

Technical Information

OUSBT66

Hygienic sensor for cell concentration measurement using NIR absorption



Application

- Cell growth in bacterial fermentation and mammalian cell cultures
- Biomass level during fermentation processes
- Monitoring of algae concentration
- Control of crystallization processes
- Suspended solids measurement

Your benefits

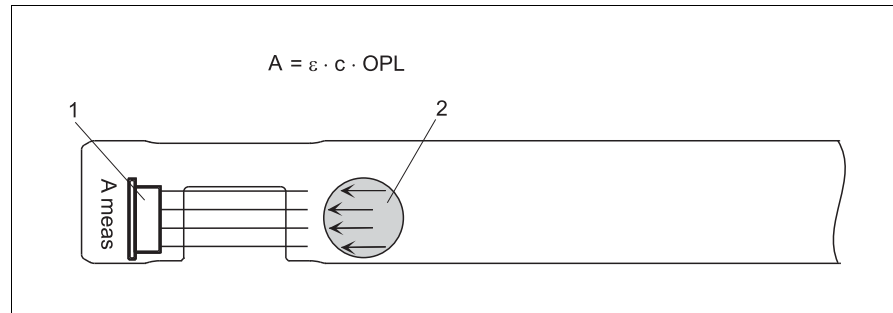
- Sensor with hygienic design:
 - Stainless steel 1.4435 (316L)
 - Sterilizable and autoclaveable
 - CIP/SIP resistant
 - Sapphire windows without seals and crevices
- Accurate measurement:
 - Highest linearity and broad measuring range through LED lamp
 - Easy calibration with traceable clip-on filters
- For a wide range of applications:
 - Various optical pathlengths for different cell cultures and concentrations
 - PG 13.5 thread for standard assemblies or head plate installations
 - Suitable for laboratory, pilot scale and production fermenters and bioreactors with 12 mm design
 - Available in several lengths to accommodate fermenters and bioreactors of different sizes

Function and system design

Measuring principle

Absorption light method

The measuring principle is based on the Lambert-Beer law. There is a linear dependency between the absorption of light and the concentration of the absorbing substance. A light source emits light waves through the medium and the transmitted light is measured on the detector side. The intensity of light is determined by a photodiode and converted into a photo current. The final conversion into absorption units (AU, OD) is done by the related transmitter.



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NIR absorption sensor OUSBT66

A Absorption

ε Extinction coefficient

c Concentration

OPL Optical pathlength

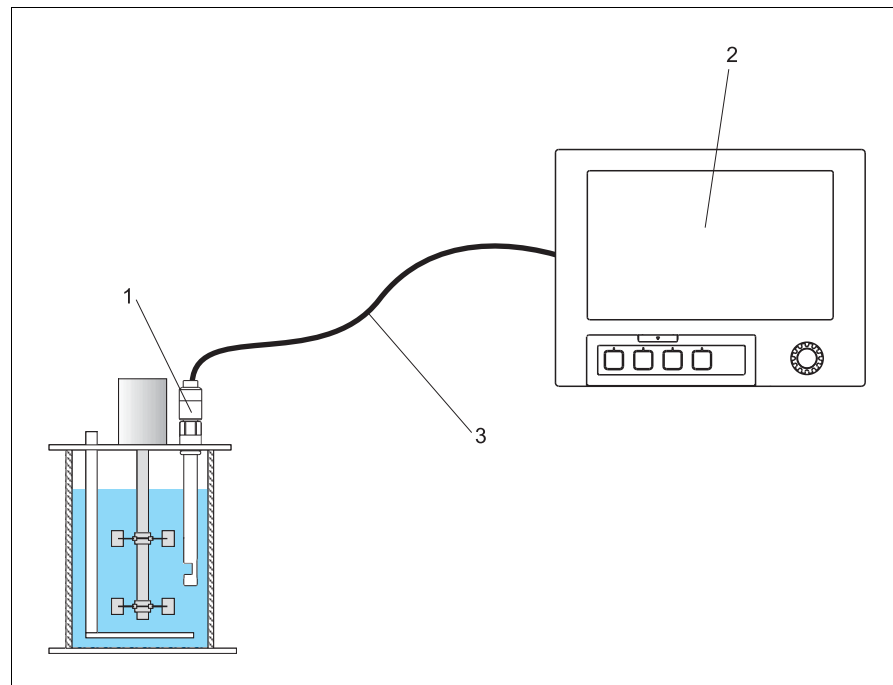
1 Measurement detector

2 Light source

Measuring system

A complete measuring system comprises, e.g.:

- Optical sensor OUSBT66
- Memograph CVM40
- Measuring cable, e.g. OUK60



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Measuring system example

1 Optical sensor OUSBT66

2 Transmitter Memograph CVM40

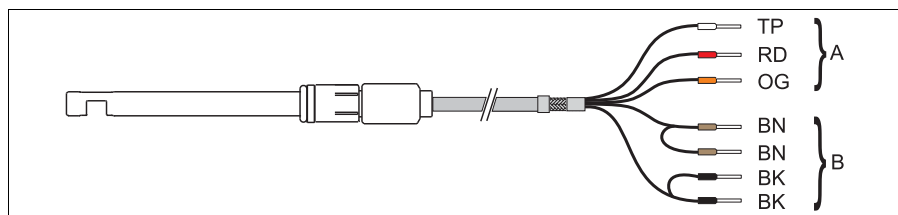
3 Measuring cable OUK60

Input

Measured variable	NIR absorption
Measuring range	0 to 4 AU, 0 to 8 OD (depending on optical pathlength)
Wavelength	880 nm
Optical pathlengths	5, 10 or 20 mm

Wiring

Electrical connection Up to two sensors can be connected to the transmitter Memograph CVM40.



Connection to transmitter Memograph CVM40
 A Signal transmission of detector
 B Power supply for lamp and lamp voltage signal

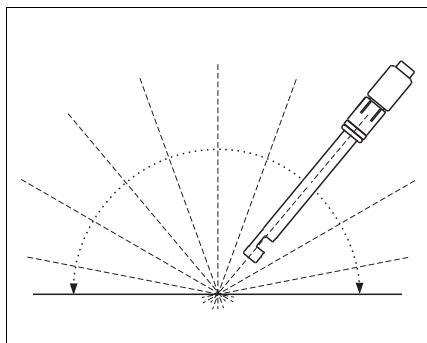
Terminal CVM40	Sensor OUSBT66	
	Core	Assignment
S1.5	TP	Shield
S1.1	RD	Sensor +
S1.2	OG	Sensor -
V1.1	BN	Lamp voltage +
V1.3	BN	Lamp sense +
V1.4	BK	Lamp sense -
V1.2	BK	Lamp voltage -

Cable connection	IP68 Fischer locking with autoclave cap
Cable lengths	3 m (10 ft), 5 m (16 ft), 10 m (32 ft) or 20 m (65 ft)

Installation

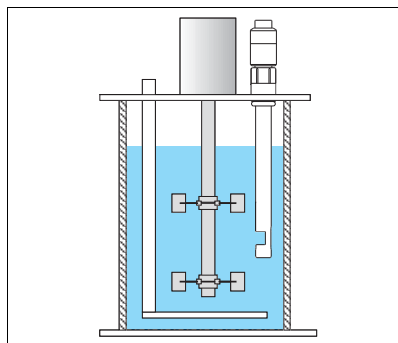
Angle of installation

The sensor can be installed either directly in fermenters and bioreactors through the head plate ports or in an assembly or suitable process connection.



Permitted angle of installation

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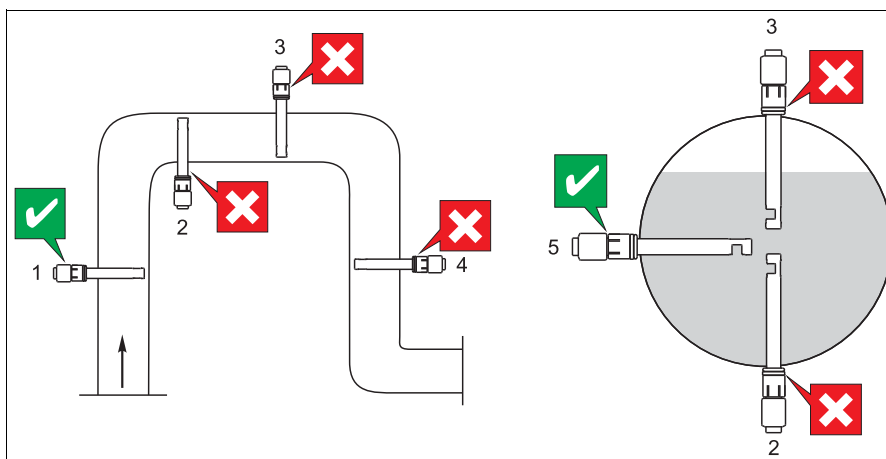


Installation of OUSBT66 in fermenter

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Pipe installation

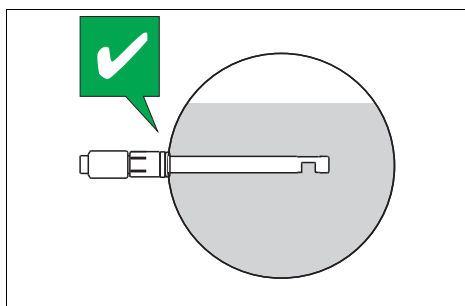
To ensure proper operation, install the sensor so that the optical path remains flooded with process fluid at all times. The following figure illustrates recommended installation orientation to ensure the optical path remains flooded.



Orientation and installation positions

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- The pipeline diameter must be at least 76.2 mm (3") with Unifit CPA442 TriClamp 50.8 (2").
- Install the sensor in places with uniform flow conditions.
- The best installation location is in the ascending pipe (item 1). Installation is also possible in the horizontal pipe (item 5).
- Do not install the sensor in places where air may collect or foam bubbles form (item 3) or where suspended particles may settle (item 2).
- Avoid installation in the down pipe (item 4).



Orientation of OUSBT66

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Orientate the sensor in such a way that the medium flows through the measurement section (self-cleaning effect).

Environment

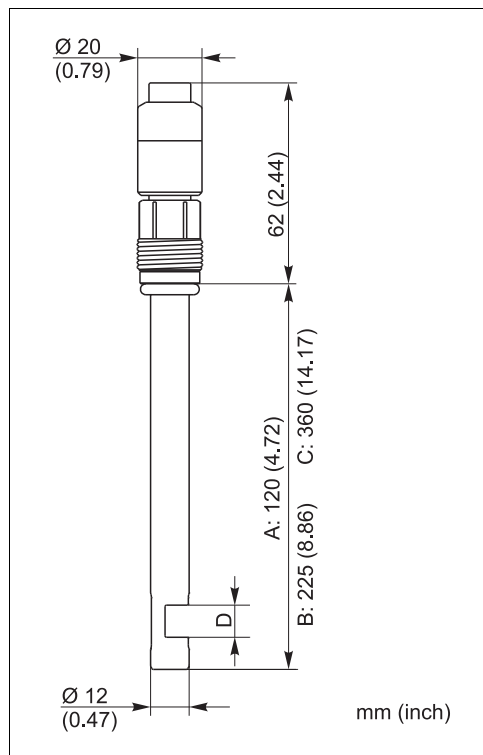
Ambient temperature	0 to 55 °C (32 to 131 °F)
Storage temperature	0 to 70 °C (32 to 158 °F)
Relative humidity	5 to 95 %
Ingress protection	IP 68 Fischer locking (at a depth of 2 m (6.6 ft) for 24 hours)

Process

Process temperature	0 to 70 °C (32 to 158 °F), up to 135 °C (275 °F) when lamp is switched off
Process pressure	10 bar (150 psig) max. at 25 °C

Mechanical construction

Design, dimensions



Dimensions

- A Version with shaft length 120 mm (4.72")
- B Version with shaft length 225 mm (8.86")
- C Version with shaft length 360 mm (14.17")
- D Optical pathlength: 5, 10 or 20 mm

Weight	0.2 kg (0.44 lbs)
Materials	Sensor: Stainless steel 1.4435 (316L) Windows: Sapphire
Process connection	PG 13.5 thread
Surface roughness	$R_a < 0.76 \mu\text{m}$
Light source	LED

Ordering information

Product page

You can create a complete and valid order code by using the configurator on the internet product page. Enter the following address to access the product page:
www.products.endress.com/OUSAF12


Online configurator

1. You can choose from the following options on the product page located on the right:

Product page function
:: Add to product list
:: Price & order information
:: Compare this product
:: Configure this product

2. Click "Configure this product".
3. The configurator opens in a separate window. You can now configure your device and receive the complete order code that applies for the device.
4. Afterwards, export the order code as a PDF or Excel file. To do so, click the appropriate button at the top of the page.

Product structure


 The following product structure represents the status of printing. You can create a complete and valid order code on the Internet using the configurator tool.

		Approval	
	AA	Non-hazardous area	
		Optical pathlength (OPL)	
	05	5 mm	
	10	10 mm	
	20	20 mm	
		Diameter; Process Connection; Length	
	A1	12 mm; PG13.5; 120 mm	
	A2	12 mm; PG13.5; 225 mm	
	A3	12 mm; PG13.5; 360 mm	
		Sealing material	
	A	EPDM (FDA, USP CI VI)	
OUSBT66-			Order code

Scope of delivery

- The scope of delivery includes:
- Sensor OUSBT66
 - Operating Instructions (English)


Accessories

-  The most important accessories that could be delivered at the time this document went to print are listed below.
For information on accessories that are not listed here, please contact your local service or sales representation.

Assembly

- Unifit CPA442
(120 mm length only with 5 and 10 mm OPL. 225 mm and 360 mm length sensor with any OPL)
- Installation assembly for food, biotechnology and pharmaceuticals, with EHEDG and 3A certificate
 - Technical Information TI306C/07/EN

Measuring cable

-  The following product structure represents the status of printing. You can create a complete and valid order code on the Internet using the configurator tool.


OUK60 cable set

Approval			
	AA	Non-hazardous area	
Cable length			
	03	3 m (10 ft)	
	05	5 m (16 ft)	
	10	10 m (32 ft)	
	20	20 m (65 ft)	
Cable connection			
	A	Wire terminals	
OUK60-			Order code

Transmitter

- CVM40 Memograph
- Graphic transmitter for inline photometers and data manager
 - Order according to product structure, see Technical Information TI457C/07/EN

Calibration

- Calibration kit OUSBT66
- Case contains 2 calibration filters 2.0 - 0.35 AU
 -  Nominal values, refer to calibration kit certificate for actual values
 - Order no. 71128340

www.addresses.endress.com
