



YEX-S1PRO-TS

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## Online Turbidity Sensor User Manual



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## I. Application Environment

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

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

Principle: Light-scattering method. An infrared LED is used as the light source. As turbidity increases, more light is scattered and detected by the photodetector, producing a higher current from which the turbidity value is calculated.

Features: Stable infrared light source and a built-in temperature sensor for automatic temperature compensation.

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

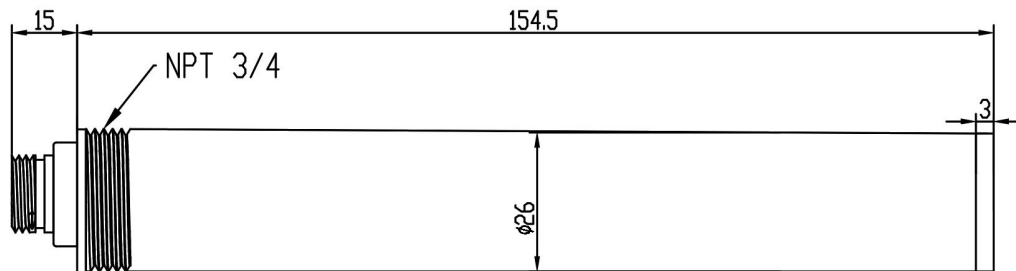
## II. Technical Performance and Specifications

### 1. Technical Parameters

|                            |                                                        |
|----------------------------|--------------------------------------------------------|
| Model                      | YEX-S1PRO-TS                                           |
| Power Supply / Consumption | 12-24VDC (0.4W)                                        |
| Range                      | 0-200NTU 0-1000NTU 0-4000NTU range customizable        |
| Resolution                 | 0.1                                                    |
| Accuracy                   | ±3%; ±0.1°C                                            |
| Response Time              | 10s                                                    |
| Communication Interface    | RS485 (MODBUS)                                         |
| Housing Material           | 316L+ABS                                               |
| Temperature Compensation   | Automatic temperature 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

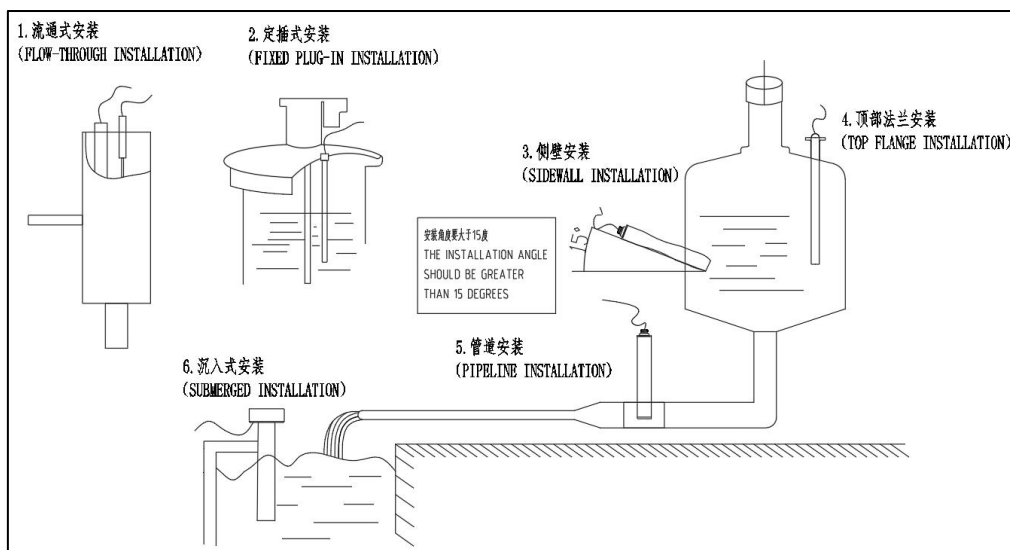
## III. Connection and Installation

### 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: 2)<br>0 is the non-response broadcast address<br>255 is the response general address |
| Product Model   | 0x0001       | Unsigned (unsigned integer) | 1 (2 bytes)                 | R          | 3                                                                                                           |
| Restore Factory | 0x0002       | Unsigned                    | 1 (2 bytes)                 | R/W        | Write 1 to restore factory                                                                                  |

|                                        |        |                                 |             |     |                                                                                                                                                                          |
|----------------------------------------|--------|---------------------------------|-------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Settings                               |        | (unsigned integer)              |             |     | settings; write 0 for no action;<br>read has no meaning                                                                                                                  |
| Software Version                       | 0x0003 | Unsigned<br>(unsigned integer)  | 1 (2 bytes) | R   | 1                                                                                                                                                                        |
| Baud Rate                              | 0x0004 | Unsigned<br>(unsigned integer)  | 1 (2 bytes) | R/W | Read to obtain the code;<br>write the corresponding code<br>to change the baud rate<br>0:2400, 1:4800, 2:9600,<br>3:19200, 4:38400, 5:115200<br>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<br>(floating-point, CDAB) | 2 (4 bytes) | R   | (-40-120)°C                                                                                                                                                              |
| Turbidity<br>Value                     | 0x000A | Float<br>(floating-point, CDAB) | 2 (4 bytes) | R   |                                                                                                                                                                          |
| Temperature<br>Calibration             | 0x0030 | Float<br>(floating-point, CDAB) | 2 (4 bytes) | W   | Write the actual temperature                                                                                                                                             |
| Direct-Write<br>Turbidity K Value      | 0x0032 | Float<br>(floating-point, CDAB) | 2 (4 bytes) | W   | Write K value<br>Default: 1.0                                                                                                                                            |
| Direct-Write<br>Turbidity B Value      | 0x0034 | Float<br>(floating-point, CDAB) | 2 (4 bytes) | W   | Write B value<br>Default: 0.0                                                                                                                                            |
| Turbidity<br>Zero-Point<br>Calibration | 0x0036 | Float<br>(floating-point, CDAB) | 2 (4 bytes) | W   | Write 0 in air or purified<br>water                                                                                                                                      |
| Turbidity Slope<br>Calibration         | 0x0038 | Float<br>(floating-point, CDAB) | 2 (4 bytes) | W   | Write the known conductivity<br>value while immersed in the<br>reference solution                                                                                        |

### 3. Command Example

➤ Read Data

➤

Read request : 02 03 00 08 00 04 C5 F8



Response : 02 03 08 30 00 41 DA C2 DB 41 D3 F3 0B

Parsed in float CDAB format: 30 00 41 DA = 27.27 °C, C2 DB 41 D3 = 26.47NTU

## VI. Calibration

The sensor is factory-calibrated by default. Do not recalibrate unless necessary.

### 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

02 10 00 30 00 02 04 00 00 41 C8 CE 39

### 2. Turbidity Calibration

Use a suitable 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.

#### ➤ Turbidity Zero-Point Calibration

Fill the container with purified water, insert the sensor, wait for the reading to stabilize, and write 0 to 0x0036.

Example: send 0

02 10 00 36 00 02 04 00 00 00 7F D5

#### ➤ Turbidity Slope Calibration

Pour a solution of known turbidity into the container, insert the sensor, wait for the reading to stabilize, and send the turbidity value to 0x0038.

Example: send 40.0

02 10 00 38 00 02 04 00 00 42 20 CF 21



Alternatively, write the K and B values directly.