



ExCos-D Transmitter for ExPro-C... Temperature / humidity sensors

| |
|------------------|
| ExCos - D |
| ExCos - D - A |
| ExCos - ... - CT |
| ExCos - ... - VA |

Subject to change!

Electrical, explosion-proof transmitters with ExPro-C... sensors
24 VAC/DC supply voltage, (0)4...20 mA/0...10 V analogue output
EC type-approved in acc. with ATEX directive 94/9/EC for zone 1, 2, 21, 22

Compact. Easy installation. Universal. Cost effective. Safe.

| Type | Sensors (compulsory) | Function of sensors | Supply | Output | Ex-i output | Wiring diagram | Installation area |
|-----------------|--|---------------------|-----------|-------------------------|------------------|----------------|-------------------|
| ExCos-D | ExPro-C... (see below) | °C, % rH, °C+% rH | 24 VAC/DC | (0)4...20 mA / 0...10 V | - | SB 2.0 | Zone 1, 2, 21, 22 |
| ExCos-D - A | as above with 2 additional intrinsically safe analogue output to connect an external digital indicator | | | | 2 × (0)4...20 mA | SB 3.2 | Zone 1, 2, 21, 22 |
| ExCos-D... - CT | Types as above with aluminium housing and seawater resistant coating (cable glands M16 brass nickel-plated, screws in stainless steel) | | | | | | |
| ExCos-D... - VA | Types as above with stainless steel housing for aggressive ambient (cable glands M20 brass nickel-plated, screws in stainless steel) | | | | | | |

| Type | Function | Range | Probe/sensor length | Connection | Installation area sensor |
|--------------|--------------------|-------------------------------|-------------------------|--|--------------------------|
| ExPro-CT... | Temperature sensor | -40...+125 °C* | 50 / 100 / 150 / 200 mm | Plug and socket to ExCos-D..., RedCos-D... | Zone 1, 2, 21, 22 |
| ExPro-CF... | Humidity sensor | 0...100 % rH | 50 / 100 / 150 / 200 mm | Plug and socket to ExCos-D..., RedCos-D... | Zone 1, 2, 21, 22 |
| ExPro-CTF... | Combination sensor | -40...+125 °C* / 0...100 % rH | 50 / 100 / 150 / 200 mm | Plug and socket to ExCos-D..., RedCos-D... | Zone 1, 2, 21, 22 |

↑ Sensor length * at 50 mm length -40...+80 °C

Product views and applications

...Cos-D... transmitter



ExPro-C... sensors



...Cos-D...-CT



...Cos-D...-VA



Duct or room sensor



Description

The ExCos-D... transmitter generation with directly coupled ExPro-C... sensors are a revolution for measuring temperature and/or humidity in HVAC systems, in chemical, pharmaceutical, industrial and offshore/onshore plants, for use in hazardous areas zone 1, 2 (gas) and zone 21, 22 (dust).

Highest protection class (ATEX) and IP66 protection, small dimensions, universal functions and technical data guarantee safe operation even under difficult environmental conditions.

All sensors are programmable on site without any additional tools. The measuring ranges are scalable within the maximum ranges. The analogue output signal is either 0...10 VDC or (0)4...20 mA and can be selected on site. The integrated display (can be switched off as needed) is for parametrisation and an actual value indication at working mode.

...Cos-D-A transmitter are additionally equipped with two intrinsically safe (IS) outputs, e.g. for an external indicator.

Highlights

- ▶ For all types of gases, mists, vapours and dust for use in zone 1, 2, 21 and 22
- ▶ Power supply 24 VAC/DC
- ▶ Scalable analogue output, selectable 0...10 V / (0)4...20 mA
- ▶ Integrated Ex-e terminal box
- ▶ No additional Ex-i module required
- ▶ No intrinsically safe wiring/installation between panel and sensor required
- ▶ No intrinsically safe wiring/installation and no space in the panel required
- ▶ Optional IS output (0)4...20 mA for external indicator in Ex-areas
- ▶ Display with backlight, can be switched off
- ▶ Password locking
- ▶ Down to -20 °C ambient temperature applicable
- ▶ Compact design and small dimension
- ▶ Robust aluminium housing (optional with seawater resistant coating) or in stainless steel
- ▶ IP66 protection

ExPro-C – see additional data sheet



Technical data

| | |
|-----------------------------|--|
| Supply voltage, frequency | 24 VAC/DC $\pm 20\%$ (19,2...28,8 VAC/DC), 50/60 Hz |
| Current, power consumption | 150 mA, ~ 4 W, internal fuse 500 mA, without bracket, not removable |
| Galvanic isolation | Supply for analogue in- and outputs min. 1,5 kV, supply for relay output min. 1,5 kV |
| Electrical connection | Terminals 0,14...2,5 mm ² at integrated Ex-e terminal box, stripping length 9 mm, torque 0,4...0,5 Nm, equipotential bonding 4 mm ² |
| Cable glands | 2 x M16 x 1,5 mm, Ex-e approved, for cable diameter ~ \varnothing 5...9 mm |
| Cable glands ...-CT | 2 x M16 x 1,5 mm, Ex-e approved, brass nickel-plated, for cable diameter ~ \varnothing 6...10 mm |
| ...-VA | 2 x M20 x 1,5 mm, Ex-e approved, brass nickel-plated, for cable diameter ~ \varnothing 6...13 mm |
| Protection class | Class I (grounded) |
| Display | 2 x 16 digits, dot-matrix display, backlit, for configuration, user guidance, parameter and actual value indication |
| Control elements | 3 buttons for configuration |
| Housing material | Aluminium die casting, coated. Optional with seawater resistant coating (...-CT) or stainless steel V4A / AISI 316 Cd / DIN EN 1.4581 (...-VA) |
| Dimensions (L x W x H) | Aluminium housing ~ 180 x 107 x 66 mm, stainless steel housing ~ 195 x 127 x 70 mm (each without connectors) |
| Weight | ~ 950 g aluminium housing, stainless steel version ~ 2,5 kg |
| Ambient temperature | -20...+50 °C, storage temperature -35...+70 °C |
| Temperature class | Aluminium housing T6 (T80 °C) at -20...+50 °C Stainless steel housing T5 (T95 °C) at -20...+40 °C, T4 (T130 °C) at -20...+50 °C |
| Ambient humidity | 0...95 % rH, non condensing |
| Sensor connection | For ExPro-C... sensor only! Via plug and socket connection at front side (for room mounting) or at back side (for duct mounting). Attention: Only 1 ExPro-C... sensor per transmitter can be connected! |
| ExPro-C... sensors | More information of connectable ExPro-C... sensors see separate data sheet |
| Measuring ranges adjustable | Measuring ranges are scalable within and limited by the maximum sensor measuring range |
| Response time of sensor | T90 / ~ 1 s |
| Start delay | 5 s |
| Stability | Long term stability < 0,2 %/year, temperature influence < 0,02 %/K, supply voltage influence < 0,01 % |
| Output | Voltage U [V] or current I [mA] selectable via menu on site (with combi sensors not adjustable separately), protected against short circuit and external voltage up to 24 V, protected against polarity reversal |
| Voltage output U | 0...10 V adjustable, invertible, burden > 1 k Ω , influence < 0,05 %/100 Ω + accuracy of ...Pro-C... sensor |
| Current output I | 0...20 mA adjustable, invertible, burden < 500 Ω , influence < 0,1 %/100 Ω , open circuit voltage < 24 V + accuracy of ...Pro-C... sensor |
| Output in alarm mode | Increasing or decreasing output signal, selectable on site, down to 0 VDC/0 mA or up to 10 VDC/20 mA |
| Wiring diagram | SB 2.0 |
| Scope of delivery | Transmitter, 3 self-tapping screws 4,2 x 13 mm resp. in stainless steel (with ...CT and ...VA versions) ...Cos-D-A with 2 additional plugs for cable diameter \varnothing 6...8 mm |
| Parameter at delivery | Output 4...20 mA, output in alarm mode decreasing to 0 V/0 mA |
| ExCos-D-A | as above and 2 additional intrinsically safe analogue outputs |
| Ex-i analogue output | 2 x (0)4...20 mA, intrinsically safe (IS), burden max. 400 Ω |
| Accuracy | $\pm 0,5\%$ |
| Wiring diagram | SB 3.2 |

Approbations

| | |
|----------------------|--|
| ATEX directive | 94/9/EC |
| EC type-approved | EPS 14 ATEX 1 655 X |
| IECEx certified | IECEx EPS 14.0022X |
| Approval for gas | II 2 (1) G Ex e ma [ja Ga] IIC T6...T4 Gb Types ...-CT II 2 (1) G Ex e ma [ja Ga] IIB T6 Gb |
| Approval for dust | II 2 (1) D Ex tb [ja Da] IIIC T80°C...T130°C Db IP66 |
| CE identification | CE № 0158 |
| EMC directive | 2004/108/EC |
| Enclosure protection | IP66 in acc. with EN 60529 |
| EAC | TC RU C-DE.ГБ08.B.01510 |

Special solutions and accessories

| | |
|-------------------|---|
| ...-CT | Types in aluminium housing with seawater resistant coating, parts nickel-plated |
| ...-VA | Types in stainless steel housing, parts nickel-plated |
| EXC-RIA-16 | LCD indicator (IS) for Ex-/RedCos... sensors in Ex-zones 1, 2, 21, 22 |
| MKR | Mounting bracket for round ducts up to \varnothing 600 mm |
| Kit-S8-CBR | 2 cable glands M16 x 1,5 mm, Ex-e, brass nickel-plated, for cable \varnothing 5...10 mm |
| VL3 | Sensor extension cable, 3 m |



Electrical connection

All transmitters require a 24 VAC/DC power supply. The electrical wiring must be realized via the integrated Ex-e terminal box acc. to ATEX. The terminals' type of protection is "Increased safety Ex-e".

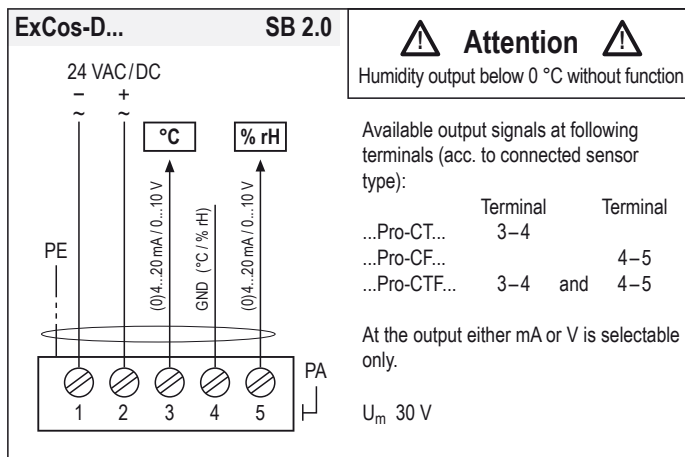
Attention: Before opening the terminal box cover, the supply voltage must be shut off! The supply has to be connected at terminals 1 (-/-) and 2 (+/+), the analogue output for temperature sensors at terminals 3 (mA/V) and 4 (GND), for humidity sensors at terminals 5 (mA/V) and 4 (GND). The additional analogue output at ...Cos-D-A is intrinsically safe. Note the maximum connection values of intrinsically safe parameters (see table below).

Depending on the ...Pro-C... sensor's type you can measure either temperature (...Pro-CT...) or humidity (...Pro-CF...) at the time or combined with a ...Pro-CTF... Simultaneous measurements are not possible, use only one transmitter at the time.

Before starting parametrisation of ...Cos-D... transmitter a ...Pro-C... sensor must be connected, which can be mounted either to the front or the back side of the transmitter. The protective cap must be removed.

Unused connectors must be covered with the original protective cap to avoid mechanical damage and dirt!

Depending on the sensor's type you need to set parameters for one or two measuring ranges and their related data.



Intrinsically safe parameters (IS) – For external ExPro-C... sensor

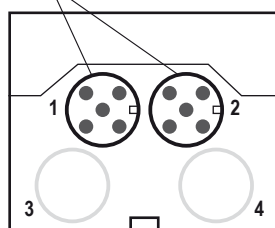
| | | | | | |
|---------------|---------------------|-------|-------------|-------------|-------------|
| $U_o = 7.9$ V | $C_i \rightarrow 0$ | IIC | IIB | IIA | |
| $I_o = 48$ mA | $L_i \rightarrow 0$ | L_o | 2 mH | 5 mH | 10 mH |
| $P_o = 95$ mW | | C_o | 1.3 μ F | 5.8 μ F | 7.1 μ F |

Ex-i output (IS) (optional) – ExCos-D-A...

Connector and terminals

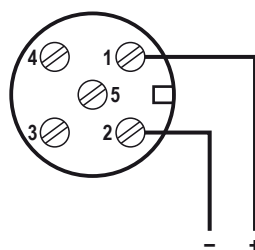
SB 3.2

Female connector



Output 1: for temperature sensor [°C]
Output 2: for humidity sensor [% rH]

Male connector

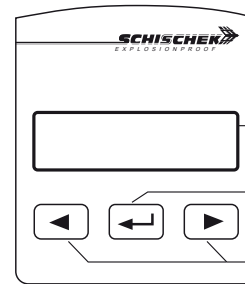


to connect e.g.
an external LCD indicator (IS)

Intrinsically safe parameters (IS) – Analogue Ex-i output

| | | | | | |
|----------------|---------------------|-------|--------------|-------------|-------------|
| $U_o = 15.8$ V | $C_i \rightarrow 0$ | IIC | IIB | IIA | |
| $I_o = 85$ mA | $L_i \rightarrow 0$ | L_o | 2 mH | 5 mH | 10 mH |
| $P_o = 336$ mW | | C_o | 0.33 μ F | 1.6 μ F | 1.8 μ F |

Display, buttons and parameters



Change operation – parametrisation mode

To change from operation to parametrisation mode and vice versa, push ENTER button for minimum of 3 seconds. Back to operation mode with menu "save".

Indication of data logging

A flashing star in the display shows that data is received and the device is working.

Password input

The default/delivery setup is 0000. In this configuration the password input is not activated. To activate the password protection (menu 20) change the 4 digits into your chosen numbers (e.g. 1234) and press ENTER.

Please keep your password in mind for next parameter change! Due to a new parameter setup the password is requested.

Important information for installation and operation

A. Installation, commissioning, maintenance

All national and international standards, rules and regulations must be complied with. Certified apparatus must be installed in accordance with manufacturer instructions. If the equipment is used in a manner not specified by the manufacturer, the safety protection provided by the equipment may be impaired. For electrical installations design, selection and erection, EN/IEC 60079-14 can be used.

Attention: Apply all Ex rules and regulation before opening the internal terminal box. Do not open cover when circuits are live!

Draw the wiring cables through the cable glands. For connection use the internal Ex-e approved terminal box and connect equipotential bonding.

After connection install the cables in a fixed position and protect them against mechanical and thermal damage. Close all openings and ensure IP protection (min. IP66).

Avoid temperature transfer and ensure not to exceed max. ambient temperature! For outdoor installation a protective shield against sun, rain and snow should be applied.

Sensors are maintenance free. An annual inspection is recommended. For electrical installations inspection and maintenance, EN/IEC 60079-17 can be used.

Clean with damp cloth only.

Ex sensors must not be opened and repaired by the end user.

B. Long cabling

We recommend using shielded signal wires and to connect one end of the shield to the ...Cos-... terminal box.

C. Separate ground wires

For supply and signal wires use separate grounds.

D. ExPro-C... sensors

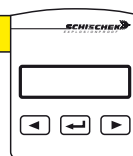
The ExPro-C... sensor is supplied by the transmitter's intrinsically safe circuit. Unused connectors must be covered with a protective cap.



Parametrisation and commissioning

To change from operation to parametrisation mode push the "ENTER" button (↵) for minimum 3 seconds.
 If password protected: type password and push (↵).
 Skip menu with (▶), back to operation mode with menu "Save and exit".

Operation → Parametrisation
 push (↵) for min. 3 s



Example:
 Menu language English
 Ranges 0...50 °C, 0...100 % rF
 Output ranges 0...10 V, 0...10 V
 Output Ex-i 0...20 mA

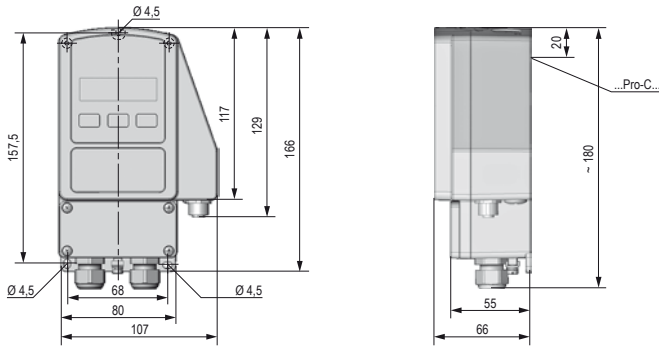
| Menu | Function | ENTER | Indication | Select | ENTER | Next indication | Select | ENTER | Next menu |
|---------|---|-------|---|--------|-------|--|--------|-------|-----------|
| Menu 1 | DE, EN, FR Select language: German, English, French | ↵ | DE, EN, FR English deutsch, english, francais | ◀ ▶ | ↵ | | | | ▶ |
| Menu 2 | no function – menu skip | | | | | | | | |
| Menu 3 | no function – menu skip | | | | | | | | |
| Menu 4 | Unit sensor 1 Select physical unit | ↵ | unit sensor 1 °C °C, °F | ◀ ▶ | ↵ | | | | ▶ |
| Menu 5 | Range 1 Adjust the measuring range | ↵ | range 1 0...50 °C ← adjust lower limit | ◀ ▶ | ↵ | range 1 0...50 °C ← adjust higher limit | ◀ ▶ | ↵ | ▶ |
| Menu 6 | no function – menu skip | | | | | | | | |
| Menu 7 | Output V mA Select output signal | ↵ | output V mA mA V, mA | ◀ ▶ | ↵ | | | | ▶ |
| Menu 8 | Output range 1 Adjust output range | ↵ | output range 1 0...10 mA ← adjust lower limit | ◀ ▶ | ↵ | output range 1 0...10 mA ← adjust higher limit | ◀ ▶ | ↵ | ▶ |
| Menu 9 | Sensor error 1 Select output signal at sensor error | ↵ | sensor error 1 10 V/20 mA 10 V/20 mA, 0 V/0 mA | ◀ ▶ | ↵ | | | | ▶ |
| Menu 10 | Output 1 ↕ Select signal output behaviour | ↵ | output 1 ↕ increasing increasing, decreasing | ◀ ▶ | ↵ | | | | ▶ |
| Menu 11 | Unit sensor 2* (humidity) Select physical unit | ↵ | unit sensor 2 % rF % rF, % rH | ◀ ▶ | ↵ | | | | ▶ |
| Menu 12 | Range 2* Adjust the measuring range | ↵ | range 2 0...100 % rF ← adjust lower limit | ◀ ▶ | ↵ | range 2 0...100 % rF ← adjust higher limit | ◀ ▶ | ↵ | ▶ |
| Menu 13 | Output range 2* Adjust output range | ↵ | output range 2 0...10 V ← adjust lower limit | ◀ ▶ | ↵ | output range 2 0...10 V ← adjust higher limit | ◀ ▶ | ↵ | ▶ |
| Menu 14 | Sensor error 2* Select output signal at sensor error | ↵ | sensor error 2 0 V/0 mA 0 V/0 mA, 10 V/20 mA | ◀ ▶ | ↵ | | | | ▶ |
| Menu 15 | Output 2* ↕ Select signal output behaviour | ↵ | output 2 ↕ increasing increasing, decreasing | ◀ ▶ | ↵ | | | | ▶ |
| Menu 16 | Output Ex-i 1 (optional ...Cos-D-A) Select lower output signal: 0 mA resp. 4 mA (0...20 or 4...20 mA) | ↵ | output Exi 1 0...20 mA ← adjust lower limit | ◀ ▶ | ↵ | output Exi 1 0...20 mA ← adjust higher limit | ◀ ▶ | ↵ | ▶ |
| Menu 17 | Output Ex-i 2 (optional ...Cos-D-A)* Select lower output signal: 0 mA resp. 4 mA (0...20 or 4...20 mA) | ↵ | output Exi 2 0...20 mA ← adjust lower limit | ◀ ▶ | ↵ | output Exi 2 0...20 mA ← adjust higher limit | ◀ ▶ | ↵ | ▶ |
| Menu 18 | no function – menu skip | | | | | | | | |
| Menu 19 | Display function Select display | ↵ | display function on illuminated on illuminated, off, on | ◀ ▶ | ↵ | | | | ▶ |
| Menu 20 | Password Select password protection | ↵ | new password yes no Ja | ◀ ▶ | ↵ | password 0000 push (↵) to change position | ◀ ▶ | ↵ | ▶ |
| Menu 21 | Save and exit Select: save data, factory setting, discard or back to menu | ↵ | save and exit save data save data, factory setting, discard, back to menu | ◀ ▶ | ↵ | (operation mode after "save data") | | | ▶ |
| Menu 22 | Set offset 1 Add / subtract offset from measure value temperature | ↵ | set offset 1 +0.01 °C | ◀ ▶ | ↵ | | | | ▶ |
| Menu 23 | Set offset 2* Add / subtract offset from measure value humidity | ↵ | set offset 2 -0.02 % rH | ◀ ▶ | ↵ | | | | ▶ |

* with combination sensor ...Pro-CTF only



Dimensions [mm]

Aluminium housing



Stainless steel housing

