YEX-S1PRO-COD

Online COD Sensor User Manual

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Contents

I. Application Environment

This product is suitable for online COD measurement in natural waters, industrial water, laboratories, municipal wastewater, and similar applications.

Signal output: RS485 (MODBUS); 4-20 mA optional.

Principle: UV254 absorption. Organic matter in water absorbs ultraviolet light; the COD value is calculated from the degree of light attenuation.

Features: Stable ultraviolet light source, built-in temperature sensor for automatic temperature compensation, and a turbidity channel for automatic turbidity compensation.

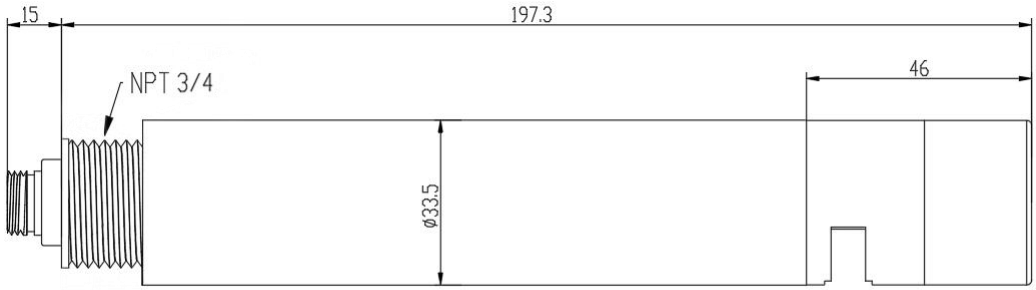
Installation: 3/4 NPT pipe thread; suitable for immersion or installation in a pipe or tank.

II. Technical Performance and Specifications

1. Technical Parameters

Model	YEX-S1PRO-COD
Power Supply / Consumption	12-24VDC (0.4W)
CODRange	0-200mg/L, 0-500mg/L, 0-1500mg/L, customizable
TurbidityRange	0-200NTU , 0-1000NTU, customizable
Resolution	0.1
Accuracy	±5%; ±0.1°C
Response Time	10s
Communication Interface	RS485 (MODBUS)
Housing Material	316L+ABS
Compensation	Automatic temperature and turbidity compensation
Cable	5 m four-core shielded cable
Operating Environment	Temperature: 0-50°C (non-freezing); pressure < 0.2 MPa
Ingress Protection	IP68
Installation Method	Immersion installation, NPT 3/4 thread
Self-Cleaning Function	Optional

2. Dimensional Drawing



传感器接头为M16-5芯防水接头母头

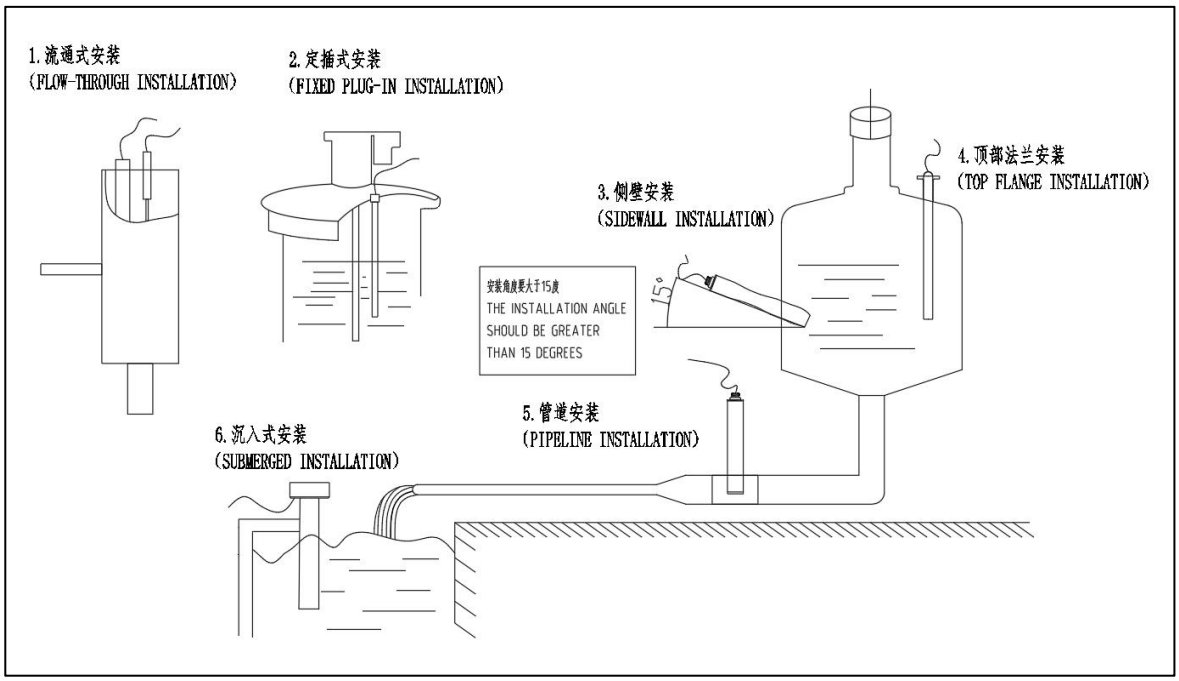
III. Connection and Installation

1. Connection

1 - Red: power positive; 2 - Black: power negative; 3 - Green: RS485-B; 4 - Yellow: RS485-A; 5 - Optional 4-20 mA output

Note: 1, 2, 3, and 4 are the pin numbers of the aviation connector. Wire colors may vary by batch; follow the markings or aviation-connector pin numbers.

2. Installation



Note: Electrochemical sensors contain liquid and must not be installed upside down or horizontally. Install at an inclination of more than 15 degrees.

For light-scattering products, keep the sensor window more than 10 cm from the bottom and more than 3

cm from the container walls; otherwise, reflected light may affect the reading.

IV. Maintenance and Care

1. Use and Maintenance

- Insert at least one-third of the sensor into the test liquid so that the electrode tip is fully immersed and the temperature measurement is more accurate.
- Keep the terminals, probe, and aviation connector clean. Use a soft-bristled brush to clean the probe and prevent damage.
- If readings become inaccurate after long-term use, calibrate the sensor according to the communication protocol.

V. Data Communication

1. Communication Settings

Baud rate: 9600; start bits: 1; data bits: 8; parity: none; stop bits: 1

2. Register Addresses

Register Name	Data Address	Data Type	Number of Registers (bytes)	Read/Write	Description
Device Address	0x0000	Unsigned (unsigned integer)	1 (2 bytes)	R/W	1-254(default address: 14) 0 is the non-response broadcast address 255 is the response general address
Product Model	0x0001	Unsigned (unsigned integer)	1 (2 bytes)	R	14
Restore Factory Settings	0x0002	Unsigned (unsigned integer)	1 (2 bytes)	R/W	Write 1 to restore factory settings; write 0 for no action; read has no meaning
Software Version	0x0003	Unsigned (unsigned integer)	1 (2 bytes)	R	1

Baud Rate	0x0004	Unsigned (unsigned integer)	1 (2 bytes)	R/W	Read to obtain the code; write the corresponding code to change the baud rate 0:2400, 1:4800, 2:9600, 3:19200, 4:38400, 5:115200 Other values are ignored
Reserved	0x0005				
Cleaning Interval	0x0006	(unsigned integer)	1 (2 bytes)	R/W	Minutes
Cleaning Cycles	0x0007	(unsigned integer)	1 (2 bytes)	R/W	
Temperature	0x0008	Float (floating-point, CDAB)	2 (4 bytes)	R	(-40-120)°C
COD Value	0x000A	Float (floating-point, CDAB)	2 (4 bytes)	R	
Turbidity Value	0x000C	Float (floating-point, CDAB)	2 (4 bytes)	R	
TOC Value	0x000E	Float (floating-point, CDAB)	2 (4 bytes)	R	
Temperature Calibration	0x0030	Float (floating-point, CDAB)	2 (4 bytes)	W	Write the actual temperature
Direct-Write COD K Value	0x0032	Float (floating-point, CDAB)	2 (4 bytes)	W	Write K value Default: 1.0
Direct-Write COD B Value	0x0034	Float (floating-point, CDAB)	2 (4 bytes)	W	Write B value Default: 0.0
Direct-Write Turbidity K Value	0x0036	Float (floating-point, CDAB)	2 (4 bytes)	W	Write K value Default: 1.0
Direct-Write Turbidity B Value	0x0038	Float (floating-point, CDAB)	2 (4 bytes)	W	Write B value Default: 0.0

COD Zero-Point Calibration	0x003A	Float (floating-point, CDAB)	2 (4 bytes)	W	Write 0 in air or purified water
COD Slope Calibration	0x003C	Float (floating-point, CDAB)	2 (4 bytes)	W	Write the known conductivity value while immersed in the reference solution
Turbidity Zero-Point Calibration	0x003E	Float (floating-point, CDAB)	2 (4 bytes)	W	Write 0 in air or purified water
Turbidity Slope Calibration	0x0040	Float (floating-point, CDAB)	2 (4 bytes)	W	Write the known conductivity value while immersed in the reference solution

3. Command Example

- Read Data

Read request : 0E 03 00 08 00 06 44 F5

Response : OE 03 0C 94 CD 41 C9 AO 76 40 D1 1D 43 41 1F 29 9C

Parsed in float CDAB format: 94 CD 41 C9 = 25.19°C, AO 76 40 D1 = 6.55 COD

1D 43 41 1F = 9.94 NTU

VI. Calibration

The sensor has been factory-calibrated. Recalibration is unnecessary unless required.

1. Temperature Calibration

Immerse more than one-third of the sensor in the test liquid and wait for the temperature reading to stabilize. Send the actual temperature to 0x0030 according to the protocol, then read the temperature to verify the calibration result.

Example: send 25.0°C

0E 10 00 30 00 02 04 00 00 41 C8 F1 69

2. Calibration

Use an opaque container, preferably black. Place the sensor vertically, keeping the sensor window more than 10 cm from the bottom and more than 3 cm from the container walls.

➢ Zero-Point Calibration

Fill the container with purified water, insert the sensor, wait for the reading to stabilize, and write 0 to 0x003A to complete COD zero-point calibration.

Example: send 0

0E 10 00 3A 00 02 04 00 00 00 00 40 D0

Fill the container with purified water, insert the sensor, wait for the reading to stabilize, and write 0 to 0x003E to complete turbidity zero-point calibration.

Example: send 0

0E 10 00 3E 00 02 04 00 00 00 00 41 23

➢ Slope Calibration

Pour a solution of known COD into the container, insert the sensor, wait for the reading to stabilize, and send the COD value to 0x003C.

Example: send 40.0

0E 10 00 3C 00 02 04 00 00 42 20 F1 82

Pour a solution of known turbidity into the container, insert the sensor, wait for the reading to stabilize, and send the turbidity value to 0x0040.

Example: send 40.0

0E 10 00 40 00 02 04 00 00 42 20 F6 F3

Alternatively, write the K and B values directly.