

Operating instructions

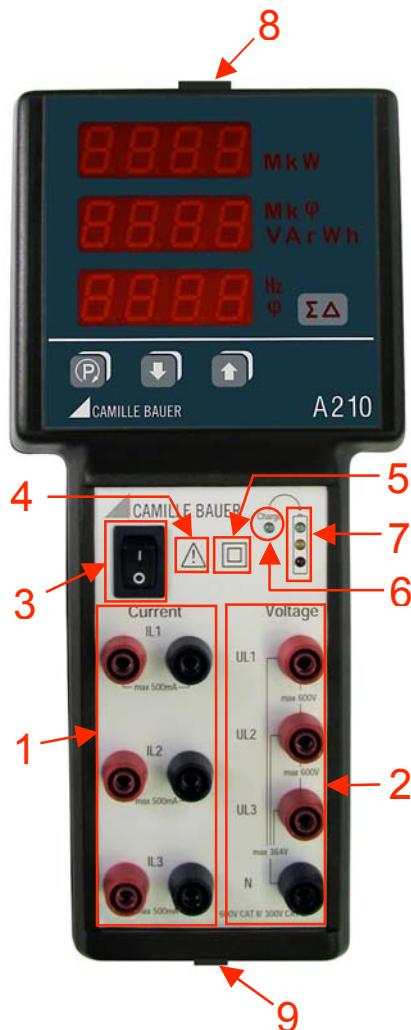
Issue 08.04

A210-Handheld

3-phase power analyser with load profile recorder

ATTENTION:

These operating instructions supplement the 'SINEAX A210/A220' operating instructions with the specific properties of a portable handheld design. In particular, the maximum permissible connection values of the measuring inputs, the connection images and the power supply differ from the installed device SINEAX A210. In addition, there are no pulse / limit value outputs. These operating instructions also show deviating technical data.



Operating, display and connection elements

- [1] Connection sockets for measuring (for current clamp with current output)
- [2] Connection sockets for voltage measuring inputs
- [3] ON/Off switch of the device
- [4] Symbol "Attention, observe documentation"
- [5] Symbol "Integrated double or reinforced insulation (protective insulation)"
- [6] LED green: Battery is being charged (turns off after charging process)
- [7] LED green, yellow and red: State of battery charge
- [8] RS232 PC connection socket
- [9] Mains adapter connection socket



Observe safety instructions in chapter II



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I Initial inspection

Unpack the device and the supplied accessories immediately upon receipt and examine for completeness:

Unpacking

Apart from the usual diligence in handling electronic devices, no particular precautionary measures are required in handling the device when unpacking. The transport packaging provides for sufficient protection from the usual in-transit wear. Use equivalent packaging materials when repacking.

Visual inspection

Compare the order number/type identification on the packaging and/or device with the details on the shipping documents.

Determine whether all accessories have been delivered (1.1 Accessories included in delivery)

Examine the packaging as well as the mechanics of device and accessories for possible transport damage.

Complaints

In case any damages are noted, a complaint should be filed with the transport company immediately (keep the packaging!).

In case of any other deficiencies or if repairing the device is necessary, please inform the responsible representation or directly contact the address stated on the last page.

II Safety instructions

Read this section carefully. It contains the most important safety instructions for handling the device.

WARNING: An operating instruction, a practical application, etc. which must absolutely be observed in order to maintain the safety protection of the device and to avoid injury of persons.

ATTENTION: An operating instruction, a practical application, etc. which must absolutely be observed in order to avoid damage of the device and safeguard proper operation. The most important safety instructions are summarised below. These warnings are referred to in the relevant passages of the operating instructions.



WARNING 1

Power connection only to be made via the mains adapter included in delivery. Operation with other mains adapters may result in dangerous differences of potential.



WARNING 2

Do not alter the output voltage of the supplied mains adapter. Otherwise, the operator assumes the responsibility. In case of a defect caused by this, any guaranty claims will be rejected.



WARNING 3

The device may only be operated by persons capable of recognising the dangers of contact and taking precautionary measures. The danger of contact exists wherever voltages larger than 50 V can occur.



WARNING 4

When measurements are conducted in which there is the danger of contact, avoid working alone. In this case, call in another person.



WARNING 5

The maximum permissible potential of the current or voltage measuring inputs, respectively, against earth is as follows:

- for connection to an overvoltage category III circuit: 300 V
- for connection to an overvoltage category II circuit: 600 V

The current clamp used must also be rated for this level.



ATTENTION

Make absolutely sure that the measuring inputs are not exposed to more than the permissible load. The maximum permissible levels are:

- at the voltage measuring inputs "U" against "N", 346 V, respectively
- at the voltage measuring inputs "U" against "U", 600 V, respectively
- at the current measuring inputs "I", 1.2A, respectively (current clamp WZ11 max. 240A corresponds to 240mA at the device)



WARNING 6

Do not perform any measurements with this device in circuits with corona discharge (high voltage).



WARNING 7

You may only perform measurements in a 50 or 60 Hz grid without any DC portion.

 **WARNING 8**

Always anticipate measured objects (e.g. defective devices) to show unforeseen voltages. Capacitors, for example, can be dangerously charged .

 **WARNING 9**

Measurements in humid ambient conditions are not permissible. The device must not be exposed to moisture.

 **WARNING 10**

Keep the measuring cables in immaculate condition, e.g. no damage of insulation, no interruption of cables, connectors, etc.

 **WARNING 11**

Connect the measuring lines to the measuring instrument before connecting the electric load.

 **WARNING 12**

If it is assumable that the instrument can no longer be employed safely, it has to be put out of commission and secured against unintentional use. Safe operation can no longer be expected:

- if the device is visibly damaged,
- if the device does not function,
- after longer periods of storage under unfavourable conditions,
- after severe in-transit wear.

 **WARNING 13**

Do not open the housing cover. This might uncover current-carrying parts. Maintenance and repair work may only be carried out by our service department.

 **WARNING 14**

Make sure the device is switched off when not used for longer periods. Excessive discharge of the battery may impair its serviceable life.

1 Accessories

1.1 Accessories included in delivery

The A210-HANDHELD scope of delivery includes:

- 1 A210-HANDHELD power analyser incl. Li-Ion battery
- 1 Cable set for the voltage measuring inputs, consisting of 4 measuring cables
- 4 Attachable alligator crimps
- 3 200A current clamps WZ11
- 1 Mains adapter
- 1 RS232 interface cable
- 1 Transport case for device and accessories
- 1 CD containing PC software
- 1 A210-HANDHELD and SINEAX A210/A220 instruction manual
- 1 WZ11 current clamp instruction manual

1.2 Available accessories

further current clamp variants on request

2 Commissioning

2.1 Switching on

Use the On/Off switch [3] to switch the device on/off. The integrated LEDs [7] indicate the active status or the charging status of the battery :

- | | | |
|---------------------------|--------------------------|--------------------------------|
| - LED green: | Battery fully charged | (approx. 100- 85% of capacity) |
| - LED green + LED yellow: | Battery half charged | (approx. 85- 40% of capacity) |
| - LED yellow + LED red : | Battery empty soon | (approx. 40- 0% of capacity) |
| - LED red: | Battery empty | (display is not illuminated) |
| - no LEDs illuminated: | Low discharge of battery | (with device switched on) |

When switched on, the control unit of the device runs an initialisation routine.

During this routine, the LED display [14] shows the following information:

- the device name
- the version of integrated device software, e.g. *V 1.04*

Then the device changes to the function of the rendition used last.

2.2 Power connection (observe WARNING 1!)

The use of the mains adapter requires a power supply of 100 to 240 VAC. Connection to the mains is made via the socket installed in the bottom of the device.

3 Measuring circuit for performance / energy analyses

3.1 Measuring connection

The A210-HANDHELD has the voltage measuring inputs UL1, UL2, UL3 and N. Measurements in a medium-voltage power grid must generally be conducted via a voltage converter installed in the plant! Their conversion ratio can be adopted from the setup menu *U-I inP*.

Voltage is usually connected to the measured object by means of the provided measuring cables with 4 mm safety connectors and probes. The measuring inputs are designed for connection to overvoltage category III circuits up to 300 V (or CAT.II up to 600V). If the device is used in grids of this category, the measuring accessories used (e.g. current clamp, measuring cables, etc.) must comply at least with this category, too. See the respective specifications for accessory categories. The low potential of the respective voltage and current path must be connected with corresponding socket (black). The conversion ratios of current clamps and of possibly existing voltage converters have to be accurate (setup menu *U-I inP*).

Interchanging the connectors results in misinterpretation. The display does not provide any information on the complete and correct connection of measured objects. For instance, a phase not connected in a three-phase measurement can result in misinterpretation of the three-wire measured variables (e.g. U13, U23, U31).

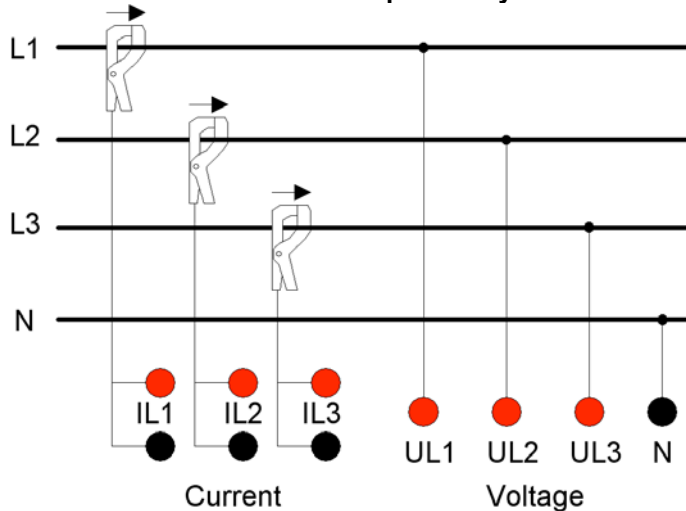
Inputs not connected are rated 0 (zero) and entered in the calculation accordingly.

Therefore, you should pay attention to the plausibility of measuring results at the beginning of your measurements.

Check

- the correct setting of conversion ratios on basis of the magnitude of the values U and I
- the correct polarity of the connectors on basis of the polarity of the P values measured.

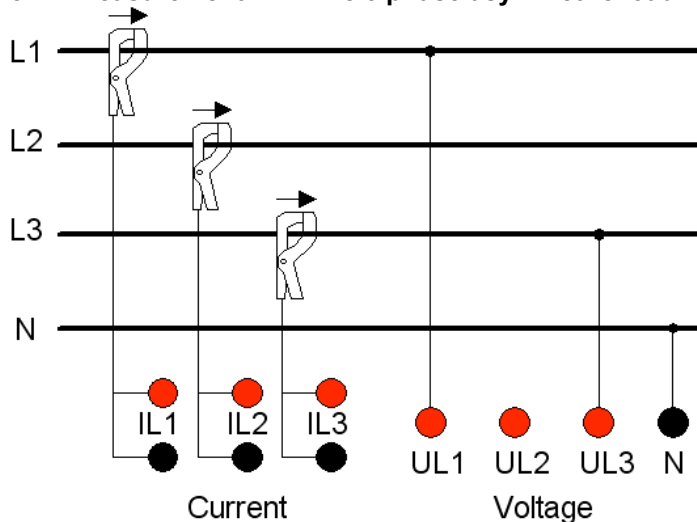
3.1.1 Measurement in 4 wire 3 phase asymmetric load - full connection



In 4 wire 3 phase grids with asymmetric load and for harmonics analysis in the voltage paths, three voltage measuring systems have to be connected. Current is measured in the phases L1, L2 and L3, and voltage between the phases L1, L2, L3 and neutral, respectively. Set the grid type to 4 wire asymmetric load (*4Lu*) in the setup menu (*U-I inP*).

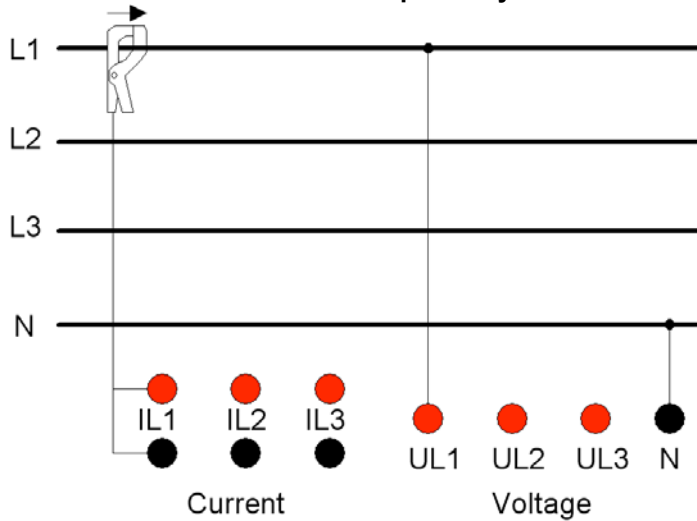
In general, 4 wire 3 phase grids are low-voltage grids (115/200 or 230/400 Volt) so that no voltage converter is required.

3.1.2 Measurement in 4 wire 3 phase asymmetric load – Open-Y circuit



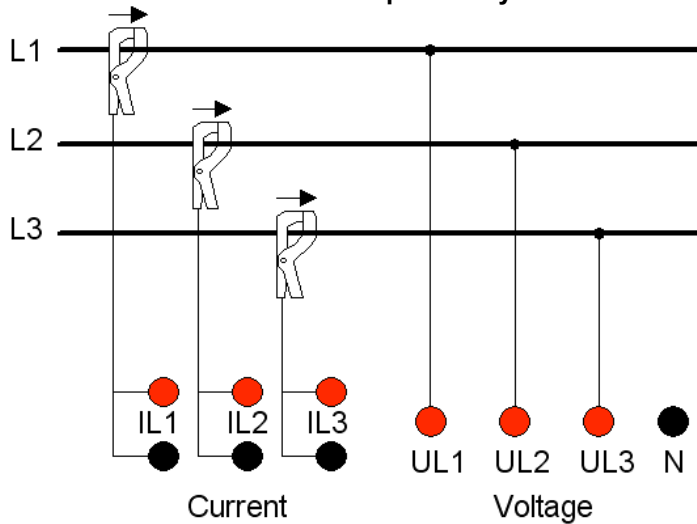
This grid type is not integrated in the A210-Handheld.

3.1.3 Measurement in 4 wire 3 phase symmetric load



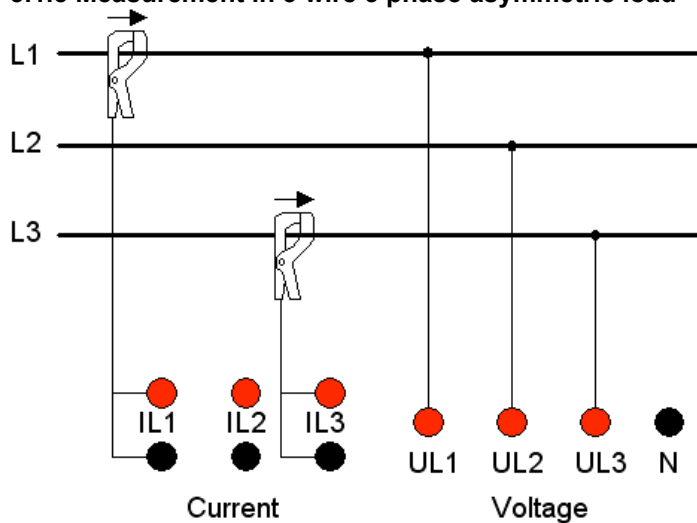
In 4 wire 3 phase grids, one current measuring system and one voltage measuring system are sufficient. Current is usually measured in phase L1, voltage between phase L1 and neutral. Set the grid type to 4 wire symmetric load (4Lb) in the setup menu (U-I inP).

3.1.4 Measurement in 3 wire 3 phase asymmetric load - full connection



This grid type is not integrated in the A210-Handheld.

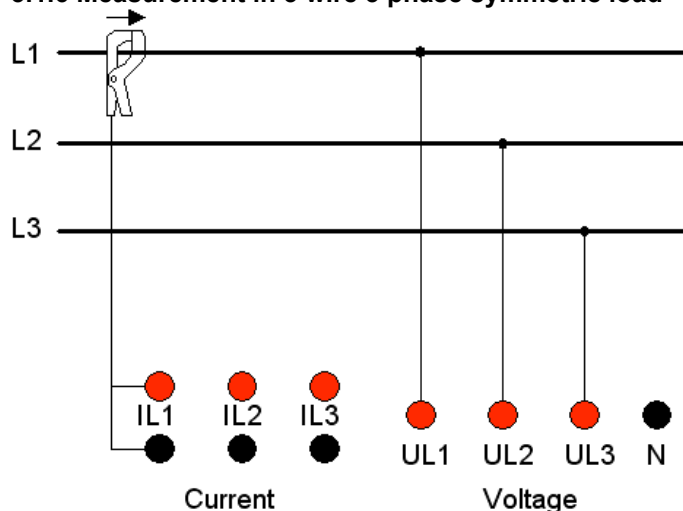
3.1.5 Measurement in 3 wire 3 phase asymmetric load - Aron circuit



For measurements in 3 wire 3 phases grids, two current measuring systems are usually sufficient. (two wattmeter method / Aron circuit). Current is usually measured in L1 and L3. The absence of neutral conductor current is utilised. Voltage is measured in the three voltage paths against an artificial zero point. Set the grid type to 3 wire asymmetric load Aron circuit (3Lu) in the setup menu (U-I inP).

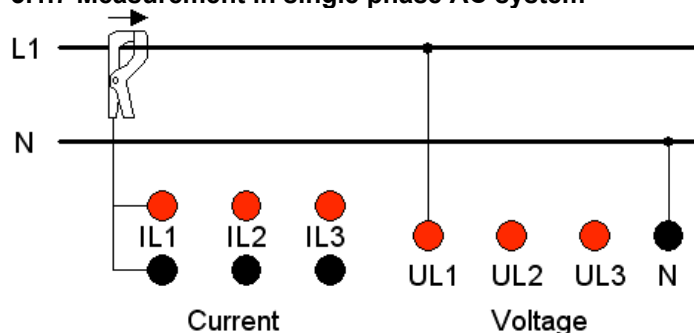
The 3 wire 3 phase grids are used in the medium and high voltage range. In some cases they are also found as special grid types in the low voltage range.

3.1.6 Measurement in 3 wire 3 phase symmetric load



For measurement in 3 wire 3 phase symmetric load grids, one current measuring system is sufficient. Current is usually measured in L1. Voltage is measured in the three voltage paths against an artificial zero point. Set the grid type to 3 wire symmetric load (3Lb) in the setup menu (U-I inP).

3.1.7 Measurement in single phase AC system



Set the grid type to single phase AC grid (1L) in the setup menu (U-I inP).

4 Technical data

Power supply	Rechargeable Li-Ion battery and mains adapter
Autonomy at max. display brightness	Approx. 24 hours (depending on active display elements and ambient temperature)
Autonomy at min. display brightness	Approx. 90 hours (depending on active display elements and ambient temperature)
Connection types	Single phase, 3 / 4 wire balanced and unbalanced
Voltage range	L-L max.: 0-500V, L-N max. : 0-290V
Current range	max. 3 x 0-240A over current clamps WZ11 (240mA at the device) max. 1.2A at the device (suitable current clamps on request)
EN 61010-1 safety standard (pollution level 2)	CAT III 300V~; CAT II 600V~
Accuracy (without current clamps)	A210-Handheld
U, I	0.5%
P, Q, S, PF	1.0%
F	0.02Hz
14mm LED display	3 digits + sign

4.1 Power supply

Mains adapter 100VAC – 240VAC (47...63Hz), Protection class II according to EN 60950

4.2 Mechanical structure

Housing	IP40
Connections	IP20
Dimensions	260 x 120 x 65 mm
Weight without accessories	0.7 kg

5 Maintenance and repair work

5.1 Housing

Special maintenance of the housing is not necessary. Keep the surface clean. Use a moist cloth for cleaning. Do not use cleaning agents and abrasives.

5.2 Fuses in the power measuring circuit

These fuses are located within the device and may only be replaced by our service department.

5.3 Rechargeable Li-Ion battery

The device has a premium Li-Ion battery for autonomous power supply. This cell only needs replacing if you note materially decreased capacity. If handled correctly, this should only be the case after several years of use. Replacement may only be performed by our service department. After such period, we recommend a general overhaul of the device.

6. Repair, support and spare part service

Please contact our respective representations or branches in case of need.



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Subject to changes

**Betriebsanleitung
Multifunktionales
Leistungsmessgerät**

**Mode d'emploi
Indicateur puissance
multifonction**

**Operating Instructions
Multifunctional
Power Monitor**

SINEAX A 210/A 220



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A 210/A 220 Be 151 118 01.05



Safety notes

The installation and commissioning should only be carried out by trained personnel. Check the following points before commissioning:

- that the maximum values for all the connections are not exceeded, see the "Technical data" section,
- that the connection wires are not damaged, and that they are not live during wiring,
- that the power flow direction, and the phase rotation are correct.

The instrument must be taken out of service if safe operation is no longer possible (e.g. visible damage). In this case, all the connections must be switched off. The instrument must be returned to the factory or to an authorized service dealer.

It is forbidden to open the housing and to make modifications to the instrument. The instrument is not equipped with an integrated circuit breaker. During installation check that a labeled switch is installed and that it can easily be reached by the operators.

Unauthorized repair or alteration of the unit invalidates the warranty.

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Brief description

The A 210/A 220 are panel mounting instruments for monitoring AC systems with dimensions 96 x 96 mm (A 210) and 144 x 144 mm (A 220). The following measurements are acquired: voltages, currents, frequency, and phase angles in single phase or 3 phase systems. From these, the active power, reactive power, apparent power, active energy, reactive energy, and the power factor and the neutral current can be calculated. With the use of voltage and current transformers, the instrument can be used for measurements in medium and high voltage systems. The trans-formation ratios are configurable for the direct display of all measurements. The A 210/A 220 instrument is used as a display with two S0 pulse or limit value outputs.

Technical data

(for more detailed information please see data sheet, download under www.camillebauer.com)

Measuring inputs

Nominal frequency:	50, 60 Hz
Nominal input voltage:	Phase-phase: 500 V Phase - N: 290 V
Nominal input current:	5 A or 1 A

Continuous thermal ratings of inputs

10 A at 346 V single phase AC system 10 A at 600 V 3 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

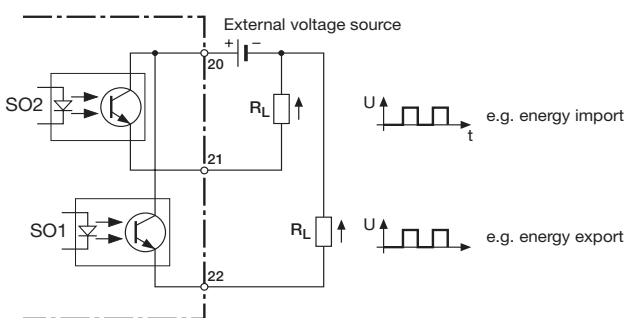
U, I, S:	≤ 120% of nominal value
P, Q:	≤ ± 120% of nominal value
F:	45 to 65 Hz
cosφ:	± 1

Pulse/Limit value outputs

Depending on the function selected, the two digital outputs can be used either as pulse outputs for active 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-relais.

$U_{ext} \leq 40$ V DC (OFF: leakage current ≤ 0.1 mA)
 $I_L \leq 150$ mA (ON: terminal voltage ≤ 1.2 V)



Limit value outputs

Any measured value can be allocated to the limit values.

Impulse outputs

Active and reactive energy impulses can be generated for driving electronic and electromechanical energy meters.

Power supply*

DC, AC power pack 45 to 400 Hz
85 to 253 V AC/DC or
20 to 70 V AC/DC

Power input: < 3 VA (without extension module)

* For power supplies > 125 V the auxiliary circuit should include an external fuse.

Reference conditions acc. to IEC 688 resp. EN 60 688

Sine 50 - 60 Hz, 15 - 30°C, application group II

Measurement accuracy (related to nominal value)

Current, voltage	± 0.5%
Power	± 1.0%
Power factor	± 1.0%
Energy	± 1.0%
Frequency	± 0.02 Hz (abs.)

Environmental conditions

Operating temperature:	-10 to +55 °C
Storage temperature:	-25 to +70 °C
Relative humidity:	≤ 75%
Altitude:	2000 m max.
Indoor use statement	

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

Note of maintenance

No maintenance is required.

Display

The measurement display is 3 digit resp. 4 digit (frequency) and right justified, with the exception of the energy values which are 8 digits. The left-hand 7-segment display is for the sign or an abbreviation.

Abbreviations:

	maximal value
	minimal value
	average value
	max. average value
	minimal value for power factor; the worst out of the 3 values of P1, P2, or P3 is displayed
	neutral current
	inductive
	capacitive
	incoming
	outgoing
	interval active power
	interval reactive power
	interval apparent power
	last interval; t-0
	previous interval; t-1, -2, -3, -4
	overload, out of range indicator
Σ	system value
Δ	delta voltage

Energy meter

- .H high tariff
- .L low tariff

	Interval 0	Interval 1	Interval 2	Interval 3	Interval 4
Current					
time t	t-0	t-1	t-2	t-3	t-4

Commissioning

The multi-functional power monitor is made operational by switching on the power supply. The following appears sequentially on the display:

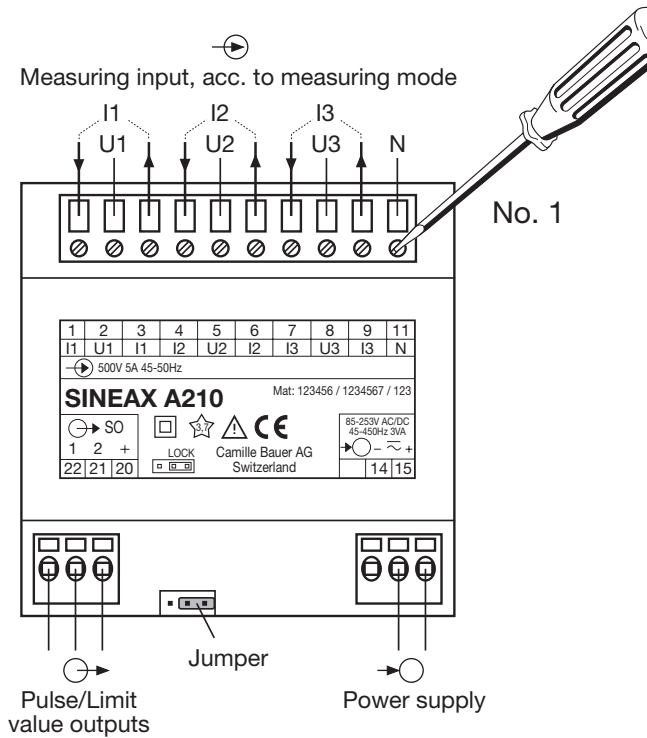
- Segment tests:** all the segments of the displays and all the LEDs are lit for 2 s.
- Version of the software:** e.g. A 210 1.04
- The 3 line voltages at switching on.

Loss of the power supply

All the values configured remain during a loss of the power supply. On reconnecting the power supply, the last mode selected is displayed.

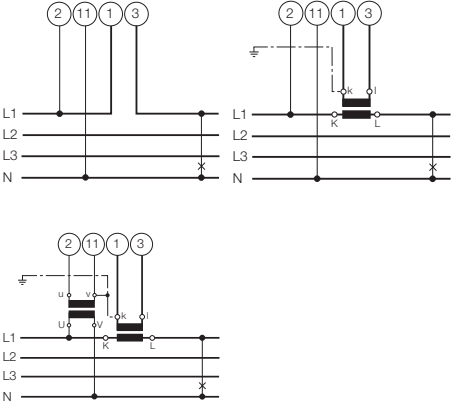
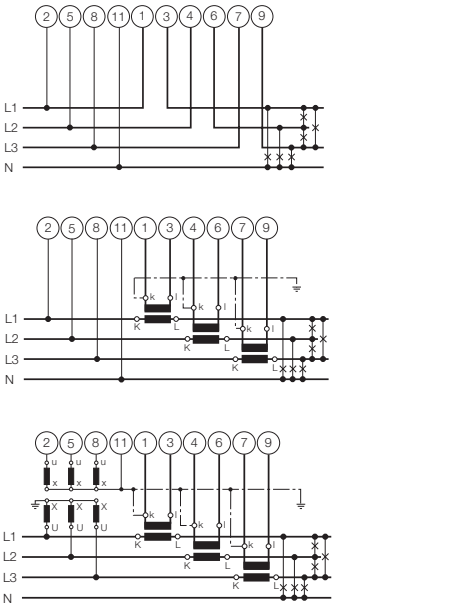
Electrical connections

The electrical connections are identical for the SINEAX A 210 and A 220.



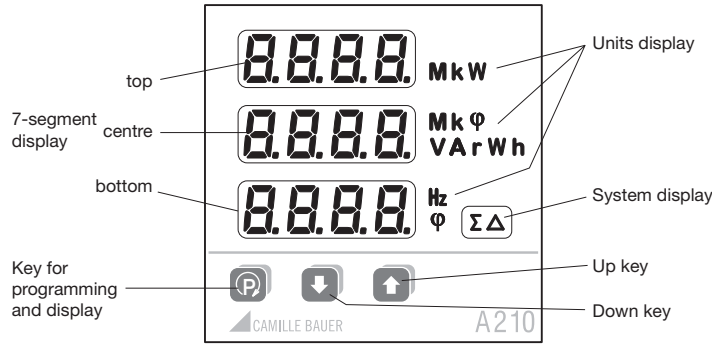
Connecting modes

System/ application	Terminals															
Single phase AC system L1 N																
3wire 3 phase symmetric load I: L1 L1 L2 L3	<p>Connect the voltage according to the following table for current measurement in L2 or L3:</p> <table border="1"> <thead> <tr> <th>Current transf.</th> <th>Terminals</th> <th>2</th> <th>5</th> <th>8</th> </tr> </thead> <tbody> <tr> <td>L2</td> <td>1</td> <td>3</td> <td>L2</td> <td>L3</td> </tr> <tr> <td>L3</td> <td>1</td> <td>3</td> <td>L3</td> <td>L1</td> </tr> </tbody> </table>	Current transf.	Terminals	2	5	8	L2	1	3	L2	L3	L3	1	3	L3	L1
Current transf.	Terminals	2	5	8												
L2	1	3	L2	L3												
L3	1	3	L3	L1												
3 wire 3 phase asymmetric load L1 L2 L3																

System/ application	Terminals															
<p>4 wire 3 phase symmetric load I: L1</p> <p>4068</p>	 <p>Connect the voltage according to the following table for current measurement in L2 or L3:</p> <table border="1" data-bbox="255 739 710 840"> <thead> <tr> <th>Current trans.</th> <th colspan="2">Terminals</th> <th>2</th> <th>11</th> </tr> </thead> <tbody> <tr> <td>L2</td> <td>1</td> <td>3</td> <td>L2</td> <td>N</td> </tr> <tr> <td>L3</td> <td>1</td> <td>3</td> <td>L3</td> <td>N</td> </tr> </tbody> </table>	Current trans.	Terminals		2	11	L2	1	3	L2	N	L3	1	3	L3	N
Current trans.	Terminals		2	11												
L2	1	3	L2	N												
L3	1	3	L3	N												
<p>4 wire 3 phase asymmetric load</p> <p>4000</p>	 <p>3 single-pole insulated voltage transformers in high-voltage system</p>															

Display and operating

Display and operating are identical for the SINEAX A 210 and A 220.



Available measurement data	Example display top	Example display centre	Example display bottom	Units display	System display
Phase voltages U1, U2, U3	230	231	229	V	
Maximum value U1 _{max.} , U2 _{max.} , U3 _{max.}	235	236	231	V	
Minimum value U1 _{min.} , U2 _{min.} , U3 _{min.}	227	226	225	V	
Delta voltages U12, U23, U31	400	402	398	V	Δ
Maximum values U12 _{max.} , U23 _{max.} , U31 _{max.}	405	406	403	V	Δ
Minimum values U12 _{min.} , U23 _{min.} , U31 _{min.}	395	397	396	V	Δ
Phase current I1, I2, I3	2.35	2.37	2.34	A	
Maximum values I1 _{max.} , I2 _{max.} , I3 _{max.}	2.39	2.40	2.38	A	
Average values I1 _{avg.} , I2 _{avg.} , I3 _{avg.} (bimetal -15 min.)	2.04	2.05	2.07	A	
Max. average values I1 _{avgmax.} , I2 _{avgmax.} , I3 _{avgmax.}	2.07	2.05	2.04	A	
Neutral current IN	0.0	0.45		A	
Active powers P1, P2, P3	56.1	56.2	56.5	kW	
Maximum values P1 _{max.} , P2 _{max.} , P3 _{max.}	60.5	60.4	60.3	kW	
Active power system P		125		kW	Σ
Maximum value P _{max.}		239		kW	Σ
Reactive power Q1, Q2, Q3	1.24	1.23	1.22	VAR	
Maximum values Q1 _{max.} , Q2 _{max.} , Q3 _{max.}	1.51	1.52	1.54	VAR	
Reactive power system Q		1.54		VAR	Σ
Maximum value Q _{max.}		2.31		VAR	Σ
Apparent power S1, S2, S3	2.56	2.58	2.60	VA	
Maximum values S1 _{max.} , S2 _{max.} , S3 _{max.}	3.43	3.44	3.67	VA	
Apparent power system S		5.33		VA	
Maximum value S _{max.}		6.23		VA	Σ
Power factor PF1, cosφ	0.87	0.87	0.87	φ	
Power factor PF2, cosφ	0.88	0.88	0.88	φ	
Power factor PF3, cosφ	0.89	0.89	0.89	φ	
Power factor system PF, cosφ	0.88	0.88	0.88	φ	Σ
Minimum value power factor inductive	0.76	0.76	0.76	φ	Σ
Minimum value power factor capacitive	0.84	0.84	0.84	φ	Σ
Frequency, F			49.99	Hz	
Active energy incoming EP high tariff	4589	2356	0.0	kWh	Σ
Active energy incoming EP low tariff *)	1234	5678	0.0	kWh	Σ
Active energy outgoing EP high tariff	4589	2356	0.0	kWh	Σ
Active energy outgoing EP low tariff *)	1234	5678	0.0	kWh	Σ
Reactive energy inductive EQ high tariff	9876	5432	0.0	kVarh	Σ
Reactive energy inductive EQ low tariff *)	1234	9876	0.0	kVarh	Σ
Reactive energy capacitive EQ high tariff	9876	5432	0.0	kVarh	Σ
Reactive energy capacitive EQ low tariff *)	1234	9876	0.0	kVarh	Σ
5 active power intervals Pint0, Pint1, ...	234	234	0.0	kW	Σ
5 reactive power intervals Quint0, Quint1, ...	123	123	0.0	VAR	Σ
5 apparent power intervals Sint0, Sint1, ...	10.1	10.1	0.0	VA	Σ

*) Tariff switching via digital input only (optional extension module required)

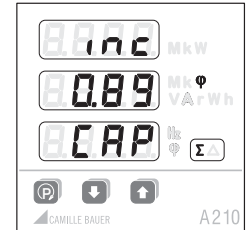
Determination of measured quantities

The calculation of the measurements is made in accordance with EN 40 110, with the exception of the reactive power. This is calculated by the SINEAX A 210/A 220 as a signed value.

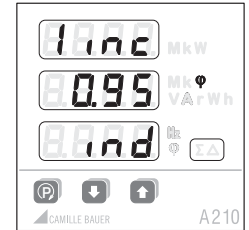
Transducers and displays can possibly display different values for the reactive power in the same power system.

The reason is the different calculation methods.

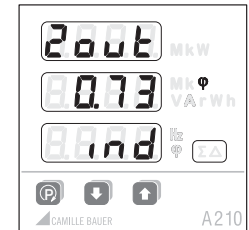
Power factor cosφ 4 quadrant operation



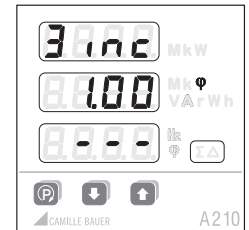
System



Phase 1



Phase 2



Phase 3

Display levels

Within a level (1, 2, 3 ...) you can change the 3 displays to the next mode (a, b, c, ...) with the **P** key. From the last mode, the display changes to mode a again

Change to the next level with the **↑** or **↓** keys.

4 wire asymmetric load

		a	b	c	d	e	f	
↑ ↓	1	U1 U2 U3	U1 _{max.} U2 _{max.} U3 _{max.}	U1 _{min.} U2 _{min.} U3 _{min.}	U12 U23 U31	U12 _{max.} U23 _{max.} U31 _{max.}	U12 _{min.} U23 _{min.} U31 _{min.}	
	2	I1 I2 I3	I1 _{max.} I2 _{max.} I3 _{max.}	I1 _{avg.} I2 _{avg.} I3 _{avg.}	I1 _{avgmax.} I2 _{avgmax.} I3 _{avgmax.}	IN	IN _{max.}	
	3	P1 P2 P3	P1 _{max.} P2 _{max.} P3 _{max.}	P	P _{max.}			
	4	Q1 Q2 Q3	Q1 _{max.} Q2 _{max.} Q3 _{max.}	Q	Q _{max.}			
	5	S1 S2 S3	S1 _{max.} S2 _{max.} S3 _{max.}	S	S _{max.}			
	6	PF1	PF2	PF3	PF	PF _{minind}	PF _{mincap}	
	7	F						
	8	EP inc HT ¹	EP inc LT ²	EP out HT ¹	EP out LT ¹			
	9	EQ ind HT ¹	EQ ind LT ²	EQ cap HT ¹	EQ cap LT ¹			
	10	P Q PF	P S F					
	11	Pint0	Pint1	Pint2	Pint3	Pint4		
	12	Qint0	Qint1	Qint2	Qint3	Qint4		
	13	Sint0	Sint1	Sint2	Sint3	Sint4		

Single-phase, 3 wire symmetric load, 4 wire symmetric load

		a	b	c	d	e
↑ ↓	1	U	U _{max.}	U _{min.}		
	2	I	I _{max.}	I _{avg.}	I _{avgmax.}	
	3	P	P _{max.}			
	4	Q	Q _{max.}			
	5	S	S _{max.}			
	6	PF	PF _{minind}	PF _{mincap}		
	7	F				
	8	EP inc HT ¹	EP inc NT ²	EP out HT ¹	EP out NT ²	
	9	EQ int HT ¹	EQ ind NT ²	EQ cap HT ¹	EQ cap NT ²	
	10	P Q PF	P S F			
	11	Pint0	Pint1	Pint2	Pint3	Pint4
	12	Qint0	Qint1	Qint2	Qint3	Qint4
	13	Sint0	Sint1	Sint2	Sint3	Sint4

Operating

Brightness

13 levels: continuous pressing of the **↓** key (darker), or the **↑** key (brighter).

Delete / Clear

To delete the min. or max. values, or the energy values of the displayed measurements, press the **↓** **↑** keys at the same time.

Locking

The reset function for the energy counters can be locked by setting the jumper at the rear of the instrument to the position LOCK.

3 wire asymmetric load

		a	b	c	d	e
↑ ↓	1	U12 U23 U31	U12 _{max.} U23 _{max.} U31 _{max.}	U12 _{min.} U23 _{min.} U31 _{min.}		
	2	I1 I2 I3	I1 _{max.} I2 _{max.} I3 _{max.}	I1 _{avg.} I2 _{avg.} I3 _{avg.}	I1 _{avgmax.} I2 _{avgmax.} I3 _{avgmax.}	
	3	P	P _{max.}			
	4	Q	Q _{max.}			
	5	S	S _{max.}			
	6	PF	PF _{minind}	PF _{mincap}		
	7	F				
	8	EP inc HT ¹	EP inc LT ²	EQ out HT ¹	EQ out LT ²	
	9	EQ ind HT ¹	EQ ind LT ²	EQ cap HT ¹	EQ cap LT ²	
	10	P Q PF	P S F			
	11	Pint0	Pint1	Pint2	Pint3	Pint4
	12	Qint0	Qint1	Qint2	Qint3	Qint4
	13	Sint0	Sint1	Sint2	Sint3	Sint4


¹ HT = high tariff


² LT = low tariff


Programming


All parameters may be displayed at any time. For modifications the jumper on the backside of the device must be removed (not on position LOCK).



The following table shows all parameters with their adjustable ranges or possible selections respectively. The black numbers give a cross-reference to the appropriate diagram position on page 30.


Starting at the measurands display by pressing the key  you may change to the menu level.

Afterwards you can select the desired menu item by pressing the key  shortly.

Use  to enter the level where the desired parameter is displayed.

Pressing  shortly will force the selectable element to flash.

The flashing content may be modified using the keys  or .

Press  for a longer time to leave the parameter or menu level.

All settings will remain non-volatile stored even in case of power-fail.

Hints:

First you have to set the system configuration and the transformer ratios because further measurand selections, alarm limit settings etc. will depend on them.

The programming may be modified via an optional extension module as well.

Locking the configuration

Place the jumper in the LOCK position.

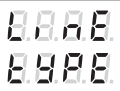








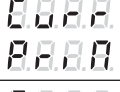


The configuration of all parameters is disabled.



Factory Default

Brightness: (mid setting)
 Limit value / S01: Off
 Limit value / S02: Off
 Transformer ratio: 1 : 1
 Jumper: Not in the LOCK position
 Connecting mode: 4 wire asymmetric load
 Synchronizing interval: 15 min.

Parameters overview

No.	Topmost display Middle display	Undermost display (Selection, * = default)	Meaning	Hints		
1			System configuration			
		 *	4-line system, unbalanced load	(4 lines unbalanced)		
			3-line system, unbalanced load	(3 lines unbalanced)		
			4-line system, balanced load	(4 lines balanced)		
			3-line system, balanced load	(3 lines balanced)		
2		 kV*	Primary voltage of an external transformer on the voltage input (line-to-line voltage)	First you enter any 3-digit number followed by the appropriate power unit selection in steps of factor 10		
		100 V to 999 kV				
		3			 V*	Secondary voltage of an external transformer on the voltage input (line-to-line voltage)
					100 V bis 999 V	
					4	
1.00 A to 999 kA						
5		 A*	Secondary current of an external transformer on the current input			
		1.00 A to 9.99 A				

No.	Topmost display Middle display	Undermost display (Selection, * = default)	Meaning	Hints		
6	8888 / .2 0000		Operating mode of both digital outputs "out.1" and "out.2"	(mode)		
		8888 *	Output switched-off	Simulation via interface module is still possible		
		8888	Energy pulse output	The output generates energy pulses depending on the rate set under 11. The meter measurands to output may be selected under 10.		
		8888	Alarm output	If the alarm limit 8 is exceeded the output will be active (current flows). If the measurand is below limit 9 the output will be passive. The source of the monitored is selected under 7.		
7	8888 / .2 8588		Alarm supervision source	This selection is presented only if operating mode 6 is set to ALM previously		
				Line Type		
				'1L', '3Lb', '4Lb'	'3Lu'	'4Lu'
		8888	Frequency	●	●	●
		8888	Neutral current			●
		5888	Apparent power interval	●	●	●
		8888	Reactive power interval	●	●	●
		8888	Active power interval	●	●	●
		8888	Power factor (cos φ)	●	●	○
		5888	Apparent power	●	●	○
		8888	Reactive power	●	●	○
		8888	Active power	●	●	○
		0888	Voltage	●		
		0088 *	Line-neutral voltage			○
		0088	Line-to-line voltage		○	○
8888	Average current (bimetal)	●	○	○		
8888	Phase current	●	○	○		
				○: 'A.on'= OR-operation of line-measurands 'A.off'= AND-operation of line-measurands		
8	8888 / .2 8888	8280 v *	Alarm limit for ON-state	The maximum values of the alarm limits depend on the possible measuring range (fixed by hardware), converted into possible primary values given by the selected system configuration and transformation ratios.		
9	8888 / .2 8888	8220 v *	Alarm limit for OFF-state			

No.	Topmost display Middle display	Undermost display (Selection, * = default)	Meaning	Hints
10			Source of energy meters for pulse output	
			Reactive energy capacitive, low tariff	
			Reactive energy capacitive, high tariff	
			Reactive energy inductive, low tariff	
			Reactive energy inductive, high tariff	
			Active energy outgoing, low tariff	(outgoing low tariff)
			Active energy outgoing, high tariff	(outgoing high tariff)
			Active energy incoming, low tariff	(incoming low tariff)
			Active energy incoming, high tariff	(incoming high tariff)
11		 1 to 5000 / Wh to GWh	Number of pulses per displayed energy unit. After entering a number from 1 to 5000 you may input the scaling: Basic unit (-), kilo (k), Mega (M) or Giga (Mk)	(energy rate)
12		 1 to 60 min.	Time interval in minutes for the calculation of power intervals	

Examples

Example 1: Programming the system configuration
(3-line, unbalanced load)

- Press > 2 s
- Press (present setting is displayed)
- Press (alterable parameter flashes)
- Press / to select desired setting

- Press (takes over new setting).
Display stops flashing
- Press > 2 s to return to display level

Example 2: Programming voltage transformer ratio and synchronization interval

- Press > 2 s
- Press (transformer ratio menu)

3. Press (present setting of primary voltage)



4. Press (leftmost digit flashes)



5. Press / until desired number appears

6. Press (middle digit flashes)

7. Press / until desired number appears

8. Press (rightmost digit flashes)

9. Press / until desired number appears

10. Press (decimal point flashes)

11. Press / until the decimal point is on the desired position and the kilo/Mega display is correct

12. Press (takes over new value).
The display stops flashing

13. Press (present setting of secondary voltage)



14. Programming procedure same as for primary voltage (1 to 12)

15. Press until the topmost display as shown

16. Press three times



17. Press (present setting of synchronization interval in minutes)



18. Press (left digit flashes)



19. Press / until desired number appears

20. Press (right digit flashes)

21. Press resp. until desired number appears

22. Press (takes over new value).
The display stops flashing

23. Press > 2 s (return to display level)

Konformitätserklärung / Certificat de conformité / Declaration of conformity

SINEAX A 210



EG - KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY



Dokument-Nr./
Document.No.: A210.DOC
Hersteller/
Manufacturer: Camille Bauer AG
Switzerland
Anschrift /
Address: Aargauerstrasse 7
CH-5610 Wohlen
Produktbezeichnung/
Product name: Multifunktionales Leistungsmessgerät
Multifunctional Power Monitor
Typ / Type: SINEAX A 210

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein, nachgewiesen durch die Einhaltung folgender Normen:

The above mentioned product has been manufactured according to the regulations of the following European directives proven through compliance with the following standards:

Nr. / No.	Richtlinie / Directive
89/336/EWG	Elektromagnetische Verträglichkeit - EMV - Richtlinie
89/336/EEC	Electromagnetic compatibility -EMC directive

EMV / EMC	Fachgrundnorm / Generic Standard	Messverfahren / Measurement methods
Störaussendung / Emission	EN 50 081-2 : 1993	EN 55011 : 1998 + A1 : 1999
Störfestigkeit / Immunity	EN 61000-6-2 : 2001	IEC 61000-4-2 : 1995+A1:1998+A2:2000 IEC 61000-4-3 : 1995+A1:1998+A2:2000 IEC 61000-4-4 : 1995+A1:2000 IEC 61000-4-5 : 1995+A1:2000 IEC 61000-4-6 : 1996+A1:2000 IEC 61000-4-8 : 1993+A1:2000 IEC 61000-4-11:1994+A1:2000

Nr. / No.	Richtlinie / Directive
73/23/EWG	Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen - Niederspannungsrichtlinie - CE-Kennzeichnung : 95
73/23/EEC	Electrical equipment for use within certain voltage limits - Low Voltage Directive - Attachment of CE mark : 95

EN/Norm/Standard	IEC/Norm/Standard
EN 61 010-1 : 1993	IEC 1010-1 : 1990 + A1 : 1992

Ort, Datum /
Place, date: Wohlen, den 11. Juni 2002
Unterschrift /
Signature: M.Ulrich
Leiter Entwicklung

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentationen sind zu beachten.

This declaration certifies compliance with the above mentioned directives but does not include a property assurance. The safety notes given in the product documentations, which are part of the supply, must be observed.

SINEAX A 220



EG - KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY



Dokument-Nr./
Document.No.: A220.DOC
Hersteller/
Manufacturer: Camille Bauer AG
Switzerland
Anschrift /
Address: Aargauerstrasse 7
CH-5610 Wohlen
Produktbezeichnung/
Product name: Multifunktionales Leistungsmessgerät
Multifunctional Power Monitor
Typ / Type: SINEAX A 220

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein, nachgewiesen durch die Einhaltung folgender Normen:

The above mentioned product has been manufactured according to the regulations of the following European directives proven through compliance with the following standards:

Nr. / No.	Richtlinie / Directive
89/336/EWG	Elektromagnetische Verträglichkeit - EMV - Richtlinie
89/336/EEC	Electromagnetic compatibility -EMC directive

EMV / EMC	Fachgrundnorm / Generic Standard	Messverfahren / Measurement methods
Störaussendung / Emission	EN 50 081-2 : 1993	EN 55011 : 1998 + A1 : 1999
Störfestigkeit / Immunity	EN 61000-6-2 : 2001	IEC 61000-4-2 : 1995+A1:1998+A2:2000 IEC 61000-4-3 : 1995+A1:1998+A2:2000 IEC 61000-4-4 : 1995+A1:2000 IEC 61000-4-5 : 1995+A1:2000 IEC 61000-4-6 : 1996+A1:2000 IEC 61000-4-8 : 1993+A1:2000 IEC 61000-4-11:1994+A1:2000

Nr. / No.	Richtlinie / Directive
73/23/EWG	Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen - Niederspannungsrichtlinie - CE-Kennzeichnung : 95
73/23/EEC	Electrical equipment for use within certain voltage limits - Low Voltage Directive - Attachment of CE mark : 95

EN/Norm/Standard	IEC/Norm/Standard
EN 61 010-1 : 1993	IEC 1010-1 : 1990 + A1 : 1992

Ort, Datum /
Place, date: Wohlen, den 7. März 2003
Unterschrift /
Signature: M.Ulrich
Leiter Entwicklung

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentationen sind zu beachten.

This declaration certifies compliance with the above mentioned directives but does not include a property assurance. The safety notes given in the product documentations, which are part of the supply, must be observed.

Brief operating instruction for parameter modification

- On the parameter level press key **(P)**
- Adjustable 7-segment display **8** flashes
- Use **↓** or **↑** to set the flashing content.
Adjustable values see **1** to **12** in the parameter overview. All values shown are default values
- Press key **(P)**.
If there is still a flashing 7-segment digit **8**, decimal point or unit **k**: Back to 3.
- Change to the next parameter by pressing **↓** or **↑** and go back to 2.
or
go back to menu level with **↑** and go on with 1.

Return to measurands display:
Press **(P)** for more than 2 seconds.

Anzeige-
Ebene

Niveaux
d'affichage

Display
level

Menü-
Ebene

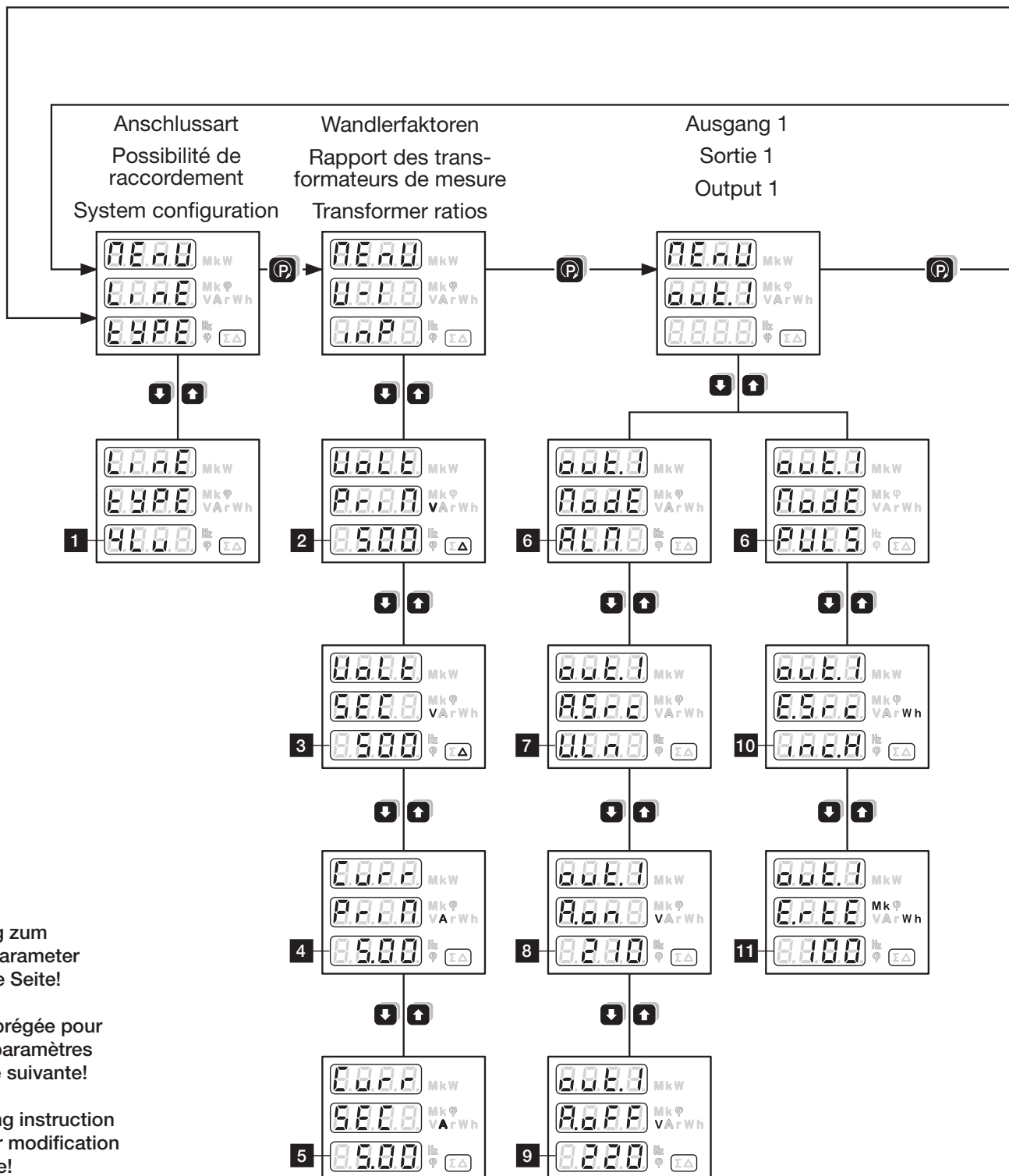
Niveaux
du menu

Menu
level

Parameter-
Ebene

Niveaux du
paramètre

Parameter
level

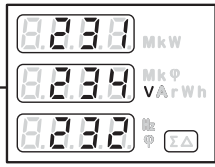


Kurzanleitung zum
Ändern der Parameter
siehe nächste Seite!

Instruction abrégée pour
modifier les paramètres
voir à la page suivante!

Brief operating instruction
for parameter modification
see next page!

Messwert-Anzeige
Affichage des valeurs de mesure
Measurands display



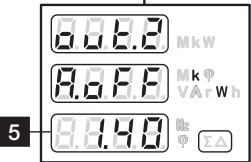
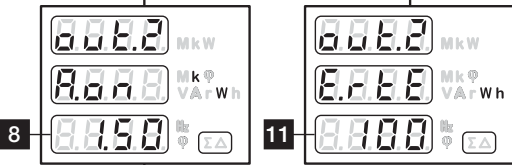
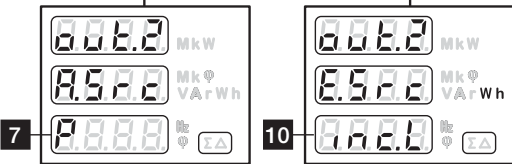
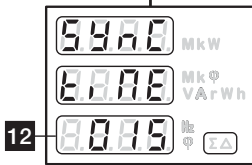
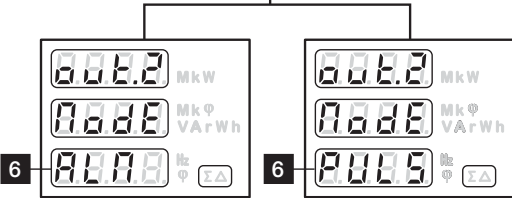
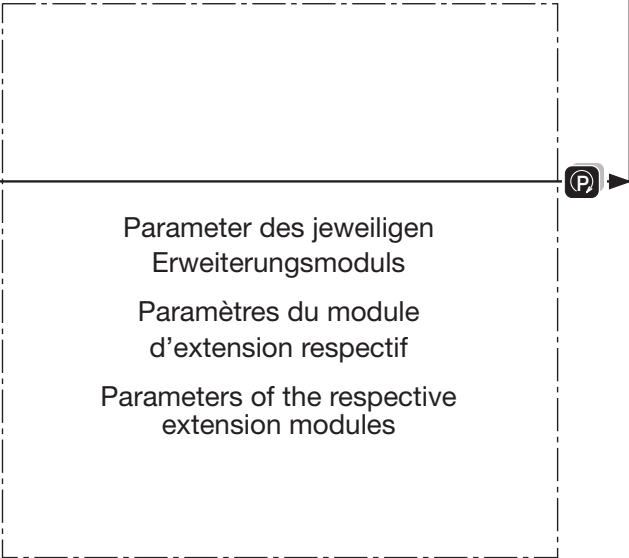
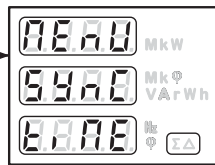
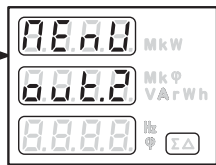
P
< 2s

Zurück aus jeder Anzeige
Retour de chaque affichage
Back from any other display

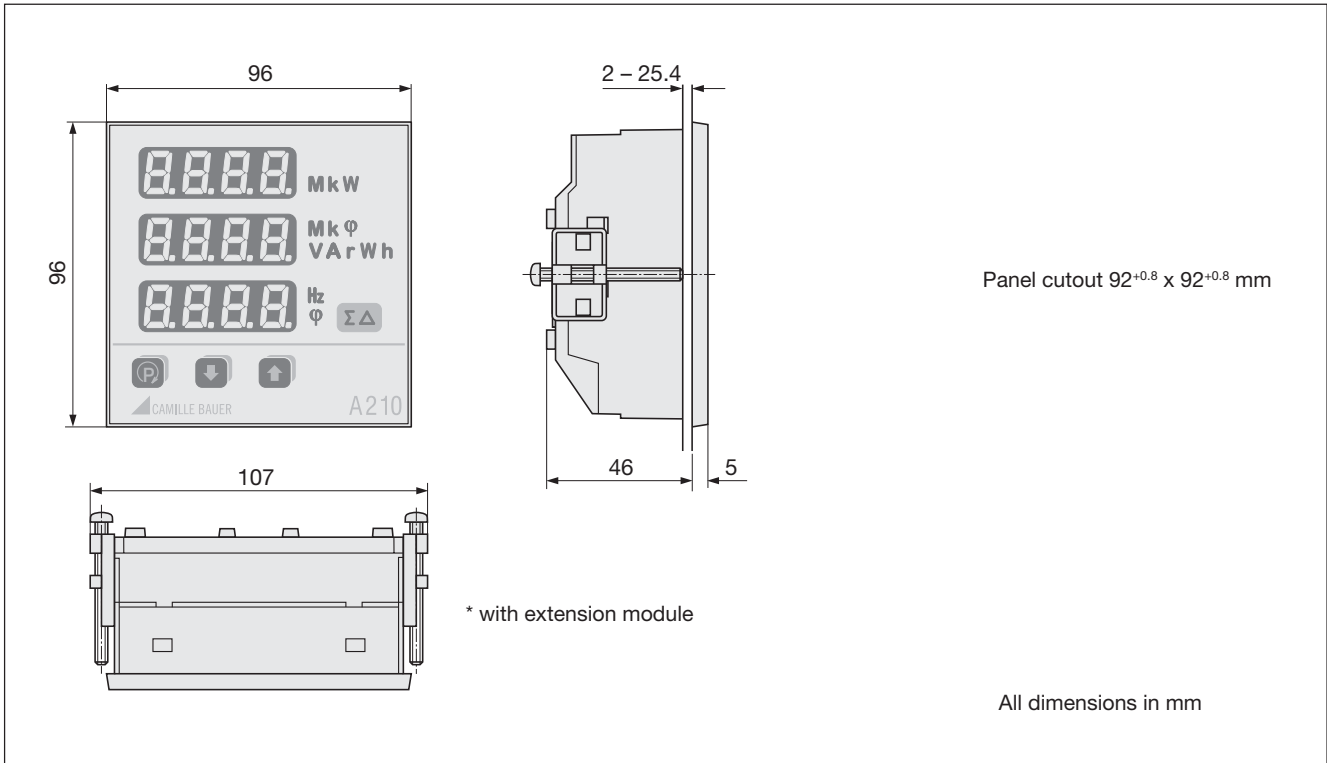
P
< 2s

Ausgang 2
Sortie 2
Output 2

Leistungs-Intervall
Intervalle de puissance
Power interval



Dimensional drawing SINEAX A 210



Dimensional drawing SINEAX A 220

