EXcell 231 / 241

TECHNICAL INFORMATION

NIR - Absorption Sensor

EXNER
Process Equipment

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EXNER PROCESS EQUIPMENT GmbH

Imprint

Distributed by:

Exner Process Equipment GmbH
Carl-Metz-Str. 26
D-76275 Ettlingen

Date of issue: 2024-07-09

As per: 01.07.2024

File: Technical information Excell 231_241 240701

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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 (ISO 7027)

1.2 Specification

Sensor specifications	
Measurement range	0...6 AU; 0...6600 EBC; 0...12 OD
Resolution	0.01 AU
Accuracy	± 1 %
Reproducibility	≤ 1 % of the final value
Wave length	850 nm
Light source	LED
Material	Stainless steel 1.4435 (316L)
Surface finish	Ra <0.37 µm
Measuring window	Sapphire
Process connection	Thread PG 13.5; union nut (G 1 ¼")
Process temperature	0...90 °C, autoclavable
Process pressure	Max. 16 bar (232 psi)
Electrical connection	Fischer Core series
Connector cable length	2 m / 5 m
Interfaces	RS485 Modbus, USB (with ECI-01), 0/4...20 mA with switching output (with ECI-03), 0/4...20 mA with zeroing function (configuration "DA")

Max. measuring range:

Unit	Optical path length		
	5 mm	10 mm	20 mm
AU	0...6	0...6	0...6
OD	0...12	0...6	0...3
EBC	0...6600	0...3300	0...1650

1.3 Dimensions

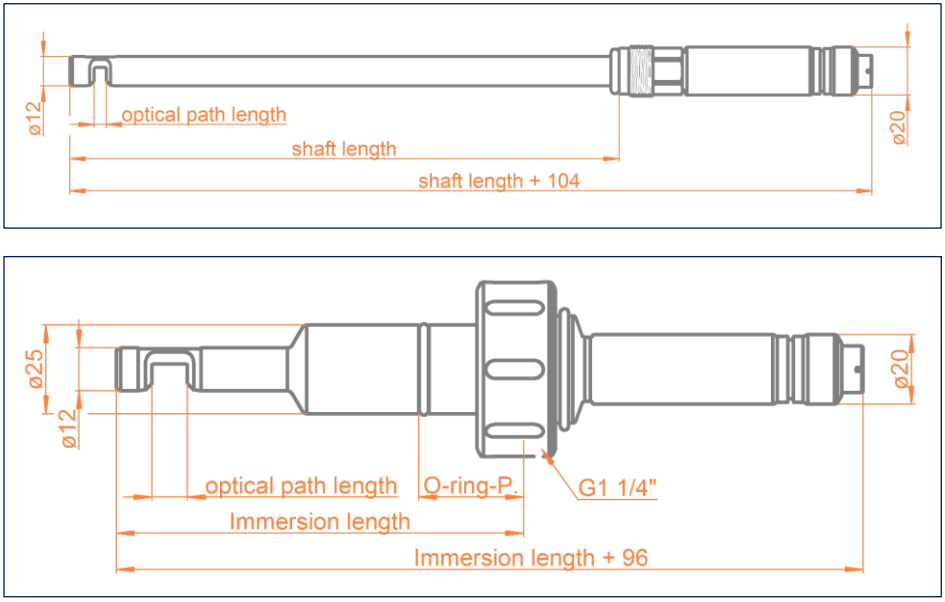


Fig. 1: EXcell 231 / 241 dimensions

1.4 Environmental conditions

Ambient temperature -10...70 °C

Transport and storage temperature -20...80 °C

1.5 EXcell process conditions

Max. permissible pressure PS:	16 bar	
Max. permissible temperature TS:	90 °C	
Max. permissible sterilisation temperature	135 °C	max. 1 hour

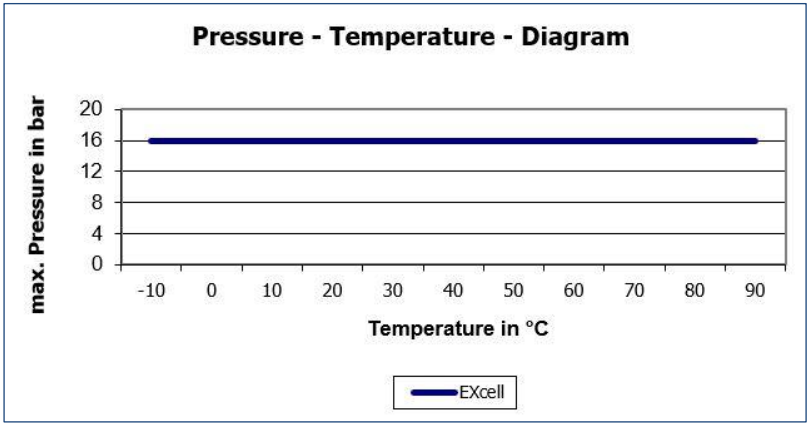


Figure 2: Pressure - temperature diagram EXcell

1.6 Identification plate

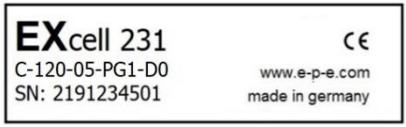
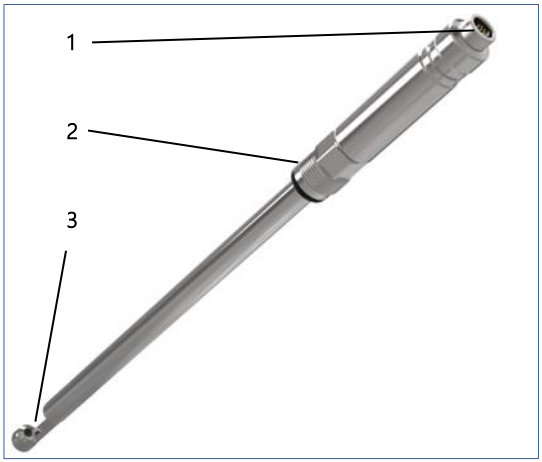


Fig. 3: Identification plate (based on EXcell 231)

2 Product description

2.1 NIR – EXcell absorption sensor

2.1.1 Components



1	Fischer Core series connector plug
2	PG 13.5 thread
3	Measuring window

Fig. 4: EXcell 231 sensor

2.1.2 EXcell 231

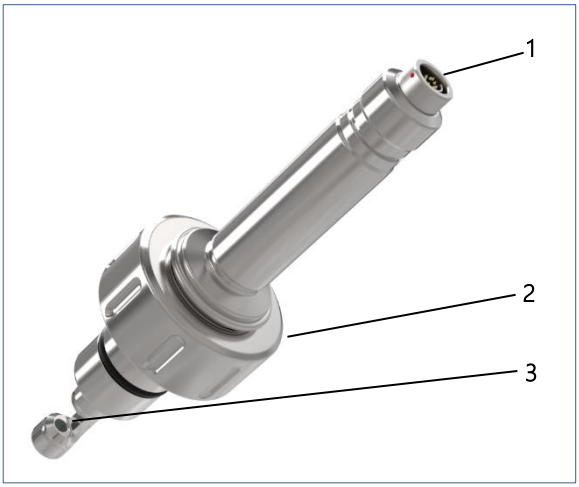
The NIR absorption sensor EXcell 231 is a high-precision digital NIR rod sensor for monitoring production processes in the biotech, food and pharmaceuticals industries.

Its 12mm stainless steel design and non-wearing sapphire windows make the EXcell 231 a reliable absorption sensor with an integrated digital measurement amplifier. Turbidity values such as EBC / FAU / TEF / mg/l / AU / OD or customer-specific units can be output.

The sensor can be comfortably parameterised at the PC using the matching EXpert 2.x software and the measuring values can be logged and displayed graphically. Also, a RS485 Modbus interface and an interface for 0...20mA output with an integrated measurement value display are available.

The sensor can be mounted like a standard pH-sensor by it´s PG13,5 thread connection. The assembly dimensions on the process side are equivalent to those of a standardised

sensor. Therefore, this sensor can also be used in combination with retractable process probe housing and fully automatic cleaning systems.



1	Fischer Core series connector plug
2	DN25 (Ingold) connector
3	Measuring window

Fig. 5: Sensor EXcell 241

EXcell 241

The NIR absorption sensor EXcell 241 is a high-precision digital NIR rod sensor for monitoring production processes in the biotech, food and pharmaceuticals industries.

Its use on common DN25 welding plugs and the non-wearing sapphire windows make the EXcell 241 a reliable, intelligent absorption sensor with an integrated digital measurement amplifier which is very easy to install on typical industrial fermenters. Turbidity values such as EBC / FAU / TEF / mg/l / AU / OD or customer-specific units can be output.

The sensor can be comfortably parameterised at the PC using the matching EXpert 2.x software and the measuring values can be logged and displayed graphically. Also, a RS485 Modbus interface and an interface for 0...20mA output with an integrated measurement value display are available.

The sensor is attached to the welding socket using a G1 1/4" thread. In order to enable the best possible sterile installation, the O-ring-position can be chosen according to the existing plug.

2.1.3 Checking and adjustment

For checking and adjusting reference filters (EXcap 110) with various absorption values, the sensors EXcell 231 and EXcell 241 are available. If necessary, they can be attached to the sensor. To guarantee that inspection/adjustment is carried out without any errors, ensure that the reference filter is placed precisely on the sensor, and that the filter plate is at the lower measuring window of the sensor. The optical sensor unit must be dry and clean for this.

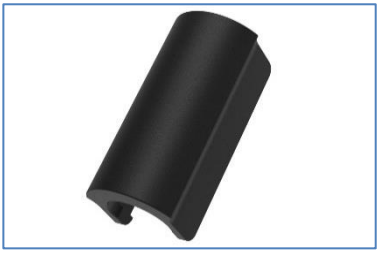


Fig. 6: Reference filter

In order to be able to carry out an inspection or adjustment of the sensor with the reference filter, the unit "AU" must first be selected for the sensor.

3 Ordering structure

3.1 EXcell 231 sensor

	Code	Measurement range				
	C	0...6 AU / 0...6600 EBC / 0...12 OD				
	X	Special version				
		Code	Shaft length			
		120	120 mm			
		225	225 mm			
		325	325 mm			
		425	425 mm			
		XXX	Special version			
			Code	Optical path length		
			05	5 mm		
			10	10 mm		
			20	20 mm		
			XX	Special version		
				Code	Process connection	
				PG1	Gewinde PG 13,5	
				XXX	Special version	
					Code	Interface
					D0	Modbus RTU (RS485)
					DA	Modbus RTU (RS485) / 4...20 mA
EXcell 231						Ordercode

Example: EXcell 231-C-225-10-PG1-D0

3.2 Sensor EXcell 241

	Code	Measurement range					
	C	0...6 AU / 0...6600 EBC / 0...12 OD					
	X	Special version					
		Code	Immersion length				
		070	65 mm + optical path length				
		110	105 mm + optical path length				
		XXX	Special version				
			Code	Optical path length			
			05	5 mm			
			10	10 mm			
			20	20 mm			
			XX	Special version			
				Code	O-Ring position		
				25	25 mm		
				28	28 mm		
				29	29 mm		
				30	30 mm (for standard weld-in socket)		
				35	35 mm		
				50	50 mm		
				55	55 mm		
				XX	Special version		
					Code	Sealing material	
					EPD	EPDM (FDA/USP VI)	
					XXX	Special version	
						Code	Interface
						D0	Modbus RTU (RS485)
						DA	Modbus RTU (RS485) / 4...20 mA
EXcell 241							Ordercode

Example: EXcell 241-C-110-05-30-EPD-D0

4 Spare parts and accessories

EXcell 231 / 241 accessories	Order code
PC EXpert 2.x software on a USB stick (for Windows)	2-120-69-003
Communication interface ECI-01 for PC connection via USB	2-120-69-004
Communication interface ECI-02 Modbus RS485	2-120-58-003
Communication interface ECI-03 0...20mA with display	2-120-69-005
EXcell 231/241 2m connection cable (for ECI-02/03)	2-120-69-001
EXcell 231/241 5m connection cable (for ECI-02/03)	2-120-69-002
EXcell 231/241 2m connection cable (for Lucullus)	2-120-69-006
EXcell 231/241 5m connection cable (for Lucullus)	2-120-69-007
Connection cable ECI-01 to ECI-03	2-120-69-009

Accessories for EXcell 241	Order code
Safety weld-in socket DN25 straight, 40 mm, 1.4404 / 316L	2-087-33-001
Safety weld-in socket DN25 inclined, 40 mm, 1.4404 / 316L	2-087-33-002
Safety bracket SK25 for welding socket DN25 (Ingold)	2-140-33-002

EXcell 231 / 241 certificates	Order code
Certificate EN10204-2.2 for surface-finishing (Ra<0,37 µm)	2-121-01-019
Certificate EN10204-3.1 for materials (media wetted parts)	2-121-01-002
Certificate for elastomer-compound EPDM-FDA / USP VI according to DIN EN 10204-2.2	2-121-01-003
Certificate for factory calibration NIR sensors acc. DIN EN 10204-3.1	2-121-01-022

EXcell 231 / 241 factory inspection	Order code
Factory recalibration for NIR sensors incl. certificate (proof of return)	2-999-00-013

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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