



SC12EX - INTRINSICALLY SAFE PROFIBUS-DP SEGMENT COUPLER (RS485-IS)



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- Induktive Sensoren für Schwenkantriebe
- uprox*® induktive Sensoren
- Kapazitive Sensoren
- Magnetfeldsensoren
- Opto-Sensoren
- Geräte für den Personenschutz
- Ultraschall-Sensoren
- levelprox*-Füllstandssensoren
- Strömungswächter
- Druckwächter
- Temperaturwächter
- Linearweg-Sensoren
- Drehweg-Sensoren
- Steckverbinder
- CD-ROM Sensortechnik

Interfacetechnik

- Interfacetechnik im Aufbaugehäuse
 - Bauform *multimodul*
 - Bauform *multisafe*®
- Allgemeine Informationen
- Interfacetechnik auf 19"-Karte
 - Bauform *multicart*®
- Miniaturrelais, Industrirelais, Zeitwürfel, Sockel
- Zeit- und Überwachungsrelais
- Ex-Schutz - Grundlagen für die Praxis (Übersichtsposter)
- CD-ROM Interfacetechnik

Feldbustechnik

- busstop*®-Feldbuskomponenten
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- Bussystem *sensoplex*®2Ex
- Bussystem *sensoplex*®MC
- Bussystem AS-Interface®
- Bussystem DeviceNet™
- Ethernet Netzwerkkomponenten
- BL20 I/O-Busklemmensystem
- Bussystem FOUNDATION™ fieldbus
- Bussystem PROFIBUS-DP
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Sensors

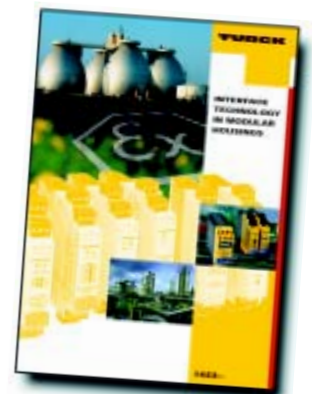
- inductive sensors
- inductive sensors for rotary actuators
- uprox*® inductive sensors
- capacitive sensors
- magnetic-field sensors
- photoelectric sensors
- machine safety equipment
- ultrasonic sensors
- levelprox* level sensors
- flow controls
- pressure controls
- temperature controls
- linear position sensors
- rotary position sensors
- connectors
- CD-ROM Sensors

Interface technology

- devices in modular housings
 - *multimodul* style
 - *multisafe*® style
- general information
- devices on 19" card
 - *multicart*® style
- miniature relays, industrial relays, time cubes, sockets
- programmable relays and timers
- explosion protection - basics for practical application (overview poster)
- CD-ROM Interface technology

Fieldbus technology

- busstop*® fieldbus components
- bus system *sensoplex*®2
- bus system *sensoplex*®2Ex
- bus system *sensoplex*®MC
- bus system AS-Interface®
- bus system DeviceNet™
- Ethernet network components
- BL20 I/O bus terminal system
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SC12EX - INTRINSICALLY SAFE PROFIBUS-DP SEGMENT COUPLER (RS485-IS)



- I.S. barrier between RS485 and RS485-IS

- 2 x RS485-IS for up to 62 additional modules or 32 modules in case of line redundancy

- Conversion of redundant line to single line configuration

- All segments operate as equal communication channels

- Automatic baud rate detection (selection of baud rate via rotary switch)

- Regeneration of amplitude and phase

The new PROFIBUS-DP segment coupler SC12EX by TURCK is designed for intrinsically safe PROFIBUS-DP interfacing. Equipped with a standard PROFIBUS-

DP interface and two PROFIBUS-DP-Ex-i interfaces, this coupler is designed to cover various applications in explosion hazardous areas. The coupler is capable of working with both lines of the intrinsically safe I/O system *excom*[®] (line redundancy). Thus only a single device is needed to provide intrinsically safe separation and line redundancy. The segment coupler SC12Ex is mounted in the non-hazardous area and features protection rating IP20.

PROFIBUS-DP interface

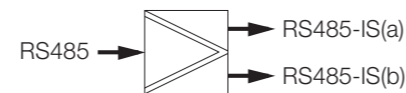
1 x RS485: A standard PROFIBUS interface with RS485 level according to EIA 485. The control line for direction reversal is not connected.

2 x RS485-IS: Two intrinsically safe PROFIBUS interfaces RS485-IS(a) and RS485-IS(b) according to the "RS485-IS" guideline of the PNO working group.

All three segments are equal communication channels:

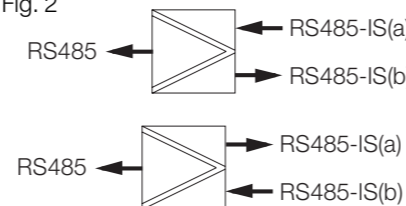
Data received by the RS484 interface are transferred parallelly to the interfaces RS485-IS(a) and RS485-IS(b) (Fig. 1). The delay time is 11 bit times.

Fig. 1



Data received by the RS485-IS(a) and/or RS485-IS(b) are transferred to the RS485 and either to the RS485-IS(a) or the RS485-IS(b). The data of the interface that was the **first** to receive valid messages are transferred (Fig. 2). The delay time is 11 bit times.

Fig. 2



Power supply

The coupler enables redundant power supply. The two operating voltage inputs are isolated by diodes. Load distribution depends on the supply voltage rating. The operational voltage range is specified with 18...32 VDC. A power supply unit with $U_M < 60$ VDC should be used.

Terminating resistors

The terminating resistors in the non-explosive area must be connected to the SUB-D connector. Intrinsically safe bus termination accords to the "RS485-IS" guidelines of the PNO working group. Pull-up/pull-down resistors of 510 Ω are integrated in the device. For bus termination it is merely required to wire a 200 Ω resistor externally between the RS485-IS(a) and RS485-IS(b) segments. A special PROFIBUS SUB-D connector approved for intrinsically safe applications (e.g. D9T-Ex, TURCK ident. no. 6890938) is required; standard connectors may not be used.

Line errors

Line errors (wire-break/short-circuit) are not transferred from one segment to the other. Thus interference-free and independent operation of all segments is ensured.

Regeneration

In order not to restrict the maximum system expansion and line length of a PROFIBUS segment, amplitude and phase are regenerated by the coupler.

Indicator LEDs

The coupler features one status LED for each of the three PROFIBUS segments, one LED for each power line and one status LED for automatic baud rate detection.

Automatic baud rate detection

If the rotary switch is set to "O", the baud rate is detected automatically by the coupler. For this, the start delimiter of the PROFIBUS messages is evaluated. Three subsequent valid start delimiters must be received in order to determine the final baud rate value. All messages are checked for plausibility by means of the start delimiter. Baud rate detection accords to the state machine described in the EN 50170 and is started by a Reset.

If no messages are received by the interface for a period of 1.7 s, a Reset is generated and the baud rate is re-determined.

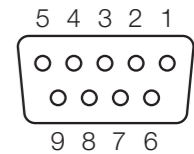
Alternatively, it is possible to set a fixed baud rate value using a rotary switch.

Rotary switch position	
Position 0	Automatic baud rate detection
Position 1	9.60 kbps
Position 2	19.20 kbps
Position 3	45.45 kbps
Position 4	93.75 kbps
Position 5	187.50 kbps
Position 6	500.00 kbps
Position 7	1.50 Mbps
Position 8	not assigned
Position 9	not assigned

Connection technology

The PROFIBUS interfaces are provided via 9-pole SUB-D connectors; the pin configuration accords to PROFIBUS standards (Fig. 3). Each bus branch features a separate shield terminal. The shield terminal is connected to the housing of the corresponding SUB-D connector. Internally, the shields are already connected capacitively to the equipotential-bonding system (PA). The user may choose an appropriate shielding concept that suits his installation requirements and the actual causes of interference.

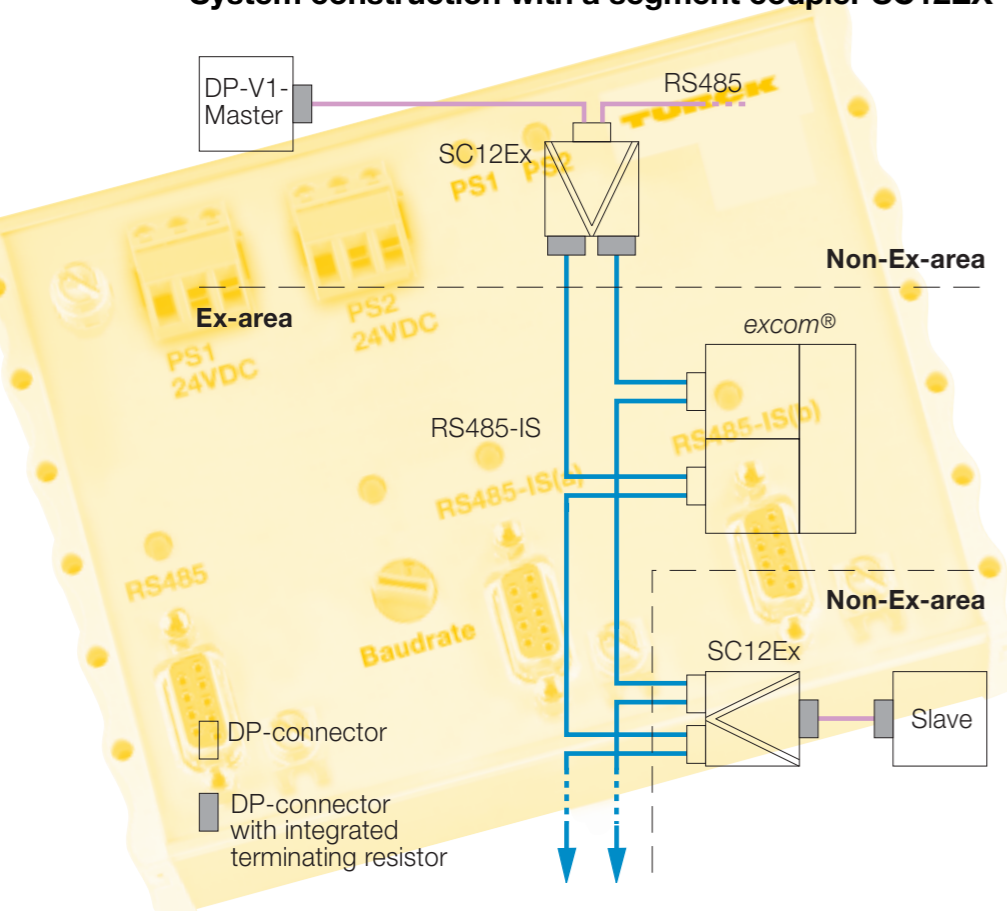
Fig. 3



- | | |
|------------|------------|
| 1 = n. c. | 6 = VP+ |
| 2 = n. c. | 7 = n. c. |
| 3 = B line | 8 = A line |
| 4 = n. c. | 9 = n. c. |
| 5 = GND | |

The device is powered via two three-pole COMBICON pluggable screw connectors. The maximum conductor cross section is 2.5 mm². An earthing stud with an M5 thread is used for equipotential bonding of the housing.

System construction with a segment coupler SC12EX



Technical data	
Type	SC12Ex
Ident. -no.	6884047
Operational voltage	18...32 VDC
Current consumption	< 200 mA
Transmission rate	9.6 kbps...1.5 Mbps (self-detecting)
Galvanic isolation	
Between PROFIBUS and input voltage (to EN 50020)	250 V
Between intrinsically safe PROFIBUS and PROFIBUS (to EN 50020)	60 V
Between intrinsically safe PROFIBUS and input voltage (to EN 50020)	60 V
Between two intrinsically safe PROFIBUS segments (to EN 50020)	10 V
I.S. marking of device	[EEx ib] IIC
I.S. limit value acc. to PNO working group "RS485-IS"	$U_0 = 4.2$ V; $I_0 = 4.8$ A
LED indications	
Operation of PS1 and PS2	2 x green
- green	input voltage o.k.
- off	input voltage too low
Status PROFIBUS segments	3 x red/yellow (dual colour LED)
- red	error in PROFIBUS segment
- yellow	receipt of valid data
- off	no data exchange
Automatic baud rate detection	1 x yellow
- permanent yellow	baud rate detected
- yellow flashing	baud rate detection active
- off	baud rate setting via rotary switch
Housing	
Dimensions (mm)	142 x 105 x 32
Housing material	Aluminium, anodized
Cover material	FR4, grey/blue
Protection degree	IP20
Ambient temperature	-20...+70 °C