CAMILLE BAUER

SINEAX A 230 / A 230s
Multifunctional Power Monitor with System Analysis

Benefits

- **System and load analysis by measurement of harmonics, THD, asymmetry, comprehensive average and max./min. values**
- **High functionality in a compact form (depth 46 mm) low costs for purchase, engineering and installation**
- **4-digit, 14 mm high LED display enables reliable reading from a distance, especially in dark rooms**
- **User configurable display simplifies local operation**

Features

- Accuracte meas. values: U, I: 0.2% P, Q, S, PF, meter: 0.5% F: 0.02 Hz
- 4-quadrant measurement of all values in AC systems
- Upgrade extension modules with RS 232/485 interface, load profile memory, MODBUS, synchronizing input, analog output, Ethernet, Profibus-DP or LON
- Safe 3-way galvanic isolation between all circuits
- 2 outputs for pulse or limit values
- 4 meters for active power: Incoming/outgoing with high/low tariff*
- 4 meters for reactive power: Inductive/capacitive or incoming/outgoing with high/low tariff*
- All counter values, recorded values, and settings are kept on a power supply failure
- System/application: Single-phase 3L, balanced/unbalanced (Aron, Full), 4-L balanced/unbalanced (Open-Y, Full)

** Tariff switching with extension module*

Application

The display instrument A 230 has dimensions 144 x 144 x 46 mm resp. 96 x 96 x 46 mm for instrument A 230s, and is suitable for mounting in a control panel. With 4-quadrant measurement, it is suitable for system and load analysis in single and multi-phase AC systems.

The A 230/A 230s is designed for application in high, medium and low voltage systems. Any current and voltage transformers are taken into account in the calculation of the measured values.

Display

The measured values are displayed with high contrast by the three 14 mm high LED displays, each with four digits plus sign. The brightness of the display is adjustable. Selectable display modes cover different user requirements. The display settings configured can be archived on the PC for later use. The mode selection can be locked to prevent incorrect operation.

In the FULL mode, the measured values can be displayed without restriction. This aids experts in the assessment of the current situation in the power system.

The number of display windows in USER mode can be reduced to individual requirements by configuration. The USER mode simplifies operation for local personnel.

In LOOP mode, the configured display windows change automatically, in this way, e.g. three voltages and three currents can be displayed alternately. As a further application, the permanent display of a configured display content is possible (preferred display).

All the other display windows can be selected as in FULL mode. After a configurable time interval, the display automatically returns to the preferred display or to LOOP mode

Basic version

Instrument with active and reactive energy counters. Digital outputs configurable as impulse output counters and/or limit value indicators. Comprehensive average value and max./min. value functions. Harmonic analysis and THD measurement. Determination of the neutral wire current, asymmetry factor and neutral point voltage shift.

Extension modules

Extension modules increase the functionality and flexibility. The EMMOD 201 module has an RS 232/RS 485 interface and supports data exchange with a control system via MODBUS RTU. Memory and a digital input (switching between high and low tariffs) for monitoring, or the storage of average power values (load profile) complete the functionality. The user-friendly A200*plus* software supports parameter setting and reading the measured values.

The EMMOD 202 has 2 galvanically isolated analog outputs. Any of the important input measurements can be assigned to the 4-20 or 0-20 mA signal, and it is possible to program an inverted characteristic.

EMMOD 203 users can communicate with the Ethernet and Internet worlds with the MODBUS over TCP/IP and HTTP. In addition, the module has an extensive memory, which supports backed up recordings for up to one year. The data are recorded with an exact time stamp, which is given by an internal, battery backed up clock.

Further modules are the EMMOD 204 (Profibus DP), the EMMOD 205 (LON) and the EMMOD 206 (M-Bus).

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All the modules can be upgraded by simply plugging in the extension module without having to open the power monitoring instrument. A separate power supply is not required.

PC software A200*plus*

Comfortable PC software for the configuration and control of the instrument. Graphic log analysis, measured value display etc. via RS 232 or RS 485/MODBUS-RTU with EMMOD 201 and EMMOD 203.

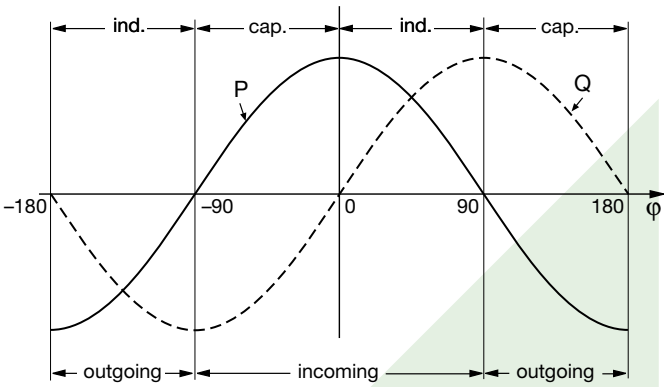
Function

The instrument measures the currents I1, I2, I3 and the voltages U1, U2, U3, the frequency, and the phase angles between the individual currents and voltages. All the other measurands are calculated from these. The measurements are made internally via integrated current transformers. Therefore it is possible to make direct connections without an external transformer.

Each input is sampled 32 times per cycle. This allows measurements to be made including up to the 15th harmonic.

The calculation of the measurands is made in accordance with DIN 40 110 part 1 and part 2, however in 4-quadrant operation.

In the figures at this data sheet only SINEAX A230s is shown. Display and operating are identical with the A 230**.**



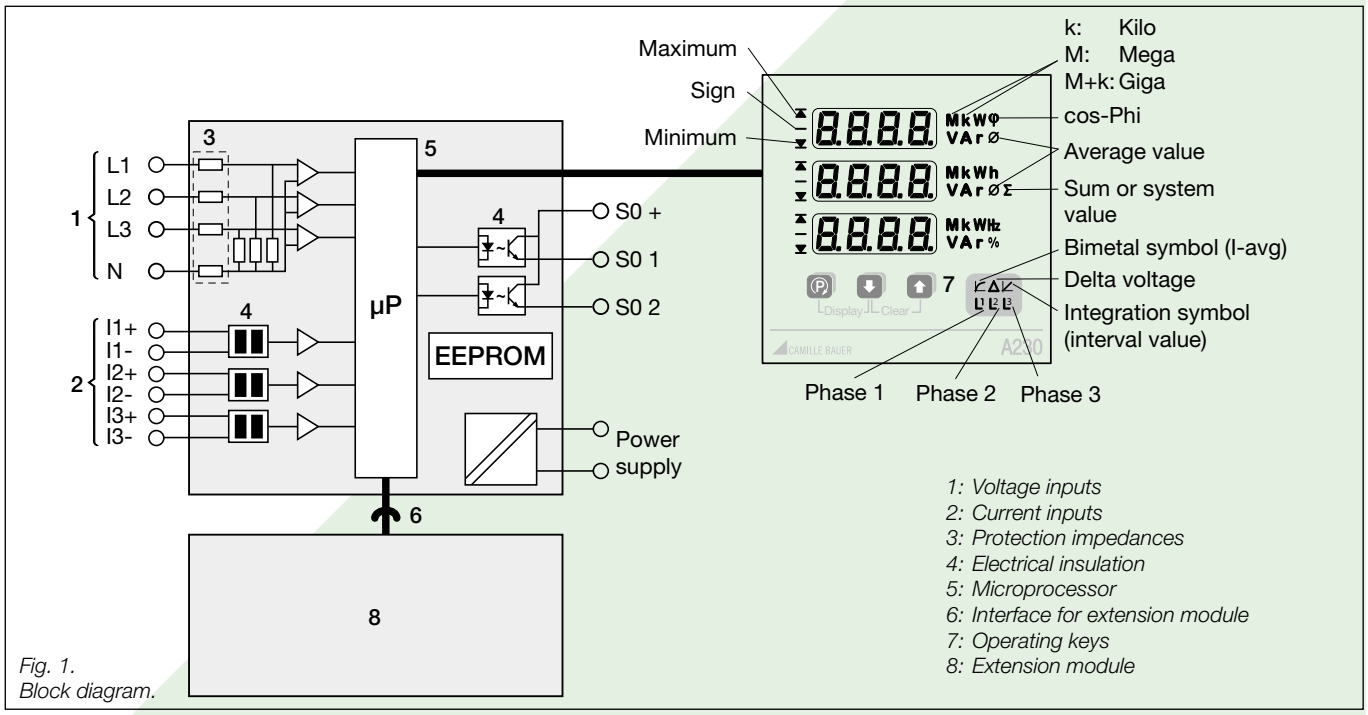


Fig. 1.
Block diagram.

Specification and ordering information

Description			Feature
SINEAX A230s, Multifunctional power monitor with system analysis, size 96 x 96 mm			230S-
SINEAX A230, Multifunctional power monitor with system analysis, size 144 x 144 mm			230-
Features, Selection			
1.	**Nominal voltage**		
	500 V (Ph-Ph), 290 V (Ph-N): Overload ≤20%		1
	500 V (Ph-Ph), 290 V (Ph-N): Overload ≤100% for earth fault monitoring in IT system		2
2.	**Nominal current**		
	1 A		1
	5 A		2
3.	**Nominal frequency**		
	50 / 60 Hz		1
4.	**Power supply**		
	24...60 V AC/DC		1
	100...230 V AC/DC		2
5.	**Test certificate**		
	Without test certificate		0
	Test certificate German		D
	Test certificate Englisch		E
6.	**Built-on extension module**		
	Without		0
	EMMOD 201	Interface MODBUS/RTU, data logger, digital input	1
	EMMOD 202	2 analog outputs	2
	EMMOD 203	Ethernet, real-time clock, 2 digital inputs, 2 MB data logger	3
	EMMOD 204	Interface Profibus-DP	4
	EMMOD 205	Interface LON, digital input	5
	EMMOD 205	Interface LON, digital output 125 V, direct connection to	6
		summation station U160x of Gossen-Metrawatt possible"	7
	EMMOD 206	Inteface M-Bus, digital input <230 V AC/DC	8

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Technical data

Programmable values (bais instrument)

Connecting mode:	4-wire symmetric and asymmetric load (Open Y, full), 3-wire symmetric and asymmetric load (Aron, full), Single-phase
Voltage transformer:	100 V - 999 kV / 100 V - 999 V
Current transformer:	1.00 A - 999 kA / 1.00 A - 9.99 A
Q definition:	Inductive/capacitive or incoming/ outgoing
Digital output:	Off, impulse counters, limit value indicator
Limit value indicator:	Measured value, switch on and off values
Impulse counters:	Measured value, pulse rate
Synchronizing interval:	1 to 30 min.
Display:	Block change ON/OFF, display interval LOOP 2…32 s, display content LOOP and USER mode

Locking the configuration (Jumper Lock)

The configuration can be locked with the jumper, which is at the rear of the instrument (also locks resetting the counters). Nevertheless, the limit values remain adjustable.

Factory default

Jumper:	Not in the LOCK position
Connecting mode:	4-wire asymmetric load
Transformer ratio:	1:1
Q definition:	Inductive/capacitive
Limit value / S01:	Off
Limit value / S02:	Off
Synchronizing interval:	15 min.
Display mode:	FULL, block change off
Brightness:	Mid setting

Deletion of the max./min. values and counters

Both the energy counter values, and the min./max. values can be deleted by pressing a pushbutton twice. The deletion of the counter values can be prevented with the lock jumper (also blocks the configuration).

Data security on power supply failure

All the counter values, recorded values, and settings are kept on a power supply failure.

Applicable regulations and standards

IEC 1010 resp. EN 61010	Safety regulations for electrical measuring, control and laboratory equipment
EN 60 529	Protection types by case
DIN 43 864	Current interface for the transmission of impulses between impulse counter and tariff meter (S0 output)
DIN 40 110	AC quantities
IEC/EN 61326-1	Electrical equipment for control and laboratory use, EMV requirements
IEC/EN 61326/A1	Electrical equipment for measurement, control and laboratory use, EMV requirements
IEC/EN 61326/A1	Electrical equipment for measurement, control and laboratory use, EMV requirements, disturbance immunity
EN 60 688	Electrical measuring transducers for converting AC electrical variables into analogue and digital signals
IEC 68-2 resp. EN 60 068-2-1/-2/-3/-6/-27	Ambient tests -1 Cold, -2 Dry heat, -3 Damp heat, -6 Vibration, -27 Shock

Measuring inputs

Nominal frequency:	50, 60 Hz
Nominal voltage:	Phase-phase: 500 V resp. Phase-N: 290 V
Nominal current:	5 A or 1 A
Waveform:	Sine
Own consumption:	Current circuit: ≤ $I^2 \cdot 0.01\ \Omega$ Voltage circuit: ≤ $U^2_{LN} / 300\ k\Omega$

Continuous thermal rating of inputs

10 A at 346 V in single-phase AC system

10 A at 600 V in three-phase system

Short-time thermal rating of inputs

Input variable	Number of inputs	Duration of overload	Interval between two overloads
577 V LN	10	1 s	10 s
100 A	10	1 s	100 s
100 A	5	3 s	5 min.

Measuring ranges

U, I:	≤ 120% of nominal value
P, Q, S:	≤ ± 120% of nominal value
F:	45 to 65 Hz
Power factor (cosφ):	± 1
Overload indicator:	oL

The frequency is measured from the current or voltage. The voltage has priority.

Measurements available

Reference conditions acc. to IEC 688 resp. EN 60 688
Sine 50 - 60 Hz, 15 - 30 °C, application group II,
Power supply 230 V AC/DC resp. 24 V AC/DC

The calculation of the measurands is in accordance with DIN 40 110 with 4-quadrant measurement.

Measured quantity	Measuring path	max	min	Error[1)]
Voltage	1N, 2N, 3N	•	•	0.2%
Voltage	12, 23, 31	•	•	0.2%
Voltage average value	∑	•		0.2%
Voltage	N-E	•		0.2%
Current	1, 2, 3	•		0.2%
Current I_{avg} (bimetal-15min) (slave pointer)	1, 2, 3	•		0.2%
Current average value	∑	•		0.2%
Neutral current	N	•		0.5%
Active power P	1, 2, 3, ∑	•		0.5%
Reactive power Q	1, 2, 3, ∑	•		0.5%
Apparent power S	1, 2, 3, ∑	•		0.5%
Power factor PF (cosφ 4-quadrant display)	1, 2, 3, ∑			0.5%
PF incoming ind. min.	1, 2, 3		•	0.5%
PF outgoing cap. min.	1, 2, 3		•	0.5%
PF outgoing ind. min.	1, 2, 3		•	0.5%
PF outgoing kap. min.	1, 2, 3		•	0.5%
Frequency	U, I	•	•	0.02 Hz
Active power incoming/outgoing (tariff high and low)	∑			0.5%
Reactive power incoming/outgoing (tariff high and low)	∑			0.5%
Reactive power ind./cap. (tariff high and low)	∑			0.5%
5 active power intervals each incoming/outgoing (+ Trend)	∑	•	•	0.5%
5 reactive power intervals each incoming/outgoing (+ Trend)	∑	•	•	0.5%
5 reactive power intervals each inductive/capacitive (+ Trend)	∑	•	•	0.5%
5 apparent power intervals (+ Trend)	∑	•	•	0.5%
9 gen. interval average values (+ Trends)	Meas. value	•	•	Meas. value
Voltage asymmetric	∑	•		0.5%
THD voltage	1N, 2N, 3N	•		1.0%
THD voltage	12, 23, 31	•		1.0%
THD current	1, 2, 3	•		1.0%
2. - 15. harmonic, voltage	1N, 2N, 3N	•		1.0%
2. - 15. harmonic, voltage	12, 23, 31	•		1.0%
2. - 15. harmonic, current	1, 2, 3	•		1.0%

1) Error ± related to nominal value (frequency = absolute)
∑ = System value

Note
A possible synchronizing signal (extension module) for the interval values must be within the range of 10 sec. to 90 min.

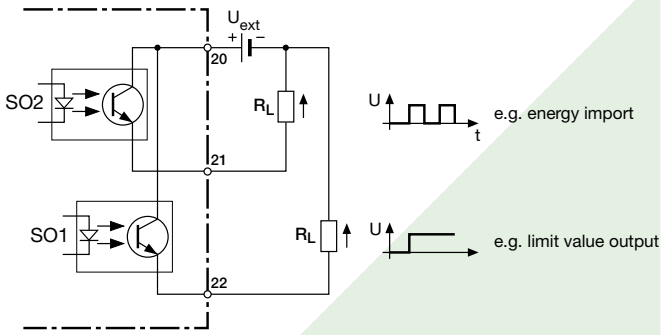
Digital outputs

Depending on the function selected, the two digital outputs can be used either as pulse outputs for actual and reactive energy or as limit signals.

The outputs are passive, and are galvanically isolated from all the other circuits by opto-couplers. They are suitable to drive tariff devices (S0-standard DIN 43 864) or 24 V-relays.

Uext ≤ 40 V DC (OFF: leakage current ≤ 0.1 mA)

I L ≤ 150 mA (ON: terminal voltage ≤ 1.2 V)



Alarm unit

Limit values can be associated with every measurand, with the exception of harmonic content.

There is a logical OR function for the line value ON limit values, and a logical AND function for the OFF limit values.

3-wire unbalanced load

U12/U23/U31	I1/I2/I3	THD.U12/THD.U23/ THD.U31
	Iavg1/Iavg2/Iavg3	THD.I1/THD.I2/THD.I3

4-wire unblanced load

U1/U2/U3	I1/I2/I3	THD.U1N/THD.U2N/ THD.U3N
U12/U23/U31	Iavg1/Iavg2/Iavg3	THD.I1/THD.I2/THD.I3
P1/P2/P3	Q1/Q2/Q3	S1/S2/S3
PF1/PF2/PF3		

Example 1 (ON-limit value > OFF-limit value)

Output “ON”: immediately <u>one</u> of the 3 phase currents exceeds the ON limit value

Output “OFF”: when <u>all</u> the phase currents go below the OFF limit value

Example 2 (ON-limit value < OFF-limit value)

Output “ON”: immediately <u>one</u> of the 3 phase currents goes below the ON limit value

Output “OFF”: when <u>all</u> the phase currents exceed the OFF limit value

Delay time: 1 s (cannot be programmed)

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Pulse outputs

The reactive and active energy can be read out at the pulse outputs in the form of standard S0 pulses for the driving of electronic and electromechanical counting mechanisms. For systems with external transformers, the pulses are for the primary energy data.

Pulse rate:	1 … 5000 Imp./Wh … GWh 1 … 5000 Imp./varh … Gvarh
Pulse duration:	≥ 100 ms (cannot be programmed)

Power supply

DC, AC power pack 40 to 400 Hz
100 to 230 V AC/DC ±15% or 24 to 60 V AC/DC ±15% (UL) 85 to 125 V DC

Power consumption:	< 3 VA (without extension module)

Display

LED digital display:	14 mm high, red
LED symbols:	5 mm high, red
Brightness:	adjustable
Measured values:	4 digits with sign
Energy counters:	8 digit (top + middle display)

Zero value suppression

PF resp.cosφ:	Display ---, if Sx < 0.2% Snenn
Currents:	Display 0, if Ix < 0.1% Inenn
unb. U:	Display 0, if Ø U < 5% Unenn

Safety

Protection class:	II (voltage inputs with protection impedances)
Measuring category:	III
Pollution degree:	2
Measurement voltage:	300 V
Test voltage:	Between current inputs, power supply, digital outputs, terminals of the plugged-in module: 3700 V / 50 Hz / 1 min. On voltage inputs: 4.25 kV 1.2/50 µs
Module connections:	The pin rail at the back is connected to the voltage inputs via a protection impedance. Only the permitted modules can be plugged-in!
Enclosure protection:	Front IP 66, terminals IP 20

Inputs, outputs and power supply are electrically isolated. The current inputs are electrically isolated from each other.

Mechanic

Dimensions	A 230:	144 x 144 x 46 mm; panel cutout 138^{+1} x 138^{+1} mm
	A 230s:	96 x 96 x 46 mm; panel cutout $92^{+0,8}$ x $92^{+0,8}$ mm

Housing material:	ABS flammability class V-0 acc. to UL94, self-extinguishing, non-dripping, free of halogen
Weight:	300 g at A 230 resp. 250 g at A 230s
Mounting:	For control panel mounting

Terminals:

Inputs:	Screw terminals wire gauge single wire: 0.5 - 2.5 mm^2 wire gauge fine wire: 0.5 - 1.5 mm^2
Power supply, outputs:	Spring clamps Wire gauge single and fine wire: 0.5 - 1.5 mm^2

Environmental conditions

Operating temperature:	– 10 to + 55 °C
Storage temperature:	– 25 to + 70 °C
Humidity relative:	≤ 75%
Altitude:	2000 m max.

Indoor use statement

Note of maintenance

No maintenance is required

Display possibilities for 4-wire asymmetrical load connection

		a	b	c	d	e	f	g	h
	1	U1 U2 U3	U1 ▲ U2 ▲ U3 ▲	U1 ▼ U2 ▼ U3 ▼	U12 U23 U31	U12 ▲ U23 ▲ U31 ▲	U12 ▼ U23 ▼ U31 ▼	UNE UNE ▲	unb. U unb. U ▲
	2	I1 I2 I3	I1 ▲ I2 ▲ I3 ▲	I1avg I2avg I3avg	I1avg ▲ I2avg ▲ I3avg ▲	IN IN ▲			
	3	P1 P2 P3	P1 ▲ P2 ▲ P3 ▲	P P ▲					
	4	Q1 Q2 Q3	Q1 ▲ Q2 ▲ Q3 ▲	Q Q ▲					
	5	S1 S2 S3	S1 ▲ S2 ▲ S3 ▲	S S ▲					
	6	PF1 PF2 PF3	PF PF ▼-inc-ind PF ▼-inc-cp	PF PF ▼-out-ind PF ▼-out-cp					
	7	F ▲ F F ▼							
⬆	8	..... EP inc HT	..... EP inc LT	..... EP out HT	..... EP out LT				
⬇	9	..... EQ *inc/ind* HT	..... EQ *inc/ind* LT	..... EQ *out/cap* HT	..... EQ *out/cap* LT				
	10	P Q S	U ∅ I ∅ P	PF P Q	P S F				
	11	P1 Q1 S1	P2 Q2 S2	P3 Q3 S2	U1 I1 P1	U2 I2 P2	U3 I3 P3		
	12	thd.U1 thd.U1 ▲	thd.U2 thd.U2 ▲	thd.U3 thd.U3 ▲					
	13	thd.I1 thd.I1 ▲	thd.I2 thd.I2 ▲	thd.I3 thd.I3 ▲					
	14	P.inc-int-Trend	P.inc-int- ▲ P.inc-int- ▼	P.inc-int t-0	P.inc-int t-1	P.inc-int t-2	P.inc-int t-3	P.inc-int t-4	
	15	P.out-int-Trend	P.out-int- ▲ P.out-int- ▼	P.out-int t-0	P.out-int t-1	P.out-int t-2	P.out-int t-3	P.out-int t-4	
	16	Q.*inc/ind*-int-Trend	Q.*inc/ind*-int- ▲ Q.*inc/ind*-int- ▼	Q.*inc/ind*-int t-0	Q.*inc/ind*-int t-1	Q.*inc/ind*-int t-2	Q.*inc/ind*-int t-3	Q.*inc/ind*-int t-4	
	17	Q.*out/cap*-int-Trend	Q.*out/cap*-int- ▲ Q.*out/cap*-int- ▼	Q.*out/cap*-int t-0	Q.*out/cap*-int t-1	Q.*out/cap*-int t-2	Q.*out/cap*-int t-3	Q.*out/cap*-int t-4	
	18	S.int-Trend	S.int- ▲ S.int- ▼	S.int t-0	S.int t-1	S.int t-2	S.int t-3	S.int t-4	

		a	b	c	d	e	f	g	h	i	j	k	l	m	n
	19	H2.U1 H2▲.U1	H3.U1 H3▲.U1	H4.U1 H4▲.U1	H5.U1 H5▲.U1	H6.U1 H6▲.U1	H7.U1 H7▲.U1	H8.U1 H8▲.U1	H9.U1 H9▲.U1	H10.U1 H10▲.U1	H11.U1 H11▲.U1	H12.U1 H12▲.U1	H13.U1 H13▲.U1	H14.U1 H14▲.U1	H15.U1 H15▲.U1
	20	H2.U2 H2▲.U2	H3.U2 H3▲.U2	H4.U2 H4▲.U2	H5.U2 H5▲.U2	H6.U2 H6▲.U2	H7.U2 H7▲.U2	H8.U2 H8▲.U2	H9.U2 H9▲.U2	H10.U2 H10▲.U2	H11.U2 H11▲.U2	H12.U2 H12▲.U2	H13.U2 H13▲.U2	H14.U2 H14▲.U2	H15.U2 H15▲.U2
⬆	21	H2.U3 H2▲.U3	H3.U3 H3▲.U3	H4.U3 H4▲.U3	H5.U3 H5▲.U3	H6.U3 H6▲.U3	H7.U3 H7▲.U3	H8.U3 H8▲.U3	H9.U3 H9▲.U3	H10.U3 H10▲.U3	H11.U3 H11▲.U3	H12.U3 H12▲.U3	H13.U3 H13▲.U3	H14.U3 H14▲.U3	H15.U3 H15▲.U3
⬇	22	H2.I1 H2▲.I1	H3.I1 H3▲.I1	H4.I1 H4▲.I1	H5.I1 H5▲.I1	H6.I1 H6▲.I1	H7.I1 H7▲.I1	H8.I1 H8▲.I1	H9.I1 H9▲.I1	H10.I1 H10▲.I1	H11.I1 H11▲.I1	H12.I1 H12▲.I1	H13.I1 H13▲.I1	H14.I1 H14▲.I1	H15.I1 H15▲.I1
	23	H2.I2 H2▲.I2	H3.I2 H3▲.I2	H4.I2 H4▲.I2	H5.I2 H5▲.I2	H6.I2 H6▲.I2	H7.I2 H7▲.I2	H8.I2 H8▲.I2	H9.I2 H9▲.I2	H10.I2 H10▲.I2	H11.I2 H11▲.I2	H12.I2 H12▲.I2	H13.I2 H13▲.I2	H14.I2 H14▲.I2	H15.I2 H15▲.I2
	24	H2.I3 H2▲.I3	H3.I3 H3▲.I3	H4.I3 H4▲.I3	H5.I3 H5▲.I3	H6.I3 H6▲.I3	H7.I3 H7▲.I3	H8.I3 H8▲.I3	H9.I3 H9▲.I3	H10.I3 H10▲.I3	H11.I3 H11▲.I3	H12.I3 H12▲.I3	H13.I3 H13▲.I3	H14.I3 H14▲.I3	H15.I3 H15▲.I3

Q meas. values are in italics: depending on the Q definition, either the values for incoming/outgoing or the values for ind./cap. are displayed.

▲ *Maximal value* ▼ *Minimal value*

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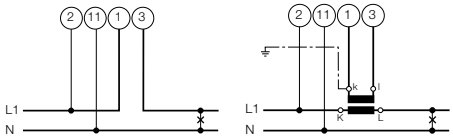
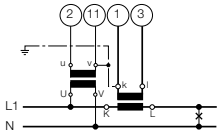
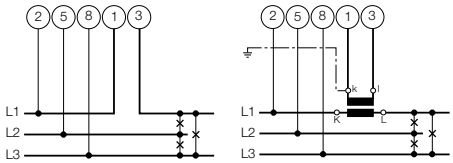
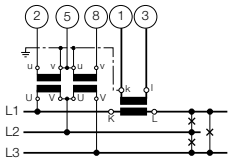
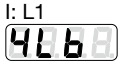
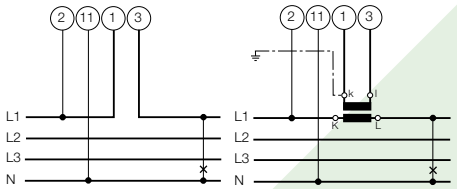
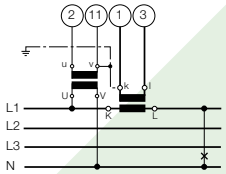
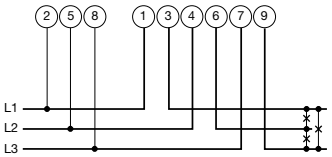
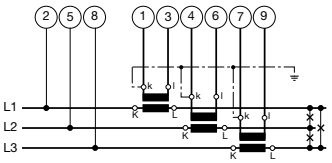
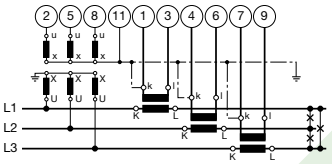
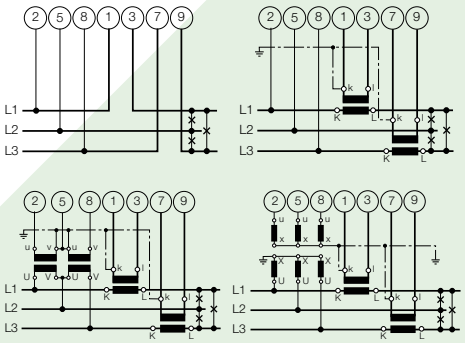
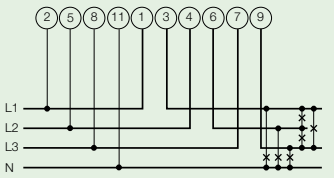
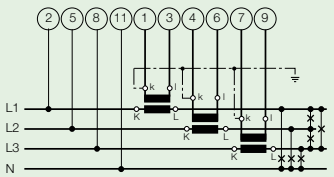
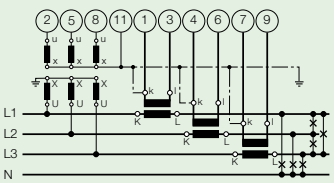
Connection modes

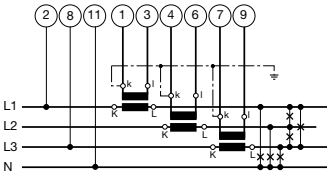
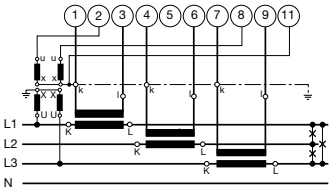
System/ application	Terminals
Single phase AC system 	 
3-wire 3-phase **symmetric load** I: L1 	  Connect the voltage according to the following table for current measurement in L2 or L3:
4-wire 3-phase **symmetric load** I: L1 	  Connect the voltage according to the following table for current measurement in L2 or L3:

Current transf.	Terminals		2	5	8
L2	1	3	L2	L3	L1
L3	1	3	L3	L1	L2

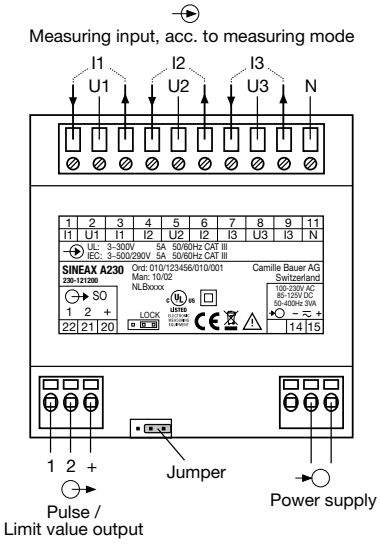
Current transf.	Terminals		2	11
L2	1	3	L2	N
L3	1	3	L3	N

System/ application	Terminals
3-wire 3-phase **asymmetric load** 	   3 single-pole insulated voltage transformers in high-voltage system
3-wire 3-phase **asymmetric load** Aron 	
4-wire 3-phase **asymmetric load** 	   3 single-pole insulated voltage transformers in high-voltage system

SINEAX A 230 / A 230s
Multifunctional Power Monitor with System Analysis

System/ application	Terminals
4-wire 3-phase **asymmetric load**, Open-Y 	 Low-voltage system  2 single-pole insulated voltage transformers in high-voltage system

Electrical connections



Accessories SINEAX A 230/A 230s

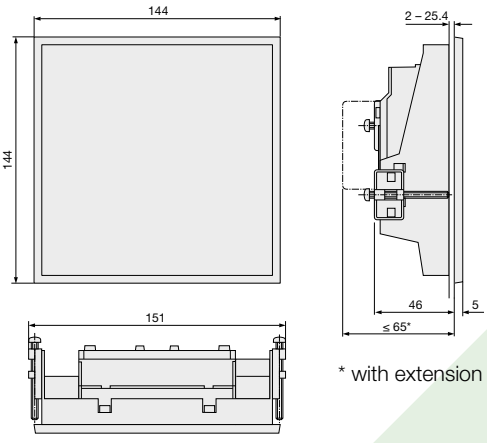
Description	Art. No.
Operating Instructions *) in German	152 851
Operating Instructions *) in French	154 815
Operating Instructions *) in English	154 807
Top-hat rail adapter	154 055
Fixing clips as set (4 pce.) for top-hat rail adapter with extension module	154 394
Extension module EMMOD 201 Interface/MODBUS RTU/Data logger	150 285
Extension module EMMOD 202 2 analog outputs	155 574
Extension module EMMOD 203 Ethernet, 2 MB memory, real-time clock	155 582
Extension module EMMOD 204 Profibus-DP	158 510
Extension module EMMOD 205 LON, digital output, direct connection to summation stations U160x of Gossen-Metrawatt possible	156 647

Description	Art. No.
Extension module EMMOD 205 LON, synchronization input	156 639
Extension module EMMOD 206 Interface M-Bus, digital input <230 V AC/DC	168 965

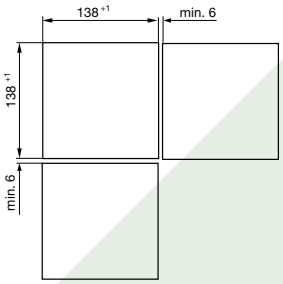
**) Download free of charge under www.camillebauer.com*

Dimensional drawings (all dimensions in mm)

SINEAX A 230

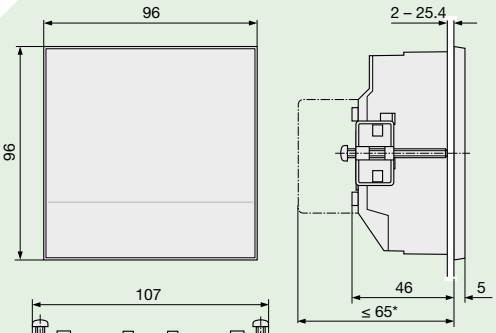


* with extension module

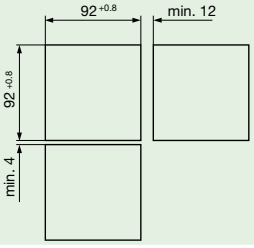


Panel cut-out

SINEAX A 230s



* with extension module



Panel cut-out

SINEAX A 230 / A 230s
Multifunctional Power Monitor with System Analysis

PC software A200*plus)**
Connection via the extension module. Comfortable PC software for the configuration, control, display of measured values, graphic logger analysis etc.

Scope of supply

– A 230 resp. A 230s with/without extension module
– Operating Instructions in German, French and English
– Fixing clamp
– Test certificate for the corresponding variant

Extension module EMMOD 201

Communication

Interface:	RS232/RS485 switchable
Protocol:	MODBUS RTU for SCADA
Digital input:	Synchronizing signal for average power values or high/low tariff switchover for energy counters
Bus address:	1 to 247
Baudrate:	1200, 2400, 4800, 9600, 19.2 k
Parity check:	no, even, odd, space

Recording average power value

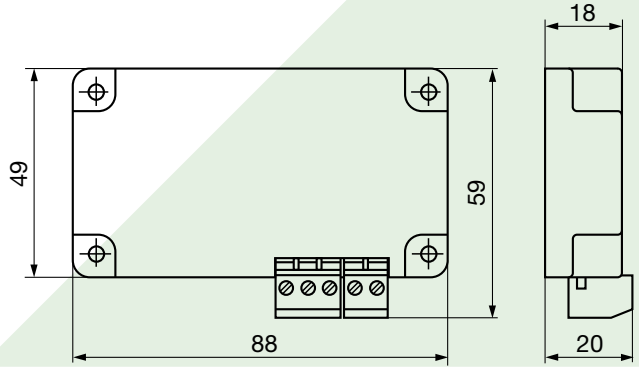
Vales that can be recorded:	Pint: average active power values inc./outg., Qint: average reactive power values inc./outg. resp. ind./cap., Sint: average apparent power values and 9 further freely programmable average values (max. 14 values)
Amount of data:	1 value = 166 days 2 values = 83 days ... 14 values = 12 days at 15min interval

Accessories EMMOD 201 (not included in scope of supply)

Description	Article No.
Software A200*plus* *)	146 557
Interface adapter cable	152 603
Extension cable sub-D 9pol. 2 m	980 179

**) Download free of charge under www.camillebauer.com*

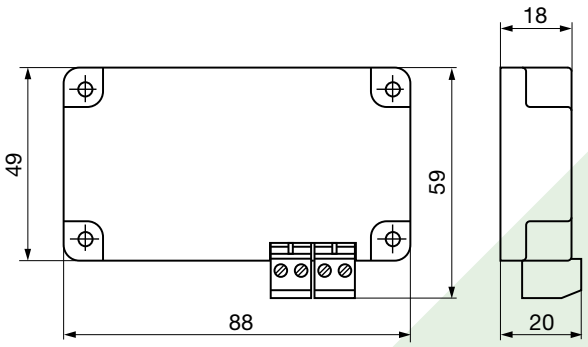
Dimensional drawing



Extension module EMMOD 202

Input:	U, I, Iavg, In, P, Q, S, F, cosφ
Output:	0 - 20 mA, 4 - 20 mA, inverting
Limits:	0/3.7 mA resp. 21 mA
Burden voltage:	8 V
Accuracy:	0.1% (without A2..)
Number of channels:	2 (electrically isolated)

Dimensional drawing



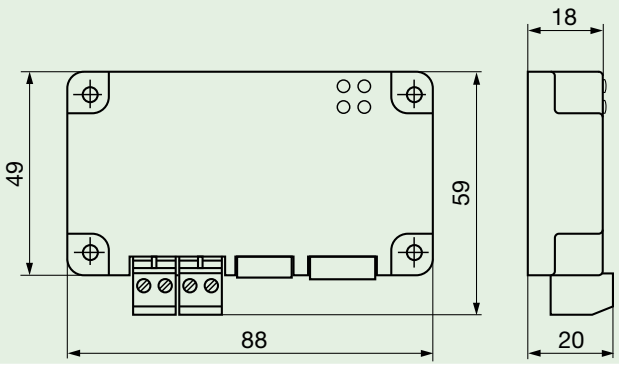
Extension module EMMOD 203

Protocol:	MODBUS over TCP/IP, HTTP
Real-time clock:	Battery backup, synchronized via LAN or external (e.g. 230 V/50 Hz)
Memory:	up to one year with time stamp

Connections

Ethernet RJ45 port:	10/100 base Tx
Tariff switching:	plug-in screw terminals
Synchronizing input:	plug-in screw terminals
Synchronizing input:	5 V – 300 V AC, 1 – 500 Hz
Tariff switching:	5 V – 300 V AC/DC

Dimensional drawing



Accessories EMMOD 203 (not included in scope of supply)

Description	Art.-No.
Software A200*plus* *)	146 557

Extension module EMMOD 204

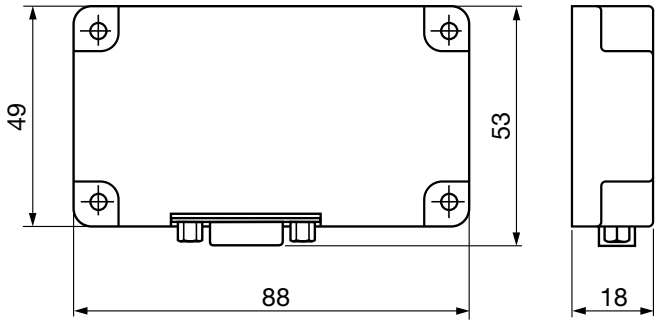
Interface: Profibus-DP
9-pin D-sub socket
EIA RS485 standard
15 kV ESD protection

Baudrate: Autom. recognition,
9600 bit/s … 12 Mbit/s

Type: DPV0, SPC4-2
Repeater_Ctrl_Sig (TTL)

Address: 126 (0 - 125)
Set_Slave_Add_Supp

Dimensional drawing



Accessories EMMOD 204 (not included in scope of supply)

Description	Article No.
Profibus CD (GSD and documentation *)	156 027

*) Download free of charge under http://www.camillebauer.com

Extension module EMMOD 205

Communication

Interface: LON

Protocol: LONTALK®

Medium: Echelon FTT-10 A transceiver,
transformer-coupled, reverse polarity,
twisted two-wire cable

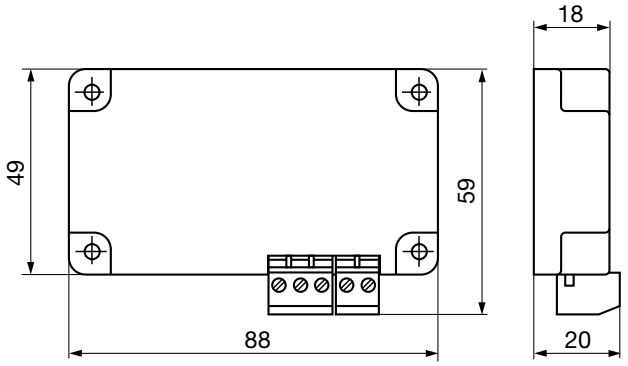
Transmission: 78 kBit/s

Connections

Bus: Pluggable screw terminals

I/O connector: Digital synchronization input or
Digital output 125 V DC

Dimensional drawing



Extension module EMMOD 206

Communication

Interface: M-Bus

Protocol: M-Bus

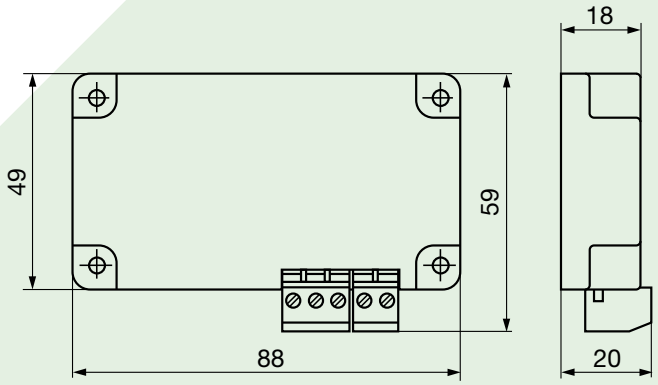
Baud rate: 300…38’400 Baud

Connections

Bus: Pluggable screw terminals

Digital input: Pluggable screw terminals for
mean-value synchronization
or tariff switching

Dimensional drawing



SINEAX A 230 / A 230s
Multifunctional Power Monitor with System Analysis

Appendix A

A230s (230S-21110x) for special applications

Measurement input:	500 V, 1 A, 45 - 65 Hz, 3N~
Measuring ranges:	U: ≤ 200% of nominal value
	I, P, Q, S: ≤ 120% of nominal value
Auxiliary supply:	24 - 60 V AC/DC, ±15%,
	45 - 450 Hz, 3 VA

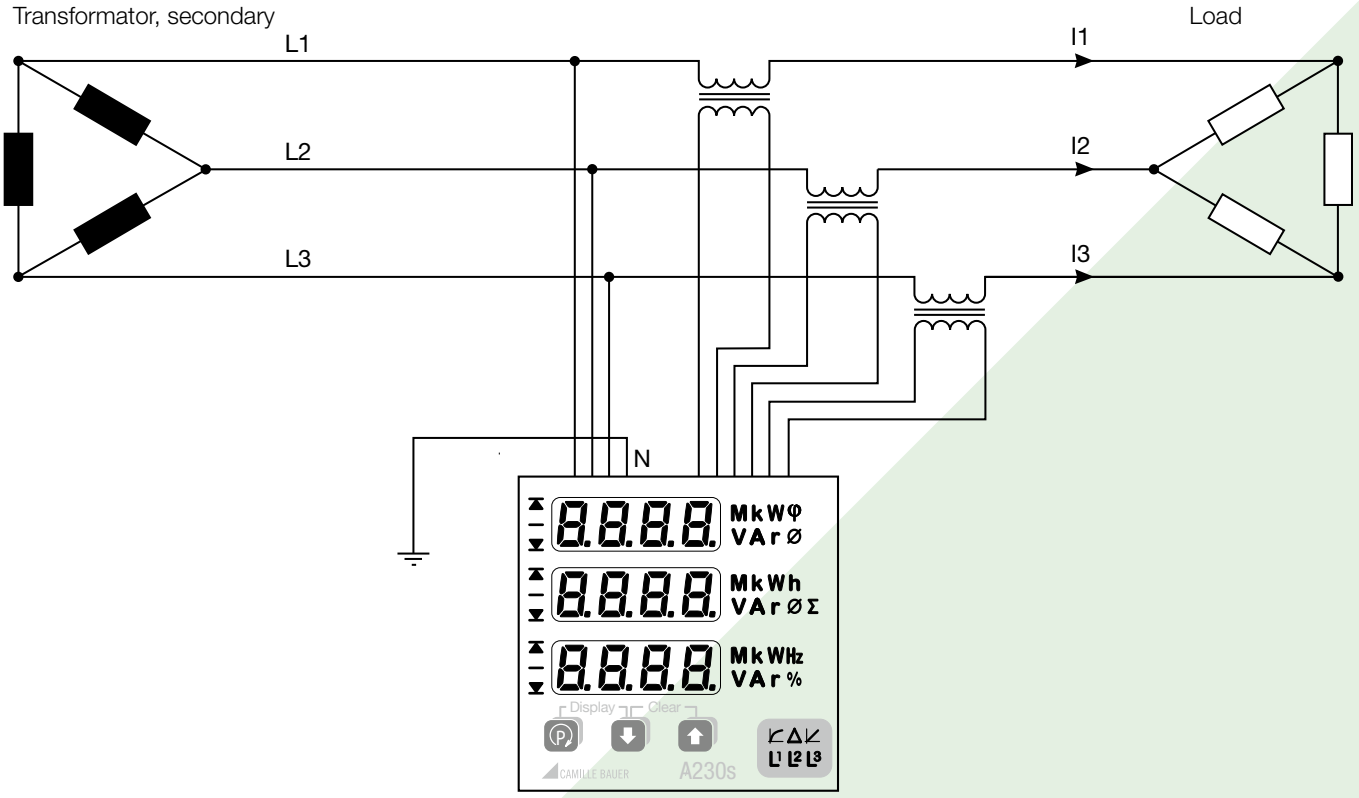
1. Earth fault monitoring in IT systems

To detect the first earth fault in an unearthed IT system normally an insulation monitoring device is used. The same may be done by determing the zero displacement voltage, which is normally a measure for the asymmetrical load of a power system. To do so the neutral terminal of the device is connected to earth and the A230s has to be configured for the measurement of a 4-wire system.

If a single phase earth fault occurs a zero displacement voltage of $U_{PP}/\sqrt{3}$ will be measured. The signalling may be done using a built-in limit monitoring output.

Because in case of a fault the voltage triangle formed by the three phases does not change the voltage and current measurements as well as the system power values will be still measured and displayed correctly. Also the meters carry on to work as expected.

This special version of the A230s therefore is suited for the earth fault monitoring of unearthed three-phase systems of up to 500 V rated voltage.



2. Monitoring of compensation capacitors

The condensators used in compensation systems are wear parts, which fail quite often and then have to be replaced. When using three phase power capacitors all phaes will be compensated equally which leads to almost identical currents flowing through the capacitors, if the system load is comparable. By monitoring the current imbalance it's then possible to estimate if a capacitor failure is present.

The method used to calculate the imbalance of the currents (Unb. I) determines the largest deviation of any of the phase currents from the mean value of the three phase currents. So the result is independent of rated values and present load. The measurand Unb. I is displayed instead of In.

The signalling of a possible capacitor failure may be done using one of the built-in limit monitoring outputs.

CAMILLE BAUER

Rely on us.

Camille Bauer Ltd
Aargauerstrasse 7
CH-5610 Wohlen / Switzerland
Phone: +41 56 618 21 11
Fax: +41 56 618 21 21
info@camillebauer.com
www.camillebauer.com