

Data Sheet

SCHISCHEK REDCOS-D TRANSMITTER

for ExPro-C... Temperature / humidity sensors



Supplied by

247able.com

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

RedCos - D
RedCos - D - A
RedCos - ... - CT
RedCos - ... - 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 2, 22

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

Type	Sensors (compulsory)	Function of sensors	Supply	Output	Ex-i output	Wiring diagram	Installation area
RedCos- D	ExPro-C... (see below)	°C, % rH, °C+% rH	24 VAC/DC	(0)4...20 mA / 0...10 V	-	SB 2.0	Zone 2, 22
RedCos- 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 2, 22
RedCos- D... - CT	Types as above with aluminium housing and seawater resistant coating (cable glands M16 brass nickel-plated, screws in stainless steel)						
RedCos- 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

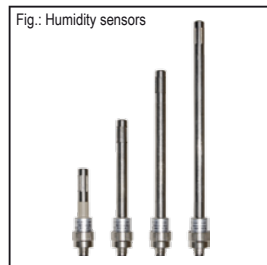
↑ Sensor length * at 50 mm length -40...+80 °C

Product views and applications

...Cos-D... transmitter



ExPro-C... sensors



...Cos-D...-CT



...Cos-D...-VA



Duct or room sensor



Description

The RedCos-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 2 (gas) and zone 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 2 and 22
- ▶ Power supply 24 VAC/DC
- ▶ Scalable analogue output, selectable 0...10 V / (0)4...20 mA
- ▶ Integrated Ex 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 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 approved, for cable diameter ~ \varnothing 5...9 mm
Cable glands ...-CT	2 x M16 x 1,5 mm, Ex approved, brass nickel-plated, for cable diameter ~ \varnothing 6...10 mm
...-VA	2 x M20 x 1,5 mm, Ex 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
RedCos-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

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

CSA:



This equipment is suitable for installation in Class I, Division 2, Group A, B, C, D hazardous locations or nonhazardous locations only.



WARNING – EXPLOSION HAZARD:
Substitution of components may impair suitability for Class I, Division 2.



WARNING – EXPLOSION HAZARD:
Do not connect or disconnect this equipment unless power has been removed or the area is known to be nonhazardous.



Electrical connection

All transmitters require a 24 VAC/DC power supply. The electrical wiring must be realized via the integrated Ex terminal box acc. to ATEX.

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 measurings 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.

RedCos-D... SB 2.0

Attention
Humidity output below 0 °C without function

Available output signals at following terminals (acc. to connected sensor type):

...Pro-CT...	Terminal 3-4	Terminal
...Pro-CF...		4-5
...Pro-CTF...	3-4 and 4-5	

At the output either mA or V is selectable only.

U_m 30 V

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 μF	5.8 μF	7.1 μF

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

Connector and terminals SB 3.2

Female connector: 1, 2, 3, 4
Male connector: 1, 2, 3, 4, 5

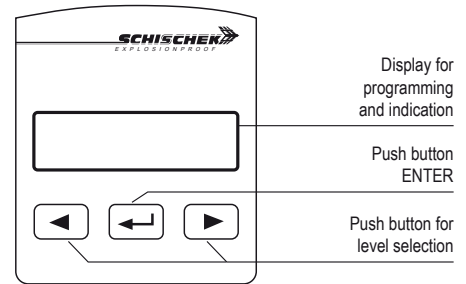
Output 1: for temperature sensor [°C]
Output 2: for humidity sensor [% rH]

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 μF	1.6 μF	1.8 μF

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.

Canada: Install per Canadian Electrical Code (CEC).
USA: Install per National Electrical Code (NEC).

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 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

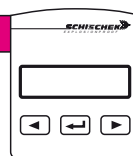
The ExPro-C... sensor is supplied by the transmitter's intrinsically safe circuit. Unused connectors must be covered with a protective cap.



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".

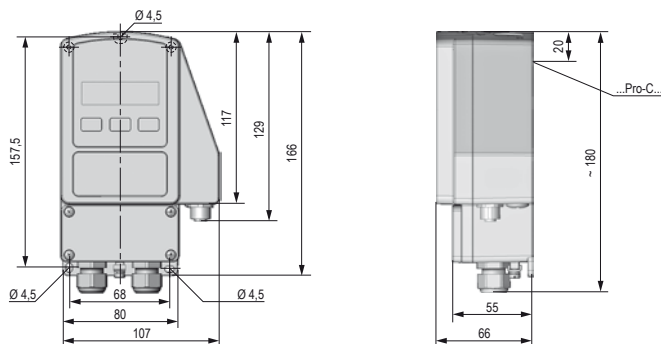
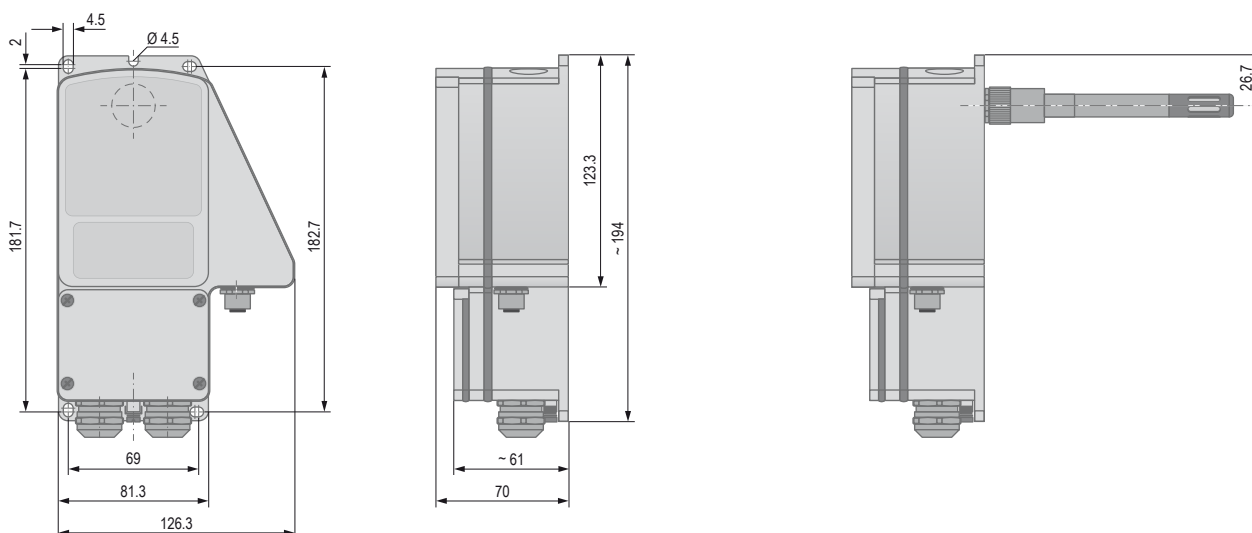
Operation → Parametrisation
 push (↵) for min. 3 s



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

Approbations

ATEX directive	94/9/EC	EAC	TC RU C-DE.ГБ08.B.01510
EC type-approved	EPS 14 ATEX 1 656 X	CSA	13.2672226 Aluminium housing
IECEX certified	IECEX EPS 14.0023X	Class Division	Class I, Division 2, Groups ABCD, T6, IP66
Approval for gas	II 3 (1) G Ex nC [ja Ga] IIC T6...T4 Gc		Ex nA [ja Ga] IIC Gc
Types ...-CT, ...-OCT	II 3 (1) G Ex nC [ja Ga] IIB T6 Gc	Types ...-CT	Ex nA [ja Ga] IIB Gc
Approval for dust	II 3 (1) D Ex tc [ja Da] IIC T80°C...T130°C Dc IP66	Class Zone	Class I, Zone 2, AEx nA [ja Ga] IIC T6 Gc, IP66
		Types ...-CT	Class I, Zone 2, AEx nA [ja Ga] IIB T6 Gc, IP66
CE identification	CE № 0158		
EMC directive	2004/108/EC		
Enclosure protection	IP66 in acc. with EN 60529		



ExPro-C Temperature/humidity sensor

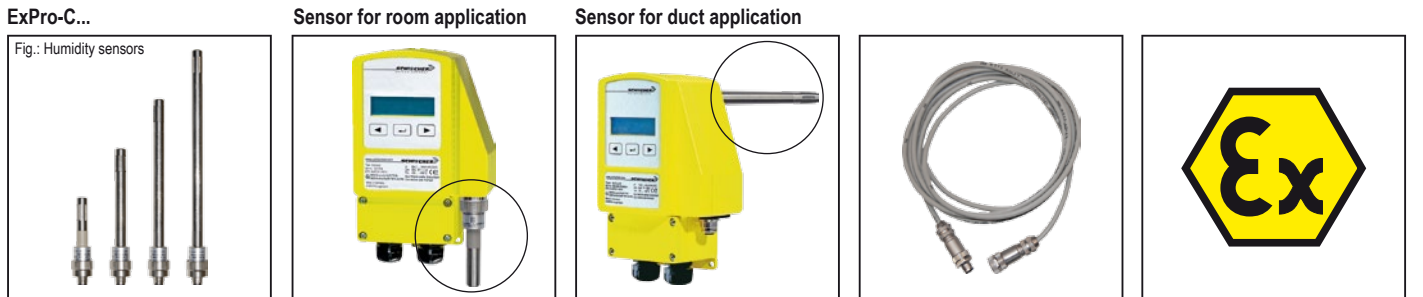
connectable exclusively to transmitters **ExCos-D** and **RedCos-D** for measuring of temperature and/or humidity

Subject to change!

Type	Function	Range	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



Technical data	ExPro- CT -...	ExPro- CF -...	ExPro- CTF -...
	Temperature sensor	Humidity sensor	Temperature / humidity sensor
Measuring range	-40...+125 °C* * -40...+80 °C at 50 mm length	0...100 % rH	-40...+125 °C* / 0...100 % rH * -40...+80 °C at 50 mm length
Sensor length	ExPro-CT- 50 = 50 mm ExPro-CT-100 = 100 mm ExPro-CT-150 = 150 mm ExPro-CT-200 = 200 mm	ExPro-CF- 50 = 50 mm ExPro-CF-100 = 100 mm ExPro-CF-150 = 150 mm ExPro-CF-200 = 200 mm	ExPro-CTF- 50 = 50 mm ExPro-CTF-100 = 100 mm ExPro-CTF-150 = 150 mm ExPro-CTF-200 = 200 mm
Response time sensor	T90 / 20 s	T90 / 4 s	T90 / 20 s, T90 / 4 s
Accuracy temperature	±0,4 °C at 25 °C ±0,02 °C/°C		
Accuracy humidity	± 3 % at 10...90 % rH / ± 5 % at < 10 % rH and > 90 % rH		
Housing protection	IP66 acc. to EN 60529		
Material	Adapter	Stainless steel № 1.4305, length 50 mm in plastic PEEK-GF30 (max. room temperature +80 °C)	
	Protection sleeve	Stainless steel № 1.4301 / AISI 304	
	End cap	AISI 316	
	Plug-in connector	Zinc die-cast nickel-plated, screw sleeve brass nickel-plated	
Filter element humidity sensor	Mesh size 100 µm		
Ambient temperature / humidity	-40...+125 °C (-40...+80 °C at 50 mm length) / 0...100 % rH		
Storage temperature	-40...+125 °C (-40...+80 °C at 50 mm length)		
Installation area sensor	in Ex areas zone 1, 2, 21, 22		
Scope of delivery	ExPro-C... sensor with plug-in connector and gasket (EPDM) for duct installation		

Description

ExPro-C... sensor is a measuring element which is in combination with an ...Cos-D... transmitter for temperature, humidity or combination of temperature and humidity measuring. **ExPro-C... sensors are only for use with ExCos-D.../RedCos-D... transmitters.**

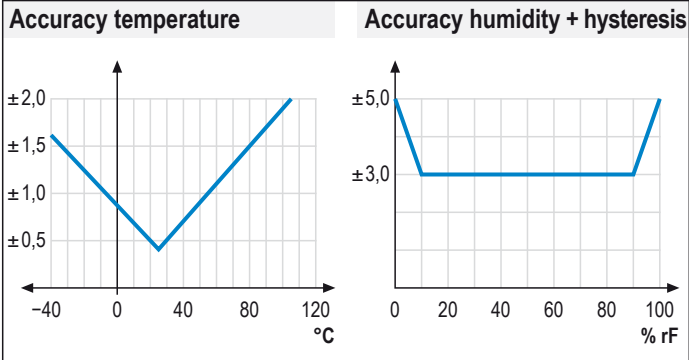
The electromechanical connection is done with a socket on the front resp. on the back side of the transmitter, but only 1 ExPro-C... per module is allowed and can be used.

Warning: Aggressive gases can destroy the sensor element.

Accessories

MFK	Mounting flange for duct mounting for variable immersion depth in ducts
MKR	Mounting bracket for round ducts up to Ø 600 mm
TH-VA	Immersion sleeve in stainless steel V4A / DIN EN 1.4571, length 120 mm. Other length on request.
Kit-FA-VA	Stainless steel sinter filter cap for humidity sensors, pore size 10 µm. Not for high humidity measurements!
VL3	Sensor extension cable, 3 m, PVC

Accuracy temperature and humidity incl. hysteresis



Max. Medium temperature – Temperature class (surface temp.)

Temperature class	T6	T5	T4	T3	T2	T1
Max. medium temperature [°C]	60	75	110	125	125	125

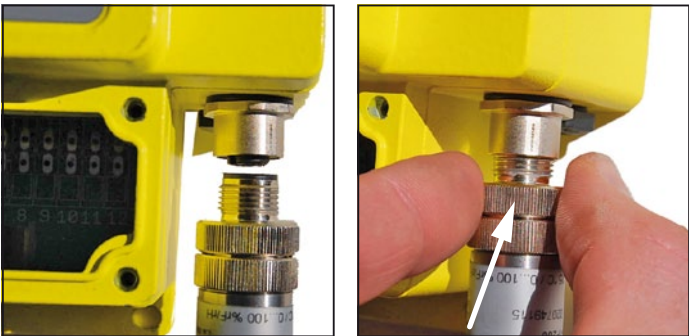
Important information for installation and operation

- A. ExPro-C... sensor**
The power for ExPro-C... sensor is supplied via an intrinsically safe (IS) circuit from the transmitter. Unused sensor entries have to be closed with the black caps.
- B. Temperature flow**
When measuring temperature over the max. allowed environmental temperature of the transmitter of +50 °C regard that no temperature flow over the sensor takes place. The mounting of the sensor has to ensure that errors due to heat dissipation are within the tolerance limits and the max. allowed environmental temperature is not exceeded.
- C. Mounting**
Screw the sensor into the socket of the transmitter. The sensor cannot be opened as parts of the element are moulded. A small distance tolerance between transmitter and sensor has to be accepted due to production conditions.

Intrinsically safe parameters

$U_i = 7,9\text{ V}$	$C_i = 0$	$P_i = 95\text{ mW}$
$I_i = 48\text{ mA}$	$L_i = 0$	

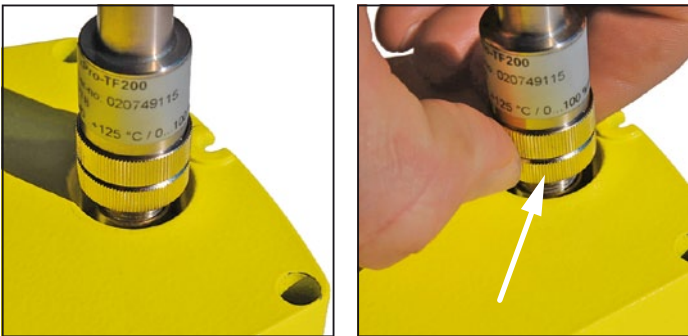
Mounting room sensor (at terminal box side)



For mounting the sensor must be plugged into the socket and screwed on the sensor by turning the lower knurled screw clockwise. Tighten hand-screwed only. A small clearance between transmitter and sensor has to be accepted due to production conditions.



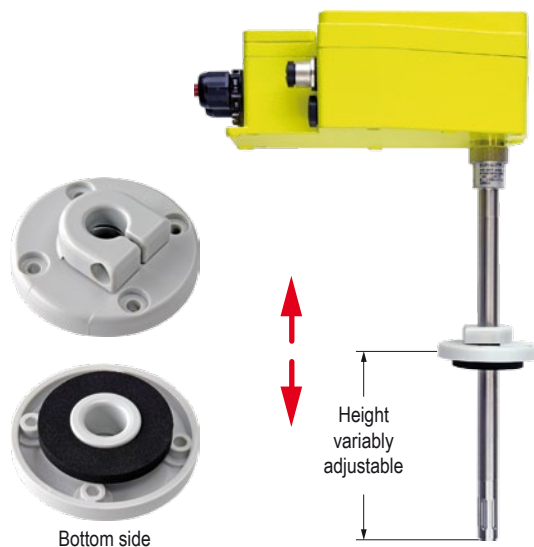
Mounting duct sensor (back side)



For mounting the sensor must be plugged into the socket and screwed on the sensor by turning the lower knurled screw clockwise. Tighten hand-screwed only. A small clearance between transmitter and sensor has to be accepted due to production conditions.

MFK mounting flange for duct installation

The flange is to be moved over the sensor and fixed with the adjusting screw on the side. The flange can be mounted with 4 screws directly to the duct.



Dimensions [mm]

