WATER QUALITY SENSOR / DATA SHEET

SS304-01

Optical Turbidity Sensor

ISO 7027 90° nephelometric turbidity measurement with RS485 / Modbus RTU and calculated SS / transparency outputs.

0.3-4000 NTU	0.01 NTU	0-45 °C	IP68 / 10 m
Range options	Best resolution	Operating temperature	Ingress / max. depth

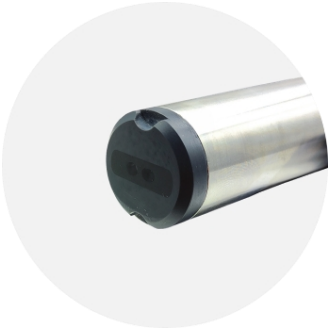
Introduction

The SpeSense optical turbidity sensor uses a fiber-optic optical path. An 860 nm light source enters the sample and scatters from particles in the water; light scattered at 90 degrees is detected by a photodiode. The measurement follows the nephelometric technique and is expressed in nephelometric turbidity units (NTU), in accordance with ISO 7027.

Key Advantages

- Fiber-optic measurement path
- Ambient light rejection technology
- Internal temperature compensation for optics
- Easy calibration
- Low calibration-solution volume: 50 mL minimum
- Calculated SS and transparency outputs
- Inside leakage alarm support
- RS485 Modbus RTU output

Sensor Construction



FIBER-OPTIC / 90° SCATTERING

Optical Window

The optical window directs and collects light through the internal fiber-optic path for nephelometric turbidity measurement.

PERFORMANCE

Technical Specifications

Item	Specification
Measurement Method	Scattered light at 90 degrees, ISO 7027
Range	0.3-100 NTU; 0.3-1000 NTU; 1.0-4000 NTU
Resolution	0.01 NTU; 0.1 NTU; 1.0 NTU
Accuracy	±5% of reading or 1 NTU, whichever is greater
Operating Temperature	0-45 °C
Storage Temperature	-10-50 °C
Minimum Detection Limit	0.3 NTU
Warranty	1 year
Depth	IP68; 10 m maximum
Power	DC 5-12 V, 10 mA normal

Item	Specification
Output	RS485 and Modbus protocol
Materials	PVC, PMMA, SS316 (default); TC4 optional
Dimensions	Length 187 mm; diameter 22 mm
Flow Rate	< 3 m/s
Response Time	Minimum 10 s, T90
Field Life*	Sensor ≥2 years
Recommended Calibration / Maintenance Frequency*	Sensor: 6 months

Note: *Field life and calibration frequency depend on site conditions.

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

MODBUS

Register Map

Address	Length	Type	Access	Description
0x0009	4	Char	R	SN number, e.g. V0203021
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
0x0034	2	Float	R	Temperature, °C; LED temperature, not water
0x0036	2	Float	R	Turbidity data, NTU
0x0038	2	Float	R	SS data, mg/L, calculated from turbidity; default 1 NTU = 1 mg/L SS
0x003A	2	Float	R	Transparency data, cm, calculated from turbidity
0x0056	2	Float	R	Inside humidity; e.g. 77.8 = 77.8%
0x0060	2	Float	R/W	Turbidity calibration slope K; default K=1.0
0x0062	2	Float	R/W	Turbidity calibration offset B; default B=0
0x00B0	2	Float	R/W	SS calibration slope K; default K=1.0
0x00B2	2	Float	R/W	SS calibration offset B; default B=0
0x00B4	2	Float	R/W	Transparency calibration slope K; default K=1.0
0x00B6	2	Float	R/W	Transparency calibration offset B; default B=0

DIAGNOSTICS

Alarm Definitions

Code	Condition
0x01	Temperature alarm: outside 0-50 °C
0x02	Leakage alarm: inside humidity above 50%
0x04	User calibration data outside 0.5<K<2 or -100<B<100

INTEGRATION

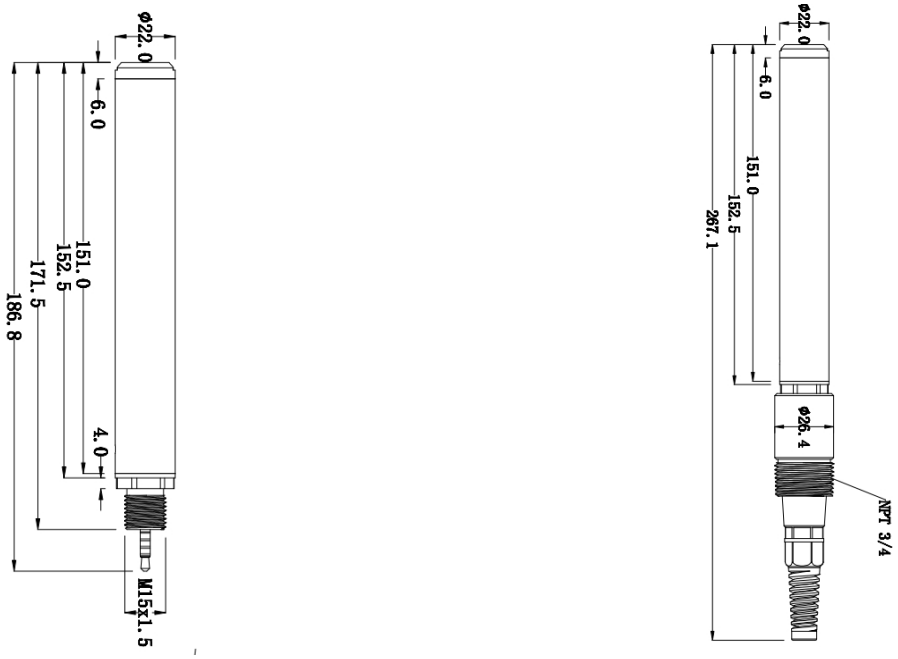
Operating Notes

- 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

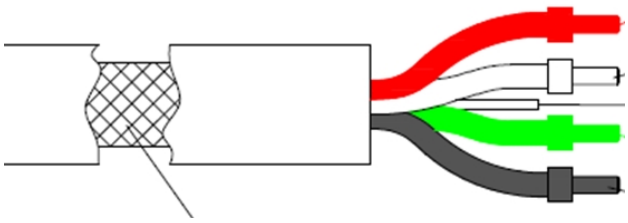
Outline Dimensions

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

187 mm	Ø22 mm	SS316 / TC4
Overall length	Sensor body diameter	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 620211	0.3-1000 NTU, SS316
PN 620211-1	0.3-100 NTU, SS316
PN 620211-2	1.0-4000 NTU, SS316
PN 810002	PUR cable

CONTACT / SUPPORT

SpeSense
SpeSense Technologies Inc.

SpeSense Technologies Inc.
No. 9 Yuhe Road, Guitang Subdistrict, Yuhua District, Changsha City
+86-731-85222616 | info@spesense.com
www.spesense.com

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