

Technical Information

OUSAF22

Optical sensor combined with flow assembly
OUA260 for color measurement



Application

The OUSAF22 sensor is used for color measurement in the visible region of the electromagnetic spectrum. It is suitable for a variety of industries.

Color scale measurement

- APHA/Hazen
- EBC
- ASBC
- ASTM
- ICUMSA

Color measurement for

- Quality control/Purity monitoring
- Color insurance
- Decolorization control
- Distillation monitoring

Your benefits

- Accurate measurement
 - Measuring range up to 2.5 AU or 50 OD (depending on optical path length)
 - Configurable to measure color at discrete wavelengths in the visible region
 - Outstanding filter performance for highest linearity
 - Built-in reference detector for compensation of particles, bubbles and lamp aging
- Incandescent light provides long service life and stable operation
- Easy, liquid-free verification
- FM and ATEX approved lamps for hazardous area applications

The OUA260 flow assembly used with the sensor offers the following benefits:

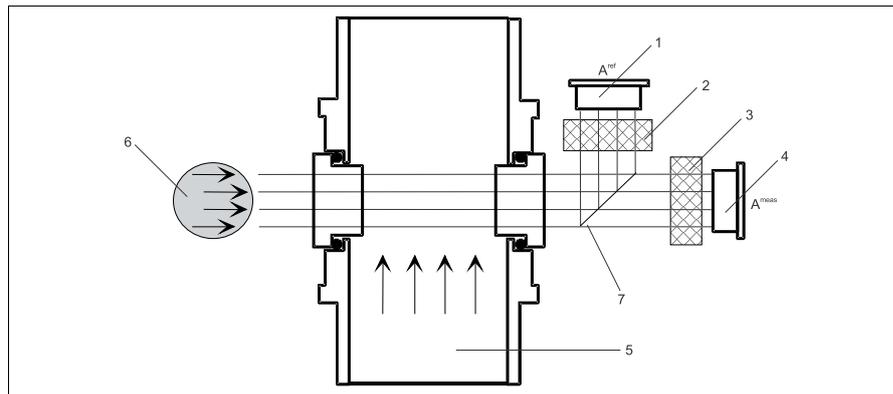
- Broad variety of wetted materials provides resistance against any process medium
- Flexible process adaptation with various process connections
- Hygienic versions with certified materials and SIP/CIP-resistance
- Air purge ports available for preventing condensate formation on the optical windows
- Unique precision optical pathlength adjuster available enabling exact adjustment of short pathlengths

Function and system design

Measuring principle

Dual beam 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 radiation through the medium and the transmitted radiation is measured on the detector side. After passing a filter for wavelength selection, the intensity of light is determined by a photodiode and converted into a photo current. We compare the intensity of light at the target wavelength to the intensity at a reference wavelength to compensate for particles, bubbles or issues with the hardware.



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Dual-wavelength absorption sensor

1	Reference detector	5	Medium
2	Reference filter	6	Light Source
3	Measurement filter	7	Beam Splitter
4	Measurement detector		

Options

Installation in hazardous areas

The explosion-proof lamp housing allows for installation in hazardous areas. This sensor version is rated for FM Class 1, Division 1, Groups B, C, D and ATEX II 2G EExd IIC T5.

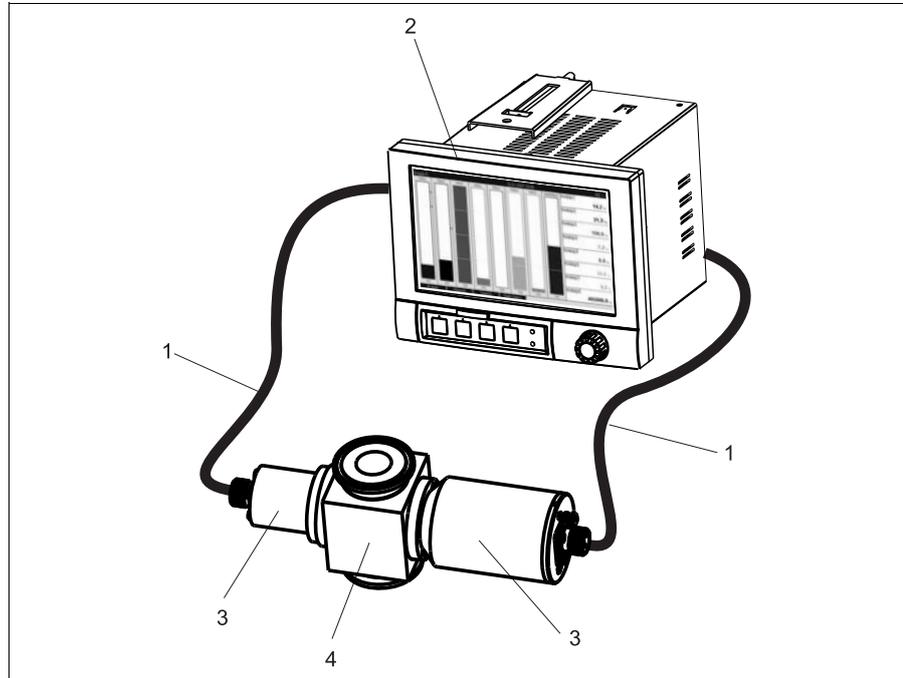
Air purge

Air purge ports prevent build-up of condensate on optical windows.

Measuring system

A complete measuring system comprises:

- Transmitter Memograph CVM40
- Optical sensor OUSAF22
- Flow assembly OUA260
- Cable set OUK20



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Example of a measuring system

- 1 Cable set OUK20
- 2 Transmitter Memograph CVM40
- 3 Optical sensor OUSAF22
- 4 Flow assembly OUA260

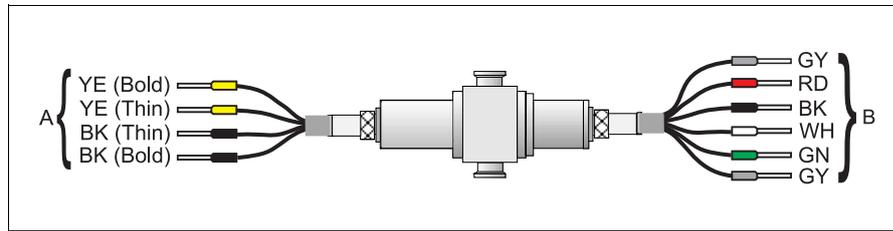
Input

Measured variable	VIS absorption in absorbance units (AU)
Measuring range	Measuring range 0 to 2.5 AU
Wavelengths	400/720 nm, 420/720 nm, 430/720 nm, 490/720 nm, 520/720 nm (other wavelengths available upon request)

Wiring

Electrical connection

The OUSAF22 sensor is connected to the transmitter via the pre-terminated and labeled cable set OUK20 (to be ordered separately). Terminals and labeling might vary with the transmitter in use.



Connecting cable for OUSAF22

A Power supply for lamp

B Signal transmission of measurement detector and reference detector

Terminal CVM40	Cable OUK20 for sensor OUSAF22	
	Core	Assignment
S1.S	GY	Shield
S1.1	RD	Sensor Mea +
S1.2	BK	Sensor Mea -
S2.S	GY	Shield
S2.1	WH	Sensor Ref +
S2.2	GN	Sensor Ref -
V1.1	YE (Bold)	Lamp voltage +
V1.3	YE (Thin)	Lamp sense +
V1.4	BK (Thin)	Lamp sense -
V1.2	BK (Bold)	Lamp voltage -

Cable length max. 100 m (328 ft)

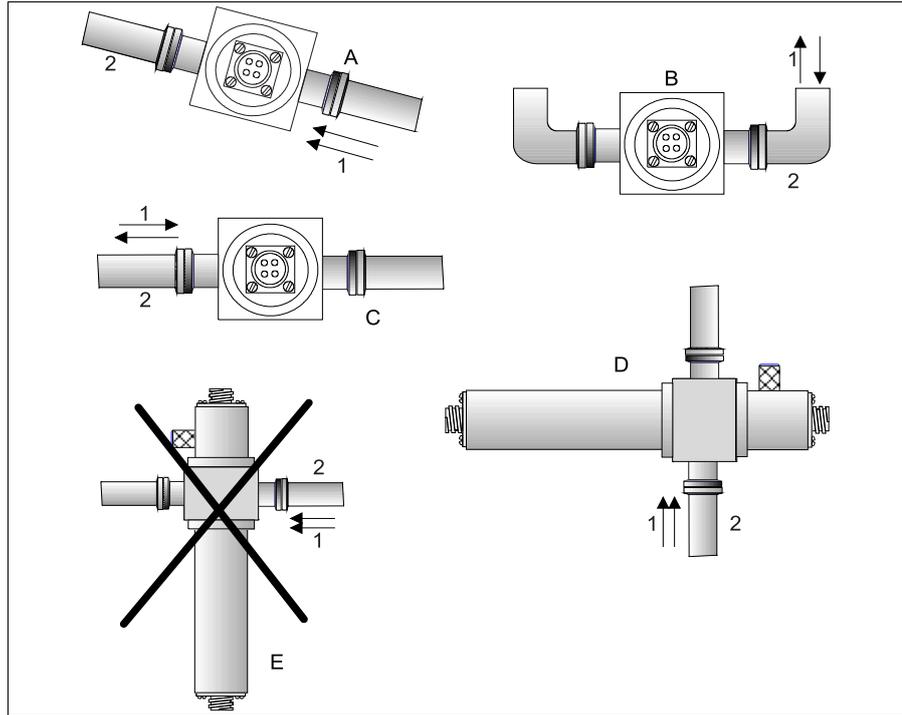
Cable connectors Nickel-plated brass

Installation

Installation instructions

Sensors are designed for in-line use with the related OUA260 flow assembly. The flow assembly can be installed either directly in a process line or in a by-pass line. The OUSAF22 sensor cannot be used without the OUA260.

- i** Make sure that the sensor and detector housings are horizontal. This will ensure that the optical window surfaces are in a vertical position which will help to prevent buildup on the window surfaces. Install the sensor upstream of pressure regulators. Allow adequate space for the connection of cables at the ends of the lamp and the detector housing. Operating sensors under pressure will help to avoid air or gas bubble creation.



Sensor installation

- | | | | |
|---|------------|---|----------------|
| A | Preferred | E | Never |
| B | Avoid | 1 | Process flow |
| C | Acceptable | 2 | Process piping |
| D | Best | | |

Environment

Ambient temperature 0 to 55 °C (32 to 131 °F)

Storage temperature -20 to 70 °C (-4 to 158 °F)

Relative humidity 5 to 95 %

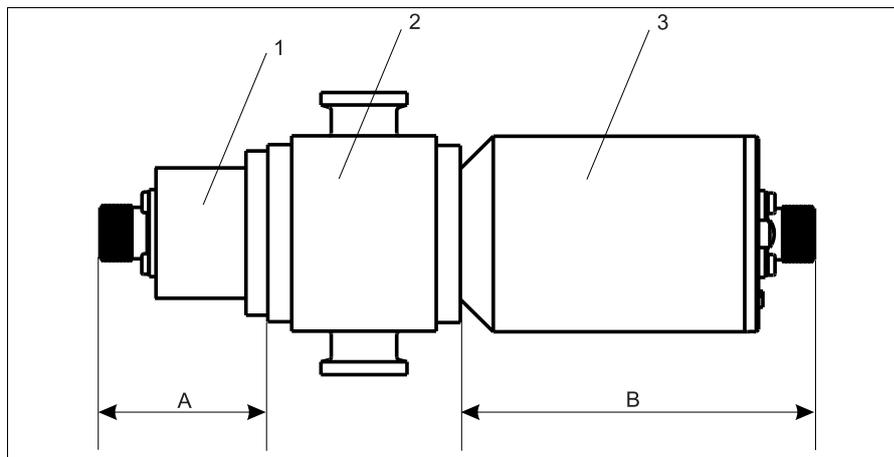
Ingress protection IP 65 (NEMA 4)

Process

Process temperature	0 to 90 °C (32 to 194 °F) continuous max. 130 °C (266 °F) for 2 hours
Process pressure	up to 100 bar (1450 psi), depending on material, line size and process connection of flow assembly

Mechanical construction

Design, dimensions The sensor dimensions depend on the flow assembly.



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Design of OUSAF22 with OUA260 flow assembly

- 1 Lamp assembly
- 2 OUA260 flow assembly (to be ordered separately)
- 3 Detector assembly

Lamp assembly type	"A" Dimension	Detector assembly type	"B" Dimension
High luminescence lamp	33.78 mm (1.33")	Standard with validation filter	102.8 mm (4.05")
Gas filled lamp	33.78 mm (1.33")		

Detector and lamp may vary depending on options ordered.

Flow assembly OUA260

Process connections: Tri-clamp, weld stubs, tube compression fittings, Swagelok, ANSI flange, DIN flange
(further connections available on request)

Materials: SS316L, Kynar
(further materials such as titanium, Hastelloy, etc. available on request)

Line size: ¼" to 4" (DN 6 to DN 100)

Path lengths: 0.5 to 100 mm (0.02" to 3.94"), depending on line size and process connection

Windows: Quartz, Sapphire

O-rings: EPDM, Viton, Kalrez, Silicone
(further materials available on request)

For flowcell dimensions please refer to OUA260 documentation.

i Make sure to leave an additional clearance of approx. 5 cm (2") at the lamp end and detector end of the sensor to allow for installation of the sensor cables.

Weight**Sensor**

Lamp housings

Lamp:

0.36 kg (0.794 lbs)

Hazardous lamp with SS-braided cable (1.2 m (4ft)) and junction box (FM Ex-sensor only):

3.2 kg (6.66 lbs)

ATEX lamp

1.34 kg (2.95 lbs)

Detector housings

Detector:

0.36 kg (0.794 lbs)

Flow assembly OUA260 (assembled with windows and window rings, no sensor)

TC ¼", 316 SS: 1.14 kg (2.51 lbs)

TC 1", 316 SS: 1.39 kg (3.07 lbs)

TC 2", 316 SS: 1.88 kg (4.15 lbs)

TC 4", 316 SS: 3.38 kg (7.45 lbs)

For other options please consult the Technical Information for the OUA260 flowcell.

Materials

Sensor housing: Stainless Steel 316L

Light source

- High luminescence gas lamp (wavelength filter 450 nm and above)
Lamp life: Typically 10,000 hours
- Gas filled high output lamp (wavelength filter below 450 nm)
Lamp life: Typically 10,000 hours

Detectors

Visible/IR enhanced silicon detectors, hermetically sealed

Filters

Multilayer narrow bandpass interference filter

Certificates and approvals

Ex approval

- ATEX II 2G EEx d IIC T5
- FM Cl.1, Div. 1, Group B, C, D

FDA

All non metallic wetted parts as in rubber and plastics comply with FDA Regulations 21 CFR 177.2600. The plastic and elastomeric wetted parts of the sensor have passed the bio-reactivity tests according to USP <87> and <88> class VI.

Cable set OUK20

Sensor			
1			OUSTF10
2			OUSAF21/OUSAF22
3			OUSAF23
Transmitter			
	A		OUM900 Series
	B		OUM600 Series
	C		OUM700 Series
	D		Memograph CVM40
Cable length			
	10		10 ft / 3 m
	15		15 ft / 4.5 m
	25		25 ft / 7.5 m
	50		50 ft / 15 m
	80	 ft; cable
	90	 m; cable
Barrier			
	A		Non-hazardous area
	B		FM Busbar
	C		ATEX Busbar
	D		FM DIN rail
	E		ATEX DIN rail
OUK20-			Complete order code

Scope of delivery

The scope of delivery depends on the ordered version.

Isolated order

- 1 detector and lamp assembly without flow assembly
- Operating Instructions

Assembled to flow assembly

- Detector and lamp assembly installed
- OUA260 flow assembly
- Operating Instructions

When the sensor is ordered together with a transmitter, the complete measuring system is factory-calibrated and shipped as one package.

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.

Flow assembly

OUA260 flow assembly

- For sensor installation in pipe lines
- Materials: stainless steel 316L or Kynar (further materials available on request)
- Many process connections and pathlength versions available
- Order according to product structure, see Technical Information TI418C/07/EN

Transmitter

CVM40 Memograph

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

Cable

OUK20 cable set

- Pre-terminated or labeled cable set for connection of OUSAF2x sensors
- Order according to product structure

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