2025

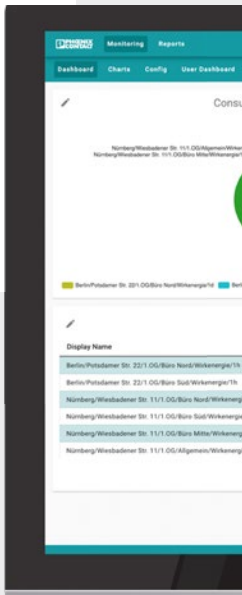
Energy monitoring

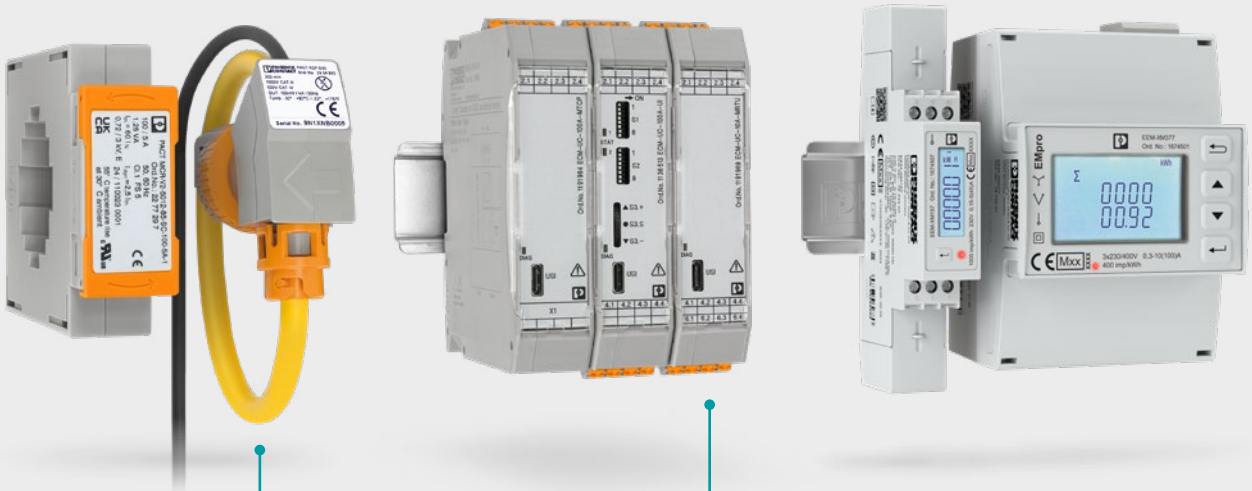
Current transformers, current and voltage measuring technology, energy and power measuring technology, energy management software

PHOENIX CONTACT

Products and services for monitoring your energy

Energy efficiency is a real economic success factor. And therefore, an energy management system must be easy to implement. Our innovative and coordinated portfolio of sensors and measuring technology can save you a great deal of effort when it comes to energy data acquisition. Future-oriented communication solutions and digital services help you to integrate, manage, and process your data.





1 Current transformers

Conversion of high AC currents into the typical secondary currents of 0 to 1 A and 5 A AC.

- Window-type, bus-bar, and winding current transformers
- Current transformers for retrofitting based on the Rogowski coil
- Split-core current transformers for retrofitting

› More information starting on page 4

2 Current and voltage measuring technology

Measurement of AC, DC, and distorted currents as well as AC and DC voltages.

- Current measuring transducers
- Voltage measuring transducers

› More information starting on page 14

4 Energy management software

Local or location-independent visualization and analysis of energy data in accordance with ISO 50001.

- Energy Management Service – On-Premises
- Energy Management Service – Powered by Proficloud.io

› More information starting on page 38

3 Energy and power measuring technology

Capture energy data and communicate it to higher-level control and management systems.

- AC and DC energy meters for billing purposes
- Multifunctional energy measuring devices

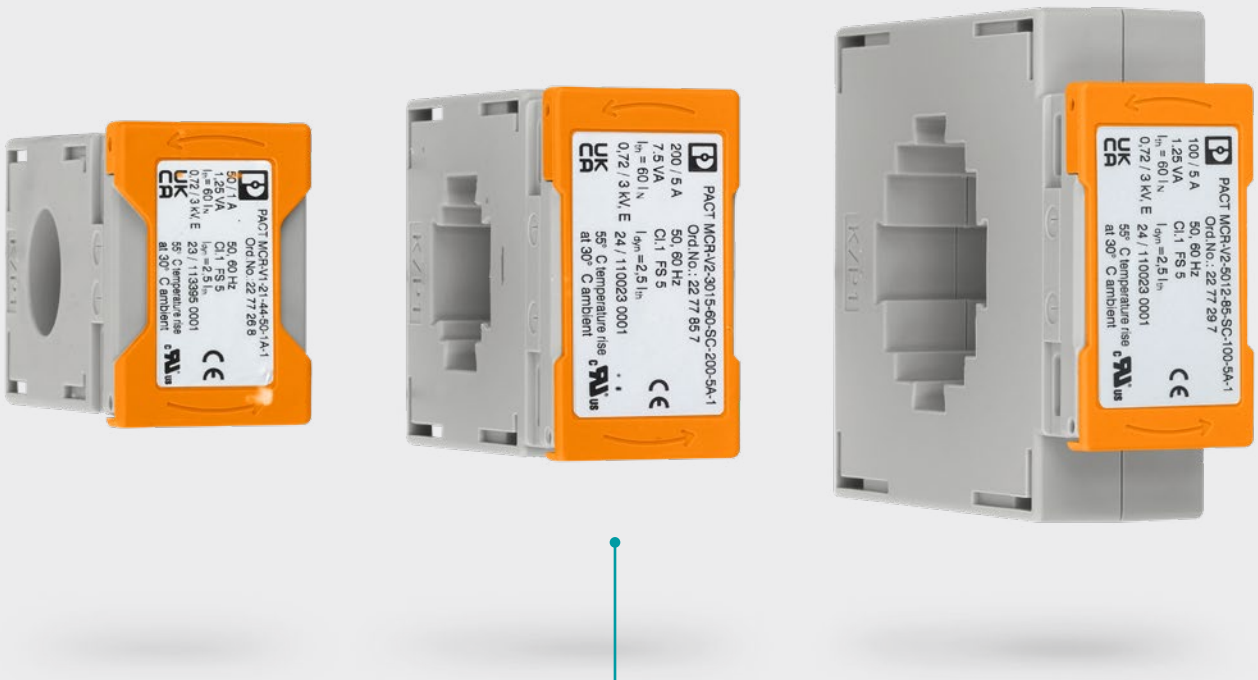
› More information starting on page 24

Contents

Current transformers

1

Our PACT current transformers offer a comprehensive portfolio for new installations for converting high currents into low secondary currents. PACT RCP Rogowski coils and PACT SPC split-core current transformers facilitate the retrofitting of new measuring points in existing systems. The direct connection of the current sensors to our EMpro energy measuring devices is especially practical.

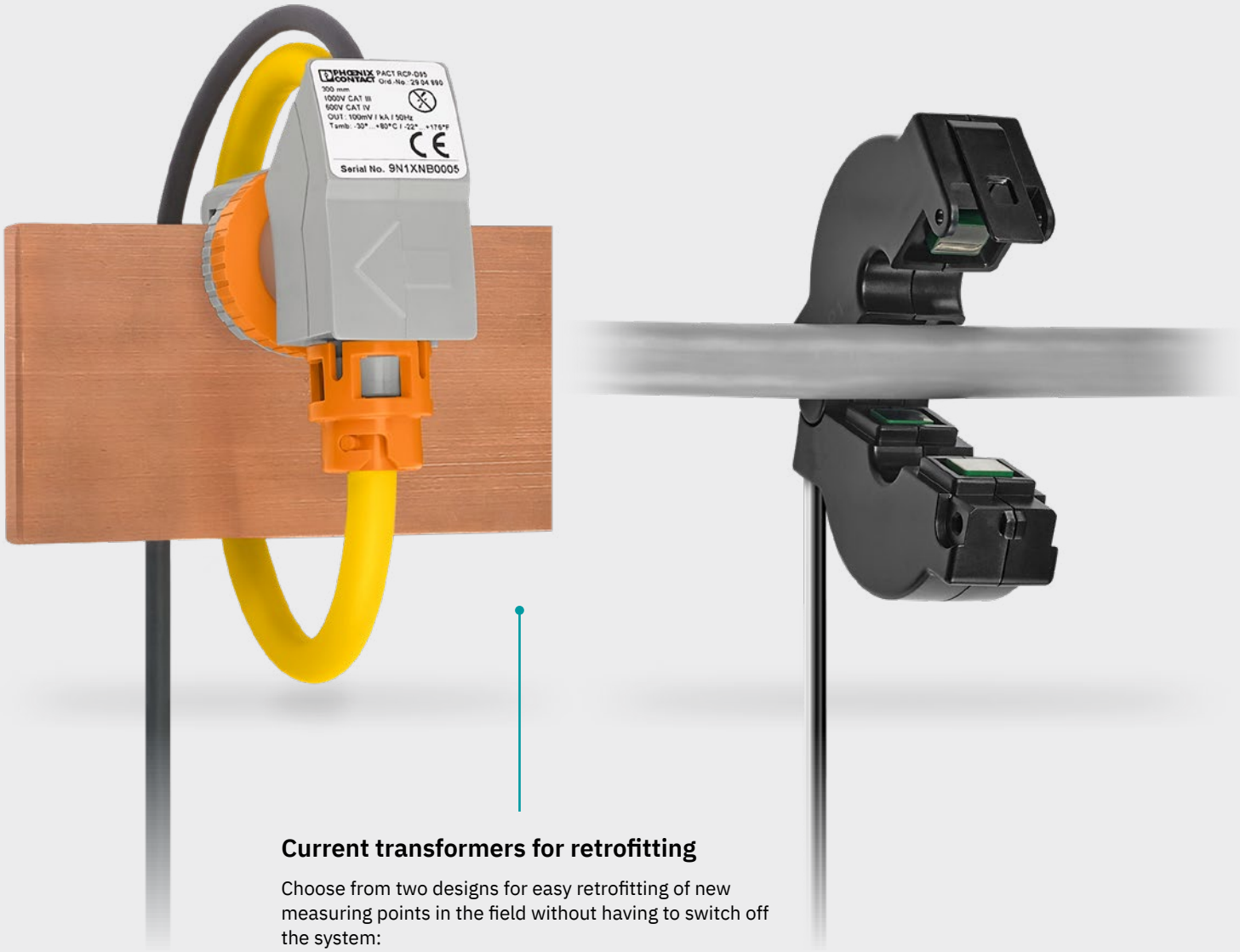


Current transformers for new installations

PACT current transformers offer a comprehensive product range for converting currents of up to 4,000 A AC into secondary currents of 1 A AC and 5 A AC.

- Window-type current transformers
- Bus-bar current transformers
- Winding current transformers

› More information starting on page 6



Current transformers for retrofitting

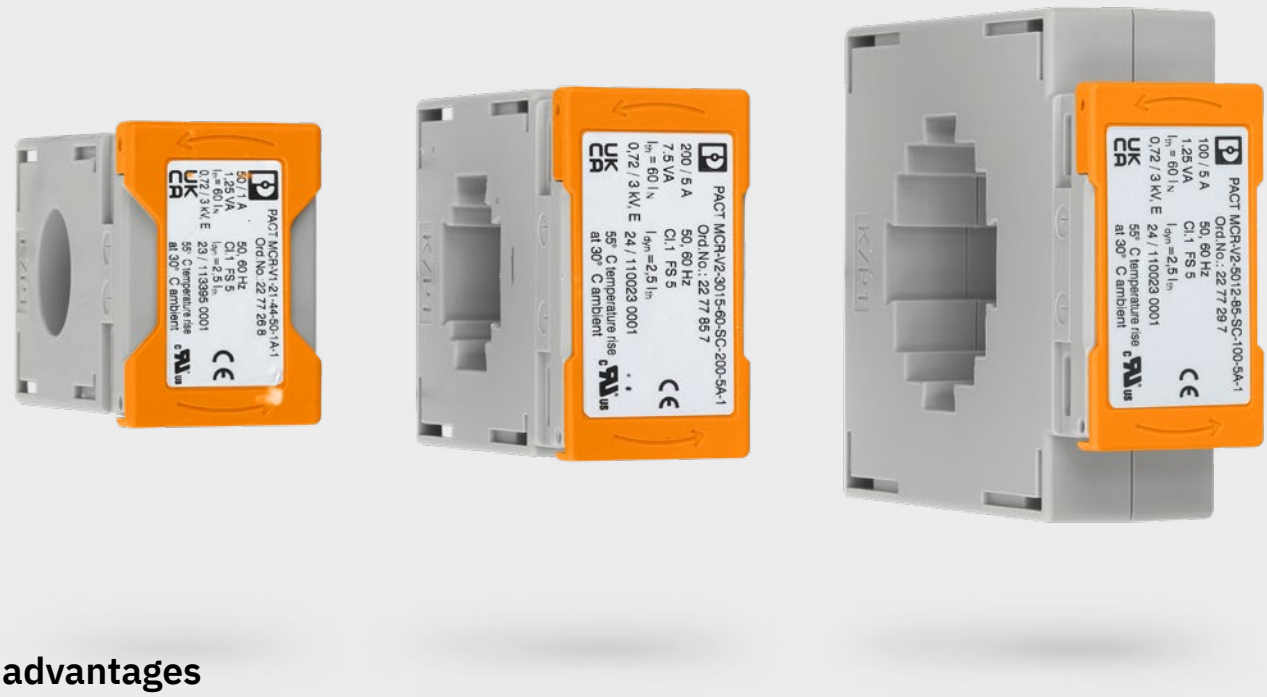
Choose from two designs for easy retrofitting of new measuring points in the field without having to switch off the system:

- Current transformers based on the Rogowski coil, with downstream measuring transducer for currents up to 4,000 A AC
- Split-core current transformers for circular conductors with currents up to 100 A AC

› More information starting on page 10

Current transformers for new installations

PACT current transformers offer a complete product family for converting alternating currents up to 4,000 A into secondary currents of 1 A and 5 A. Depending on the requirements, bus-bar, window-type, and winding current transformers are available.
PACT current transformers come in a range of different transformation ratios, accuracy classes, and rated powers for your current measuring tasks.



Your advantages

- Protection against destruction: short-circuiting of the transformer by rotating the terminal cover 90°
- Variable mounting with flexible mounting options
- Detect peak loads reliably with a thermal nominal continuous current that is 120% of the primary rated current
- Increased electrical safety with high rated insulation voltages up to 1,000 V (L-N)

Your advantages in detail

Protection against destruction

All terminal points are made immediately accessible by rotating the captive terminal cover 90°.

At the same time, the current transformer is electrically short-circuited to protect it from damage if all conductors are removed on the secondary side during operation (open mode).

Variable mounting options

PACT current transformers come with various mounting options:

- Installation directly on the busbar with the included accessories
- Screw connection on a mounting panel via the plug-on feet included
- Mounting on DIN rails with snap-in adapters available as an option

Safe detection of current peaks

PACT current transformers enable you to safely detect larger current peaks without the risk of damage.

The products are designed for a continuous nominal current that is 120% of the primary rated current strength. So for a rated current that is 1.2 times greater, a PACT current transformer with 10 VA delivers a rated power of 14.4 VA on a continual basis.

Comparison of operating voltages

The housing panels of PACT MCR current transformers have a 14 mm overlap, thus offering better electrical safety than required by the standard.

These overlaps significantly increase the air clearances and creepage distances, thereby preventing electrical sparkover from the primary side to the secondary side.

The rated insulation voltage of conventional 720 V transformers is just 416 V (L-N). PACT MCR current transformers enable a maximum rated insulation voltage of up to 1,000 V (L-N).

		
	EN 61869 (transformer standard)	**PACT MCR-V-...**
Rated insulation voltage (operating voltage)	480 V (L-L)	277 V (L-N)
	720 V (L-L)	416 V (L-N)
	1000 V (L-L)	577 V (L-N)
	–	**1000 V (L-N) PACT**
Impulse withstand voltage for transformer testing		
– At 277 V (L-N)	3 kV	6 kV
– At 1000 V (L-N)	6 kV	12 kV PACT

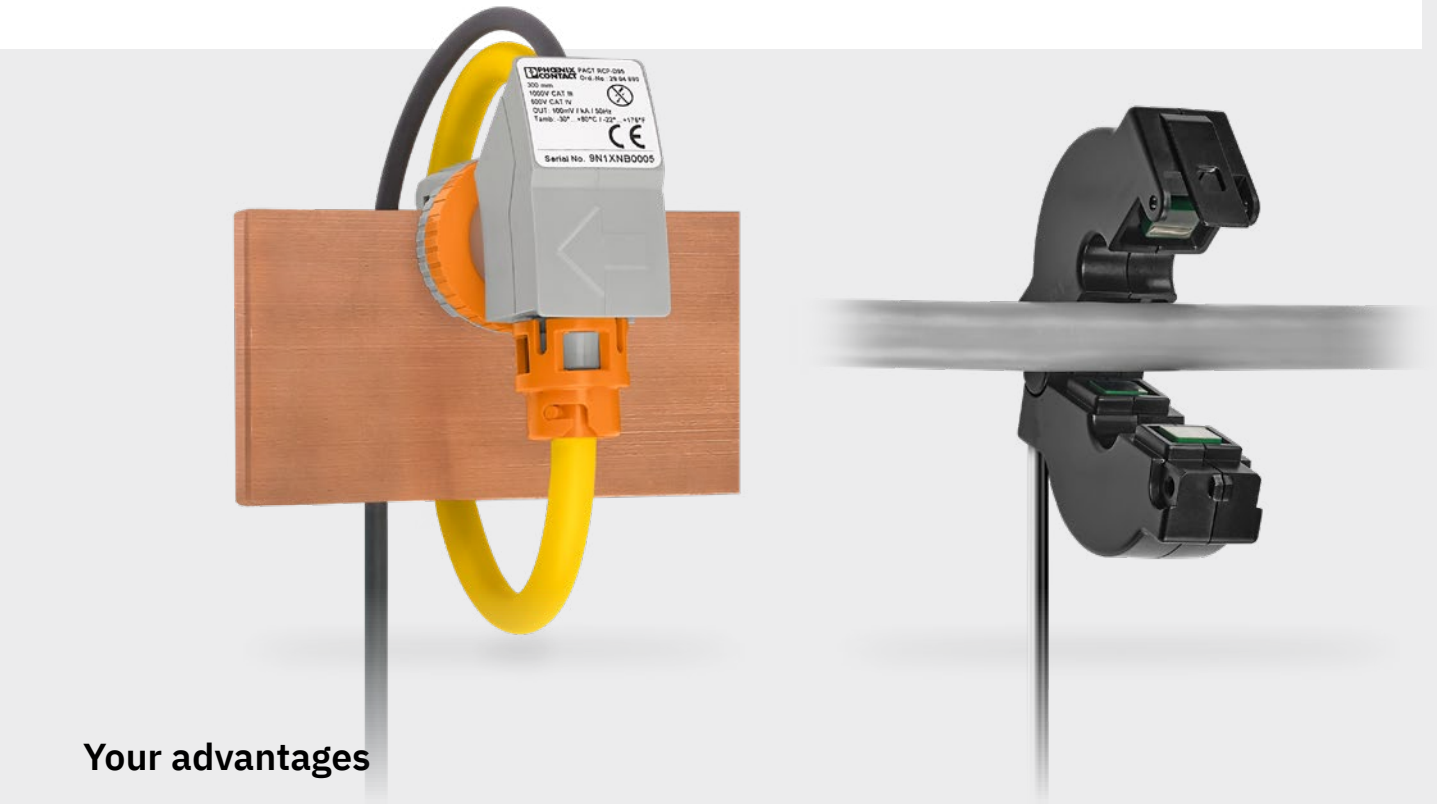
Product overview: Current transformers for new installations

PACT current transformers		
		
Description	**Winding current transformer**	**Bus-bar current transformer**
Primary rated current	0 ... 1 A AC 0 ... 2 A AC 0 ... 5 A AC 0 ... 10 A AC 0 ... 15 A AC 0 ... 20 A AC 0 ... 25 A AC 0 ... 30 A AC 0 ... 40 A AC	0 ... 50 A AC 0 ... 75 A AC 0 ... 100 A AC 0 ... 125 A AC 0 ... 150 A AC 0 ... 200 A AC 0 ... 250 A AC 0 ... 300 A AC 0 ... 400 A AC
Secondary rated current	1 A AC / 5 A AC	
Accuracy class	0.5 / 1	
Frequency range	50 Hz / 60 Hz	
Circular conductor dimensions		20 mm
Connection method	Screw connection	
Item no.	2277417	2277268

PACT current transformers					
					
Description	**Window-type current transformer**				
Primary rated current	0 … 60 A AC 0 … 80 A AC 0 … 100 A AC 0 … 125 A AC 0 … 150 A AC 0 … 200 A AC 0 … 250 A AC 0 … 300 A AC 0 … 400 A AC 0 … 500 A AC 0 … 600 A AC 0 … 750 A AC	0 … 100 A AC 0 … 150 A AC 0 … 200 A AC 0 … 250 A AC 0 … 300 A AC 0 … 400 A AC 0 … 500 A AC 0 … 600 A AC 0 … 750 A AC 0 … 800 A AC 0 … 1000 A AC	0 … 100 A AC 0 … 150 A AC 0 … 200 A AC 0 … 250 A AC 0 … 300 A AC 0 … 400 A AC 0 … 500 A AC 0 … 600 A AC 0 … 750 A AC 0 … 800 A AC 0 … 1000 A AC 0 … 1250 A AC 0 … 1500 A AC	0 … 200 A AC 0 … 300 A AC 0 … 400 A AC 0 … 500 A AC 0 … 600 A AC 0 … 750 A AC 0 … 800 A AC 0 … 1000 A AC 0 … 1250 A AC	0 … 800 A AC 0 … 1000 A AC 0 … 1500 A AC 0 … 2000 A AC 0 … 2500 A AC 0 … 3000 A AC 0 … 4000 A AC
Secondary rated current	1 A AC / 5 A AC				
Accuracy class	0.5 / 1				
Frequency range	50 Hz / 60 Hz				
Circular conductor dimensions	28 mm	33 mm	42 mm	52 mm	85 mm
Rail dimensions	30 mm x 15 mm 20 mm x 20 mm	40 mm x 12 mm 30 mm x 10 mm	50 mm x 12 mm 40 mm x 10 mm	60 mm x 15 mm 50 mm x 10 mm 40 mm x 40 mm	100 mm x 10 mm 80 mm x 64 mm
Connection method	Screw connection				
Item no.	2277271	2277284	2277297	2277336	2277378

Current transformers for retrofitting

Use the PACT RCP Rogowski coil to capture alternating currents up to 4,000 A and convert them into a secondary current or a standard analog signal, depending on the type of downstream measuring transducer. PACT SCP split-core current transformers allow you to quickly retrofit additional measuring points for smaller currents up to 100 A. The direct connection of the output signal to our EMpro energy measuring devices is especially practical.



Your advantages

- Quick retrofitting of new measuring points without disconnecting electrical conductors
- Practical direct connection to all EMpro energy measuring devices with 0 ... 1 A AC current input
- Space-saving due to the compact design
- Secure fit on rails and circular conductors due to professional mounting options
- Suitable for any application due to the various measuring ranges

Your advantages in detail

Compact, safe, and flexible

Capture currents up to 4,000 A AC in the frequency spectrum from 40 to 20,000 Hz using a single compact coil type.

Measure harmonics and transients with phase accuracy, without magnetic saturation or dangerous open-circuit voltages.

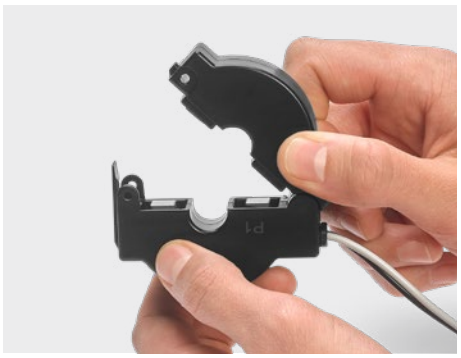
The optional holding device ensures the Rogowski coil is securely seated on busbars.

Eight current measuring ranges

The downstream measuring transducer offers eight current measuring ranges from 0 ... 100 A to 0 ... 4,000 A AC. On the secondary side, a secondary current of 0 ... 1 A AC is output.

Simply select the appropriate current measuring range using the DIP switch.

For optimum measuring accuracy, set the length of the Rogowski coil used using the potentiometer on the measuring transducer.



Ideal for currents up to 100 A AC

For quick retrofitting, the PACT SPC split-core current transformers can be positioned around conductors up to 13 mm in diameter by simply opening the housing.

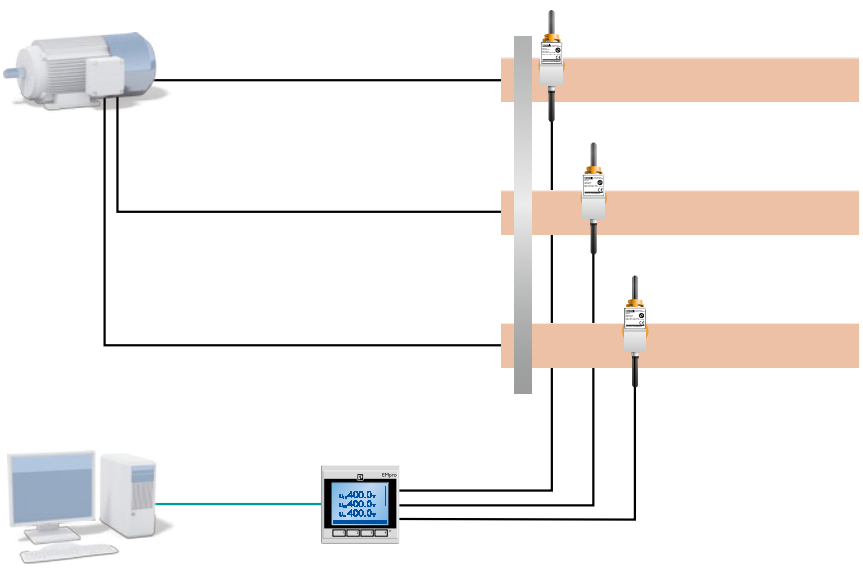
Three versions cover the current measuring ranges from 0 to 20, 50 or 100 A AC and output 0 to 1 A AC on the secondary side.

Optimum interaction with our EMpro energy measuring devices

Some EMpro energy measuring devices have an mV input so that you can connect the PACT RCP Rogowski coils directly.

Benefit from high measuring accuracy and very easy configuration.

When the coil is connected, the respective phase can be inverted by the firmware if needed. It is no longer necessary to rewire the two conductors.



Central energy data acquisition with a PACT RCP Rogowski coil and an EMpro energy measuring device

Product overview: Current transformers for retrofitting

PACT RCP current transformers for retrofitting							
							
Product type	**Current transformer**						
Description	Rogowski coil and measuring transducer for energy measurement						
Primary rated current	0 … 100 A AC 0 … 250 A AC 0 … 400 A AC 0 … 630 A AC 0 … 1000 A AC 0 … 1500 A AC 0 … 2000 A AC 0 … 4000 A AC						
Accuracy class	Rogowski coil: 0.2 (IEC 61869-10: A1)						
Typical measuring error	<1%						
Output signal	0 … 1 A AC						
Length of measuring coil	300 mm			450 mm		600 mm	
Length of signal line	3 m	5 m	10 m	3 m	10 m	3 m	10 m
Connection method	Screw connection						
Item no.	2904921	2910325	2910326	2904922	1033483	2904923	2910327

PACT RCP current transformers for retrofitting		
		
Product type	**Current transformer**	
Description	Rogowski coil and measuring transducer for current measurement	
Primary rated current	0 … 100 A AC 0 … 250 A AC 0 … 400 A AC 0 … 630 A AC 0 … 1000 A AC 0 … 1500 A AC 0 … 2000 A AC 0 … 4000 A AC	
Accuracy class	Rogowski coil: 0.2 (IEC 61869-10: A1)	
Typical measuring error	<1%	
Output signal	0 … 20 mA / 4 … 20 mA / 0 … 10 mA / 2 … 10 mA / 0 … 21 mA / 0 … 10 V / 2 … 10 V / 0 … 5 V / 1 … 5 V / 0 … 10.5 V	
Length of measuring coil	300 mm	
Length of signal line	3 m	
Connection method	Screw connection	Push-in connection
Item no.	2906231	2906234

Product overview: Current transformers for retrofitting

PACT RCP Rogowski coils

							
Product type	**Rogowski coil**						
Description	Rogowski coil for current measurement, can be connected directly to energy measuring devices						
Frequency range	40 Hz ... 20000 Hz						
Accuracy class	0.2 (IEC 61869-10: A1)						
Output signal	100 mV AC (no load, at 1000 A AC)						
Length of measuring coil	300 mm			450 mm		600 mm	
Length of signal line	3 m	5 m	10 m	3 m	10 m	3 m	10 m
Item no.	2904890	2910322	2910323	2904891	1033482	2904892	2910324

Accessories

	Description	Item no.	Type
	The optional holding device ensures the Rogowski coil is securely seated on busbars with a thickness of 10 ... 15 mm. During installation, the coil housing is pushed onto the flange of the holding device and snaps in automatically.	2904895	PACT RCP-CLAMP
	The optional holding device ensures the Rogowski coil is securely seated on busbars with a thickness of 5 ... 10 mm. During installation, the coil housing is pushed onto the flange of the holding device and snaps in automatically.	2907888	PACT RCP-CLAMP-5-10

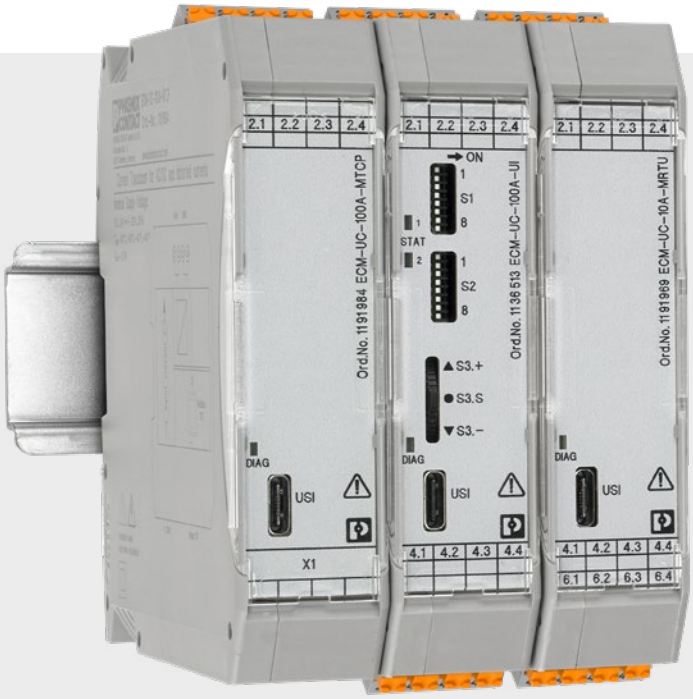
PACT SPC current transformers for retrofitting

			
Product type	**Current transformer**		
Description	Split-core current transformer for retrofitting		
Primary rated current	0 ... 20 A AC	0 ... 50 A AC	0 ... 100 A AC
Secondary rated current	0 ... 1 A AC		
Accuracy class	3	1	0.5
Frequency range	50 Hz / 60 Hz		
Circular conductor dimensions	13 mm		
Length of signal line	2 m	3 m	
Item no.	1382378	1382384	1382387

Current and voltage measuring technology

2

Use our current measuring transducers to measure direct and alternating currents of any waveform, as well as distorted alternating currents, and convert them into a standard analog signal. Our voltage measuring transducers capture DC voltages and sinusoidal AC voltages in various signal ranges and convert them into standard analog signals as well.



Current measuring transducers

Here you can find the right measuring transducer for capturing direct, alternating, and distorted currents:

- Current measuring transducers
  - With web-based management for currents up to 100 A AC/DC and distorted currents
  - For currents up to 600 A AC/DC and distorted currents
  - For currents up to 200 A AC and distorted currents
  - For currents up to 120 A AC
- Current monitors

› More information starting on page 16

Voltage measuring transducers

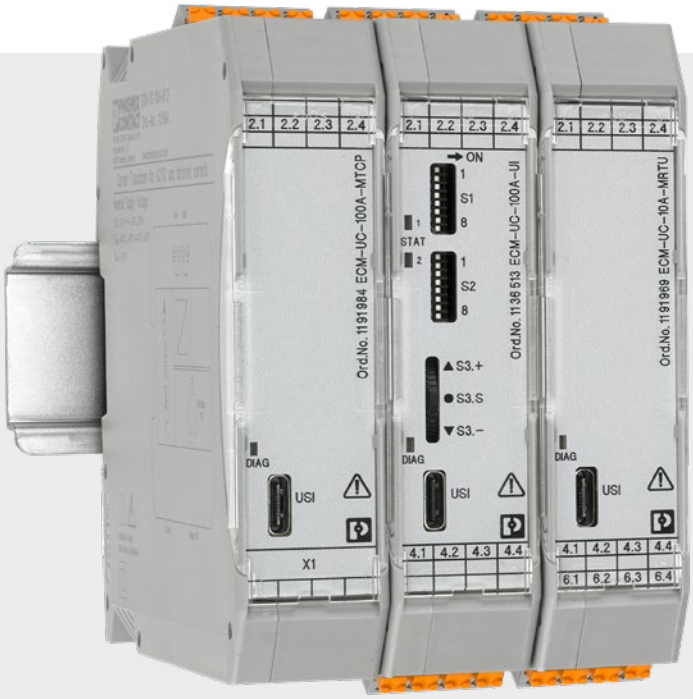
Choose the suitable measuring transducer for capturing direct and alternating voltages in various signal ranges:

- Voltage measuring transducers
  - For alternating voltages up to 660 V AC
  - For direct voltages up to 660 V DC
  - For direct voltages up to 1,500 V DC

› More information starting on page 22

Current measuring transducers for AC, DC, and distorted currents

With intuitive device configuration via web-based management and standard USB-C interface, ECM UC current measuring transducers save you a lot of time. The products feature high measuring accuracy with a measurement error of <0.5% in all measuring ranges from 0 to 100 mA up to 0 to 100 A. The Modbus versions enable digital further processing of the measured data.



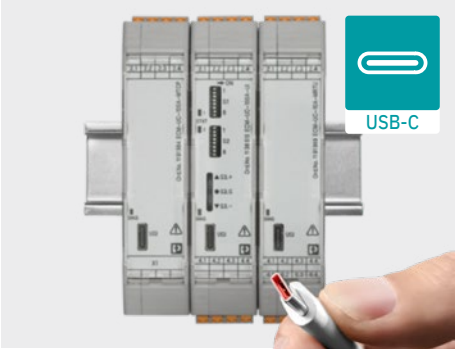
Your advantages

- Intuitive configuration and visualization of measured data via web-based management
- Easy connection to the PC via standard USB-C cable without additional 24 V supply
- Low measurement error of <0.5% in the measuring ranges from 0 to 100 mA up to 0 to 100 A
- Digital further processing of measured data with Modbus/RTU and Modbus/TCP versions
- Reliable even at temperatures from -40 to +60°C and installation altitudes of up to 4,000 m

Modbus RTU

Modbus TCP

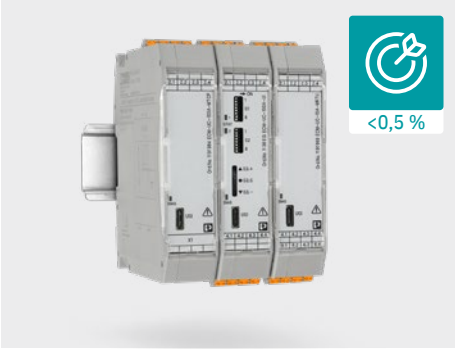
Your advantages in detail



Easy connection including power supply

PC connection is simply via a standard USB-C cable, without the need for special accessories.

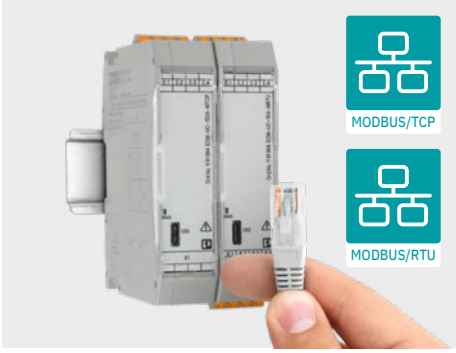
During configuration, data is transmitted and power is supplied to the device via the USB-C cable. An external 24 V DC supply is not required.



High measuring accuracy

For optimized AC current measurement, ECM UC current measuring transducers have four different frequency measuring ranges from 10 to 100 Hz to 10 to 1,000 Hz.

The devices deliver precise measurement results with a measurement error of <0.5% in all measuring ranges from 0 to 0.1 A up to 0 to 100 A.



Digital further processing of measured data

The ECM UC current measuring transducer portfolio includes devices with analog output signals as well as Modbus/RTU and Modbus/TCP digital interfaces.

To modify the configuration or to retrieve measured data, for example, simply address the current measuring transducers in the network via IP address. To evaluate them further, import the data as a CSV file.

Intuitive configuration via web-based management

Use-driven menu navigation

To make the desired settings for operation, simply connect the devices to the PC via the USB-C interface and open web-based management (WBM) in your chosen browser. This saves you the inconvenience of downloading software.

The intuitive menu navigation simplifies the settings on the device. In addition, the live measurement data of the currents, such as the AC and DC components, can be visualized simultaneously in different windows.

For fast startup of multiple measuring transducers with the same configuration, save the device settings in a JSON file and then simply import them into additional devices.

Product overview: Current measuring transducers for AC, DC, and distorted currents

Current measuring transducers for direct, alternating, and distorted currents								
								
Frequency range	**0 Hz / 10 Hz ... 100 Hz / 10 Hz ... 200 Hz / 10 Hz ... 500 Hz / 10 Hz ... 1000 Hz**							
Measuring range	0 ... 10 A AC / -10 ... 10 A DC				0 ... 100 A AC / -100 ... 100 A DC			
Output signal	0 ... 20 mA / 4 ... 20 mA / 20 ... 0 mA / 20 ... 4 mA / 0 ... 10 V / 0 ... 5 V / 1 ... 5 V / 2 ... 10 V / -10 ... 10 V / -5 ... 5 V / 10 ... -10 V / 5 ... -5 V / 10 ... 0 V / 5 ... 0 V				0 ... 20 mA / 4 ... 20 mA / 20 ... 0 mA / 20 ... 4 mA / 0 ... 10 V / 0 ... 5 V / 1 ... 5 V / 2 ... 10 V / -10 ... 10 V / -5 ... 5 V / 10 ... -10 V / 5 ... -5 V / 10 ... 0 V / 5 ... 0 V			
Switching output	Relay output: 1 changeover contact				Relay output: 1 changeover contact			
Supply voltage	9.6 V DC ... 30 V DC							
Communication protocol	WBM: Default address, USB-C interface		WBM: Default address, USB-C interface / Modbus/RTU interface configuration	WBM: Default address, USB-C interface / Modbus/ TCP interface configuration	WBM: Default address, USB-C interface		WBM: Default address, USB-C interface / Modbus/RTU interface configuration	WBM: Default address, USB-C interface / Modbus/ TCP interface configuration
Circular conductor dimensions					11 mm			
Degree of protection	IP20							
Maximum transmission error	0.5%							
Ambient temperature range	-40°C ... +60°C							
Delivery state	Standard configuration							
Connection method	Push-in connection							
Item no.	NEW 1698164	NEW 1136504	NEW 1191969	NEW 1191970	NEW 1698172	NEW 1136513	NEW 1191986	NEW 1191984

Current measuring transducers for currents up to 600 A AC/DC and distorted currents

MCR AC/DC current measuring transducers measure direct and alternating currents of any waveform, as well as distorted currents, and convert them into a standard analog signal.

Your advantages

- Space-saving due to the compact dimensions
- Variable mounting options
- Plug-in connection terminal blocks

Current measuring transducers for direct, alternating, and distorted currents

									
Frequency range	**20 Hz ... 6000 Hz**								
Description	3-way isolation, COMBICON connector for supply and output signal, max. cable diameter 32 mm								
Measuring range	0 ... 100 A AC/DC		0 ... 200 A AC/DC		0 ... 300 A AC/DC		0 ... 400 A AC/DC	0 ... 500 A AC/DC	0 ... 600 A AC/DC
Output signal	4 ... 20 mA	0 ... 10 V	4 ... 20 mA	0 ... 10 V	4 ... 20 mA	0 ... 10 V	4 ... 20 mA		
Supply voltage	20 V DC ... 30 V DC								
Degree of protection	IP20								
Maximum transmission error	<±1%								
Ambient temperature range	-40°C ... +65°C								
Delivery state	Unconfigured								
Connection method	Push-in connection								
Item no.	2308027	2308108	2308030	2308205	2308043	2308302	2308072	2308085	2308098

Product overview: Current measuring transducers for AC, DC, and distorted currents

Current measuring transducers for currents up to 200 A AC and distorted currents

Our MCR AC current measuring transducers capture alternating currents up to 200 A and convert them into a standard analog signal. The hinged Rogowski sensor is ideal for easy installation and retrofitting.

Your advantages

- Current measurement without shunt via Rogowski sensor
- Plug-in connection terminal blocks
- Variable mounting options

Current measuring transducers for alternating currents				
				
Frequency range	**30 Hz ... 6000 Hz**			
Description	Current measuring transducer for opening, max. cable diameter 18.5 mm			
Measuring range	0 ... 50 A AC / 0 ... 75 A AC / 0 ... 100 A AC		0 ... 100 A AC / 0 ... 150 A AC / 0 ... 200 A AC	
Output signal	0 ... 5 V / 0 ... 10 V	4 ... 20 mA	0 ... 5 V / 0 ... 10 V	4 ... 20 mA
Supply voltage	20 V DC ... 30 V DC	Loop-powered, no external supply necessary	20 V DC ... 30 V DC	Loop-powered, no external supply necessary
Degree of protection	IP20			
Maximum transmission error	<1%			
Ambient temperature range	-20°C ... +60°C			
Delivery state	Unconfigured			
Connection method	Screw connection			
Item no.	2813457	2813486	2813460	2813499

Current measuring transducers for currents up to 12 A AC

MACX MCR AC current measuring transducers capture sinusoidal alternating currents up to 12 A and convert them into a standard analog signal. The products are configurable and provide electrical isolation and a variable supply concept.

Your advantages

- Input and output signal set via DIP switch
- Versions with wide-range supply
- 24 V voltage bridging via the DIN rail bus connector

Current measuring transducers for sinusoidal alternating currents

			
Frequency range	**45 Hz ... 65 Hz**		
Description	3-way isolation, measuring range and output signal configurable	3-way isolation, measuring range and output signal configurable, wide-range supply for worldwide use	
Measuring range	0 ... 1 A AC / 0 ... 5 A AC		0 ... 5 A AC / 0 ... 12 A AC
Output signal	0 ... 20 mA / 4 ... 20 mA		
Supply voltage	19.2 V DC ... 30 V DC	19.2 V AC/DC ... 253 V AC/DC	
Degree of protection	IP20		
Maximum transmission error	≤0.5%		
Ambient temperature range	-20°C ... +65°C		
Delivery state	Unconfigured		
Connection method	Screw connection		
Item no.	2810612	2810625	2810638

Current measuring transducers for sinusoidal alternating currents

		
Frequency range	**45 Hz ... 60 Hz**	**45 Hz ... 65 Hz**
Description	Passive current measuring transducer for sinusoidal AC currents	Current monitor for sinusoidal AC currents. Through connection: Ø 4.2 mm
Measuring range	0 ... 1 A AC / 0 ... 5 A AC	0 ... 16 A AC
Output	0 ... 20 mA / 0 ... 10 V	Relay output: 1 changeover contact
Supply voltage		20 V DC ... 30 V DC
Degree of protection	IP20	
Maximum transmission error	<0.5%	
Ambient temperature range	-25°C ... +60°C	-20°C ... +65°C
Delivery state	Unconfigured	
Connection method	Screw connection	
Item no.	2814359	2864464

AC and DC voltage measuring transducers

MACX MCR voltage measuring transducers capture DC or AC voltages and convert them into standard analog signals. The MACX MCR-VDC measuring transducer captures DC voltages from 0 to ±660 V DC. The MACX MCR-VAC voltage measuring transducer captures sinusoidal AC voltages from 0 to 660 V AC. Eight finely graded voltage measuring ranges provide optimum measuring accuracy. The 3-way electrical isolation ensures high operational safety.

Your advantages

- Bidirectional output signals
- Optimum measuring accuracy with eight finely graduated voltage measuring ranges
- ZERO/SPAN adjustment ±20%
- High operational safety due to 3-way electrical isolation

Product overview: AC and DC voltage measuring transducers

Voltage measuring transducers				
				
Voltage type	**DC voltage**		**AC voltage**	
Description	Voltage measuring transducer for DC voltages up to ±660 V DC, ZERO/SPAN adjustment up to ±20%		Voltage measuring transducer for sinusoidal AC voltages up to 660 V AC, ZERO/SPAN adjustment up to ±20%	
Measuring range	-550 V DC ... 550 V DC / -370 V DC ... 370 V DC / -250 V DC ... 250 V DC / -170 V DC ... 170 V DC / -120 V DC ... 120 V DC / -80 V DC ... 80 V DC / -54 V DC ... 54 V DC / -36 V DC ... 36 V DC / -24 V DC ... 24 V DC		0 V AC ... 550 V AC / 0 V AC ... 370 V AC / 0 V AC ... 250 V AC / 0 V AC ... 170 V AC / 0 V AC ... 120 V AC / 0 V AC ... 80 V AC / 0 V AC ... 54 V AC / 0 V AC ... 36 V AC / 0 V AC ... 24 V AC	
Frequency range			15 ... 405 Hz	
Output signal	-20 ... 20 mA / 4 ... 20 mA / -10 ... 10 V / 2 ... 10 V		0 ... 20 mA / 4 ... 20 mA / 0 ... 10 V / 2 ... 10 V	
Supply voltage	19.2 V DC ... 30 V DC			
Degree of protection	IP20			
Maximum transmission error	<1%			
Ambient temperature range	-25°C ... +60°C			
Connection method	Screw connection	Push-in connection	Screw connection	Push-in connection
Item no.	2906242	2906243	2906239	2906244

Voltage measuring transducers		
		
Voltage type	**DC voltage**	
Description	Voltage measuring module	
Measuring range	0 V DC ... 1500 V DC (CAT III) / 0 V DC ... 1000 V DC (UL)	
Temperature coefficient	<0.01%/K	
Output signal	2 ... 10 V DC	
Supply voltage	21.6 V DC ... 30 V DC	
Internal current consumption	8 mA (typical) / 65 mA (maximum)	
Degree of protection	IP20	
Maximum transmission error	±1%	
Ambient temperature range	-20°C ... +70°C	
Connection method	Screw connection	
Items per packing unit	1	10
Item no.	2903591	1084352

Energy and power measuring technology

3

With our energy and power measuring technology portfolio, you can record all electrical values that are relevant for your energy monitoring. To ensure easy device installation and startup, we have focused in particular on user-friendliness and optimum interaction with the current sensors.

AC energy meters for billing purposes

EMpro AC energy meters with MID approval in accordance with 2014/32/EU enable cost center-specific energy data billing (submetering). They record all key parameters such as currents, voltages, power factors, powers, and energy values in all four quadrants.

› More information starting on page 28

DC energy meters for billing purposes

EMpro DC energy meters enable the direct measurement of currents and voltages up to 650 A/1,000 V DC for billing purposes. The tamper-proof design with data in OCMF format and the calibration log are ideal for use in charging infrastructure.

› More information starting on page 34

PV string monitoring

The SOLARCHECK PV string monitoring system provides reliable information on the status of your photovoltaic system. Detect power losses in individual lines, which may be caused by damaged panels or defective contacts and cabling, for example.

For more information on PV string monitoring, simply enter the web code into the search field on our website.

Web code: #1925

Multifunctional energy measuring devices

EMpro energy measuring devices capture your energy data and communicate it to higher-level control and management systems. These products can be configured and integrated into your network in minutes. The integrated REST (Representational State Transfer) interface and direct connection to the cloud pave the way to the digital world.

› More information starting on page 34

Energy and power measuring technology

Selection guide: Energy meters and energy measuring devices		
		Energy meters for billing purposes
		
Description	DC energy meter	Three-phase energy meter
Measurement method	Direct measurement	Direct measurement or current transformer
Maximum input current	650 A DC	100 A AC (direct measurement)
		Secondary: 1 A / 5 A Primary: <9999 A (via current transformer)
Input voltage range	150 V DC ... 1000 V DC	173 V AC ... 480 V AC (Ph/Ph) 100 V AC ... 277 V AC (Ph/N)
Accuracy	Class B	C (2014/32/EU) 0.5 (IEC 62053-21)
Supply voltage	24 V DC (-20% ... +50%)	Supply from the measuring circuit, 100 V AC ... 277 V AC (external), for measurement via current transformer
Communication protocol	SLIP	Modbus/RTU
		Modbus/TCP
Communication interfaces	2 x RS-485 (RJ12)	RS-485
		Ethernet (RJ45)
Special function		S0 output
Ambient temperature range (operation)	-40°C ... +80°C	-40°C ... +70°C
Dimensions (width)	107.2 mm (6 HP)	72 mm (4 HP)
Certification	Compliant with calibration laws	MID-compliant

	Multifunctional energy measuring devices		
			
AC energy meter	Front panel device	DIN rail device with display	DIN rail device without display
Direct measurement	Current transformer or Rogowski coil		
45 A AC	Secondary: 1 A / 5 A Primary: <20000 A (via current transformer)		
	Secondary: 400 mV Primary: <4000 A (via Rogowski coil)		
1 x 100 V AC ... 277 V AC	35 V AC ... 690 V AC (Ph/Ph) 20 V AC ... 400 V AC (Ph/N) 60 V AC ... 2,000,000 V AC (via external transformers)		
C (2014/32/EU) 0.5 (IEC 62053-21)	Active energy: Class 0.5 S (IEC 62053-22) / Class 1 (IEC 62053-21) Reactive energy: Class 2 (IEC 62053-23)		
Supply from the measuring circuit	100 V AC ... 400 V AC (±20%) / 150 V DC ... 250 V DC (±20%) / 18 V DC ... 30 V DC	100 V AC ... 230 V AC (±20%) / 150 V DC ... 250 V DC (±20%) / 18 V DC ... 30 V DC	
Modbus/RTU	Modbus/TCP		
	REST		
	Modbus/RTU	Modbus/RTU	
	PROFINET RT		PROFINET RT
	EtherNet/IP™		EtherNet/IP™
			MQTT (Proficloud)
RS-485	1 x RS-485	1 x RS-485	
	1 to 3 x Ethernet (RJ45)	1 x Ethernet (RJ45)	1 to 3 x Ethernet (RJ45)
S0 output	- Integrated web server: simple configuration, startup, and firmware updates - Grid quality analysis: harmonics, voltage dips and rises, min/max values - Customizable functions: mean-value generation, alerting, logging, tariff assignment - 1 DI and 1 DO: can be linked with functions and measured value acquisition		
-40°C ... +70°C	-25°C ... +70°C	-25°C ... +70°C	-25°C ... +70°C
18 mm (1 HP)	96 mm	90 mm (5 HP)	90 mm (5 HP)
MID-compliant	CE, UL	CE, UL	CE, UL

AC energy meters for billing purposes

EMpro AC energy meters with MID approval in accordance with 2014/32/EU enable cost center-specific energy data billing (submetering). The products record all key parameters such as currents, voltages, power factors, powers, and energy values in all four quadrants. The data is forwarded to your higher-level control system via standard communication interfaces.

Your advantages

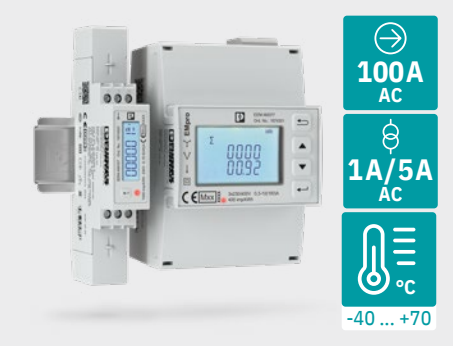
- Direct current measurement up to 100 A AC over the entire temperature range from -40 to +70°C
- Compliance with accuracy class C in accordance with EN 50470-3 and 0.5 in accordance with IEC 62053-21
- Easy, intuitive operation and reading via the backlit LCD display
- Simple bus and network connection via Modbus/RTU or Modbus/TCP interface
- Modbus registers based on EMpro multifunctional energy measuring devices

Modbus RTU

Modbus TCP

S0

Your advantages in detail

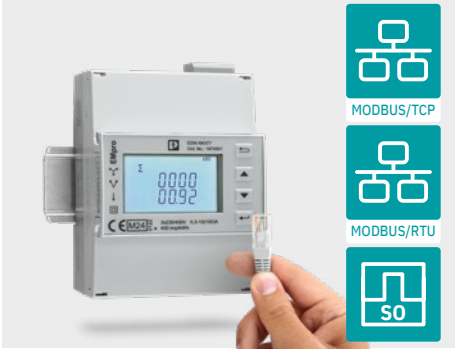


Direct current measurement up to 100 A AC

Currents up to 100 A AC can be measured directly over the entire temperature range from -40 to +70°C. The measurement input via current transformer can be configured for 1 A or 5 A current transformers, whereby the transformer ratio can be parameterized.

Compliance with accuracy class C

The energy meters satisfy class C in accordance with EN 50470-3 and class 0.5 in accordance with IEC 62053-21 and are suitable for increased requirements in the commercial and industrial sector.

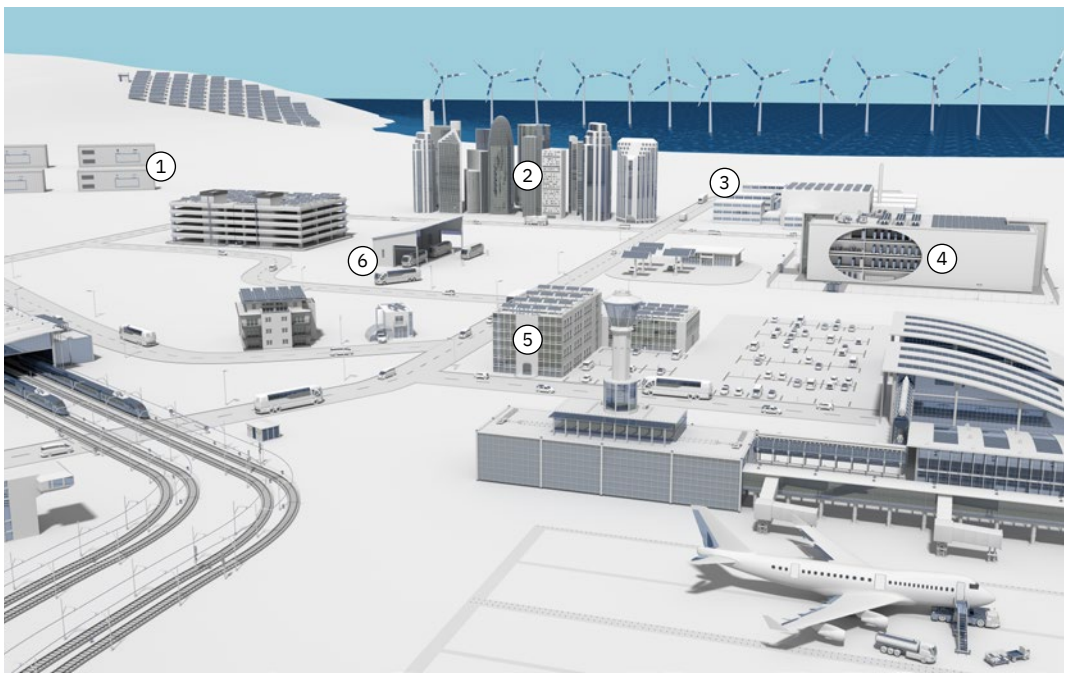


Easy bus and network connection

The data is forwarded to a higher-level control system via standard communication interfaces, such as Modbus/RTU or Modbus/TCP. The Modbus registers are based on the multifunctional EMpro energy measuring devices. So when it comes to energy measurement, Phoenix Contact products basically speak the same language.

Application examples for AC energy meters

The products can be used wherever cost center-specific energy data acquisition and billing is required.



1. **Storage**
   Store and draw energy as needed
2. **Public buildings**
   Energy management of buildings
3. **Company**
   Production machinery in manufacturing
4. **Data center**
   Transparency in data centers
5. **Hotels, shops, and restaurants**
   Individual billing between operator and landlord
6. **Charging infrastructure**
   E-mobility

DC energy meters for billing purposes

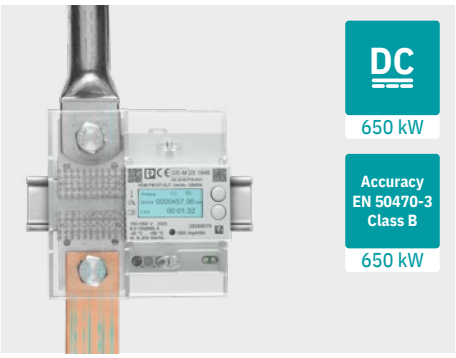
The space-saving EMpro DC energy meters enable direct measurement of currents and voltages up to 650 A/1,000 V DC for billing purposes. The tamper-proof design with data in OCMF format and the calibration log are ideal for use in charging infrastructure.

Your advantages

- Space-saving and accurate DC direct measurement up to 650 kW
- Tamper-proof electromechanics and firmware
- Simplified point-to-point protocol with standardized data communication
- High reliability with an extended temperature range from -40 to +80°C
- Ideal for e-mobility charging processes with the OCMF data format, calibration log, and interaction with the CHARX DC charging controller

Serial Line Internet Protocol

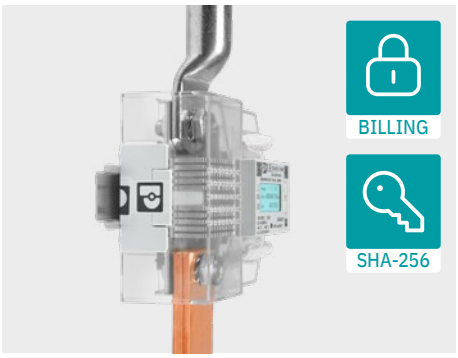
Your advantages in detail



Space-saving DC direct measurement

EMpro DC energy meters measure powers up to 650 kW in accordance with accuracy class B (EN 50470-3).

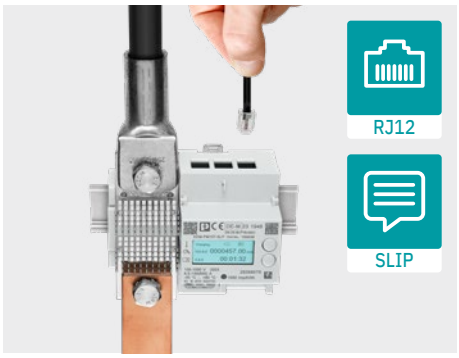
Measurement is performed directly via a shunt. The compact dimensions save valuable space in your application.



Tamper-proof electromechanics and firmware

The EMpro DC energy meters have corresponding approvals for use in kWh-based billing systems.

The tamper-proof hardware and firmware design provides protection against unauthorized access.



Standardized data communication

The integrated RS-485 interface with the simplified SLIP protocol (Serial Line Internet Protocol) enables the communication of measurement data to higher-level control systems.

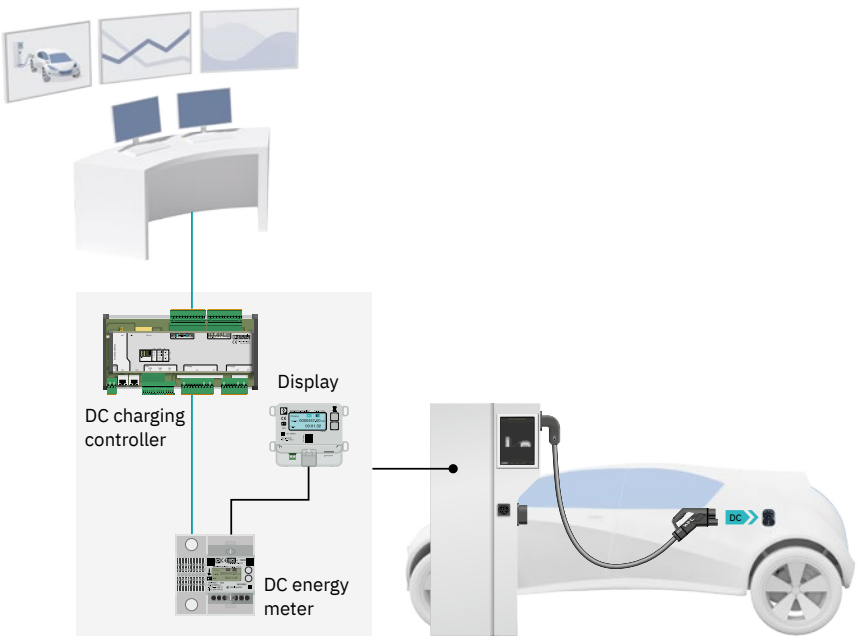
Save cabling effort with the RJ12 connectors which facilitate the connection of several DC energy meters in series due to their versatile design.

Ideal for billing purposes in e-mobility charging processes

By storing the energy data, permanent traceability of the charging processes is guaranteed. In addition, all events that have an impact on billing are recorded in the calibration log. This includes, for example, adjusting the cable resistance to calculate the cable power loss.

Send billing-related data yourself in standardized OCMF (Open Charge Metering Format) data format to end devices identified as being secure by compiling signed identification, meter, time, and private key values.

Benefit from our integrated network solutions, consisting of a CHARX DC charging controller, an EMpro DC energy meter, and many other products from Phoenix Contact covering all aspects of charging infrastructure.



Product overview: Energy meters for billing purposes

AC energy meters for billing purposes					
					
Product type	**Energy meter**				
Accuracy class	C (EN 50470-3) / 0.5 (IEC 62053-21)				
Input voltage range	100 V AC ... 277 V AC (phase/neutralconductor)	100 V AC ... 277 V AC (phase/neutral conductor) 173 V AC ... 480 V AC (phase/phase)			
Maximum measurement connection	2.5 mm² ... 10 mm²	1.5 mm² ... 25 mm²		0.5 mm² ... 2.5 mm²	
Measurement method	45 A AC (direct measurement)	100 A AC (direct measurement)		1 A AC (via external transformers) 5 A AC (via external transformers)	
Supply voltage	Supply from the measuring circuit			100 V AC ... 277 V AC (external)	
Compliance	MID-compliant				
Meter type	Bidirectional meter (supply and consumption) incl. 4-quadrant measurement				
Number of tariffs		4		4	
Communication protocol	Modbus/RTU		Modbus/TCP	Modbus/RTU	Modbus/TCP
Ambient temperature range	-40°C ... +70°C				
Connection method	Screw connection				
Item no.	NEW 1674507	NEW 1674511	NEW 1674501	NEW 1674509	NEW 1674510

DC energy meters for billing purposes	
	
Product type	**Energy meter**
Accuracy class	B (1%, EN 50470-3)
Input voltage range	150 V DC ... 1000 V DC
Maximum measurement connection	0.75 mm² ... 1.5 mm²
Measurement method	650 A (direct measurement)
Supply voltage	19.2 V DC ... 36 V DC
Compliance	Compliant with calibration laws
Communication protocol	SLIP
Ambient temperature range	-40°C ... +80°C
Connection method	Screw connection
Item no.	NEW 1269236

Multifunctional energy measuring devices

The multifunctional EMpro energy measuring devices capture your energy data and communicate it to higher-level control and management systems. Configure and integrate the devices in just a few steps using the web-based, user-guided installation wizard. You can also benefit from the simple, direct connection of conventional Rogowski coils, and from the many practical web server and device functions.

Your advantages

- Energy measurement in just three steps with the intuitive installation wizard
- Versions for the direct connection of conventional Rogowski coils
- Easy startup and servicing with smart web server and display functions
- Data protection through the targeted deactivation of button configuration functions and interfaces
- Future-oriented communication solutions and digital services

Modbus RTU
Modbus TCP
EtherNet/IP
PROFINET
{ REST API }
Proficloud.io

Your advantages in detail

Intuitive installation wizard

Set up communication interface, select grid type, configure measuring input – it takes just three steps to configure and integrate EMpro measuring devices into the network.

The installation wizard launches automatically when the device is switched on for the first time. Alternatively, you can set the configuration baseline directly on the device via the user-guided operating buttons.

Smart web server and device functions

Many practical web server and device functions make your daily work easier, such as monitoring the proper operation of the system or analyzing errors in the event of service and support issues.

In addition to configuring the devices, you can use the web server to log data, assess the grid quality, and display energy flows in clear trend diagrams.

Fast wiring and configuration

The Rogowski measuring input saves you a great deal of time during wiring and configuration. Connect any conventional Rogowski coil directly: The products process the mV signal directly. The measuring transducer that is normally used is no longer required.

Configure your current input with a single click. The coil parameters are already stored on the web server.

Easy networking

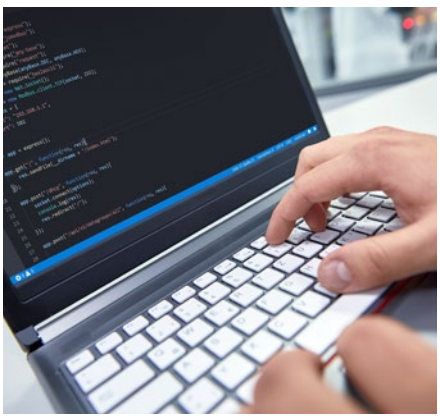
In local networks, the devices can be easily accessed via the integrated REST API.

REST or “Representational State Transfer” is a widely used architecture in the field of IT, which is also gradually being adopted in industrial applications.

The user-friendly interface architecture uses well-known Internet protocols. Using any browser, data can be retrieved with just a few commands via an HTTP GET request, for example. You do not need long register tables or special knowledge of industrial communication protocols.

Your advantages with the REST API

- The HTTP/REST/JSON format enables the quick and convenient development of system integration
- Simplified data analysis with parameterizable queries and additional information, such as the serial number and device designation
- Read-only concept provides added security
- Communication interfaces such as Modbus/TCP can be used in parallel
- Continuous expansion of the scope of functions with firmware updates



Easy data access via the REST API

Product overview: Multifunctional energy measuring devices

EMpro energy measuring devices								
								
Measurement method	**Current transformer**				**Rogowski coil**			
Mounting type	Front panel installation							
Voltage measuring input (direct)	35 V AC ... 690 V AC (phase/phase)							
Current measuring input L1, L2, L3	Secondary: 1 A / 5 A Primary: <20000 A (via external transformers)				400 mV Primary: <4000 A (via Rogowski coil)			
Power measurement, active energy	Class 0.5 S (IEC 62053-22)				Class 1 (IEC 62053-21)			
Supply voltage	100 V AC ... 400 V AC (±20%) / 150 V DC ... 250 V DC (±20%)							
Connection method	Screw connection							
Communication protocol	Modbus/TCP							
	REST							
		Modbus/RTU	PROFINET RT	EtherNet/IP™		Modbus/RTU	PROFINET RT	EtherNet/IP™
Item no.	2907945	2907944	2907946	2907953	2908286	2908285	2908301	2908302

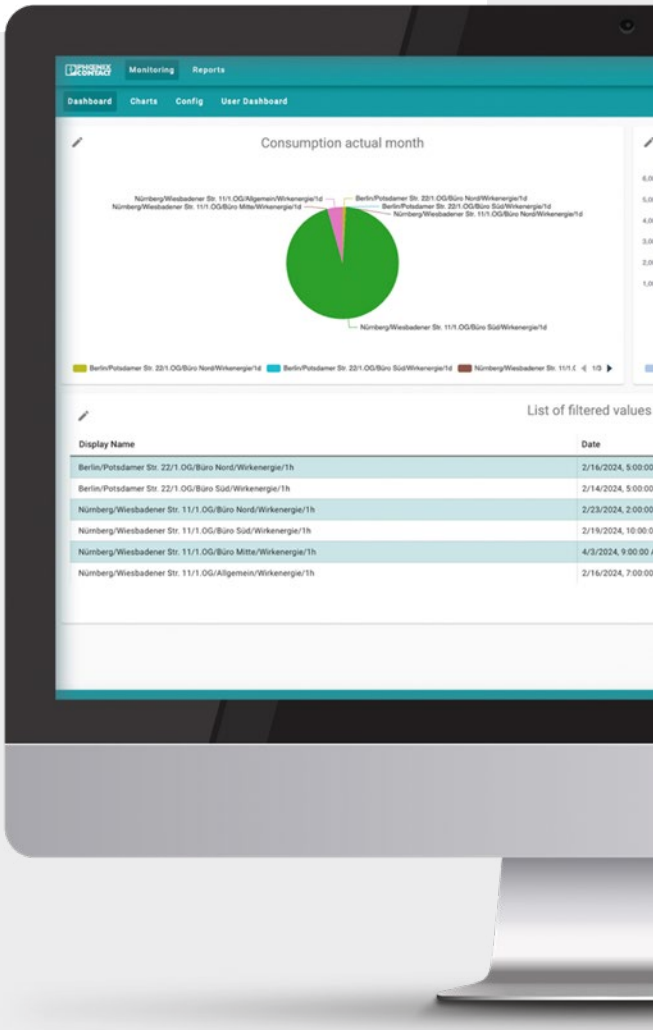
EMpro energy measuring devices				
				
Measurement method	**Current transformer**		**Rogowski coil**	
Mounting type	DIN rail mounting			
Voltage measuring input (direct)	35 V AC ... 690 V AC (phase/phase)			
Current measuring input L1, L2, L3	Secondary: 1 A / 5 A Primary: <20000 A (via external transformers)		400 mV Primary: <4000 A (via Rogowski coil)	
Power measurement, active energy	Class 0.5 S (IEC 62053-22)		Class 1 (IEC 62053-21)	
Supply voltage	100 V AC ... 230 V AC (±20%) / 150 V DC ... 250 V DC (±20%)			
Connection method	Screw connection			
Communication protocol	Modbus/TCP			
	REST			
		Modbus/RTU		Modbus/RTU
Item no.	2907983	2907980	2908307	2907985

EMpro energy measuring devices								
								
Measurement method	**Current transformer**				**Rogowski coil**			
Mounting type	DIN rail mounting							
Voltage measuring input (direct)	35 V AC ... 690 V AC (phase/phase)							
Current measuring input L1, L2, L3	Secondary: 1 A / 5 A Primary: <20000 A (via external transformers)				400 mV Primary: <4000 A (via Rogowski coil)			
Power measurement, active energy	Class 0.5 S (IEC 62053-22)				Class 1 (IEC 62053-21)			
Supply voltage	100 V AC ... 230 V AC (±20%) / 150 V DC ... 250 V DC (±20%)							
Connection method	Screw connection							
Communication protocol	Modbus/TCP							
	REST							
		PROFINET RT	EtherNet/IP™	MQTT for Proficloud.io		PROFINET RT	EtherNet/IP™	MQTT for Proficloud.io
Item no.	2907954	2907984	2907971	1158951	2907955	2908308	2907976	1158947

EMpro energy measuring devices with 24 V DC supply						
						
Measurement method	**Current transformer**			**Rogowski coil**		
Mounting type	Front panel installation	DIN rail mounting		Front panel installation	DIN rail mounting	
Voltage measuring input (direct)	35 V AC ... 690 V AC (phase/phase)					
Current measuring input L1, L2, L3	Secondary: 1 A / 5 A Primary: <20000 A (via external transformers)			400 mV Primary: <4000 A (via Rogowski coil)		
Power measurement, active energy	Class 0.5 S (IEC 62053-22)			Class 1 (IEC 62053-21)		
Supply voltage	18 V DC ... 30 V DC					
Connection method	Screw connection					
Communication protocol	Modbus/TCP					
	REST					
Item no.	1127052	1127059	1127061	1127060	1127058	1127055

Energy management software

Our energy management services and software solutions are specifically tailored to the needs of energy managers and support you in monitoring and analyzing your energy data in accordance with ISO 50001. Use the numerous functions to identify potential savings, to derive appropriate efficiency measures, and to save costs.

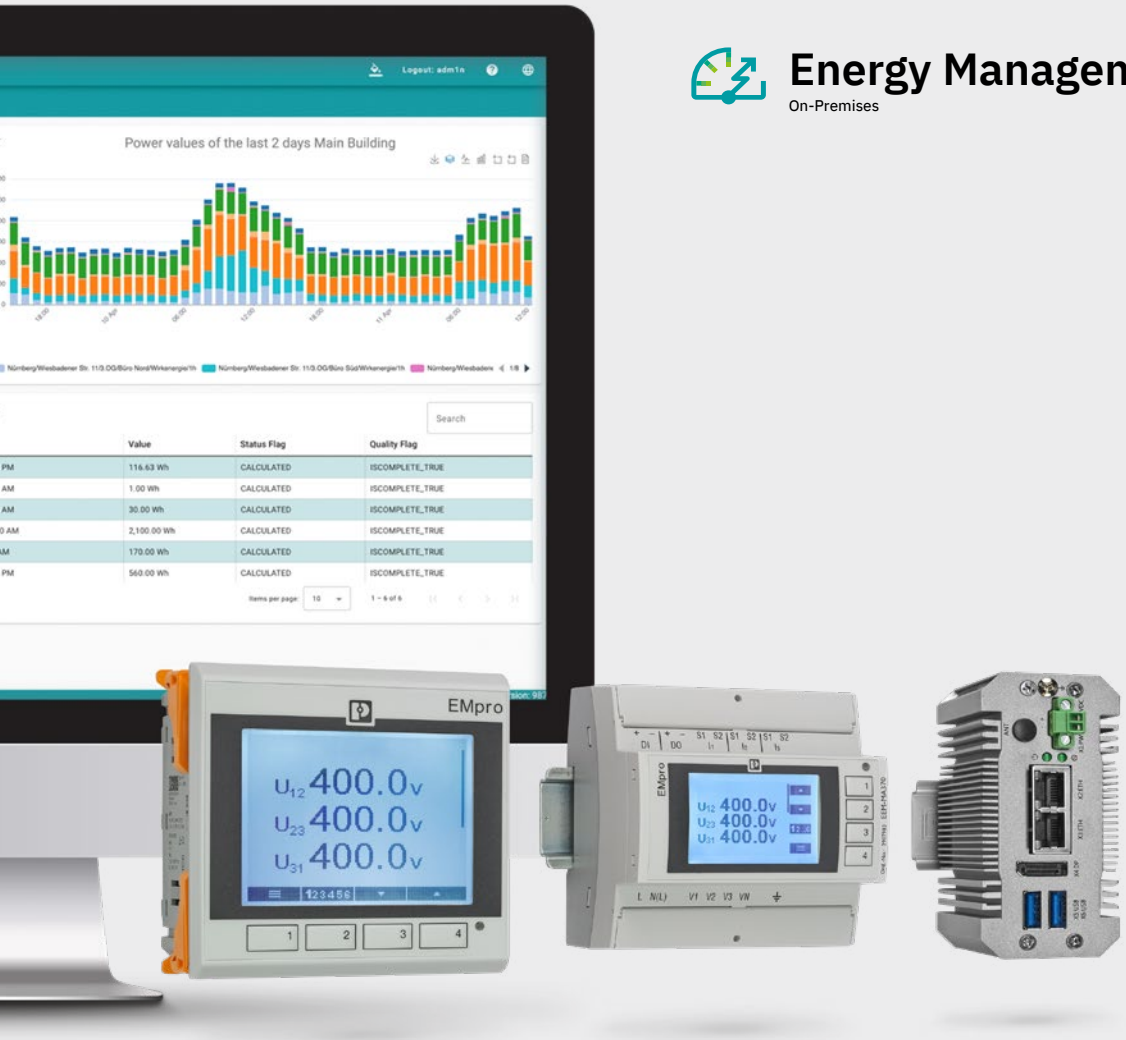


Energy management software

Local or location-independent visualization and analysis of energy data in accordance with ISO 50001.

- Energy Management Service – On-Premises
- Energy Management Service – Powered by Proficloud.io

› More information starting on page 40



Energy Management Service

On-Premises

Energy management software

The “Energy Management Service – On-Premises” energy management software is the perfect solution for your local energy monitoring. Benefit from a system that can be ordered preconfigured with intuitive, flexible functions for the informative visualization and analysis of your energy data. Alternatively, you can use the “Energy Management Service – Powered by Proficloud.io” smart service as a location-independent solution.

Your advantages

- Efficient energy monitoring and identification of potential savings in accordance with ISO 50001
- Scalable, stand-alone system with one-off license costs and free updates
- Preconfigured complete system with automatic device detection and configuration wizard
- Transparent monitoring with dashboards and energy reports
- Open system for your individual EnPIs and other forms of energy such as gas and water

Your advantages in detail

Local energy monitoring in accordance with ISO 50001

Design your local energy monitoring system in accordance with ISO 50001. Identify potential savings with graphical representations, charts, evaluations, reporting, the formula editor, alerts, and by calculating key figures.

With this approach, you can increase your energy efficiency and also benefit from government subsidies.

Scalable and cost-effective

Enjoy long-term cost efficiency: You can purchase one-off licenses for 5, 10, 20, 50, and 100 data points, with no recurring costs or fees.

You can also benefit from continuous improvements to your energy data analysis through free, usage-oriented updates.

Your flexible complete system

Receive your system prepared by us with measuring devices, edge PC and installed energy monitoring software as well as accessory components.

Once connected, the measuring devices are automatically discovered in the network. This reduces your configuration effort. You can also integrate third-party hardware into the energy monitoring system.

Energy management services and software solutions		
Two solutions are available for the informative visualization and analysis of your energy data:		
	Energy Management Service - On-Premises	**Energy Management Service - Powered by Proficloud.io**
Energy monitoring solution	Your local energy monitoring in accordance with ISO 50001, independent of external servers / internet connections	Your service for the location-independent monitoring of energy and power data in accordance with ISO 50001
Access	Connect the EMpro measuring devices to an EPC and analyze and visualize data directly	Connect the IoT-capable EMpro energy measuring devices directly to Proficloud.io
Functions and monitoring	Monitor and analyze your energy data with intuitive, customizable functions	Use additional services on Proficloud.io and benefit from cloud-based data acquisition
Visualization and accessibility	The Energy Management Service – On-Premises can be ordered preconfigured on an edge PC with accessories	Register your EMpro energy measuring devices in Proficloud.io and book the service in the store

Energy Management Service – On-Premises

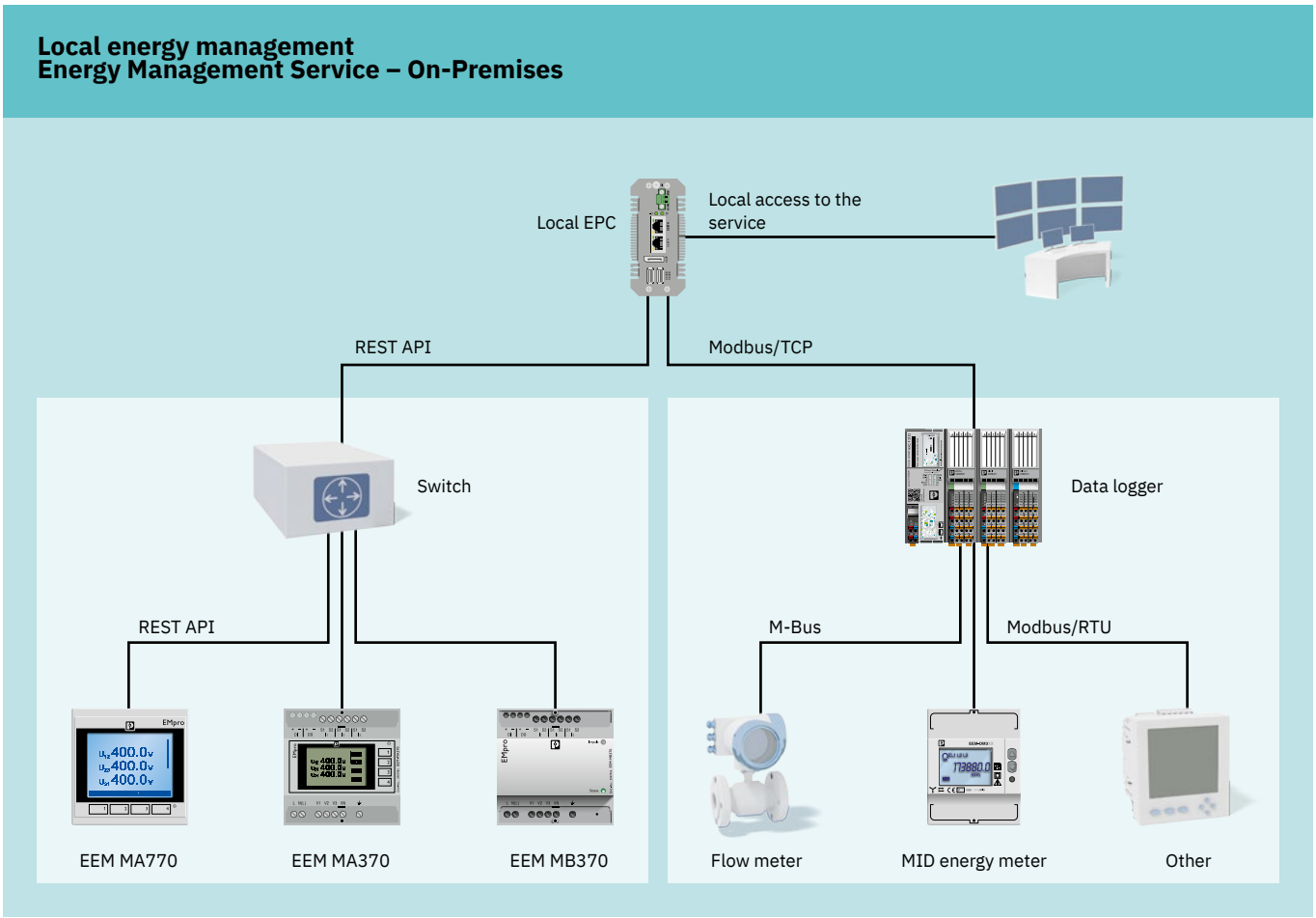
System topology

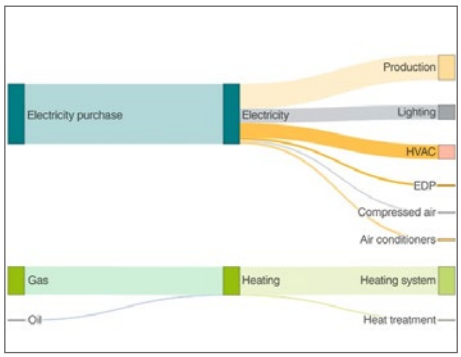
The Energy Management Service – On-Premises system consists of EMpro measuring devices that are connected to an EPC via a switch. They can be easily integrated into your network via a REST API or via Modbus/TCP.

After starting the software, the EPC automatically discovers the devices in the network.

The openness of the system allows you to integrate any other Modbus/RTU and M-Bus measuring devices that are connected via data logger or PLCnext Control.

This allows the measurement data of all energy carriers to be easily transmitted to the EPC via Modbus/TCP, transferred to the Energy Management Service – On-Premises, and displayed.

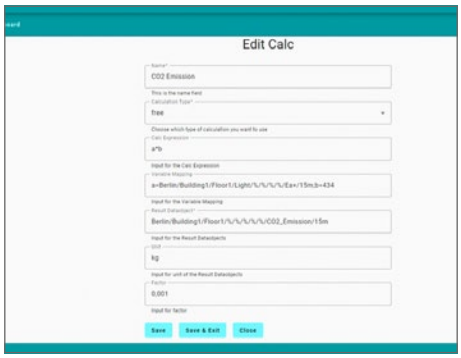




Dashboards and representations

Create custom dashboards with pie, bar, line, and Sankey charts to analyze energy data and reveal potential savings.

Structure your own data points in eight hierarchy levels, from the building network right down to the individual measurement level.



Key figures and reporting

Create your own key figures (EnPIs) and calculate them using the formula editor. External or older energy data can be imported as a CSV file so that it can be included in the calculations.

The reports from previous months and years can be easily downloaded and shared.

Alerting

Alerts are generated within the system when defined characteristic values are violated. So, users are informed in good time about any excessively high energy consumption or defects.

The system can send all reports and notifications by email on request.

Product overview: Energy management software

Software license			
	Description	**Item no.**	**Type**
Local energy monitoring with graphical representations, charts, evaluations, reporting, formula editor, alerts, and calculation of key figures.			
	Software license for operating EMS - On-Premises for up to 5 data points.	1669443	EMS - ON-PREMISES LIC-5
	Software license for operating EMS - On-Premises for up to 10 data points.	1667809	EMS - ON-PREMISES LIC-10
	Software license for operating EMS - On-Premises for up to 20 data points.	1669444	EMS - ON-PREMISES LIC-20
	Software license for operating EMS - On-Premises for up to 50 data points.	1669445	EMS - ON-PREMISES LIC-50
	Software license for operating EMS - On-Premises for up to 100 data points.	1667806	EMS - ON-PREMISES LIC-100
Necessary accessories and complete packages			
	PLCnext Control for edge computing with Intel® Celeron® N3350 processor. This small form factor programmable edge device supports IEC 61131-3, MATLAB Simulink, C/C++, and is ideal for protocol conversion, data acquisition, and cloud computing.	1185416	EPC 1502
		1185423	EPC 1522
	Configurable complete package consisting of EPC and preinstalled and licensed software: Energy Management Service - On-Premises	1683404	EMS - ON-PREMISES STARTERKIT

Open communication with customers and partners worldwide

Phoenix Contact is a global market leader based in Germany. We are known for producing forward-thinking products and solutions for the comprehensive electrification, networking, and automation of all sectors of the economy and infrastructure. With a global network, we maintain close relationships with our customers, something we believe is essential for our common success.

You can find your local partner at

phoenixcontact.com

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