

SINEAX C 402

Alarm Unit

for DC currents or DC voltages

CE 0102 Ex II (1) G

Application

The alarm unit **SINEAX C402** (Figure 1) is normally applied to monitor the limits of both current and voltage measurements. The status of the device is signalled remotely by a relay and locally by LED's. The electrical insulation between input, output relay contacts and the power supply conforms to IEC 1010. The value detected by the alarm unit is set on a potentiometer and measured at test sockets on the front of the unit.

The alarm unit fulfils all the important requirements and regulations concerning electromagnetic compatibility **EMC** and **Safety** (IEC 1010 resp. EN 61 010). It was developed and is manufactured and tested in strict accordance with the **quality assurance standard** ISO 9001/ EN 29 001.

Production QA is also certified according to guideline 94/9/EG.

Features / Benefits

- With 2 alarm circuits
- Analogous trip point adjusted by 12-turn potentiometer, adjusted trip point measurable on test sockets 0 ... 1 V \triangleq 0 ... 100%
- Sense of relay action and associated LED's switchable by jumpers
- Electrical insulation between measuring input, contact outputs and power supply / Fulfils EN 61 010
- Non-standard user-specific ranges available
- AC/DC power supply / Universal
- Available in type of protection "Intrinsic safety" [EEx ia] IIC (see "Table 4: Data on explosion protection")
- Provision for either snapping the alarm unit onto top-hat rails or securing it with screws to a wall or panel



Fig. 1. SINEAX C 402-1 with 2 relay outputs with 1 changeover contact each, in housing **S17** clipped onto a top-hat rail.

Technical data

Measuring input

DC current:

Standard ranges
0...20 mA, 4...20 mA, \pm 20 mA
Limits
0...0.1 to 0...50 mA
also live zero,
initial value > 0 to \leq 50% of end value
- 0.1...0...+ 0.1 to
- 50...0...+ 50 mA
also bipolar asymmetric
 $R_i = 15 \Omega$

DC voltage:

Standard ranges
0...10 V, 2...10 V, \pm 10 V
Limits
0...0.06 to 0...40, **Ex max. 30 V**
also live zero,
initial value > 0 to \leq 50% of end value
- 0.06...0...+ 0.06 to
- 40...0...+ 40 V,
Ex max. - 30...0...+ 30 V
 $R_i = 100 \text{ k}\Omega$

Overload capacity:

DC current
continuously 2-fold
DC voltage
continuously 2-fold

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Contact outputs A1/A2 →

SINEAX in housing S17: 2 relay outputs,
1 potentialfree changeover contact
per trip point

Trip point type: Switching function adjustable by
jumpers ST2 and ST6 as low or high
trip point (see Fig. 2)

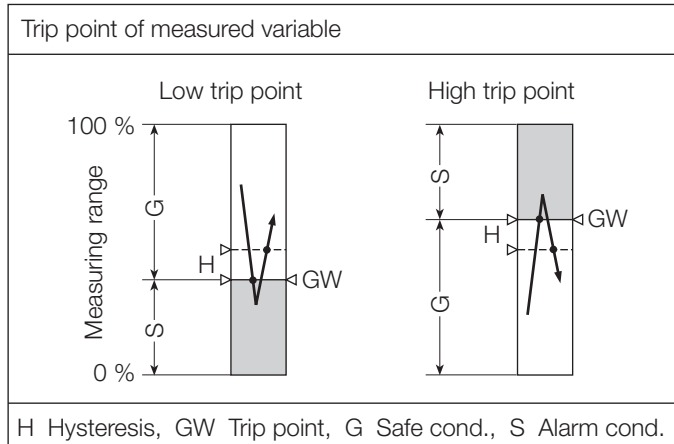


Fig. 2. Switching function, according to trip point type.

Trip point adjustment: By 12-turn potentiometer $\text{C} \text{ J1}$
and $\text{C} \text{ J2}$ for GW1 and GW2
Adjusted trip point measurable on
test sockets with separate voltmeter
 $R_i > 10 \text{ M}\Omega$,
 $0 \dots 1 \text{ V} \triangleq 0 \dots 100\%$
Test switch $\text{O} 2 \text{ mm}$

Hysteresis: Standard 1%,
between > 1 and 10% acc. to order

Energizing and de-
energizing delays: Standard 0.2 s
between 0.1 and 10 s acc. to order

Sense of relay action: Adjustable by jumpers J4 and J8 (see
Fig. 3)

Display of switching state: GW1 and GW2 by yellow LED's J1
and J2 , display mode adjustable by
jumpers J5 and J9 (see Fig. 3)

Contact rating: AC: $\leq 2 \text{ A} / 250 \text{ V}$ (500 VA)
DC: $\leq 1 \text{ A} / 0.1 \dots 250 \text{ V}$ (30 W)
Gold flashed contacts silver alloy
(Relay approved by UL, CSA, TÜV,
SEV)

Power supply H →

AC/DC module (DC and 45...400 Hz)

Table 1: Nominal voltages and tolerance

Nominal voltage U_N	Tolerance	Instruments version
24... 60 V DC / AC	DC $-15\% + 33\%$ AC $\pm 15\%$	Standard (Non-Ex)
85...230 V ¹ DC / AC		
24... 60 V DC / AC	DC $-15\% + 33\%$ AC $\pm 15\%$	Type of protection "Intrinsic safety" [EEx ia] IIC
85...230 V AC	$\pm 10\%$	
85...110 V DC	$-15\% + 10\%$	

Power consumption: $\leq 1.2 \text{ W}$ resp. $\leq 3 \text{ VA}$

Accuracy data (acc. to DIN/IEC 770)

Reference conditions: Ambient temperature 23°C , $\pm 1 \text{ K}$

Accuracy of the
pick-up value: Max. $\pm 1\%$

Repeatability of
the setting: Max. $\pm 0.2\%$

Temperature influence: $< \pm 0.1\%$ per 10 K

Installation data

Mechanical design: Housing S17
Dimensions see Section "Dimen-
sional drawings"

Material of housing: Lexan 940 (polycarbonate)
Flammability Class V-0 acc. to UL 94,
self-extinguishing, non-dripping, free
of halogen

Mounting: For snapping onto top-hat rail
($35 \times 15 \text{ mm}$ or $35 \times 7.5 \text{ mm}$) acc. to
EN 50 022
or
directly onto a wall or panel using the
pull-out screw hole brackets

Position of use: Any

Electrical terminals: DIN/VDE 0609
Screw terminals with wire guards, for
light PVC wiring and
max. $2 \times 0.75 \text{ mm}^2$ or $1 \times 2.5 \text{ mm}^2$

Seismic test: 2 g acc. to EN 60 068-2-6

Shock: 50 g,
3 shocks in each of 6 directions
acc. to EN 60 068-2-27

Weight: Approx. 180 g

¹ For power supplies $> 125 \text{ V}$, the auxiliary circuit should include an external
fuse with a rating $\leq 20 \text{ A DC}$.

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Electrical insulation:	All circuits (measuring input / contact outputs / power supply) electrically insulated	Double insulation:	<ul style="list-style-type: none"> – Power supply versus all other circuits – Measuring output versus output contacts
Regulations		Test voltage:	50 Hz, 1 min. acc. to DIN EN 61 010-1
Electromagnetic compatibility:	The standards DIN EN 50 081-2 and DIN EN 50 082-2 are observed		2300 V, Input versus outputs and outputs versus each other
Intrinsically safe:	Acc. to EN 50 020: 1996-04		3700 V, Power supply versus all circuits
Protection (acc. to IEC 529 resp. EN 60 529):	Housing IP 40 Terminals IP 20	Environmental conditions	
Electrical standards:	Acc. to IEC 1010 resp. EN 61 010	Commissioning temperature:	– 10 to + 55 °C
Operating voltages:	< 300 V between all insulated circuits	Operating temperature:	– 25 to + 55 °C, Ex – 20 to + 55 °C
Contamination level:	2	Storage temperature:	– 40 to + 70 °C
Overvoltage category acc. to IEC 664:	III for power supply II for measuring input and contact output	Annual mean relative humidity:	≤ 75%

Table 2: SINEAX alarm unit in housing S17 as standard version

Measuring input set to 0 ... 20 mA resp. 0 ... 10 V – acc. to external connection – (plug-in jumper J1 in position B2). Any of the standard ranges simply selected by positioning **plug-in jumpers J1**. Quoting the **order No.** is sufficient when ordering:

Instrument in standard (non-Ex) version

Standard input signals	Contact outputs A1 / A2	Power supply	Order Code	Order No.
0 ... 20 mA / 0 ... 10 V 4 ... 20 mA / 2 ... 10 V ± 20 mA / ± 10 V	2 relay outputs with 1 changeover contact each	85 ... 230 V DC/AC	402 - 1202	128 654

Please complete the Order Code 402 - 1... .. according to Table 3 for versions with user-specific configuration.

Basic configuration of the standard versions

For functional control:	Trip point GW1 set to 30%, GW2 set to 70%.
Hysteresis:	1%
Energizing and deenergizing delays:	0.2 s



Further details for switching function (trip point type), sense of relay action and LED's see on the next page!

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Basic configuration of the standard versions



Switching function (trip point type)

Trip point	Switching function (trip point type)	Jumpers		Position
		ST 2	ST 6	
⅃2 GW 2	higher			a
⅃1 GW 1	lower			b

Sense of relay action


Operating status	Relay	Operating sense	Jumpers		Position
			J4	J8	
Safe condition	⅃2 GW 2	Relay energized			b
	⅃1 GW 1				b

Operating sense of LED's

Operating status	LED's	Operating sense	Jumpers		Position
			J5	J9	
Alarm condition	⅃2 GW 2	LED lit-up			b
	⅃1 GW 1				b

Arrangement of the jumpers on PCB and further details for the configuration see section "Configuration" and Fig. 3.

Table 3: Coding of the variants (see also "Table 2: Standard version")

Order Code 402 –										
Features, Selection		*SCODE	no-go							
1. Mechanical design										
1) Housing S17 for rail and wall mounting										
2. Version / Power supply										
1) Standard, / 24 ... 60 V DC/AC										
2) Standard, / 85 ... 230 V DC/AC										
3) [EEx ia] IIC, / 24 ... 60 V DC/AC input circuit intrinsically safe										
4) [EEx ia] IIC, / 85 ... 110 V DC input circuit intrinsically safe 85 ... 230 V AC										
3. Measuring input										
0) 0...20 mA / 0...10 V, zero point changeable										
9) Non-standard [V]										
Z) Non-standard [mA]										
Line 9: [V] 0...0.06 to 0...≤ 40 V, (Ex max. 30 V), also live zero, Initial value > 0 to ≤ 50% of end value [V] –0.06...+ 0.06 to –40...+ 40 V, (Ex max. – 30...+ 30), also bipolar asymmetric										
Line Z: [mA] 0...0.1 to 0...50 mA, also live zero, Initial value > 0 to ≤ 50% of end value [mA] –0.1...+ 0.1 to –50...+ 50 mA, also bipolar asymmetric										

1

2

3

4



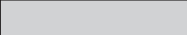


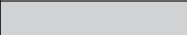
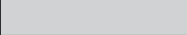
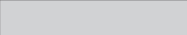

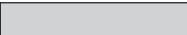
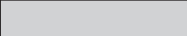
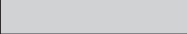
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Order Code 402 – 										
Features, Selection			*SCODE	no-go						
4. Trip points / contact outputs										
2) 2 trip points, 1 changeover contact per trip point				2						
5. Trip point 1, type, hysteresis										
1) Low alarm, hysteresis 1%				. 1						
2) Low alarm, hysteresis [%]				. 2						
3) High alarm, hysteresis 1%				. 3						
4) High alarm, hysteresis [%]				. 4						
Lines 2 and 4: hysteresis [%] > 1.0 to 10										
6. Trip point 1, energizing/deenergizing delay										
1) Energizing/deenergizing 0.2 s				. . 1						
2) Energizing/deenergizing [s]				. . 2						
3) Energizing 0.2 s/deenergizing [s]				. . 3						
4) Deenergizing 0.2 s/energizing [s]				. . 4						
Lines 2 to 4: switching delay [s] 0.10 to 10										
7. Trip point 1, sense of action										
1) Relay energized: alarm condition / LED lit-up: alarm condition				. . . 1						
2) Relay energized: alarm condition / LED lit-up: safe condition				. . . 2						
3) Relay energized: safe condition / LED lit-up: alarm condition				. . . 3						
4) Relay energized: safe condition / LED lit-up: safe condition				. . . 4						
8. Trip point 2, type, hysteresis										
1) Low alarm, hysteresis 1%				. . . . 1 . . .						
2) Low alarm, hysteresis [%]				. . . . 2 . . .						
3) High alarm, hysteresis 1%				. . . . 3 . . .						
4) High alarm, hysteresis [%]				. . . . 4 . . .						
Lines 2 and 4: hysteresis [%] > 1.0 to 10										
9. Trip point 2, energizing/deenergizing delay										
1) Energizing/deenergizing 0.2 s				. . . . . 1 . .						
2) Energizing/deenergizing [s]				. . . . . 2 . .						
3) Energizing 0.2 s/deenergizing [s]				. . . . . 3 . .						
4) Deenergizing 0.2 s/energizing [s]				. . . . . 4 . .						
Lines 2 to 4: switching delay [s] 0.10 to 10										
10. Trip point 2, sense of action										
1) Relay energized: alarm condition / LED lit-up: alarm condition				. . . . . 1 .						
2) Relay energized: alarm condition / LED lit-up: safe condition				. . . . . 2 .						
3) Relay energized: safe condition / LED lit-up: alarm condition				. . . . . 3 .						
4) Relay energized: safe condition / LED lit-up: safe condition				. . . . . 4 .						

* Lines with letter's under "no-go" cannot be combined with preceding lines having the same letter under "SCODE".

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Table 4: Data on explosion protection  II (1) G

Order Code	Type of protection	Input	Output	Type examination certificate	Mounting location of the instrument
402-1...	[EEx ia] IIC	$U_o = 6\text{ V}$ $I_o = 63\text{ }\mu\text{A}$ $L_i = 20\text{ }\mu\text{H}$ $C_i = 20\text{ nF}$ only for connection to certified intrinsically safe circuits with following maximum values: $U_o = 30\text{ V}$	$U_m = 253\text{ V AC}$ resp. 125 V DC	PTB 97 ATEX 2192	Outside the hazardous area

Type of measuring input (current or voltage signal)

Choice of terminals determines whether the alarm unit input monitors a current or a voltage.





Measuring input 	Terminals
Current [mA]	1 – 6 I +
Voltage [V]	1 – 11 U +

Configuration

The instrument has to be opened before it can be configured.









Input standard ranges

The measuring output can be configured by inserting the plug-in jumper **J1** in position “**B1**, **B2** or **B3**”.

Measuring input 	Plug-in jumper J1
4 ... 20 mA / 2 ... 10 V	 B1
0 ... 20 mA / 0 ... 10 V	 B2
± 20 mA / ± 10 V	 B3

Switching function (trip point type)

The positions of the plug-in jumpers ST 2 and ST 6 determine the operating mode of the alarm unit (minimum or maximum limit).





Trip point	Trip point type	Plug-in jumpers ST 2	ST 6	Position
I^2 GW 2	higher			a
	lower			b
I^1 GW 1	higher			a
	lower			b

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Sense of relay action

The sense of relay action can be set with the aid of plug-in jumpers J4 and J8.

Operating status	Relay	Operating sense	Jumpers J4	J8	Position
Alarm condition	GW 2	Relay energized			a
Safe condition					b
Alarm condition	GW 1				a
Safe condition					b

Operating sense of LED's

The operating sense can be set with the aid of plug-in jumpers J5 and J9.

Operating status	LED's	Operating sense	Jumpers J5 | J9		Position
Alarm condition	J2 GW 2	LED lit-up			b
Safe condition					a
Alarm condition	J1 GW 1				b
Safe condition					a

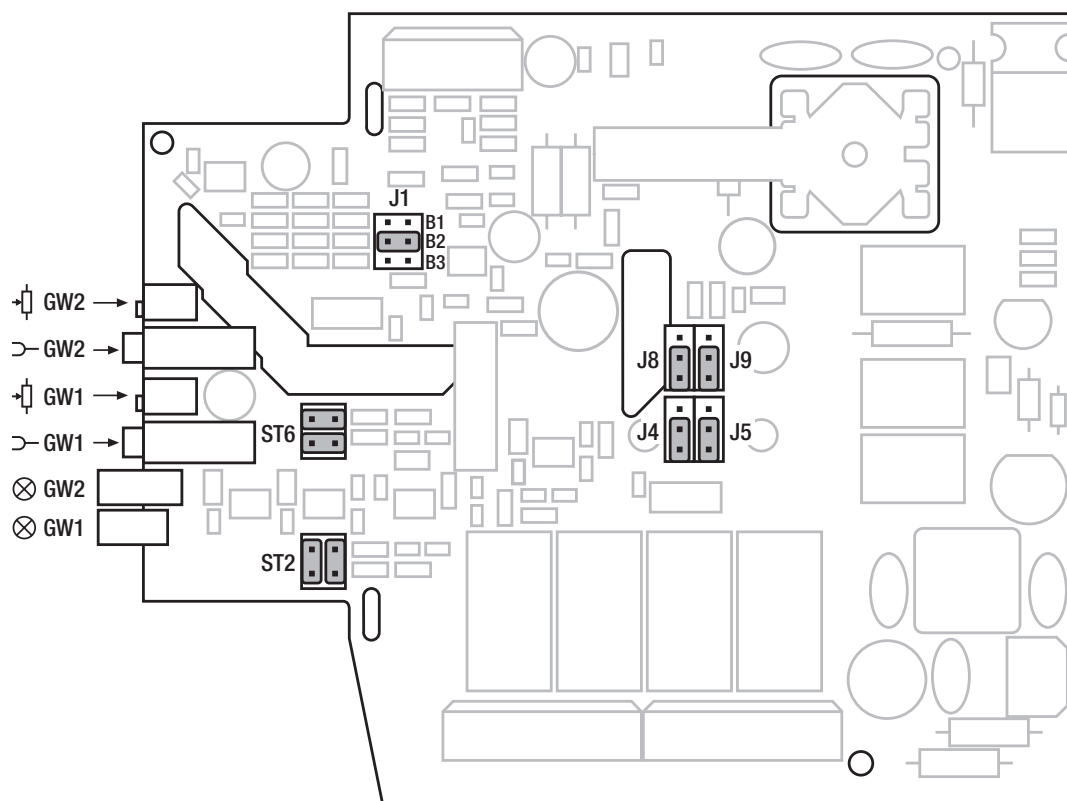
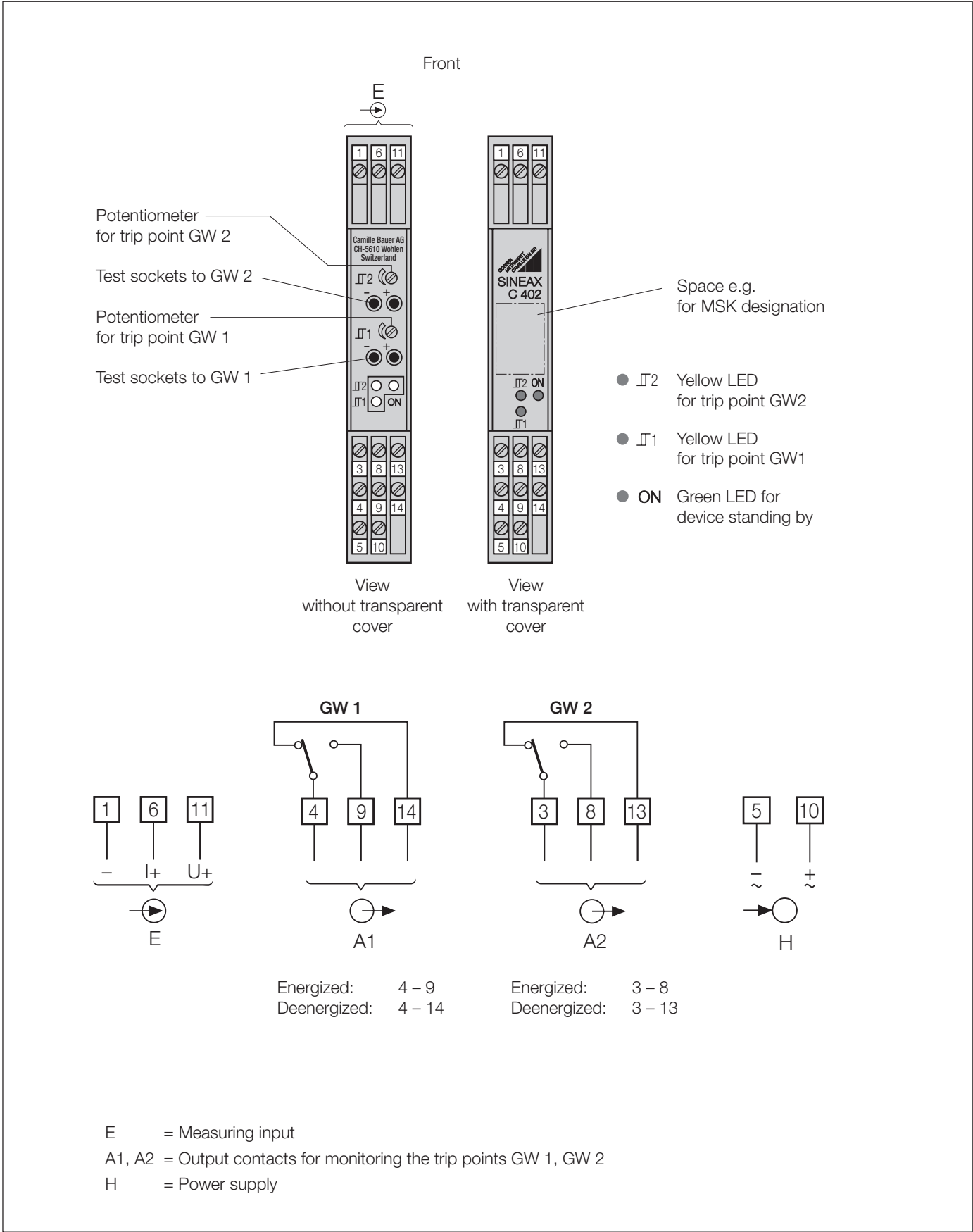


Fig. 3. Position of the plug-in jumpers, potentiometers, test sockets and LED's (standard versions as supplied).

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Electrical connections SINEAX C 402-1 in housing S17



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Dimensional drawings

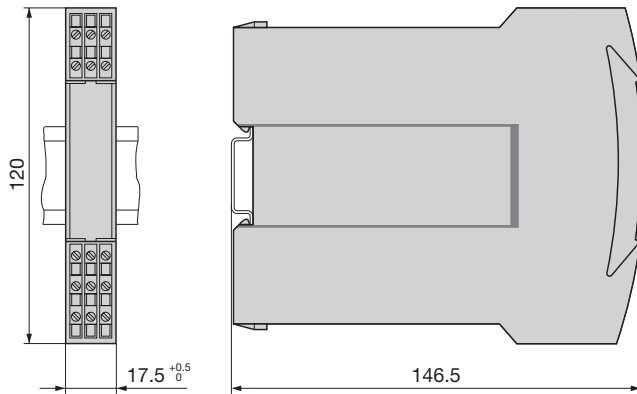


Fig. 5. SINEAX C 402-1 in housing **S17** clipped onto a top-hat rail (35 x 15 mm or 35 x 7.5 mm, acc. to EN 50 022).

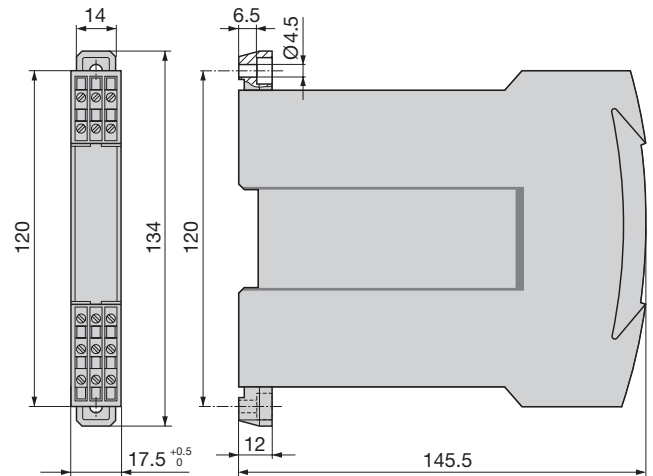


Fig. 6. SINEAX C 402-1 in housing **S17**, screw hole mounting brackets pulled out.

Standard accessories

- 1 Operating Instructions in three languages: German, French, English
- 2 Withdrawing handle (for opening the housing)
- 2 Labels (under transparent cover)
- 1 Type Examination Certificate (for instruments in type of protection "Intrinsically safe" only)