

SINEAX 211

Passive DC Signal Isolator

without power supply

CE₀₁₀₂  II (1) G resp. II (2) G

Application

The DC signal isolator **SINEAX 211** (Fig. 1) serve to isolate **load-independent** DC current signals. It suppressed noise voltages and currents in a signal loop circuit.

Features / Benefits

- Electrically insulated between input and output / Prevents the transfer of interference voltages and currents, overcomes signal connection problems
- Input signal : Output signal = 1 : 1
- No power supply required / No additional wiring and no power supply unit
- Immune to transient voltages
- Single-channel
- Available in type of protection “Intrinsic safety” [EEx ib] IIC (see “Table 2: Data on explosion protection”)



Fig. 1. SINEAX 211 in housing **N** for rail or wall mounting.

Layout and mode of operation

The DC signal isolator comprises a DC chopper **Z**, an isolating stage **T**, a rectifier **G** and a multivibrator **M** (see Fig. 2). The DC chopper converts the load independent DC signal into an AC signal. This signal is passed through a ferrite-core transformer serving as an isolating stage. On the secondary side, it is rectified, smoothed and converted into a load-independent DC signal.

The chopper unit is controlled by a specially designed multivibrator which obtains its power from the input signal.

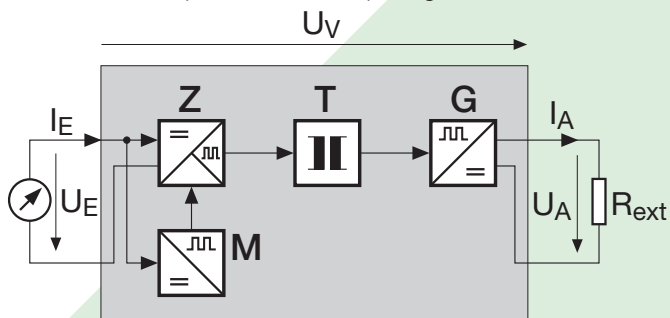


Fig. 2. Schematic diagram.

Technical data

General

MTBF: Approx. 120 000 h per isolator

Input signal **E**

Input current (I_E): Load-independent DC current
0 to 5 mA to 0 to 20 mA,
4 to 20 mA
(all ranges are possible with the same type)

Max. input voltage: $U_E \leq 15$ V (see “Application example, Fig. 10, page 4)

Permissible input ripple: $\leq 10\%$

Voltage loss U_V across signal isolator:
– non-intrinsically safe version approx. 3 V
– intrinsically safe version approx. 6 V

Overload capacity: ≤ 50 mA continuous

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Output signal A $\ominus \rightarrow$

Output signal (I_A):	Load-independent DC current
Transformation ratio:	1 : 1
Residual ripple in output current:	$\leq 0.5\%$ (7 kHz)
Time constant:	Approx. 100 ms
Output load voltage:	$U_A = U_E - U_V$ (Fig. 2)

Accuracy data

Reference value:	20 mA
Deviation from specified characteristic under reference conditions:	Max. $\pm 0.1\%$

Reference conditions:

Ambient temperature	$23\text{ }^\circ\text{C} \pm 1\text{ K}$
Input current I_E	0 to 20 mA
External load R_{ext}	$250\ \Omega$

Additional error:

Dependence on output load	$< +0.1\% / 100\ \Omega$ if $R_{\text{ext}} < 250\ \Omega$ $< -0.1\% / 100\ \Omega$ if $R_{\text{ext}} > 250\ \Omega$
Temperature influence	$< 0.1\% / 10\text{ K}$ for $+10 \leq t \leq +40\text{ }^\circ\text{C}$ $< 0.2\% / 10\text{ K}$ for $-25 \leq t \leq +10\text{ }^\circ\text{C}$ and for $+40 \leq t \leq +55\text{ }^\circ\text{C}$

Installation data

Mechanical design:	Housing type N in plastic for rail or wall mounting. (Dimensions see Section "Dimensional drawings")
Mounting versions:	For snap mounting on G-type rail or cap-type rail (see Section "Dimensional drawings")

Mounting position:	Any
Electrical connections:	Screw terminals with indirect wire pressure, suitable for max. $2 \times 1.5\text{ mm}^2$ or $1 \times 2.5\text{ mm}^2$
Weight:	Approx. 100 g

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: 1994
Max. surge voltage:	5 kV, 1.2/50 μs surge withstand test IEC 255.4 and Surge withstand test, as per IEEE-Std. 472-1975. Common-mode and differential-mode between any two terminals
Electrical design:	Acc. to EN 61 010
Protection:	Housing IP 40 acc. to EN 60 529 Terminals IP 20
Test voltage:	4 kV, 50 Hz, 1 min.

Environmental conditions

Operating temperature:	-25 to $+55\text{ }^\circ\text{C}$ for standard version -20 to $+40\text{ }^\circ\text{C}$ for Ex versions
Storage temperature:	-40 to $+70\text{ }^\circ\text{C}$
Relative humidity of annual mean:	$\leq 75\%$ standard climatic rating $\leq 90\%$ improved climatic rating
Altitude:	2000 m max.
Indoor use only!	

Table 1: Type overview

Description	Type	Article Number
Standard version	84-2I1-10	154 253
Improved climatic rating	84-2I1-10	154 261
Intrinsically safe input	84-2I1-11	154 279
Intrinsically safe output	84-2I1-12	154 287

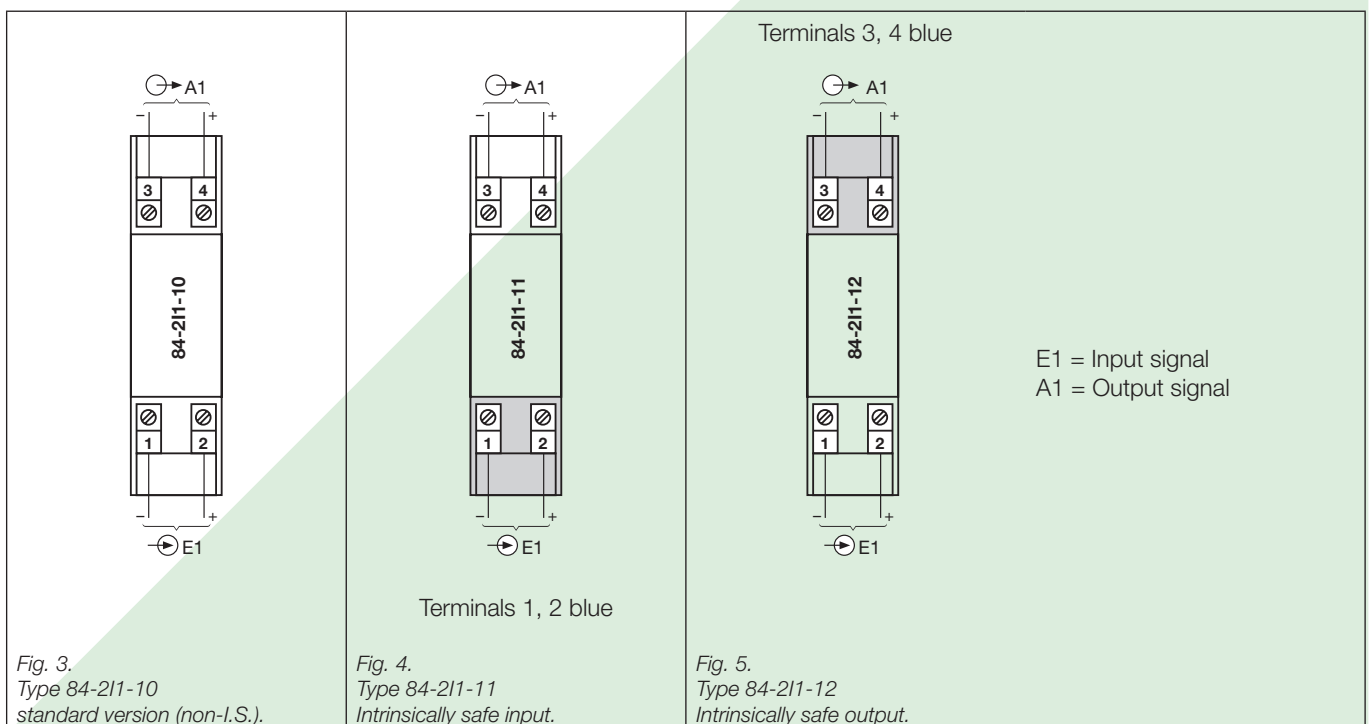
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Table 2: Data on explosion protection Ex II (2) G resp. II (1) G

Type	Article Number	Type of protection	Electrical data acc. to Certificates		Type examination certificate	Mounting location							
			Input	Output									
84-211-11	154 279	[EEx ib] IIC	$L_i = 0$ $C_i = 0$ for connection to certified intrinsically safe circuit with following maximum values: $U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$	$U_m = 253 \text{ V AC}$ resp. 125 V DC	PTB 98 ATEX 2176	Outside the hazardous area							
84-211-12	154 287	[EEx ia] IIC	$U_m = 253 \text{ V AC}$ resp. 125 V DC	$U_o = 12,6 \text{ V}$ $I_o = 100 \text{ mA}$ $P_o = 315 \text{ mW}$ linear characteristic <table border="1"> <thead> <tr> <th></th> <th>IIC</th> <th>IIB</th> </tr> </thead> <tbody> <tr> <td>L_o</td> <td>4 mH</td> <td>15 mH</td> </tr> <tr> <td>C_o</td> <td>1.15 μF</td> <td>7.4 μF</td> </tr> </tbody> </table>				IIC	IIB	L_o	4 mH	15 mH	C_o
	IIC	IIB											
L_o	4 mH	15 mH											
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Electrical connections



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Dimensional drawings

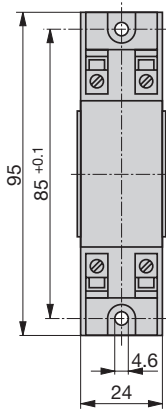


Fig. 6. SINEAX 211 for wall mounting.

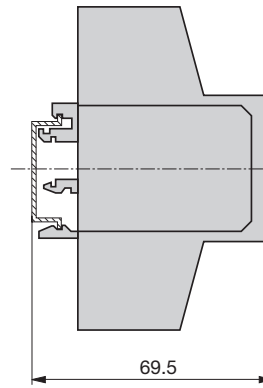
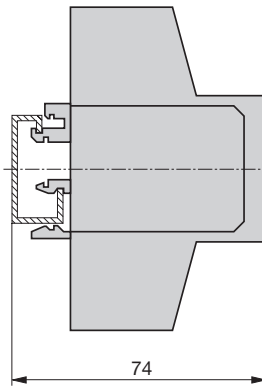
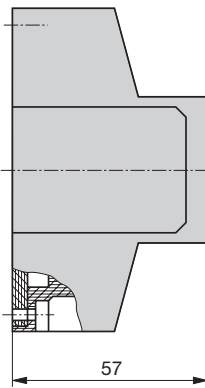


Fig. 8. SINEAX 211 for mounting on cap-type rail, EN 50 022-35 × 7.5.

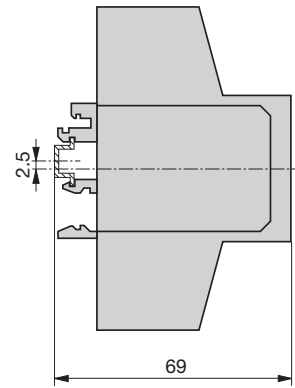


Fig. 9. SINEAX 211 for mounting on cap-type rail, EN 50 045-15 × 5.5.

Application example

The output signal generated by the KINAX 3W2 is needed both for local and remote measurement.

Problem:

Is the burden R2 connected across the output signal of the isolating transformer type 84-211-10 sufficient for local measurement? If not, then use, for example, SINEAX TV 808.

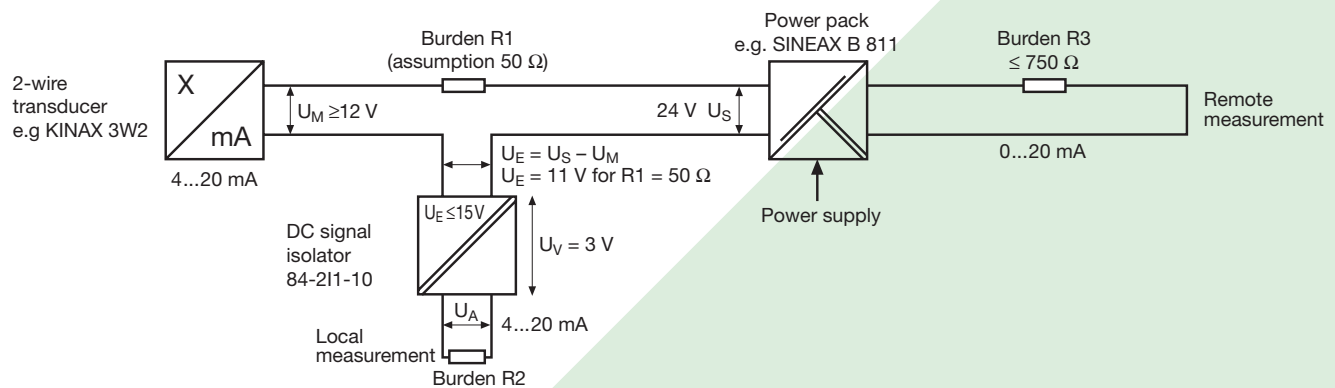


Fig. 10. Typical circuit with an isolating transformer SINEAX 84-211-10, transmitter KINAX 3W2 for angular measurement and a power supply unit SINEAX B 811.

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