EXspect 271

TECHNICAL INFORMATION

NIR Backscatter Sensor

EXNER
Process Equipment

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1 Technical data

1.1 Standards

The following standards were applied when manufacturing the sensor:

- EN 61326-1: 2013-7
- EN 61326-2-3: 2013-7
- DIN/EN 27027 (ISO7027)

1.2 Specification

Sensor specifications	
Measurement range	0...100 %
Resolution	0.1 %
Accuracy	± 1.5 %
Reproducibility	≤ 1 % from final value
Wave length	850 nm
Light source	LED
Material	Stainless steel 1.4435 (316L)
Surface finish	Ra <0.37 µm
Lens	Sapphire ball
Supply voltage	24 V DC
Output current	4...20 mA
Switch output	Can be set to NO or NC
Input contact	+24 V DC for adjustment (zeroing)
Cable connection	5 or 8-pin M12 plug
Cable length	2 m or 5 m
Process connection	G 1/2" for welding sockets with 35° cone

1.3 Dimensions

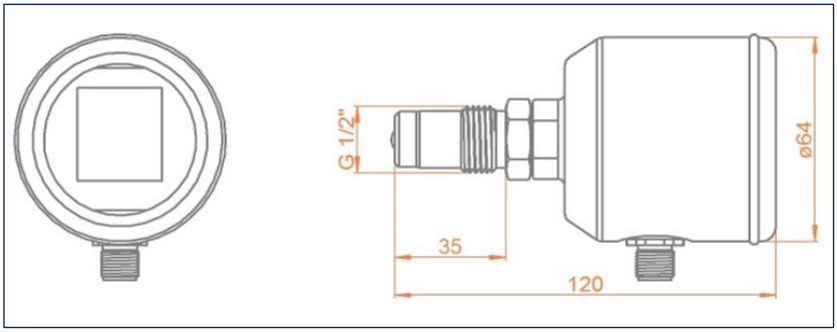


Fig. 1: Sensor dimensions

1.4 Environmental conditions

Ambient temperature	-10...70°C
Transport and storage temperature	-20...80°C

1.5 EXspect process conditions

Max. permissible pressure PS	20 bar	
Max. permissible temperature TS:	100°C	
Max permissible sterilisation temperature	141°C	max. 2 hours

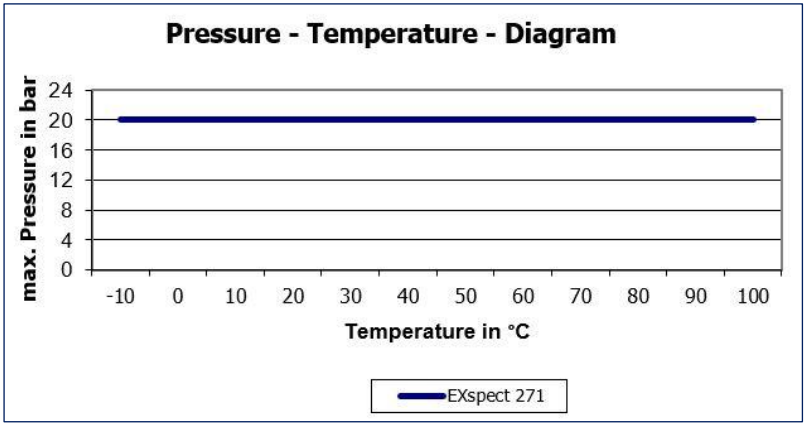


Fig. 2: EXspect pressure-temperature diagram

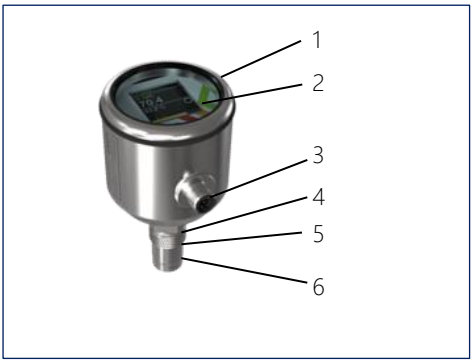
1.6 Identification plate

Fig. 3: Identification plate

In case of queries, please contact your dealer directly.

2 Product description

2.1 EXspect 271 NIR backscatter sensor



1	Housing cover
2	Touch display
3	M12 port
4	Pressure screw
5	Process connection
6	Sapphire lens (ball)

Fig. 4: NIR backscatter sensor

EXspect 271

The EXspect 271 NIR backscatter sensor enables monitoring of the turbidity of liquids for continuous monitoring of process results or safe indication of variations. It is particularly suitable for phase separation, separation control, filter monitoring and concentration measurement.

- Safe phase separation
- Quicker product changeovers
- Reduced waste water costs
- Filter monitoring
- Colour-independent concentration measurement
- Compact design with integrated booster and display
- Durable sapphire lens
- Hygienic design, CIP/SIP-compliant
- LED light source, guaranteed stable and long-lasting signal
- Integrated contact and analogue outlet
- Simple parameterisation
- Turbidity in % or a customer-specific unit

Display

The current measurement value is shown on the display. The sensor can be configured using the touch display.

Calibration input

The current measurement value can be set to 0 by briefly connecting a 24 V DC signal to the calibration input. With this, the transmitter can be adjusted to familiar measurement media (zeroed). The same is possible using the "Offset Val" menu function.

2.2 Functions

Zeroing

Set the current measurement value to 0 using offset.
This is the same function as the calibration input via the external contact.

Display switching

Defines which measurement value should be displayed:

- Turbidity
- Customer-defined unit (CDU)

The factory pre-set CDU value can only be changed or adjusted for sensors with the 8-pin M12 connector and the ECI-01 communication interface, as well as the EXpert 2.x software.

Independent of display toggling, the analogue output always provides a turbidity-dependent signal.

Lower measuring range

Defines the 4 mA point for the output current. The range can be freely selected between 0 and 100 %.

Upper measuring range

Defines the 20 mA point for the output current. The range can be freely selected between 0 and 100 %.

Damping

Attenuates the turbidity measurement value by continuous averaging.

Switch-off point

Defines the point at which the contact switch switched off. The range can be freely selected between 0...100 %.

Switch-on point

Defines the point at which the contact switch switched on. The range can be freely selected between 0...100 %.

Switch function

Defines the digital output function for the contact switch. You can choose between making contact and breaking contact.

Switching delay

Defines the switching delay for the contact switch. You can choose freely from a range of 0...200 seconds.

Language

Defines the display language.

2.3 Process integration

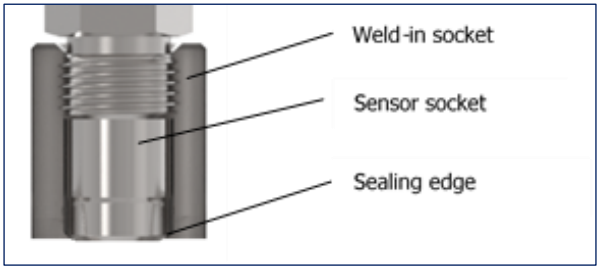
Sensor

The EXspect 271 sensor is integrated directly into pipes or tanks with its G ½" connector, or by using corresponding adapters with the existing process connectors.

Fig. 5: Process integration

Welding sockets

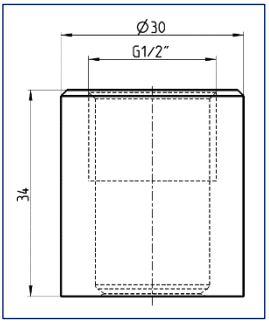
Installation using welding sockets guarantees hygienic process adaptation, which can be used with minimal dead space and free of elastomers. As this is a purely metal-sealed system, no other sealing materials, e.g. elastomers, may be used.

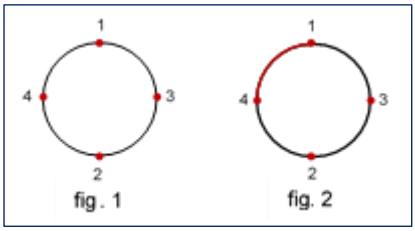


Please always use the weld-in plugs supplied as accessories so that the heat resulting from the welding process can be dissipated safely, and distortion of the drill hole is hindered effectively.

Welding in tanks / pipes

1. Drill a hole with the same external diameter as the weld-in plug (maximum tolerance is +0.2 mm)
2. Attach plugs at 4 evenly-spaced points (Fig. 1 below)
3. Screw the weld-in plugs in
4. Weld the parts between the 4 points (Fig. 2 below)





Transmitter

The transmitter is powered by a 24 V DC supply, has a freely programmable contact switch, and a 4...20 mA output for outputting measurement values. The measuring value can be set to 0 % via 24 V input.

Pressure / Temperature

The EXspect sensor can be used at a pressure of up to 20 bar and at a maximum process temperature of 141 °C.

To protect the LED which is used, it is switched off as of a temperature of 100 °C. Measurement is then no longer possible. The display shows the error message “Electricity LED".

After lowering the media temperature below 100 °C, the LED is reactivated and the error message disappears.

NOTE

Please note the pressure and temperature diagrams in → Chapter 3

Installation position

In principle, the sensors can be used in any location. However, you must ensure that the pipe is completely filled, and that the sensor is not set up in a place where bubbles are formed due to high turbulence of the medium. You should also observe how easily the display can be read ensure good access and operability.

The following diagram shows the favoured locations for installing the sensor. As you can see, the sensor is better mounted on the side of the pipe.

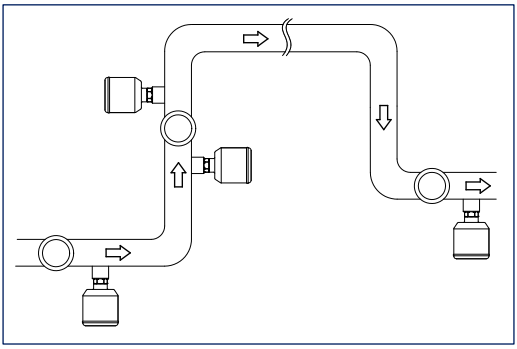


Fig. 6: Installation locations

2.4 Checking and Adjustment

Reference normals (EXcap 120) with varying backscattering values are available for checking and adjustment of the EXspect 271 sensor. If necessary, they can be attached to the sensor. To guarantee the inspection/adjustment is carried out without any errors, ensure that:

- The optical sensor unit is dry and clean

- The reference normal is placed precisely on the sensor
- The marking (arrow) for the standard is aligned with the sensor connector

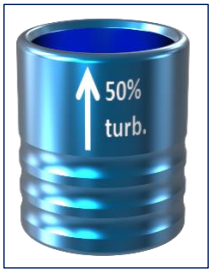


Fig. 7: Reference normal with marking

3 Order structure for EXspect 271

EXspect 271 sensor							
	Code	Measurement range					
	A	0...100 % turbidity					
		Code	Material				
		4435	Stainless steel, 1.4435 (316L)				
		XXXX	Special version				
			Code	Seal material (touching medium)			
			MET	Metal sealing (without elastomer)			
			XXX	Special version			
				Code	Process connection		
				G12	Thread G ½" (metal sealing)		
				T15	Tri-Clamp 1,5" (EHEDG/3A)		
				T20	Tri-Clamp 2" (EHEDG/3A)		
				VRN	Varivent N (EHEDG/3A) DN40-125		
				XXX	Special version		
					Code	Interface	
					AS	Analogue 4...20 mA / 5-pin M12	
					AD	Analogue 4...20 mA / can be parameterised digitally / 8-pin M12	
					XX	Special version	
						Code	Display
						1	with integrated display
						X	Special version
EXspect 271							Order code

4 Spare parts and accessories

The sensor serial number must always be quoted for spare parts and accessories orders.

4.1 EXspect 271 accessories

Description	Order number
2 m EXspect connector cable (M12 5-pin)	2-125-00-001
5 m EXspect connector cable (M12 5-pin)	2-125-00-002
2 m EXspect connector cable (M12 8-pin)	2-120-68-001
5 m EXspect connector cable (M12 8-pin)	2-120-68-002
PC software EXpert 2.x on a USB stick (for Windows)	2-120-69-003
Communication interface ECI-01 EXspect 271/231 for connecting to a PC via USB (connector cable M12 8-pin)	2-120-66-001

4.2 EXspect 271 certificates

Description	Order number
Certificate EN10204-2.2 for surface roughness (Ra <0.37 µm)	2-121-01-001
Certificate EN10204-3.1 for material	2-121-01-002

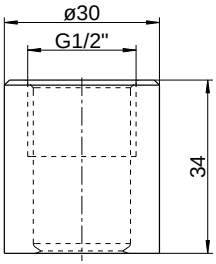
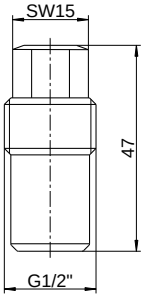
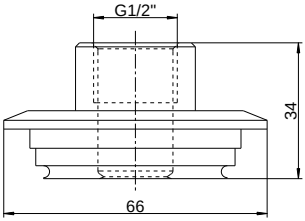
4.3 EXspect 271 factory inspection

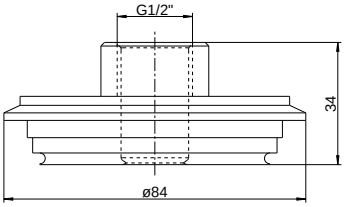
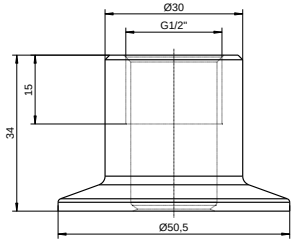
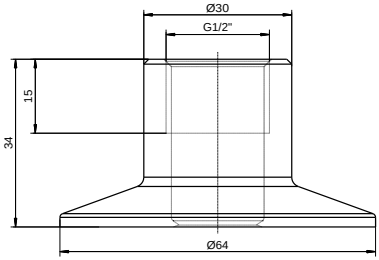
Description	Order number
Factory recalibration for NIR sensors incl. certificate (proof of return)	2-999-00-013

4.4 Spare parts

Description	Order number
Operating and display unit	2-118-00-001
Housing cover with inspection glass	2-151-32-001

4.5 Installation adapter

Description	Drawing	Order number
Welding socket G ½" cylindrical		2-087-33-003
Brass welding aid G ½"		2-086-11-001
Varivent F process adapter DN 25-40		2-083-33-001

Description	Drawing	Order number
Varivent N DN 40-125 process adapter		2-083-33-002
Process adapter Tri-clamp 1 ½"		2-083-33-005
Process adapter Tri-clamp 2"		2-083-33-006

5 Certificates and compliances

All freely available certificates and conformities can be found in their most current form in the “Downloads” section of our website.

To access the following address, enter it into your browser or scan the QR code below. Then select the relevant product and document from the list.

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Depending on the product, additional certificates (e.g. material, surface, etc.) are available. If necessary, please send a corresponding request to Exner Process Equipment GmbH.

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