

Plug-in module SIRAX TI 807

Passive DC signal isolator

without power supply,
Ex- and non-Ex version

CE 0102  II (1) G resp. II (2) G

Application

The signal isolator **SIRAX TI 807** (Fig. 1) serves to electrically insulate the analogue DC signal in the range 0...20 mA which depending on version is then converted to a current or voltage signal (0...20 mA or 0...10 V). It operates passively and does not require a separate power supply, but derives the little auxiliary energy it needs from the DC signal.

The series of isolators also includes “intrinsically safe” explosion-proof versions with either an intrinsically safe **input** signal [EEx ib] IIC **or** intrinsically safe **output** signal [EEx ia] IIC. They are thus suitable for use in connection with intrinsically safe equipment installed in the hazardous area.

The SIRAX TI 807 is supplied with **two** or **three** channels.

The signal isolator fulfils all the important requirements and regulations concerning electromagnetic compatibility **EMC** and **Safe isolation** (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.

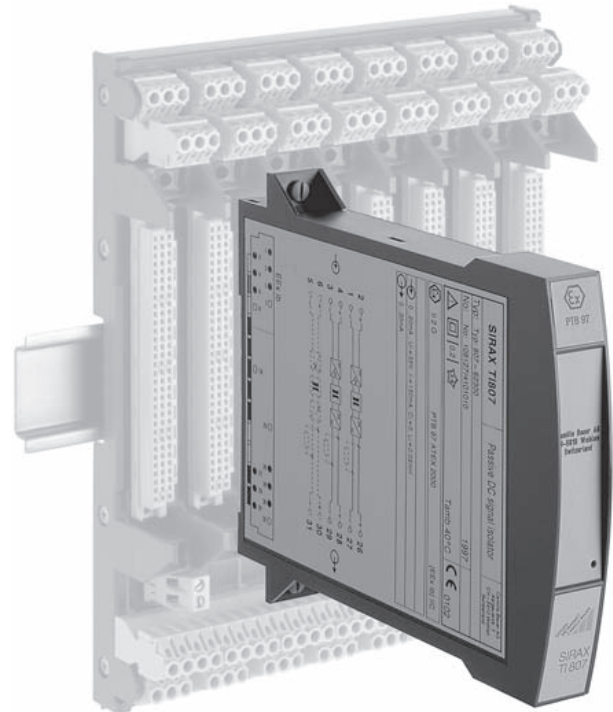


Fig. 1. Plug-in module SIRAX TI 807 for plugging onto backplane BP 902.

Features / Benefits

- **Signal isolator plugs onto backplane** (mechanically latched by fasteners), all electrical connections made to the backplane and not to the SIRAX TI 807 / Thus no wiring when replacing devices
- Electrically insulated analogue DC signals 0...20 mA / Prevents the transfer of interference voltages and currents. Solves grounding problems in meshed signal networks
- Highly accurate / Performs its isolating function with negligible transmission error
- No power supply required / Saves wiring costs and is easy to install in existing plants
- Available in type of protection “Intrinsic safety” [EEx ib] IIC or [EEx ia] IIC (see “Table 5: Data on explosion protection”)

Layout and mode of operation

Description of a function unit.

The DC signal isolator comprises a DC chopper Z, an isolating stage T, a rectifier G and an oscillator O.

The chopper converts the DC input signal $E = 0...20$ mA to an AC signal which is transformed with electrical insulation, rectified, smoothed and appears at the output as a DC **current** signal $A = 0...20$ mA (Fig. 2, left). Versions with a DC output **voltage** signal $A = 0...10$ V have a resistive burden of 500Ω (Fig. 2, right).

The chopper is controlled by the oscillator which obtains its power from the DC signal.

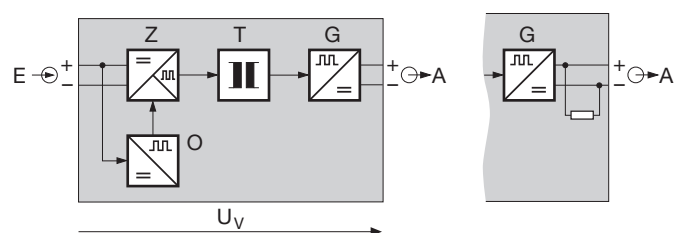


Fig. 2. Block diagram for a function unit.

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Passive DC signal isolator

Technical data

Input signal E

DC current signal I_E :	0...20 mA
Max. permissible current:	50 mA
Voltage limiter:	Non-Ex version: 27 V \pm 5% (with zener diode) Ex version: 18 V, \pm 5%

Output signal A

(DC current or DC voltage)

DC current signal I_A : 0...20 mA

Voltage drop U_V :

< 2.8 V	with standard (non-Ex) version
< 4.7 V	with Ex versions (input signal(s) "intrinsically safe")
< 6.3 V	with Ex versions (output signal(s) "intrinsically safe")

Max. burden:

1000 Ω	with standard (non-Ex) version
500 Ω	with Ex versions (input signal(s) "intrinsically safe")
500 Ω	with Ex versions (output signal(s) "intrinsically safe")

Limit: Approx. 40 mA

Residual ripple: < 20 mV ss

Time constant: Approx. 3 ms

Response time¹
acc. to IEC 770: Approx. 15 ms

DC voltage signal U_A : 0...10 V

Voltage drop U_V :

< 2.8 V	with standard (non-Ex) version
< 4.7 V	with Ex versions (input signal(s) "intrinsically safe")
< 6.3 V	with Ex versions (output signal(s) "intrinsically safe")

Internal resistance: 500 Ω

Limit:

< 26 V	with standard (non-Ex) version
< 16 V	with Ex versions (input signal(s) "intrinsically safe")
< 16 V	with Ex versions (output signal(s) "intrinsically safe")

Residual ripple: < 20 mV ss

Time constant: Approx. 3 ms

Response time¹
acc. to IEC 770: Approx. 15 ms

Accuracy data

Error limits:	< \pm 0.1% (Reference value 20 mA of output signal, typical linearity error included)
	< \pm 0.2% (Reference value 10 V of output signal, typical linearity error included)

Reference conditions

DC current signal I_E :	0...20 mA
Ambient temperature:	23 °C \pm 1 K
Output burden:	250 Ω (at DC current output signal) \geq 5 M Ω (at DC voltage output signal)

Additional error

Burden influence: < 0.05% / 100 Ω
(at DC **current** output signal)

Temperature coefficient: < 50 ppm/K

Installation data

Housing: Signal isolator in housing B17 for plugging onto backplane BP 902. Refer to Section "Dimensional drawings" for dimensions

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

Designation: SIRAX TI 807

Mounting position: Any

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

Coding: Signal isolator supplied already coded.

The rack is coded by the user by fitting the coding inserts supplied

Weight: Approx. 0.17 kg

¹ This is the time which transpires before the output signal reaches the error limit of 1% for a step change of the input signal from 0 \rightarrow 90%.

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Passive DC signal isolator

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 design:	Acc. to IEC 1010 resp. EN 61 010
Protection (acc. to IEC 529 resp. EN 60 529):	Housing IP 40 Terminals IP 00
Contamination level:	2
Overvoltage category acc. to IEC 664:	II
Test voltage:	2.3 kV, 50 Hz, 1 min. Inputs versus outputs Inputs versus inputs Outputs versus outputs

Surge voltage:	4.25 kV, 1.2/50 μ s Inputs versus outputs Inputs versus inputs Outputs versus outputs
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Ambient conditions

Commissioning temperature:	-10 to +40 °C
Operating temperature:	-25 to +40 °C, Ex -20 to +40 °C
Storage temperature:	-40 to +70 °C
Annual mean relative humidity:	\leq 75%

Standard versions

The following signal isolators are available in standard versions. It is only necessary to quote the **Order No.:**

Table 1: Instruments in standard (non-Ex) version (input and output signal non intrinsically safe)

Description	Number of isolation channels	Output signal	Order Code	Order No.
Passive DC signal isolator , standard (non-Ex) version, input signal 0...20 mA	2 channels	0...20 mA	807 – 6120	973 950
	3 channels	0...20 mA	807 – 6130	108 044

Table 2: Instruments in [EEx ib] IIC version (input signal intrinsically safe)

Description	Number of isolation channels	Output signal	Order Code	Order No.
Passive DC signal isolator , [EEx ib] IIC, input signal intrinsically safe 0...20 mA, output signal non intrinsically safe	2 channels	0...20 mA	807 – 6220	108 119
	3 channels	0...20 mA	807 – 6230	108 127

Table 3: Instruments in [EEx ia] IIC version (output signal intrinsically safe)

Description	Number of isolation channels	Output signal	Order Code	Order No.
Passive DC signal isolator , [EEx ia] IIC, input signal non intrinsically safe 0...20 mA, output signal intrinsically safe	2 channels	0...20 mA	807 – 6620	108 078
	3 channels	0...20 mA	807 – 6630	108 068

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Passive DC signal isolator

Table 4: Order informations (see also Tables 1 to 3: "Standard versions")

DESCRIPTION	MARKING
1. Mechanical design Housing B17 (for plugging onto backplane BP 902, see data sheets BP 902)	807 - 6
2. Version 1) Standard (non-Ex) 2) [EEx ib] IIC, input signals intrinsically safe 6) [EEx ia] IIC, output signals intrinsically safe	1 2 6
3. Number of isolation channels 2) 2 channels 3) 3 channels	2 3
4. Output signals (A1 and A2 or A1, A2 and A3) 0) 0 ... 20 mA 2) 0 ... 10 V, 2 channels 3) 0 ... 10 V, 3 channels	0 2 3

Possible special versions, e.g. increased climatic rating on inquiry

Table 5: Data on explosion protection  II (2) G resp. II (1) G

Order Code	Type of protection	Input	Output	Type examination certificate	Mounting location							
807-62...	[EEx ib] IIC	$L_i = 0.03 \text{ mH}$ $C_i = 0$ for connection to certified intrinsically safe circuit with following maximum values: $U_o \leq 30 \text{ V}$ $I_o \leq 100 \text{ mA}$	$U_m = 253 \text{ V AC}$ resp. 125 V DC	PTB 97 ATEX 2102	outside the hazardous area							
807-66...	[EEx ia] IIC	$U_m = 253 \text{ V AC}$ resp. 125 V DC	$U_o = 15.75 \text{ V}$ $I_o = 100 \text{ mA}$ $P_o = 400 \text{ mW}$ 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>478 nF</td> <td>2.88 μF</td> </tr> </tbody> </table>				IIC	IIB	L_o	4 mH	15 mH	C_o
	IIC	IIB										
L_o	4 mH	15 mH										
C_o	478 nF	2.88 μF										

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Passive DC signal isolator

Electrical connections

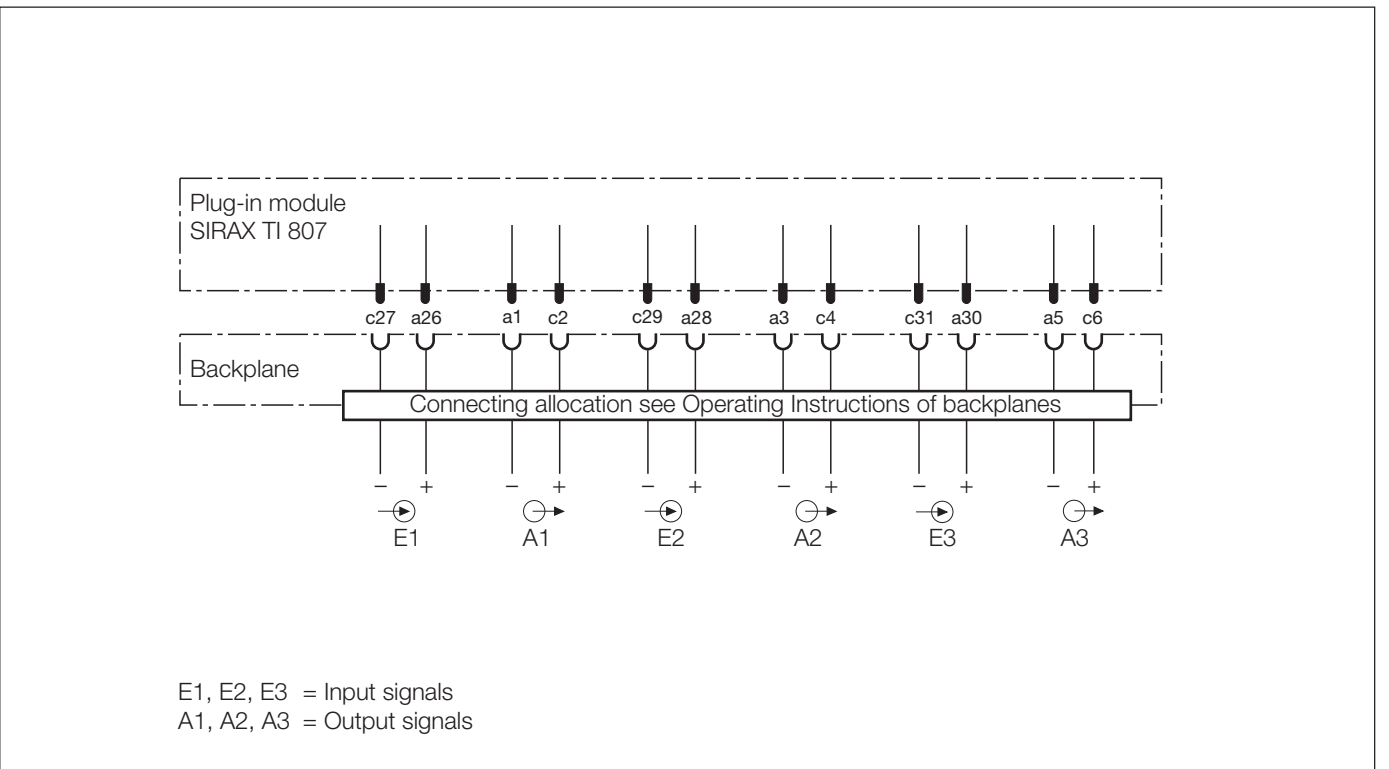
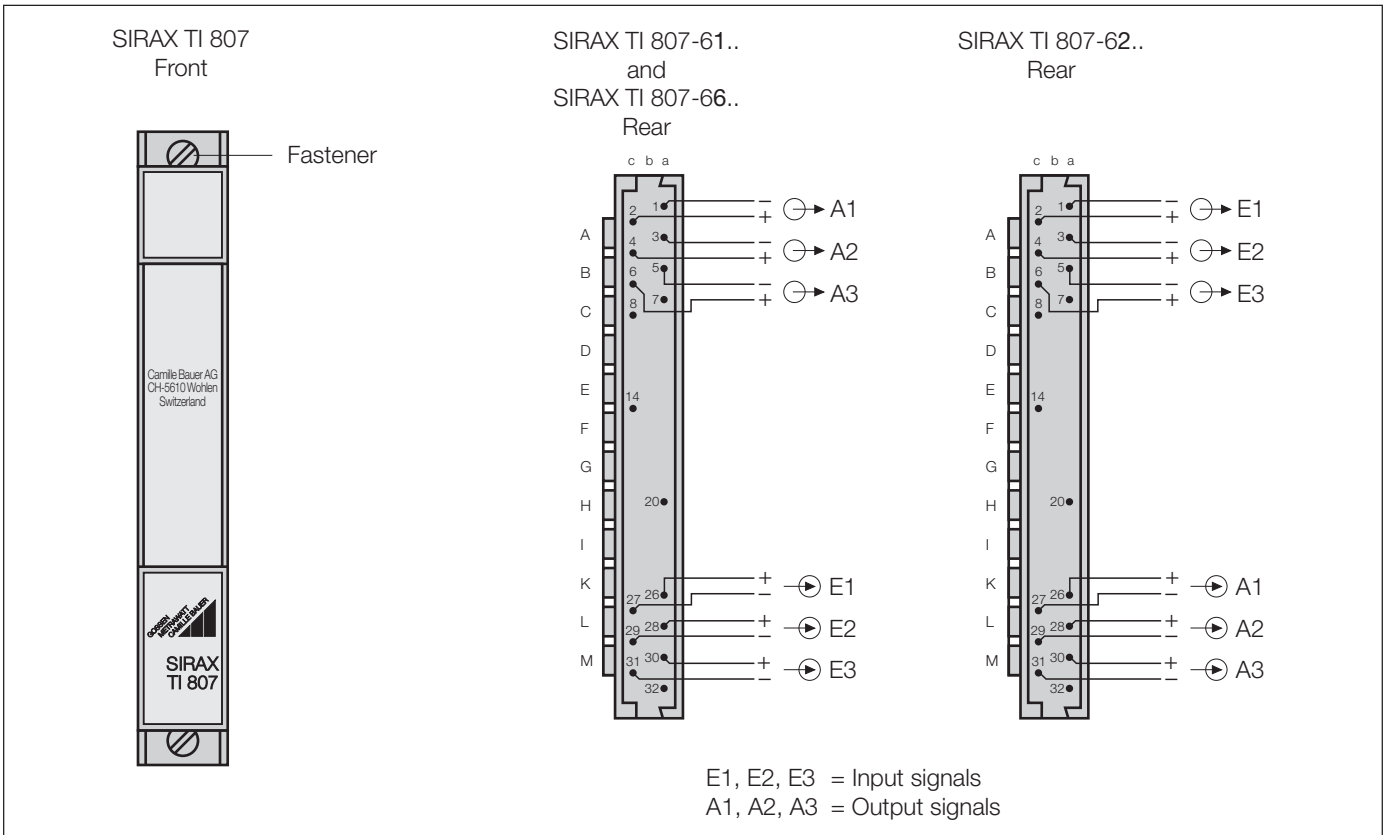


Fig. 3. SIRAX TI 807-61..., standard (non-Ex) version
and
SIRAX TI 807-66..., Ex version, (output signals intrinsically safe).

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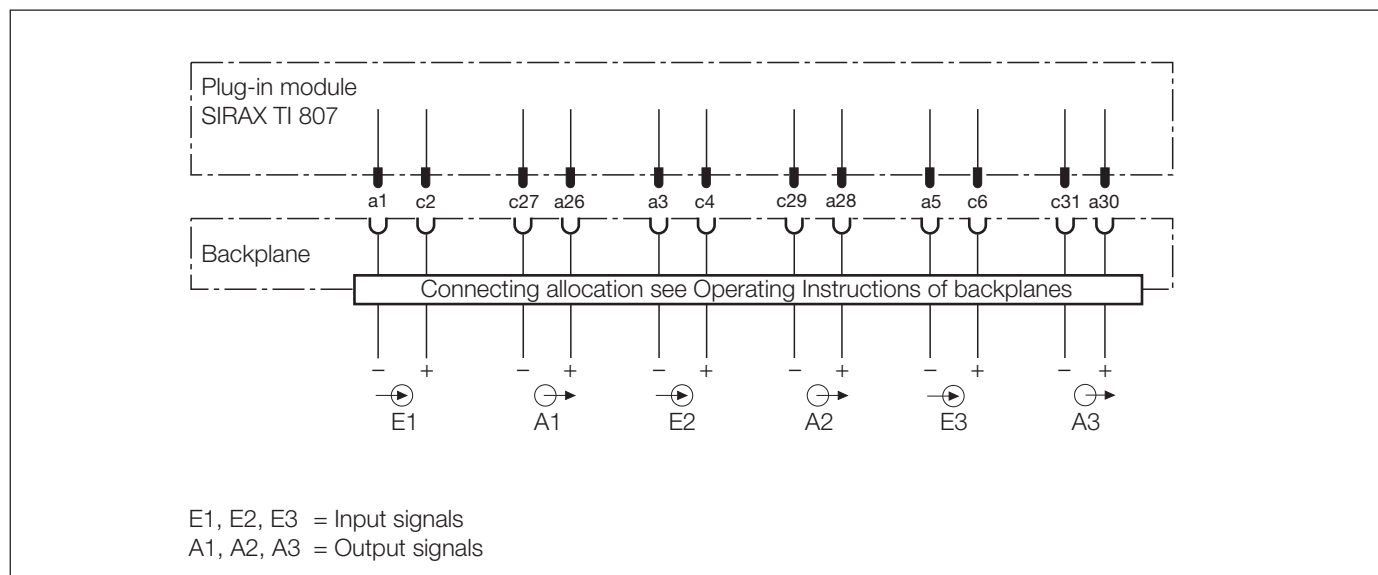


Fig. 4. SIRAX TI 807-62., Ex version, (input signals intrinsically safe).

Table 6: Accessories and spare parts

Description	Order No.
Coding comb with 12 sets of codes (for coding the backplane BP 902)	107 971
Operating Instructions TI 807-6 B d-f-e	108 151

Standard accessories

- 1 Operating Instructions for SIRAX TI 807, in three languages: German, French, English
- 1 Coding comb with 12 sets of codes
- 1 Type examination certificate (only for instruments in type of protection "Intrinsically safe")

Dimensional drawing

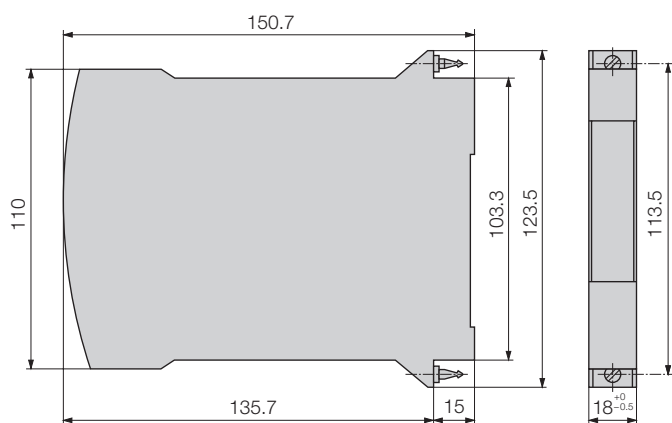


Fig. 5. SIRAX TI 807 in housing B17.