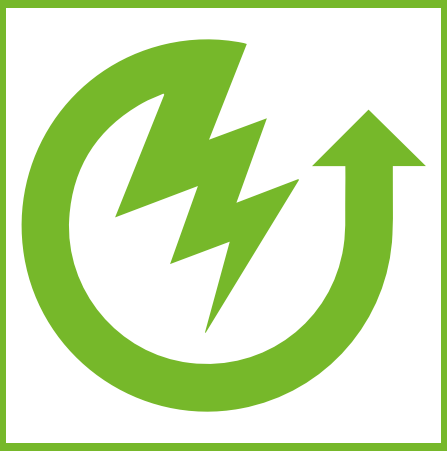
3



ENERGY AND ELECTRICAL MEASUREMENTS

3 ENERGY AND ELECTRICAL MEASUREMENTS

SENECA's Energy and Electrical Measurements line includes systems for consumption monitoring such as multifunction Modbus network analyzers with web server, harmonic analysis, Rogowski sensors, and energy meters with Modbus/Ethernet/M-bus protocols, also available with MID certification. Additionally, there is a complete range of AC/DC current transformers with patented magnetic measurement or Hall effect technology, as well as traditional multistandard panel converters for electrical quantities (Vrms, Irms, Watt, VAR, frequency, Energy, power factor) with Modbus or analog output. The reliability and wide range of this instrumentation allows achieving fundamental goals such as reducing wiring, energy savings, revamping and retrofitting of existing installations, and improving energy efficiency with maximum ease of use.

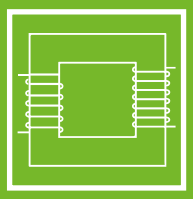
3.1 MULTIFUNCTION NETWORK ANALYZERS SERIES 203



3.2 NETWORK ANALYZERS SERIES S604 / S711



3.3 CURRENT TRANSFORMERS SERIES TAA / TAC



3.4 ROGOWSKI SENSORS



3.5 ENERGY METERS SERIES S500



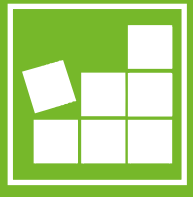
3.6 CURRENT TRANSDUCERS SERIES T201



3.7 CONVERTERS FOR ELECTRICAL MEASUREMENTS



3.8 CONTROLLERS FOR ENERGY MANAGEMENT



3.1



MULTIFUNCTION POWER METERS

S203, Z203, R203, TPM203 Series

QUICK SELECTION GUIDE

	S203TA-D	S203RC-D	R203	T203PM	Z203-2
					
GENERAL DATA					
Precision class	0.2	0.5	0.5	1	0.5
Ethernet interface	-	-	x	-	-
ModBUS RTU interface	x	x	x	x	x
USB interface	x	x	-	x	x
Power Supply	10..40 Vdc; 19..28 Vac	10..40 Vdc; 19..28 Vac	10-30 Vdc or 90..264 Vac	11.5 – 28 Vdc	10..40 Vdc; 19..28 Vac
Display	Front LCD	Front LCD	Widgets on external HMI	-	-
PROGRAMMING					
DIP Switch	x	x	-	-	x
Z-NET4	x	x	-	-	-
WEB SERVER	-	-	x	-	-
EASY SETUP	x	x	-	-	-
EASY SETUP 2	x	x	x	x	x
EASY SETUP app	x	x	-	-	-
GSDML / TiA Portal	-	-	-	-	-
INPUTS / OUTPUTS					
Input	Up to 600 Vac / 5 Arms	Up to 600 Vac / Rogowski 100 mV RMS	Up to 600 Vac, 5A (CT), 333 mV (CT with voltage output or Rogowski)	Up to 600A / 590Vac (AC/DC TRMS); ±600A / – +1000Vdc (TRMS)	Up to 500 Vac, 5 Arms
Re-transmitted analog output	x	x	x	X	X
Digital output (alarm/pulse)	x	x	x	x	x
MEASUREMENTS					
Direct measurement	-	-	-	x	-
Star voltage measurement	x	x	x	-	-
Delta voltage measurement	-	-	x	-	-
Three-phase Aron measurement	x	x	x	-	-
Single-phase measurement	x	x	x	x	x
Harmonic / THD measurements	-	-	Up to the 55th	Up to the 21th	-
External CTs	x	-	x	-	x
Rogowski Sensors	-	x	x	-	-
SPECIAL FEATURES					
Datalogger	-	-	x	x	-
ENERGY METER	x	x	x	x	x
Daisy Chain	-	-	x	-	-
LAN By Pass	-	-	x	-	-
Peer-To-Peer	-	-	X (ver. Profinet, Ethernet/IP)	-	-
ModBUS PASS Through	-	-	X (ver. Profinet, Ethernet/IP)	-	-



S203 Series

MODBUS NETWORK ANALYZERS WITH ANALOG OUTPUT

Network analyzers are specifically designed to detect the characteristics of the electrical supply in single-phase or three-phase networks and loads. They allow energy and power analysis, thus controlling the quality of the supply. At the same time, in many versions, they are also used to continuously record the behavior of the available alternating quantities.
Measurement and event reporting functions provide a useful information base to monitor the proper operation of a machine, maximizing energy efficiency.

HIGHLIGHTS

600 Vac

VOLTAGE INPUT

The S203 series analyzers support voltage inputs with a maximum range of up to 600 Vac (50-60 Hz)

100mA 5 Arms 4000A

POWER INPUT

The S203 series analyzers handle current inputs up to 5 Arms, (S203TA-D), 4,000 A (S203RC-D).

MEASURED VALUES

The S203 series analyzers provide via analog output (mA / V) the single-phase and three-phase values of the main electrical quantities: effective voltage, effective current, active power, reactive power, apparent power, frequency, power factor, energy (bidirectional). The configurable analog output allows the analyzer to also be used as a measurement converter.

ENERGY COUNTING

The S203TA-D and S203RC-D models are equipped with a pulse digital output and non-volatile memory for energy metering.

Modbus

COMMUNICATION

Equipped with a mini USB programming port (S203TA-D and S203RC-D) and RS485, all models support the MODBUS RTU protocol up to a maximum of 32 nodes and 115,200 bps without the use of amplifiers or repeaters.

PROGRAMMING

All models are configurable via the free EASY SETUP2 software and connection through an easily accessible front Mini USB port.
Versions without a display are also programmable via DIP-switch.

LCD

DISPLAY

The S203 Series includes models with a high-brightness front LCD display (2 rows x 16 characters) with backlighting.

CONNECTIONS

Depending on the version, the main types of insertion are possible: single-phase, three-phase Aron, three-phase 4-wire. The analyzers can be connected to commercial CTs with a maximum secondary of 5A, precision transformers with a full scale from 15 to 100 A, Rogowski sensors with a maximum of 4,000 A.

CONFIGURATION APP

The models with displays can be configured via the Android app EASY SETUP APP, available on the Play Store.

4,000 Vac

ISOLATION

The analyzers provide protection against ESD discharges up to 4 kV, isolation between power input and other circuits up to 4,000 Vac, and isolation between communication (or analog output) and power supply of 1500 Vac.

TECHNICAL DATA

	S203TA-D	S203RC-D
		
	Advanced three-phase network analyzer	Advanced three-phase network analyzer for Rogowski sensors
GENERAL DATA		
Power Supply	10-40 Vdc, 19-28 Vac (50-60 Hz)	
Max Consumption	2.5 W	
Isolation	4 kVac (measurement input) 1.5 kVac (other circuits)	
Status Indicators	Power, Fail, RS485 Communication	
Installation category	350 V CAT II	
Display	Front LCD display 2 rows x 16 alphanumeric characters, backlit	
Retransmission error	0.1% (maximum field)	
Bandwidth	7 kHz	
Precision class	0.2% (voltmeter, ammeter, voltmeter)	Dependent on the Rogowski sensor
Types of insertion	Single-phase, three-phase, Aron	
Connections	Commercial CTs with a maximum secondary of 5A, typical accuracy 0.5%	Rogowski transducers with a maximum output of 100 mV RMS
Protection class	IP20	
Configuration	Front keys DIP Switch Z-NET4 EASY SETUP EASY SETUP APP	
Mounting	DIN 35 mm rail (IEC EN 60715)	
Connections	Screw terminals, 5.08 mm pitch	
Operating Temperature	-10..+65°C	
Dimensions	17.5 x 100 x 112 mm	
Weight	200 g	
Enclosure	UL V0 plastic material	
Certifications	CE, UKCA	
COMMUNICATION		
Interfaces	#1 RS485 port, # 1 USB port	
Speed	1 reading every 25 ms	
Protocol	ModBUS RTU	
Distance	Up to 1,200 m	
MEASUREMENTS AND I/O		
Channels	1 input, 2 outputs	
Input type	VOLTAGE: Up to 600 Vac (50-60 Hz)	
	CURRENT: Up to 5 Arms	CURRENT from Rogowski transducers with a maximum output of 100 mV RMS
Output type	VOLTAGE 0..5, 0..10 Vdc, minimum load resistance 2 kΩ CURRENT 0..20, 4..20 mA, maximum load resistance 500 Ω DIGITAL IMPULSE for energy meters (produced/absorbed), capacity 50 mA	

ACCESSORIES

ROGOWSKI SENSORS FOR S203RC-D



RC-V250-100
First-generation Rogowski sensor, output 100 mV/kA, 50-60 Hz, Ø 115 mm

RC-V400-050
First-generation Rogowski sensor, output 50 mV/kA, 50-60 Hz, Ø 115 mm



RC-V400-100
First-generation Rogowski sensor, output 100 mV/kA, 50-60 Hz, Ø 115 mm

RC-V500-100
First-generation Rogowski sensor, output 100 mV/kA, 50-60 Hz, Ø 147 mm



RC150
Second-generation high-performance Rogowski sensor, maximum error <1%, Ø 8 mm, 100 mV/1kA

ORDER CODES

Code	Description
ANALYZERS	
S203RC-D	Three-Phase Network Analyzer, 600 Vac / 1000 Arms, Rogowski, Analog and Impulse Outputs, LCD Display, Micro USB App
S203TA-D	Three-Phase Network Analyzer, 600 Vac / 5 Arms, Analog and Impulse Outputs, Standard TA, LCD Display, Micro USB App
ACCESSORIES	
RC-V250-100	Rogowski Sensor 100mV/kA - 50/60Hz Ø 65 mm
RC-V400-050	Rogowski Sensor 50mV/kA - 50/60Hz 2m cable
RC-V400-100	Rogowski Sensor 100mV/kA - 50/60Hz 2m cable
RC-V500-100	Rogowski Sensor 100mV/kA - 50/60Hz 2m cable
RC150-025-100-10	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 10m cable
RC150-025-100-3M	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 3m cable
RC150-025-100-5M	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 5m cable
RC150-035-100-3M	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 3m cable
RC150-035-100-5M	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 5m cable
RC150-035-100-10	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 10m cable
RC150-040-100-10	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 10m cable
RC150-040-100-3M	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 3m cable
RC150-040-100-5M	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 5m cable
RC150-060-100-10	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 10m cable
RC150-060-100-3M	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 3m cable
RC150-060-100-5M	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 5m cable
RC150-090-100-10	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 10m cable
RC150-090-100-3M	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 3m cable
RC150-090-100-5M	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 5m cable
RC150-120-100-3M	Rogowski Sensor L=12cm, Ø 38cm, 100mV/1kA - 50Hz, 3m cable
RC150-120-100-5M	Rogowski Sensor L=12cm, Ø 38cm, 100mV/1kA - 50Hz, 5m cable
RC150-130-100-5M	Rogowski Sensor L=13cm, Ø 38cm, 100mV/1kA - 50Hz, 5m cable
RC150-180-100-3M	Rogowski Sensor L=180cm, Ø 57cm, 100mV/1kA - 50Hz, 3m cable
RC150-280-100-5M	Rogowski Sensor L=280cm, Ø 89cm, 100mV/1kA - 50Hz, 5m cable
RC150-300-100-5M	Rogowski Sensor L=300cm, Ø 96cm, 100mV/1kA - 50Hz, 5m cable
RC190-030-333-3M	Rogowski Sensor L=30cm, Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-030-333-5M	Rogowski Sensor L=30cm, Ø 9cm, 333mV/1kA - 50Hz, 5m cable
RC190-035-333-3M	Rogowski Sensor L=35cm, Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-060-333-3M	Rogowski Rogowski Sensor L=60cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-090-333-3M	Rogowski Rogowski Sensor L=90cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-160-333-3M	Rogowski Rogowski Sensor L=160cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable

The technical data and diagrams in this document are indicative and not binding.



Z203-2

Single-phase network analyzer with Micro USB port

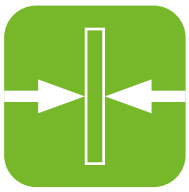


WIDE MEASUREMENT RANGE


SIMPLIFIED CONNECTIONS


FLEXIBLE SETTINGS

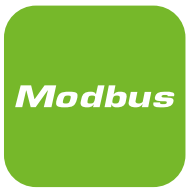

VAC/DC


REDUCED DIMENSIONS


INTERNATIONAL CERTIFICATIONS



HIGH ISOLATION

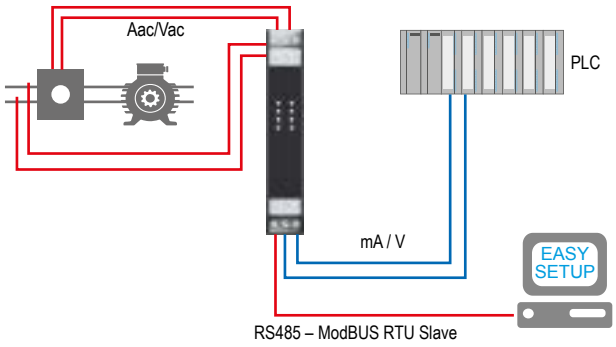


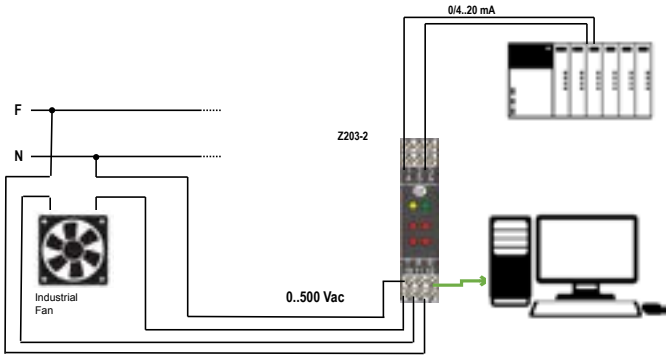
FIELDBUS INTERFACE

GENERAL DATA	
Power Supply	10-40 Vdc; 19-28 Vac
Consumption	Typical: 1.5 W @ 24Vdc, Max: 2.5 W
Isolation	3.750 Vac towards power circuits; 1,500 Vac (other circuits)
Protection	ESD < 4kV
Status Indicators	Power Supply Error Rx/Tx data packet
Type of insertion / Connection mode	Single-phase
Front protection level	IP20
Accuracy	0.5%
Thermal Stability	< 100 ppm/K
Programming	DIP Switch, Software (EASY SETUP 2)
Data Memory	EEPROM
Special Features	Energy counter (via impulses from digital output)
Mounting	Vertical position DIN rail 35mm IEC EN60715
Connections	Removable screw terminals, 3-way, 5 mm and 10 mm pitch Rear IDC10 connector for DIN rail 46277 Frontal Micro USB
Operating Temperature	-25..+65 °C (-20..+55°C UL)
Storage temperature	-30..+ 85°C
Humidity	30% ÷ 90% non-condensing
Dimensions (WxHxD)	17.5 x 102.5 x 111 mm
Weight	130 g
Enclosure	PA6, black color
Certifications	CE, UKCA, UL
MEASUREMENT AND CALCULATION TIMES	
Sampling time	8,000 sps (for voltage/current channels)
Bus scan time	10 ms
RMS values settling time	580..700 ms
Harmonic update times	30s
COMMUNICATION	
RS485 / MODBUS RTU	
Interfaces	#1 RS485 port
Protocol	ModBUS RTU slave
Distance	Up to 1,200 m
Speed	1,200..115,200 baud
Connections	Max 128 Seneca device nodes
USB	
Ports	#1 Micro USB programming port
MEASUREMENTS AND I/O	
Measured values	Vrms, Irms, Watt, Var, Frequency, Energy, Power factor
Number of channels	1 measurement input, 1 analog output, 1 digital output
Measurement Input	VOLTAGE: Configurable start/end scale between: 0..125 Vac; 0..250 Vac; 0..500 Vac; Input impedance: 600 kΩ CURRENT: Configurable start/end scale between: 0..1.25A; 0..2.5A; 0..5A Crest factor: 3; Nominal current: 5 Arms; Maximum current 15A
Analog output	VOLTAGE: 0..10 Vdc, minimum load resistance 2 kΩCURRENT: 0..20, 4..20 mA, maximum load resistance 500 Ω 12-bit resolution; transmission error: 0.1 % of the maximum field; thermal drift: 100 ppm/K
Digital Output	PULSE COUNTER: Passive type; capacity 50 mA; pulse duration 200 ms; Isolation 1500 V peak; Imax=V/R=50 mA

The technical data and diagrams in this document are indicative and not binding.

APPLICATION DIAGRAMS





ORDER CODES	
Code	**Description**
Z203-2	Single-phase network analyzer 500 Vac / 5A Micro USB
SOFTWARE	
(ASY SETUP 2	Plug&Play configuration software

SERIE R203

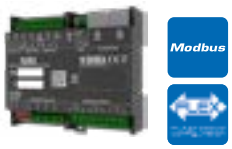
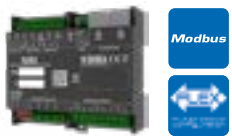
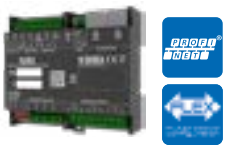
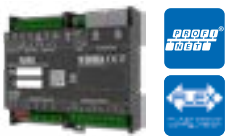
MULTIFUNCTION NETWORK ANALYZERS WITH UNIVERSAL INPUT



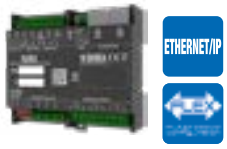
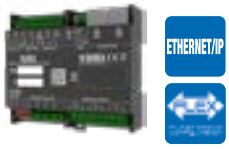
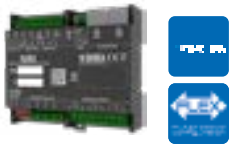
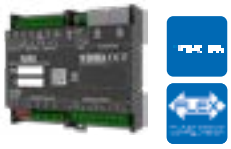
The R203 three-phase network analyzer accepts current measurement inputs for CTs with current/voltage output, TV, and Rogowski sensors (with voltage output up to 333 mV), with single-phase, three-phase Aron insertion types, and supports ModBUS RTU, ModBUS TCP-IP, Profinet, Ethernet/IP protocols (switchable with FLEX technology). Like many of the space-saving R-series products, the R203 features 1 or 2 Ethernet ports, also usable for daisy chain connections with automatic bypass protection. The analyzer provides an output signal in voltage (0..10Vdc) or current (0/4..20mA). The R203 also measures and records voltage/current harmonics up to the 55th order with THD (Total Harmonic Distortion) calculation. The instrument also functions as an Edge/IoT device (with MQTT protocol), Web Server, energy meter, and datalogger for reading the main parameters and downloading data and events.

HIGHLIGHTS

- Universal Analog Input (voltage, CT, TV, Rogowski)
- Integrated monitoring system for up to 40 devices
- Measured Values and Analog Output
- Configuration via Web Server or EDS
- THD measurement up to the 55th harmonic
- High Accuracy (0.2 / 0.5)
- Multi-protocol configuration and support
- Active/reactive/apparent energy meter
- Datalogger with up to 30 variables per tag / 55k samples
- Event Recorder (32k samples)
- Daisy Chain
- LAN BY-PASS (internal switch)
- Peer-To-Peer
- ModBUS Pass-Through (gateway)
- SSL/TLS/X.509 digital certificates, data transmission
- Edge/IoT Device

	R203-2-L	R203-2-H	R203-2-L-P	R203-2-H-P
				
	Three-phase network analyzer with 2xETH, 10-30 Vdc, ModBUS RTU/ TCP-IP	Three-phase network analyzer with 2xETH, 90-264 Vac, ModBUS RTU/ TCP-IP	Three-phase network analyzer with 2xETH, 10-30 Vdc, Profinet IO	Three-phase network analyzer with 2xETH, 90-264 Vac, Profinet IO
GENERAL DATA				
Power Supply	10-30 Vdc	90-264 Vac (50-60 Hz)	10-30 Vdc	90-264 Vac (50-60 Hz)
Max Consumption	2.5 W			
Max isolation	3,500 Vac			
Status Indicators	Input/Output status I/O address status Wiring error Ethernet Data Transit/Connection			
	RX/TX RS485		Profinet communication active	
	Datalogger		-	
Installation category	300 V CAT III	600 V CAT III	300 V CAT III	600 V CAT III
Type of insertion / Connection mode	Single-phase, three-phase 3-wire, three-phase 4-wire, Aron			
Front protection level	IP20			
Precision class	0.5			
Flash Memory (data)	8 MB		-	
Mounting	DIN 35mm IEC EN60715 rail mounting, wall or panel mounting with screws			
Connections	Screw terminals			
Operating Temperature	-25..+65°C			
Storage temperature	-30..+ 85°C			
Humidity	30% ÷ 90% non-condensing			
Dimensions	90 x 107 x 32 mm			
Weight	170 g			
Enclosure	Self-extinguishing PC/ABS UL94-V0 material, black color			
Certifications	CE, UKCA			
MEASUREMENT AND CALCULATION TIMES				
Sampling time	8,000 sps (for voltage/current channels)			
Bus scan time	10 ms		>2 ms	
RMS values settling time	580..700 ms			
Harmonic update times	30 s			
PROGRAMMING				
EASY SETUP 2	Communication parameters, I/O, datalogging		-	
WEB SERVER	Connection diagnostics, device configuration, alarm and I/O configuration, datalogger, special functions (ModBUS Pass Through), firmware update		Connection diagnostics, firmware update	
GSD/GSDML/EDS	-		Configuration, project and I/O management	
SPECIAL FEATURES				
Datalogger data	Max 30 variables per tag and approx. 65504 samples storable in internal flash; sampling time between 1s and 24h		-	
Event Datalogger	Recording up to 4096 samples with respective time tag, threshold, time window, date/time		-	
ENERGY METER	Active/reactive energy metering on digital output # 2 incremental 32-bit counters on digital inputs @5kHz		-	
Integrated monitoring system	Configuration, viewing, and simultaneous monitoring on SSD for up to 40 units connected in daisy-chain mode		-	
COMMUNICATION				
RS485 / ModBUS RTU				
Interfaces	#1 RS485 port		-	
Protocol	ModBUS RTU slave		-	
Distance	Up to 1,200 m		-	
Speed	1,200..115,200 baud		-	
Connections	Max 128 Seneca device nodes		-	
Ethernet / Profinet				
Ports	#2 Ethernet 100BaseT ports			
Speed	100 Mbps			
Protocols	ModBUS TCP-IP (switchable with FLEX technology), Seneca P2P I/O Mirror with broadcast (UDP based)		Profinet IO (switchable with FLEX technology)	
Multi-protocol Configuration (ModBUS, Profinet, Ethernet/IP)	yes			
CONNECTIVITY				
Daisy Chain	x			
LAN Fault By-Pass	x			
Peer-To-Peer	x		-	
ModBUS Pass-Through	x		-	
IT/IIoT Protocols	http(s), Ftp, MQTT(s)		-	
MEASUREMENTS AND I/O				
Number of channels	#1 measurement input, #2 DI (Digital Inputs), #2 DO (Digital Outputs), #1 AO (Analog Output)			
Measurement Input	PHASE VOLTAGE Up to 600 Vac, frequency 45 ÷ 65 Hz / Minimum voltage: 5 V (Full Scale 150 Vac); 20 V (Full Scale 600 Vac) / Voltage Transformer (VT) output up to 600 Vac relative to neutral PHASE CURRENT Current input for CT (Current Transformer): 1 ÷ 5A full scale / Voltage input (mV) for CT with voltage output or Rogowski: up to 250 mV / Network Frequency: 50 ÷ 60Hz Voltmeter: 0.2% / Ammeter: 0.2%, Wattmeter: 0.5%			
Analog output	VOLTAGE OUTPUT 0..10 Vdc, minimum load resistance: 2 kΩ CURRENT OUTPUT (active/passive): 0..20, 4..20 mA, maximum load resistance: 500 Ω Transmission Error: 0.1% of the maximum range Thermal Drift: 100 ppm/K			
Digital Inputs	Digital Inputs: #2, activated by 12 to 24V			
DIGITAL OUTPUTS	Digital Outputs: #2, capacity: Imax = 50 mA, Vmax = 28V			

The technical data and diagrams in this document are indicative and not binding.

	R203-2-L-E	R203-2-H-E	R203-2-L-U	R203-2-H-U
				
	Three-phase Network Analyzer, 2xETH, 10-30 Vdc, OPC UA	**Three-phase Network Analyzer, 2xETH, 90-264 OPC UA**	**Three-phase Network Analyzer, 2xETH, 10-30 Vdc, OPC UA**	**Three-phase Network Analyzer, 2xETH, 90-264 OPC UA**
GENERAL DATA				
Power Supply	10-30 Vdc	90-264 Vac (50-60 Hz)	10-30 Vdc	90-264 Vac (50-60 Hz)
Max Consumption	2.5 W			
Max isolation	3,500 Vac			
Status Indicators	Input/Output Status, I/O address status, wiring error, Ethernet data transit/connection, active Ethernet communication,			
Installation category	300 V CAT III	600 V CAT III	300 V CAT III	600 V CAT III
Type of insertion / Connection mode	Single-phase, three-phase 3-wire, three-phase 4-wire, Aron			
Front protection level	IP20			
Precision class	0.5			
Mounting	DIN 35mm IEC EN60715 rail mounting, wall or panel mounting with screws			
Connections	Screw terminals			
Operating Temperature	-25..+65°C			
Storage temperature	-30..+ 85°C			
Humidity	30% ÷ 90% non-condensing			
Dimensions	90 x 107 x 32 mm			
Weight	170 g			
Enclosure	Self-extinguishing PC/ABS UL94-V0 material, black color			
Certifications	CE, UKCA			
MEASUREMENT AND CALCULATION TIMES				
Sampling time	8,000 sps (for voltage/current channels)			
Bus scan time	>2 ms		>10 ms	
RMS values settling time	580..700 ms			
Harmonic update times	30s			
PROGRAMMING				
WEB SERVER	Connection diagnostics, firmware update		firmware diagnostics, device configuration, firmware update	
GSD/GSDML/EDS	Configuration, project and I/O management		-	-
INTERFACES				
Ports	#2 Ethernet 100BaseT ports			
Speed	100 Mbps			
Protocols	Ethernet/IP		OPC UA Server	
Connectivity	Daisy Chain, LAN Fault By-Pass			
MEASUREMENTS AND I/O				
Number of channels	#1 measurement input, #2 DI (Digital Inputs), #2 DO (Digital Outputs), #1 AO (Analog Output)			
Voltage Measurement Input	Up to 600 Vac, frequency: 45 ÷ 65 Hz			
	Minimum voltage 5 V (Full Scale 150 Vac); 20 V (Full Scale 600 Vac)			
	Voltage Transformer (VT) output up to 600 Vac relative to neutral			
Current Measurement Input	Current input for CT (Current Transformer): 1 ÷ 5A full scale			
	Voltage input (mV) for CT with voltage output or Rogowski: up to 250 mV			
	Network Frequency: 50 ÷ 60Hz			
	Accuracy: Volt Meter: 0.2%; Ampere Meter: 0.2%, Wattmeter: 0.5%			
Analog output	VOLTAGE 0..10 Vdc, min load resistance 2kΩ CURRENT (active/passive): 0..20, 4..20 mA, maximum load resistance: 500 Ω Transmission Error: 0.1% of the maximum range Thermal drift: 100 ppm/K			
Digital Inputs	Digital Inputs: #2, activated by 12 to 24V			
DIGITAL OUTPUTS	Digital Outputs: #2, capacity: Imax = 50 mA, Vmax = 28V			

The technical data and diagrams in this document are indicative and not binding.

FLEXIBLE AND RECONFIGURABLE DEVICES WITH FLEX TECHNOLOGY

SENECA's proprietary FLEX technology allows connecting a single device capable of supporting various protocols in serial and Ethernet industrial communication networks. Starting from the same network analyzer, for example, it is possible to change the type of protocol conversion in a few steps, addressing rapid production layout changes or efficiently transferring data to and from PLCs and other Master/Slave or Client/Server devices. This flexible approach saves time, financial resources, and the hassle of managing multiple devices with different purchasing codes, regardless of the application type.

STRENGTHS

- A single multiprotocol solution on one device
- Maximum connectivity in a single hardware
- The functionality of multiple gateways at the price of one
- Simplification of purchasing codes
- Reduction in storage and handling costs
- Immediate selection of multiple protocol combinations based on the freely downloadable Seneca Discovery Device tool from the Seneca website
- No programming software or change of tag and I/O registers needed
- Supported and interchangeable protocols: ModBUS RTU, ModBUS TCP-IP, ModBUS ASCII, Profinet, Ethernet/IP, upcoming implementations (OPC UA, IEC 61850)
- Models integrating FLEX technology: R-KEY-LT, R-KEY-LT-E, R-KEY-LT-P, Z-KEY-0, Z-KEY-2ETH, Z-KEY-2ETH-E, Z-KEY-2ETH-P, Z-KEY-P, Z-KEY-E, R203-2-L, R203-2-H, R203-2-L-P, R203-2-H-P, R203-2-L-U, R203-2-H-U

PROTOCOL RECONFIGURATION PROCEDURE WITH FLEX TECHNOLOGY

- Connect the PC to the FLEX device via Ethernet
- Launch the SENECA DISCOVERY DEVICE software, available on the SENECA website; scan the ModBUS / Ethernet network
- Select the new combination of protocols to apply to the device
- With the module turned off, set the DIP Switch to "Factory Reset"
- Turn on the module and set the DIP Switch to "Read configuration from Flash"

1 Connect the PC via Ethernet to the SENECA module



2 Launch the SENECA DISCOVERY DEVICE software and scan the ModBUS / Ethernet network



3 Change the protocol from ModBUS to Profinet or Ethernet/IP



4 When the module is off, position the DIP Switches to "ON" (factory reset).



5 Turn on the module and set the DIP Switch to "OFF", read configuration from Flash

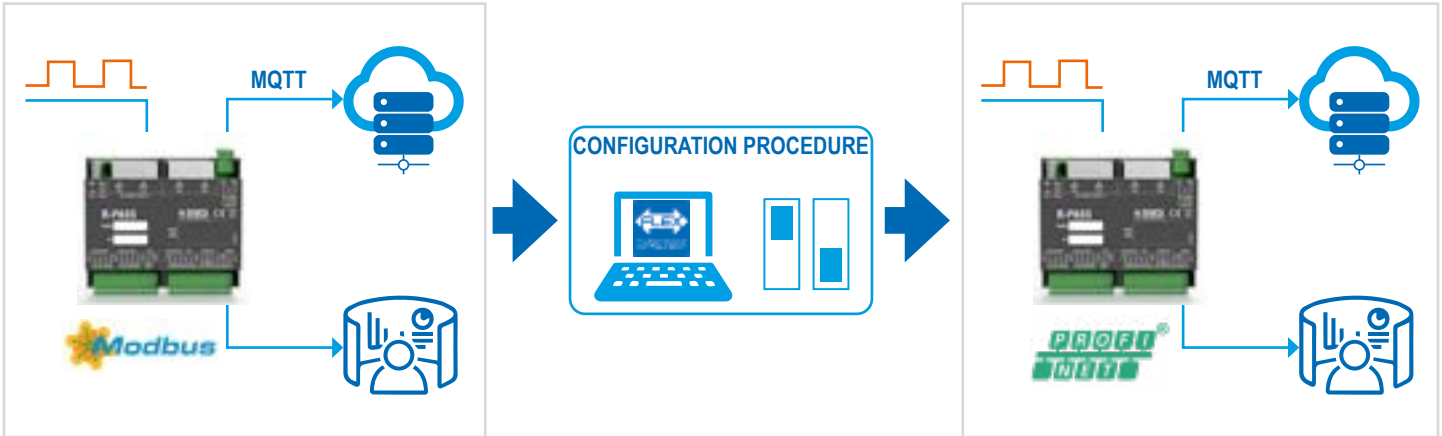


6 Now the module operates with another combination of protocols



For more information: www.seneca.it/flex

EXAMPLE OF CONVERSION FROM MODBUS ANALYZER TO PROFINET ANALYZER.

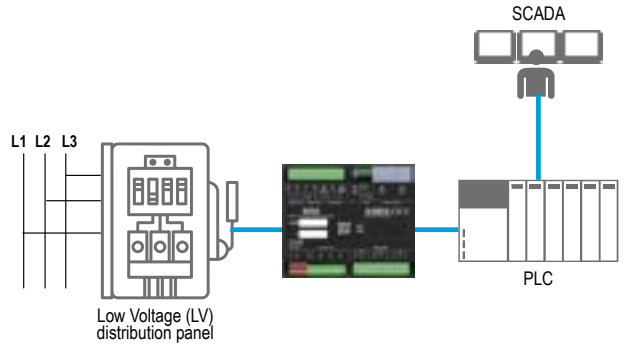


MAIN MEASUREMENTS

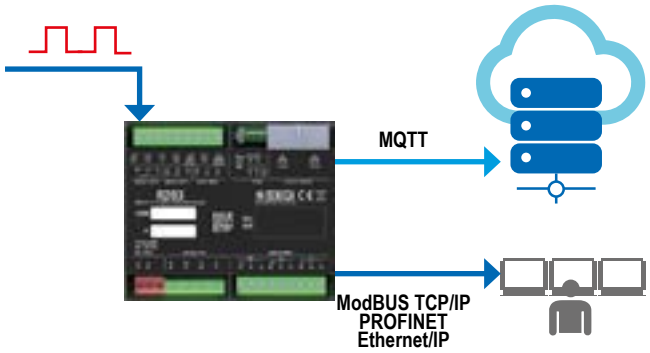
INSTANTANEOUS VALUES	
Voltage	VL1-L2, VL2-L3, VL3-L1, VL1-N, VL2-N, VL3-N
Current (+/-)	IL1, IL2, IL3, IN
Active Power (+/-)	P1, P2, P3, Ptot
Reactive Power (+/-)	Q1, Q2, Q3 and Qtot
Apparent Power (+/-)	S1, S2, S3 and Stot
Power Factor (inductive and capacitive)	PF1, PF2, PF3 and PFtot
Frequency	F1, F2, F3
Period	PER1, PER2, PER3
Voltage-Current Phase Angle [°]	Delta VIL1, VIL2, VIL3
Line Voltage Phase Angle [°]	Delta VL1-L2, VL2-L3, VL3-L1
Total Harmonic Distortion of Voltage (THD)	THD % VL1-N, VL2-N, VL3-N
Total Harmonic Distortion of Current (THD)	THD % IL1, IL2, IL3
AVERAGE VALUES IN DEMAND TIME	
Average Voltage	VL1-N, VL2-N, VL3-N, VL1-N MIN, VL1-N MAX, VL2-N MIN, VL2-N MAX, VL3-N MIN, VL3-N MAX
Average Current (+/-)	IL1, IL2, IL3, IL1 MIN, IL1 MAX, IL2 MIN, IL2 MAX, IL3 MIN, IL3 MAX
Average Active Power (+/-)	P1, P2, P3, P1 MIN, P1 MAX, P2 MIN, P2 MAX, P3 MIN, P3 MAX, Ptot
Average Reactive Power (+/-)	Q1, Q2, Q3, Q1 MIN, Q1 MAX, Q2 MIN, Q2 MAX, Q3 MIN, Q3 MAX, Qtot
Average Apparent Power (+/-)	S1, S2, S3, S1 MIN, S1 MAX, S2 MIN, S2 MAX, S3 MIN, S3 MAX, Stot
Average Power Factor (inductive and capacitive)	PF1, PF2, PF3, PF1 MIN, PF1 MAX, PF2 MIN, PF2 MAX, PF3 MIN, PF3 MAX, PFtot
MAXIMUM / MINIMUM / ABSOLUTE VALUES	
Voltage	VL1-N MIN, VL1-N MAX, VL2-N MIN, VL2-N MAX, VL3-N MIN, VL3-N MAX
Current (+/-)	IL1 MIN, IL1 MAX, IL2 MIN, IL2 MAX, IL3 MIN, IL3 MAX
Active Power (+/-)	P1 MIN, P1 MAX, P2 MIN, P2 MAX, P3 MIN, P3 MAX, Ptot
Reactive Power (+/-)	Q1 MIN, Q1 MAX, Q2 MIN, Q2 MAX, Q3 MIN, Q3 MAX, Qtot
Apparent Power (+/-)	S1 MIN, S1 MAX, S2 MIN, S2 MAX, S3 MIN, S3 MAX, Stot
Power Factor (inductive and capacitive)	PF1 MIN, PF1 MAX, PF2 MIN, PF2 MAX, PF3 MIN, PF3 MAX, PFtot
Counters	
Active Energy [Wh]	ACTIVE ENERGY IMPORTED L1 (+) Q1/Q4
	ACTIVE ENERGY IMPORTED L2 (+) Q1/Q4
	ACTIVE ENERGY IMPORTED L3 (+) Q1/Q4
	ACTIVE ENERGY EXPORTED L1 (-) Q2/Q3
	ACTIVE ENERGY EXPORTED L2 (-) Q2/Q3
	ACTIVE ENERGY EXPORTED L3 (-) Q2/Q3
	ACTIVE ENERGY IMPORTED TOTAL (+) Q1/Q4
	ACTIVE ENERGY EXPORTED TOTAL (-) Q2/Q3
	ACTIVE ENERGY BALANCE TOTAL (+/-)
REACTIVE ENERGY [VARH]	REACTIVE ENERGY IMPORTED L1 (+) Q1/Q2
	REACTIVE ENERGY IMPORTED L2 (+) Q1/Q2
	REACTIVE ENERGY IMPORTED L3 (+) Q1/Q2
	REACTIVE ENERGY EXPORTED L1 (-) Q3/Q4
	REACTIVE ENERGY EXPORTED L2 (-) Q3/Q4
	REACTIVE ENERGY EXPORTED L3 (-) Q3/Q4
	REACTIVE ENERGY IMPORTED L1 (+) Q1
	REACTIVE ENERGY IMPORTED L2 (+) Q1
	REACTIVE ENERGY IMPORTED L3 (+) Q1
	REACTIVE ENERGY IMPORTED L1 (-) Q2
	REACTIVE ENERGY IMPORTED L2 (-) Q2
	REACTIVE ENERGY IMPORTED L3 (-) Q2
	REACTIVE ENERGY IMPORTED L1 (+) Q3
	REACTIVE ENERGY IMPORTED L2 (+) Q3
	REACTIVE ENERGY IMPORTED L3 (+) Q3
	REACTIVE ENERGY IMPORTED L1 (-) Q4
	REACTIVE ENERGY IMPORTED L2 (-) Q4
	REACTIVE ENERGY IMPORTED L3 (-) Q4
	REACTIVE ENERGY IMPORTED TOTAL (+) Q1/Q2
	REACTIVE ENERGY EXPORTED TOTAL (-) Q3/Q4
	REACTIVE ENERGY BALANCE TOTAL (+/-)
APPARENT ENERGY [VAH]	APPARENT ENERGY BALANCE TOTAL (+/-)
HARMONIC ANALYSIS	
Voltage Harmonics from the fundamental to the 55th [V]	VL1-N, VL2-N, VL3-N
Current Harmonics from the fundamental to the 55th [A]	IL1, IL2, IL3
Voltage Harmonics from the 2nd to the 55th [% relative to the fundamental]	VL1-N, VL2-N, VL3-N
Current Harmonics from the 2nd to the 55th [% relative to the fundamental]	IL1, IL2, IL3

CONNECTION EXAMPLES

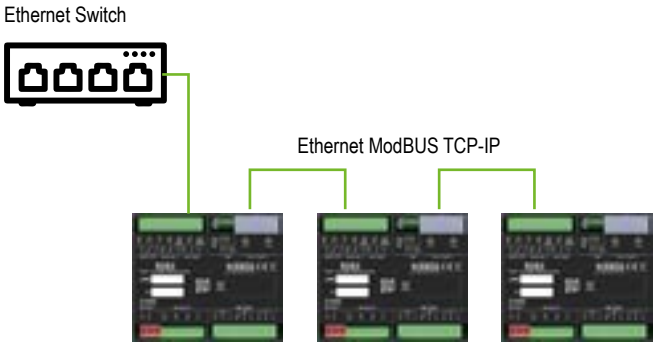
ENERGY MONITORING WITH PLC AND SCADA



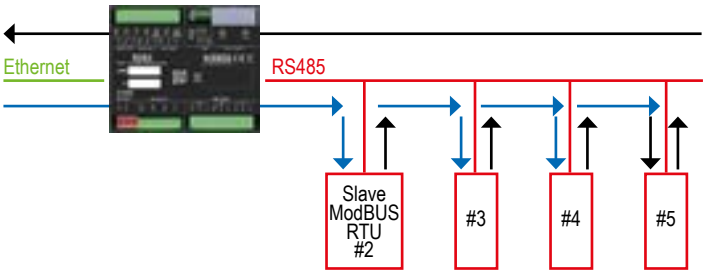
ENERGY MONITORING VIA MQTT



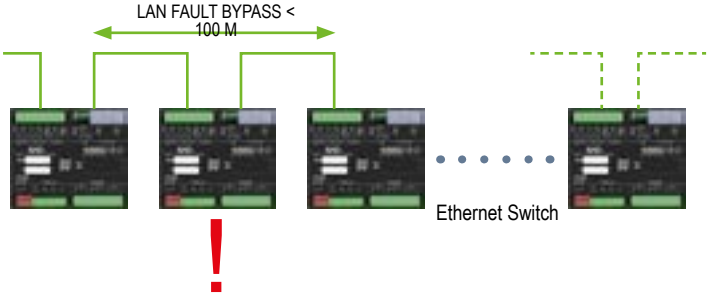
DAISY CHAIN



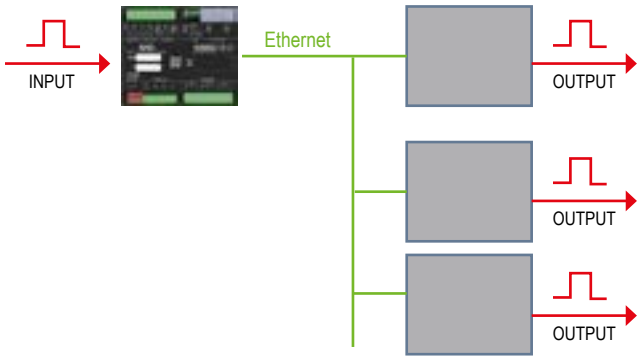
ModBUS Pass-Through



Fault By-Pass



Peer-To-Peer I/O Copy



ORDER CODES

Code	Description
NETWORK	
R203-2-L	Three-phase network analyzer, 2xETH, 24 Vdc, ModBUS RTU/TCP-IP
R203-2-H	Three-phase network analyzer, 2xETH, 90-264 Vac, ModBUS RTU/TCP-IP
R203-2-L-P	Three-phase network analyzer, 2xETH, 24 Vdc, Profinet IO
R203-2-H-P	Three-phase network analyzer, 2xETH, 90-264 Vac, Profinet IO
R203-2-L-E	Three-phase network analyzer, 2xETH, 24 Vdc, Ethernet/IP
R203-2-H-E	Three-phase Network Analyzer, 2xETH, 90-264 OPC UA
ROGOWSKI SENSORS	
RC150-025-100-10	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 10m cable
RC150-025-100-3M	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 3m cable
RC150-025-100-5M	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 5m cable
RC150-035-100-3M	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 3m cable
RC150-035-100-5M	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 5m cable
RC150-035-100-10	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 10m cable
RC150-040-100-10	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 10m cable
RC150-040-100-3M	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 3m cable
RC150-040-100-5M	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 5m cable
RC150-060-100-10	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 10m cable
RC150-060-100-3M	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 3m cable

Code	Description
RC150-060-100-5M	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 5m cable
RC150-090-100-10	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 10m cable
RC150-090-100-3M	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 3m cable
RC150-090-100-5M	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 5m cable
RC150-120-100-3M	Rogowski Sensor L=12cm, Ø 38cm, 100mV/1kA - 50Hz, 3m cable
RC150-120-100-5M	Rogowski Sensor L=12cm, Ø 38cm, 100mV/1kA - 50Hz, 5m cable
RC150-130-100-5M	Rogowski Sensor L=13cm, Ø 38cm, 100mV/1kA - 50Hz, 5m cable
RC150-180-100-3M	Rogowski Sensor L=180cm, Ø 57cm, 100mV/1kA - 50Hz, 3m cable
RC150-280-100-5M	Rogowski Sensor L=280cm, Ø 89cm, 100mV/1kA - 50Hz, 5m cable
RC150-300-100-5M	Rogowski Sensor L=300cm, Ø 96cm, 100mV/1kA - 50Hz, 5m cable
RC190-030-333-3M	Rogowski Sensor L=30cm, Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-030-333-5M	Rogowski Sensor L=30cm, Ø 9cm, 333mV/1kA - 50Hz, 5m cable
RC190-035-333-3M	Rogowski Sensor L=35cm, Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-060-333-3M	Rogowski Rogowski Sensor L=60cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-090-333-3M	Rogowski Rogowski Sensor L=90cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-160-333-3M	Rogowski Rogowski Sensor L=160cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-160-333-3M	Rogowski Rogowski Sensor L=160cm, Øint. 9cm, 333mV/1KA-50Hz, 3m cable



T203PM

SINGLE-PHASE NETWORK ANALYZERS WITH DIRECT CURRENT AND ENERGY MEASUREMENT

T203PM is a series of single-phase network analyzers for AC/DC TRMS with a ModBUS interface, analog and digital outputs, and inputs with 3 current measurement ranges: 100, 300, or 600 Aac/dc depending on the version (T203PM100-MU, T203PM300-MU, T203PM600-MU) and for voltage 290 Vac, 1000 Vdc. The devices directly measure current and energy without the use of external current transformers (CTs). The T203PM measures voltage, AC/DC current, active/reactive/apparent power, power factor, frequency, harmonic distortion (THD), retransmitting them via an analog output with a voltage of 0-10V. The T203PM analyzers are particularly robust, operating over a wide temperature range, -25..+65°C, with Isolation up to 3 kVac (on bare conductors), safety class CAT. III 600V (bare conductor) and 1kV (insulated conductor).

HIGHLIGHTS

DIRECT CURRENT AND ENERGY MEASUREMENT WITHOUT CTS

The following measurements are available without the need for external CTs: TRMS AC voltage and current, DC voltage, bipolar DC current, instantaneous power, active, reactive, and apparent energy, power factor, THD, and grid frequency.

ANALOG VOLTAGE OUTPUT

The analog output can replicate one of the input measurements with an accuracy of 1% (0.2% for voltage) at 23°C and a response time (10-90%) of 100 ms.

HARMONIC ANALYSIS

The input measurement bandwidth of 1.3kHz ensures voltage and current measurement with harmonic components up to the 21st (at 60 Hz grid frequency).

DIGITAL OUTPUT

The digital output is used for alarm signaling that may occur for a given associated measurement.

MODBUS RTU INTERFACE

The ModBUS RTU (Slave) protocol is supported both via the RS485 communication port up to 115,200 bps and via the USB port for programming operations.

MICRO USB PORT

The front Micro USB port allows for easy device configuration via software.
Firmware updates can also be performed through it.

CONFIGURATION VIA EASY SETUP2

The T203PM can be configured via the free EASY SETUP2 software and connected through the easily accessible front USB port.

ENERGY COUNTER

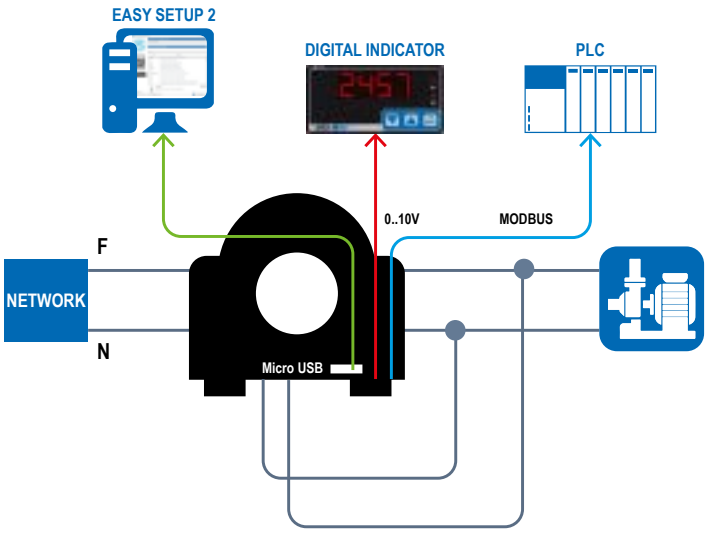
The analyzers are equipped with 64-bit energy counters whose values (active, reactive, apparent) are stored in memory (FeRAM).

The technical data and diagrams in this document are indicative and not binding.

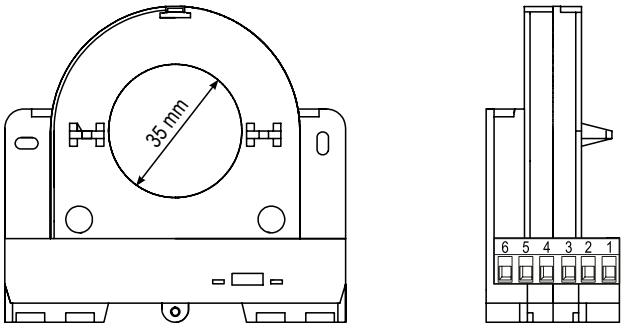
TECHNICAL DATA

	T203PM100-MU	T203PM300-MU	T203PM600-MU
			
	Single-phase AC/DC TRMS network analyzer, inputs up to 100 Vac/dc, ModBUS, analog and digital output	**Single-phase AC/DC TRMS network analyzer, inputs up to 300 Vac/dc, ModBUS, analog and digital output**	**Single-phase AC/DC TRMS network analyzer, inputs up to 600 Vac/dc, ModBUS, analog and digital output**
GENERAL DATA			
Power Supply	11.5 – 28 Vdc		
Consumption	Typical: < 70 mA @ 24 Vdc		
Max isolation	3 kVac (on bare conductors)		
Status Indicators	Power supply, USB communication, digital output		
Installation Category / Overvoltage Category	CAT. III 600V (bare conductor)		
	CAT. III 1kV (insulated conductor)		
Front protection level	IP20		
Precision class	1% of full scale at 50/60 Hz, 23°C		
Programming	EASY SETUP 2 Software		
Mounting	35mm DIN rail IEC EN60715, wall-mounted via screws, suspended via straps		
Connections	6-way removable screw terminals, 5 mm pitch for cables up to 2.5 mm2		
	Micro USB for programming and firmware updates		
Operating Temperature	-25..+70°C		
Dimensions	95 x 75 x 35 mm		
Weight	150 g		
Enclosure	PA6, black color		
Certifications	CE, UKCA		
MEASUREMENT AND CALCULATION TIMES			
Sampling Time	47,000 sps		
RMS values settling time	500..1000 ms		
MEASURED PARAMETERS			
Instantaneous values	Voltage, AC/DC current, Active / Reactive / Apparent Power, Power Factor, Frequency, THD		
Avg / Max / Min Values	Voltage, AC/DC current, Active / Reactive / Apparent Power, Power Factor, Frequency, THD		
Harmonics	Up to the 21th		
ACCURACY			
Precision class	1% of full scale at 50/60 Hz, 23°C		
INTERFACES			
SERIAL			
Interfaces	#1 RS485 port		
Protocol	ModBUS RTU		
Distance	Up to 1,200 m		
Connectivity	Max 32 nodes		
USB			
Ports	#1 Micro USB programming port		
MEASUREMENT INPUTS			
Voltage	Up to 0 – 100A or 0 – 90Vac (AC/DC TRMS); ±100A or 0 – +1000Vdc (TRMS DC Bipolar)	Up to 0 – 300A or 0 – 290Vac (AC/DC TRMS); ±300A or 0 – +1000Vdc (TRMS DC Bipolar)	Up to 0 – 600A or 0 – 590Vac (AC/DC TRMS); ±600A or 0 – +1000Vdc (TRMS DC Bipolar)
	Crest factor: 100A = 1.7 / 300A = 1.9 / 600A = 1.9		
	Bandwidth: 1.4 kHz		
	Overload: 3 x IN continuous		
MEASUREMENT INPUTS			
Channels	1DO, 1 AO		
Digital outputs	ACTIVE 0 – Vcc, max load 50mA		
Analog output	VOLTAGE: 0..10 Vdc, min load 2kΩ. Polarity reversal protection and overvoltage protection Resolution: 13.5 f.s.AC EMI Error: < 1% Temperature Coefficient: < 200 ppm/°C Measurement Hysteresis: 0.2% f.s. Response Time: < 200 ms		

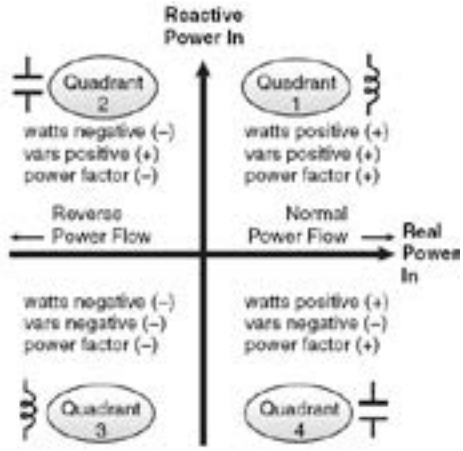
TYPICAL APPLICATION



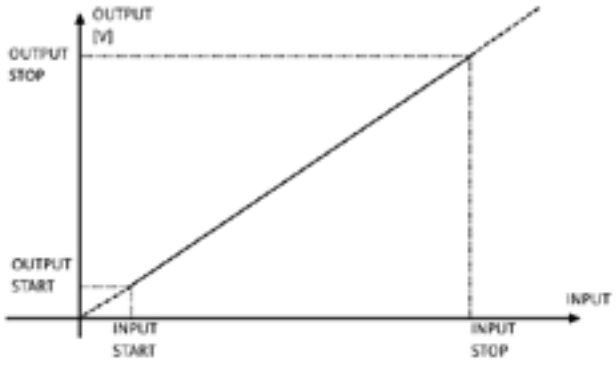
MODULE LAYOUT



AVAILABLE MEASUREMENTS VIA SERIAL



ANALOG OUTPUT



MEASURED INSTANTANEOUS, MIN, AND MAX VALUES

Voltage	V
AC / DC Current (+/-)	I
Active Power (+/-)	P
Reactive Power (+/-)	Q
Apparent Power (+/-)	S
Power Factor	PF
Frequency	F (measured grid voltage frequency)
THD	% (measured on current)

COUNTERS

ACTIVE ENERGY [Wh/10] (TOTAL (+/-))
REACTIVE ENERGY [VARh/10] (TOTAL (+/-))
APPARENT ENERGY [VAh/10] (TOTAL (+/-))

ORDER CODES

Code	Description
T203PM100-MU	Single-phase AC/DC TRMS network analyzer, inputs up to 100 Vac/dc, ModBUS, analog and digital output
T203PM300-MU	Single-phase AC/DC TRMS network analyzer, inputs up to 300 Vac/dc, ModBUS, analog and digital output
T203PM600-MU	Single-phase AC/DC TRMS network analyzer, inputs up to 600 Vac/dc, ModBUS, analog and digital output
CU-A-MICROB	USB-A to Micro USB-B 5 P Cable

3.2



NETWORK ANALYZERS
S604 / S711 Series



S604 / S711 Series

MULTIFUNCTION ANALYZERS FOR PANELS AND RECESSED MOUNTING



The multifunction network analyzers of the S604 and S711 series are innovative instruments for measuring and recording electrical parameters. They are particularly suitable when a device is needed for consumption analysis and control, offering excellent value for money. In versions with Rogowski current transducers, they provide extreme ease of connection and can be used in applications with high currents, linear measurements, retrofitting, energy audits, etc.The instruments can communicate through the RS485 serial port with the ModBUS RTU/ASCII protocol or via the LAN port with the ModBUS TCP-IP protocol. The ENERGY POWER PACK software is also provided for configuring the instrument. A web server interface is also available for managing the device from any PC connected to the LAN/Internet.

HIGHLIGHTS

INSERTION MODES

- From 3x230/400 V to 3x240/415 V three-phase 4-wire
- From 3x400 V to 3x415 V three-phase 3-wire
- From 230 V to 240 V single-phase

POWER SUPPLY

- Self-powered models
- Models with auxiliary power supply
- Extended power supply 85 ... 265 VAC / 110 VDC ±15%

DIGITAL I/O

- #1/2 outputs for alarms/pulses
- #1 input for calculating average values (DMD)

DATA STORAGE

- Recording of average active and reactive power values
- Up to 24 selectable parameters among instantaneous variables for recording MIN/AVG/MAX values
- Up to 8 MB memory for data recording

TYPICAL APPLICATIONS

- Energy monitoring and control systems
- Monitoring the load of individual machines
- Power peak control
- Control panels, generators, motor control, etc.
- Remote consumption detection and cost calculation

PROGRAMMING

Remote management of the instrument is possible via ENERGY POWER PACK software or through a web server interface.

COMMUNICATION

Models with communication in MODBUS RTU/ASCII via RS485 port or in MODBUS TCP via LAN port are available.

ENERGY MEASUREMENTS AND COUNTERS

- Total counters
- Separate inductive/capacitive counters
- Bidirectional measurement on four quadrants for all energies and powers
- Measurement of all the main parameters necessary for effective consumption analysis

THD & HARMONICS

THD values for voltage and current THD values for voltage and current + harmonics up to the 15th

INPUTS

- Versions for standard CTs of 1 or 5 A, direct insertion up to 80 A, or Rogowski coils

MULTIFUNCTION NETWORK ANALYZERS FOR PANELS

	S604B	S604E	S604E-ROG
			
	Three-phase network analyzers for inputs from CT 1/5 A, direct 80 A, BASIC version	**Three-phase network analyzers for inputs from CT 1/5 A, direct 80 A, ENERGY PLUS version**	**Three-phase network analyzers, ENERGY PLUS version with Rogowski coil set**
GENERAL DATA			
Power Supply	180..285 Vac line-neutral, Cat III (self-powered models) 85..265 Vac, Aux, Cat II (models with auxiliary power)	85..265 Vac, Aux, Cat II (models with auxiliary power)	
Max Consumption	3.5 VA - 1 W per single phase (self-powered models) 1.6 VA - 1 W (models with auxiliary power, RS485 interface) 4.5 VA - 1.6 W (models with auxiliary power, Ethernet interface)	1.6 VA - 1 W (models with auxiliary power, RS485 interface) 4.5 VA - 1.6 W (models with auxiliary power, Ethernet interface)	
Display	LCD, backlit, 43x29 mm, 3 rows, 4 digits + symbols		
Function keys	3 front keys, 1 protected key		
Operating temperature	-25..+55°C		
Sinusoidal vibration amplitude	50 Hz ± 0.075 mm		
Memory (for instruments with communication port)	1 MB	8 MB	
Recordings	Average values for active and reactive power	MIN/AVG/MAX values for all powers, selectable	
THD & Harmonics	THD values for voltage and current	THD values for voltage and current Harmonic values for voltage and current up to the 15th	
Apparent Energy Counters	Total or separate counters (inductive/capacitive)		
Connection Modes	Single-phase Three-phase, 4-wire, 3 currents Three-phase, 4-wire, 2 currents (aux models)		
Front protection level	IP51		
Terminal Protection Rating	IP20	IP20	IP20
Dimensions	72x90x65 mm		
Weight	436 g		
Certifications	CE		
ACCURACY			
Voltage	±0.2% reading 10% FS...FS (FS = full scale value)		
Current	±0.4% reading in 5% FS...FS		
Power	±0.5% reading ±0.1% FS (PF = 1)		
Frequency	±0.1% reading ±1 digit in the range 45...65 Hz		
Active Energy	Class 1 according to IEC/EN 62053-21		
Reactive Energy	Class 2 according to IEC/EN 62053-23		
COMMUNICATION			
Serial Port*	RS485 opto-isolated, 300..57,600 bps (optional)		
Ethernet Port*	10/100 Mbps, RJ45 connector (optional)		
Supported Protocols	ModBUS RTU/ASCII (RS485); http, Ntp, Dhcp, ModBUS TCP-IP (Ethernet)		
I/O			
Voltage Input	3x180/310..3x285/495 Vac, Cat III, 300 V (self-powered models) 3x10/17…3x285/495 Vac, Cat III, 300 V (auxiliary power models)		
Current Input	6A (1/5A CT models); 80 A (models with 80 A direct insertion)		3 selectable ranges: 500 / 4,000 / 20,000 A via Rogowski Sensors
Digital Inputs	# 1 active opto-isolated channel (models without communication port), synchronization range for DMD average values 80..276 Vac/dc		
Digital output	# 1 (RS485 models) / 2 (models without communication port) passive opto-isolated channels, IEC/EN 62053-31		
PROGRAMMING			
Configuration Systems	Front keys Energy Power Pack software (MODBUS/Ethernet models) Web server (Ethernet models)		
ADDITIONAL EQUIPMENT			
			# 3 Rogowski coils RC150

***Alternative configuration**

The technical data and diagrams in this document are indicative and not binding.

MULTIFUNCTION NETWORK ANALYZERS FOR PANELS

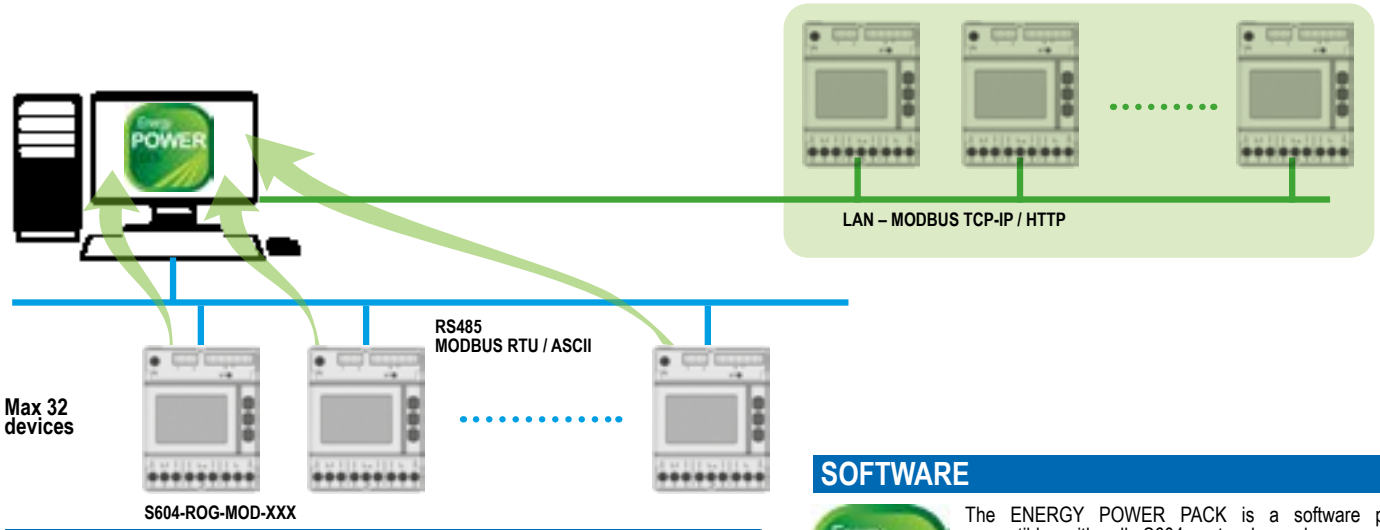
	S711B	S711E	S711EROG
			
	Three-phase Network Analyzer LCD 96x96 BASIC version	**Three-phase network analyzer LCD 96x96 ENERGY Plus version**	**Three-phase network analyzer LCD 96x96, ENERGY PLUS version, with Rogowski coil set**
GENERAL DATA			
Power Supply	230 Vac ±15%, 50-60 Hz (RS485 port models)	230 Vac ±15%, 50-60 Hz (RS485 port models) 85..265 Vac (Ethernet port models)	
Display	LCD, backlit 78x61 mm, 3 rows, 4 digits + symbols		
Function keys	4 front keys		
Operating temperature	-25..+55°C		
Sinusoidal vibration amplitude	50 Hz ± 0.075 mm		
Average value calculation (DMD)	Synchronization with DI or fixed window	Synchronization with DI, fixed or sliding window	
Memory (for instruments with communication port)	1 MB	8 MB	
Recordings	Average values for active and reactive power	MIN/AVG/MAX values for instantaneous variables Energy counters	
THD & HARMONICS	THD values for voltage and current	THD values for voltage and current Harmonic values for voltage and current up to the 15th	
Apparent Energy Counters	Total or separate counters (inductive/capacitive)		
Connection Modes	Three-phase, 4-wire, 3 currents Three-phase, 3-wire, 2 currents Single-phase		
Front protection level	IP51		
Terminal Protection Rating	IP20		
Wire diameter for measurement terminals	2,5 mm^2 / 14 AWG	1,5.. 1.5..6 mm^2 (CT models)	
Wire diameter for I/O/power/ COM terminals	1,5.mm^2 / 16 AWG	1,5.. 35 mm^2 (80 A insertion models)	
Dimensions	96x96x39 mm		
Weight	310 g		436 g
Certifications	CE		
ACCURACY			
Voltage	±0.2% reading 10% FS...FS (FS = full scale value)		
Current	±0.4% reading in 5% FS...FS		
Power	±0.5% reading ±0.1% FS (PF = 1)		
Frequency	±0.1% reading ±1 digit in the range 45...65 Hz		
Active Energy	Class 1 according to IEC/EN 62053-21		
Reactive Energy	Class 2 according to IEC/EN 62053-23		
COMMUNICATION			
Serial Port	RS485 for MODBUS RTU / ASCII communication (MODBUS models)		
Ethernet Port	-	Ethernet 10/100 Mbps for http communication, ModBUS TCP-IP (Ethernet models)	
Supported Protocols	ModBUS RTU/ASCII (RS485)	ModBUS RTU/ASCII (RS485); http, Ntp, Dhcp, ModBUS TCP-IP (Ethernet)	
MEASUREMENT INPUTS I/O			
Voltage Input	Max Measurable Voltage: 600 Vac max L-L 20/35 VCA (*TV ratio, in case of TV use) Input Impedance: ›1.3 MOhm Frequency: 45 -65 Hz		
Current Input	Input from CT Max value: 7A Starting current (Ist): 2mA CT Load: max 0.15 VA per phase Min value for FFT calculation: 100 mA * CT ratio		3 selectable ranges: 500 / 4,000 / 20,000 A via Rogowski Sensors
Digital Input	# 1 channel for average value calculation synchronization (DMD), opto-isolated range 80..265 Vac/dc		# 1 active opto-isolated channel (models without communication port), synchronization range for DMD average values 80..276 Vac/dc
Digital output	# 2 channels for alarm events / pulse emission, NPN/PNP opto-isolated passive, max value 27 Vdc - 27 mA, pulse duration 50 ± 2 ms, max reaction time at output 1 s		
Analog output	-	# 1 opto-isolated active channel 0/4..20 mAcc, max load 500 W (model S711E6MODAO)	
PROGRAMMING			
Configuration Systems	Front keys Energy Power Pack software (MODBUS/Ethernet models)	Front keys Energy Power Pack software (MODBUS/Ethernet models) Web server (Ethernet models)	
ADDITIONAL EQUIPMENT			
	-	-	# 3 Rogowski coils RC150 from 30, 45, or 70 cm (internal diameter 10/14/22 cm), 3 m cable

(*) for equipped models

The technical data and diagrams in this document are indicative and not binding.

PROGRAMMING SYSTEMS

MODBUS / ETHERNET CONNECTIONS



FRONT KEYS



Readings, settings, and recordings are available via front keys, with the ability to manage up to 7 groups of pages on the instrument's display.

SOFTWARE

The ENERGY POWER PACK is a software package compatible with all S604 network analyzer models. It communicates via Modbus RTU and ModBUS TCP and performs multi-device management, up to a maximum of 32. ENERGY POWER PACK ensures the reading and display of all measurements, provides a complete parameter setup, downloads and converts recordings, and manages remote connections.

For versions with an integrated Ethernet port or with an external communication module, a Web Server is available and accessible via browser. With this system, it is possible to view all available values in the module and associate a recording with an exportable file in CSV format.

ORDER CODES

Code	Description
NETWORK	
S604B-6-ETH	Basic Analyzer, CT input 1/5A, with Ethernet
S604B-6-MOD	Basic Basic Analyzer, CT input 1/5A, with RS485
S604B-80-MOD	Basic Basic Analyzer, direct 80A input, with RS485
S604E-6-ETH	Energy Plus Analyzer for CT 1/5A - Ethernet, 8MB log. Arm.
S604E-6-MOD	Energy Plus Analyzer for CT 1/5A - RS485 Modbus, 8MB log. Arm.
S604E-80-ETH	Energy Plus Analyzer 80A - Ethernet, 8MB log. Arm.
S604E-80-MOD	Energy PLUS Network Analyzer 80A-RS485 Modbus, 8MB Log Harmonics
S604E-ROG-ETH-30	Energy Plus Kit Ethernet + 3 Rogowski Coils RC150 L = 30 cm Øint. 9.5 cm
S604E-ROG-ETH-45	Energy Plus Kit Ethernet + 3 Rogowski Coils RC150 L = 45 cm Øint. 14 cm
S604EROGETH45-10	Energy Plus Kit Ethernet + 3 Rogowski Coils RC150 L = 45 cm Øint. 14 cm
S604EROGETH45-5	Energy Plus Kit Ethernet + 3 Rogowski Coils RC150 L = 45 cm Øint. 14 cm
S604E-ROG-ETH-70	Energy Plus Kit Ethernet + 3 Rogowski Coils RC150 L = 70 cm Øint. 22 cm
S604E-ROG-MOD-30	Energy Plus Kit RS485 Modbus + 3 Rogowski Coils RC150 L = 30 cm Øint. 9.5 cm
S604E-ROG-MOD-45	Energy Plus Kit RS485 Modbus + 3 Rogowski RC150 L = 45 cm Øint. 14 cm
S604E-ROG-MOD-70	Energy Plus Kit RS485 Modbus + 3 Rogowski RC150 L= 70cm Øint.22cm
S711B6MOD	Basic Analyzer CT 1/5A RS485 1MB 1 DI/1 DO LCD
S711E6ETH	Energy Plus Analyzer CT 1/5A ETHERNET 8MB DI/DO LCD
S711E6MOD	Energy Plus Analyzer CT 1/5A RS485 8MB DI/DO LCD
S711E6MODAO	Energy Plus Analyzer CT 1/5A RS485 8MB DI/DO 1 AO LCD
S711EROGETH30	Energy Plus Analyzer ETH. 8MB+3ROG L30Ø10CM DI/DO LCD
S711EROGETH45	Energy Plus Analyzer ETH. 8MB+3ROG L45Ø14CM DI/DO LCD
S711EROGETH70	Energy Plus Analyzer ETH. 8MB+3ROG L70Ø22CM DI/DO LCD
S711EROGMOD30	Energy Plus Analyzer RS485 8MB + 3 Rogowski Coils L30 Ø10CM DI/DO LCD
S711EROGMOD30AO	Energy Plus Analyzer 485 8MB + 3 Rogowski Coils L30 Ø10CM DI/DO/ AO LCD
S711EROGMOD45	Energy Plus Analyzer RS485 8MB + 3 Rogowski Coils L45 Ø14CM DI/DO LCD
S711EROGMOD45AO	Energy Plus Analyzer 485 8MB + 3 Rogowski Coils L45 Ø14CM DI/DO/ AO LCD
S711EROGMOD70	Energy Plus Analyzer RS485 8MB + 3 Rogowski Coils L70 Ø22CM DI/DO LCD
S711EROGMOD70AO	Energy Plus Analyzer 485 8MB + 3 Rogowski Coils L70 Ø22CM DI/DO/ AO LCD

Code	Description
ROGOWSKI SENSORS	
RC150-025-100-10	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 10m cable
RC150-025-100-3M	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 3m cable
RC150-025-100-5M	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 5m cable
RC150-035-100-3M	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 3m cable
RC150-035-100-5M	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 5m cable
RC150-035-100-10	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 10m cable
RC150-040-100-10	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 10m cable
RC150-040-100-3M	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 3m cable
RC150-040-100-5M	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 5m cable
RC150-060-100-10	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 10m cable
RC150-060-100-3M	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 3m cable
RC150-060-100-5M	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 5m cable
RC150-090-100-10	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 10m cable
RC150-090-100-3M	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 3m cable
RC150-090-100-5M	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 5m cable
RC150-120-100-3M	Rogowski Sensor L=12cm, Ø 38cm, 100mV/1kA - 50Hz, 3m cable
RC150-120-100-5M	Rogowski Sensor L=12cm, Ø 38cm, 100mV/1kA - 50Hz, 5m cable
RC150-130-100-5M	Rogowski Sensor L=13cm, Ø 38cm, 100mV/1kA - 50Hz, 5m cable
RC150-180-100-3M	Rogowski Sensor L=180cm, Ø 57cm, 100mV/1kA - 50Hz, 3m cable
RC150-280-100-5M	Rogowski Sensor L=280cm, Ø 89cm, 100mV/1kA - 50Hz, 5m cable
RC150-300-100-5M	Rogowski Sensor L=300cm, Ø 96cm, 100mV/1kA - 50Hz, 5m cable
RC190-030-333-3M	Rogowski Sensor L=30cm, Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-030-333-5M	Rogowski Sensor L=30cm, Ø 9cm, 333mV/1kA - 50Hz, 5m cable
RC190-035-333-3M	Rogowski Sensor L=35cm, Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-060-333-3M	Rogowski Rogowski Sensor L=60cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-090-333-3M	Rogowski Rogowski Sensor L=90cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-160-333-3M	Rogowski Rogowski Sensor L=160cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable

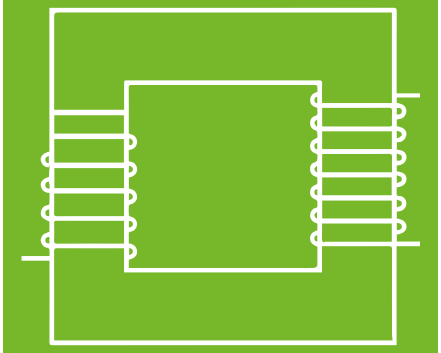
S604 / S711 SERIES

Measurement Parameters

Instantaneous values		Base	Energy Plus
VOLTAGE	VL1-N, VL2-N, VL3-N, VL1-L2, VL2-L3, VL3-L1, VΣ [V]	●	● MAM
CURRENT (+/-)	IL1, IL2, IL3, IN, IΣ [A]	●	● MAM
ACTIVE POWER (+/-)	PL1, PL2, PL3, PΣ [W] AVG	● AVG	● MAM
REACTIVE POWER (+/-)	QL1, QL2, QL3, QΣ [var] AVG	● AVG	● MAM
APPARENT POWER (+/-)	SL1, SL2, SL3, SΣ [VA]	●	● MAM
POWER FACTOR (inductive & capacitive)	PFL1, PFL2, PFL3, PFΣ	●	● MAM
DPF (+/-)	DPFL1, DPFL2, DPFL3 MAM		● MAM
TANGENT Ø (+/-)	TANØL1, TANØL2, TANØL3, TANØΣ	●	● MAM
VOLTAGE THD	THDVL1, THDVL2, THDVL3, THDVL1-L2, THDVL2-L3, THDVL3-L1 [V]	●	● MAM
CURRENT THD	THDAL1, THDAL2, THDAL3, THDAN [A]	●	● MAM
FREQUENCY	f [Hz]	●	● MAM
PHASE ORDER	Ph	●	●
AVERAGE VALUES (DMD)			
AVERAGE CURRENT (absolute)	IL1DMD, IL2DMD, IL3DMD, INDMD, IΣDMD [A]		●
AVERAGE ACTIVE POWER (import & export)	PL1DMD, PL2DMD, PL3DMD, PΣDMD [W]	●	●
SYSTEM AVERAGE ACTIVE POWER BALANCE (+/-)	PΣDMDBAL [W]		●
AVERAGE REACTIVE POWER (import & export)	QL1DMD, QL2DMD, QL3DMD, QΣDMD [var]	●	●
SYSTEM AVERAGE REACTIVE POWER BALANCE (+/-)	QΣDMDBAL [var]		●
AVERAGE APPARENT POWER (import & export)	SL1DMD, SL2DMD, SL3DMD, SΣDMD [VA]		●
SYSTEM AVERAGE APPARENT POWER BALANCE (+/-)	SΣDMDBAL [VA]		●
AVERAGE POWER FACTOR (import & export)	PFL1DMD, PFL2DMD, PFL3DMD, PFΣDMD		●
MAXIMUM VALUES			
MAXIMUM VOLTAGE	VL1-NMAX, VL2-NMAX, VL3-NMAX, VL1-L2MAX, VL2-L3MAX, VL3-L1MAX, VΣMAX [V]	●	●
MAXIMUM CURRENT (absolute)	IL1MAX, IL2MAX, IL3MAX, INMAX, IΣMAX [A]	●	●
MAXIMUM ACTIVE POWER (import & export)	PL1MAX, PL2MAX, PL3MAX, PΣMAX [W]		●
MAXIMUM REACTIVE POWER (import & export)	QL1MAX, QL2MAX, QL3MAX, QΣMAX [var]		●
MAXIMUM APPARENT POWER (import & export)	SL1MAX, SL2MAX, SL3MAX, SΣMAX [VA]		●
MAXIMUM POWER FACTOR (import & export)	PFL1MAX, PFL2MAX, PFL3MAX, PFΣMAX		●
MAXIMUM TANGENT Ø (import & export)	TANØL1MAX, TANØL2MAX, TANØL3MAX, TANØΣMAX		●
MAXIMUM VOLTAGE THD	THDVL1MAX, THDVL2MAX, THDVL3MAX, THDVL1-L2MAX, THDVL2-L3MAX, THDVL3-L1MAX [V]		●
MAXIMUM CURRENT THD	THDAL1MAX, THDAL2MAX, THDAL3MAX, THDANMAX [A]		●
MAXIMUM AVERAGE CURRENT (DMD)	IL1MAXDMD, IL2MAXDMD, IL3MAXDMD, IΣMAXDMD [A]		●
MAXIMUM AVERAGE ACTIVE POWER (DMD) (import & export)	PL1MAXDMD, PL2MAXDMD, PL3MAXDMD, PΣMAXDMD [W]	●	●
MAXIMUM AVERAGE REACTIVE POWER (DMD) (import & export)	QL1MAXDMD, QL2MAXDMD, QL3MAXDMD, QΣMAXDMD [var]	●	●
MAXIMUM AVERAGE APPARENT POWER (DMD) (import & export)	SL1MAXDMD, SL2MAXDMD, SL3MAXDMD, SΣMAXDMD [VA]		●
MINIMUM VALUES			
MINIMUM ACTIVE POWER	PΣMIN [W]	●	●
MINIMUM REACTIVE POWER	QΣMIN [var]	●	●
MINIMUM APPARENT POWER	SΣMIN [VA]	●	●
Counters			
ACTIVE ENERGY (import & export)	kWhL1, kWhL2, kWhL3, kWhΣ [Wh]	●	● EC
SYSTEM ACTIVE ENERGY BALANCE	kWhΣBAL [Wh]	●	● EC
REACTIVE ENERGY (import & export) (inductive & capacitive)	kvarhL1, kvarhL2, kvarhL3, kvarhΣ [varh]	●	● EC
SYSTEM REACTIVE ENERGY BALANCE (inductive & capacitive)	kvarhΣBAL [varh]	●	● EC
APPARENT ENERGY (import & export) (inductive & capacitive on request)	kVAhL1, kVAhL2, kVAhL3, kVAhΣ [VAh]	●	● EC
SYSTEM APPARENT ENERGY BALANCE (inductive & capacitive on request)	kVAhΣBAL [VAh]	●	● EC
INSTALLATION HOURS COUNTER	HRCNTi [h]		●
MEASUREMENT HOURS COUNTER	HRCNTm [h]		●
HARMONIC ANALYSIS UP TO THE 15th			
VOLTAGE HARMONICS	VL1-N, VL2-N, VL3-N, VL1-L2, VL2-L3, VL3-L1 [V]		● MAM
CURRENT HARMONICS	IL1, IL2, IL3, IN [A]		● MAM

LEGEND
● = Standard
AVG = Parameters for recording average values (fixed)
MAM = Parameters for recording MIN/MED/MAX values (up to 24 programmable parameters)
EC = Parameters for energy meter recording (fixed)
imp&exp = Separate values for imported and exported
abs = Absolute value
ind&cap = Separate values for inductive and capacitive
DMDBAL = Difference between the positive average value and the negative average value: [DMD+] - [DMD-]
BAL = Difference between the imported and exported value: [imp] - [exp]

3.3



CURRENT TRANSFORMERS TAA / TAC SERIES

CURRENT TRANSFORMERS TAA / TAC Series



The current transformers of the TAA / TAC Series are components with accuracy class 0.5, available in split-core versions (for easy installation), wound primary (for low primary current values), and busbar types (for high primary current values). They can be used for current measurement with both cables and busbar systems. They are the ideal complement for current measurement in combination with network analyzers, energy meters, and electrical measurement converters. The current transformers of the TAA / TAC Series are installed to reduce the line current to a value of up to 5 A on the secondary output circuit.

SUPPLY COMPLEMENT for analyzers, meters, converters

WIDE RANGE
Split-core models
Wound primary models
Busbar models

EASY INSTALLATION AND MAINTENANCE

TRANSFORMATION RATIO FROM 20/5 TO 1000/5

PRECISION CLASS 0.5

SECONDARY CURRENT 5A

NOMINAL CURRENT
2.5 I.ter@1s (dynamic)
40-80 IpN@1s (thermal)

PERFORMANCE / LOAD From 1 VA to 8 VA

WOUND PRIMARY CLOSED CURRENT TRANSFORMERS

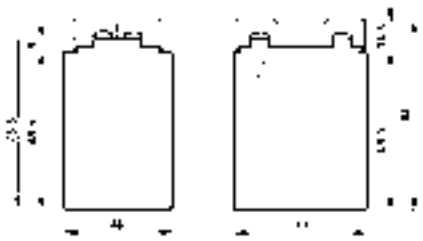


COMMON DATA	
Precision class	0.5
Nominal performance	3 VA
Secondary current	5A
Frequency	40-60 Hz
Nominal dynamic DC current	2.5 I.ter@1s
Nominal thermal DC current	40-80 IpN@1s
Reference voltage	0.72 kV
Test voltage	3kV@50Hz (1 min)
Permanent overcurrent	1.2 In
Safety coefficient (FS)	=<5
Operating Temperature	-25..+50°C
Storage Temperature	-40..+80°C
Relative humidity	90% without condensation
Air Isolation	Class E
Protection class	IP30 (CEI EN 60529)
Enclosure	Self-extinguishing ABS, sealable terminal covers
Installation type	DIN rail
Pole Dimensions	6 mm
Dimensions	47x56x84 mm
Reference standards	CEI 38-1, IEC 185, VDE 0414, EN600044-1, EN60044-1A

ORDER CODES

Order Code	Transformation ratio
TAC-0205-00-0000	20/5
TAC-0255-00-0000	25/5
TAC-0305-00-0000	30/5

DIMENSIONS



SPLIT-CORE CURRENT TRANSFORMERS



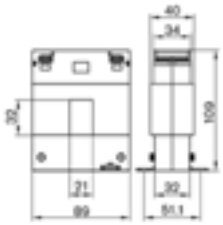
COMMON DATA

Precision class	0.5
Secondary current	5A
Frequency	40-60 Hz
Nominal dynamic DC current	2.5 I.ter@1s
Nominal thermal DC current	40-80 IpN@1s
Reference voltage	0.72 kV
Test voltage	3kV@50Hz (1 min)
Permanent overcurrent	1.2 In
Safety coefficient (FS)	=<5
Operating Temperature	-25..+50°C
Storage Temperature	-40..+80°C
Maximum cable temperature passing through	70°C
Relative humidity	90% without condensation
Air Isolation	Class E
Protection class	IP30 (CEI EN 60529)
Enclosure	Self-extinguishing ABS, protected terminals
Installation type	DIN rail
Reference standards	CEI 38-1, IEC 185, VDE 0414, EN600044-1, EN60044-1A

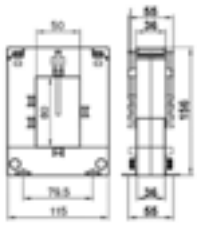
ORDER CODES

Order Code	Transformation ratio	Nominal performance	Fanless	Dimensions
TAA-01005-2030	100/5	1.5 VA	20x30 mm	89x111x40 mm
TAA-01505-2030	150/5	1.5 VA	20x30 mm	89x111x40 mm
TAA-02005-2030	200/5	1.5 VA	20x30 mm	89x111x40 mm
TAA-02505-2030	250/5	1.5 VA	20x30 mm	89x111x40 mm
TAA-03005-2030	300/5	1.5 VA	20x30 mm	89x111x40 mm
TAA-02505-5080	250/5	1.5 VA	50x80 mm	114x145x82 mm
TAA-04005-5080	400/5	1.5 VA	50x80 mm	114x145x82 mm
TAA-05005-5080	500/5	2.5 VA	50x80 mm	114x145x82 mm
TAA-06005-5080	600/5	2.5 VA	50x80 mm	114x145x82 mm
TAA-07505-5080	750/5	2.5 VA	50x80 mm	114x145x82 mm
TAA-08005-5080	800/5	2.5 VA	50x80 mm	114x145x82 mm
TAA-05005-8080	500/5	2.5 VA	80x80 mm	144x145x82 mm
TAA-08005-8080	800/5	2.5 VA	80x80 mm	144x145x82 mm
TAA-10005-8080	1000/5	2.5 VA	80x80 mm	144x145x82 mm

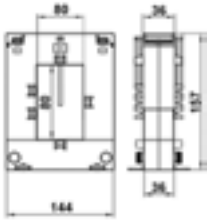
DIMENSIONS



SPLIT-CORE WITH HOLE CURRENT TRANSFORMERS 20x30 mm



SPLIT-CORE WITH HOLE CURRENT TRANSFORMERS 50x80 mm



SPLIT-CORE WITH HOLE CURRENT TRANSFORMERS 80x80 mm

BUSBAR CLOSED CURRENT TRANSFORMERS



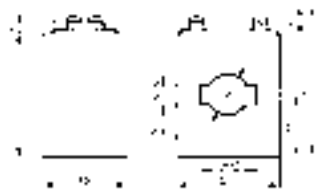
COMMON DATA

Secondary current	5A
Frequency	40-60 Hz
Nominal dynamic DC current	2.5 I.ter@1s
Nominal thermal DC current	40-80 IpN@1s
Reference voltage	0.72 kV
Test voltage	3kV@50Hz (1 min)
Permanent overcurrent	1.2 In
Safety coefficient (FS)	=<5
Operating Temperature	-25..+50°C
Storage Temperature	-40..+80°C
Maximum cable temperature passing through	70°C
Relative humidity	90% without condensation
Air Isolation	Class E
Protection class	IP30 (CEI EN 60529)
Enclosure	Self-extinguishing ABS, sealable terminal covers
Installation type	DIN rail
Dimensions	46x57x83.5 mm
Reference standards	CEI 38-1, IEC 185, VDE 0414, EN600044-1, EN60044-1A

ORDER CODES

Code Order Code	Precision class	Transformation ratio	Nominal performance	Fanless	Dimensions
TAC-0505-22-3010	1	50/5	1 VA	Cable: 22 mm Busbar 30x10 mm	46x57x83.5 mm
TAC-0605-22-3010	1	60/5	1 VA	Cable: 22 mm Busbar 30x10 mm	46x57x83.5 mm
TAC-01005-22-3010	1	100/5	1.5 VA	Cable: 22 mm Busbar 30x10 mm	46x57x83.5 mm
TAC-01505-22-3010	1	150/5	1.5 VA	Cable: 22 mm Busbar 30x10 mm	46x57x83.5 mm
TAC-01005-32-4010	1	100/5	2 VA	Cable: 32 mm Busbar 40x10 mm	46x71x98.5 mm
TAC-02505-32-4010	0.5	250/5	2.5 VA	Cable: 32 mm Busbar 40x10 mm	46x71x98.5 mm
TAC-04005-32-4010	0.5	400/5	5 VA	Cable: 32 mm Busbar 40x10 mm	46x71x98.5 mm
TAC-05005-32-4010	0.5	500/5	6 VA	Cable: 32 mm Busbar 40x10 mm	46x71x98.5 mm
TAC-08005-32-4010	0.5	800/5	8 VA	Cable: 32 mm Busbar 40x10 mm	46x71x98.5 mm

DIMENSIONS



BUSBAR CLOSED CURRENT TRANSFORMERS Cable 22mm, busbar 30x10 mm

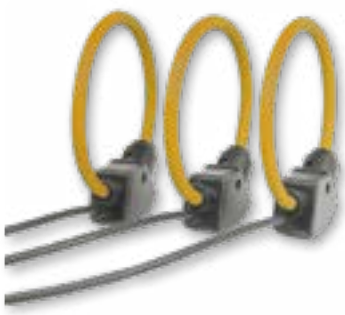


BUSBAR CLOSED CURRENT TRANSFORMERS Cable 32mm, busbar 40x10 mm

3.4



ROGOWSKI SENSORS



RC150 / RC190 SERIES

A flexible coil without a magnetic core, shaped like a toroid, is placed around the current conductor. The variable magnetic field produced by the current induces a voltage in the coil.

The output voltage is proportional to the rate of change of the current and, after an integrator circuit, it is proportional to the current value itself (as with a current transformer). The coil length varies from 25 to 300 cm with a rope diameter reduced to about 8 mm.

HIGHLIGHTS

TECHNOLOGY

- Junction point insensitive to the position of the inner conductor and currents from external conductors
- Shielded coil and cable against electromagnetic noise

ENGINEERING

- Coil diameter reduced to about 8 mm
- High flexibility

CALIBRATION

- Accuracy better than 1% even near the coil closure point
- Calibration point easily accessible for recalibration

OPTIMAL CLOSURE

- Secure closure even in the presence of vibrations and/or strains
- Stable closure ensures measurement repeatability

INSTALLATION

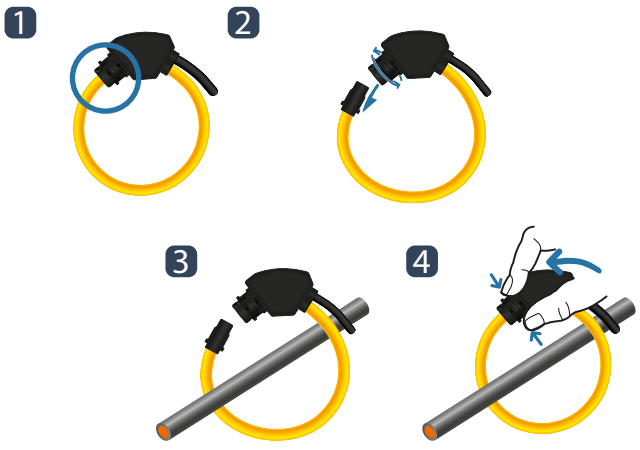
- Applications with difficult access
- Non-intrusiveness in the measurement circuit

TYPICAL APPLICATIONS

- Measurement of high currents
- Harmonics, transients, machine load, power, and consumption supervision
- Laboratory measuring instruments
- Control of welding machines

INSTALLATION PHASES

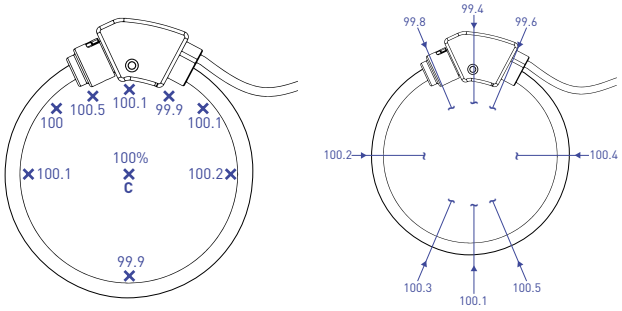




DIMENSIONS



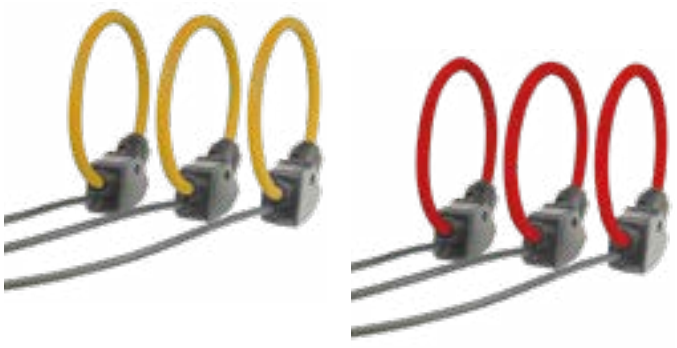
PRECISION RANGE



C (conductor centered)

HIGH-EFFICIENCY ROGOWSKI FLEXIBLE TRANSDUCERS

RC150 / RC190 SERIES

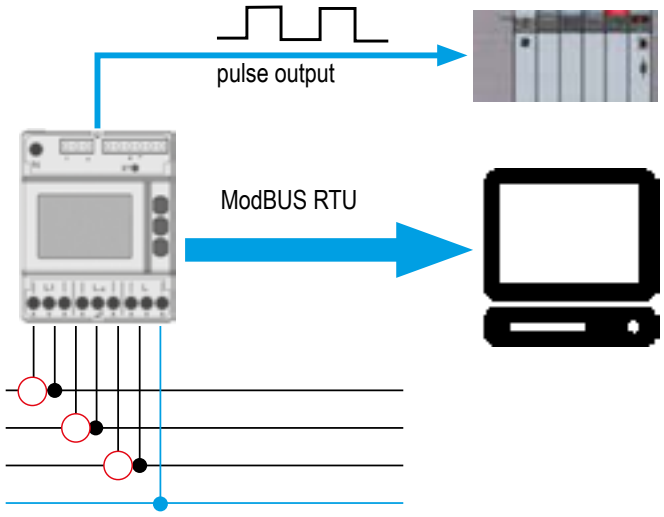


Suitable for measuring currents from mA to hundreds of kA, the RC150 and RC190 series ensure high linearity, wide dynamic range, and are very useful with large or irregularly shaped conductors. Their light weight and flexibility also make them optimal for use in places with limited access.
The transducers present no danger to open secondaries and cannot be damaged by large overloads. The absence of a magnetic core gives this range a very wide frequency response. All this makes them particularly suitable for measuring harmonic content or transients.
The bayonet closure guarantees linear detection at any distance between the conductor and transducer, even if they are not perpendicular to each other.

TECHNICAL SPECIFICATIONS

GENERAL DATA	
Coil Length	From 25 to 300 cm (for RC150 versions) From 30 to 300 cm (for RC190 versions)
Coil Diameter	From 8 ±0.2 mm to 57 cm (RC150) From 12 ±0.2 mm to 57 cm (RC190)
Cable length	3 m
Closure	Bayonet
Protection class	IP67
Material	UL94-V0 thermoplastic
OPERATING TEMPERATURE	-30..+80°C
Weight	150 to 500 g
ELECTRICAL SPECIFICATIONS	
Output Level (RMS)	100 mV / 1 kA @50 Hz (standard) (RC150) 333 mV / 1 kA @50 Hz (standard) (RC190)
Transducer Resistance	70..900 Ω (RC150) 300..2,000 Ω (RC190)
Accuracy	Better than ±1% of reading (with a conductor diameter of 15 mm) across the coil diameter
Frequency	Approximately 40 Hz to 20 kHz
Working Voltage	1,000 Vrms CAT III, 600 Vrms CAT IV, pollution degree 2
Test voltage	7,400 Vrms / 1 min
STANDARD	
Certifications	CE

EXAMPLE APPLICATION

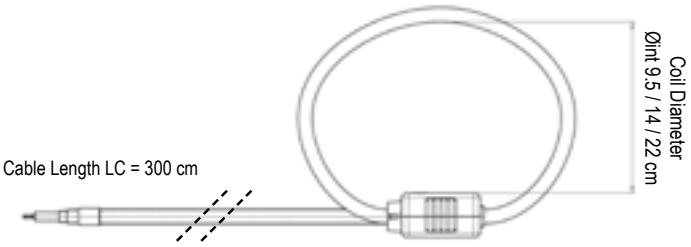


ORDER CODES

Code	Description
RC150-025-100-10	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 10m cable
RC150-025-100-3M	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 3m cable
RC150-025-100-5M	Rogowski Sensor L=25cm, Ø 8cm, 100mV/1kA - 50Hz, 5m cable
RC150-035-100-3M	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 3m cable
RC150-035-100-5M	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 5m cable
RC150-035-100-10	Rogowski Sensor L=35cm, Ø 11cm, 100mV/1kA - 50Hz, 10m cable
RC150-040-100-10	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 10m cable
RC150-040-100-3M	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 3m cable
RC150-040-100-5M	Rogowski Sensor L=40cm, Ø 12cm, 100mV/1kA - 50Hz, 5m cable
RC150-060-100-10	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 10m cable
RC150-060-100-3M	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 3m cable
RC150-060-100-5M	Rogowski Sensor L=60cm, Ø 19cm, 100mV/1kA - 50Hz, 5m cable
RC150-090-100-10	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 10m cable
RC150-090-100-3M	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 3m cable
RC150-090-100-5M	Rogowski Sensor L=90cm, Ø 28cm, 100mV/1kA - 50Hz, 5m cable
RC150-120-100-3M	Rogowski Sensor L=12cm, Ø 38cm, 100mV/1kA - 50Hz, 3m cable
RC150-120-100-5M	Rogowski Sensor L=12cm, Ø 38cm, 100mV/1kA - 50Hz, 5m cable
RC150-130-100-5M	Rogowski Sensor L=13cm, Ø 38cm, 100mV/1kA - 50Hz, 5m cable
RC150-180-100-3M	Rogowski Sensor L=180cm, Ø 57cm, 100mV/1kA - 50Hz, 3m cable
RC150-280-100-5M	Rogowski Sensor L=280cm, Ø 89cm, 100mV/1kA - 50Hz, 5m cable

The technical data and diagrams in this document are indicative and not binding.

DIMENSIONS



ORDER CODES

Code	Description
RC150-300-100-5M	Rogowski Sensor L=300cm, Ø 96cm, 100mV/1kA - 50Hz, 5m cable
RC190-030-333-3M	Rogowski Sensor L=30cm, Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-030-333-5M	Rogowski Sensor L=30cm, Ø 9cm, 333mV/1kA - 50Hz, 5m cable
RC190-035-333-3M	Rogowski Sensor L=35cm, Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-060-333-3M	Rogowski Rogowski Sensor L=60cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-090-333-3M	Rogowski Rogowski Sensor L=90cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable
RC190-160-333-3M	Rogowski Rogowski Sensor L=160cm, Øint. Ø 9cm, 333mV/1kA - 50Hz, 3m cable

VANTAGGI DELLA BOBINA DI ROGOWSKI

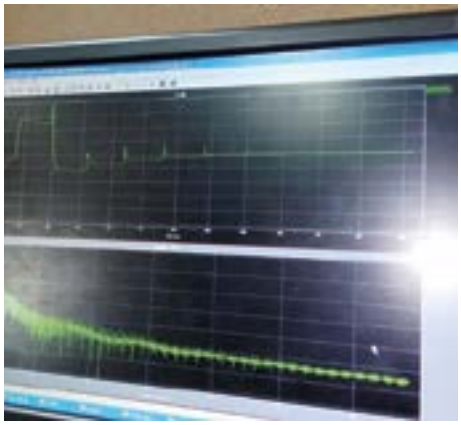
- Adatta alla misurazione di correnti fino a centinaia di kA
- Molto utile con grandi conduttori o di forma irregolare o in luoghi scarsamente accessibili
- Non intrusiva, non assorbe potenza dal circuito sotto misura
- Caratterizzata da elevata linearità
- Facilità di accoppiamento al conduttore da misurare

CAMPI DI IMPIEGO

Misura di correnti molto elevate



Supervisione di armoniche e transienti



Supervisione del carico di singoli macchinari



Supervisione della potenza e dei consumi



Strumenti di misura da laboratorio



Controllo di macchine per la saldatura



SENSORI DI ROGOWSKI VS TA

	Sensori di Rogowski	Trasformatori Amperometrici
Misura di correnti elevate	●	
Applicazioni con accesso difficoltoso	●	
Spazi di cablaggio ridotti		●
Linearità della misura	●	
Non intrusività nel circuito di misura	●	
Barriere all'adozione (abitudine elettricisti / quadristi)		●
Prezzo		●

3.5



ENERGY COUNTERS



S500 Series

ENERGY COUNTERS

The energy meters of the S500 Series in DIN format are used for energy measurement in industrial and civil environments. They are available with integrated, remote communication and MID certification. The LCD display shows the totalizers and instantaneous power. For remote management, the ENERGY MODBUS PACK tools for meters with ModBUS interface and ENERGY M-BUS PACK for meters with M-BUS interface are available, in addition to the Web Server for versions with an Ethernet interface. The S500 meters are built in full compliance with the EN 50470-1 standard. The accuracy of active energy is in accordance with IEC/EN 62053-21 class 1. The accuracy of reactive energy complies with IEC/EN 62053-23 class 2.

HIGHLIGHTS

M-BUS COMMUNICATION

- Standard for remote reading of energy meters, sensors, and actuators
- Simplified 2-wire bus connection
- High number of network nodes (max 250 per branch)

MID CERTIFICATION

- Instruments suitable for fiscal use
- European Directive 2014/22/EU for measuring instruments
- Supplementary metrological marking

S0 OUTPUT / TARIFF INPUT

- # 1 input for tariff
- # 2 S0 outputs for energy pulse re-emission

COMMUNICATION PROTOCOLS

- External communication modules with side optical port or integrated into the module
- Support for ModBUS, Ethernet, M-BUS, Konnex protocols

ACCURACY

- Active Energy: class B, EN 50470-3
- Reactive Energy: class 2, IEC EN 62053-23

CONNECTIONS

- For 3/4 wire networks with balanced/unbalanced load
- Current: direct connection or via CT
- Single-phase/Three-phase voltages

CONFIGURATION

- Via front keys
- ENERGY MODBUS PACK software
- ENERGY M-BUS PACK software
- Web Server

TYPICAL APPLICATIONS

- Energy totalization for industrial machinery
- Remote consumption monitoring
- Energy distribution
- Energy and fiscal accounting

500 SERIES

	S501-40	S502-80	S504C	S534
	 MID	 MID	 MID	 MID
	40A single-phase energy meter, 2 wires, 1 DIN, certified MID	**80A single-phase energy meter, 2 wires, 2 DIN, certified MID**	**6A/80A three-phase energy meter, 4 wires, 4 DIN, integrated communication, certified MID**	**6A/80A three-phase energy meter, 3/4 wires, 4 DIN, certified MID**
GENERAL DATA				
Power Supply	Voltage derived from measurement circuit			
Max Consumption	1.5 VA - 1 W	7.5 VA - 0.5 W (per phase)	7.5 VA - 0.5 W (per phase) - M-BUS version 3.5 VA - 1 W (per phase) - Modbus/ Ethernet version	7.5 VA - 0.5 W (per phase)
Accuracy	Active energy class 1 according to IEC/EN 62053-21 and class B according to EN 50470-3 (MID)			
Tariff Input		Active opto-isolated Tariff 2 voltage range: 80..276 Vac/dc		
Metrological LED	Meter constant 5000 imp/kWh Pulse duration 4±0.1 ms	Meter constant 1000 imp/kWh	Meter constant 10000 imp/kWh Pulse duration 10±2 ms	
Counter reset	Optional configurations available			
OPERATING TEMPERATURE	-25..+55°C			
Protection class	IP51 (front), IP20 (terminals)			
Dimensions	18x90x64 mm	36x90x64 mm	72x90x64 mm	
Certifications	CE, MID			
VOLTAGE				
Nominal Value	230 V, 50-60 Hz	230 V 50 Hz 240 V 50 Hz 230 V 50/60 Hz 230..240 V 50/60 Hz	3x230/400..3x240/415 V 50/60 Hz	3x230/400 V 50 Hz 3x240/415 V 50 Hz 3x230/400 V 50/60 Hz 3x230/400..3x240/415 V 50/60 Hz
CURRENT				
Starting current Ist	20mA		2 mA (S504C-6) / 20 mA (S504C-80)	2 mA (S534-6) / 20 mA (S534-80)
Minimum current Imin	250mA		10 mA (S504C-6) / 250 mA (S504C-80)	10 mA (S534-6) / 250 mA (S534-80)
Transition current Itr	500mA		50 mA (S504C-6) / 500 mA (S504C-80)	50 mA (S534-6) / 500 mA (S534-80)
Reference current Iref (Ib)	5A		1 A (S504C-6) / 5 A (S504C-80)	1 A (S534-6) / 5 A (S534-80)
Maximum current Imax	40A		6 A (S504C-6) / 80 A (S504C-80)	6 A (S534-6) / 80 A (S534-80)
S0 OUTPUTS / ENERGY PULSE EMISSION				
Quantity/Type	1 passive opto-isolated	2 passive opto-isolated		
Maximum values	27 Vdc - 27 mA	250 Vac/dc - 100 mA	27 Vdc - 27 mA	250 Vac/dc - 100 mA
Pulse duration	100±0.5 ms	50±2 ms		
Meter constant	1000 imp/kWh	-	-	-
COMMUNICATION				
Supported Protocols	ModBUS, M-BUS, Ethernet	ModBUS, M-BUS, Ethernet, Konnex	ModBUS, M-BUS, Ethernet	ModBUS, M-BUS, Ethernet, Konnex
ModBUS Communication	RS485 port, Modbus RTU/ASCII, 30..57600 bps	-	RS485 port, Modbus RTU/ASCII, 30..57600 bps	-
M-BUS COMMUNICATION	EN 1434-3 wired port, M-BUS, 300..38400 bps	-	EN 1434-3 wired port, M-BUS, 300..38400 bps	-
Ethernet Communication	10/100BaseT, http, Ntp, Dhcp, Modbus TCP, 10/100 Mbps, data recording, web server	-	10/100BaseT, http, Ntp, Dhcp, Modbus TCP, 10/100 Mbps, data recording, web server	-
Type	Integrated / Via external interface	Via external interface	Integrated	Via external interface
CONFIGURATION				
Front keys	Yes			
PC Windows Software	E-MODBUS-PACK, E-MBUS-PACK			
			WEB SERVER	

The technical data and diagrams in this document are indicative and not binding.

S500 SERIES - PROGRAMMING

FRONT KEYS



Using the front keys available on all models, the following functions can be performed:

- **Scroll through pages and groups**
- **Temporarily display secondary values**
- **Access/exit programming pages**
- **Start/stop/reset partial counter**
- **Parameter settings**
- **Display test**

WEB SERVER



All S500 Series meters in the Ethernet version with integrated or external COM have access to a WEB SERVER via a secure connection.
The WEB SERVER provides access to the values present in the module and defines a recording with an exportable file in .csv format.

ENERGY MODBUS PACK



Downloadable for free from www.seneca.it

The models with Modbus communication can be configured via the ENERGY MODBUS PACK software package downloadable from www.seneca.it.

- **Serial port settings**
- **Search/add meters to the network**
- **Network parameter configuration for each meter**

ENERGY M-BUS PACK



Downloadable for free from www.seneca.it

The models with M-BUS communication can be configured via the ENERGY M-BUS PACK software package downloadable from www.seneca.it.

- **Serial port settings**
- **Search/add meters to the network**
- **Network parameter configuration for each meter**

ORDER CODES

Code	Description
COUNTERS	
S501-40-0	40A single-phase energy meter, 2 wires, 1 DIN
S501-40-0-MID	40A single-phase energy meter, 2 wires, 1 DIN, certified MID
S501-40-MOD-MID	40A single-phase energy meter, 2 wires, 1 DIN, RS485 Modbus, certified MID
S501-40-MBU-MID	40A single-phase energy meter, 2 wires, 1 DIN, M-Bus, certified MID
S502-80-MOD	80A single-phase energy meter, 2 wires, 2 DIN, RS485 Modbus
S502-80-MBU	80A single-phase energy meter, 2 wires, 2 DIN, M-Bus
S502-80-ETH	80A single-phase energy meter, 2 wires, 2 DIN, Ethernet
S502-80-MID	80A single-phase energy meter, 2 wires, 2 DIN, certified MID
S502-80-R	80A single-phase energy meter, 2 wires, 2 DIN, reset all counters
S504C-6-MOD-MID	1/5A three-phase energy meter, 4 wires, 4 DIN-RS485 Modbus, certified MID
S504C-6-MBU-MID	1/5A three-phase energy meter, 3/4 wires, 4 DIN-MBus, certified MID
S504C-6-ETH-MID	1/5A three-phase energy meter, 4 wires, 4 DIN-Ethernet, certified MID
S504C-80-MOD-MID	80A three-phase energy meter, 4 wires, 4 DIN-RS485 Modbus, certified MID
S504C-80-MBU-MID	80A three-phase energy meter, 4 wires, 4 DIN-MBus, certified MID
S504C-80-ETH-MID	80A three-phase energy meter, 4 wires, 4 DIN-Ethernet, certified MID
S534-6-MID	1/5A three-phase energy meter, 3/4 wires, 4 DIN, certified MID
S534-80-MID	80A three-phase energy meter, 3/4 wires, 4 DIN, certified MID
ACCESSORIES	
S107USB	Portable USB/RS485 Serial Converter
S117P1	Configuration Kit K121, K120RTD, K111, T120, T121 - Portable Serial RS232-TTL-RS485/USB Converter
S107MBU	USB - M-BUS Converter/Adapter, Portable Version
S500-MOD	Optical Communication Interface - RS485 Modbus Rtu Standard
S500-MBU	Optical Communication Interface - M-Bus
S500-ETH	Optical Communication Interface - LAN Modbus TCP-IP, web server
S500-KNX	Optical Communication Interface – KNX (Konnex)
SOFTWARE	
E-MODBUS PACK	Energy meter management software for the S500 Series with Modbus/Ethernet communication
E-M-BUS PACK	Energy meter management software for the S500 Series with M-BUS communication

S501 SERIES

Measurement Parameters	Symbol	UdM/State	Display	COM Port
Instantaneous values				
Voltage	V	V	●	●
Current	I	A	■	■
Power factor	PF		■	■
Active Power	P	kW	■	■
Apparent Power	S	kVA	■	■
Reactive Power	Q	kvar	■	■
Frequency	f	Hz	●	●
Power Direction	↔ display) +/- (port)		●	●
Stored Data				
Active energy		kWh	■	■
Inductive and capacitive apparent energy		kVAh	■	■
Inductive and capacitive reactive energy		kvarh	■ ◊	■
Resettable energy meters (NON-MID)		kWh, kVAh, kvarh	■ ◊	■
Resettable partial energy meters		kWh, kVAh, kvarh	■ ◊	■
Other Information				
Partial counter status	P	Started / Stopped	●	●
S0 output status	●	Active	●	

LEGEND

● = Present

■ = Bidirectional value

◊ = varh not available for MID S instrument

S502 SERIES

Measurement Parameters	Symbol	UdM/State	Display	COM Port
Instantaneous values				
Voltage	V	V		●
Current	I	A		■
Power factor	PF			■
Active Power	P	kW	■	■
Apparent Power	S	kVA	■	■
Reactive Power	Q	kvar	■	■
Frequency	f	Hz		●
Power Direction	↔		●	●
Stored Data				
Active energy		kWh	■	■
Inductive and capacitive apparent energy		kVAh	■ ◊	■ ◊
Inductive and capacitive reactive energy		kvarh	■	■
T1/T2 Tariff energy meters		kWh, kVAh, kvarh	■ ◊	■
Resettable partial energy meters		kWh, kVAh, kvarh	■ ◊	■
Energy balance		kWh, kVAh, kvarh	■ ◊	■
Other Information				
Current tariff	T	1/2		●
Voltage above/below limit	VOL, VUL	ON/OFF		●
Current above/below limit	IOL, IUL	ON/OFF		●
Frequency above/below limit	fOL, fUL	ON/OFF		●
Partial counters	PAR	START/STOP	●	●
S0 output status	1, 2	Active / Not active	●	

LEGEND

● = Present

■ = Bidirectional value

◊ = varh not available for MID S instrument

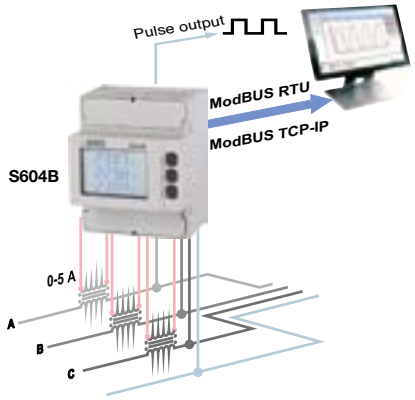
S504C - S534 SERIES

Measurement Parameters	Symbol	UdM/State	Display	COM Port	3-wire system	4-wire system
Instantaneous values						
Phase voltage	VL1-N - VL2-N - VL3-N	V		●		●
Line voltage	VL1-L2 - VL2-L3 - VL3-L1	V		●	●	●
System voltage	VΣ	V		●	●	●
Phase current	I1 - I2 - I3	A		■	●	●
Neutral current	IN	A		■		●
System current	IΣ	A		■	●	●
Phase power factor	PFL1 - PFL2 - PFL3	-		●		●
System power factor	PFΣ	-		●	●	●
Apparent phase power	SL1 - SL2 - SL3	VA (kVA)	■	■		●
Apparent system power	SΣ	VA (kVA)	■	■	●	●
Active phase power	PL1 - PL2 - PL3	W (kW)	■	■		●
Active system power	PΣ	W (kW)	■	■	●	●
Reactive phase power	QL1 - QL2 - QL3	var (kvar)	■	■		●
Reactive system power	QΣ	var (kvar)	■	■	●	●
Frequency	f	Hz		●	●	●
Phase order	CW/CCW	-	●	●	●	●
Energy direction	↔	-	●	●	●	●
Stored Data						
Active phase energy	L1 - L2 - L3	Wh (kWh)	■	■		●
Active system energy	Σ	Wh (kWh)	■	■	●	●
Reactive inductive and capacitive phase energy	L1 - L2 - L3	varh (kvarh)	■ ◊	■		●
Reactive inductive and capacitive system energy	Σ	varh (kvarh)	■ ◊	■	●	●
Inductive and capacitive apparent phase energy	L1 - L2 - L3	VAh (kVAh)	■	■		●
Inductive and capacitive apparent system energy	Σ	VAh (kVAh)	■	■	●	●
Active phase energy tariff 1/2	L1 - L2 - L3	Wh (kWh)	■	■		●
Active system energy tariff 1/2	Σ	Wh (kWh)	■	■	●	●
Reactive inductive and capacitive phase energy tariff 1/2	L1 - L2 - L3	varh (kvarh)	■ ◊	■		●
Reactive inductive and capacitive system energy tariff 1/2	Σ	varh (kvarh)	■ ◊	■	●	●
Inductive and capacitive apparent phase energy tariff 1/2	L1 - L2 - L3	VAh (kVAh)	■	■		●
Inductive and capacitive apparent system energy tariff 1/2	Σ	VAh (kVAh)	■	■	●	●
Resettable partial energy meters	Σ	Wh, varh, VAh (kWh, kvarh, kVAh)	■ ◊	■	●	●
Energy balance	Σ	Wh, varh, VAh (kWh, kvarh, kVAh)	■ ◊	■	●	●
Other Information						
Current tariff	T	1/2		●		
Secondary values	SEC	ON/OFF	●	●		
CT ratio	CT	Set value	●	●		
Voltage above/below limit	VOL, VUL	ON/OFF		●		
Current above/below limit	IOL, IUL	ON/OFF		●		
Frequency out of range	fOUT	ON/OFF		●		
Partial counters	PAR	START/STOP	●	●		
S0 output status	1, 2	Active	●			

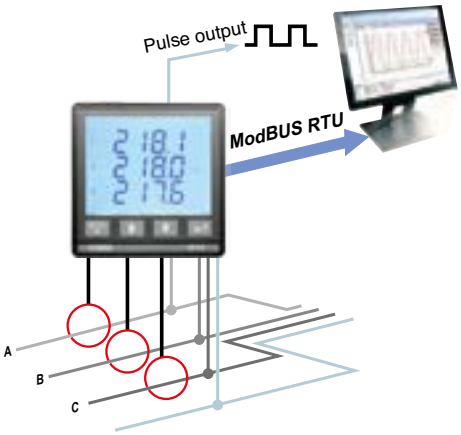
LEGEND
● = Present
■ = Bidirectional value
◊ = varh not available for MID S instrument

APPLICATION DIAGRAMS

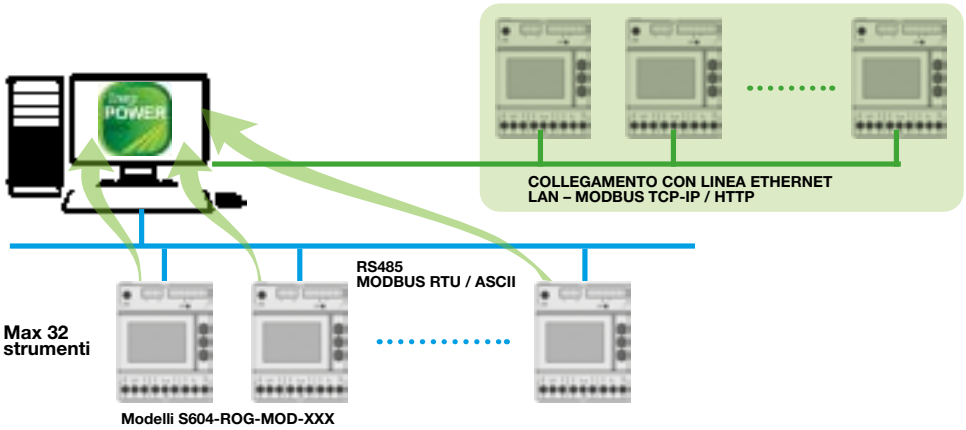
S604B/E



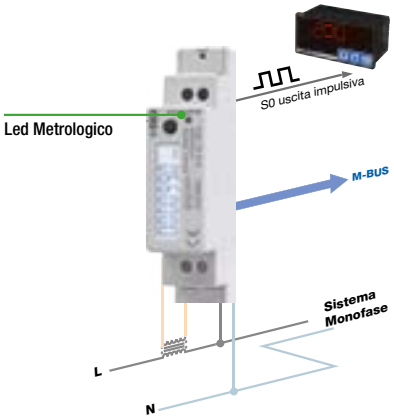
S711



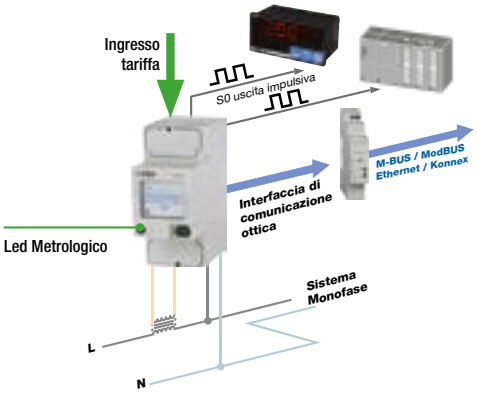
S604 / S711



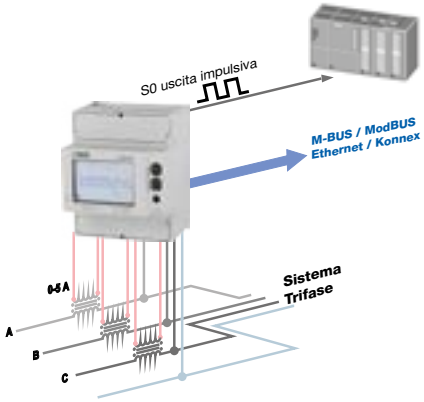
S501



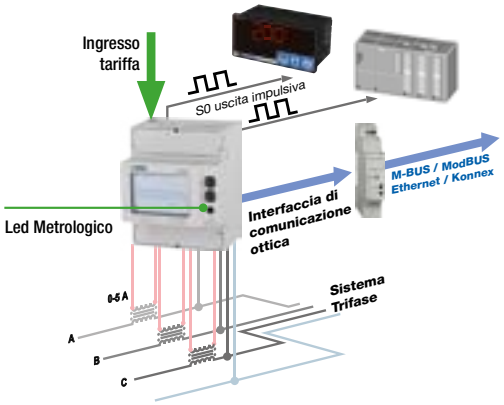
S502



S504C



S504 / S534



OPTICAL COMMUNICATION INTERFACES

S500-ETH
Interfaccia di comunicazione ottica - LAN Modbus TCP-IP, web server



S500-KNX
Interfaccia di comunicazione ottica – KNX (Konnex)



S500-MBU
Interfaccia di comunicazione ottica - M-Bus



S500-MOD
Interfaccia di comunicazione ottica - RS485 Modbus Rtu standard



WEB SERVER
- Visualizzazione valori in tempo reale
- Contatori totali
- Archiviazione ed esportazione dati
- Bilanci energia attiva, reattiva, apparente



SOFTWARE

ENERGY MODBUS PACK
- Parametri di connessione seriale
- Gestione contatori
- Aggiornamento firmware
- Gestione misure, valori, allarmi



ENERGY M-BUS PACK
- Configurazione rete M-BUS
- Ricerca e aggiunta automatica contatori
- Parametri di comunicazione



CAMPI DI IMPIEGO

Totalizzazione dell'energia elettrica per macchinari industriali



Misura dell'energia generata da fonti rinnovabili



Contabilizzazione dei consumi per centri residenziali e strutture ricettive



Ripartizione energetica dei consumi in edifici e complessi a uso terziario



Sistemi di monitoraggio e controllo



Monitoraggio remoto dei consumi e calcolo dei costi



3.6



CURRENT TRANSDUCERS

HOW TO MEASURE AND CONVERT CURRENT

CURRENT TRANSFORMERS WITH ANALOG OUTPUT

Current transformers with Volt or milliamp output (also available with loop power supply, ModBUS interface, and digital contacts for alarm management) provide direct current measurements that can be acquired by PLCs, indicators, and acquisition and control systems, without the need for separate transducers or auxiliary power wiring. The measurement conversion stage and output signal generation are integrated within the transducer. Modular current converters for panels measure alternating current applied at the input or acquired through sensors, then provide mA or V signals directly proportional to the measured current.

SOLUTIONS SENECA



CURRENT TRANSFORMERS T201 SERIES WITH ANALOG OUTPUT



OPEN CURRENT TRANSFORMERS T201 SERIES OPEN WITH ANALOG OUTPUT



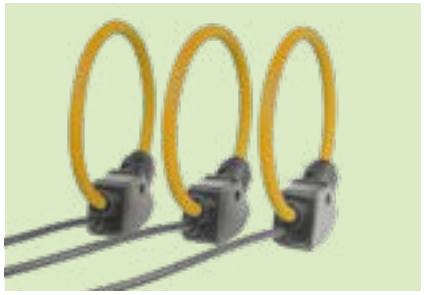
MODULAR CONVERTERS WITH ANALOG OUTPUT

CURRENT SENSORS AND MEASURING INSTRUMENTS

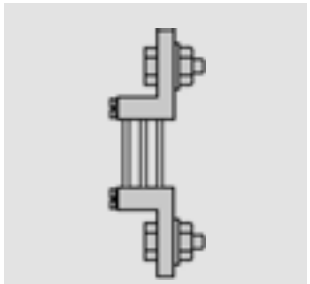
Rogowski sensors are flexible, coreless coils placed around the current conductor. They are suitable for measuring high currents by wrapping large bundles of cables, bus bars, irregularly shaped conductors, and hard-to-access conductors. Current shunts detect current flow through a low-value ohm precision resistor inserted in the current path. Zero Flux current sensors use a winding that makes them ideal for high precision measurements. Ammeters, clamp meters, and multimeters are also available that allow rapid current measurement with diagnostic functions and without circuit interruptions.

SENECA SOLUTIONS

OTHER OPTIONS



ROGOWSKI SENSORS - RC150 SERIES SENECA



SHUNT - DERIVATORS



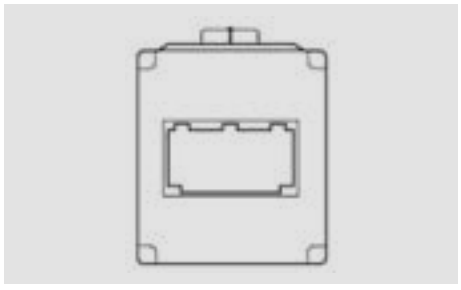
ZERO FLUX SENSORS



CLAMP METERS

AMMETER TRANSFORMERS (CT)

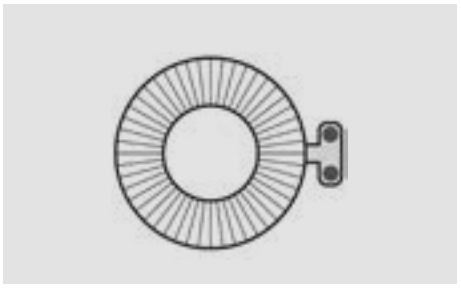
Ammeter transformers or CTs consist of two insulated windings and a magnetic core. The primary winding is traversed by the current to be measured, while the secondary winding powers the measuring instruments. CTs are characterized by the transformation ratio between the primary and secondary current. They can be through-primary (cable or bus) to reduce the primary current to a secondary value of a few Amperes, primary-wound (with low primary values or with high power associated with small dimensions of the CT), or toroidal CTs where the conductor passes through the central hole and the windings are wound on the core.



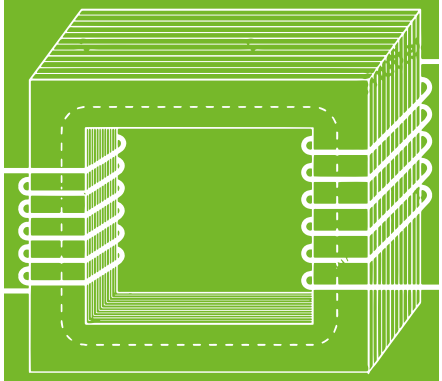
CT WITH THROUGH PRIMARY



CT WITH WOUND PRIMARY



TOROIDAL CT



GUIDE TO CHOICE

SERIE T201
CURRENT TRANSDUCERS
QUICK SELECTION GUIDE

	INPUTS	AC / AC TRMS				DC / DC Bipolar			
	OUTPUTS	mA	V	ModBUS	Contact	mA	V	ModBUS	Contact
MODELS	T201	x*	-	-	-	-	-	-	-
	T201DC	-	-	-	-	x	-	-	-
	T201DC100	-	-	-	-	x	-	-	-
	T201DCH50-LP	x	-	-	-	x	-	-	-
	T201DCH100-LP	x	-	-	-	x	-	-	-
	T201DCH300-LP	x	-	-	-	x	-	-	-
	T201DCH	-	x	-	-	-	x	-	-
	T201DCH100	-	x	-	-	-	x	-	-
	T201DCH300	-	x	-	-	-	x	-	-
	T201DCH50-M	-	x	x	-	-	x	x	
	T201DCH100-M	-	x	x	-	-	x	x	
	T201DCH300-M	-	x	x	-	-	x	x	
	T201DCH50-MU	-	x	x	x	-	x	x	x
	T201DCH100-MU	-	x	x	x	-	x	x	x
	T201DCH300-MU	-	x	x	x	-	x	x	x
	T201DCH600-MU	-	x	x	x	-	x	x	x
	T201DCH100-OPEN	-	x	x	x	-	x	x	x
	T201DCH300-OPEN	-	x	x	x	-	x	x	x
	T201DCH600-OPEN	-	x	x	x	-	x	x	x

*NO TRMS

SERIE T201
CURRENT TRANSDUCERS
QUICK SELECTION GUIDE

Model	POWER SUPPLY	INPUTS		OUTPUTS			DIMENSIONS		CONDUCTOR SIZING			Certifications	Precision class
		NOMINAL CURRENT	MEASURE-MENT TYPE	mA / V	ModBUS	Alarm	Totals	Through Hole	Max cable section	Max cable diameter	Max bar size through		
T201	Loop powered (5..28 Vdc)	40A	AC	4..20 mA	-	-	41x44x26 mm	12.3 mm	25 mm²	10 mm	-	CE, UL	0.2
T201DC	Loop powered (6..100 V)	40A	DC	4..20 mA	-	-	41x44x26 mm	12.3 mm	25 mm²	10 mm	-	CE, UL, EU Patent	0.2
T201DC100	Loop powered (6..100 V)	100A	DC	4..20 mA	-	-	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE, UL, EU Patent	0.2
T201DCH	10..28 Vdc	± 50 A	AC/DC TRMS	0..10 V	-	-	54x 41x30 mm	12.3 mm	25 mm²	10 mm	-	CE, UL	0.5
T2012DCH100	12..28 Vdc	± 100 A	AC/DC TRMS or DC Bipolar	0..10 V	-	-	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE, UL	0,5 (AC) / 1 (DC)
T2012DCH300	12..28 Vdc	± 300 A	AC/DC TRMS or DC Bipolar	0..10 V	-	-	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE, UL	0,5 (AC) / 1 (DC)
T201DCH50-LP	Loop powered (9..28 Vdc)	± 50 A	AC/DC TRMS or DC Bipolar	4..20 mA	-	-	95x68x26 mm	12.3 mm	25 mm²	10 mm	-	CE, UL	0,5 (AC) / 1 (DC)
T201DCH100-LP	Loop powered (9..28 Vdc)	± 100 A	AC/DC TRMS or DC Bipolar	4..20 mA	-	-	41x44x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE, UL	0,5 (AC) / 1 (DC)
T201DCH300-LP	Loop powered (9..28 Vdc)	± 300 A	AC/DC TRMS or DC Bipolar	4..20 mA	-	-	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE, UL	0,5 (AC) / 1 (DC)
T201DCH50-M	12..28 Vdc	± 50 A	AC/DC TRMS or DC Bipolar	0..10 V	x	-	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE	0.5
T201DCH100-M	12..28 Vdc	± 100 A	AC/DC TRMS or DC Bipolar	0..10 V	x	-	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE	0.5
T201DCH300-M	12..28 Vdc	± 300 A	AC/DC TRMS or DC Bipolar	0..10 V	x	-	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE	0.5
T201DCH50-MU	11.5..28 Vdc	± 100 A	AC/DC TRMS or DC Bipolar	0..10 V	x	x	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE	0.5
T201DCH100-MU	11.5..28 Vdc	± 100 A	AC/DC TRMS or DC Bipolar	0..10 V	x	x	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE	0.5
T201DCH300-MU	11.5..28 Vdc	± 300 A	AC/DC TRMS or DC Bipolar	0..10 V	x	x	95x68x26 mm	20.8 mm	120 mm²	20 mm	12x5 mm (x2)*	CE	0.5
T201DCH600-MU	11.5..28 Vdc	± 600 A	AC/DC TRMS or DC Bipolar	0..10 V	x	x	95x75x35 mm	35 mm	300 mm²	33 mm	32x5 mm (x2)**	CE	0.5
T201DCH100-OPEN	11.5..28 Vdc	± 100 A	AC/DC TRMS or DC Bipolar	0..10 V	x	x	95x75x35 mm	35 mm	300 mm²	33 mm	32x5 mm (x2)**	CE	0.5
T201DCH300-OPEN	11.5..28 Vdc	± 300 A	AC/DC TRMS or DC Bipolar	0..10 V	x	x	95x75x35 mm	35 mm	300 mm²	33 mm	32x5 mm (x2)**	CE	0.5
T201DCH600-OPEN	11.5..28 Vdc	± 600 A	AC/DC TRMS or DC Bipolar	0..10 V	x	x	95x75x35 mm	35 mm	300 mm²	33 mm	32x5 mm (x2)**	CE	0.5

(*) Coupled with max capacity 334 A (ΔT 30°C) or 440 A (ΔT 50°C)

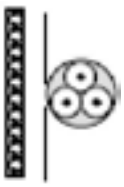
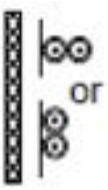
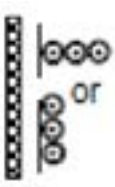
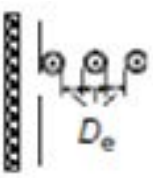
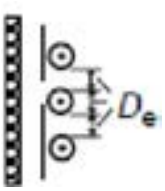
(**) Coupled with max capacity 695 A (ΔT 30°C) or 920 A (ΔT 50°C)

T201 SERIES
CURRENT TRANSDUCERS
CONDUCTOR SIZING - CABLES



The determination of current carrying capacity and installation method of cables refers to the IEC 60364-5-52 standard, considering the reference temperature of the conductor at 70°C and the ambient temperature at 30°C. However, the determination of the sizing of cables and insulated bars (section, thickness, diameter, length) in relation to the intensity of the current they carry must be related to various parameters and criteria such as thermal balance, insulations, power supplies, materials, voltage drop, and power loss of each specific installation.
Therefore, the data reported in these tables should be interpreted and contextualized within the scope of electrical design, cabling, and analysis of the electrical characteristics of the devices and components used.

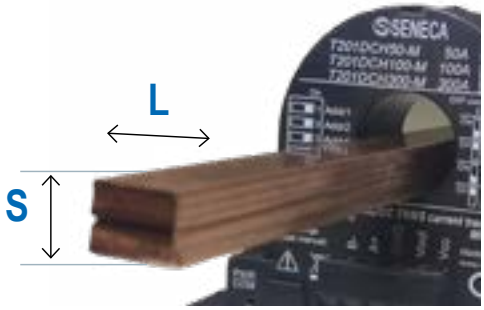
AMPACITY TABLE (AMPERES)
Installation methods B.52.1
PVC Isolation, copper conductors, conductor temp. 70°C, reference temp. 30°C

Nominal cross-sectional area of the conductor mm²	Multipolar cables		Monopolar cables				
	2 loaded conductors	3 loaded conductors	2 conductors in contact	3 stranded conductors	3 loaded conductors		
					In contact	Spacing	
						Horizontal	Vertical
							
	Method E	Method E	Method F	Method F	Method F	Method G	Method G
1	2	3	4	5	6	7	8
1.5	22	18.5	-	-	-	-	-
2.5	30	25	-	-	-	-	-
4	40	34	-	-	-	-	-
6	51	43	-	-	-	-	-
10	70	60	-	-	-	-	-
16	94	80	-	-	-	-	-
25 (*)	119	101	131	110	114	146	130
35	148	126	162	137	143	181	162
50	180	153	196	167	174	219	197
70	232	196	251	216	225	281	254
95	282	238	304	264	275	341	311
120 (**)	328	276	352	308	321	396	362
150	379	319	406	356	372	456	419
185	434	364	463	409	427	521	480
240	514	430	546	485	507	615	569
300 (***)	593	497	629	561	587	709	659
400	-	-	754	656	689	852	795
500	-	-	878	749	789	982	920
630	-	-	1005	855	905	1138	1070

Circular conductors are considered for sizes up to 16 mm² included. The values for larger sizes refer to shaped conductors and can be safely applied to circular conductors.

(*) T201DCH
(°°) T201DCH100..300
(***) T201DCH600

T201 SERIES
CURRENT TRANSDUCERS
CONDUCTOR SIZING - INSULATED BARS



Full copper bars are used in electrical panels, for power distribution, and when no predefined connection, branching, and fixing points are available. Full copper bars with rounded edges are excellent electrical conductors and are appreciated for their ductility, robustness, and resistance. In addition to electrical panels, they are used for power distribution or transmission, in the production of bus ducts, electrical conduits, and electrical power lines in industrial electrical installations with typical thicknesses of 4, 5, 10 mm and lengths of 1750 and 4200 mm.

AMPACITY TABLE (AMPERES) FULL COPPER BARS

Thermal rise ΔT according to DIN 43671 standard. Reference ambient temperature Ta = 35°C

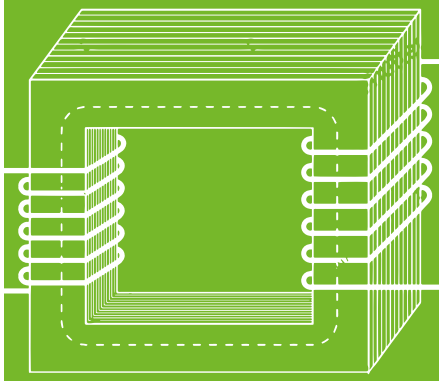
Dimensions	Sez mm²	T 30° C				T 50° C			
Number of bars in parallel		I	II	III	II II	I	II	III	II II
12 x 4	48	160				212			
12 x 5	60	183	334 (*)	460	514	241	440	607	679
15 x 5	75	218	405 (*)	567	635	289	537	751	841
20 x 5	100	274	500	690	772	363	663	914	1023
25 x 5	125	327	586	795	890	433	776	1053	1179
30 x 5	150	379	672 (**)	896	1003	502	890	1187	1329
32 x 5	160	400	695 (**)	931	1043	530	920	1234	1382
40 x 5	200	482	836	1090	1220	639	1108	1444	1617
50 x 5	250	583	994	1260	1411	772	1317	1670	1870
60 x 5	300	688	1150	1440	1613	912	1524	1908	2137
63 x 5	315	718	1197	1494	1673	951	1586	1980	2217
80 x 5	400	885	1450	1750	1960	1173	1921	2319	2597
100 x 5	500	1080	1730	2050	2296	1431	2292	2716	3042
125 x 5	625	1300	2022	2381	2666	1723	2679	3155	3532
20 x 10	200	427	734	959	1151	564	970	1269	1522
30 x 10	300	573	986	1289	1547	756	1300	1701	2041
40 x 10	400	715	1230	1609	1931	944	1624	2124	2549
50 x 10	500	852	1510	2040	2448	1129	2001	2703	3243
60 x 10	600	985	1720	2300	2760	1305	2279	3048	3658
80 x 10	800	1240	2110	2790	3124	1643	2796	3697	4140
100 x 10	1000	1490	2480	3260	3651	1974	3286	4320	4838
120 x 10	1200	1740	2860	3740	4188	2306	3790	4956	5500
160 x 10	1600	2220	3590	4680		2942	4757	6201	
200 x 10	2000	2690	4310	5610		3564	5711	7433	

Example of bar selection
For In = 800 A; maximum operating temperature Tmax = 85°C; number of bars in parallel = 1.

As the thermal rise T = Tmax - Ta = (85 - 35) = 50 °C, from the tables with T 50 °C, the bars with In ≥ 800 A are selected:

punched copper bar 63x5 (In = 951 A)
full copper bars: 63x5 (In = 951 A), 40 x 10 (In = 944 A)
full aluminum bar 50 x 10 (In = 874 A).

(*) T201DCH100..300
(**) T201DCH600



TECHNICAL DATA

AC/DC Current Transducers



The AC/DC current transducers **T201 Series** are devices capable of converting the measured current value (up to 300 A) into a standardized industrial signal of 4..20 mA or 0..10 V. Most models of the **T201 Series** are UL certified and characterized by low consumption, convenient adjustable measurement scales via DIP-switch, and high precision guaranteed by the absence of thermal drift. 16 models are available with different measurement principles: rectified average, magnetic balance (with patented technology), Hall Effect, or TRMS with bipolar input range. Some models are equipped with an RS485 interface supporting the ModBUS RTU protocol.

INPUT
Up to 600 A

OUTPUT
mA, V, PNP (Alarm)

POWER SUPPLY
Direct
Through Loop

REDUCED CONSUMPTION
No thermal drift
<25mA

TYPES OF MEASURE
AC TRMS / DC BIPOLAR
Hall Effect

HIGH PRECISION CLASS
0,2..05%

DATA MANAGEMENT STANDARD
(VERSIONS –M /-MU)
ModBUS IEEE 754

WIDE TEMPERATURE RANGE
-20..+70°C

BASIC CONFIGURATION VIA DIP-SWITCH
1 2 3 4

COMPLETE CONFIGURATION VIA SOFTWARE
(VERSIONS –M/-MU)
EASY SETUP

INTERNATIONAL PATENT
T201DC / T201DC100

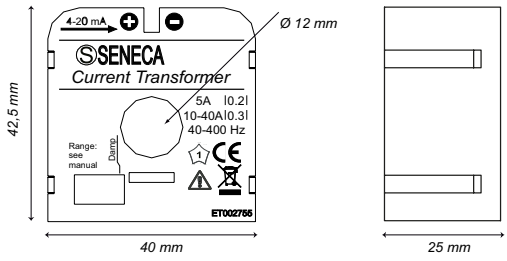
INTERNATIONAL CERTIFICATION
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INSTALLATION AND DIMENSIONS

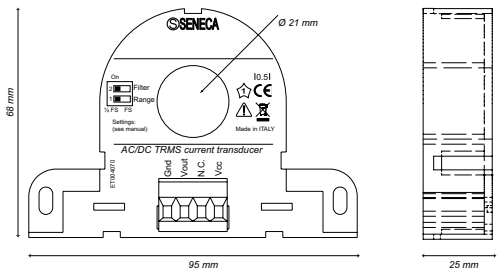
QUICK INSTALLATION ON DIN RAIL



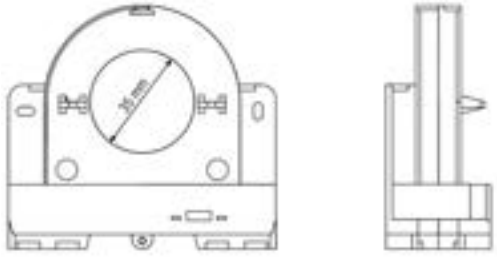
FORMAT 1



FORMAT 2



FORMAT 3



AC/DC CURRENT TRANSFORMERS WITH 4-20 mA OUTPUT

	T201	T201DC	T201DC100
		PATENTED TECHNOLOGY 	PATENTED TECHNOLOGY 
	Alternating current transformer 0..40 Aac, 8 input scales, 4..20 mA loop powered output	Bipolar direct current transformer 0..40 Adc, 8 input scales, 4..20 mA, inductively measured patented technology	Bipolar direct current transformer 0..100 Adc, 8 input scales, 4..20 mA, inductively measured patented technology
GENERAL DATA			
Power Supply	Loop powered (5..28 Vdc)	Loop powered (6..100 V)	
Consumption	< 21 mA		
Isolation and protections	3 kVdc (on bare conductors)		
Overvoltage category	300 V CAT III (bare conductor) 600 V CAT III (insulated conductor)		
Polarity of measurement	Positive (incoming current on label side)		
Protection class	IP20		
Precision class	0.2% f.s. (AC)	0.2% f.s. (DC)	
Configuration	DIP Switch		
Operating temperature	-20..+70°C		
Storage temperature	-40..+85°C		
Humidity	10rH..90% non-condensing		
Altitude	Up to 2,000 m a.s.l.		
Connections	Removable terminals (5 poles), pitch 5 mm for cables up to 2.5 mm²		
Through-hole diameter	12.3 mm		20.8 mm
Dimensions (WxHxD)	41x44x26 mm		95x68x26 mm
Mounting	Free or on DIN IEC EN 60715 rail via supplied accessories		
Enclosure	PA6, black color		
Weight	47 g		120 g
Certifications	CE, UL-UR	CE, UL-UR, European patent	
INPUT DATA			
Channels	1		
Range	5, 10, 15, 20, 25, 30, 35, 40 A	Monopolar 0..5, 0..10, 0..20,0.. 40A Bipolar -5..5, -10..10, -5..20, -10..40 A	Monopolar 0..10, 0..25, 0..50, 0..100 A Bipolar -10..10, -25..25, -10..50, -25..100 A
Measurement type	Rectified average	Magnetic balance	
Bipolar measure	No	Yes	
Overload	800A		2000 A (impulsive)
Bandwidth	20..1,000 Hz	n.d.	
Crest factor	2	1.2	
OUTPUT DATA			
Channels	1		
Range	4..20 mA (2 wires)		
Resolution	infinite	12 bit	
Max load	< 5000 Ohm @ 100 Vdc	-	
Error due to EMI	< 40µA	< 50µA	< 50µA
Thermal Drift	< 150 ppm/K		
Response Time	100 ms (without filter) 2.5 s (with filter)	100 ms (without filter) 600 ms (with filter)	
CONDUCTOR SIZING			
Max cable section	25 mm²		120 mm²
Max cable diameter	10 mm (H07V-K)		20 mm (H07V-K)
Max bar size through	-		2 bars 12x5 mm coupled with max capacity 334 A (ΔT 30°C) or 440 A (ΔT 50°C)
ORDER CODES	T201	T201DC	T201DC100

Technical data, diagrams, and images are indicative and not binding

HALL EFFECT CURRENT TRANSFORMERS WITH 0-10 V OUTPUT

	T201DCH	T201DCH100	T201DCH300
	HALL EFFECT 	HALL EFFECT 	HALL EFFECT 
	Hall effect AC or DC current transformer (± 50 A) with 0..10 V TRMS output	Hall effect AC or DC current transformer (± 100 A) with 0..10 V TRMS output	Hall effect AC or DC current transformer (± 300 A) with 0..10 V TRMS output
GENERAL DATA			
Power Supply	10..28 Vdc		
Consumption	< 25 mA		
Isolation and protections	3 kVdc (on bare conductors)		
Overvoltage category	300 V CAT III (bare conductor) 600 V CAT III (insulated conductor)		
Polarity of measurement	Positive (incoming current on label side)		
Protection class	IP20		
Precision class	0.5% f.s. (DC bipolar, AC TRMS)		
Configuration	DIP Switch		
Operating temperature	-10..+70°C	-20..+70°C	
Storage temperature	-40..+85°C	-40..+85°C	
Humidity	10rH..90% non-condensing		
Altitude	Up to 2,000 m a.s.l.		
Connections	Removable terminals (5 poles), pitch 5 mm for cables up to 2.5 mm²		
Through-hole diameter	12.3 mm	20.8 mm	
Dimensions (WxHxD)	54 x 41 x 30 mm	95x68x26 mm	
Mounting	Free or on DIN IEC EN 60715 rail via supplied accessories		
Enclosure	PA6, black color		
Weight	47 g	120 g	
Certifications	CE, UL-UR	CE, UL-UR	CE, UL-UR
INPUT DATA			
Channels	1		
Range	0..25, 0..50 Aac/dc TRMS	0-50 A, 0-100 Aac/dc TRMS ±50 A, ±100 A Bipolar	0-150 A, 0-300 Aac/dc TRMS ±150 A, ±300 A Bipolar
Measurement type	AC/DC TRMS	AC/DC TRMS or DC Bipolar	
Bipolar measure	No	Yes	
Hysteresis	0.1% f.s.		
Overload	300 A continuous; 2,000 A impulsive	300 A continuous; 2,000 A impulsive	500 A continuous; 2,000 A impulsive
Bandwidth	1 kHz		
Crest factor	1.2	2	
OUTPUT DATA			
Channels	1		
Range	0..10 V		
Resolution	12 bit	12 bit	12 bit
Max load	> 2 kOhm		
Thermal Drift	< 200 ppm/K		
Response Time	Fast filter: 800 ms Slow filter: 2 s		
CONDUCTOR SIZING			
Max cable section	25 mm²	120 mm²	
Max cable diameter	10 mm (H07V-K)	20 mm (H07V-K)	
Max bar size through	-	2 bars 12x5 mm coupled with max capacity 334 A (ΔT 30°C) or 440 A (ΔT 50°C)	
ORDER CODES	T201DCH	T201DCH100	T201DCH300

Technical data, diagrams, and images are indicative and not binding

HALL EFFECT CURRENT TRANSFORMERS WITH 4-20 mA

	T201DCH50-LP	T201DCH100-LP	T201DCH300-LP
			
	Hall effect AC or DC current transformer (± 50 A) with 4..20 mA loop powered output	Hall effect AC or DC current transformer (± 100 A) with 4..20 V TRMS output loop powered	Hall effect AC or DC current transformer (± 300 A) with 4..20 mA loop powered output
GENERAL DATA			
Power Supply	Loop powered (9..28 Vdc)		
Consumption	< 22 mA		
Isolation and protections	3 kVdc (on bare conductors)		
Overvoltage category	300 V CAT III (bare conductor); 600 V CAT III (insulated conductor)		
Polarity of measurement	Positive (incoming current on label side)		
Protection class	IP20		
Precision class	AC: 0,5% f.s,; DC: 1% f.s.		
Configuration	DIP Switch		
Operating temperature	-20..+70°C		
Storage temperature	-40..+85°C		
Humidity	10rH..90% non-condensing		
Altitude	Up to 2,000 m a.s.l.		
Closed	core		
Connections	Removable terminals (5 poles), pitch 5 mm for cables up to 2.5 mm²		
Through-hole diameter	12.3 mm	20.8 mm	
Dimensions (WxHxD)	41x44x26 mm	95x68x26 mm	
Mounting	Free or on DIN IEC EN 60715 rail via supplied accessories		
Enclosure	PA6, black color		
Weight	47 g	120 g	120 g
Certifications	CE, UKCA, UL-UR		
INPUT DATA			
Channels	1		
Range	0..50 Aac/dc TRMS ±50 Adc bipolar	0-50 A, 0-100 Aac/dc TRMS ±50 A, ±100 A Bipolar	0-150 A, 0-300 Aac/dc TRMS ±150 A, ±300 A Bipolar
Measurement type	AC/DC TRMS or DC Bipolar	AC/DC TRMS or DC Bipolar	AC/DC TRMS or DC Bipolar
Bipolar measure	No	Yes	
Hysteresis	0.3% f.s.		
Overload	300 A continuous 2.000 A (impulsive)		500 A continuous 2.000 A (impulsive)
Bandwidth	1 kHz		
Crest factor	1.3		
OUTPUT DATA			
Channels	1		
Range	4..20 mA nominal 3.6 mA fault indication 22 mA maximum indication		
Resolution	12 bit		
Max load	< 1000 Ohm @ 28 Vdc		
Error due to EMI	< 1%		
Thermal Drift	< 200 ppm/K		
Response Time	Fast filter: 500 ms Slow filter: 1 s		
CONDUCTOR SIZING			
Max cable section	25 mm²	120 mm²	
Max cable diameter	10 mm	20 mm (H07V-K)	
Max bar size through	-	2 bars 12x5 mm coupled with max capacity 334 A (ΔT 30°C) or 440 A (ΔT 50°C)	
ORDER CODES	T201DCH50-LP	T201DCH100-LP	T201DCH300-LP

Technical data, diagrams, and images are indicative and not binding

HALL EFFECT CURRENT TRANSFORMERS WITH 0-10 V / MODBUS OUTPUT

	T201DCH50-M	T201DCH100-M	T201DCH300-M
	HALL EFFECT ModBUS 	HALL EFFECT ModBUS 	HALL EFFECT ModBUS 
	Hall effect AC or DC current transformer (± 50 A) with 0..10 V output, ModBUS interface	**Hall effect AC or DC current transformer (± 100 A) with 0..10 V output, ModBUS interface**	**Hall effect AC or DC current transformer (± 300 A) with 0..10 V output, ModBUS interface**
GENERAL DATA			
Power Supply	12..28 Vdc		
Consumption	< 25 mA		
Isolation and protections	3 kVdc (on bare conductors)		
Frontal LED	Power / Communication RS485		
Overvoltage category	300 V CAT III (bare conductor) 600 V CAT III (insulated conductor)		
Polarity of measurement	Positive (incoming current on label side)		
Protection class	IP20		
Precision class	0.5% f.s. (DC bipolar, AC TRMS)		
Configuration	DIP switch, Software (EASY SETUP)		
Data Log	Yes		
Operating temperature	-20..+70°C		
Storage temperature	-40..+85°C		
Humidity	10rH..90% non-condensing		
Altitude	Up to 2,000 m a.s.l.		
Connections	Removable terminals (5 poles), pitch 5 mm for cables up to 2.5 mm²		
Through-hole diameter	20.8 mm		
Dimensions (WxHxD)	95x68x26 mm		
Mounting	Free or on DIN IEC EN 60715 rail via supplied accessories		
Enclosure	PA6, black color		
Weight	120 g		
Certifications	CE, UKCA		
COMMUNICATION			
Communication port	RS485		
Protocol	ModBUS RTU slave		
Speed	1.200..115200 bps		
INPUT DATA			
Channels	1		
Range	0..25, 0..50 Aac/dc TRMS ±25 A, ±50 Adc Bipolar	0-50 A, 0-100 Aac/dc TRMS ±50 A, ±100 Adc Bipolar	0-150 A, 0-300 Aac/dc TRMS ±150 A, ±300 Adc Bipolar
Measurement type	AC/DC TRMS or DC Bipolar		
Bipolar measure	Yes		
Hysteresis	0.3% f.s.		
Overload	300 A (continuous) 2.000 A (impulsive)	500 A continuous; 2,000 A impulsive	800 A continuous; 2,000 A impulsive
Bandwidth	1 kHz		
Crest factor	2		
OUTPUT DATA			
Channels	1		
Range	0..10 V		
Resolution	13 bit (10,000 points)		
Max load	> 2 kOhm		
Error due to EMI	<0,5%		
Thermal Drift	< 200 ppm/K		
Response Time	Fast filter: 800 ms Slow filter: 2 s		
CONDUCTOR SIZING			
Max cable section	120 mm²		
Max cable diameter	20 mm (H07V-K)		
Max bar size through	2 bars 12x5 mm coupled with max capacity 334 A (ΔT 30°C) or 440 A (ΔT 50°C)		
ORDER CODES	T201DCH50-M	T201DCH100-M	T201DCH300-M

Technical data, diagrams, and images are indicative and not binding

HALL EFFECT CURRENT TRANSFORMERS WITH 0-10 V OUTPUT - ALARM / MODBUS - USB

	T201DCH50-MU	T201DCH100-MU	T201DCH300-MU	T201DCH600-MU
				
	ModBUS	ModBUS	ModBUS	ModBUS
	Hall effect AC/DC current transformer (±50 Aac/dc) with analog or alarm output, ModBUS and USB interface	Hall effect AC/DC current transformer (±100 Aac/dc) with analog or alarm output, ModBUS and USB interface	Hall effect AC/DC current transformer (±300 Aac/dc) with analog or alarm output, ModBUS and USB interface	Hall effect AC/DC current transformer (±600 Aac/dc) with analog or alarm output, ModBUS and USB interface
GENERAL DATA				
Power Supply	11.5..28 Vdc			
Consumption	21 mA excluding load			
Isolation and protections	3 kVdc (on bare conductors)			
Front LED	Power / Communication USB / Digital output			
Overvoltage category	300 V CAT III (bare conductor); 600 V CAT III (insulated conductor)			
Polarity of measurement	Positive (incoming current on label side)			
Protection class	IP20			
Precision class	0.5% f.s. (DC bipolar, AC TRMS)			
Configuration and data export	DIP switch, Software (EASY SETUP)			
Operating temperature	-20..+70°C			
Storage temperature	-40..+85°C			
Humidity				
Altitude	Up to 2,000 m a.s.l			
Connections	Removable terminals (5 poles), pitch 5 mm for cables up to 2.5 mm²			
Through-hole diameter	20.8 mm			35 mm
Dimensions (WxHxD)	95 x 68 x 25 mm			95 x 75 x 35 mm
Mounting	Free or on DIN IEC EN 60715 rail via supplied accessories			
Enclosure	PA6, black color			
Weight	120 g			
Certifications	CE, UKCA			
COMMUNICATION				
Communication port	RS485 / Micro USB			
Protocol	ModBUS RTU slave			
Speed	1.200..115200 bps			
INPUT DATA				
Channels	1			
Range	0-25 / 50 Aac/dc TRMS; ±25 / ±50 Adc Bipolar	0-50 /100 Aac/dc TRMS; ±50 / ±100 Adc Bipolar	0-150 / 300 Aac/dc TRMS; ±150 / ±300 Adc Bipolar	0-300 /-600 Aac/dc TRMS; ±300 / ±600 Adc Bipolar
Measurement type	AC/DC TRMS or DC Bipolar	AC/DC TRMS or DC Bipolar	AC/DC TRMS or DC Bipolar	AC/DC TRMS or DC Bipolar
Bipolar measure	Yes			
Overload	$3xI_{IN}$ continuous; 2.000 A (impulsive)			
Bandwidth	1 kHz			
Crest factor	2			
OUTPUT DATA				
Analog channels	1			
Range	0..10 V			
Resolution	13 bit (10,000 points)			
Minimum load	2 kOhm			
Error due to EMI	<0,5%			
Thermal Drift	< 200 ppm/K			
Measurement hysteresis	0.2% f.s.			
Response Time	Fast filter: 800 ms Slow filter: 2 s			
Digital channels	1			
Function	Alarm (alternative to analog channel)			
Type	Active PNP output, max load 50 mA			
CONDUCTOR SIZING				
Max cable section	120 mm²			300 mm2
Max cable diameter	20 mm (H07V-K)			33 mm (FG16R16)
Max bar size through	2 bars 12x5 mm coupled with max capacity 334 A (ΔT 30°C) or 440 A (ΔT 50°C)			2 bars 32x5 mm coupled with max capacity 695 A (T 30°C) or 920 A (T 50°C)
ORDER CODES	T201DCH50-MU	T201DCH100-MU	T201DCH300-MU	T201DCH600-MU

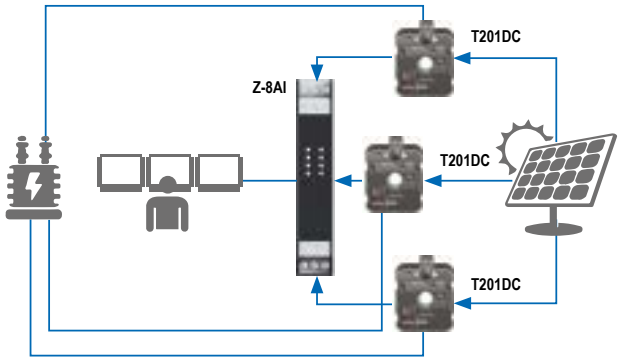
Technical data, diagrams, and images are indicative and not binding

HALL EFFECT OPEN CURRENT TRANSFORMERS WITH 0-10 V OUTPUT

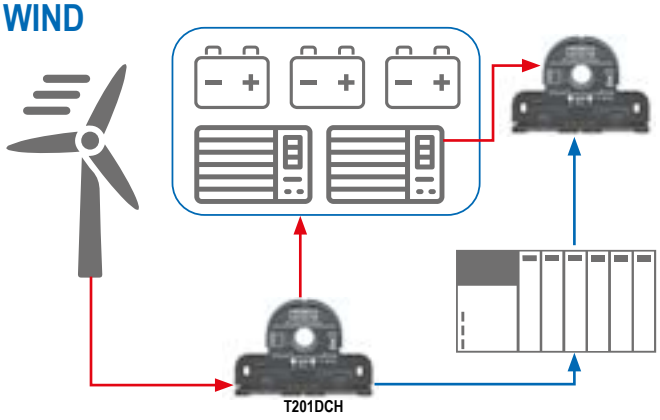
	T201DCH100-OPEN	T201DCH300-OPEN	T201DCH600-OPEN
			
	Hall effect openable AC/DC current transformer (± 100 A) bipolar/TRMS, 0..10 V output	Hall effect openable AC/DC current transformer (± 300 A) bipolar/TRMS, 0..10 V output	Hall effect openable AC/DC (± 600 A) Hall effect, bipolar/TRMS, 0..10 V output
GENERAL DATA			
Power Supply	12..28 Vdc		
Consumption	38 mA excluding load		
Isolation and protections	3 kVac (on bare conductors)		
Front LEDs	Power Supply Communication USB/RS485 Digital output		
Overvoltage category	300 V CAT III (bare conductor); 600 V CAT III (insulated conductor)		
Polarity of measurement	Positive (incoming current on label side)		
Configuration and data export	DIP Switch, Software (EASY SETUP)		
Protection class	IP20		
Precision class	0.5% f.s. (DC bipolar, AC TRMS)		
Operating temperature	-25..+70°C		
Storage temperature	-40..+85°C		
Humidity	10rH..90% non-condensing		
Altitude	Up to 2,000 m a.s.l.		
Closed	Openable		
Connections	Screw terminals removable 5 ways, pitch 5 mm for cables up to 2.5 mm^2		
Through-hole diameter	35 mm		
Dimensions (WxHxD)	95x75x35 mm		
Mounting	DIN 35mm rail IEC EN60715 or fixing via plastic clamps.		
Enclosure	PA6, black color		
Weight	145 g		
Certifications	CE, UKCA		
COMMUNICATION			
Communication port	RS485 / USB		
Protocol	ModBUS RTU slave		
Speed	1.200..115200 bps		
INPUT DATA			
Channels	1		
Range	0-50 A, 0-100 Aac/dc TRMS; ±25 A, ±50 A, ±100 Adc Bipolar	0-75/150/300 Aac/dc TRMS; ±150/300 Adc Bipolar	0-150/300/600 Aac/dc TRMS; ±300/300 Adc Bipolar
Measurement type	AC/DC TRMS or DC Bipolar		
Bipolar measure	Yes		
Hysteresis	0.2% f.s.		
Overload	3xIIN continuous; 2,000 A (impulsive)		
Bandwidth	1 kHz		
Crest factor	2		
OUTPUT DATA			
Analog channels	1		
Range	0..10 V		
Resolution	13 bit (10,000 points)		
Max load	> 2 kOhm		
Error due to EMI	<0,5%	<1%	
Thermal Drift	< 200 ppm/K		
Response Time	Fast filter: 800 ms Slow filter: 2 s		
Digital channels	1		
Function	Alarm (alternative to analog channel)		
Type	Active PNP output, 50 mA max		
CONDUCTOR SIZING			
Max cable section	300 mm^2		
Max cable diameter	33 mm (FG16R16)		
Max bar size through	2 bars 32x5 mm coupled with max capacity 695 A (ΔT 30°C) or 920 A (ΔT 50°C)		
ORDER CODES	T201DCH100-OPEN	T201DCH300-OPEN	T201DCH600-OPEN

APPLICATION SCENARIOS

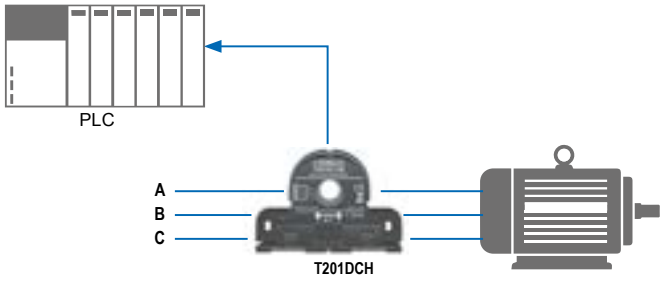
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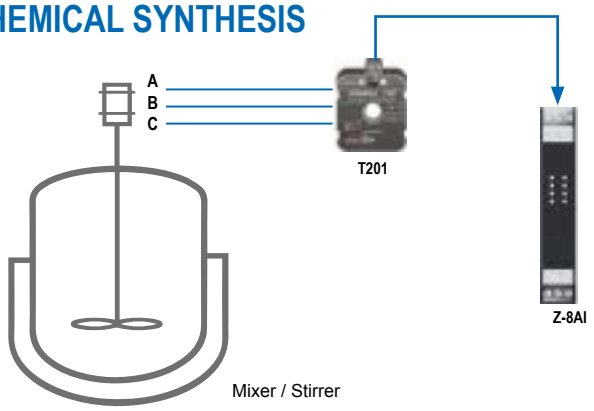
WIND



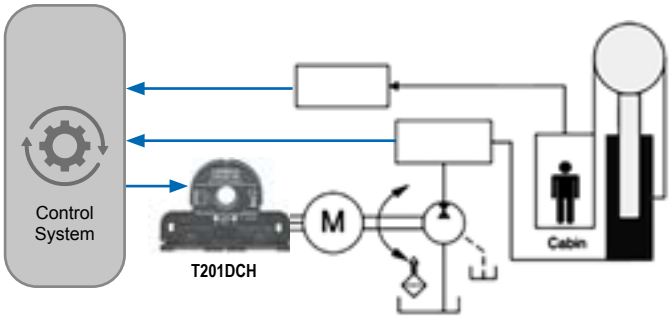
ELECTRIC MOTORS



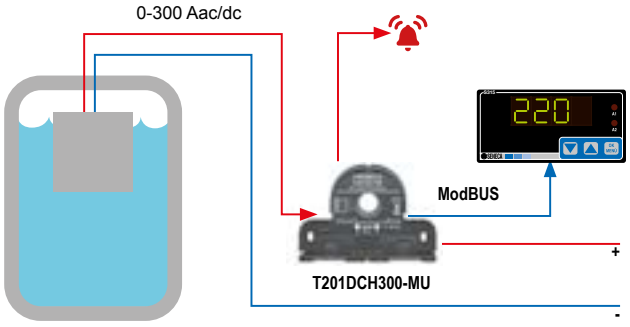
CHEMICAL SYNTHESIS



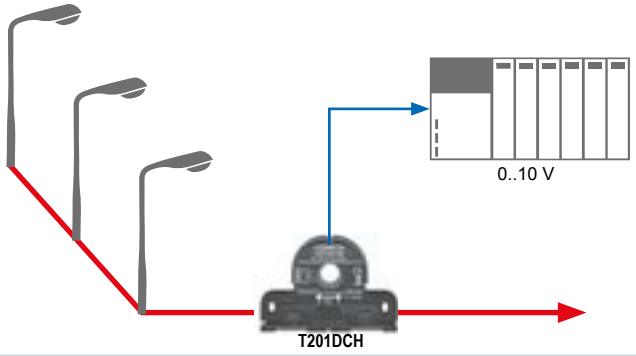
ELEVATORS



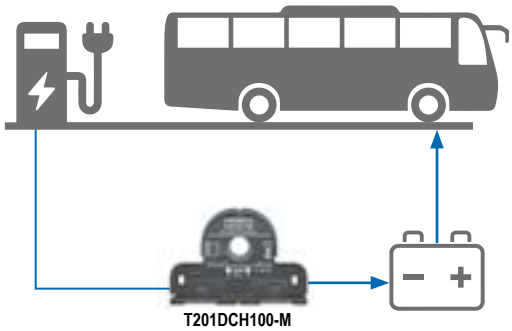
GALVANIC TREATMENTS



PUBLIC LIGHTING



ELECTRIC MOBILITY



3.7



MODULAR ELECTRICAL MEASUREMENT CONVERTERS



Modular electrical measurement converters

The converter modules for electrical measurements measure voltage and current values (alternating and/or direct) and convert them into a standardized current or voltage signal at the output terminals, proportional to the input value.
The scale parameters of inputs and outputs are selectable via software or DIP switches.
The modules ensure a high precision class (from 0.1 to 0.5%) and very high multi-channel galvanic isolation, up to 4,000 Vac.
In addition to the presence of power or error, modules equipped with a ModBUS interface also provide RS485 LED indication on the front panel.

HIGHLIGHTS

WIDE MEASUREMENT RANGE FOR CURRENTS AND VOLTAGES

- Alternating
- Continuous
- TRMS

SIMPLIFIED CONNECTIONS

2.5 mm² screw terminals

FLEXIBLE CONFIGURATION

- DIP-switch
- Software

COMPLETE POWER OPTIONS

Vac/dc switching
Loop/Self powered

REDUCED DIMENSIONS

17.5 / 35 mm

INTERNATIONAL STANDARDS

CE, UL

HIGH ISOLATION SIGNAL

Up to 4,000 Vac

AND BUS INTERFACES

- Analog Output
- RS485 Modbus

HIGH PRECISION CLASS

From 0.1 to 0.5%

RTU STATUS INDICATORS FOR CONTROL AND DIAGNOSTICS

CONVERTERS FOR ELECTRICAL MEASUREMENTS

	Z201	Z201-H	Z202
			
	Alternating current converter, 10..40 Vdc; 19..28 Vac	**Alternating current converter, 85..265 Vac/dc**	**Alternating voltage converter, 10..40 Vdc; 19..28 Vac**
GENERAL DATA			
Power Supply	10..40 Vdc; 19..28 Vac	85..265 Vac/dc	10..40 Vdc; 19..28 Vac
Max Consumption	< 2.5 W	< 2.5 W	< 1.5 W
Isolation	3,750 Vac (input/output/power supply) 1,500 Vac (output/power supply)	4,000 Vac (input/output/power supply)	3,750 Vac (input/output; input/power supply) 1,500 Vac (output/power supply)
Protection class	IP20	IP20	IP20
LED Status Indicators	Power Supply	Power Supply	Power Supply
Response Time	< 200 ms	< 100 ms	< 30 ms
Interfaces			
Precision class	0.3%	0.3%	0.25%
Thermal Drift	<200 ppm/K	<200 ppm/K	<150 ppm/K
Configuration	DIP Switch	DIP Switch	DIP Switch
Operating Temperature	0..+55°C	-10..+65°C	0..+60°C
Dimensions	17.5 x 100 x 112 mm	17.5 x 100 x 112 mm	17.5 x 100 x 112 mm
Connections	Screw-in removable terminals	Screw-in removable terminals	Screw-in removable terminals
Enclosure	Nylon 6 30% glass fiber	Nylon 6 30% glass fiber	Nylon 6 30% glass fiber
Mounting	35 mm DIN rail (IEC/EN 60715)	35 mm DIN rail (IEC/EN 60715)	35 mm DIN rail (IEC/EN 60715)
Weight	200 g	200 g	200 g
Certifications	CE	CE	CE
INPUT DATA			
Channels	1	1	1
Type	ALTERNATING CURRENT 0..5 / 0..10 Aac	ALTERNATING CURRENT 0..5 / 0..10 Aac	ALTERNATING VOLTAGE 0..500 Vac (41 scales), input impedance 2,000 Ω/V Frequency 10 Hz..1 kHz
OUTPUT DATA			
Channels	1	1	1
Type	CURRENT 0..20 / 4..20 mA, max load 600 Ω, active / passive connection VOLTAGE 0..5 / 0..10 / 1..5 / 2..10 Vdc, min load 2,500 Ω	CURRENT 0..20 / 4..20 mA, max load 600 Ω, active / passive connection VOLTAGE 0..5 / 0..10 / 1..5 / 2..10 Vdc, min load 2,500 Ω	CURRENT 0..20 / 4..20 mA, max load 600 Ω, active / passive connection VOLTAGE 0..5 / 0..10 / 1..5 / 2..10 Vdc, min load 2,500 Ω
ORDER CODES	**Z201**	**Z201-H**	**Z202**

The technical data and diagrams in this document are indicative and not binding.

CONVERTERS FOR ELECTRICAL MEASUREMENTS

	Z202-H	Z202-LP	Z203-2	Z204-1
				
	Alternating voltage converter, 85..265 Vac/dc	**Loop powered alternating voltage converter**	**Single-phase network analyzer**	**Alternating and direct voltage TRMS converter**
GENERAL DATA				
Power Supply	85..265 Vac/dc	5..28 Vdc (from loop)	10..40 Vdc; 19..28 Vac	10..40 Vdc; 19..28 Vac
Max Consumption	< 1.5 W	<1mA	< 2.5 W	< 1 W
Isolation	3,750 Vac (input/output; input/power supply) 1,500 Vac (output/power supply)	4,000 Vac (input/output)	3,750 Vac (input/output/power supply)	4,000 Vac (input/output; input/power supply) 1,500 Vac (output/power supply)
Protection class	IP20	IP20	IP20	IP20
LED Status Indicators	Power Supply	Power Supply	Power Supply Error RS485 communication	Power Supply Error RS485 communication
Response Time	< 100 ms	< 100 ms	< 10 ms	For a step change: 1 s from 10 to 90 %
Interfaces	-	-	Frontal Micro USB for programming (baud rate, address, parity, data/ stop bit) RS485 (backplane), as an alternative to analog output, speed up to 115,200 bps, ModBUS RTU protocol	RS232 (frontal connector for programming): baud rate, address, parity, data/stop bit RS485 (backplane), as an alternative to analog output, speed up to 115,200 bps, ModBUS RTU protocol
Precision class	0.3%	0.3%	0.5%	0.5% input; 0.1% output
Thermal Drift	+150 ppm/K	+150 ppm/K	+150 ppm/K	+100 ppm/K
Configuration	DIP Switch	DIP Switch	DIP Switch Software (EASY SETUP)	DIP Switch Software (EASY SETUP)
Operating Temperature	-10..+65°C	-20..+65°C	-10..+65°C	-20..+65°C
Dimensions	17.5 x 100 x 112 mm	35 x 100 x 112 mm	17.5 x 100 x 112 mm	35 x 100 x 112 mm
Connections	Screw-in removable terminals	Screw-in removable terminals	Screw-in removable terminals	Screw-in removable terminals
Enclosure	Nylon 6 30% glass fiber	Nylon 6 30% glass fiber	Nylon 6 30% glass fiber	Nylon 6 30% glass fiber
Mounting	35 mm DIN rail (IEC/EN 60715)	35 mm DIN rail (IEC/EN 60715)	35 mm DIN rail (IEC/EN 60715)	35 mm DIN rail (IEC/EN 60715)
Weight	200 g	200 g	200 g	200 g
Certifications	CE	CE	CE	CE
INPUT DATA				
Channels	1 (single phase load)	1	1 (single phase load)	1
Type	ALTERNATING VOLTAGE 0..500 Vac (41 scales), input impedance 2,000 Ω/V Frequency 10 Hz..1 kHz	ALTERNATING VOLTAGE 0..500 Vac DIRECT VOLTAGE 0..540 Vdc, max voltage 710 Vpk Frequency DC / 20 Hz..20 kHz	ALTERNATING VOLTAGE Max load 500 Vac, frequency 50-60 Hz ALTERNATING CURRENT Rated load 5 A rms, max crest factor 3, max current 15 A, frequency 50 – 60 Hz	DIRECT VOLTAGE: 0..1,200 Vdc; ALTERNATING VOLTAGE 0..850 Vac Input impedance: 800 kΩ Frequency: 30..300 Hz
OUTPUT DATA				
Channels	1	1	1 analog, 1 digital	1
Type	CURRENT 0..20 / 4..20 mA, max load 600 Ω, active / passive connection VOLTAGE 0..5 / 0..10 / 1..5 / 2..10 Vdc, min load 2,500 Ω	CURRENT 0..20 / 4..20 mA, max load 600 Ω, active / passive connection VOLTAGE 0..5 / 0..10 / 1..5 / 2..10 Vdc, min load 2,500 Ω	VOLTAGE 0-5, 0-10, 1-5, 2-10 V Analog retransmission: Vrms, Irms, Watt, Var, frequency, cosφ, energy CURRENT 0-20, 4-20 mA DIGITAL TBD counter	CURRENT Range: 0..20 mA; max impedance: 500 Ω VOLTAGE Range: 0..10 V; min impedance: 1 k Ω
ORDER CODES	**Z202-H**	**Z202-LP**	**Z203-2**	**Z204-1**

The technical data and diagrams in this document are indicative and not binding.



S201RC-LP

LOOP-POWERED CONVERTER FOR ROGOWSKI SENSORS

TECHNICAL DATA

GENERAL DATA

Power Supply	From 4..20 mA output loop
Max Consumption	< 0.6 W
Protection class	IP20
LED Status Indicators	Out-of-range alarm
Response Time	0.5 / 1 s
Precision class	0.5 % of f.s. (@ 40..120 MHz)
Thermal Drift	<200 ppm/°C
Configuration	f.s. choice and filter
Operating Temperature	-25 … 70°C
Storage temperature	-40… 85°C
Humidity	10 - 90 % non-condensing
Altitude	Up to 2000 m a.s.l.
Dimensions (wxhxd)	18x105x62 mm including terminals
Connections	Removable connectors pitch 5mm for cables up to 2.5 mm^2
Enclosure	PC-ABS self-extinguishing material, gray color
Mounting	35 mm DIN rail (IEC/EN 60715)
Certifications	CE

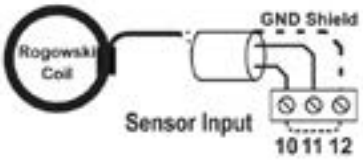
INPUT DATA

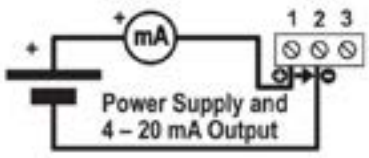
Channels	1
Type	ROGOWSKI SENSORS 100 mV/kA (330 mV/kA) Measurement type: TRMS Scales: 250, 500, 1000, 2000, 4000 A (50-60 Hz) Bandwidth: 3 kHz Overload: 10 kA (1 Vrms) Protection: Overvoltage and polarity reversal Damping filter: FAST = 0.5 s, SLOW = 1 s

OUTPUT DATA

Channels	1
Type	CURRENT Power supply / Output 4..20 mA Maximum output: 22mA Power supply voltage: 9 - 28 Vdc Maximum load: 600 Ohm

CONNECTIONS





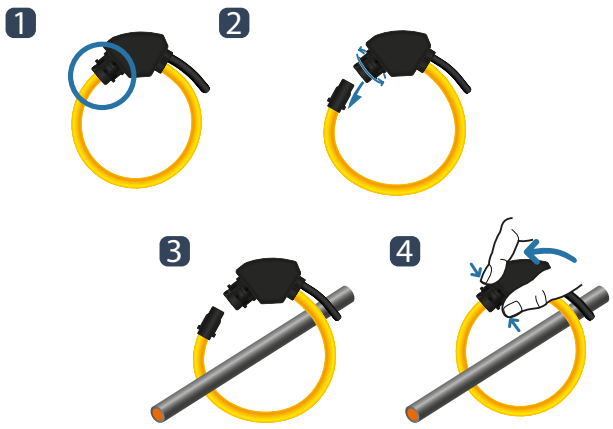
ERROR



ORDER CODES

Code	Description
S201RC-LP	LOOP-POWERED CONVERTER FOR ROGOWSKI SENSORS
RC150-025-100-3M	Rogowski Sensor L=25cm Øint.8cm,100mV/1kA-50Hz,cable L=3m.
RC150-035-100-3M	Rogowski Sensor L=35cm Øint.11cm,100mV/1kA-50Hz,cable L=3m.
RC150-040-100-3M	Rogowski Sensor L=40cm Øint.12cm,100mV/1kA-50Hz,cable L=3m.
RC150-060-100-3M	Rogowski Sensor L=60cm Øint.19cm,100mV/1kA-50Hz,cable L=3m.
RC150-090-100-3M	Rogowski Sensor L=90cm Øint.28cm,100mV/1kA-50Hz,cable L=3m.
RC150-120-100-3M	Rogowski Sensor L=120cm Øint.38cm,100mV/1kA-50Hz,cable L=3m.
RC150-180-100-3M	Rogowski Sensor L=180cm Øint.57cm,100mV/1kA-50Hz,cable L=3m.
RC190-030-333-3M	Rogowski Sensor L=30cm Øint.9.5cm,333mV/1kA-50Hz,cable L=3m.

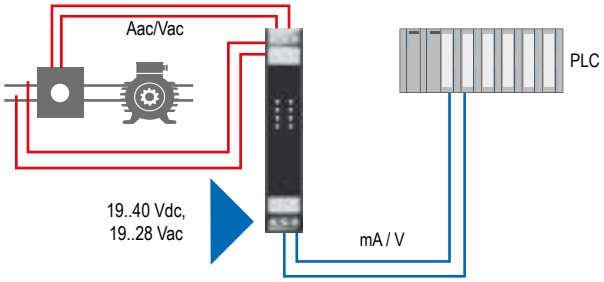
EXAMPLE OF ROGOWSKI SENSORS INSTALLATION



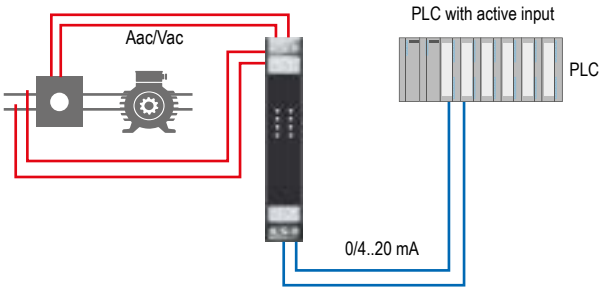
The technical data and diagrams in this document are indicative and not binding.

APPLICATION EXAMPLES

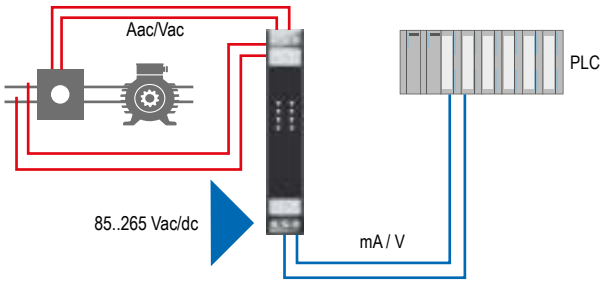
Z201



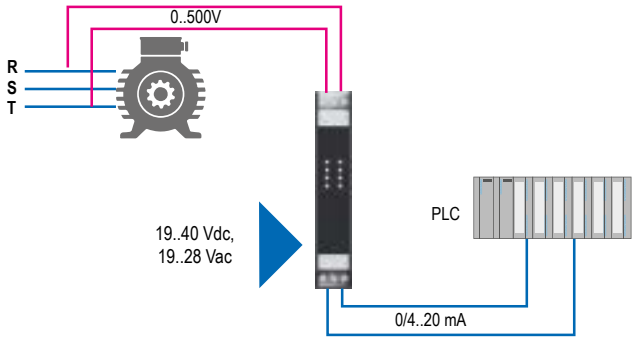
Z201-LP



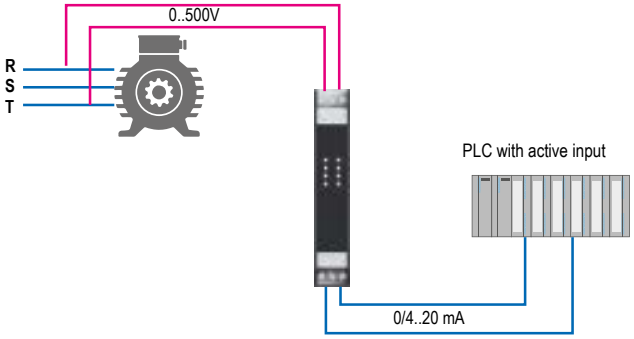
Z201-H



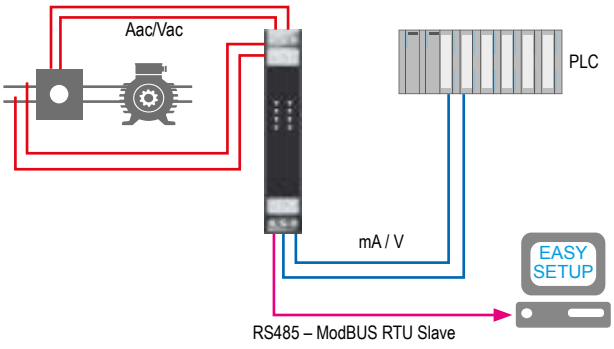
Z202



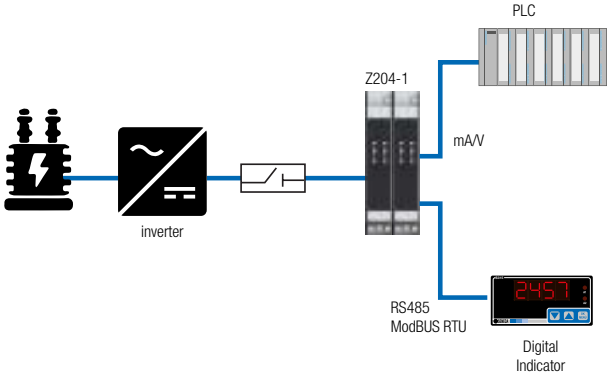
Z202-LP



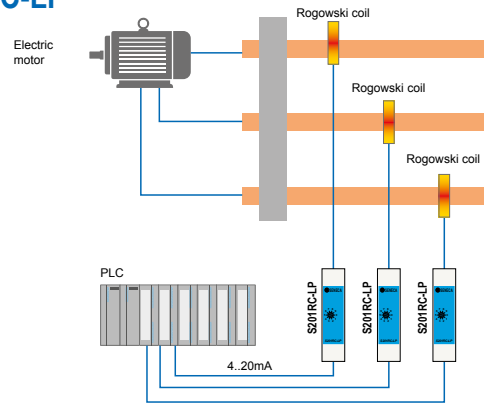
Z203-2



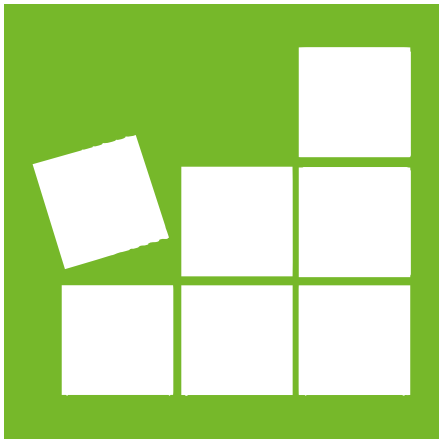
Z204



S201RC-LP

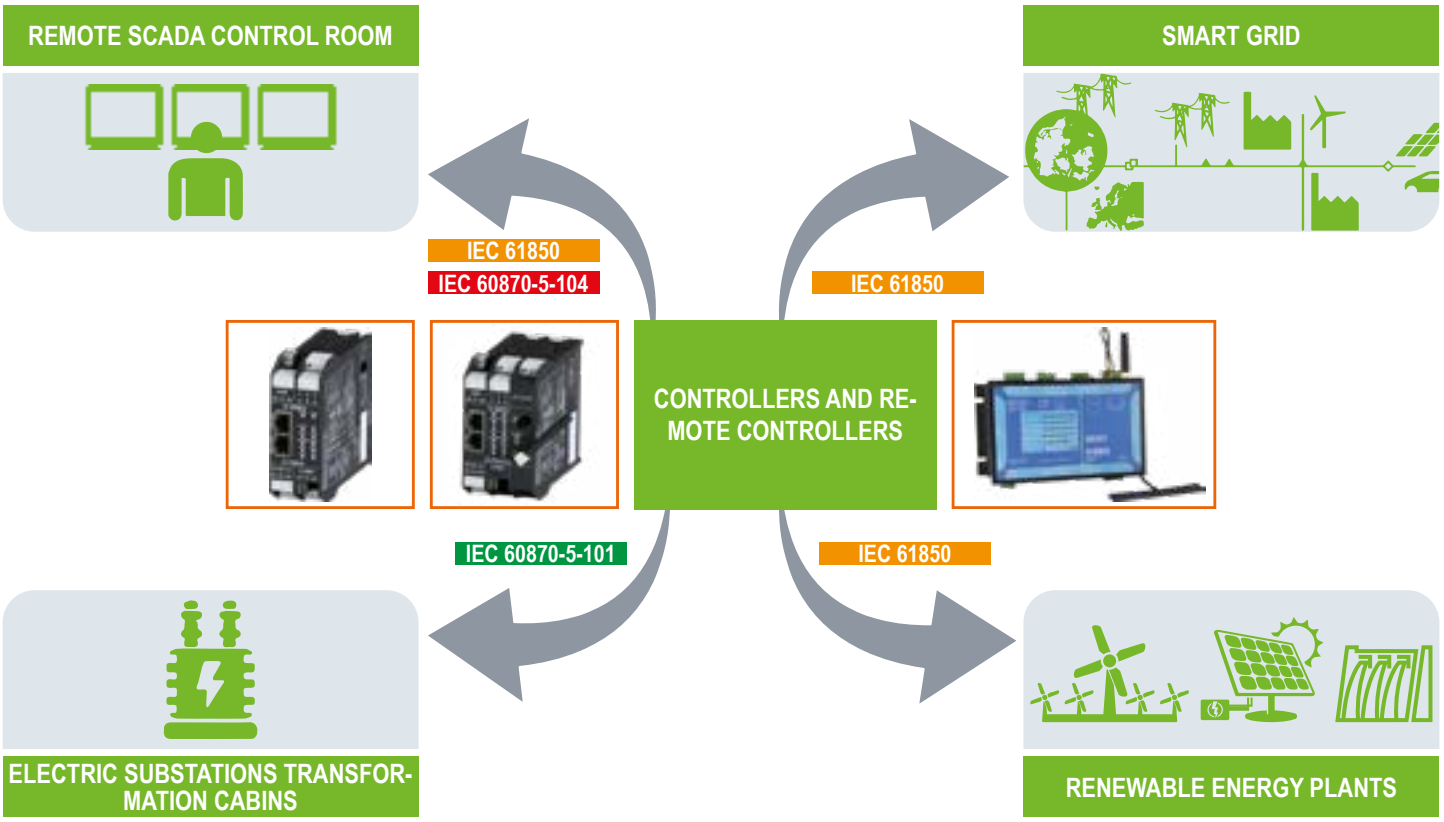


3.8



ENERGY CONTROLLERS

CONTROL AND COMMUNICATION FOR ELECTRIC NETWORKS



ENERGY CONTROLLERS AND REMOTE CONTROLLERS

For Energy Management applications, SENECA offers different types of controllers, Z-TWS4-E, Z-PASS2-S-E, S6001-RTU-E with the support of communication protocols IEC 60870-101/104 and IEC 61850. These units can be used as redundant controllers for plant automation, management of produced energy, management of renewable energy plants (biomass, photovoltaic, wind, etc.), development of smart grids, etc. They are also configurable as web servers and TCP-IP nodes and can be integrated with SCADA, EMS, and Web supervision platforms.

IEC 60870

IEC 60870 - REMOTE CONTROL

In the field of electrical engineering and power plant automation, the international standard IEC 60870 allows interoperability between devices from different manufacturers and is divided into six parts that define general information, operability conditions, electrical interfaces, performance requirements, and standard transmission protocols. The stack (data type) used in Straton particularly supports:

- IEC 60870-5-101 (serial communication)
- IEC 60870-5-104 Slave (communication via TCP/IP).

IEC 61850

IEC 61850 & GOOSE - ELECTRIC NETWORKS

The IEC 61850 standard was designed to send messages between sender and receiver optimally, making communication as direct as possible to avoid performance and functionality losses. The SENECA stack for the IEC 61850 server protocol includes the source, configurator, compiler, and runtime. The abstract data model defined in IEC 61850 can be "mapped" onto a different number of protocols, as in the case of GOOSE (Generic Object Oriented Substation Events, a mechanism that allows the sending of any data grouped in a dataset in less than a few milliseconds.

MULTIFUNCTION CONTROLLERS AND RTUS WITH ENERGY PROTOCOLS

	S6001-RTU ENERGY	R-PASS ENERGY	Z-PASS2-RT ENERGY	Z-TWS4-RT ENERGY
	IEC 60870 IEC 61850			
				
	All-in-one remote controller with integrated I/O, 4G WW LTE modem, IEC 61131, IEC 60870-101, IEC 60870-104, IEC 61850	**Remote Edge IIoT Controller, IEC 61131, integrated I/O, 4xETH, Wi-Fi (opt.) IEC 60870-101, IEC 60870-104, IEC 61850**	**Remote Controller with 4G WW LTE modem; Edge IIoT, IEC 61131, integrated I/O, IEC 60870-101, IEC 60870-104, IEC 61850**	**Edge IIoT Controller, IEC 61131, integrated I/O, IEC 60870-101, IEC 60870-104, IEC 61850**
GENERAL DATA				
Power Supply	24 Vac/dc	10..40 Vdc; 19..28 Vac	11..40 Vdc	
Max Consumption	10 W	8 W	6 W	
Battery / UPS	-	With additional R-COMM module	-	-
Max isolation	1.5 kVac			
Protection class	IP20			
Connections	3.5 mm pitch removable terminal block, 1.5 mm2 wire section			
			IDC10 power/bus connector	
Flash Memory (data)	≥4 GB			
RAM	512 MB			
Micro SD	-	-	Max 32 GB (PUSH-PUSH type micro SD slot	
Supported SIM cards	Standard SIM with push slot	Standard SIM with additional R-COMM module	Standard SIM with push slot	
I/O Channels	Nr.17DI, 4AI, 8DO, 2AO	#4 DI, #4 DO, #2 AI (mA, V)	#6 DI/DO configurable, #2 AI (mA,V)	
Operating temperature	-10..+65°C	-20..+65°C	-25..+65°C	
Dimensions (WxHxD)	190x105x60 mm	106 x 90 x 32 mm	52.5 x 102.5 x 111 mm	52.5 x 112 x 100 mm
Weight	700 g	170 g	Approximately 270 g	Approximately 240 g
Enclosure	Painted aluminum	PC / ABS self-extinguishing UL94-V0, black color	PA6 fiberglass reinforced, black color	
Installation	For 35 mm DIN rail IEC EN 60715	On DIN rail EN 60715, wall / panel mounted	For 35 mm DIN rail IEC EN 60715	
Certifications	CE, UKCA			
COMMUNICATION				
Ethernet Ports (ETH1, ETH2)	#1 Ethernet port 10/100 Mbps (RJ45)	#4 Fast Ethernet 10/100Tx ports with front RJ45 connector	Nr.2 Fast Ethernet (LAN/1WAN), 10/100Tx su RJ45 frontal	
Serial ports (COM1, COM2, COM4)	#1 RS232 / RS485 port on terminals, max baud rate 115kbps #3 RS485 (on terminals or IDC10), max baud rate 115kbps #1 RS232 port (DB9M)	-	#1 RS232 / RS485 port on terminals, max baud rate 115kbps	
		#1 RS485 port on terminals, max baud rate 115kbps		
		-	#1 RS485 port on terminals, max baud rate 115kbps	
USB Ports	#1 USB host port on side type A connector			
	-	#1 micro USB port for debugging		
CAN Port	-	#1 CAN port (terminals)	#1 CAN port (terminals)	#1 CAN port (terminals)
Modem/Router	Multiband M2M/IoT, 4G / LTE World Wide (integrated)	Multiband M2M/IoT, 4G / LTE World Wide (with optional R-COMM module)	Multiband M2M/IoT, 4G / LTE World Wide (integrated)	-
Sat Receiver.	GPS / GLONASS / BeiDou (compass) / Galileo / QZSS	GPS / GLONASS / BeiDou (compass) / Galileo / QZSS (with optional R-COMM module)	GPS / GLONASS / BeiDou (compass) / Galileo / QZSS	-
Wi-Fi (opt.)	-	WiFi 802.11 b/g/n, band 2.4 ÷2.4835GHz, max Output Power: 17dBm (50 mW), security WEP / WPA / WPA2	-	-
Serial / IT Protocols	ModBUS TCP-IP Server/Client, ModBUS RTU Master/Slave, FTP/SFTP Client/Server HTTP/HTTPS Server, SMTPs client, SNMP, Samba			
IoT Protocols	MQTT, MQTTs, OPC UA Server, https, http post			
Energy Protocols	IEC 60870-101, IEC 60870-104, IEC 61850			
Connectivity	Max TCP-IP Clients 50, Max ModBUS RTU/ASCII slave nodes 128 per port, Memory area for 2,000 variables (tags)			
Operating Modes	Industrial Gateway, LAN Router, Wi-Fi Router (opt.) Datalogger, Remote Alarm Unit, Remote VPN Access Unit, SoftPLC IEC 61131, Energy Controller IEC 60870/61850, Widget HMI, Remote Display			
SECURITY				
LAN / WAN separation	Yes			
Authentication	User / Password		Two-factor authentication (Google Authenticator)	
Permission Management	Supervisor		Supervisor / Users / Groups	
Security Protocols	OpenVPN, SSL, HTTPS Server, MQTT over SSL/TLS	OpenVPN, SSL, HTTPS Server, MQTT over SSL/TLS, TLS 1..2 or higher		
SSL/TLS Certificates	-	-	Automated TLS certificate management for HTTPS	
Cybersecurity certificates (penetration test)	-	-	Yes, OWASP, NIST 800-115, Risk Analysis, IEC62443	
Encryption algorithm (data encryption)	OpenVPN BF-CBC + Auth SHA1	OpenVPN AES-256bit-CBC + Auth SHA256 bit or user-selectable		
PROGRAMMING				
Configuration environments	Z-NET4, Web Server			
VPN Management Software	OpenVPN, VPN Client Communicator			
LET'S Support	Yes			
PLC Programming	IEC 61131-3 (Straton)			
Max # PLC variables/tags	2,000			
PLC program size	2048 kB			

ORDER CODES

Code	Description
R-PASS-0-4-E	Edge Controller IIoT Straton with Energy protocols and 4 Ethernet ports
R-PASS-W-4-E	Edge Controller IIoT Straton with Energy protocols, Wi-Fi, and 4 Ethernet ports
S6001-RTU-E-4GWW	All-in-one RTU with integrated I/O, 4G WW LTE modem, Straton, Energy protocols
Z-PASS2-RT-4G-E	Edge IIoT Controller, 4G, prot. protection, GPS and integrated I/O.
Z-TWS4-RT-E	Edge Controller IIoT, IEC 61131, integrated I/O, Energy protocols

MYALARM2 CEI



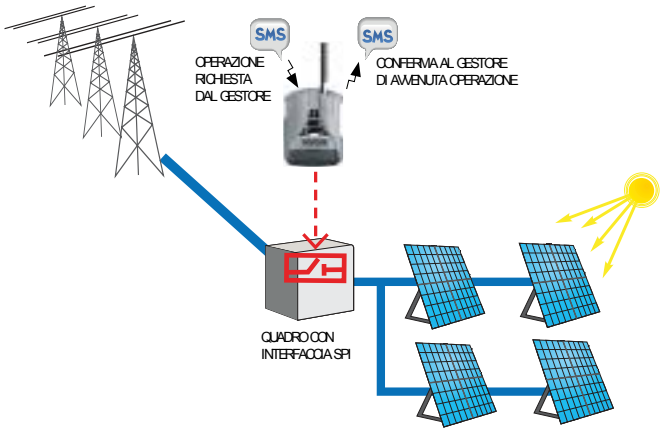
MYALARM2-CEI 0-16 è un'unità di telegestione che consente il teledistacco, il riallaccio e la diagnostica da remoto di impianti di generazione di energia. Con 2 uscite a relè, porta USB, batteria tampone, alloggio per MicroSD, display LCD e LED diagnostici, il modulo GSM/GPRS integrato consente l'intervento del gestore di rete (GSE) e dei responsabili di impianto mediante SMS codificati fino ad un massimo di 20 utenti. L'unità elabora il segnale ricevuto dal gestore ed emette un comando verso il sistema di protezione interfaccia (SPI) cui è collegato in modo da consentire il distacco e l'inibizione dei gruppi di generazione. Studiato per l'installazione facilitata e sicura con guida DIN il modulo può gestire fino a 4 sistemi di protezione interfaccia. Seneca propone 4 versioni compatibili con tutte le SPI presenti sul mercato, con antenna integrata o esterna e alimentazione a 220 Vac o 12 Vdc. Per applicazioni in condizioni ambientali critiche il dispositivo è disponibile anche in custodia ABS con grado di protezione IP66.

TECHNICAL DATA

GENERAL DATA	
Power Supply	5..15 Vdc @ 500 mA (*)
Consumption	3.5 W (max)
Protection class	IP20
Rechargeable battery	Lithium Polymers (1,100 mAh), autonomy up to 8 hours (without auxiliary relay)
Status indications	GSM / GPRS Device state power supply
Connections	Spring-loaded removable terminals, pitch 3.5 mm SMA connector for GSM antenna Micro USB port for configuration and power supply
Slot	Push-Push SIM for mini SIM (15 x 25 mm)
Supported SIM	Mini SIM
O.S.	Real-Time Multitasking
Display	LCD 128x32 Dots with visible area 39 mm x 8.6 mm Display scroll button
GSM / GPRS	Quad band 850 / 900 / 1800 / 1900 MHz
Dimensions	80 x 105 x 30 mm
Weight	150 g
Operating temperature	-10..+55°C
Storage temperature	-20..+85°C
Material	ABS Polycarbonate
Installation	DIN rail or wall
Included items	Power supply for network connection on terminals, support bracket, #2 screws, #2 anchors, GSM antenna, installation manual, USB cable
FUNCTIONS AND SETTINGS	
Basic configuration	Software (EASY CEI): SMS, users, PIN, POD, inputs, outputs, debug
Firmware update	Via software or through card
Alarm management	SMS,
Contact list	20 phone numbers
Commands	Latch, Unlatch
DIGITAL INPUTS	
Channels	4
Type	PNP OFF threshold: 0 - 2 Vdc, I < 1 mA ON threshold: 12 - 24 Vdc, I > 3 mA
DIGITAL OUTPUTS	
Channels	2
Type	SPST relay 3 A / 240 Vac
ANALOG OUTPUTS	
Channels	1
Type	12 Vdc
STANDARD	
Certifications	CE
Standards	ETSI EN 301489-7, EN 301511, EN 301489-1, IEC/EN 60950, CEI 0-16 (Annex M)

* Additional power supply range 24 Vdc and 220 Vac via supplied power supplies / transformers

SCHEMA APPLICATIVO



PROGRAMMAZIONE

MYALARM2-CEI-0-16 è accompagnato da un intuitivo tool di programmazione (EASY CEI) con cui è possibile configurare il codice POD, il codice PIN, i parametri dei canali I/O, i numeri di telefono abilitati alla ricezione delle notifiche, oltre alla personalizzazione delle stringhe SMS associate ai cambi di stato dell'impianto. Con EASY CEI è anche possibile salvare una copia della configurazione e aggiornare il firmware del dispositivo specie per eventuali implementazioni future.

QUADRO NORMATIVO

L'adozione del MYALARM2-CEI-0-16 si colloca nell'ambito degli incentivi erogati dal GSE per l'adeguamento a regola d'arte degli impianti di generazione in media tensione non programmabili da fonte rinnovabile con potenza nominale complessiva maggiore o uguale a 100 kW. Tale adeguamento si rende necessario per garantire la sicurezza di esercizio richiesta dal Servizio Elettrico Nazionale in conformità alla Normativa CEI 0-16 allegato M, alla delibera 421 (A.E.E.G) e all'Allegato A72 (TERNA).

CODICI D'ORDINE

Codice	Descrizione
UNITÁ	
MY2CEI-016-0-220	Unità gestione teledistacco, antenna integrata, alim. 220Vac - 12Vdc
MY2CEI-016-0-24	Unità gestione teledistacco, antenna integrata, alim. 24Vdc - 12Vdc
MY2CEI-016-A-220	Unità gestione teledistacco, antenna est. A-GSM, alim. 220Vac - 12Vdc
MY2CEI-016-A-24	Unità gestione teledistacco, antenna est. A-GSM, alim. 24Vdc - 12Vdc

CODICI D'ORDINE

Codice	Descrizione
ACCESSORI	
A-GSM	Antenna esterna multibanda con cavo di 3 m e attacco SMA maschio
ALIM-MY2	Alimentatore 230 V / 12 V
ALIM-MY2-12-24	Trasformatore 24-12Vdc
CU-A-MICRO-B	Cavo plug USB-A Micro USB-B 5 P
MY2-KITIP66	KIT ABS per montaggio rapido, protezione IP66
PROGRAMMAZIONE	
EASY CEI	Software di gestione MYALARM2 CEI