



VEBKO ONLINE HELP

Rogowski Coil Test

Category	tester
Section	Testing of relays protection functions
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1 Imported Content

A Rogowski coil is a flexible air-cored current transducer (CT) used for measuring AC current. Because it has no ferromagnetic core, it does not saturate. The raw output of the coil is typically proportional to di/dt (i.e., the induced voltage), therefore it is normally supplied together with an integrator so that the output becomes proportional to the current waveform. The transfer ratio is commonly expressed in mV/A. Consequently, when testing relays that use Rogowski-coil inputs, only accurate voltage sources should be used.

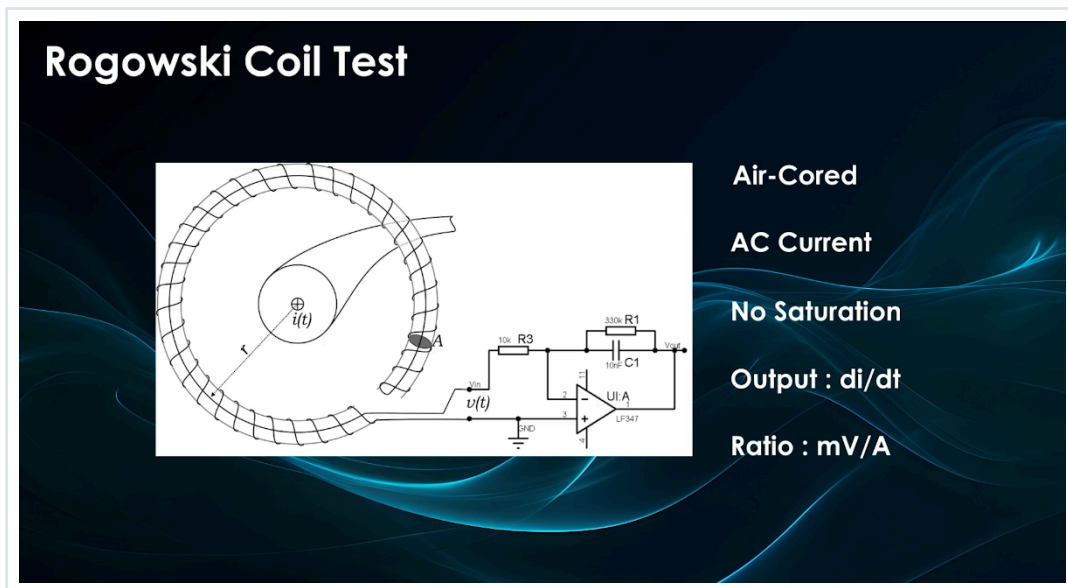


Figure 1

An important consideration when testing such relays with the AMT205 is that the unit's main voltage sources do not provide sufficient accuracy for these applications. This is because their voltage range is ± 420 V (840 V peak-to-peak), which reduces achievable resolution/accuracy.

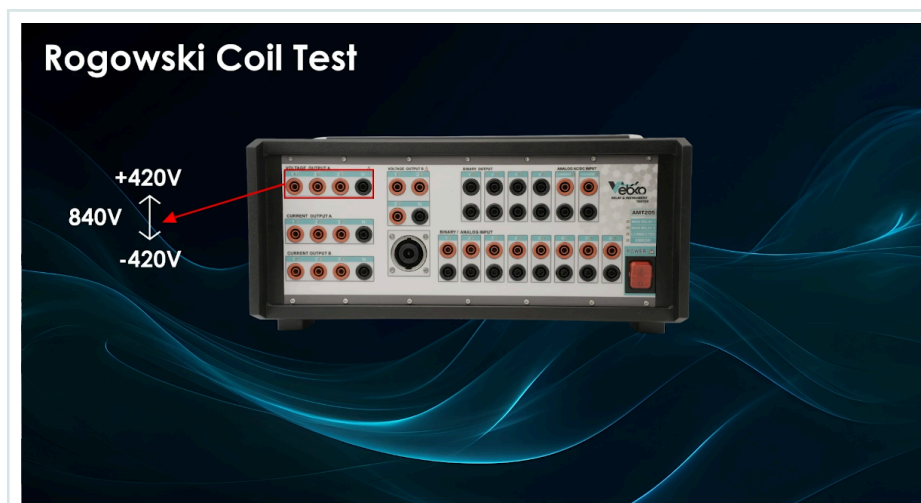


Figure 2

Therefore, the voltage sources to be used are limited to the device's Cross Voltage sources, which have a smaller range and higher accuracy.

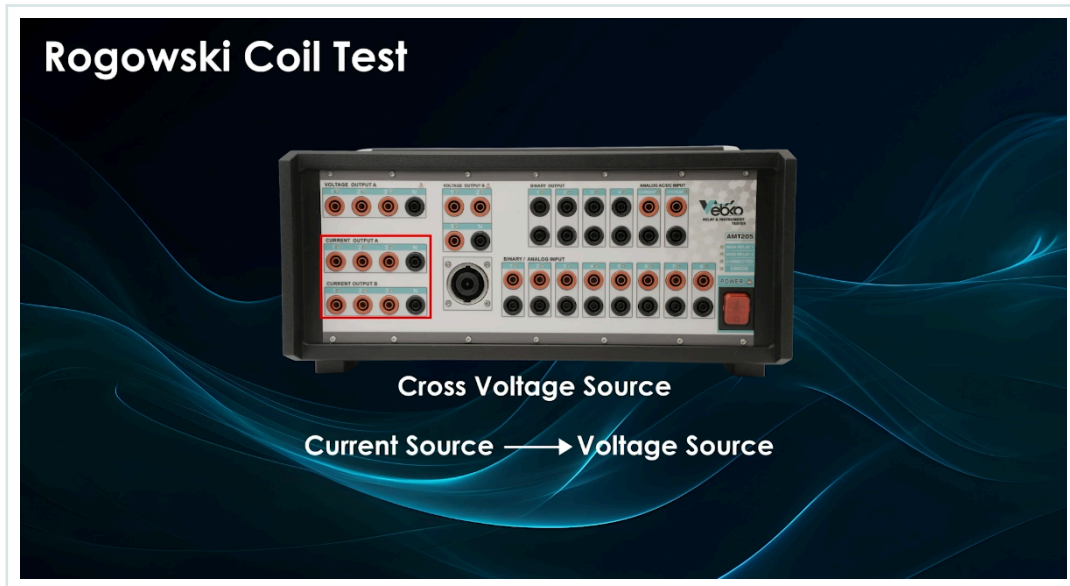


Figure 3

To convert current sources to voltage sources (i.e., to use the Cross Voltage sources), in Hardware Configuration,

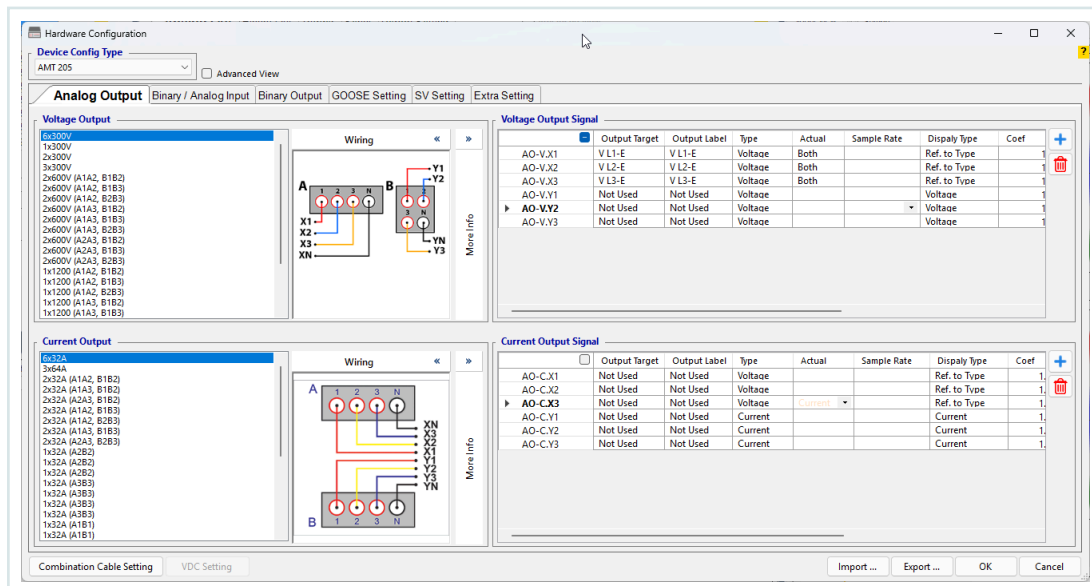


Figure 4

set the value in the Type column to Voltage.

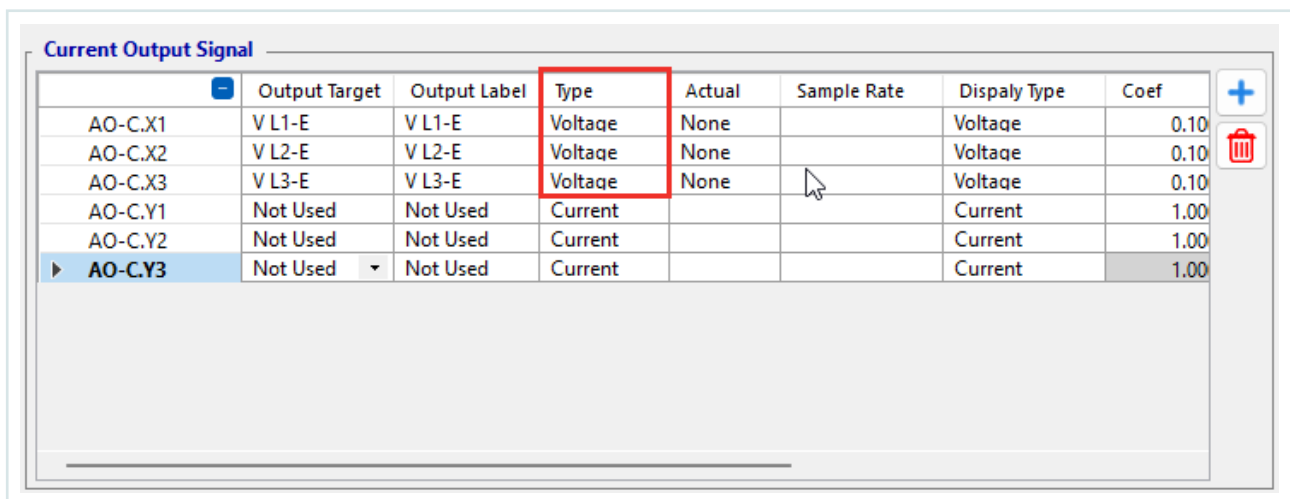


Figure 5

Note that with this configuration alone, functions such as Distance and Differential testing cannot be performed directly. This is because these functions require outputs with defined Targets; if the selected source is originally a current source, the test execution may become challenging due to the way targets and outputs are allocated.

Therefore, to test relays of this type using the Vebko device and software, the software configuration must be adjusted as described below. Consider the Distance protection function as an example.

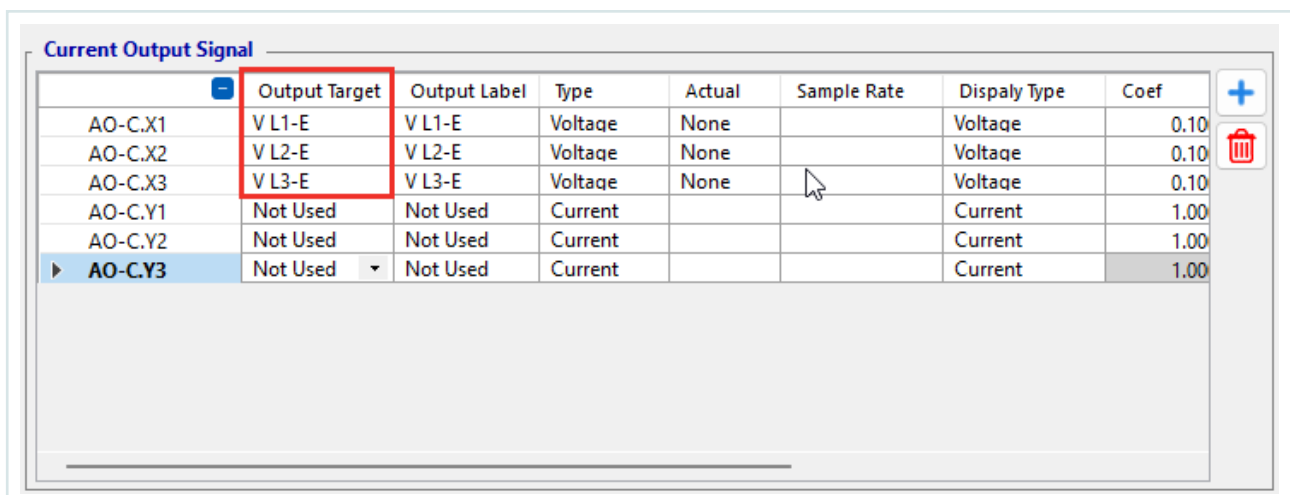
Testing this function requires three voltage sources with targets VL1-E, VL2-E, VL3-E and three current sources with targets IL1, IL2, IL3. Also note that when the relay input is provided via a Rogowski coil, all test signals must be voltage signals. module



	Output Target	Output Label	Type	Actual	Sample Rate	Display Type	Coef
AO-C.X1	VL1-E	VL1-E	Voltage	None		Voltage	0.10
AO-C.X2	VL2-E	VL2-E	Voltage	None		Voltage	0.10
AO-C.X3	VL3-E	VL3-E	Voltage	None		Voltage	0.10
AO-C.Y1	Not Used	Not Used	Current			Current	1.00
AO-C.Y2	Not Used	Not Used	Current			Current	1.00
▶ AO-C.Y3	Not Used	Not Used	Current			Current	1.00

Figure 6

Hence, we convert the three phases of Current Group A into Cross Voltage sources with targets VL1-E, VL2-E, VL3-E.



	Output Target	Output Label	Type	Actual	Sample Rate	Display Type	Coef
AO-C.X1	VL1-E	VL1-E	Voltage	None		Voltage	0.10
AO-C.X2	VL2-E	VL2-E	Voltage	None		Voltage	0.10
AO-C.X3	VL3-E	VL3-E	Voltage	None		Voltage	0.10
AO-C.Y1	Not Used	Not Used	Current			Current	1.00
AO-C.Y2	Not Used	Not Used	Current			Current	1.00
▶ AO-C.Y3	Not Used	Not Used	Current			Current	1.00

Figure 7

The Display Type shall be set to Voltage

Current Output Signal								
	Output Target	Output Label	Type	Actual	Sample Rate	Display Type	Coef	
AO-C.X1	V L1-E	V L1-E	Voltage	None		Voltage	0.10	
AO-C.X2	V L2-E	V L2-E	Voltage	None		Voltage	0.10	
AO-C.X3	V L3-E	V L3-E	Voltage	None		Voltage	0.10	
AO-C.Y1	Not Used	Not Used	Current			Current	1.00	
AO-C.Y2	Not Used	Not Used	Current			Current	1.00	
▶ AO-C.Y3	Not Used	Not Used	Current			Current	1.00	

Figure 8

and the Coefficient shall be entered according to the coil transfer ratio (e.g., 0.1). This means any value entered for the test will be multiplied by this coefficient and will appear as a voltage at the corresponding voltage output.

Current Output Signal								
	Output Target	Actual	Sample Rate	Display Type	Coef	I Gain		
AO-C.X1	V L1-E	None		Voltage	0.100 x	Peak 45A		
AO-C.X2	V L2-E	None		Voltage	0.100 x	Peak 45A		
AO-C.X3	V L3-E	None		Voltage	0.100 x	Peak 45A		
AO-C.Y1	Not Used			Current	1.000 x			
AO-C.Y2	Not Used			Current	1.000 x			
▶ AO-C.Y3	Not Used			Current	1.000 x			

Figure 9

Next, the current channels must be configured. For this purpose, set Display Type to Current,

Current Output Signal								
	Output Target	Actual	Sample Rate	Display Type	Coef	I Gain		
AO-C.X1	V L1-E	None		Voltage	0.100 x	Peak 45A		
AO-C.X2	V L2-E	None		Voltage	0.100 x	Peak 45A		
AO-C.X3	V L3-E	None		Voltage	0.100 x	Peak 45A		
AO-C.Y1	Not Used			Current	1.000 x			
AO-C.Y2	Not Used			Current	1.000 x			
▶ AO-C.Y3	Not Used			Current	1.000 x			

Figure 10

set the targets to IL1, IL2, IL3,

Current Output Signal								
☒	Output Target	Output Label	Type	Actual	Sample Rate	Display Type	Coef	
AO-C.X1	V L1-E	V L1-E	Voltage	None		Voltage	0.10	
AO-C.X2	V L2-E	V L2-E	Voltage	None		Voltage	0.10	
AO-C.X3	V L3-E	V L3-E	Voltage	None		Voltage	0.10	
AO-C.Y1	IL1	IL1	Current	None		Current	1.00	
AO-C.Y2	IL2	IL2	Current	None		Current	1.00	
▶ AO-C.Y3	IL3	IL3	Current	None		Current	1.00	

Figure 11

and enter the Coefficient according to the coil transfer ratio (e.g., 0.1).

Current Output Signal								
☒	Output Target	pe	Actual	Sample Rate	Display Type	Coef	I Gain	
▶ AO-C.X1	V L1-E	ltage	None		Voltage	0.100 x	Peak 45A	
AO-C.X2	V L2-E	ltage	None		Voltage	0.100 x	Peak 45A	
AO-C.X3	V L3-E	ltage	None		Voltage	0.100 x	Peak 45A	
AO-C.Y1	IL1	irrent	None		Current	0.100 x	Peak 45A	
AO-C.Y2	IL2	irrent	None		Current	0.100 x	Peak 45A	
AO-C.Y3	IL3	irrent	None		Current	0.100 x	Peak 45A	

Figure 12

The most critical point here is changing the Type from Current to Voltage, because the “current” input is provided by the Rogowski coil as a voltage signal.

Current Output Signal								
☒	Output Target	Output Label	Type	Actual	Sample Rate	Display Type	Coef	
▶ AO-C.X1	V L1-E	V L1-E	Voltage	None		Voltage	0.10	
AO-C.X2	V L2-E	V L2-E	Voltage	None		Voltage	0.10	
AO-C.X3	V L3-E	V L3-E	Voltage	None		Voltage	0.10	
AO-C.Y1	IL1	IL1	Voltage	None		Current	0.10	
AO-C.Y2	IL2	IL2	Voltage	None		Current	0.10	
AO-C.Y3	IL3	IL3	Voltage	None		Current	0.10	

Figure 13

With this configuration, the three phases of Current Group A are cross-assigned and converted to voltage outputs to feed the voltage input of the relay's Distance function, and the three phases of Current Group B are cross-assigned and converted to the required "current" channels to feed the current input of the relay's Distance function.

[jg1]Rogowski_Coil_Test