CAMILLE BAUER

# Plug-in module SIRAX C 402
# Alarm unit

**for DC currents or DC voltages**

CE 0102 Ex II (1) G


*Fig. 1. Plug-in module SIRAX C 402-6 for plugging onto backplane BP 902.*

## Application

The alarm unit **SIRAX 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.

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

## Features / Benefits

- **Alarm units plugs onto backplane** (mechanically latched by fasteners), **all electric connections made to the backplane and not to the SIRAX C 402 / Thus no wiring when replacing devices**
- **With 2 alarm circuits**
- **2 heavy current relay outputs with 1 changeover contact each**
- **Analogous trip point adjusted by 12-turn potentiometer, adjusted trip point measurable on test sockets, 0 … 1 V ≙ 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 3: Data on explosion protection)

## Technical data

### Measuring input

| | |
|---|---|
| DC current: | Standard ranges<br>0…20 mA, 4…20 mA, ± 20 mA<br>Limits<br>0…0.1 to 0…50 mA<br>also live zero,<br>initial value > 0 to ≤ 50% of end value<br>– 0.1…0…+ 0.1 to<br>– 50…0…+ 50 mA<br>also bipolar asymmetric<br>$R_i$ = 15 Ω |
| DC voltage: | Standard ranges<br>0…10 V, 2…10 V, ± 10 V<br>Limits<br>0…0.06 to 0…40, **Ex max. 30 V**<br>also live zero,<br>initial value > 0 to ≤ 50% of end value<br>– 0.06…0…+ 0.06 to<br>– 40…0…+ 40 V,<br>**Ex max. – 30…0…+ 30 V**<br>$R_i$ = 100 kΩ |

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Overload capacity: DC current continuously 2-fold
DC voltage continuously 2-fold

**Contact outputs A1/A2**

Version: 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)

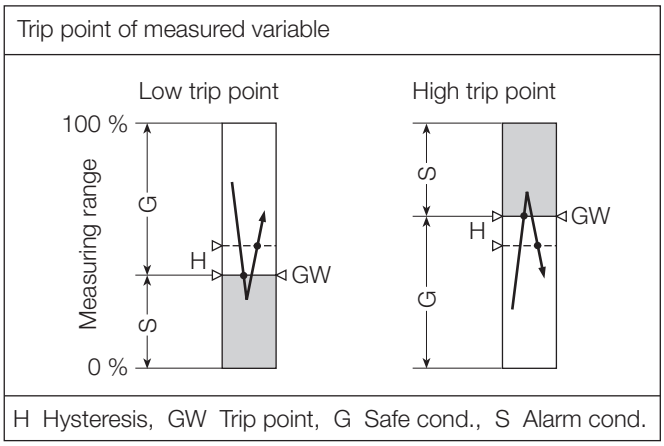


*Fig. 2. Switching function, according to trip point type.*

Trip point adjustment: By 12-turn potentiometer ⦇ ⎍1 and ⦇ ⎍2 for GW1 and GW2
Adjusted trip point measurable on test sockets with separate voltmeter $R_i$ > 10 MΩ,
0 … 1 V ≙ 0 … 100%
Test switch Ø 2 mm

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

Energizing and deenergizing 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 ⎍1 and ⎍2, display mode adjustable by jumpers J5 and J9 (see Fig. 3)

Contact rating: AC: ≤ 2 A / 250 V (500 VA)
DC: ≤ 1 A / 0.1 … 250 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 ± 15% | Standard (Non-Ex) |
| 85...230 V[1] DC / AC | | |
| 24... 60 V DC / AC | DC – 15...+ 33% AC ± 15% | Type of protection "Intrinsic safety" [EEx ia] IIC |
| 85...230 V AC | ± 10% | |
| 85...110 V DC | –15...+ 10% | |

Power consumption: ≤ 1.2 W resp. ≤ 3 VA

**Accuracy data** (acc. to DIN/IEC 770)

Reference conditions: Ambient temperature 23 °C, ± 1 K

Accuracy of the pick-up value: Max. ± 1%

Repeatability of the setting: Max. ± 0.2%

Temperature influence: < ± 0.1% pro 10 K

**Installation data**

Mechanical design: Alarm unit in housing B17 for plugging onto backplane BP 902
Dimensions see Section "Dimensional drawing"

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

Designation: SIRAX C 402

Position of use: Any

Electrical connections: 96-pin connector acc. to DIN 41 612, pattern C
Layout see Section "Electrical connections"

Coding: Alarm unit supplied already coded. The backplane is coded by the user by fitting the coding inserts supplied

Weight: Approx. 170 g

**Electrical isolation**: All circuits (measuring input/contact outputs/power supply) electrically insulated

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

### Regulations

| | |
|---|---|
| Electromagnetic compatibility: | The standards DIN EN 50 081-2 and DIN EN 50 082-2 are observed |
| Intrinsically safe: | Acc. to EN 50 020: 1996-04 |
| Protection (acc. to IEC 529 resp. EN 60 529): | Housing IP 40<br>Terminals IP 00 |
| Electrical standards: | Acc. to IEC 1010 resp. EN 61 010 |
| Operating voltages: | < 300 V between all insulated circuits |
| Contamination level: | 2 |
| Overvoltage category acc. to IEC 664: | III for power supply<br>II for measuring input and contact output |
| Double insulation: | – Power supply versus all other circuits<br>– Measuring output versus output |

contacts

| | |
|---|---|
| Test voltage: | 50 Hz, 1 min. acc. to DIN EN 61 010-1 |
| | 2300 V, Input versus outputs and outputs versus each other |
| | 3700 V, Power supply versus all circuits |

### Environmental conditions

| | |
|---|---|
| Commissioning temperature: | – 10 to + 55 °C |
| Operating temperature: | – 25 to + 55 °C,<br>**Ex* – 20** to + 55 °C |
| Storage temperature: | – 40 to + 70 °C |
| Annual mean relative humidity: | ≤ 75% |
| Altitude: | 2000 m max. |
| Indoor use statement! | |

## Table 2: Coding of the variants

| Designation | *Blocking code | no-go with blocking code | Article No./ Feature |
|---|---|---|---|
| **SIRAX C402** **Order Code 402 - xxxx xxxx xx** | | | 402 – |
| **Features, Selection** | | | |
| **1. Mechanical design** | | | |
| Housing B17 (for plugging onto backplane BP 902, see data sheet BP 902) | | | 6 |
| **2. Version / Power supply** | | | |
| Standard / 24 … 60 V DC/AC | | | 1 |
| Standard / 85 … 230 V DC/AC | | | 2 |
| [EEx ia] IIC, Input circuit intrinsically safe / 24 … 60 V DC/AC | | | 3 |
| [EEx ia] IIC, Input circuit intrinsically safe / 85 … 110 V DC / 85 … 230 V AC | | | 4 |
| **3. Measuring input** | | | |
| 0 … 20 mA / 0 … 10 V, zero point changeable | | | 0 |
| Non-standard [V] | | | 9 |
| Non-standard [mA] | | | Z |
| 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<br>[V] – 0.06…+ 0.06 to –40…+ 40 V, **(Ex max. –30…+ 30),** also bipolar asymmetric<br>Line Z: [mA] 0…0.1 to 0…50 mA, also live zero, initial value > 0 to ≤ 50% of end value<br>[mA] – 0.1…+ 0.1 to –50…+ 50 mA, also bipolar asymmetric | | | |
| **4. Trip points / contact outputs** | | | |
| 2 trip points / 1 changeover contact per trip point | | | 2 |

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| Designation | *Blocking code | no-go with blocking code | Article No./ Feature |
|---|---|---|---|
| **SIRAX C402** **Order Code 402 - xxxx xxxx xx** | | | 402 – |
| **Features, Selection** | | | |
| **5. Trip point 1, type, hysteresis** | | | |
| Low alarm, hysteresis 1% | | | 1 |
| Low alarm, hysteresis [%] | | | 2 |
| High alarm, hysteresis 1% | | | 3 |
| High alarm, hysteresis [%] | | | 4 |
| Lines 2 and 4: Hysteresis [%] > 1.0 to 10 | | | |
| **6. Trip point 1, energizing/deenergizing delay** | | | |
| Energizing/deenergizing 0.2 s | | | 1 |
| Energizing/deenergizing [s] | | | 2 |
| Energizing 0.2 s / deenergizing [s] | | | 3 |
| 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** | | | |
| Relay energized: alarm condition / LED lit-up: alarm condition | | | 1 |
| Relay energized: alarm condition / LED lit-up: safe condition | | | 2 |
| Relay energized: safe condition / LED lit-up: alarm condition | | | 3 |
| Relay energized: safe condition / LED lit-up: alarm condition | | | 4 |
| **8. Trip point 2, type, hysteresis** | | | |
| Low alarm, hysteresis 1% | | | 1 |
| Low alarm, hysteresis [%] | | | 2 |
| High alarm, hysteresis 1% | | | 3 |
| High alarm, hysteresis [%] | | | 4 |
| Lines 2 and 4: hysteresis [%] > 1.0 to 10 | | | |
| **9. Trip point 2, energizing/deenergizing delay** | | | |
| Energizing/deenergizing 0.2 s | | | 1 |
| Energizing/deenergizing [s] | | | 2 |
| Energizing 0.2 s / deenergizing [s] | | | 3 |
| 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** | | | |
| Relay energized: alarm condition / LED lit-up: alarm condition | | | 1 |
| Relay energized: alarm condition / LED lit-up: safe condition | | | 2 |
| Relay energized: safe condition / LED lit-up: alarm condition | | | 3 |
| Relay energized: safe condition / LED lit-up: alarm condition | | | 4 |

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

## Table 3: Data on explosion protection ⟨Ex⟩ II (1) G

| Order Code | Type of protection | Input | Output | Type examination certificate | Mounting location |
|---|---|---|---|---|---|
| 402-63..<br>402-64.. | [EEx ia] IIC | **$U_o$ = 6 V**<br>**$I_o$ = 63 µA**<br>**$L_i$ = 20 µH**<br>**$C_i$ = 20 nF**<br>only for connection to certified intrinsically safe circuits with following maximum values:<br>**$U_o$ = 30 V** | $U_m$ = 253 V AC resp. 125 V DC | PTB 97 ATEX 2192 | **Outside** the hazardous area |

## 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 **B2**".

| 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 |

### 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 → | Pins |
|---|---|
| Current [mA] | a1 –<br>a3 I + |
| Voltage [V] | a1 –<br>a5 U + |

### 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 | Plug-in jumpers ST 6 | Position |
|---|---|---|---|---|
| ⎍2 GW2 | higher | |  | a |
| | lower | |  | b |
| ⎍1 GW1 | higher |  | | a |
| | lower |  | | b |

### 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 | Jumpers 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 | Jumpers J9 | Position |
|---|---|---|---|---|---|
| Alarm condition | ⎍2 GW 2 | LED lit-up | |  | b |
| Safe condition | | | |  | a |
| Alarm condition | ⎍1 GW 1 | |  | | b |
| Safe condition | | |  | | a |

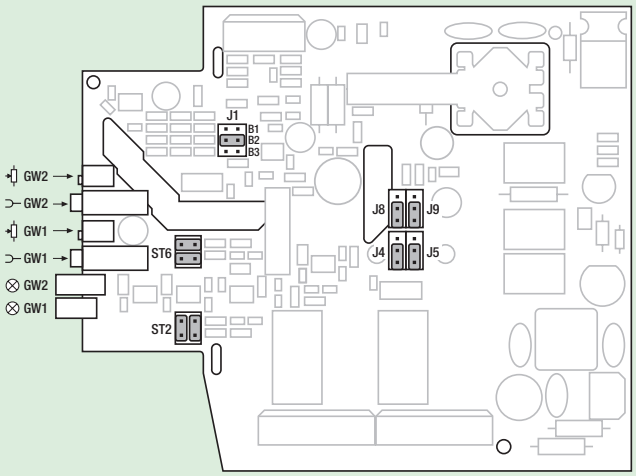


*Fig. 3. Positions of the plug-in jumpers, potentiometers, test sockets and LED's.*

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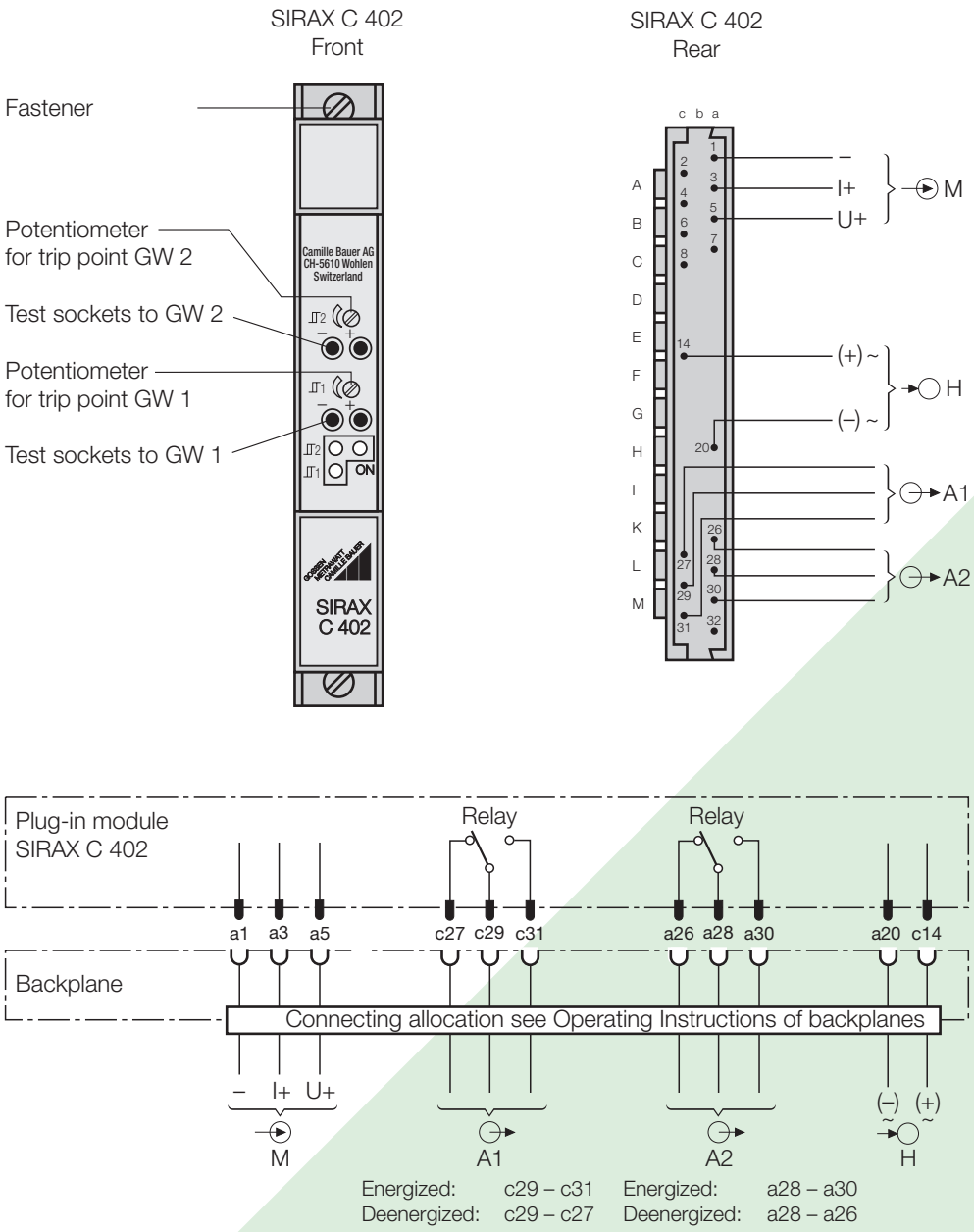
## Electrical connections




M = Measuring input (measuring circuit)
A1 = Output contacts for trip point GW 1
A2 = Output contacts for trip point GW 2
H = Power supply

## Table 4: Accessories and spare parts

| Description | Order No. |
|---|---|
| **Coding comb with 12 sets of codes** (for coding the backplane BP 902) | 107 971 |
| **Data card** (for recording configured settings) | 130 972 |

### Standard accessories

1 Operating instructions for SIRAX C 402
1 Coding comb with 12 sets of codes
3 Data cards (for recording configured settings)
1 Type Examination Certificate (for instruments in type of protection “Intrinsically safe”)

## Dimensional drawing

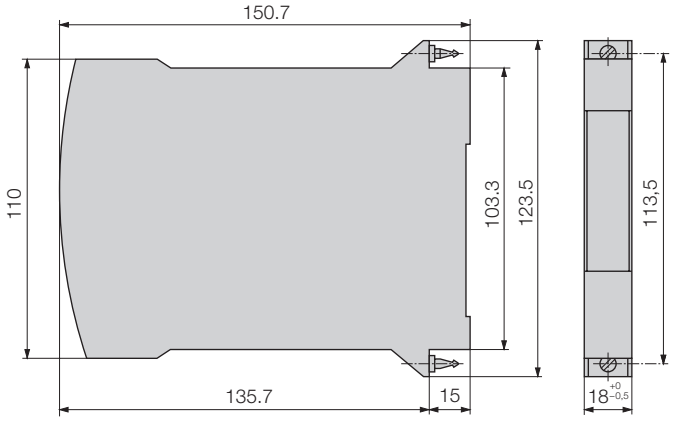



*Fig. 4. SIRAX C 402 in housing **B17**.*

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