

ExBin-D Transducer for ExPro sensors (probes) ExPro-... Thermostat/humidistat (°C, %rH)

Electrical, explosion proof transducer only connectable for
ExPro-B... thermostat and humidistat.
24 VAC/DC supply, output potential free switching contact
PTB-certified in acc. with ATEX directive 94/9/EC for zone 1, 2, 21, 22.

Type of transducer:
ExBin - D
ExBin - D - 2
Type of sensor (probe):
ExPro - BT...
ExPro - BF...
ExPro - BTF...

Subject to change!

Compact . Easy installation . Universal . Cost effective . Safe

Transducer

Type	Supply	Installation area	Connectable probes	Function of sensors	Output switch	Max. ratings	Wiring
ExBin - D	24 VAC/DC	zone 1, 2, 21, 22	ExPro - BT / BF / BTF	°C, %rH, combination °C/%rH	pot. free contact	250VAC, 0.1A / 30V, 0.5A	SB 1.0
ExBin - D - 2	as above, but with second switching output						SB 2.0

Connectable sensors (compulsory for ExBin-... transducer) – see separate data sheet

Type	Function	Mearsuring range	Length of sensor	Connectable to	Installation sensor	Installation transducer
ExPro - BT...	temperature	-40...+125 °C	50/100/150/200 mm	ExBin-D..., RedBin-D...	zone 1, 2, 21, 22	zone 1, 2, 21, 22 (ExBin...)
ExPro - BF...	humidity	0...100 %rH	50/100/150/200 mm	ExBin-D..., RedBin-D...	zone 1, 2, 21, 22	zone 1, 2, 21, 22 (ExBin...)
ExPro - BTF...	combination temp./humidity	-40...+125 °C/0...100 %rH	50/100/150/200 mm	ExBin-D..., RedBin-D...	zone 1, 2, 21, 22	zone 1, 2, 21, 22 (ExBin...)

Applicaton

ExBin-D... transducer



ExPro-B... sensors



Example: room sensor



Example: duct sensor



Description

The new **ExBin-D...** transducer generation from together with direct coupled **ExPro probes** are a revolution for thermostats and/or humidistats 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 IP 66 protection, small dimension, universal functions and technical data guarantee safe operation even under difficult environmental conditions.

The switching points are scalable within the maxium ranges. The integrated display is for actual value indication which can be switched off. All sensors are programmable on site without any additional tools. **ExBin-D-2** transducer are additionally equipped with a secondary switching output, which can be parameterized independently.

Highlights transducer

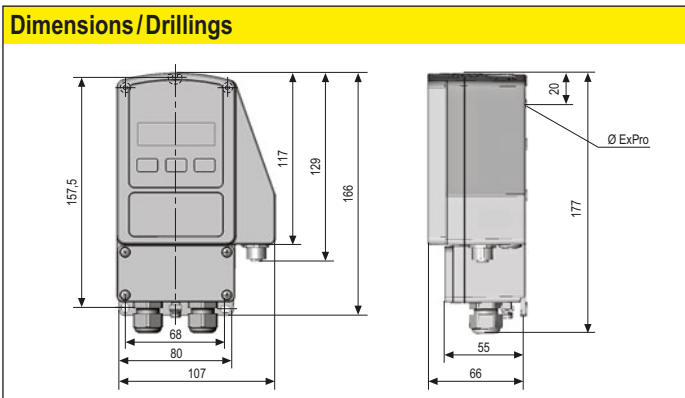
- ▶ For all type of gas, mixtures, vapours and dust for use in zone 1, 2, 21 and 22
- ▶ No additional Ex-i module required
- ▶ No intrisically safe wiring/installation between panel and sensor required
- ▶ No intrisically safe wiring/installation and no space in the panel required
- ▶ Integrated Ex-e junction box
- ▶ Power supply 24 VAC/DC
- ▶ Output potential free switching contact
- ▶ Display with backlight, can be switched off
- ▶ Scalable switching characteristics
- ▶ Compact design and small dimension (L x W x H = 177 x 107 x 66 mm)
- ▶ Robust aluminium housing in protection class IP 66
- ▶ Down to -20°C ambient temperature applicable
- ▶ Password locking
- ▶ Optional second switching output

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 ExBin-D... transducer, removable
- ▶ The ExPro probe appropriates the function (temperature, humidity or combination)
- ▶ Mounting of ExPro probe (front/back side) appropriates use for duct or room application



Technical data	ExBin-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 – output 1,5 kV
Electrical connection	terminals 0,14...2,5 mm ² at integrated Ex e junction box
Cable entry	2 x M16 x 1,5 Ex e approved, cable diameter ~ \varnothing 5...10 mm
Protection class	Class I (grounded)
Display	LCD with backlight, display for configuration, user guidance, parameter and actual value indication via LEDs
Control elements	3 buttons for configuration
Housing protection	IP66 in acc. to IEC 60529
Housing material	aluminium casting, coated
Dimensions / weight	L x W x H = 177 x 107 x 66 mm / ca. 950 g
Ambient temperature/humidity	- 20...+ 50 °C / 0...95 %rH, non condensed
Storage temperature	- 40...+ 70 °C
Sensor connection	only for ExPro-B... probes! via plug-and-socket connection at front or back side of the transducer, to appropriate the use for room or duct mounting. Attention: only one ExPro-probe can be connected to one transducer!
ExPro sensors	please have a look on the separate data sheet for ExPro-B... sensors
Measuring range	-40...+125 °C / 0...100 %rH, non condensed
Response time of sensor	T90 ~ 3 sec.
Accuracy temperature	\pm 0,2 % of end value + accuracy of ExPro-... sensor \pm 0,3 % at 25 °C \pm 0,025 °C/°C
Accuracy humidity	\pm 0,2 % of end value + accuracy of ExPro-... sensor 10...90 %rH \pm 2% and < 10%rH and > 90%rH \pm 4%
Non linearity and hysteresis	\pm 0,1 % (\pm 0,1 % of end value + accuracy of ExPro-... sensor)
Setting range hysteresis	0,5 °C...20,0 °C (factory setting 1,0 °C), 0,5 %rH...20,0 %rH (factory setting 5,0 %rH)
Start delay	5 sec.
Stability	long term stability < 0,2 %/year, temperature influence < 0,02 %/K, supply voltage influence < 0,01 %
Output switch	potential free switching contact
Ratings load max.	0,5 A @ 30 VAC/DC / 0,1A @ 250 VAC / 0,1A @ 220 VDC
Rating power max.	40 W, 10W per channel
Ratings load min.	10 mW / 0,1 V / 1 mA
Mechanical life	10×10^6
Electrical life (rated load)	100×10^3
Wiring diagram (SB)	SB 1.0 (ExBin-D) / SB 2.0 (ExBin-D-2)
Installation area transducer	in Ex-area zone 1, 2, 21, 22



Explosion proof	ExBin-D...
PTB-testet	PTB 09 ATEX 2011 94/9/EC (ATEX)
Approval for gas	II(1)G Ex emb[ia] IIC T6 for zone 1, 2
Approval for dust	II(1)D Ex tD A21 [iaD] IP66 T80°C for zone 21, 22
CE-Mark	CE No. 0158
EMC directive	RL 89/336/EC
Low voltage directive	RL 73/23/EC
Protection type	IP 66 in acc. to EN 60529
Elect. safety	Protection class I (grounded), Over voltage category II acc. to. EN 61010-1

Accessories	
MKR	Mounting bracket for round ducts up to \varnothing 600 mm
MFK	Mounting flange for probe positioning



Electrical wiring

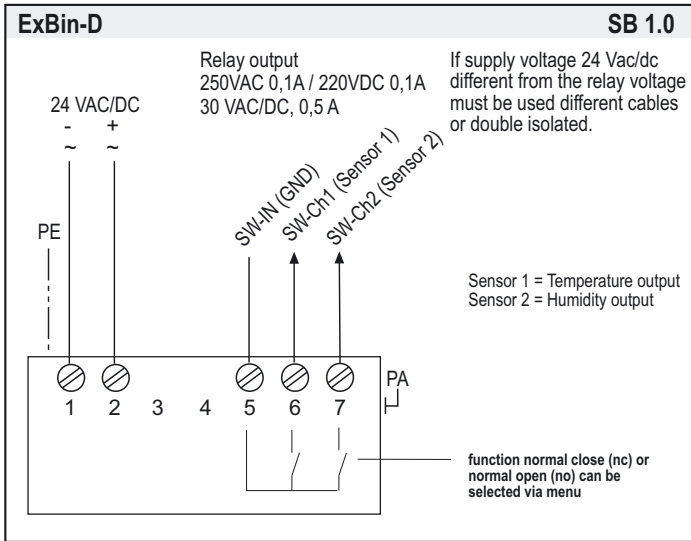
ExBin-D... transducer required a 24 VAC/DC power supply. The supply has to be connected at terminal 1 (-/~) and 2 (+/~). The electrical wiring must be realized via integrated Ex-e junction box in acc. to ATEX. Type of protection for the terminals is „Ex-e“.

Attention: Do not open covers when circuits alive!

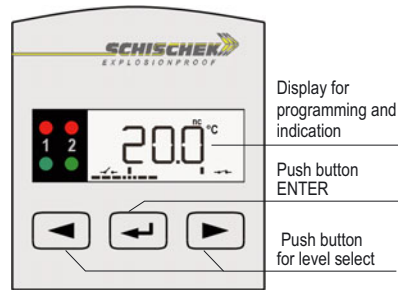
Parameter

Before starting parametrisation of ExBin-D... transducer an ExPro-B... sensor must be connected. ExPro-B... sensors are available as ExPro-BT... for single thermostat, as ExPro-BF... for single humidistat and as ExPro-BTF... with combined thermostat and humidistat.

Wiring diagram ExBin-D



Display and Buttons



Change operation-/ parametrisation mode

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

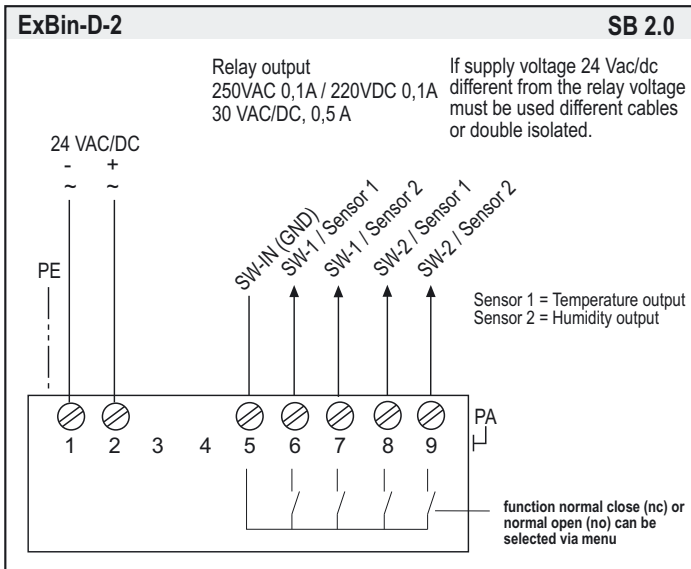
Indication of data logging

The blinking unit in the display shows that datas received and the device is working.

Sensor malfunction

A sensor malfunction is indicated through red blinking LEDs and the text „SENS“ in the display. The switching outputs will it indicate, too. In this case the connector between the transducer and the sensor should be checked first.

Wiring diagram ExBin-D-2



Password input

The default / delievery 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

Installation, Commisioning, 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 ExBin sensors are maintenance free. Nevertheless maintenace must comply with regional standards, rules and regulations.

A. Supply and Contact

Wires from safety extra low voltage must be separated from others. Only at 24 VAC/DC is supply and signal wires in one cable permitted. All others use separate or double isolated cables. Install overload protection fuse < 10 A.

B. ExPro sensors

ExPro sensors are supplied with an intrinsic safe circuit from the ExBin-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 ExBin-D transducer inside the terminal box.

D. Separate ground wires

Use for supply and signal wires a separate ground.

Values intrinsically safe (IS) for ExPro sensors

Digital ExPro sensor

- Uo = 7,9 V
Io = 6,4 mA
Po = 12,7 mW
Ci = 0 nF
Li = 0 mH
Co(IIC) = 5 mH
Lo(IIC) = 1,5 µF


Parametrisation and commissioning of ExBin-D (-2) transducers after an ExPro 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.

Menu	Function	Enter	Indication	Select	Enter	Next indication	Next selction	Enter	Next menu
Menu 1	no function – menu skip								
Menu 2	unit sensor 1 select physical unit	+Menu 2+ Unit	Menu 2 °C						
Menu 3	set 1, sensor 1 select switching point 1	+Menu 3+ SEt 1	Menu 3 20.0 °C						
Menu 4	set 2, sensor 1* select switching point 2	+Menu 4+ SEt 2	Menu 4 30.0 °C						
Menu 5	hysteresis, sensor 1 select hysteresis	+Menu 5+ HYSt	Menu 5 1.0 °C						
Menu 6	mode, sensor 1 select switching characteristic	+Menu 6+ ModE	Menu 6 UP			Menu 6 NC			
Menu 7	unit sensor 2 select physical unit	+Menu 7+ Unit	Menu 7 %rF						
Menu 8	set 1, sensor 2 select switching point 1	+Menu 8+ SEt 1	Menu 8 50.0 %rF						
Menu 9	set 2, sensor 2* select switching point 2	+Menu 9+ SEt 2	Menu 9 80.0 %rF						
Menu 10	hysteresis, sensor 2 select hysteresis	+Menu 10+ HYSt	Menu 10 5.0 %rF						
Menu 11	mode, sensor 2 select switching characteristic	+Menu 11+ ModE	Menu 11 Mid			Menu 11 NC			
Menu 12	no function – menu skip								
Menu 13	lamp select backlight	+Menu 13+ LAMP	Menu 13 ON						
Menu 14	no function – menu skip								
Menu 15	security select password	+Menu 15+ SECU	Menu 15 0000						
Menu 16	save select save data	+Menu 16+ SAVE	Menu 16 YES						

* available for 2-stage version only (ExBin-D-2)

Using the menu 6 and menu 11 „mode“

First of all the user has to define the device normal range. For example:

- The device should indicate (green LED) if the temperature is under the setpoints, mode „down-range“ has to be selected. With other words: the measure value is normally under the setpoints.
- The device should indicate (green LED) if the temperature is over the setpoints, mode „up-range“ has to be selected. (The measure value is normally over the setpoints.)
- The device should indicate (green LED) if the temperature is between the setpoints, mode „mid-range“ has to be selected. (The measure value is normally between the setpoints.) This mode is only for 2-stage devices available (ExBin-D-2).

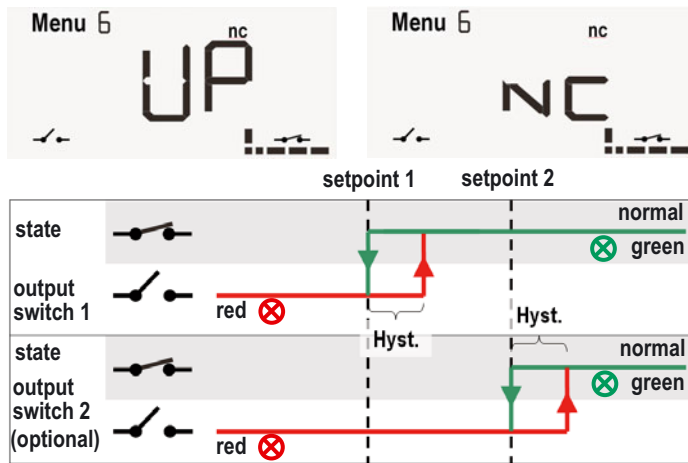
In the second step the switching characteristic of the output relay has to be selected:

- „normally closed“ (nc): if the measure value is in the normal range (see above), the corresponding relays were closed.
- „normally open“ (no): if the measure value is in the normal range (see above), the corresponding relays were open.

A detailed description of all possible settings, you find in the following section.

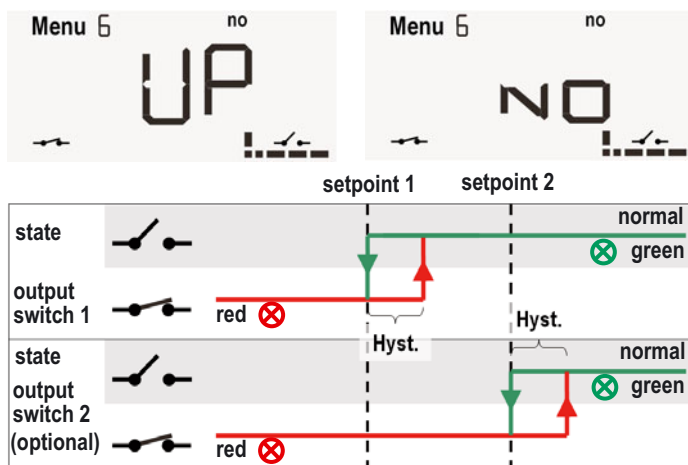
Switching characteristic „up-range“ – „normally closed“

„Up-range“: the normal range is above setpoint 1 and setpoint 2



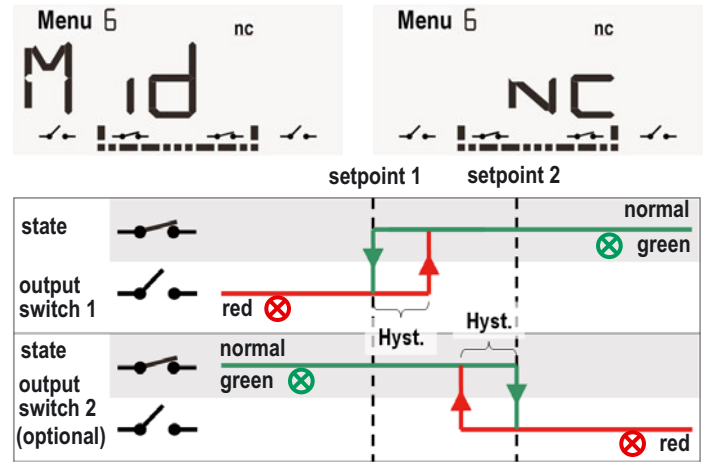
Switching characteristic „up-range“ – „normally open“

„Up-range“: the normal range is above setpoint 1 and setpoint 2



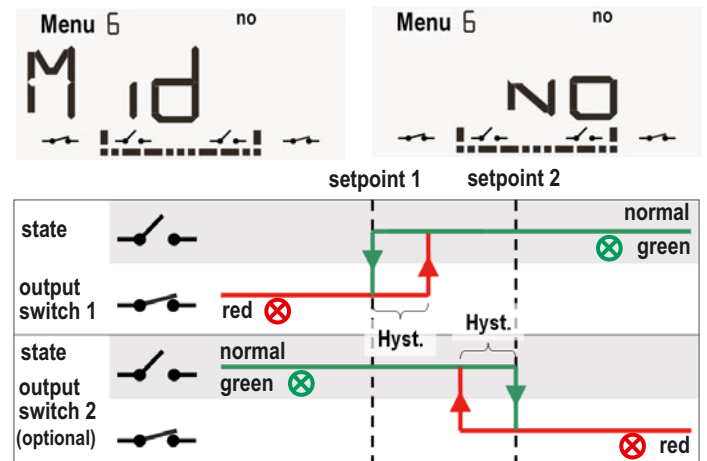
Switching characteristic „mid-range“ – „normally closed“

„Mid-range“: the normal range is between setpoint 1 and setpoint 2 (for 2-stage devices only)



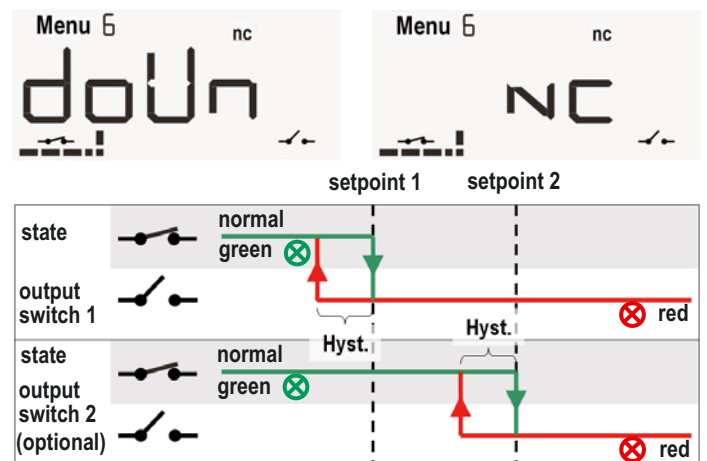
Switching characteristic „mid-range“ – „normally open“

„Mid-range“: the normal range is between setpoint 1 and setpoint 2 (for 2-stage devices only)



Switching characteristic „down-range“ – „normally closed“

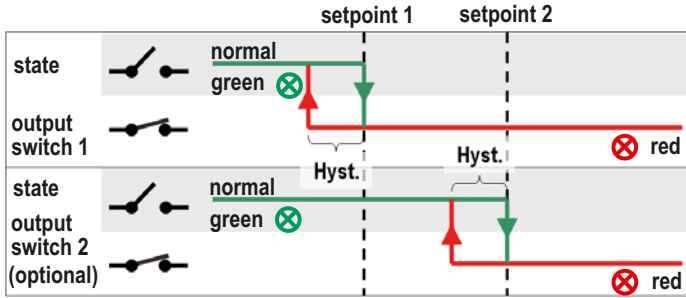
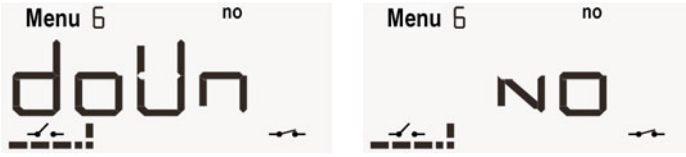
„Mid-range“: the normal range is under setpoint 1 and setpoint 2





Switching characteristic „down-range“ – „normally closed“

„Mid-range“: the normal range is under setpoint 1 and setpoint 2



ExPro-B... Digital Temperature-/Humidity Probe

Explosion proof digital probe exclusive connectable to ExBin-D / RedBin-D transducer for temperature and/or humidity measuring PTB-certified acc. to ATEX directive 94/9/EC for Zone 1, 2, 21, 22.

ExPro - BT...
ExPro - BF...
ExPro - BTF...

Subject to change!

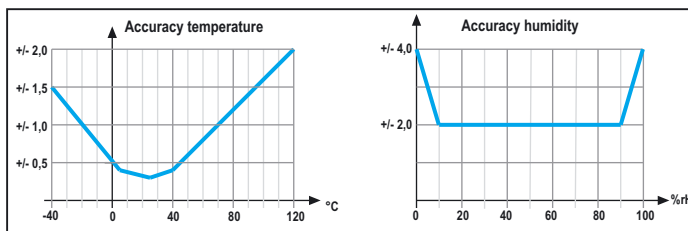
Type	Function	Range	Sensor length	Applicable to transducer	Hazardous area
Fühler					
ExPro - BT...	Temperature Probe	-40...+125 °C	50/100/150/200 mm	ExBin-D, RedBin-D	Zone 1, 2, 21, 22
ExPro - BF...	Humidity Probe	0...100 %rH	50/100/150/200 mm	ExBin-D, RedBin-D	Zone 1, 2, 21, 22
ExPro - BTF...	Combi Probe	-40...+125 °C/0...100 %rH	50/100/150/200 mm	ExBin-D, RedBin-D	Zone 1, 2, 21, 22

↑ Sensor length

Application



Technical data	ExPro-BT...	ExPro-BF...	ExPro-BTF...
Application for	Temperature Probe	Humidity Probe	Combi Probe Temperature and Humidity
Measuring Range	-40 °C...+ 125 °C	0...100 %rH	-40 °C...+ 125 °C / 0...100 %rH
Sensor type and length	ExPro-BT- 50 = 50 mm ExPro-BT-100 = 100 mm ExPro-BT-150 = 150 mm ExPro-BT-200 = 200 mm	ExPro-BF- 50 = 50 mm ExPro-BF-100 = 100 mm ExPro-BF-150 = 150 mm ExPro-BF-200 = 200 mm	ExPro-BTF- 50 = 50 mm ExPro-BTF-100 = 100 mm ExPro-BTF-150 = 150 mm ExPro-BTF-200 = 200 mm
Response time	T90 / 20 s	T90 / 4 s	T90 / 20 s, T90 / 4 s
Accuracy Temperature	± 0,3 °C @ 25 °C ± 0,025 °C/°C + transducer		
Accuracy Humidity	± 2 % @ 10 ... 90 %rH, ± 4% @ < 10%rH and > 90%rH + transducer		
Protection class	IP66 acc. to IEC 60529		
Material thermowell, protection tube	Stainless steel 1.4305, at length 50 mm in plastic max temperature 80°C (room temperature)		
Filter element	at humidity probe with plastic filter element pore size 100 µm		
Ambient temperature/humidity	- 40...+ 125 °C / 0...100 %rH		
Storage temperature	- 40...+ 125 °C		
Delivery	1 ExPro... probe with fast connection and gasket (EPDM) for duct installation		
Installation area probe	in Ex-area zone 1, 2, 21, 22		



Medium temperature

Temperature class	T6	T5	T4	T3	T2	T1
Medium temperature max [°C]	60	75	110	125	125	125

The correlation of max. medium temperatur and temperature class as well as the surface temperature is shown in table above.

Values intrinsically safe

Ui = 9,6 V Ci = 120 nF
Ii = 9,7 mA Li = 0

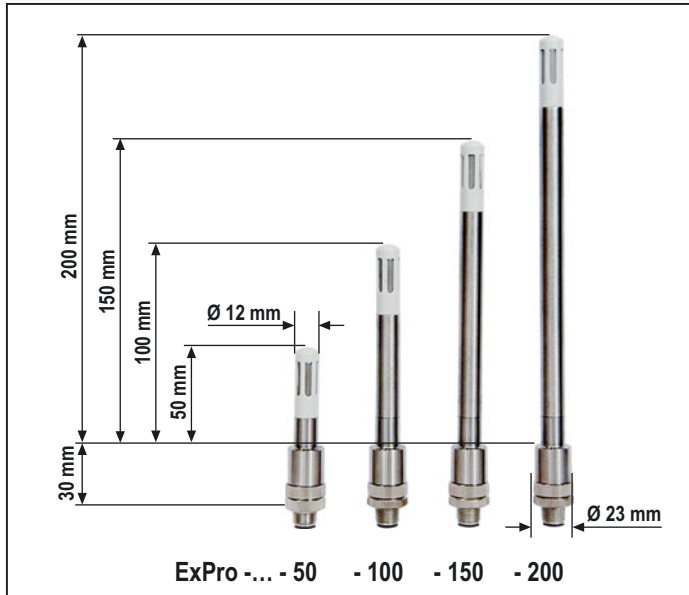
Accessories

- MFK** Flange for duct mounting, for variable depth of immersion in ducts.
- TH-VA** Immersion sleeve stainless steel V4A 1.4571, length 120 mm. other length on request.
- FA-VA** Filter element stainless steel, pore size 10µm **not for high humidity!**
- MKR** Mounting bracket for duct Ø 600 mm.

What is a ExPro-probe ?

A ExPro probe is a sensor head resp. measuring element which is in combination with a ExBin-D transducer for temperature-, humidity or combi temperature/humidity measuring. ExPro probes are only for use with ExBin-D... transducer. The connection should be done with a socket on the front resp. on the back side of the transducer but only 1 ExPro module can be used.

Dimensions



Important informations for installation and use

A. ExPro Probe

The power of the ExPro probe is supplied via an intrinsically safe (IS) circuit from the ExBin-D. Unused probe-entries at the ExBin-D have to be closed with the black caps.

B. Temperature-flow

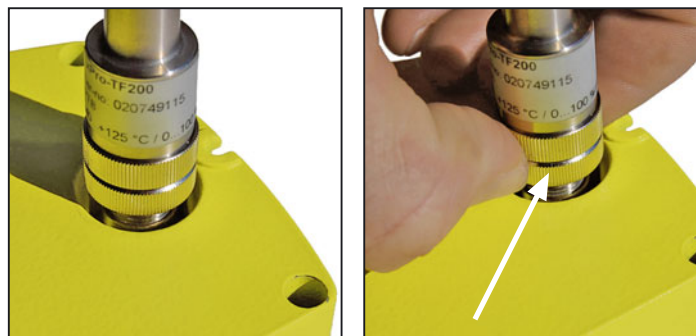
In case of temperature measuring over the max. allowed environmental temperature of 50 °C of the transducer, it has to be watched, that no temperature flow over the probe takes place.

The mounting of the probe has to make sure, that mistakes due to heat-dissipation are within the tolerance-limits and the max. allowed environment temperature is not exceeded.

C. Mounting

The probe is being screwed into the socket of the ExBin-D. The probe cannot be opened, as parts of the element are moulded. A small distance tolerance between ExBin-D (transducer) and ExPro (probe) has to be accepted due to production conditions.

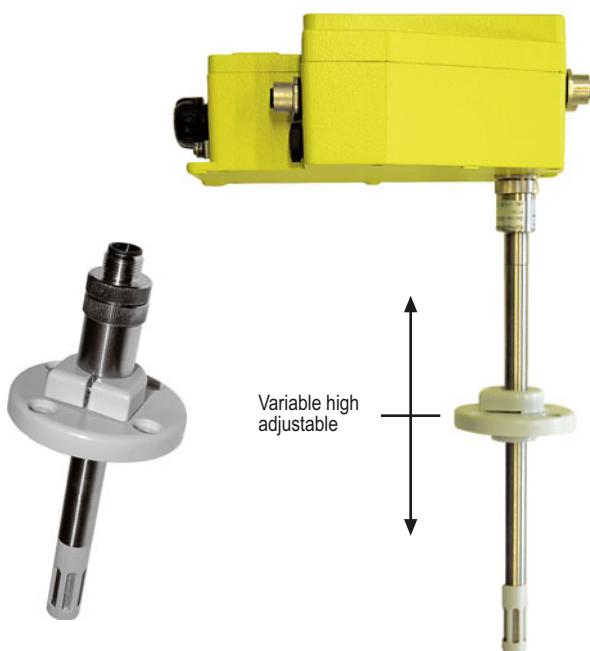
Mounting duct probe (Back side)



For mounting the probe plug the socket and screw on the sensor by turning the lower knurled thumb clock wise. Just screw hand tight. A small clearance between ExBin-D (transducer) and ExPro (probe) has to be accepted due to production conditions.

Mounting flange (MFK) for duct installation

The flange is moved over the probe and fix it with the side wise adjusting screw. The flange can be mounted with the 4 screws direct to the duct.



Mounting room probe (terminal box side)



For mounting the probe plug the socket and screw on the sensor by turning the lower knurled thumb clock wise. Just screw hand tight. A small clearance between ExBin-D (transducer) and ExPro (probe) has to be accepted due to production conditions.