RIK 1AR

Relay Class Integrator

User's Manual

ACCUENERGY

Please read this manual carefully before installation, operation, and maintenance of the 1AR Rogowski Coil Integrator Kit.

The following symbols in this manual are used to provide warning of the danger or risk during the installation and operation of the unit.

Electric Shock Symbol: Carries information about procedures which must be followed to reduce the risk of electric shock and danger to personal health.

Safety Alert Symbol: Carries information about circumstances which, if not considered, may result in injury or death.

This mark indicates that this product is UL Listed.

Installation and maintenance of the 1AR Rogowski Coil Integrator Kit should only be performed by qualified, competent professionals who have received training and show have experience with high voltage and current devices.

Accuenergy (Canada) Inc. shall not be responsible or liable for any damages caused by improper device installation and/or operation.

	The product is protected by reinforced insulation
	Application around and removal from UNINSULATED HAZARDOUS LIVE conductors is permitted

WARNING: Disconnect power supply before making electrical connections.

WARNING: Current Transformers (CT's) should be installed by a trained electrician or technician.

WARNING: The secondary circuit of a CT should not be opened when current is flowing through the primary circuit.

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Chapter 1: Introduction

1.1 Overview

The Relay-Class 1AR Rogowski Integrator Kit (RIK) is designed to provide users with an easy-to-install, plug-and-play solution that can be used with any protection relay, power meter, or device with a 1A nominal current input. The flexibility of Rogowski Coil CTs reduces installation complexity and is ideal for a variety of applications or unique configurations where spatial constraints may limit the use of rigid-body CT solutions.

The integrator kit is rated for class 5P20 (IEC 61869-2). This means that if the primary current is 20 times the rated primary current of the 1AR, it will be able to sense and measure the current with an accuracy of 5%. The 1AR is user-configurable and can measure current from 0.25A to 100kA. Additionally, it can be used on systems that operate at both 50Hz and 60Hz, further increasing its utility across industries.

1.2 What's Required

The Rogowski Coil Kit includes a single-phase integrator unit with five, configurable CT ratios for the current input channel and requires a 24Vdc power supply to power the integrator. The integrator can be surface-mounted, or DIN rail mounted; the power supply, which is sold separately, is designed to be mounted on DIN rail. One Rogowski coil (model RCTxx-1000; available in sizes from 16" to 47") is required to measure the current and is sold separately.

1. **Rogowski Coil Input**
   One channel for a flexible rope-style CT
2. **1A Output**
   One channel, 1A output
3. **Power On Light**
   Indicates that the RIK is powered up
4. **Overtemp Light**
   Indicates that the unit is over the specified temperature limits
5. **CT Configurator**
   Five field configurable CT ratios
6. **Power Supply**
   Model PSU-240-24 (sold separately)
7. **Power Supply Input**
   Power Supply Input (24Vdc)
8. **Flexible Rogowski Coil Current Transformer**
   Model RCTxx-1000 CT; sizes available from 16" to 47" inches (sold separately)
9. **Coil Input Lead**
   Rogowski CT lead for connectionwith RIK integrator

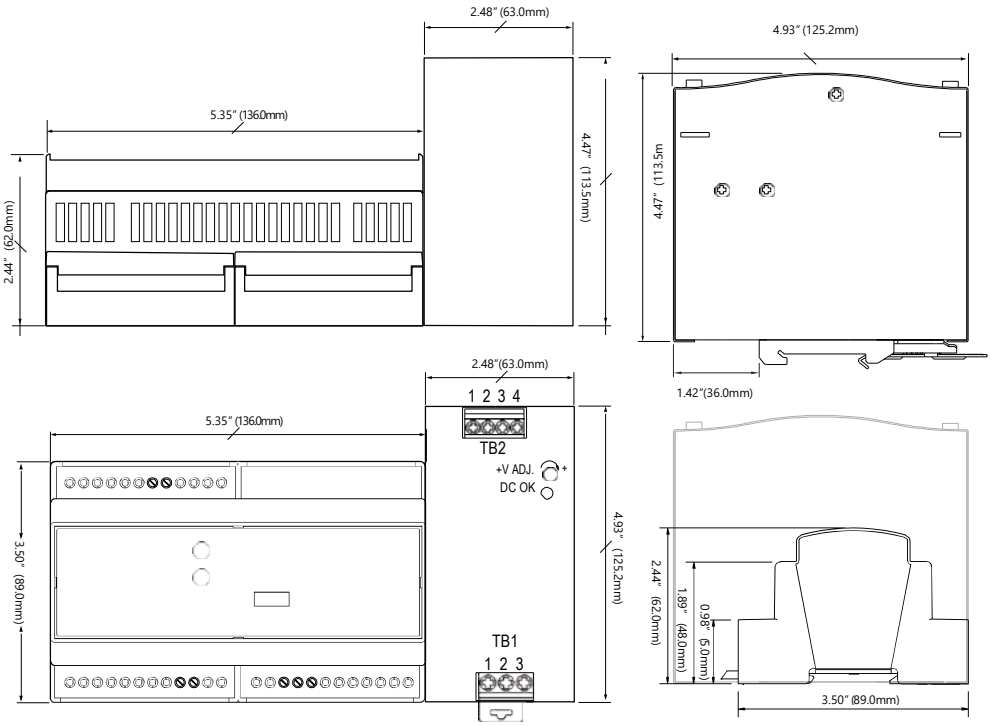
Chapter 2: Installation

The installation method is introduced in this chapter. Please read this chapter carefully before beginning installation.

2.1 Hardware Overview

A complete 1AR Rogowski Integrator Kit is comprised of the integrator and a 24Vdc, 240W power supply (sold separately) mounted on a DIN rail along with one Accuenergy RCTxx-1000 Rogowski coil (sold separately)

Dimensions:

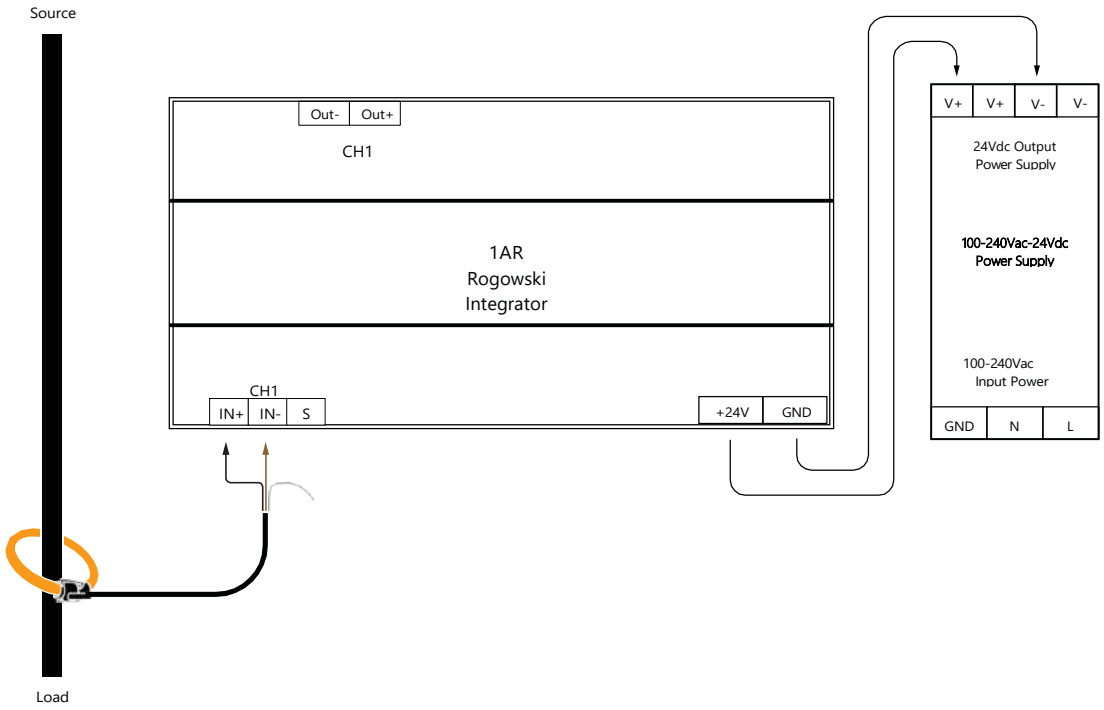


2.2 Installation

The following steps outline the installation process:

1. Connect a Rogowski coil CT (model RCTxx-1000 in any length) to the integrator
2. Wire the 1A output to the protection relay or power meter which will take the signal

The diagram below illustrates how to connect the integrator.



Input

The Rogowski coil provides the input to the integrator. Connect the Rogowski coil to the input channel on the integrator. Be sure to observe the correct wire polarity: the white lead is positive (+) and the brown lead is negative (-).

- Connect the white lead to 'IN+' and the brown lead to 'IN-'. The Shield of the Rogowski coil should be left floating.
- Open the coil by pulling apart the black connector of the CT.
- Install the CT around the conductor to be measured. Verify the CT is installed with the CT facing the same direction as the current flow direction as indicated by the arrow on the black connector.
- Connect the coil back together.

Output

Connect the output channel to the protection relay or the 1A current input on the power meter.

- The 'OUT+' is to be connected to the positive current terminal of the relay/meter.
- The 'OUT-' is to be connected to the negative current terminal of the relay/meter.

Power Supply

The RIK-1AR requires 24Vdc, 240W to operate. The Accuenergy PSU-240-24 power supply requires a 100-240Vac (50/60Hz) input and outputs 24Vdc to power the Integrator.

- Connect the input power supply that is between 100-240Vac to the 'L' and 'N' terminals of the power supply.
- Connect the V+ and V- of the power supply to the +24Vdc and GND terminals of the Integrator.

2.3 Configuration

The face of the integrator has a set of dip switches that are used to configure the current range for the current channel. When the dip switch is in the up position, the dip switch is ON. When the dip switch is in the down position, the dip switch is OFF.

Configure the channel dip switch to output the desired range. For example, to measure current rated for 500A, the dip switches 1 through 5 must be configured to 'OFF', 'OFF', 'ON', 'OFF', 'OFF'. The table below outlines the position of the dip switches for the desired current ranges.

Table 1 - Current Ratio Table

	1	2	3	4	5
50:1A	ON	OFF	OFF	OFF	OFF
200:1A	OFF	ON	OFF	OFF	OFF
500:1A	OFF	OFF	ON	OFF	OFF
2000:1A	OFF	OFF	OFF	ON	OFF
5000:1A	OFF	OFF	OFF	OFF	ON

2.4 Measurements

For each current range, the Integrator will be able to measure the current from 0.5% up to 2000% of the rated current. When the integrator is configured to measure a current rated for 500A, it will measure the current from 2.5A to 10000A.

The table below provides all the ranges of current that can be measured for each range.

Table 2 - Current Range Configurations

Primary Input (Arms)	Sensing Range (A)	Output	Relay Class Output	CT Ratio
50	0.25 to 1000	1A @ 50A	20A @ 1kA	50:1A
200	1 to 4000	1A @ 200A	20A @ 4kA	200:1A
500	2.5 to 10000	1A @ 500A	20A @ 10kA	500:1A
2000	10 to 40000	1A @ 2000A	20A @ 40kA	2000:1A
5000	25 to 100000	1A @ 5000A	20A @ 100kA	5000:1A

Appendix

Table 3 - Key Specifications

SPECIFICATIONS	
Current Range	0.25A – 100000A
Range	50A, 200A, 500A, 2000A, 5000A rated input (field configurable)
Output	0-1A
Nominal Current	1A
Accuracy	1% at 1A, 5% at 20A
Accuracy Limit Factor (ALF)	20
Phase Maximum Error	1 degree
Power Requirements	24Vdc, 240W
Class	5P20 (IEC 61869-2)
Continuous Thermal Current	150% (1.5A)
Short-Time Thermal Current	20A
Short-Time Thermal Current Maximum Duration	4 seconds
Setting Time to Full Scale	<100µs
Operating Temperature	-25°C to 70°C / -13°F to 158°C
Overload Protection	Thermal
Operating Humidity	Non-condensing, 0 to 95% RH
Mounting	DIN TS-35/7.5 or 15 (DIN 43880) or Panel
Measurement Channels	1
Frequency Range	50/60Hz
Impedance/Burden	0.25Ω
Nominal Current	1A
Full Scale Maximum Error	1% @ 1A, 5% @ 20A
Certifications	UL Listed (E359521), CE Mark

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