Plug-in module SIRAX SI 815
Passive DC signal isolator

with power supply transfer and without separate power supply connection, versions available for FSK[1], Ex and non-Ex versions

CE 0102 Ex II (1) G

Application

The signal isolator **SIRAX SI 815** (Fig. 1) serves to electrically insulate the 4…20 mA input circuit of a 2-wire transmitter. It performs two tasks at the same time. Firstly it provides electrical insulation and secondly it conducts the power supply needed for measurement to the 2-wire transmitter without injecting into the circuit itself. Thus the isolator does not require an power supply connection itself.

Some versions of the SIRAX SI 815 are **designed for FSK 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. This operate in conjunction with intrinsically safe 2-wire transmitters located in hazardous areas.

The signal isolator is supplied with **two** transmitter channels.

The SIRAX SI 815 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.

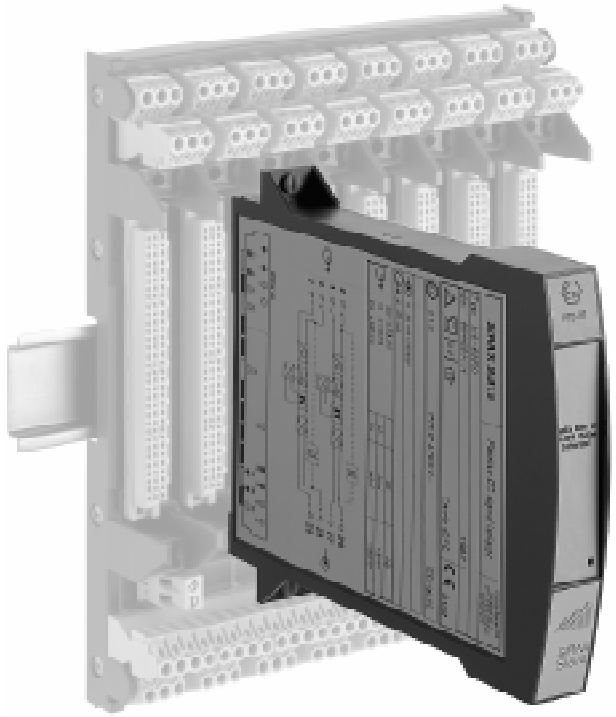

Fig. 1. Plug-in module SIRAX SI 815 for plugging onto backplane BP 902.

Features / Benefits

- **SIRAX SI 815 plugs onto backplane** (mechanically latched by fasteners)**, all electrical connections made to the backplane and not to the SIRAX V 644 / Thus no wiring when replacing devices**
- **Electrically insulated output and input signal / Prevents the transfer of interference voltages and currents, overcomes signal connection problems**
- **Output signal ≙ Input signal: 4…20 mA**
- **Transmission of the power supply for 2-wire transmitters / Simple low-cost instrumentation**
- **No power supply required / Saves having to run and connect power supply leads**
- **Suitable for transmitting analogue 4…20 mA signals frequency-modulated by digital signal (FSK communication) / Enables operation in conjunction with an "intelligent" 2-wire transmitter designed for FSK and a HART or company-specific protocol**
- **"Intrinsically safe" version [EEx ia] IIC** (see "Table 2: Data on explosion protection")

[1] *FSK = **F**requency **S**hift **K**eying*

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Layout and mode of operation

The description below refers to a SIRAX SI 815 designed for FSK communication.

The signal isolator comprises a series regulator LR, a DC chopper Z, an isolating stage T, a rectifier G, an oscillator O and a FSK converter W (see Fig. 2). E signifies the input signal[1] and A the output signal[1].

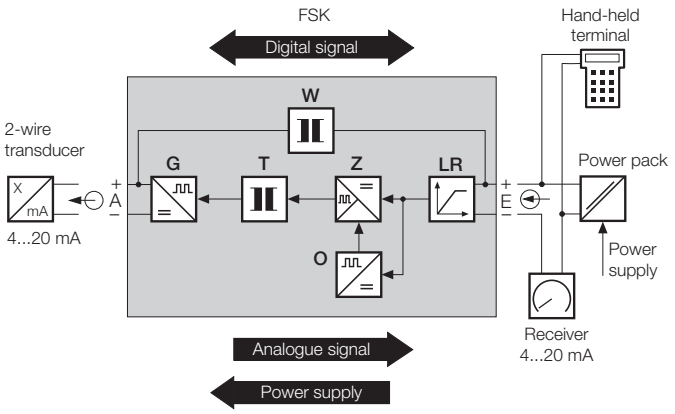

Fig. 2. Block diagram.

The series regulator limits the voltage of the impressed 4…20 mA input signal E to approx. 22 V and the chopper Z converts it to an AC signal. The latter can pass the transformer in the isolating stage and is then rectified again and smoothed to obtain the impressed analogue 4 … 20 mA output signal.

The chopper is controlled by the oscillator which draws its power supply from the input signal.

The FSK converter in the bypass provides the electrical insulation and transmits the frequency-modulated digital signal which is superimposed on the analogue 4 … 20 mA signal of the "intelligent" 2-wire transmitter and used to set its parameters and for requesting the transfer of measurements or status data.

While the digital signal is transferred by the SIRAX SI 815 in **both** directions to support a dialogue with the 2-wire transmitter, the analogue signal and the power supply only flow in **one** direction The analogue signal, however, passes the signal isolator from the transmitter side to the supply/receiver side and the power supply in the opposite direction.

The power supply is provided either by an **active** receiver (display, recorder, limit monitor and/or controller **with** integrated 4…20 mA measurement/**supply** module, PLC, PLS etc.) or a power supply unit in series with a **passive** receiver (see Fig. 2).

[1] *"Input" and "output" in this case refer to the direction of power supply flow.*

Technical data

Input signal E

(Input circuit between signal isolator and power pack)

DC current signal I_E: 4 … 20 mA

Voltage U_E: 12 … 30 V DC

Overload capacity: ≤ 50 mA continuous

Output signal A

(Input circuit between signal isolator and 2-wire transmitter)

DC current signal I_A: 4 … 20 mA

Voltage U_A (for I_E = 20 mA and U_E = 22 V):

> 19.3 V	with standard (non-Ex) version, not designed for communications protocol
> 18.5 V	with standard (non-Ex) version, designed for FSK communication
> 14.3 V	with Ex versions, not designed for communications protocol
> 13.3 V	with Ex versions, designed for FSK communication

Voltage drop $U_V = U_E - U_A$ (at U_E) 12 … 22 V):

< 2.7 V	with standard (non-Ex) version, not designed for communications protocol
< 3.5 V	with standard (non-Ex) version, designed for FSK communication
< 7.7 V	with Ex versions, not designed for communications protocol
< 8.7 V	with Ex versions, designed for FSK communication

Residual ripple: < 20 mV ss (120 kHz)

Time constant: Approx. 5 ms

Accuracy data

Error: < ± 0.2%
(Reference value 20 mA of output signal, including typical linearity error < ± 0,1%)

Reference conditions

DC current signal I_E: 4 … 20 mA DC

Ambient temperature: 23 °C, ± 1 K

Voltage U_E: 12 … 30 V DC

Additional error

Temperature coefficient: < 50 ppm/K

Installation data

Mechanical design:	Signal isolator in housing B17 for plugging onto backplane BP 902. Refer to Section "Dimensional drawing" 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 SI 815
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:

ca. 170 g	With 2 isolation and transmission channels, without FSK communication
ca. 190 g	with FSK communication

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
Rated insulation voltage:	253 V AC
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
Impulse withstand voltage:	4.25 kV, 1.2/50 µs Inputs versus outputs Inputs versus inputs Outputs versus outputs

Ambient conditions

Climatic rating:	Climate class 3Z acc. to VDI/VDE 3540
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:	≤ 75%

Table 1: Ordering informations (see also "Table 3: Standard versions")

DESCRIPTION	MARKING
1. Mechanical design Housing B17 (for plugging onto backplane BP 902, see data sheets BP 902)	815 - 6
2. Version 1) Standard (Non-Ex) 2) [EEx ia] IIC, outputs intrinsically safe	 1 2
3. Number of isolation and transmission channels 2) 2 channels (interface)	 2
4. Field communications protocol 0) Without FSK communication 2) With FSK communication, 2 channels	 0 2

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

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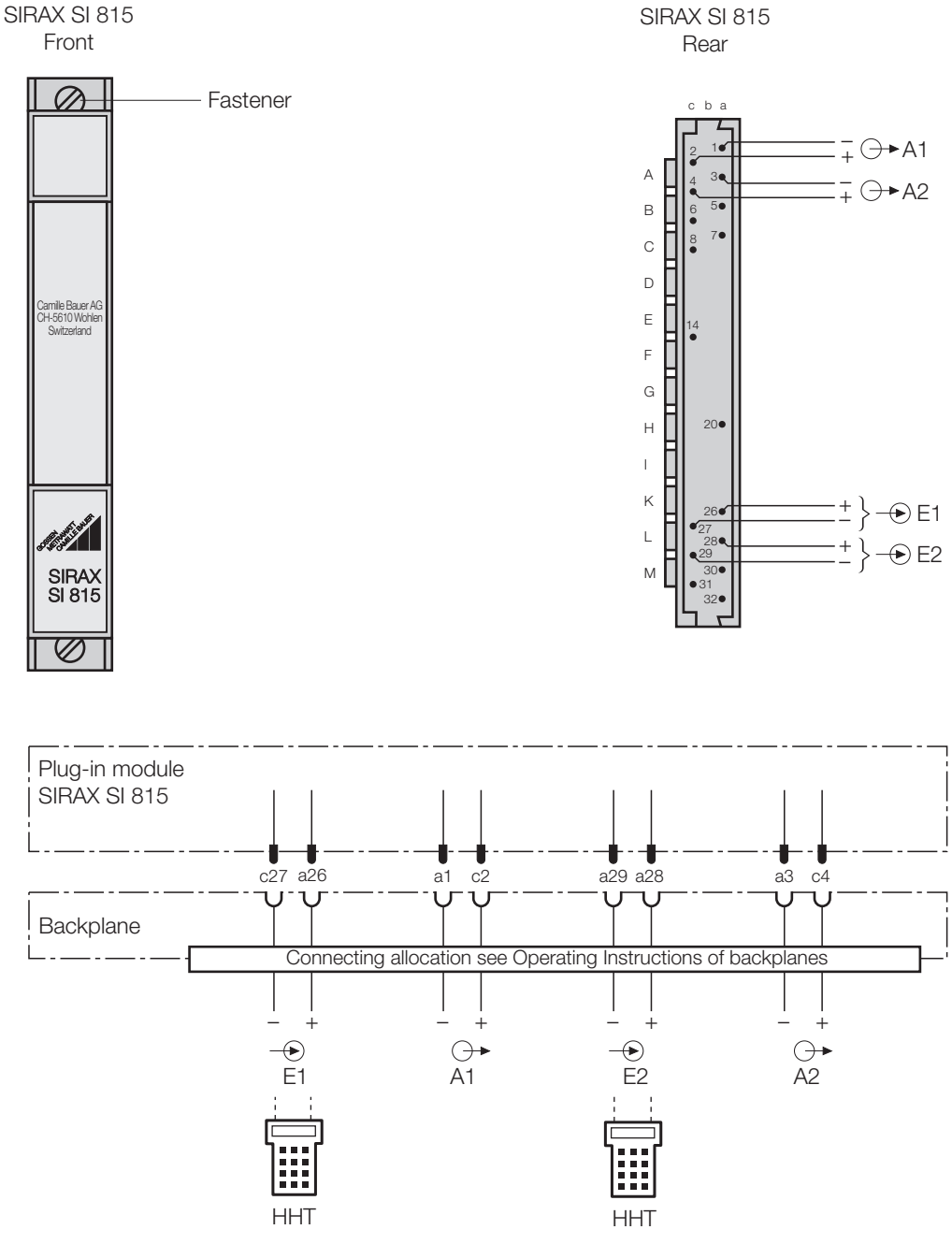
Electrical connections



E1 = Input 1 E2 = Input 2
A1 = Output 1 A2 = Output 2
HHT = Hand-held terminal

SIRAX SI 815-612. , Standard (non-Ex) version
and
SIRAX SI 815-622. , Ex version (output signals A1 and A2 “intrinsically safe”)

Table 2: Data on explosion protection ⟨Ex⟩ II (1) G

Order Code	Type of protection	Output	Input	Type Examination Certificate	Mounting location
815-622.	[EEx ia] IIC	**U_o = 23.1 V** **I_o = 100 mA** **P_o = 580 mW** linear characteristic IIC: L_o 4 mH, C_o 140 nF IIB: L_o 15 mH, C_o 1.02 µF	U_m = 253 V AC resp. 125 V DC	PTB 97 ATEX 2101	**Outside** the hazardous area

Table 3: Accessories and spare parts

Description	Order No.
Coding comb with 12 sets of codes (for coding the backplane BP 902)	107 971
Operating Instructions SI 815-6 B d-f-e	108 242

Standard accessories

1 Operating Instructions for SIRAX SI 815 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

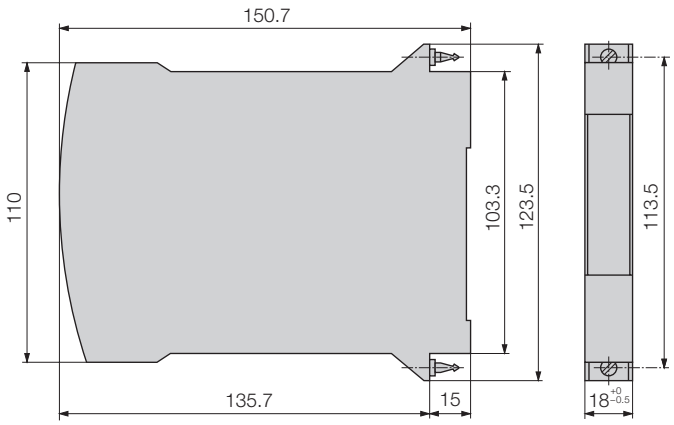


*Fig. 3. SIRAX SI 815 in housing **B17.***

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Camille Bauer Ltd
Aargauerstrasse 7
CH-5610 Wohlen/Switzerland
Phone +41 56 618 21 11
Fax +41 56 618 24 58
Telex 827 901 cbm ch