

EXCELL 231 / 241

TECHNICAL INFORMATION

NIR - Absorption Sensor



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Carl-Metz-Str. 26

D-76275 Ettlingen

For Support, Contact:



www.southforkinstruments.com

Tel: 925 461 5059

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Table of contents

1	Technical data	4
1.1	Standards.....	4
1.2	Specification.....	4
1.3	Dimensions.....	5
1.4	Environmental conditions	5
1.5	EXcell process conditions.....	6
1.6	Identification plate.....	6
2	Product description	7
2.1	NIR – EXcell absorption sensor.....	7
2.1.1	Components	7
2.1.2	EXcell 231.....	7
2.1.3	Checking and adjustment.....	9
3	Ordering structure	10
3.1	EXcell 231 sensor.....	10
3.2	Sensor EXcell 241.....	11
4	Spare parts and accessories	12
5	Certificates and compliances	13

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 1/4")
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

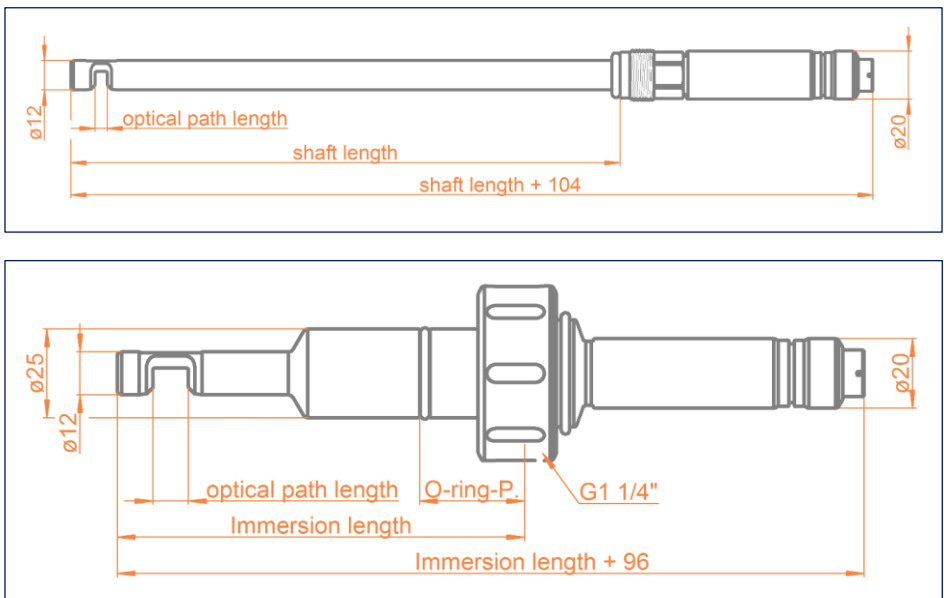


Fig. 1: EXcell 231 / 241 dimensions

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

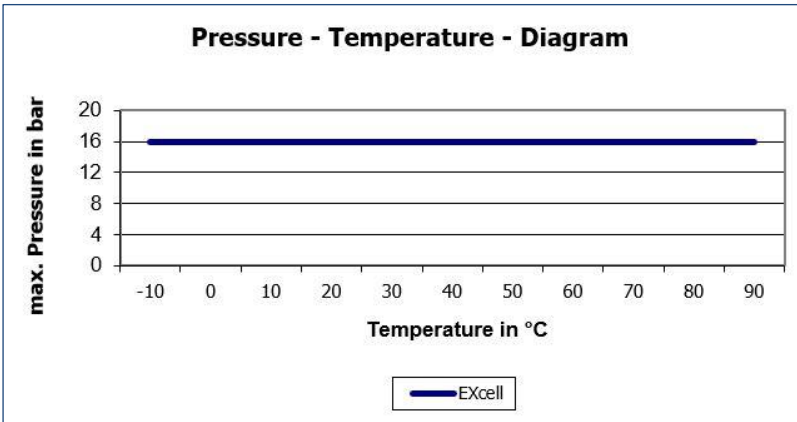


Figure 2: Pressure - temperature diagram EXcell

1.6 Identification plate

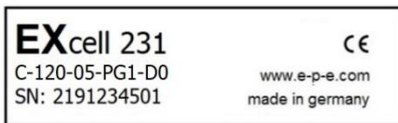
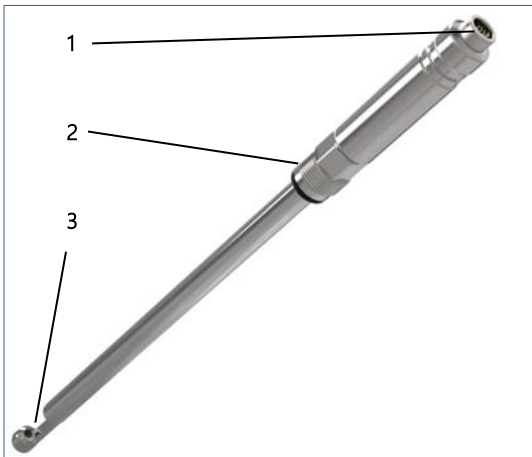


Fig. 3: Identification plate (based on EXcell 231)

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

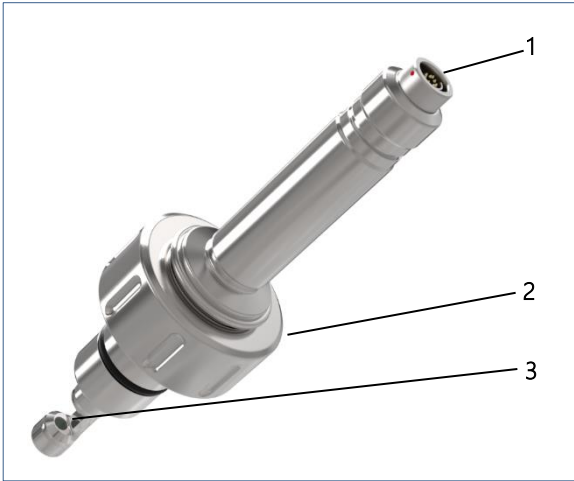
The NIR absorption sensor EXcell 231 is a high-precision digital NIR rod sensor for monitoring production processes in the biotech, food and pharmaceuticals industries.

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 its 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.

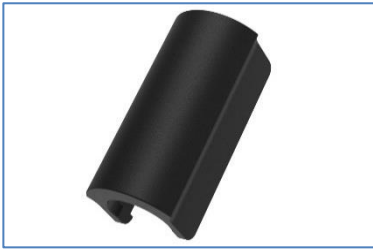


Fig. 6: Reference filter

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 ($R_a < 0,37 \mu\text{m}$)	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

Declaration of conformity

for

Turbidity sensor EXcell231/241

We declare under our sole responsibility that the product, to which this declaration relates is in conformity with the following standards and the normative documents:

EU- Directive	harmonized standards
EMV-Directive 2014/30/EU	DIN EN 61326-1:2013
Modul A	DIN EN 61326-2-3:2013

This declaration applies to all identical specimens of the product, which are manufactured according to the development-, design- and manufacturing drawings and descriptions, which are part of this declaration.

This declaration is given by the manufacturer.

Name of company: **Exner Process Equipment GmbH**
 Address: Carl-Metz-Straße 26
 D-76275 Ettlingen
 Germany

Ettlingen _____ *16.06.2021* _____
 Place Date Detlef Exner
 General Manager



For Support, Contact:



www.southforkinstruments.com

Tel: 925 461 5059



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

tel +49 (0)7243-94 54 29-0
fax +49 (0)7243-94 54 29-99
mail info@e-p-e.de

www.e-p-e.com