio



Class accuracy 0.5% at 20°C
Example: ART B22 D125
Sample: 130pcs
Target: +/- 0.5%
Average: -0.039%
Min: -0.22%
Max: 0.16%
Xb-3xσ: -0.28%
Xb+3xσ : + 0.20%

Positioning error



Average 0.2% and maxi 0.4% at 20°C
Example: ART B22 D125
Sample: 130pcs
Target:|0.4%|
Average: 0.175%
Min: 0.07%
Max: 0.30%
Xb-3xσ: 0.02%
Xb+3xσ : 0.33%

The LEM ART Rogowski coil has the most accurate manufacturing process on the market!

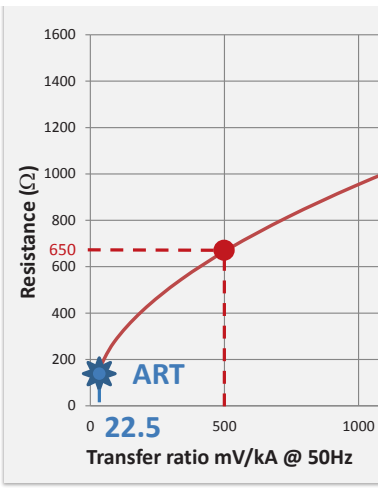
The ART has an output of **22.5mV/kA @50Hz** within 0.5% with measuring load R_L=10 kOhms. The LEM manufacturing process of the ART takes into account the internal resistance in order to guarantee the output accuracy under the rated load. ART is avoiding the use of additional resistors for the trimming.

Why is the 22.5mV/kA output voltage of the ART so low?

Because the cross section of the coil (ART is the thinnest coil on the market) and the internal resistance R_S will remain low. R_S is a crucial point to master the accuracy on absolute value as well as over temperature: the higher the R_S, the higher the potential error (provided by the resistive devider R_S/R_L). Taking into account R_S uncertainty (typically 9%) and the very high temperature coefficient of copper (4000ppm/K). It is a fact that increasing the transfer ratio of Rogowski coils with a higher cross section results in a higher internal coil resistance (Graph 1). Let's take the example of a Rogowski coil for which the cross section is increased up to 500mV/kA. The following curves (Graph 2 and 3) illustrate the impact of R_S on the accuracy versus the increasing transfer ratio.

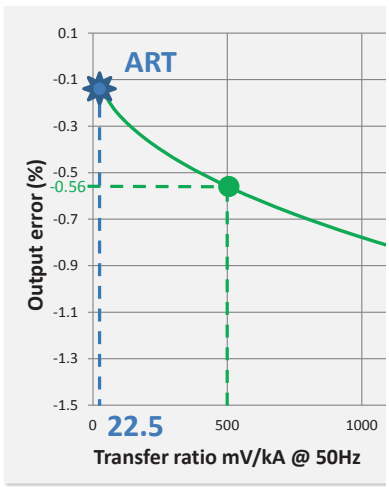
1. Internal resistance R_S (Ω) vs transfer ratio:

From 140Ω @22.5mV to 650Ω @500mV



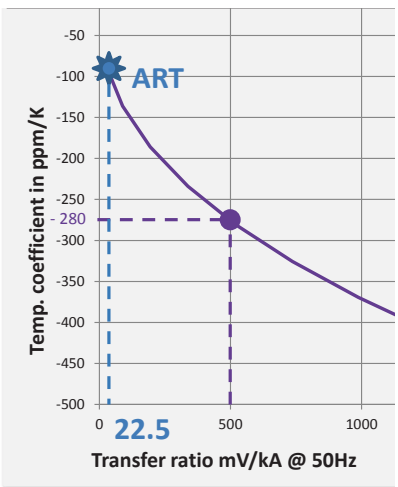
2. Potential Output error (%) vs transfer ratio with load R_L = 10kΩ

From -0.1% @22.5mV to -0.56% @500mV



3. Temperature coefficient (ppm/K) vs transfer ratio with load R_L = 10kΩ

From -80 ppm/K @22.5mV to -280 ppm/K @500mV



Simulation details: Increasing output to 500mV/kA (15mm cross section, diameter 250mm, 0.1mm wire, fix step winding and 60°C temperature variation)