

WATER QUALITY SENSOR / DATA SHEET

SS305-01

Optical Dissolved Oxygen Sensor

Luminescence-based dissolved oxygen measurement with digital RS485 / Modbus output and a serviceable optical sensor cap.


0-20 mg/L

Default range

0.01 mg/L

Resolution

0-45 °C

Operating temperature

IP68 / 10 m

Ingress / max. depth

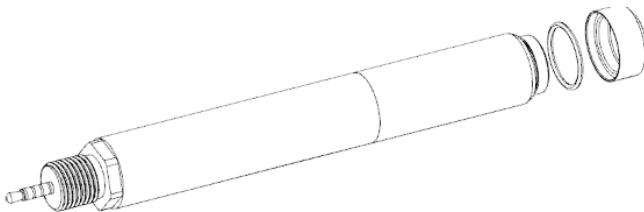
Introduction

The SpeSense optical DO sensor is coated with a luminescent material. Blue light from an LED excites the luminescent chemical; as it relaxes, it emits red light detected by a photodiode. The relaxation time is referenced to an independent red LED. Oxygen dampens the reaction, so oxygen concentration is proportional to the time required for the luminescent material to return to its relaxed state.

Key Advantages

- Smart sensor retains all calibration in the sensor
- Flow independent with no oxygen consumption
- Easy to store
- Low drift and long lifetime
- Supports leakage alarm and salinity compensation
- SS316 and PVC standard; TC4 titanium and PVC optional
- Membraneless, electrode-free design
- No warm-up time required
- User-replaceable sensor cap
- All fluorescent-film components made by SpeSense
- Digital output with RS485 Modbus protocol

Sensor Construction



USER-REPLACEABLE

Optical Sensor Cap

Serviceable sensor-cap construction for simplified field maintenance.

PERFORMANCE

Technical Specifications

Item	Specification
Measurement Method	Luminescence quenching technique
Range	0-20 mg/L or 0-200% Air Sat. (default); 0-50 mg/L or 0-500% Air Sat. (optional)
Resolution	0.01 mg/L
Accuracy	3% of reading or ± 0.3 mg/L, whichever is greater
Operating Temperature	0-45 °C
Storage Temperature	-10-50 °C
Minimum Detection Limit	0.05 mg/L
Warranty	1 year
Depth	IP68; 10 m maximum
Power	DC 5-12 V, 15 mA normal

Item	Specification
Output	RS485 and Modbus protocol
Materials	SS316 (default), titanium (optional) and PVC
Dimensions	Length 186 mm; diameter 22 mm
Response Time	Minimum 30 s, T90
Field Life*	Sensor ≥ 2 years; sensor cap ≥ 1.5 years
Recommended Calibration / Maintenance Frequency*	Sensor: 6 months

Note: *Field life and calibration frequency depend on site conditions. "Whichever is greater" applies to the stated accuracy.

INTERFACE

Default Communication Settings

Setting	Default
Baud rate	9600, 8N1
Data format	32-bit IEEE 754 floating-point value, little-endian
Default Modbus address	0x01

DIGITAL INTERFACE

RS485 Physical interface	Modbus Communication protocol	32-bit float IEEE 754 data
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MODBUS

Register Map

Address	Length	Type	Access	Description
0x0009	4	Char	R	SN number, e.g. V2103021
0x000E	1	UShort	R/W	MODBUS address; default 0x01
0x0012	1	UShort	R/W	Baud rate: 0-1200; 1-4800; 2-9600 (default); 3-19200; 4-38400; 5-115200
0x0014	1	UShort	R	Sensor alarm; resets to 0x00 after reading. 0x01 temperature; 0x02 leakage; 0x04 calibration data; 0x80 supply voltage
0x0605	1	UShort	R/W	Float format: 0-DCBA; 1-BADC; 2-CDAB; 3-ABCD (default, little-endian)
0x0030	2	Float	R	Temperature, °C
0x0032	2	Float	R	DO data, mg/L
0x0034	2	Float	R	DO data, %Sat; e.g. 0.77 = 77% Sat.
0x0046	2	Float	R/W	Salinity compensation, ppt; default 0.0
0x0056	2	Float	R	Inside humidity; e.g. 77.8 = 77.8%
0x0060	2	Float	R/W	DO calibration slope K; default K=1.0
0x0062	2	Float	R/W	DO calibration offset B; default B=0

DIAGNOSTICS

Alarm Definitions

Code	Condition
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Code	Condition
0x01	Temperature outside 0-50 °C
0x02	Inside humidity above 50%
0x04	User calibration outside $0.5 < K < 2$ or $-100 < B < 100$
0x80	Supply voltage outside 4.5-13 V

INTEGRATION

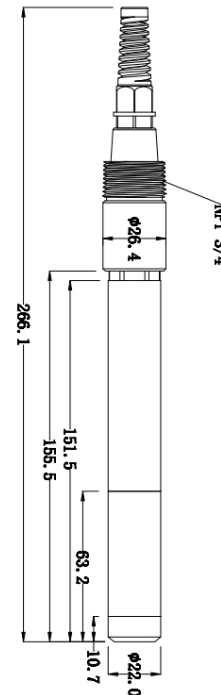
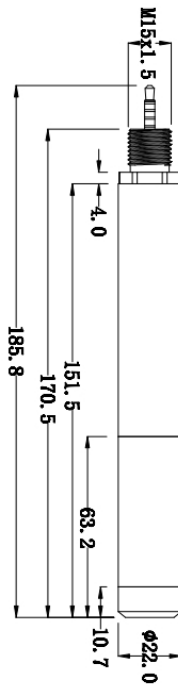
Operating Notes

- Do not access registers not listed in this document.
- Normal flow: power on → delay 50 ms → read SN (optional) → delay 2 s or longer → read sensor data. Do not use one frame for discontinuous addresses. Delay 2 s or longer before the next read.
- Read and write user-calibration data in ONE frame.
- Example read frame: 01 03 00 60 00 04 44 17.
- Example write/set frame: 01 10 00 60 00 04 08 9A 99 99 3F CD CC 4C BF 34 CF; sets $K=1.2$ and $B=-0.8$.

MECHANICAL

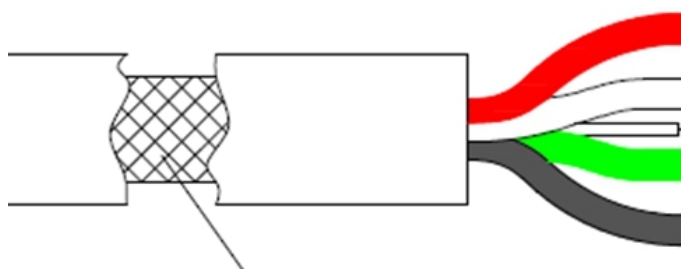
Outline Dimensions

Unit: mm | Tolerance: ± 0.2 mm



INSTALLATION

Cable Wiring



Wire	Function
Red	VCC
White	RS485-B
Bare	Shielding
Green	RS485-A
Black	GND

MECHANICAL / MATERIAL OPTIONS

186 mm
Overall length

Ø22 mm
Sensor body diameter

SS316 / TC4
Standard / optional metal

SERVICE

Maintenance Schedule

Sensor	Clean*	Clean**	Check humidity	Replace O-ring	Calibration	Consumable
Optical DO	1-4 days	4-8 weeks	6 months	12-24 months	6 months	24-36 months
Conductivity	4-8 weeks	4-8 weeks	6 months	12-24 months	6 months	No consumable part
Turbidity	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
Chlorophyll a	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
BGA	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
NH4-N	0.5-3 days	4-8 weeks	6 months	12-24 months	2-3 weeks	3-6 months
pH	0.5-3 days	4-8 weeks	6 months	12-24 months	4-8 weeks	6-12 months
UV254 COD	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
Oil in water	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
CDOM/fDOM	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
Wiper	4-8 weeks	4-8 weeks	NA	18 months	NA	18 months***

Maintenance Notes

- * Without wiper system.
- ** With wiper system.
- *** Dynamic sealing parts.
- The O-ring between sensor and wiper must be replaced every 12 months.
- Field life and calibration frequency depend on site conditions.

CONFIGURATION

Ordering Information

Part Number	Description
PN 610114	SS316 and PVC shell
PN 610115	TC4 and PVC shell
PN 710001	DO sensor cap, SS316
PN 710001-T	DO sensor cap, TC4
PN 810002	PUR cable

CONTACT / SUPPORT



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