

# ExCos-D Transducer for ExPro-C... sensors (probes)

## ExPro-C... Temperature/humidity sensors (°C, %rH)

Electrical, explosionproof transducers only connectable to **ExPro-C...** temperature and humidity sensors.

24 VAC/DC supply, 0...10 V / (0)4...20 mA output

PTB-certified in acc. with ATEX directive 94/9/EC for zone 1, 2, 21, 22.

Type of transducer:
<b>ExCos - D</b>
<b>ExCos - D - A</b>
<b>ExCos - D... - CT</b>
Type of sensor (probe):
<b>ExPro - CT...</b>
<b>ExPro - CF...</b>
<b>ExPro - CTF...</b>

Subject to change!

### Transducer

Type	Supply	Installation area	Connectable sensors	Function of sensors	Sensor connection	Wiring diagram
<b>ExCos - D</b>	24 VAC/DC	zone 1, 2, 21, 22	ExPro-CT..., ExPro-CF..., ExPro-CTF...	°C, % rH, combination °C/% rH	via plug-and-socket connection	SB 2.0
<b>ExCos - D - A</b>	as above, but with additional intrinsically safe analogue output to connect an external digital indicator (0)4...20 mA (Ex-i)					SB 3.0
<b>ExCos - D...- CT</b>	Type as above but with aluminium housing and Amercoat painting (sensor connection cable glands nickel-plated, screws in stainless steel)					

### Connectable sensors (compulsory for ExCos-D... transducer) – see separate data sheet

Type	Function	Measuring range	Length of sensor	connectable to	Installation sensor	Installation transducer
<b>ExPro - CT...</b>	temperature	-40...+125 °C*	50/100/150/200 mm	ExCos-D..., RedCos-D...	zone 1, 2, 21, 22	zone 1, 2, 21, 22 (ExCos...)
<b>ExPro - CF...</b>	humidity	0...100 % rH	50/100/150/200 mm	ExCos-D..., RedCos-D...	zone 1, 2, 21, 22	zone 1, 2, 21, 22 (ExCos...)
<b>ExPro - CTF...</b>	combination temp./humidity	-40...+125 °C*/0...100 %rH	50/100/150/200 mm	ExCos-D..., RedCos-D...	zone 1, 2, 21, 22	zone 1, 2, 21, 22 (ExCos...)

\* at 50 mm length -40...+80 °C sensor length

### Application

ExCos-D... transducer



ExPro-C... sensor



Example: room sensor



Example: duct sensor



ExCos-D...-CT



### Description

The **ExCos-D...** transducer generation from together with direct 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 dimension, universal functions and technical data guarantee safe operation even under difficult environmental conditions.

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 is for actual value indication which can be switched off.

All sensors are programmable on site without any additional tools.

**ExCos-D-A** transducer are additionally equipped with a (0)4...20 mA IS (IS = intrinsically safe) output, e.g. for an external indicator.

### Highlights transducer

- ▶ For all type of gas, mixtures, vapours and dust for use in zone 1, 2, 21 and 22
- ▶ 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
- ▶ Integrated Ex-e junction box
- ▶ Power supply 24 VAC/DC
- ▶ Display with backlight, can be switched off
- ▶ Scalable analogue output, selectable 0...10 V / (0)4...20 mA
- ▶ Compact design and small dimension (L × W × H = 180 × 107 × 66 mm)
- ▶ Robust aluminium housing in protection class IP66
- ▶ Down to -20°C ambient temperature applicable
- ▶ Password locking
- ▶ Optional IS-output (0)4...20 mA for external indicator in Ex-areas
- ▶ CT versions have an excellent resistance to chemicals and seawater

### Highlights sensor

- ▶ For all type of gas, mixtures, vapours and dust for use in zone 1, 2, 21 and 22
- ▶ Plug-and-socket connection to ExCos-D... transducer, removable
- ▶ The ExPro-C... probe appropriates the function (temperature, humidity or combination)
- ▶ Mounting of ExPro-C... probe (front/back side) appropriates use for duct or room application



Technical data	ExCos-D...
Power supply	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 – analogue output 1,5 kV (Ex 60 V)
Electrical connection	terminals 0,14...2,5 mm <sup>2</sup> at integrated Ex-e junction box
Cable entry	M16 $\times$ 1,5 mm Ex-e approved, cable diameter ~ $\varnothing$ 5...10 mm, (...-CT in nickel-plated)
Protection class	Class I (grounded)
Display	2 $\times$ 16 digits, dot-matrix with backlight, display for configuration, user guidance, parameter and actual value indication
Control elements	3 buttons for configuration
Housing protection	IP66 in acc. to IEC 60529
Housing material	aluminium casting, coated (...-CT = version in marine painting, seawater-resistant)
Dimensions/weight	L $\times$ W $\times$ H = 180 $\times$ 107 $\times$ 66 mm / ca. 950 g
Ambient temperature/-humidity	-20...+50 °C / 0...95 % rH, non condensed
Storage temperature	-40...+70 °C
Sensor connection	<b>Only for ExPro-C... sensors!</b> via plug-and-socket connection at front or back side of the transducer, to appropriate the use for room or duct mounting. <b>Attention:</b> only one ExPro-C... probe can be connected to one transducer!
ExPro-C... sensors	please have a look on the separate data sheet for ExPro-C... sensors
Measuring range	measuring ranges are scalable within the maximum measuring range
Maintenance	maintenance free, nevertheless maintenance must be complied with regional standards, rules and regulations
Response time of sensor	T90 ~ 1 s
Accuracy temperature	$\pm$ 0,2 % of end value + accuracy of ExPro-C... sensor $\pm$ 0,3 °C at 25 °C $\pm$ 0,025 °C/°C
Accuracy humidity	$\pm$ 0,2 % of end value + accuracy of ExPro-C... sensor 10...90 % rH $\pm$ 2% and < 10 % rH and > 90 % rH $\pm$ 4% + 1% hysteresis
Non linearity and hysteresis	$\pm$ 0,1 % of end value
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 (at combi sensors not separately adjustable)
Output protection	against short circuit and external voltage up to 24 V, protected against polarity reversal
Voltage output U	from 0...10 VDC adjustable, invertible, burden > 1 k $\Omega$ , influence < 0,05% / 100 $\Omega$
Current output I	from 0...20 mA adjustable, invertible, burden < 500 $\Omega$ , influence < 0,1% / 100 $\Omega$ , open circuit voltage < 24 V
Output at 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)	SB 2.0
Delivery (changeable on site)	output 4...20 mA, output with decreasing alarm situation to 0 V/0 mA
Included in delivery	ExCos-D... with 3 screws 4,2 $\times$ 13 mm self-tapping
Installation area transducer	in Ex-area zone 1, 2, 21, 22
<b>Additional information for ExCos-D-A:</b>	
Analogue output	(0)4...20 mA
Ex-i	Intrinsically Safe (IS)
Burden	max. 400 $\Omega$
Accuracy	$\pm$ 0,5 %
Plug	cable diameter $\varnothing$ 6...8 mm
Delivery version ...-D-A	incl. 2 $\times$ plug

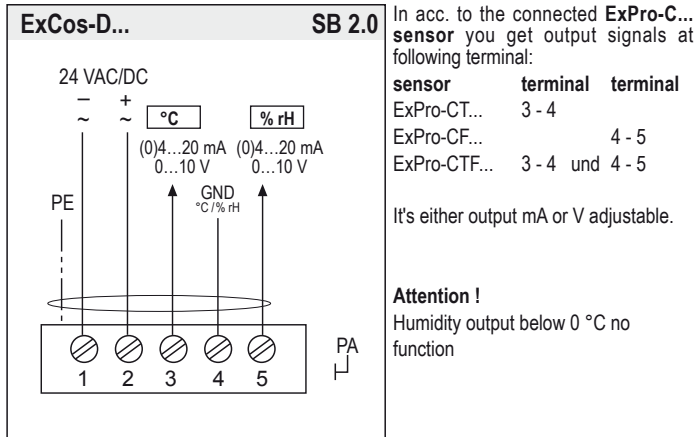
Explosion proof	ExCos-D...
PTB-testet	PTB 07 ATEX 2061
acc. to ATEX directive	94/9/EC (ATEX)
Approval for gas	I12(1)G Ex e ma [ia] IIC T6 for zone 1, 2
Approval for dust	I12(1)D Ex tD A21 [iaD] IP66 T80°C for zone 21, 22
Identification	CE No. 0158
EMC	2004/108/EC EMC directive
Electrical safety	2006/95/EC low voltage directive
Protection type	IP66 in acc. to EN 60529
Potential compensation	external PA-terminal, 4 mm <sup>2</sup>

Accessories	
<b>EXC-RIA-16</b>	LCD indicator (IS), installation in Ex-areas zones 1, 2, 21, 22, connectable directly to ...Cos... transducer
<b>MKR</b>	Mounting bracket for round ducts up to $\varnothing$ 600 mm
<b>MFK</b>	Mounting flansh for probe positioning

**Electrical wiring**

ExCos-D... transducer require a 24 VAC/DC power supply. The supply has to be connected at terminal 1 (-/-) and 2 (+/-), the analogue output at terminal 3 (mAV) and 4 (GND) for temperature, at terminal 5 (mAV) and 4 (GND) for humidity. The electrical wiring must be realized via integrated Ex-e junction box in acc. to ATEX. Type of protection for the terminals is "Ex-e". **Attention!** Before opening the junction box cover, the supply voltage must be shut off! The optional analogue output at ExCos-D-A is intrinsically safe. Note the maximum connection values of intrinsically safe parameters (see table below).

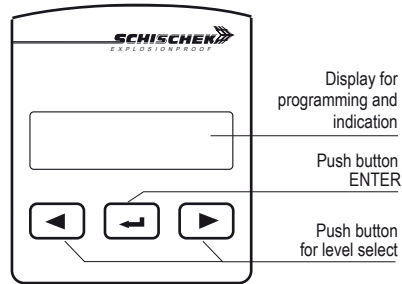
**Wiring diagram ExCos-D...**



**Parameter**

Before starting parametrisation of ExCos-D... transducer an ExPro-C... sensor must be connected. ExPro-C... sensors are available as ExPro-CT... for single temperature measurement, as ExPro-CF... for single humidity measurement and as ExPro-CTF... for combined measurement of temperature and humidity. All types are connectable to an ExCos transducer but only one sensor to one transducer. In acc. with the sensor type you need to set parameter for one or two measuring ranges.

**Display and Buttons**



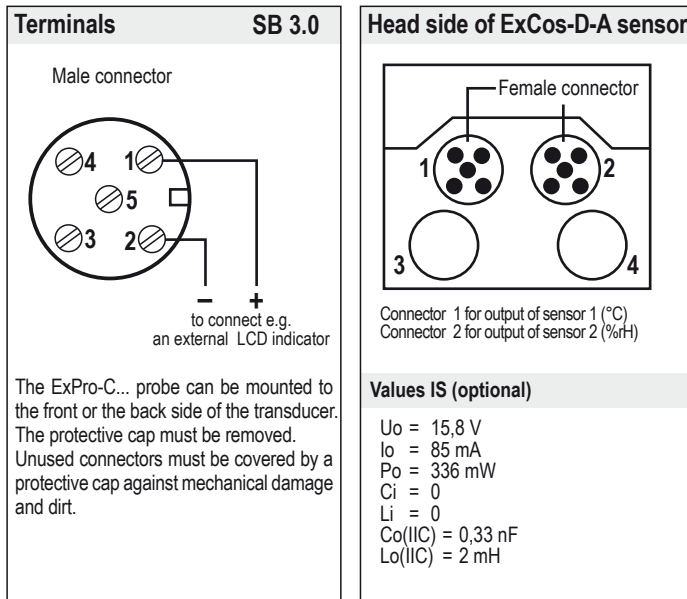
**Change operation-/parametrisation mode**

To change from operation to parametrisation mode and vice versa, push the enter button for minimum 3 seconds.

**Indication of data logging**

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

**Wiring Ex-i output (optional) at ExCos-D...A transducer**



**Password input**

The default/delivery setup is 0000. In this configuration the password input is not activated. To activate a password, go to menu point 20, change the 4 digits into your choosen 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**

The cable has to be drawn through the cable gland. After electrical connection the cable gland must be fixed tighten. IP66 must be fulfilled.

In acc. with operation ExCos sensors are maintenance free. Nevertheless maintenance must comply with regional standards, rules and regulations.

The sensors must not be opened by the customer. For outdoor installation a protective housing against rain, snow and sun should be applied. For electrical connection use the internal approved Ex-e junction box.

**Attention:** Note the explosion proof rules before opening the internal junction box.

Cut off the power supply.

**B. ExPro-C... sensors**

ExPro-C... sensors are supplied with an intrinsically safe circuit from the ExCos-D... transducer. Unused connectors must be covered by a protective cap.

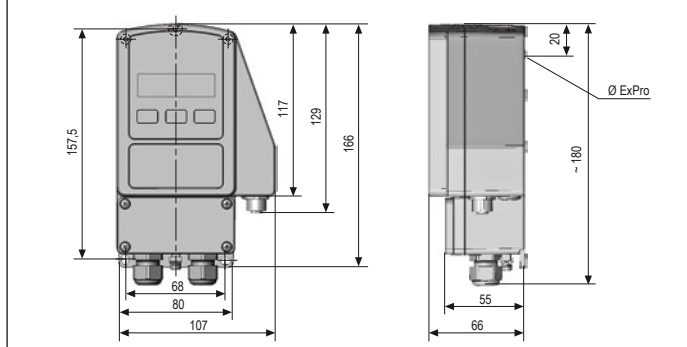
**C. Long cabling**

For using long signal wires, shielded cables are recommended. The shield must be connected to the ExCos-D transducer inside the terminal box.

**D. Separate ground wires**

Use for supply and signal wires a separate ground.

**Dimensions / Drillings**





**Values intrinsically safe (IS) for ExPro-C... sensors**

**Digital ExPro-C... sensor**

Uo = 7,9 V  
Io = 48 mA  
Po = 95 mW  
Ci = 0  
Li = 0  
Co(IIC) = 1,3 nF  
Lo(IIC) = 2 mH


**Parametrisation and commissioning of ExCos-D (-A) transducers after an ExPro-C... sensor ist connected**

**Preparation of parametrisation/operation**

Operation ↔ Parametrisation, push  for 3 sec.  
If password (PW) protection is active: put PW in, push 





















































































































**Change operation-/parametrisation mode**

To change from operation to parametrisation mode push "enter button"  for minimum 3 seconds. Back over the menu save and exit.

**Example of parameters**

**Language** English  
**Range** 0...+50 °C, 0...100 % rH  
**Output** each 0...10 VDC, 0...20 mA  
**Outputs Ex-i** 4...20 mA

Menu	Function	Enter	Indication	Select	Enter	Next indication	Next selction	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 as VDC or mA		output V/mA V mA, V						
Menu 8	output range 1 adjust the output range		output range 1 0..10V ↑ adjust lower limit			output range 1 0..10V ↑ adjust higher limit			
Menu 9	sensor error 1 select signal at sensor error		sensor error 1 10V / 20 mA 10V / 20 mA or 0V / 0mA						
Menu 10	output 1   select if signal output is increasing or decreasing		output 1   increasing   increasing, decreasing						
Menu 11	unit sensor 2* select physical unit		unit sensor 2 %rH %rF, %rH						
Menu 12	range 2* adjust the measuring range		range 2 0..100 %rH ↑ adjust lower limit			range 2 0..100 %rH ↑ adjust higher limit			
Menu 13	output range 2* adjust the output range		output range 2 0..10V ↑ adjust lower limit			output range 2 0..10V ↑ adjust higher limit			
Menu 14	sensor error 2* select signal at sensor error		sensor error 2 0V / 0 mA 10V / 20 mA or 0V / 0mA						
Menu 15	output 2*   select if signal output is increasing or decreasing		output 2   increasing   increasing, decreasing						
Menu 16	output Ex-i 1 (option, only at ExCos-D-A) adjust 4...20 mA or 0...20 mA IS output signal		output Exi 1 4..20 mA ↑ adjust lower limit			output Exi 1 4..20 mA ↑ adjust higher limit			
Menu 17	output Ex-i 2 (option, only at ExCos-D-A)* adjust 4...20 mA or 0...20 mA IS output signal		output Exi 2 4..20 mA ↑ adjust lower limit			output Exi 2 4..20 mA ↑ adjust higher limit			
Menu 18	no function - menu skip								
Menu 19	display function select display on/off, illuminated or backlight off		display function on illuminated on-illuminated, on, off						
Menu 20	password select password protection		new password yes no			password 0000			
Menu 21	save and exit select save data / factory setting / discard or back to menu		save and exit save data						
Menu 22	Set offset 1 Add / subtract from measures value		set offset 1 0.00°C						
Menu 23	Set offset 2* Add / subtract from measures value		sett offset.2 0.00%rH						

\*only available if combination sensor type ExPro-CTF... is connected