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www.phoenixcontact.com

Product range
• Cables and connectors
• Connectors
• Controllers and PLCs
• Electronic reversing contactors and motor controls
• Electronics housing
• Ethernet networks
• Fieldbus components and systems
• Functional safety
• HMIs and industrial PCs

• I/O systems
• Industrial communication technology
• Industrial lighting
• Installation and mounting material
• Marking and labeling
• Measurement and control technology
• Modular terminal blocks
• Monitoring
• PCB terminal blocks and PCB connectors
• Power-supply units and UPS

• Protective devices
• Relay modules
• Sensor cables and connectors
• Software
• Surge protection devices
• System cabling for DCS and PLC
• Tools
• Wireless data communication

PACT-RCP
Rogowski coil solution
The new split-core current transformer alternative
The Rogowski coil solution

Designed for retrofit installations of current measuring equipment onto existing wires and busbars

The system consists of three main components:

1. Open-ended Rogowski coil
2. Measuring transducers with 0-1 A CT output or standard analog outputs (4-20 mA/0-10 V)
3. Mounting provisions for wires and busbars

A Rogowski coil is a flexible rope-styled current transformer (CT) designed as a loop that can be separated to facilitate installation on an existing busbar or wire. Our Rogowski coil solution measures alternating currents in eight ranges: from 0-100 A to 0-4000 A.

Rogowski kits offer CT replacement and analog output options

One part for multiple applications

Forget fixed-ratio CTs — select the DIP switch for the desired range from 0-100 A to 0-4000 A.

Standard analog outputs

Custom ranges (0-10 V, 4-20 mA, etc.) are configurable via PC or NFC with free MINI Analog Pro app.

Slim 6.2-mm housing

Space-saving 6.2-mm housing with 3 kV isolation rating.

One-piece design with bayonet latch

No screws, bolts, or tools required.

Eight current ranges

0-100A, 0-250A, 0-400A, 0-630A, 0-1000A, 0-1500A, 0-2000A, 0-4000A

Unique Rogowski coil solution features

Unique busbar clamp

The clamp ensures that the Rogowski coil can be securely installed on a busbar.

Mounting steps

Coil can be rotated by 15-degree steps to avoid contact with adjacent busbars.

Tool-free installation

The thumbwheel allows for quick installation, without tools.

0-1 A CT output

Module output is a true 0-1 A signal with all phase information present — to energy meter, output is the same as a 0-1 A CT.

Three coil lengths

Three lengths fit a wide variety of busbar and wire sizes.
EMpro and Rogowski solutions
Unlock the potential of efficiency gains

Energy monitoring = cost reductions
Monitoring and managing energy consumption has many benefits, for you and for the environment. In the United States, there has been a push to implement Energy Management Systems (EMS) into the facilities we use every day. The focus has traditionally been on building automation; however, a new trend is on the rise: monitoring energy consumption at the machine level.

Natural allies
Good energy management practices and reliability improvement work together. To fully achieve the ultimate goals of efficiency, reliability, and environmental excellence, incorporating energy meters like Phoenix Contact’s EMpro solution is a necessity.

EMpro energy meters offer many unique configuration and communications options, providing a flexible and scalable choice for your energy monitoring needs. Our Rogowski coil solutions make integrating these meters on existing equipment a snap.

Applications
The Rogowski solution is intended for applications requiring a retrofit current-monitoring solution. The standard analog output or the 0-1A CT output enables you to use this solution practically anywhere – the flexibility of the device and the busbar clamp enable the Rogowski coil to be mounted on switchgear, in tight cabinets, and on conductors anywhere in the system.

Typical uses:
• Manufacturing
• Utility
• Switchgear
• Agriculture
• Office buildings
• Commercial spaces

Rogowski principle and technical advantages
A Rogowski coil is formed by winding wire around a flexible, non-ferrous core. The outside of the core is wound similar to a transformer, but the return lead is then fed back through the core. It is a coil constructed in a linear fashion. This allows the device to be flexed around a conductor and into a circle. The open-ended design and the flexibility of the coil’s core make the Rogowski coil easy to apply to existing conductors.

Once the coil is placed around the desired conductor, the alternating current flowing through it creates a magnetic field, which then induces a small voltage in the Rogowski coil. The voltage is typically fed into an integrator to make the signal more usable.

An integrator circuit will “translate” the signal into an instantaneous value that is in phase with and proportional to the primary current. Because all phase information is preserved, no power information is sacrificed to take advantage of the Rogowski coil’s many benefits.

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Machine-level monitoring
Along with squeezing out the last inefficiencies in their systems, monitoring also helps operators improve the reliability of processes by providing detailed information on a machine’s performance. This reduces maintenance and operating costs by identifying issues before they become problems and by optimizing the machine’s energy consumption. Even a small gain in energy efficiency can make a significant impact on the bottom line: spending less on energy ultimately translates into real dollar savings.

Rogowski-coil advantages as opposed to iron-core CTs:
• Linear output – one coil design can be used for small to very large currents
• Cannot become magnetically saturated – not damaged by short-circuit events
• Responds to changes in current very rapidly – accurately captures transients and bursts
• Excellent frequency response – transmits harmonic components accurately
• Less material required – compact size makes it flexible, lightweight, and easy to handle
• Safe open-circuit voltage – no shock hazard for personnel
• High interference rejection – adjacent conductors have no effect on the measured conductor

Energy efficiency
Costs

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Unlock the potential of efficiency gains

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Energy efficiency
Costs
Product overview: EMpro energy meters

The DIN rail adapter enables EMpro MA600 and EMpro MA400 built-in devices to also be mounted on the DIN rail.

Order No.: 2903078
Type: EEM-MKTRA

<table>
<thead>
<tr>
<th>EMpro MA600</th>
<th>EMpro MA400</th>
<th>EMpro MA250</th>
<th>EMpro MA200</th>
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<tbody>
<tr>
<td>Description</td>
<td>EEM-MA600</td>
<td>EEM-MA400</td>
<td>EEM-MA250</td>
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<tr>
<td>Order number</td>
<td>2903166</td>
<td>2903164</td>
<td>2903163</td>
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<td>Description</td>
<td>EEM-MA200</td>
<td>EEM-MA150</td>
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<tr>
<td>Order number</td>
<td>2903167</td>
<td>2903162</td>
<td></td>
</tr>
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</table>

- **Currents**:
  - I1, I2, I3 (max. 100 A)
  - I1, I2, I3 (calculation)
  - Maximum values
  - Mean values
  - Current measurement
  - Directly current transformer
  - Via current transformer
  - Via current transformer

- **Voltages**:
  - U1, U2, U3, V1, V2, V3
  - Maximum values, mean values
  - Voltage measurement via voltage transducer
  - Voltage measurement, direct (AC)

- **Frequency**:
  - f
  - Up to 700 V
  - Up to 500 V
  - Up to 500 V
  - Up to 500 V

- **Power**:
  - P, Q, S per phase (±)
  - Maximum values P, Q, S
  - Mean value P, Q, S

- **Power factor**:
  - ΣPF, PF per phase

- **Harmonics**:
  - THD U in %
  - Up to 3rd harmonic
  - Up to 5th harmonic
  - Up to 5th harmonic
  - Up to 5th harmonic

- **Trend power**:
  - Mean values

- **Inputs & Outputs**:
  - 2 digital inputs/outputs
  - 2 analog outputs
  - 2 pulse outputs
  - 1 pulse output or 1 threshold value

**Description**
- EMpro MA600
- EMpro MA400
- EMpro MA250
- EMpro MA200

**Order number**
- 2903166
- 2903164
- 2903163
- 2903162

**Voltage ranges**
- 0-10 V / 4-20mA; other configurations possible
- 0 … 1 A AC (true sine wave)

**Power supply requirements**
- 9.6 V DC ... 30 V DC; 1 W
- 19.2 V DC ... 30 V DC; 4 W

**Ambient temperature (operation/storage)**
- -40°C to +70°C/-40°C to +85°C
- -20°C to +70°C/-25°C to +85°C

**Frequency range**
- 10 Hz ... 5000 Hz

**Position error**
- < 1% (when at right angle to conductor)

**Rated insulation voltage (bare conductors)**
- 1000 V AC (see CAT II); 600 V AC (see CAT III)

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- 1000 V AC (see CAT II); 600 V AC (see CAT III)

**Maximum transmission error**
- ≤ 0.5% (of final range value)
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**Technical data for output modules**

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<th>Measuring ranges (set via DIP switch)</th>
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**BUS interface**
- 1000 V AC (see CAT II)
- 600 V AC (see CAT III)

**Lead length (coil to transducer)**
- 3 meters

**Sizing chart**

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<tr>
<th>Busbar size</th>
<th>Diameter</th>
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<tr>
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</tr>
<tr>
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<td>7 1/2&quot;</td>
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**Special function modules (optional)**

- Memory (512 KB)
- Ethernet with integrated web server
- RS-485/Ethernet gateway with integrated web server

**Product overview: PACT RCP current transformers for retrofitting**

Current transformers for retrofit applications

Set includes Rogowski coil and measuring transducer

**Screw connection**

- Description: PACT RCP-4000A-L90-DS5
- Order number: 2906232
- Length: 300 mm

- Description: PACT RCP-4000A-L90-DS10
- Order number: 2906233
- Length: 600 mm

**Push-in (PT) connection**

- Description: PACT RCP-4000A-L90-FT20
- Order number: 2906234
- Length: 300 mm

- Description: PACT RCP-4000A-L90-FT30
- Order number: 2906235
- Length: 600 mm

**Accessories**

- Description: Busbar clamp (10-15 mm)
- Order number: 2906236
- Length: 450 mm

**Technical data for Rogowski coil**

- Frequency range: 10 Hz ... 5000 Hz
- Position error: < 1% (when at right angle to conductor)
- Rated insulation voltage (bare conductors): 1000 V AC (see CAT II); 600 V AC (see CAT III)
- Ambient temperature (operation/storage): -30°C to +80°C/-40°C to +90°C
- Lead length (coil to transducer): 3 meters

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