



## Intrinsically safe barrier S2Ex-SBS CIRCUITS SEPARATOR

with bistate intrinsically safe output,

- “group I”, “category (M1)” and “group II and III”, “category (1)” accompanying device  
- Intrinsically safe output circuit of “ia” protection level – ATEX compliance

- EC-Type Examination Certificate: KDB 04ATEX120

FEATURE II (1) G [Ex ia] IIC, II (1) D [Ex ia] IIIC Protection Level IP20

I (M1) [Ex ia] I

Operating temperature range -30..+70°C

- Intrinsically safe output circuit can operate with any intrinsically safe circuit of a device installed in hazardous zone “0, 1, 2, 20, 21, 22” of any explosive mixtures.
- Input and power supply circuits can operate with non-intrinsically safe circuits of devices with voltage  $U_m=253V$  e.g. supplied from 230Vac network.
- The separator can be installed in only in an explosion safe, dry and dust free room that is protected against access of people not trained in maintenance and operation of the separator.
- The separator can be mounted in hazardous zone in flameproof enclosure. Using in first (I) explosive group does not require putting warning on the enclosure. After turning off the supply it can be taken out of the enclosure without delay. In case of using it in II and III explosive group, on outer part of the enclosure must be warning: “Do not open the enclosure within 10 minutes after turning off the power”.

### Application:

The separator S2Ex-SBS transmits state of the input bistate signal from safe zone to adequate state of output relay contacts operating with explosion hazardous zone.

The separator is designed to galvanically separate input circuit in a safe zone from output circuit operating with devices installed in hazardous zone.

Typical application is driving (also PWM 150Hz signal) devices installed in hazardous zone e.g. solenoid valves, sound sirens and light indicators. Using of the separator allows driving devices in hazardous zone from any common devices installed in safe zone.

### Ordering code

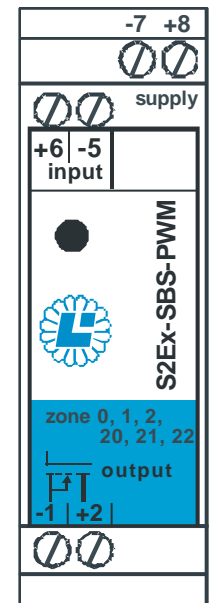
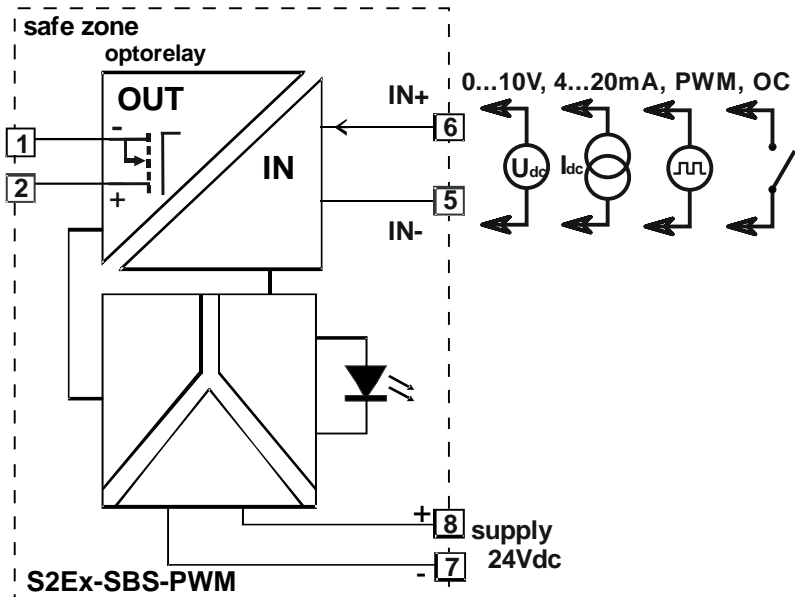
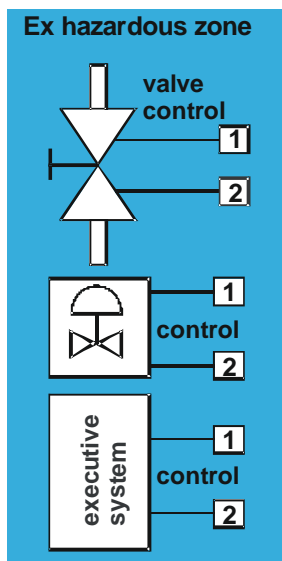
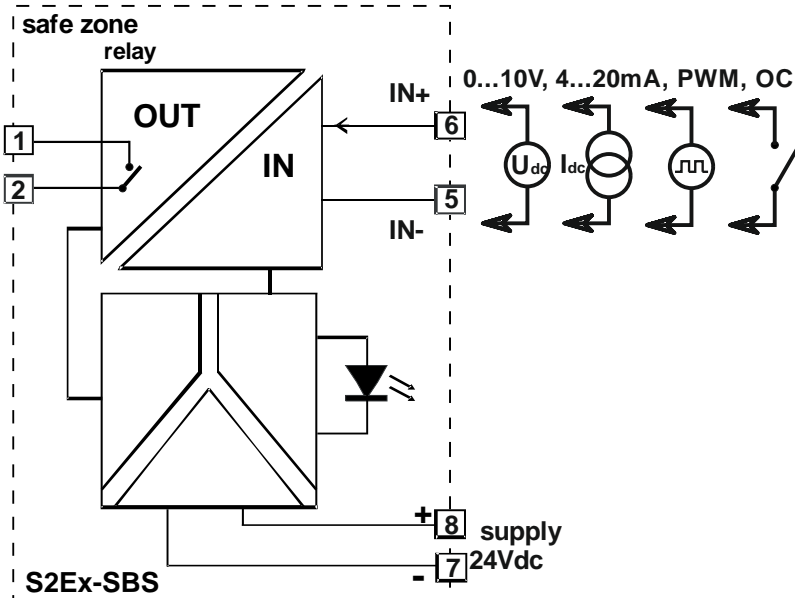
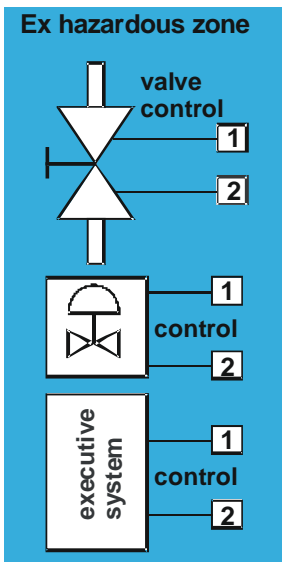
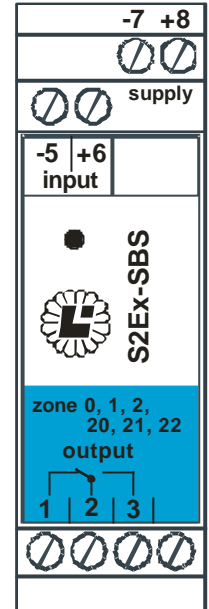
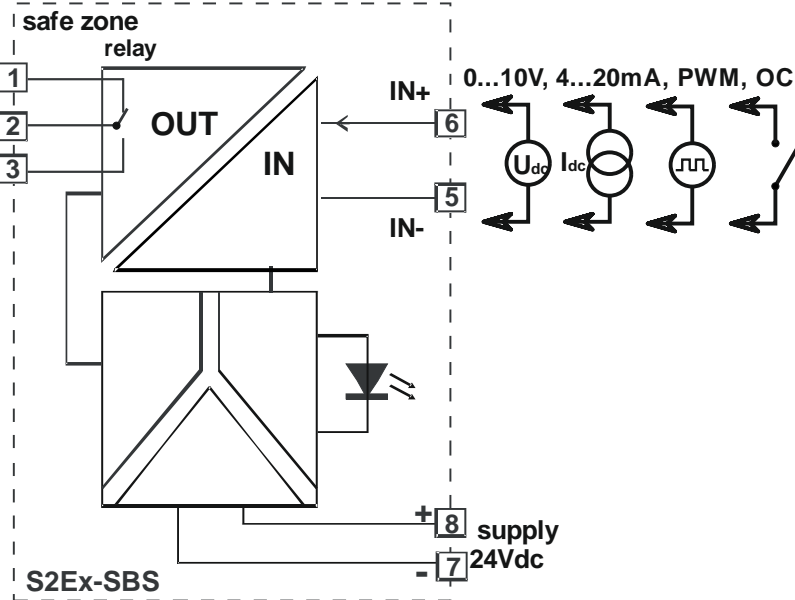
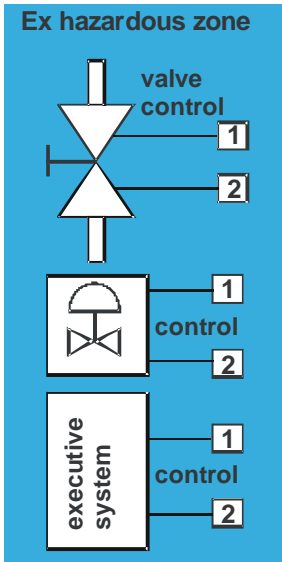
S2Ex-SBS separator with relay output  
input signal description  
specify switching level  
specify hysteresis  
describe output switching phase  
detailed description when PWM

### Order example:

Separator with bistate output S2Ex-SBS,  
input signal 0÷10V, switching level 5V, hysteresis 1V,  
 $U_{in}<4,5V \Rightarrow$  output in state OFF: type S2Ex-SBS

### Technical data:

Input signal	- any active bistate or analog signal (also PWM) or switch (e.g. 0/24V, NAMUR, OC)
Input resistance	
for current signals	- 50 $\Omega$
for voltage signals	- $\geq 100$ k $\Omega$
switching level	- to be agreed
hysteresis	- to be agreed
Output signal	- relay's state: opened or closed
to Ex zone	
Switching parameters	
S2Ex-SBS-relay	- switching contact: - 1A/(24÷30Vdc); 0.5A/(30÷60Vdc); 5A/60Vac; $t_{ON}=5ms, t_{OFF}=3ms \Rightarrow 20$ Hz
S2Ex-SBS-PWM	- 150 Hz 12V/0.5A; 24V/0.2A
output switching phase	- to be agreed
Power supply voltage	- 20V ÷ 27V (max 30V), 60 mA Can be lower if agreed.
<b>Note: If supply voltage exceeds 28V the fuse of the protection barrier may be burnt – repair only by the manufacturer</b>	
Galvanic separation of the circuits	- all circuits mutually separated from each other
Isolation voltage test between supply, input and output	- 2,5 kV, 50Hz or equivalent
Housing dimensions: 22.5 mm x 99 mm x 114.5 mm (width x height x depth)	



Intrinsically safe parameters for S2Ex-SBS – output circuit of “ia” protection level:

Transmits state of the input bistate signal from safe zone to adequate state of relay contacts operating with a device in hazardous zone.

a) Intrinsically safe contacts of output circuit (**terminals 1-2-3**) of “ia” protection level can operate with any intrinsically safe circuit installed in explosion hazardous zone. Intrinsically safe contacts are “simple device” with parameters **U<sub>o</sub>=0, I<sub>o</sub>=0, P<sub>o</sub>=0, C<sub>i</sub>≈0, L<sub>i</sub>≈0.**

Contacts do not generate or storage any energy and can be connected to any intrinsically safe circuit with parameters as given above.

b) Intrinsically safe parameters of connected bistate circuit: “**output**” – **terminals “1, 2, 3”** with “ia” protection level: **L<sub>i</sub>=0, C<sub>i</sub>=0.**

Version	U <sub>i</sub>	I <sub>i</sub>
S2Ex-SBS	≤ 24V <sub>DC</sub>	≤ 5 A <sub>DC</sub>
	24V <sub>DC</sub> - 30V <sub>DC</sub>	1 A <sub>DC</sub>
	30V <sub>DC</sub> - 60V <sub>DC</sub>	0,5 A <sub>DC</sub>
	≤ 60V <sub>AC</sub>	5 A <sub>AC</sub>

c) Non-intrinsically safe circuits parameters:

“**input**” – **terminals “5-6”** and “**supply**” - **terminals “7-8”**: **U<sub>m</sub>=253V.**

Application condition:

The maximum values of capacitance and inductance attached to the intrinsically safe terminals “1-2-3” of the separator should be chosen taking safety parameters of the attached circuits (C<sub>o</sub>, L<sub>o</sub>, L/R given in conditions of application of device which will be driven by output of the S2Ex-SBS separator).

Output circuit of the S2Ex-SBS separator (terminals 1-2-3) can operate with any intrinsically safe circuit of a device installed in zone “0, 1, 2” of explosive mixtures with air, belonging to explosion group IIA, IIB, IIC and in zone “20, 21 and 22” of dust explosion hazard (group III).

Input terminals “5, 6” and supply terminals “7, 8” can operate with non-intrinsically safe circuits of a device with voltage **U<sub>m</sub>=253V** e.g. supplied from 230Vac network.

Separator’s housing is made of self-extinguishing plastic (poliamid PA 6.6) and can be mounted on TS35 rail. The housing and terminals are IP20 made.

Outer connections should be connected using cables with diameter 0,5 ÷ 2.5 mm<sup>2</sup>.

ATEX compliance - directive 94/9/WE: PN-EN 60079-0:2013, PN-EN 60079-11:2012.

EMC requirements - PN-EN 61000-6-1, PN-EN 61000-6-3 Safety requirements - PN-EN 61010-1:2002

In general cables and wires of intrinsically safe circuits should be led separately regarding to non-intrinsically safe cables and wires. If intrinsically safe cable is shielded and is blue it can be in cable trays together with other non-intrinsically safe cables. Shield of the cable should be connected to the ground PE only from one side e.g. only in safe zone with a wire of 2,5mm<sup>2</sup> diameter. Maintain a distance of 50mm from the end of the shield braid to the stripped ends of the cable cores in both the hazardous and safe zones. Put the crimping sleeves on the stripped ends of the cable cores. If in a multicore intrinsically safe cable are several intrinsically safe circuits the cables must be of A or B type with insulation test of 500V and the insulation cannot be thinner than 0.2mm. Cables and wires must be permanently fixed and protected against the possibility of mechanical damage. It is recommended to use blue cables. Compare the parameters U<sub>o</sub>, I<sub>o</sub>, P<sub>o</sub>, C<sub>o</sub>, L<sub>o</sub>, U<sub>i</sub>, I<sub>i</sub>, P<sub>i</sub>, C<sub>i</sub>, L<sub>i</sub> (L, C of the cable and L<sub>i</sub>, C<sub>i</sub> of the device installed in the hazardous area).

If the L, C clustered parameters in the connected circuit (and this is how the L<sub>i</sub>, C<sub>i</sub> parameters of the connected device should be treated) exceed 1% of the L<sub>o</sub>, C<sub>o</sub> value, for the calculation should be taken of the L<sub>o</sub>, C<sub>o</sub> parameters given in the certificate for the clustered values. If such parameters are not provided, then half of the C<sub>o</sub>, L<sub>o</sub> value from the certificate should be taken for calculations with the assumption that the C<sub>o</sub> value cannot exceed 1 μF for groups I, IIA, IIB and III and 0.6 μF for IIC.

If a "simple device" made of plastic is installed in the hazardous area, the risk of electrostatics should be assessed. In the case of cable routes with high energy (power grid) or interferences, cables with measurement signals susceptible to the impact of interferences, apart from the use of shielded twisted-pair cables, should be led at a distance, e.g. in a separate tray, and the routes crossing each other should be at right angles.

Operation condition:

Ambient temperature - for storage	-	-30 ÷ +70°C
Ambient temperature - operation	-	-30 ÷ +70°C
Relative humidity	-	max 90%
Ambient atmosphere	-	no dust and aggressive gases
Working position	-	any