

# INTUITIVE NAVIGATION IN ELECTRICAL NETWORKS

COMPREHENSIVE INSTRUMENT FOR  
MEASUREMENT AND MONITORING OF  
POWER SYSTEMS



# THE CLEAR VIEW INTO THE ELECTRICAL GRID

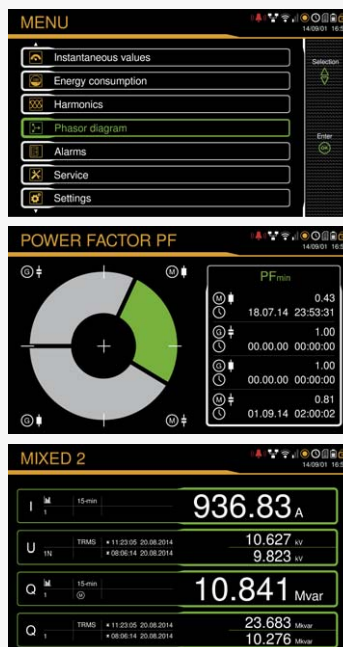
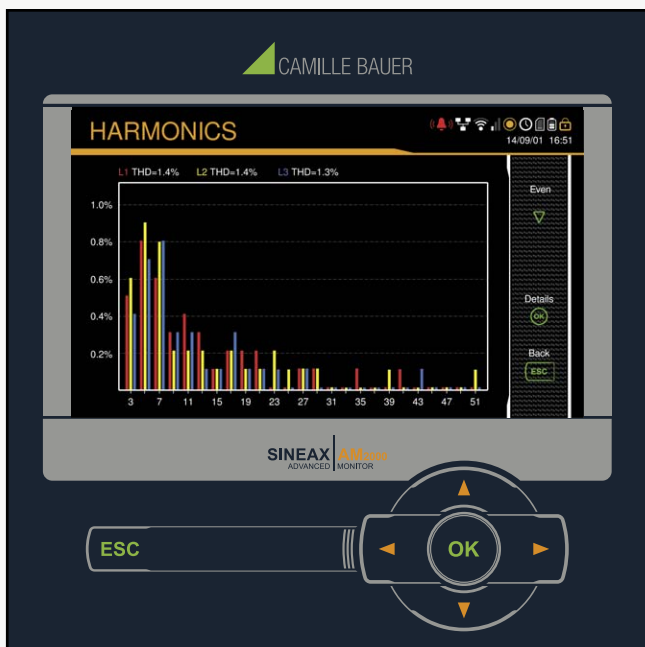
The SINEAX AM2000 is a comprehensive instrument for measurement and monitoring of power systems. It stands out by the display quality and intuitive operation. The device provides a wide functionality, which can be extended further by means of optional components. The connection of the process environment may be performed via communication interfaces or by using digital I/Os or analog outputs.

The device is designed for the universal application in industrial plants, building automation or energy distribution. In low voltage distribution

systems rated voltages up to 690V can be connected directly at measurement category CAT III.

The universal measurement system of the device can be used directly for any system, from single phase up to 4-wire unbalanced networks, without hardware modifications.

The device can easily be adapted to the on-site requirements via TFT display.



Intuitive operation via menu

Graphical representations

Measurement displays

## FUNCTIONS

**Alarming** · Limit monitoring with alarming

**Universal process I/O** · Synchronization input  
· State, pulse and relay outputs  
· Analog outputs  $\pm 20$  mA

**Energy management** · Active and reactive meters  
· Load profiles, load curves  
· Trend analysis  
· Variance of system load

**Data display** · Instantaneous values  
· Energy meters  
· Mean-values with trend  
· Harmonics + THD  
· Phasor diagram  
· Plaintext alarm list

**Analysis functions** · Harmonic analysis acc. 61 000-4-7  
· Extended reactive power analysis  
· System imbalance monitoring

## TECHNICAL DATA

## AND APPLICATION HINTS

### INPUTS

Nominal current	1 ... 5A (max. 7,5A)
Maximum	7,5A
Overload capability	10A continuous 100A, 5x1 s, interval 300 s
Nominal voltage	57,7 ... 400V <sub>LN</sub> , 100 ... 693V <sub>LL</sub>
Maximum	480V <sub>LN</sub> , 832V <sub>LL</sub> (sinusoidal)
Overload capability	480V <sub>LN</sub> , 832V <sub>LL</sub> continuous 800V <sub>LN</sub> , 1386V <sub>LL</sub> , 10x1 s, interval 10 s
Nominal frequency	45 ... <u>50</u> ... 55 Hz, 55 ... <u>60</u> ... 65 Hz
Meas. TRMS	Up to 60th harmonic
Meas. category	CATIII
Power supply	
Nominal voltage	110 ... 230V AC, 130 ... 230V DC or 110 ... 200V AC, 110 ... 200V DC or 24 ... 48V DC
Consumption	≤15 VA

### SYSTEMS

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

### I/O INTERFACE

Analog outputs	(optional)
Linearization	Linear, kinked
Range	±20 mA (24 mA max.), bipolar
Uncertainty	±0,2% of 20 mA
Burden	≤500Ω (max. 10 V/20 mA)
Burden influence	≤0,1%
Residual ripple	≤0,2%

Relays	(optional)
Contacts	Changeover contact, bistable
Load capacity	250V AC, 2A, 500VA 30V DC, 2A, 60W

Digital input	standard
Nominal voltage	12/24V DC (30V max.)
Logical ZERO	-3 up to +5V
Logical ONE	11 up to 30V

Digital output	2, standard
Nominal voltage	12/24V DC (30V max.)
Nominal current	50 mA (60 mA max.)
Load capability	400Ω ... 1 MΩ

### MEASUREMENT UNCERTAINTY ACC. IEC/EN 60688

Voltage, current	±0,2%
Power	±0,5%
Load factor	±0,2°
Frequency	±0,01 Hz
Imbalance U, I	±0,5%
Harmonics	±0,5%
THD U, I	±0,5%
Active energy	Class 1, EN 62053-22
Reactive energy	Class 2, EN 62053-23

### AMBIENT CONDITIONS, GENERAL INFORMATION

Operating temperature	-10 ... <u>15 up to 30</u> ... +55 °C
Storage temperature	-25 up to +70 °C
Temperature influence	0,5 x basic uncertainty per 10 K
Long term drift	0,5 x basic uncertainty per year
Others	Usage group II (EN 60688)
Relative humidity	<95% no condensation
Altitude	≤2000 m max.

Device to be used indoor only!

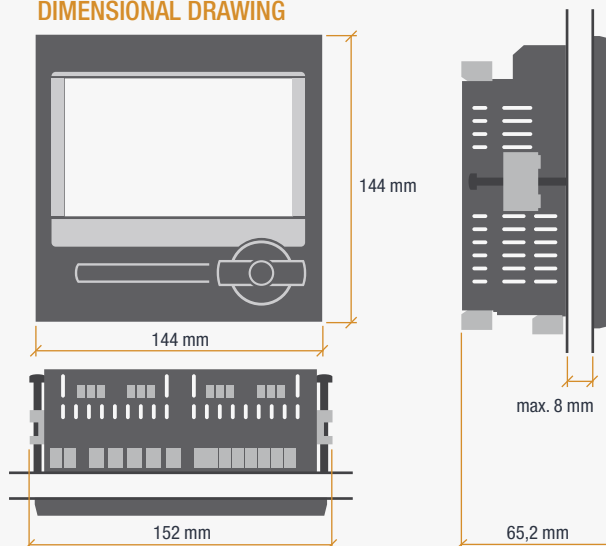
### MECHANICAL ATTRIBUTES

Orientation	Any
Housing material	Polycarbonat (Makrolon)
Flammability class	V-0 acc. UL94, self-extinguishing, non-dripping, free of halogen
Weight	500 g

### SAFETY

Current inputs are galvanically isolated from each other.	
Protection class	II (protective insulation, voltage inputs)
Pollution degree	2
Protection rating	IP54 (front), IP30 (housing), IP20 (terminals)
Measurement category	CAT III

### DIMENSIONAL DRAWING

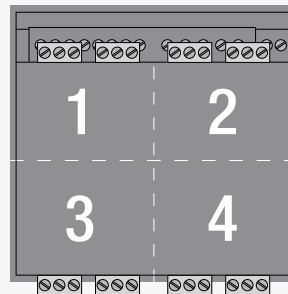


# FREE COMPOSITION OF THE REQUIRED FUNCTIONS

## ORDER-CODE AM2000 - ..... .

<b>1. Basic unit</b>			
With TFT display, for panel mounting	1		
<b>2. Input/Frequency range</b>			
Current transformer inputs, 45 ... <u>50/60</u> ... 65 Hz	1		
<b>3. Power supply</b>			
Nominal voltage 110 ... 230V AC, 130 ... 230V DC	1		
Nominal voltage 24 ... 48V DC	2		
Nominal voltage 110 ... 200V AC, 110 ... 200V DC	3		
<b>4. Bus interface</b>			
Without	0		
RS485 (Modbus/RTU)	1		
<b>5. I/O extension 1</b>			
Without	0		
2 relays	1		
2 analog outputs bipolar ( $\pm 20$ mA)	2		
4 analog outputs bipolar ( $\pm 20$ mA)	3		
<b>6. I/O extension 2</b>			
Without	0		
2 relays	1		
2 analog outputs bipolar ( $\pm 20$ mA)	2		
4 analog outputs bipolar ( $\pm 20$ mA)	3		
<b>7. I/O extension 3</b>			
Without	0		
2 relays	1		
2 analog outputs bipolar ( $\pm 20$ mA)	2		
4 analog outputs bipolar ( $\pm 20$ mA)	3		
<b>8. I/O extension 4</b>			
Without	0		
2 relays	1		
2 analog outputs bipolar ( $\pm 20$ mA)	2		
4 analog outputs bipolar ( $\pm 20$ mA)	3		
<b>9. Test certificate</b>			
Without test certificate	0		
Test certificate German	D		
Test certificate English	E		
<b>Accessories</b>		<b>Article no.</b>	
Documentation CD		156 027	
Interface converter USB <> RS485		163 189	

I/O-extensions



Per device a maximum of one I/O extension can be assembled with analog outputs.





## AVAILABLE MEASUREMENT DATA AND THEIR APPLICATION

### MEASUREMENT GROUP

#### Instantaneous values

- V, I, IMS, P, Q, S, PF, LF, QF with min/max values
- Voltage angles

#### Harmonic analysis

- Total harmonic distortion THD V/I and TDD I
- Individual harmonics V/I up to 50th

#### Extended reactive power analysis

- Reactive power total, fundamental and harmonic related
- $\cos\phi$ ,  $\tan\phi$  of the fundamental

#### System imbalance

- Symmetrical components (positive, negative, zero sequence)
- Imbalance by means of symmetrical components
- Deviation from V/I average

#### Energy consumption

- Meters for active / reactive energy consumption, HT/LT
- Active / reactive power mean-values, incoming and outgoing
- Free definable mean-values (e.g. for phase power quantities)
- Mean-values trend

### APPLICATION

- Monitoring the present system state
- Imbalance monitoring & earth-fault detection

- Evaluation of thermal load of resources
- Analysis of system perturbation and load structure

- Reactive power compensation

- Protection of resources
- Earth-fault detection

- Internal billing
- Energy efficiency check
- Load analysis for energy management
- Trend analysis for load management

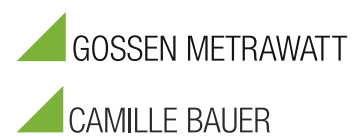


The deregulation of energy markets and the globally increasing environmental awareness define a high degree of responsibility for companies – to treat current as a precious raw material and to safeguard the non-dissipative management of this resource. And that without any gaps: from its generation and transport through to the supply and consumption in operations and households. For these new and, above all, varied challenges, Camille Bauer provides a wide spectrum of innovative and highly efficient products. The specialised power system monitoring of Camille Bauer supports energy providers and consumers in effective and complete network status supervision worldwide.

Our sophisticated instruments continually provide exact data concerning the distribution system, consumption flows and potential supply fluctuations. This information enables targeted power management and facilitates the prompt discovery and correction of possible deviations – a decisive contribution to stable power quality.

This effectively improves the overall cost structure, increases the quality of supplies and, above all, strengthens the competitiveness of the company.

**GMC** INSTRUMENTS



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