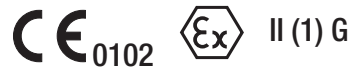


# SINEAX B 811

## Power Pack with additional Functions

for intelligent and conventional 2-wire transmitters, in housing S17 for rail and wall mounting



### Application

The power supply unit **SINEAX B 811** (Figure 1) provides the DC power supply for **2-wire transmitters** and transfers the measured variable unchanged to the **electrically insulated** output.

Conversion to a different signal range such as 0 to 5 mA or 1 to 5 V (signal converter) is also possible.

Some versions of the SINEAX B 811 are **designed for FSK<sup>1</sup> communication**. They are used in conjunction with “intelligent” 2-wire transmitters which are capable of dialogue and operation according to the FSK principle and the HART or user-specific protocol.

The series also includes “intrinsically safe” versions [EEx ia] IIC with an intrinsically safe measurement/supply circuit. These operate in conjunction with intrinsically safe 2-wire transmitters located in explosion hazard areas.

Provision is made for monitoring the measurement/supply circuit to detect short and open-circuits. Either of these faults is signalled by the fault signalling relay AF and the red LED. The output signals A1 and A12 can be set on the DIP switches to have a linear increasing or decreasing response.

The instrument 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

- Designed for FSK communication, hand-held terminal connected to separate terminals. This facilitates operation in conjunction with an “intelligent” 2-wire transmitter designed for FSK and with a HART or user-specific protocol
- Electrically insulated between input circuit, output and power supply / Fulfils IEC 1010 resp. EN 61 010 part 2
- AC/DC power supply / Universal
- “Intrinsically safe” version [EEx ia] IIC available (see “Table 5: Explosion protection data”)
- Measurement/supply circuit monitored for open and short-circuits / Faults signalled by red LED, signalling relay and/or device failure signal



Fig. 1. SINEAX B 811 in housing S17.

- Output can be switched between 0 to 20 mA and 4 to 20 mA / Universal matching to suit downstream device
- Green power on LED
- Compact and narrow

### Technical data

#### Input circuit (MSK)

Signal range  $I_E$ : 4 to 20 mA DC

Supply voltage  $U_S$  (at  $I_E = 20$  mA):

24 V ± 7%	with standard (non-Ex) version, not designed for communications protocol
24 V ± 7%	with standard (non-Ex) version, designed for FSK communication
> 16.9 V	with Ex versions not designed for communications protocol
> 16.4 V	with Ex versions designed for FSK communication

<sup>1</sup> FSK = Frequency Shift Keying

# SINEAX B811

## Power Pack with additional Functions

Current limiter: Electronic  
 At  $I_E > 30 \text{ mA}$ ,  $U_S$  is switched to 0 V for approx. 1 s.  
 $U_S$  is then automatically readjusted to its set-point

Max. line resistance: The maximum line resistance  $R_{\text{Line}}$  permissible between the 2-wire transmitter and the supply unit depends on the voltage difference  $U_S - U_M$ :

$$R_{\text{Line max.}} = \frac{U_S - U_M}{20 \text{ mA}}$$

$U_S$  = Supply voltage for 2-wire transmitter  
 $U_M$  = Min. operating voltage of the 2-wire transmitter

If the load of the burden across output A1 already exceeds 250  $\Omega$ , the resistor can be disconnected by changing the position of a jumper. The full burden voltage of 15 V is then available at output A1 instead of 10 V.

External resistance  $I_{A1}$ :  $R_{\text{ext max.}} [\text{k}\Omega] = \frac{15 \text{ V (10 V)}}{I_{AN} [\text{mA}]}$   
 $I_{AN}$  = Output circuit full-scale value

Burden voltage  $I_{A12}$ :  $< 0.3 \text{ V}$  (field indicator)

External resistance  $I_{A12}$ :  $R_{\text{ext max.}} [\text{k}\Omega] = \frac{0.3 \text{ V}}{I_{AN} [\text{mA}]}$

Residual ripple:  $< 1\% \text{ p.p., DC to } 10 \text{ kHz}$

Response time (IEC 770): Approx. 200 ms

Output characteristic: Linear

### Measuring output

#### Output signals A1 and A12

(see section "Electrical connections")

The output signals A1 and A12 can be load-independent DC voltages  $U_A$  or currents  $I_A$ .

A1 and A12 are not electrically insulated; the same value is available at both outputs.

#### DC voltage signals $U_A$

Standard ranges for  $U_A$ : 0 to 5, 1 to 5, 0 to 10 or 2 to 10 V

Non-standard ranges: 0 to  $> 5$  to 0 to 15 V  
 resp. live-zero  
 $> (1 \text{ to } 5)$  to 3 to 15 V

Short-circuit current:  $\leq 40 \text{ mA}$

Load-capacity  $U_{A1}/U_{A12}$ : 20 mA

Load impedance  $U_{A1}/U_{A12}$ :  $R_{\text{ext A1}} // R_{\text{ext A12}} [\text{k}\Omega] \geq \frac{U_A [\text{V}]}{20 \text{ mA}}$

Residual ripple:  $< 1\% \text{ p.p., DC to } 10 \text{ kHz}$

#### DC current signals $I_A$

Standard ranges for  $I_A$ : 0 to 20 mA or 4 to 20 mA  
 selected by jumpers

Non-standard ranges: 0 to 1 to 0 to  $< 20 \text{ mA}$   
 resp. live-zero  
 0.2 to 1 to  $< (4 \text{ to } 20) \text{ mA}$

Open-circuit voltage: Approx.  $-7$  to  $+22 \text{ V}$

Burden voltage  $I_{A1}$ : 15 V without communication  
 10 V (15 V) with communication\*

\*When a hand-held terminal is connected to the field output A12, the voltage across the burden at output A1 reduces to 10 V. Digital communication requires a minimum burden at output A1 of 250  $\Omega$ . A 250  $\Omega$  resistor is therefore connected across the output circuit.

### Power supply H

AC/DC power pack (DC and 45 to 400 Hz)

Table 1: Nominal voltages and tolerances

Nominal voltage $U_N$	Tolerance	Instrument version
24 to 60 V DC / AC	DC $-15$ to $+33\%$ AC $\pm 15\%$	Standard (non-Ex)
85 to 230 V <sup>1</sup> DC / AC	DC $-15$ to $+33\%$ AC $\pm 15\%$	Type of protection "Intrinsically safe" [Ex ia] IIC
24 to 60 V DC / AC	DC $-15$ to $+33\%$ AC $\pm 15\%$	
85 to 230 V AC	$\pm 10\%$	
85 to 110 V DC	$-15$ to $+10\%$	

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

Power input: Approx. 2.5 W resp.  $\leq 4.5 \text{ VA}$

#### Communication

Bi-directional communication of digital signals with an "intelligent" 2-wire transmitter designed for FSK and a HART or company-specific protocol.

Frequency range: 500 Hz to 35 kHz

#### Input circuit monitor

Pick-up level:

- Open-circuit  
Input current  $< 3.6 \text{ mA}$ , adjustable in the works between 1 and 4 mA
- Short-circuit  
Input current  $> 21 \text{ mA}$ , adjustable in the works between 20 and 23 mA

# SINEAX B811

## Power Pack with additional Functions

### Signalling modes

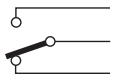
Output signals  
A1 and A12:

- Output signal **linear** response  
For an open-circuit output  
0 mA (with 4 to 20 mA)  
- 5 mA (with 0 to 20 mA)  
For a short-circuit  
output approx. 26 mA
- **Increasing** output signal  
Output approx. 115% of full-  
scale value, e.g. 23 mA for output  
0/4 to 20 mA  
or  
11.5 V for output 0/2 to 10 V
- **Decreasing** output signal  
(only possible for live zero)  
Output approx. 10% of full-scale  
value,  
e.g. 2 mA for output 4 to 20 mA  
or 1 V for output 2 to 10 V

Frontplate signals: Failure signalled by red LED

Output contact AF: 1 relay, 1 potentially-free changeover  
contact (see Table 2)

Table 2: Type of output contact

Symbol	Material	Contact rating
	Gold flashed silver alloy	AC: $\leq 2 \text{ A} / 250 \text{ V}$ (500 VA)  DC: $\leq 1 \text{ A} / 0.1 \dots 250 \text{ V}$ (30 W)

Relay approved by UL, CSA, TÜV, SEV

Direction of action: Adjustable by switch  
- Relay "energized" or "de-energized"  
in the case of a failure

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

Basic accuracy: Limit erreur  $\leq \pm 0.2\%$   
Including linearity and reproducibility  
errors

### Reference conditions:

Ambient temperature 23 °C,  $\pm 2 \text{ K}$   
Power supply 24 V DC  $\pm 10\%$  and 230 V AC  
 $\pm 10\%$   
Output burden Current:  $0.5 \cdot R_{\text{ext}}$  max.  
Voltage:  $2 \cdot R_{\text{ext}}$  min.

### Influencing factors:

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

Burden influence  $< \pm 0.1\%$  with current output  
 $< 0.2\%$  with voltage output,  
if  $R_{\text{ext}} > 2 \cdot R_{\text{ext min}}$ .

Long-time drift  $< \pm 0.3\%$  / 12 months

Switch-on drift  $< \pm 0.2\%$

Common and transverse  
mode influence  $< \pm 0.2\%$

Output + or -  
connected to ground:  $< \pm 0.2\%$

### Regulations

Electromagnetic  
compatibility: The standards DIN EN 50 081-2 and  
DIN EN 50 082-2 are observed

Intrinsically safe: Acc. to DIN EN 50 020: 1996-04

Electrical standards: Acc. to IEC 1010 resp. EN 61 010

Protection (acc. to IEC 529  
resp. EN 60 529): Housing IP 40  
Terminals IP 20

Operating voltages:  $< 300 \text{ V}$  between all insulated  
circuits

Contamination level: 2

Overvoltage category  
acc. to IEC 664: III for power supply  
II for measuring input, measuring  
output and output contact

Double insulation:  
- Power supply versus all other  
circuits,  
- Measuring input versus measuring  
output and output contact  
- Measuring output versus output  
contact

Test voltage: Power supply versus measuring  
input, measuring output and output  
contact 3.7 kV, 50 Hz, 1 min.

Measuring input versus measuring  
output 2.3 kV, 50 Hz, 1 min.

Measuring output versus output  
contact 2.3 kV, 50 Hz, 1 min.

### Environmental conditions

Commissioning temperature:  $-10$  to  $+55 \text{ °C}$

Operating temperature:  $-25$  to  $+55 \text{ °C}$ ,  
**Ex - 20** to  $+55 \text{ °C}$

Storage temperature:  $-40$  to  $+70 \text{ °C}$

Annual mean  
relative humidity:  $\leq 75\%$  standard climatic rating  
 $\leq 95\%$  enhanced climatic rating

Vibration (IEC 68 T2/6): 2 g / 5 to 150 to 5 Hz;  
1 octave/min., 2 h

# SINEAX B811

## Power Pack with additional Functions

Shock (IEC 68 T2/27):	30 g / 11 ms	Mounting:	For snapping onto top-hat rail (35 x 15 mm or 35 x 7,5 mm) acc. to EN 50 022
Altitude:	2000 m max.		or
Indoor use statement!			directly onto a wall or panel using the pull-out screw hole brackets
<b>Installation data</b>			
Housing:	Housing <b>S17</b> See section "Dimensional drawings" for dimensions	Position of use:	Any
Material of housing:	Lexan 940 (polycarbonate) flammability class V-0 acc. to UL 94, self-extinguishing, non-dripping, free of halogen	Terminals:	DIN/VDE 0609 Screw terminals with wire guards, for light PVC wiring and max. 2 x 0.75 mm <sup>2</sup> or 1 x 2.5 mm <sup>2</sup>
		Weight:	Approx. 0.2 kg

### Standard version

When ordering, it is only necessary to quote the **Order No.:**

**Table 3: Instrument in version [EEx ia] IIC, (input circuit intrinsically safe)**

Version		Order Code	Order No.
Supply voltage	≥ 16.9 V DC at 20 mA	811-14B0 0000	107 400
Power supply:	85 to 110 V DC / 230 V AC		
Outputs A1 and A12*:	4 to 20 mA, R <sub>ext</sub> ≤ 750 Ω		
FSK (field communications protocol):	Not designed for communications protocol		
Input circuit fault detection:	Open-circuit < 3.6 mA, short-circuit > 21 mA		
Response to an input circuit:	Output signal linear response		
Response of the output contact AF for a measurement/supply circuit fault:	Without relay, without output contact		
Climatic rating:	Standard climatic rating		

The complete order code 811 - 1... .... according to "Table 4: Specification and ordering information" should be stated for other versions.

\* 2nd output signal A12 for field indicator only

**Table 4: Specification and ordering information** (see also Table 3: "Standard versions")

Description	*Blocking code	No-go with blocking code	Article No./ Feature
<b>SINEAX B811-</b>	<b>Order Code 811-xxxx xxxx</b>		811 -
<b>Features, Selection</b>			
<b>1. Mechanical design</b> Housing S17			1
<b>2. Version / Power supply H (nominal voltage U<sub>N</sub>)</b>			
Standard / 24 to 60 V DC/AC			1
Standard / 85 to 230 V DC/AC			2
[EEx ia] IIC MSK intrinsically safe / 24 to 60 V DC/AC			3
[EEx ia] IIC MSK intrinsically safe / 85 to 110 V DC, 85 to 230 V AC			4
Lines 3 and 4: Instrument [EEx ia] IIC, input circuit (MSK) EEx ia IIC			

# SINEAX B811

## Power Pack with additional Functions

Description	*Blocking code	No-go with blocking code	Article No./ Feature
<b>SINEAX B811-</b> <span style="float: right;"><b>Order Code 811-xxxx xxxx</b></span>			811 –
<b>Features, Selection</b>			
<b>3. Output signals / measuring outputs A1 and A12**</b>			
0 to 5 V, $R_{ext} \geq 250 \Omega$	CD		1
1 to 5 V, $R_{ext} \geq 250 \Omega$	C		2
0 to 10 V, $R_{ext} \geq 500 \Omega$	CD		3
2 to 10 V, $R_{ext} \geq 500 \Omega$	C		4
Non-standard [V] 0 to > 5 to 0 to 15 [M]	CD		8
Live zero [V] > (1 to 5) bis 3 to 15 [M]	C		9
0 to 20 mA, $R_{ext} \leq 750 \Omega$ (500 $\Omega$ )***	DE		A
4 to 20 mA, $R_{ext} \leq 750 \Omega$ (500 $\Omega$ )***			B
Non-standard [mA] 0 to 1 to 0 to < 20 [mA]	CD		Y
Live zero [mA] 0.2 to 1 to < (4 to 20) [mA]	C		Z
<b>4. FSK (field communications protocol)</b>			
Not designed for communications protocol			0
Designed for FSK communication, at field output A12 (with output 0 to 20 / 4 to 20 mA)		C	1
Designed for FSK communication, at measuring output A1 (with output 4 to 20 mA only)		CE	2
<b>5. Input circuit fault detection</b>			
Open / short-circuit detection:			
Open-circuit < 3.6 mA; short-circuit > 21 mA			0
Open-circuit; short-circuit [mA]			1
Open-circuit: Values from 1 to 4 mA Short-circuit: Values from 20 to 23 mA e.g. [mA]: 2;22			
<b>6. Response to an input circuit</b>			
Output signal linear response			0
Increasing output signal >>> (Output approx. 115% of full-scale)			1
Decreasing output signal <<< (Output approx. 10% of full-scale, with live zero signal only)		D	2
<b>7. Response of the output contact AF for a measurement/supply circuit fault</b>			
Without output contact			0
Output contact relay energized			1
Output contact relay de-energized			2
<b>8. Climatic rating</b>			
Standard climatic rating			0
Improved climatic rating			1

\* Lines with letter(s) under "No-go with blocking code" cannot be combined with preceding lines having the same letter under "Blocking code".

\*\* A12 – according to instrument version – for connection with a field indicator or hand-held terminal only

\*\*\* External resistance dependent on the position of jumper J 204 / J 205, see section technical data "Measuring output"

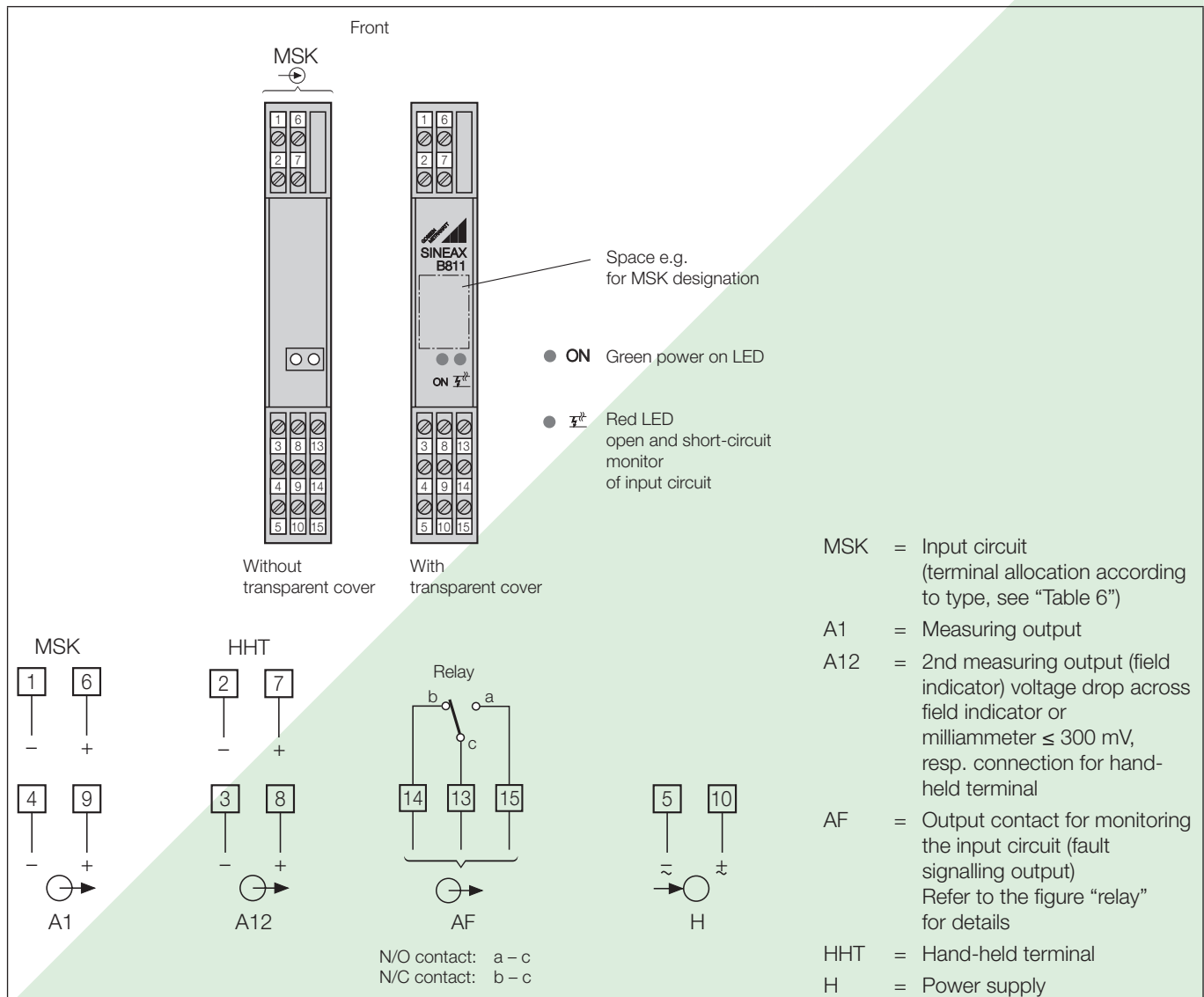
# SINEAX B811

## Power Pack with additional Functions

Table 5: Explosion protection data  $\text{Ex}$  II (1) G

Order code	Type of protection	Measuring circuit input	Output, Power supply relays contacts	Certificates	Mounting location									
811-13.. ... 811-14.. ...	[EEx ia] IIC	$U_o = 21 \text{ V}$ $I_o = 75 \text{ mA}$ $P_o = 660 \text{ mW}$ Trapezium characteristic <table border="1"> <thead> <tr> <th></th> <th>IIC</th> <th>IIB</th> </tr> </thead> <tbody> <tr> <td><math>L_o</math></td> <td>6.7 mH</td> <td>25 mH</td> </tr> <tr> <td><math>C_o</math></td> <td>178 nF</td> <td>1.26 <math>\mu\text{F}</math></td> </tr> </tbody> </table>		IIC	IIB	$L_o$	6.7 mH	25 mH	$C_o$	178 nF	1.26 $\mu\text{F}$	$U_m = 253 \text{ V AC}$ resp. 125 V DC	PTB 97 ATEX 2083	<b>Outside</b> the hazardous area
	IIC	IIB												
$L_o$	6.7 mH	25 mH												
$C_o$	178 nF	1.26 $\mu\text{F}$												

### Electrical connections



# SINEAX B811

## Power Pack with additional Functions

### Configuration

#### 1. Switching output signals A1 and A12 between the signal ranges 0 to 20 mA or 4 to 20 mA

The range of the outputs can be switched from 0 to 20 mA to 4 to 20 mA or vice versa depending on the positions of jumpers J 202 and J 203 (Fig. 2).

Output signals A1 / A12	Position of jumpers	
	J 202	J 203
4 to 20 mA	1	1
0 to 20 mA	3	3

#### 2. Communication connector

Connect the communication connector to output A1 or A12 (Figures 5 to 8). Signals are then transferred in both directions between the hand-held terminal and the transmitter via the SINEAX B 811.

When using the field output A12, the 250 Ω burden connected across output A12 in the power supply unit can be switched in and out of circuit with the aid of jumpers J 204 and J 205 (Fig. 2).

Communication connected to:	Position of jumpers	
	J 204	J 205
<b>Field output A12*</b> Integrated 250 Ω resistor <b>in circuit</b> : <i>The burden at measuring output A1 is reduced 250 Ω</i> Choice of A1 output signal range 0/4 to 20 mA Voltage across A1 burden: <b>10 V</b>	1	1
<b>Field output A12*</b> Integrated 250 Ω resistor <b>not in circuit</b> : <i>The burden at measuring output A1 is not reduced.</i> A1 output signal range 4 to 20 mA only Voltage across A1 burden: <b>15 V</b>	1	3
<b>Measuring output A1</b> Output signal range 4 to 20 mA Voltage across A1 burden: <b>15 V</b>	3	3

\*See "Measuring output" in the "Technical data" section

#### 3. Response of the output signals A1 and A12 for a fault in the measurement/supply circuit

The response of the output signals A1 and A12 can be set with the aid of switches 1 and 2 on the DIP switch S 201 (Fig. 2).

Response of output signals A1 and A12 for a short or open-circuit of the measurement/supply circuit	Dip switch S 201	
	Switch 1	Switch 2
Linear output signal	ON	OFF
Increasing output signal	OFF	OFF
Decreasing output signal (only with live zero signal)	OFF	ON

Fault	Output linear behaviour	Output driving upscale	Output driving downscale
Break	0 mA (with output 4 to 20 mA)	Approx. 115% of full scale end value  e.g. 23 mA with output 0/4 to 20 mA or 11.5 V with output 0/2 to 10 V	(with live-zero only)
	- 5 mA (with output 0 to 20 mA)		Approx. 10% of full scale end value
Short-circuit	Approx. 26 mA with output 0/4 to 20 mA		e.g. 2 mA with output 4 to 20 mA or 1 V with output 2 to 10 V

#### 4. Response of the output contact AF for a fault in the measurement/supply circuit

The response of the fault signalling relay can be set with the aid of switches 3 and 4 on the DIP switch S 201 (Fig. 2).

Operating sense of the fault signalling relay AF in the event of a fault	DIP switch S 201	
	Switch 3	Switch 4
Relay energised	ON	OFF
Relay de-energised	OFF	ON

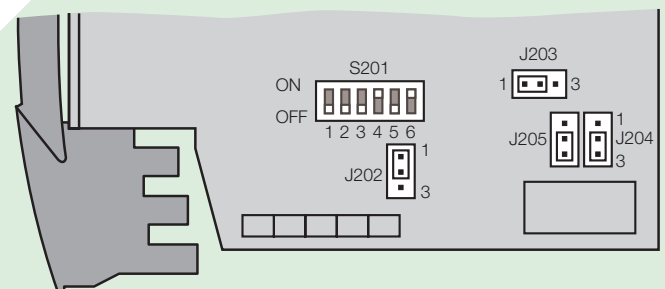
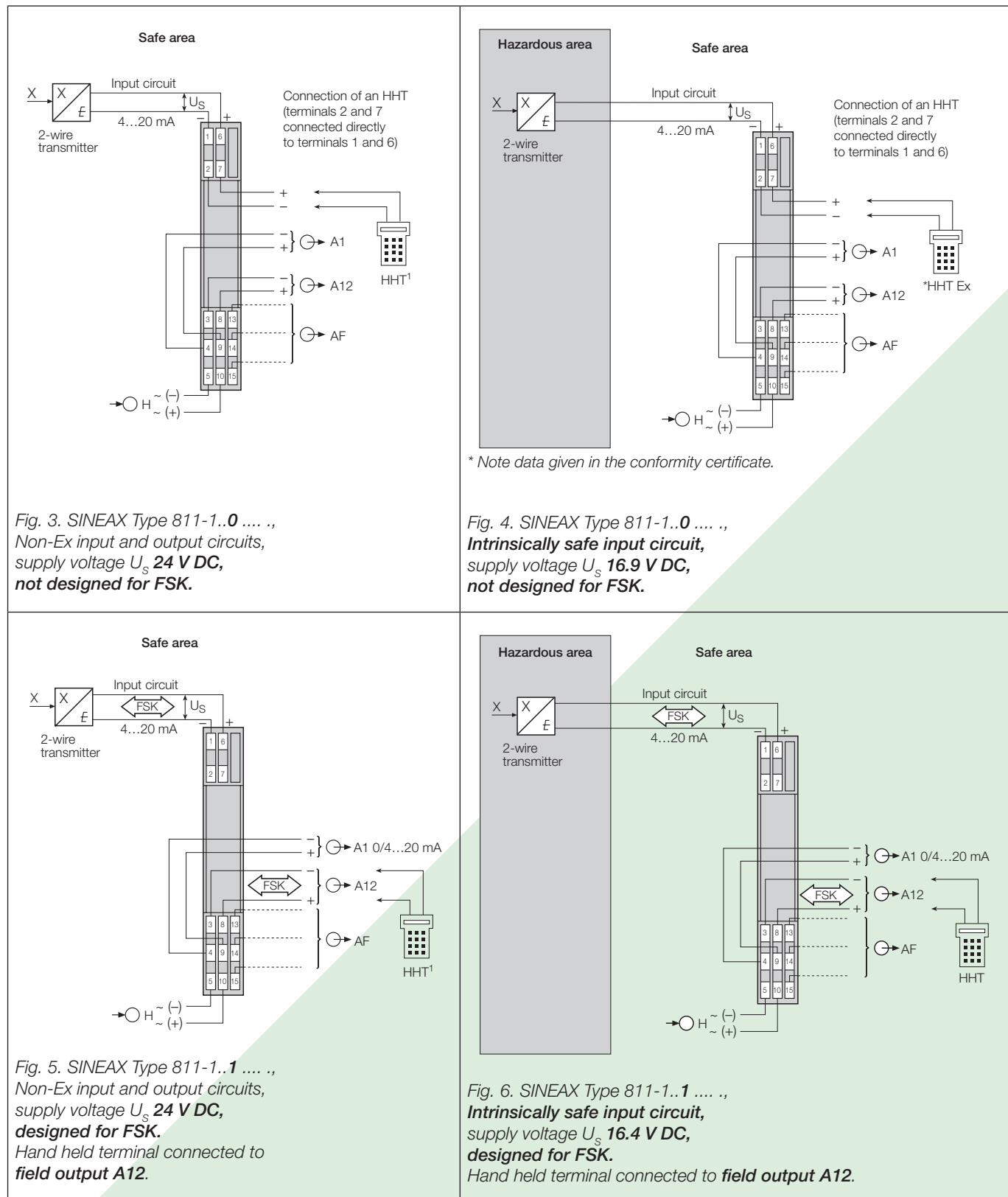


Fig. 2. Positions of the DIP switches S 201 and jumpers J 202 to J 205.

# SINEAX B811

## Power Pack with additional Functions

**Table 6: Terminal allocation**



<sup>1</sup> HHT = Hand-Held-Terminal

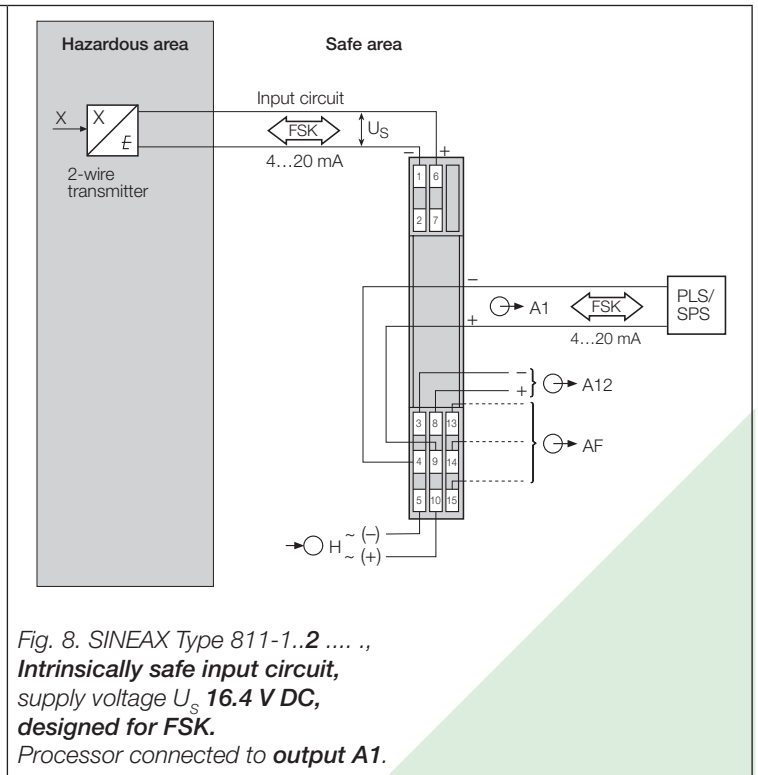
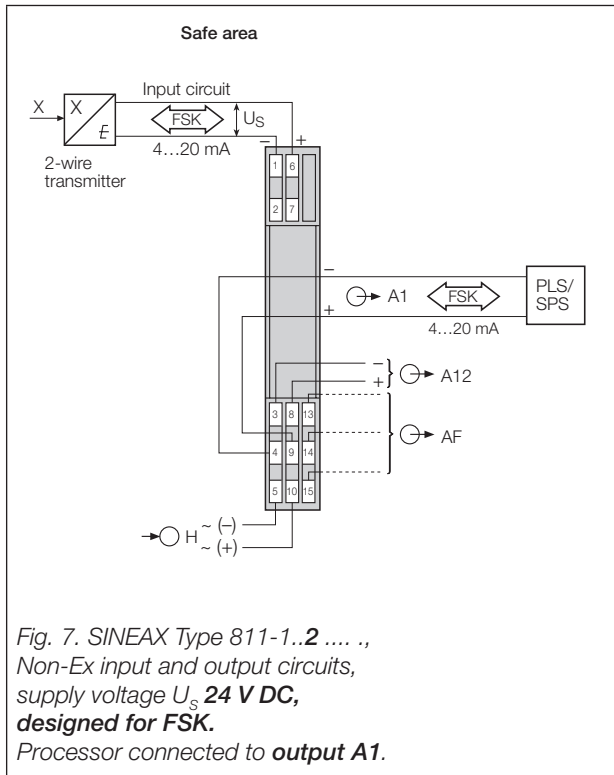
Continuation of "Table 6: Terminal allocation" see on next page!



# SINEAX B811

## Power Pack with additional Functions

Continuation "Table 6: Terminal allocation"



### Dimensional drawings

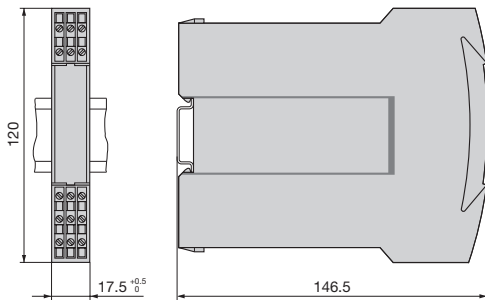


Fig. 9. SINEAX B 811 in housing **S17** clipped onto a top-hat rail (35x15 mm or 35x7.5 mm, acc. to EN 50 022).

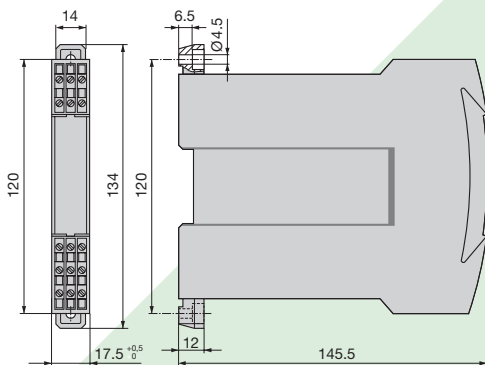


Fig. 10. SINEAX B 811 in housing **S17** screw hole mounting brackets pulled out.

### 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 (only for "Intrinsically safe" explosion-proof devices)

**CAMILLE BAUER**

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