YEX-S2-LEV Hydrostatic Level Gauge User Manual

Changsha Yex Technology Co., Ltd.

Mobile/WhatsApp: +8615111147890

Email: sales@yexsensor.com

Website:www.yexsensor.com

Add: 1303, Building A, Runjia Park Road, Yuelu District, Changsha City, Hunan Province, China

Content

I. Product description

YEX-S2-LEV hydrostatic liquid level gauge is a hydrological instrument used for water level and water temperature measurement. The input structure is fully stainless steel sealed. It has a rich product series and is widely used in water level measurement in industrial processes, mining, hydrology and water conservancy, geological exploration and other industries. and water temperature measurement.

Main feature:

- High quality and high stability pressure sensing element
- Integrated measurement of water level and temperature
- Full-scale digital calibration
- RS485 interface and MODBUS-RTU standard communication protocol
- Power supply reverse connection protection, overvoltage protection
- Anti-surge, electromagnetic interference
- All stainless steel sealed structure, IP68 protection

II. Technical Parameters

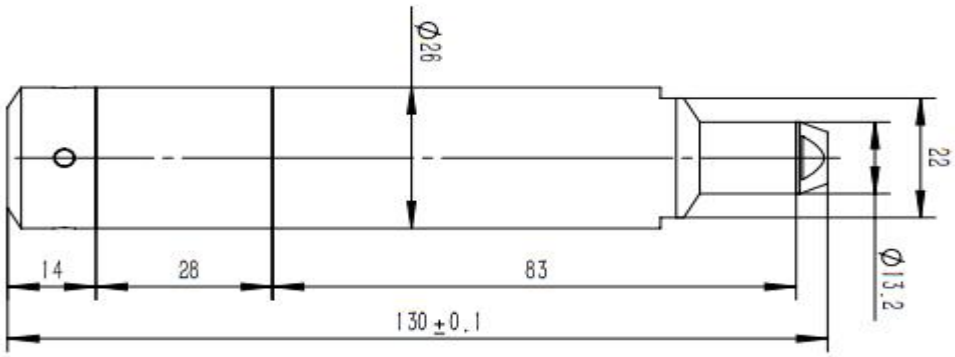
product name	YEX-S2-LEV hydrostatic liquid level gauge
Accuracy	＜±0.1% F.S (0.2%F.S, 0.5%F.S optional)
Measuring range	0～65m H2O
long term stability	＜0.1%F·S/year (0.2%F.S/year, 0.5%F.S/year optional)
Overload capacity	5XF·S
storage temperature	-40～125℃
Supply voltage	DC5～30V (typical 24V)
Power protection	Anti-reverse connection, over-voltage protection

output method	RS485/MODBUS-RTU protocol
Measuring medium	Load capacity: 128 transmitter nodes
Shell material	Compatible with stainless steel and fluororubber
Cable material	Stainless steel 316L
Cable specifications	Polyurethane
Protection level	Φ7.6mm, with air hole shielding layer, customized length
Insulation	IP68

III. Power supply and RS485 wiring definition

Serial number	Thread color	Definition
1	red	5-30V+
2	blue	RS485+
3	green	RS485-
4	yellow	GND

IV. Overall dimensions (unit: mm)



V. Instructions for use

5.1 power supply

The external power supply of the instrument can be as low as 5VDC and as high as 30VDC, with reverse connection protection function; it supports intermittent power supply mode.

5.2 Communication Interface

The instrument uses an industrial-grade RS485 communication interface, works in half-duplex master-slave mode, the transmission distance can reach 1200 meters, and the baud rate supports 9600, 19200, 38400, 57600;

Serial port number: The serial port number of the communication serial port. The default is COM1. When using it, set it according to the actual connected serial port number on the computer.

- Baud rate: The baud rate of the communication serial port, 9600, 19200, 38400, 57600 (Bit/s) is optional, and the default is 9600.
- Check digit: The calibration mode of the communication serial port, including no checksum, even checksum, and sent checksum. The default is no checksum.
- Stop bit: The stop bit of the communication serial port, the value is 1 or 2, and the default is 1 bit.
- Data bits: The data bits of the communication serial port, fixed at 8bit.

The supported communication protocol is MODBUS-RTU protocol; after the instrument is

connected to the external power supply, commands can be sent through computer software or MDOBUS host (such as RTU device) to operate the instrument, such as collecting water level and temperature values.

5.3 fixed

The instrument is an integrated input structure with a shielded gas cable. Since the cable length is generally long, steel wires are installed on the cables to increase the tensile strength and improve reliability. After the instrument is put into logging, the probe is mainly hoisted through the cable. At the logging wellhead, the steel wire should be tightened firmly when fixed, so that gravity mainly acts on the steel wire; when installing the wellhead, a protective cover should be equipped to protect one side of the cable joint to prevent the gas pipe from being blocked (absolute pressure type without gas pipe), and connect the shielded wire.

VI. Wiring

6.1 Instrument wiring

The instrument's power supply and communication share a single four-wire cable, with the wires colored red, yellow, blue, and green. Red and yellow are the positive and negative power supply lines, while blue and green are the positive and negative RS485 signal lines.

6.2 Connect to computer

The following accessories are required to connect to the computer:

- RS232<->RS485 converter
- USB<->RS232 converter
- or
- USB<->RS485 converter

Connection method: The blue wire of the cable (RS485-A) is connected to the RS485+ (T+) of the converter; the green wire of the cable (RS485-B) is connected to the RS485- (T-) of the converter; the USB cable is directly plugged into the USB port of the computer. Check the corresponding serial number in the device manager and use this serial number in the computer software.

VII. Data Communication

7.1 Data Format

The default data format of Modbus communication is: 9600, n, 8, 1 (baud rate 9600bps, 1 start bit, 8 data bits, no parity, 1 stop bit).

The factory default address of the device is: 65; parameters such as baud rate can be customized.

7.2 Infoframe format

a) Read data instruction frame

41	03	xx xx	xx xx	xx xx
Address	Function code	Register Address	Number of registers	CRC check code(low byte first)

b) Read data response frame

41	03	xx	xx……xx	xx xx
Address	Function code	Bytes	Answer data	CRC check code(low byte first)

c) Write data command frame

41	06	xx xx	xx xx	xx xx
Address	Function code	Register Address	Write data	CRC check code(low byte first)

d) Write data response frame (same as write data command frame)

41	06	xx xx	xx xx	xx xx
Address	Function code	Register Address	Write data	CRC check code(low byte first)

7.3 Register address

Register address	Name	Illustrate	Number of registers	interview method
40001 (0x0000)	Measurements	1 double-byte integer, unsigned integer, unit mm	1 (2 bytes)	read
44097 (0x1000)	Zero point calibration	The readout data is the zero offset, and the default value is 0; the meaning is the original signal value displayed as 0.	1 (2 bytes)	write/read
44101 (0x1004)	slope calibration	Read out the current slope value, the default value is 1000;	1 (2 bytes)	write/read
48195 (0x2002)	sensor address	The default is 65, and the written data range is 1~255.	1 (2 bytes)	write/read
48225 (0x2020)	Reset sensor	The calibration value returns to the default value, and the written data is 0. Note: After the sensor is reset, it needs to be calibrated again before it can be used.	1 (2 bytes)	Write

7.4 Command example

a) Read data command
Function: Get the liquid level value measured by the sensor; the unit is mm
Request frame: 41 03 00 00 00 01 8A CA;
Response frame: 41 03 02 0C 62 3D 62
Reading example:

Level value
0C 62

Liquid level value: 0C 62 represents the hexadecimal reading liquid level value, converted to decimal value is 3170mm.

b) Calibration instructions:
Zero point calibration
Function: Set the liquid level zero point calibration value of the sensor so that the sensor displays zero in the air. If the sensor currently reads a zero-point calibration value of 2 and now displays a value of 5, then the zero-point calibration value needs to be changed to 2+5=7 in order for the device to display 0 in the air. The example is as follows:
Request frame: 41 06 10 00 00 07 C2 08

Response frame: 41 06 10 00 00 07 C2 08

slope calibration

Function: Set the liquid level slope calibration value of the sensor to make the liquid level change more in line with the customer's water conditions; if the sensor's 5000mm position displays 4800mm, if you want the sensor to display at 5000mm, you need to change the slope calibration value to 5000/4800×1000= 1041, examples are as follows:

Request frame: 41 06 10 04 04 11 00 C7

Response frame: 41 06 10 04 04 11 00 C7

c) Set device ID address:

Function: Set the Modbus device address of the sensor;

Change the sensor address 41 to 01. The example is as follows:

Request frame: 41 06 20 02 00 01 EC CA

Response frame: 41 06 20 02 00 01 EC CA

7.5 Error Response

If the sensor cannot correctly execute the host computer command, it will return information in the following format:

Definition	Address	Function code	Code	CRC check
Data	ADDR	COM+80H	xx	CRC 16
Number of bytes	1	1	1	2

a) CODE: 01 –Function code error
03 – Data is wrong

b) COM: The received function code

7.6 User calibration

Users can adjust the water level zero point and density to adapt to the on-site measurement environment and medium. The instrument has been accurately calibrated before leaving the factory and generally does not require adjustment. If calibration is required, please perform it under the guidance of technical personnel.