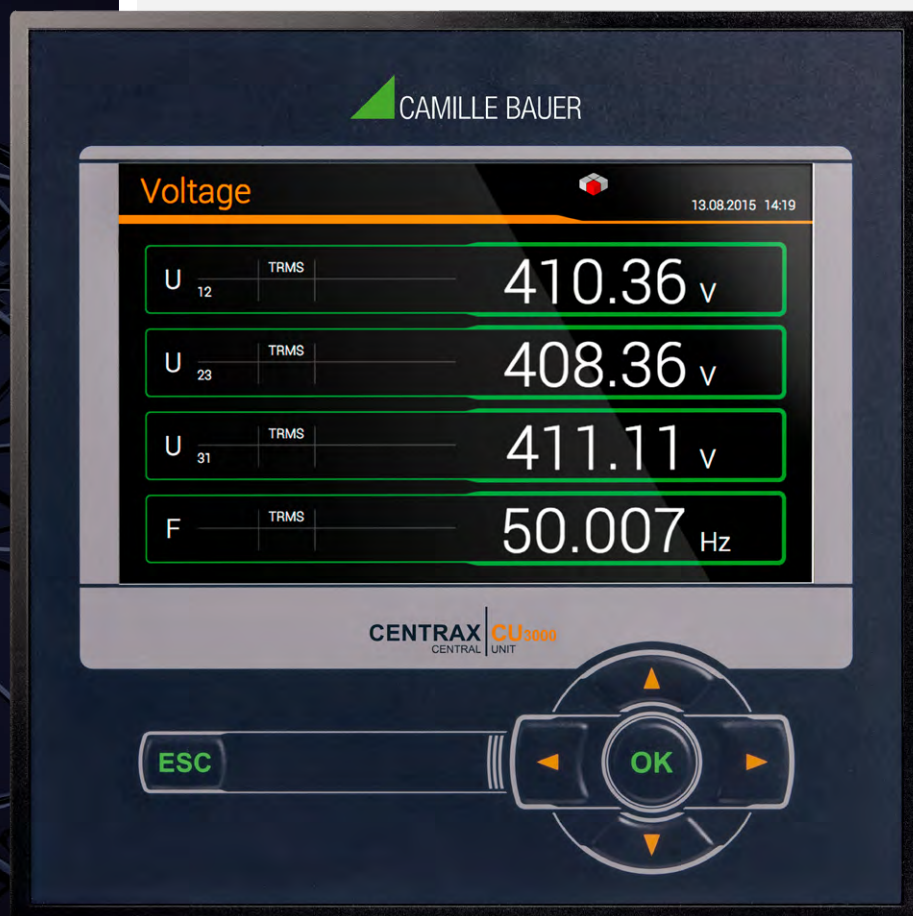


# FLEXIBLE SOLUTIONS FOR THE ENERGY INDUSTRY

COMPREHENSIVE INSTRUMENT  
FOR MEASUREMENT AND  
CONTROL OF POWER SYSTEMS



## CENTRAX CU-SERIES

CENTRAX CU3000 • CENTRAX CU5000



Comprehensive instrument for  
measurement and control of  
power systems



CENTRAX CU3000 / CU5000 combines the functionality of a highly accurate instrument for heavy current application with the possibilities of a freely programmable PLC in one housing. This makes the need of a separate control, a control system, a remote display or an additional data collector superfluous. The measuring part of the instrument determines more than 1500 high-quality items of status, energy consumption and power quality. The control application is based on CODESYS and can now, depending on the application, process this data logically, use it in control algorithms or interact with energy generation or consumers as the situation

demands. The instrument can communicate with the process environment via freely selectable I/Os and Modbus interfaces. The ADVANCED and PROFESSIONAL versions offer the additional possibility of importing measured data of other field instruments into the control application via Modbus interfaces for further processing. CENTRAX CU3000 / CU5000 can thus be used for autarkic solutions in the areas of energy management, control and optimisation of the energy consumption, utility monitoring and other general automation and control tasks. A connection to higher-ranking systems is possible at any time.

## ADAPTABLE

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Adaptable to the task at hand via control application

Possibility of providing own on-site and web visualizations

Horizontal and vertical extension possible

## INTUITIVE

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Easy device operation with language-specific plain text menu guidance

Topical arrangement of measured data information for quick access to desired data

Service area for maintenance and commissioning

## MULTIFUNCTIONAL

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Measurement and control in one instrument

Central acquisition of measured data and energy consumption

Monitoring of plant, process and utilities

## FLEXIBLE

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Universal measuring inputs for any type of grid

Freely selectable mean value and meter measuring variables

Configurable access authorisation

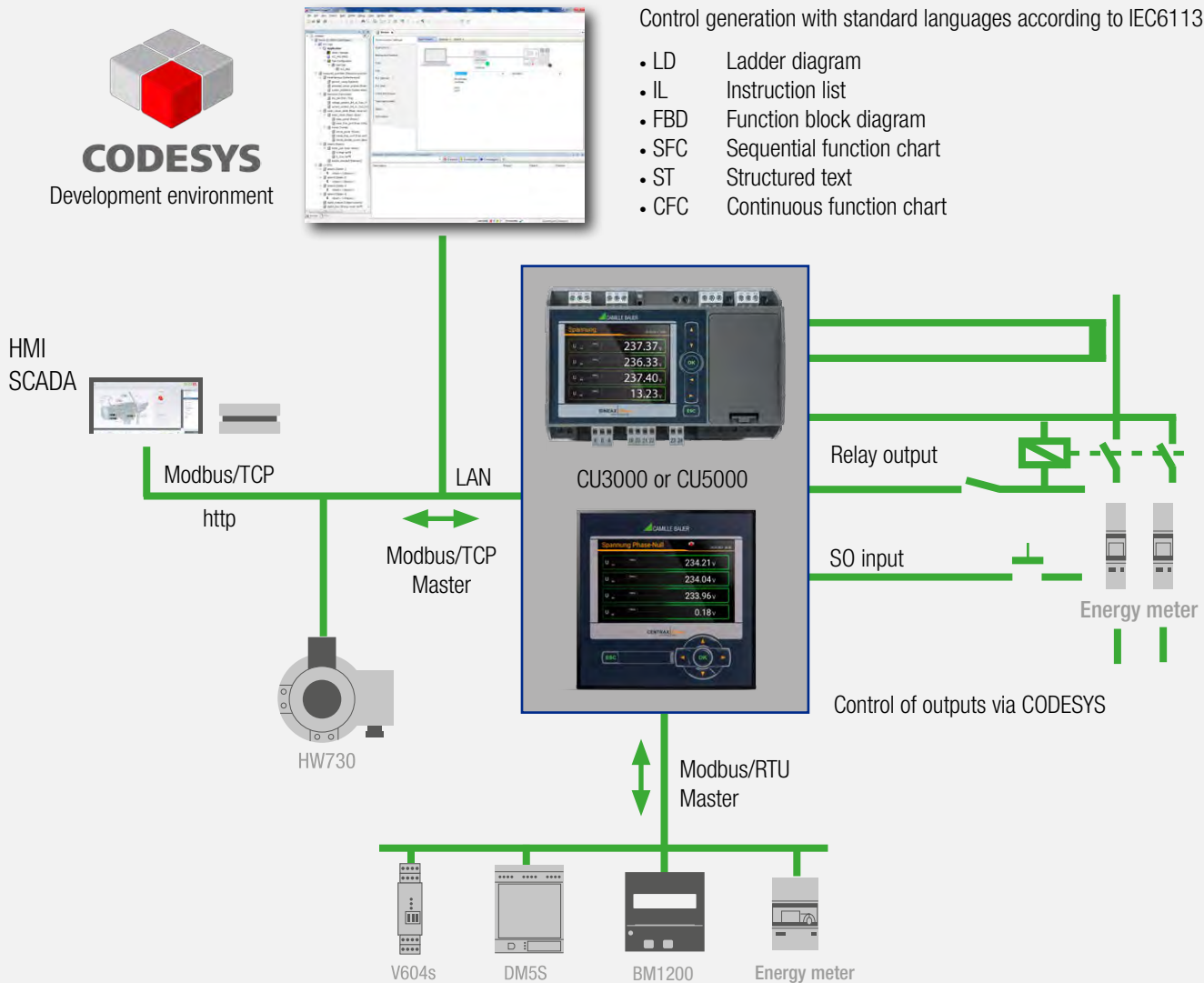
## SCALABLE

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Combinable device version (functionality, interfaces, I/Os, power supply)

Selectable design: Top hat rail or panel installation (96x96 or 144x144mm)

Integration as a standard object into the SMARTCOLLECT software



## INDIVIDUAL SYSTEM SOLUTIONS

The approach of the CENTRAX CU3000 / CU5000 is the use of the SINEAX AM3000 resp. DM5000 as a measuring instrument, supplemented by a freely programmable control application, based on the widely used CODESYS, which takes over the function of the control system or PLC. The control functionality is provided in different performance classes:

- **BASIC:** Flexible processing of the measuring data of the measuring instrument with full use of the I/O functionality
- **ADVANCED:** In addition, the possibility to read and use data from other measuring instruments via Modbus RTU/TCP, as well as to trigger time-depending processes
- **PROFESSIONAL:** To create your own web visualization and to use the local display for self-defined visualizations

### POSSIBLE APPLICATIONS

- Load balancing, load control
- Acquisition of energy consumption of any kind
- Energy management, summation station
- Monitoring of production equipment such as transformers, motors, generators, etc.
- Load management, peak load optimization, power factor compensation
- Local data display and control unit
- Monitoring of changes (Long-time-Drift / Degradation)
- Start / Stop process control, i.e. for control and monitoring of process steps

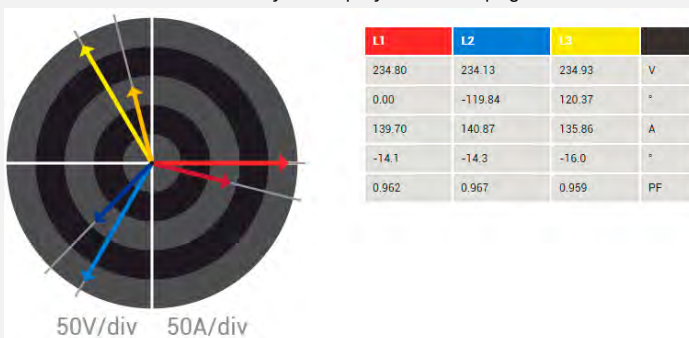


# MEASURED VALUES

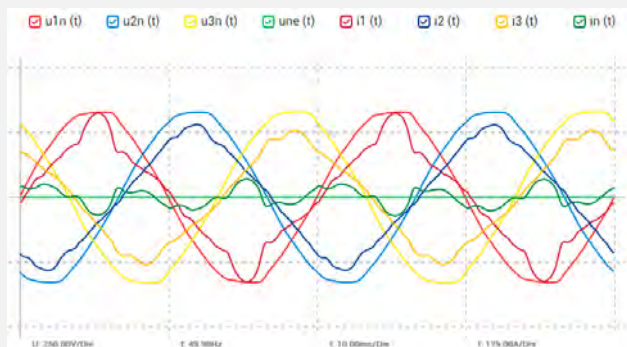
MEASURED VALUE GROUP	APPLICATION
<b>INSTANTANEOUS VALUES</b> U, I, IMS, P, Q, S, PF, LF, QF ... Angle between voltage phasors Min/max of instantaneous values with time stamp	Transparent monitoring of present system state Fault detection, connection check, sense of rotation check Determination of grid variable variance with time reference
<b>EXTENDED REACTIVE POWER ANALYSIS</b> Total reactive power, fundamental frequency, harmonics $\cos\phi$ , $\tan\phi$ of fundamental frequency with min values in all quadrants	Reactive power compensation Verification of specified power factor
<b>HARMONICS ANALYSIS (ACCORDING TO EN 61 000-4-7)</b> Total harmonics content THD U/I and TDD I Individual harmonics U/I up to 50 <sup>th</sup>	Evaluation of the thermic load of equipment Analysis of system perturbation and consumer structure
<b>IMBALANCE ANALYSIS</b> Symmetrical components (positive, negative, zero sequence system) Imbalance (from symmetrical components) Deviation from U/I mean value	Equipment overload protection Fault/earth contact detection
<b>ENERGY BALANCE ANALYSIS</b> Meters for the demand/supply of active/reactive power, high/low tariff, meters with selectable fundamental variable Power mean values active/reactive power, demand and supply, freely definable mean values (e.g. phase power, voltage, current and much more). Mean value trends	Preparation of (internal) energy billing Determination of energy consumption versus time (load profile) for energy management or energy efficiency verification Energy consumption trend analysis for load management
<b>OPERATING HOURS</b> Operating hours of the device	

## WEB VISUALIZATION

All of the measured data may be displayed via webpage



Voltage and current phasors and power factors of all phases



Waveform of all voltages and currents



## TECHNICAL DATA

### INPUTS

<b>NOMINAL CURRENT</b>	1 ... 5 A
Maximum	7,5 A
<b>NOMINAL VOLTAGE</b>	57,7 ... 400V <sub>LN</sub> , 100 ... 693V <sub>LL</sub>
Maximum	CU3000: 480V <sub>LN</sub> , 832V <sub>LL</sub> (sinusoidal) CU5000: 520V <sub>LN</sub> , 900V <sub>LL</sub> (sinusoidal)
Nominal frequency	42 ... 50 ... 58 Hz, 50,5 ... 60 ... 69,5 Hz
Sampling rate	18 kHz

### POWER SUPPLY VARIANTS

Nominal voltage	100 ... 230V AC/DC (CU5000) 110 ... 230V AC, 130 ... 230V DC (CU3000) 110 ... 200V AC, 110 ... 200V DC (CU3000) 24 ... 48V DC (CU3000/CU5000)
Consumption	≤ 20 VA

### UNINTERRUPTIBLE POWER SUPPLY (UPS)

Type (3,7 V)	VARTA Easy Pack EZPackL, UL listed MH16707
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### TYPES OF CONNECTION

- Single phase or split phase (2-phase system)
- 3 or 4-wire balanced load
- 3-wire balanced load [2U, 1I]
- 3-wire unbalanced load, Aron connection
- 3 or 4-wire unbalanced load
- 4-wire unbalanced load, Open-Y

### I/O-INTERFACE

<b>ANALOG OUTPUTS</b>	(optional)
Range	±20 mA (24 mA max.), bipolar
<b>RELAYS</b>	(optional)
Contacts	Changeover contact
Load capacity	250V AC, 2A, 500 VA; 30V DC, 2A, 60W

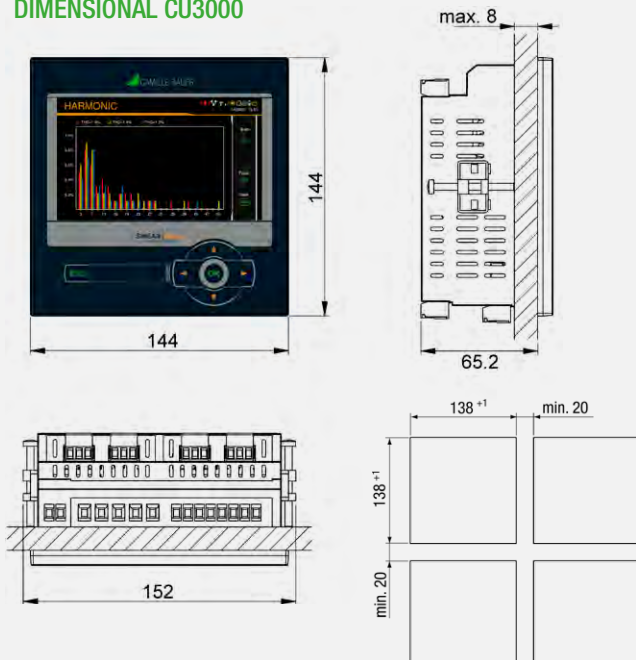
### DIGITAL INPUTS PASSIVE

Nominal voltage	12/24V DC (30V max.)
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### DIGITAL INPUTS ACTIVE (optional)

Open circuit voltage	≤ 15V
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### DIMENSIONAL CU3000



### DIGITAL OUTPUTS

Nominal voltage	12/24V DC (30V max.)
<b>BASIC UNCERTAINTY ACCORDING IEC/EN 60688</b>	
Voltage, current	±0,1 %
Power	±0,2 %
Power factor	±0,1°
Frequency	±0,01 Hz
Imbalance U, I	±0,5 %
Harmonic	±0,5 %
THD U, I	±0,5 %
Active energy	Class 0.5S (EN 62 053-22)
Reactive energy	Class 0.5S (EN 62 053-24)

### INTERFACES

<b>ETHERNET</b>	RJ45 socket
Protocols	Modbus/TCP, http, NTP (time synchronisation)
<b>MODBUS/RTU</b>	Standard (CU5000), optional (CU3000)
Baud rate	9,6 to 115,2 kBaud

### TIME REFERENCE

Internal clock	
Clock accuracy	± 2 minutes/month (15 to 30°C)
Synchronisation	NTP server

### ENVIRONMENTAL CONDITIONS, GENERAL INFORMATION

Operating temperature	without UPS: -10 up to 15 up to 30 up to + 55 °C with UPS: 0 up to 15 up to 30 up to + 35 °C
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### MECHANICAL PROPERTIES

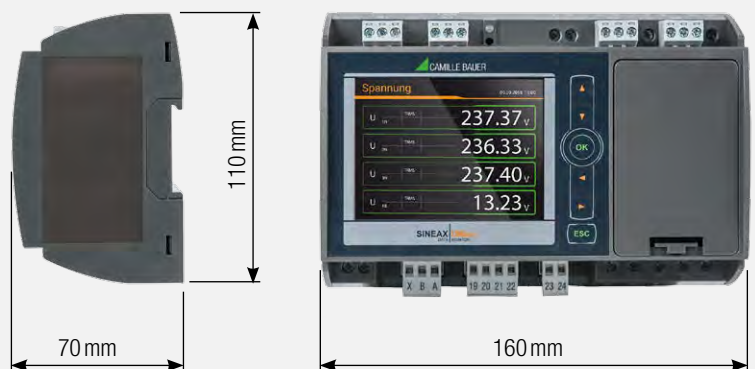
Housing material	Polycarbonate (Makrolon)
Weight	800 g (CU3000), 600 g (CU5000)

### SAFETY

Current inputs are galvanically isolated from each other.	
Protection class	II (protective insulation, voltage inputs via protective impedance)
Measurement category	CATIII

Further technical data is available in the operating instructions of the instrument.

### DIMENSIONAL CU5000





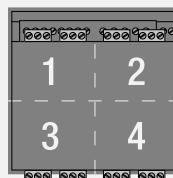
# ORDER CODE

## ORDER CODE CU3000- .... ..

<b>1. BASIC DEVICE FOR INSTRUMENTATION PANEL-MOUNTING</b>	
Without data logger	0
Periodic Data + events	1
Disturbance recorder + events	2
Periodic Data + events + disturbance recorder	3
<b>2. PLC FUNCTIONALITY</b>	
Performance class BASIC	1
Performance class ADVANCED	2
Performance class PROFESSIONAL	3
<b>3. INPUT   FREQUENCY RANGE</b>	
Current transformer inputs, 42 ... <u>50/60</u> ... 69,5 Hz	1
<b>4. POWER SUPPLY</b>	
Nominal voltage 110 ... 230 V AC, 130 ... 230 V DC	1
Nominal voltage 24 ... 48 V DC	2
Nominal voltage 110 ... 200 V AC, 110 ... 200 V DC	3
<b>5. BUS CONNECTION</b>	
Ethernet (Modbus/TCP protocol + web server)	1
Ethernet (Modbus/TCP, web server) + RS485 (Modbus/RTU)	2
<b>6. EXTENSION 1</b>	
Without	0
2 relays	1
2 analog outputs, bipolar ( $\pm 20$ mA)	2
4 analog outputs, bipolar ( $\pm 20$ mA)	3
4 digital inputs passive	4
4 digital inputs active	5
<b>7. EXTENSION 2</b>	
Without	0
2 relays	1
2 analog outputs, bipolar ( $\pm 20$ mA)	2
4 analog outputs, bipolar ( $\pm 20$ mA)	3
4 digital inputs passive	4
4 digital inputs active	5
<b>8. EXTENSION 3</b>	
Without	0
2 relays	1
2 analog outputs bipolar ( $\pm 20$ mA)	2
4 analog outputs bipolar ( $\pm 20$ mA)	3
4 digital inputs passive	4
4 digital inputs active	5
Uninterruptible power supply	8
<b>9. EXTENSION 4</b>	
Without	0
2 relays	1
2 analog outputs bipolar ( $\pm 20$ mA)	2
4 analog outputs bipolar ( $\pm 20$ mA)	3
4 digital inputs passive	4
4 digital inputs active	5
<b>10. TEST CERTIFICATE</b>	
Without	0
Test certificate in German	D
Test certificate in English	E

## ORDER CODE CU5000- .... ..

<b>1. BASIC DEVICE FOR TOP-HAT RAIL MOUNTING</b>	
Without data logger	0
Periodic Data + events	1
Disturbance recorder + events	2
Periodic Data + events + disturbance recorder	3
<b>2. ON-SITE SERVICE AND MONITORING</b>	
Without display	0
With TFT display	1
<b>3. PLC FUNCTIONALITY</b>	
Performance class BASIC	1
Performance class ADVANCED	2
Performance class PROFESSIONAL	3
<b>4. INPUT   FREQUENCY RANGE</b>	
Current transformer inputs, 42 ... <u>50/60</u> ... 69,5 Hz	1
<b>5. POWER SUPPLY</b>	
Nominal voltage 100 ... 230 V AC/DC	1
Nominal voltage 24 ... 48 V DC	2
<b>6. BUS CONNECTION</b>	
Ethernet (Modbus/TCP+web server) + RS485 (Modbus/RTU)	1
<b>7. UNINTERRUPTIBLE POWER SUPPLY</b>	
Without	0
With uninterruptible power supply	1
<b>8. EXTENSION 1</b>	
Without	0
2 relays	1
2 analog outputs bipolar ( $\pm 20$ mA)	2
4 analog outputs bipolar ( $\pm 20$ mA)	3
4 digital inputs passive	4
4 digital inputs active	5
<b>9. EXTENSION 2</b>	
Without	0
2 relays	1
2 analog outputs bipolar ( $\pm 20$ mA)	2
4 analog outputs bipolar ( $\pm 20$ mA)	3
4 digital inputs passive	4
4 digital inputs active	5
<b>10. TEST CERTIFICATE</b>	
Without	0
Test certificate in German	D
Test certificate in English	E

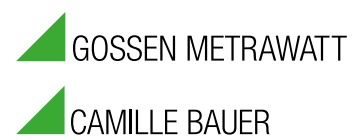


### I/O-EXTENSIONS CU3000

Maximum one I/O extension with analog outputs may be provided per device.

I/O extension 4 only possible for a variant without data logger.

**GMC INSTRUMENTS**



Camille Bauer Metrawatt AG  
Aargauerstrasse 7 • 5610 Wohlen • Switzerland  
TEL +41 56 618 21 11 • FAX +41 56 618 21 21

[www.camillebauer.com](http://www.camillebauer.com) • [info@cbmag.com](mailto:info@cbmag.com)