YW02-606 Series

Oil Level Sensor Manual

Applicable products: YW02-6061, YW02-606F

SIBO.X INDUSTRIAL CO.,LTD.
Add: No. Building 1, No. 1, Jingshi Road, Cicheng Town Industrial Park, Jiangbei District, Ningbo City, Zhejiang, China
https://www.sbxsun.com
Email: info@sbxsun.com
Tel: +86-15958288207

1. Product Introduction

The YW02-606 series oil level sensors utilize radio frequency capacitance measurement principles and tomographic scanning technology. They dynamically analyze various parameters within the medium, automatically performing precise compensation, and output signals that exhibit linear and continuous variations with liquid level changes. Integrated with GPS technology and GPRS network transmission, these sensors transmit real-time liquid level data to monitoring centers during measurements. Featuring no elastic or movable components, the system is impact-resistant and easy to install, making it suitable for accurate measurement of gasoline, diesel, hydraulic oil, and other weakly corrosive liquids in diverse environments.

The YW02-606 series oil level sensors are precision-grade measuring instruments featuring high resolution and measurement accuracy. These sensors operate without manual intervention, automatically calibrate, and maintain temperature drift-free performance. They remain unaffected by medium variations while consistently delivering accurate liquid level signals. This technology effectively resolves measurement challenges for ethanol-blended gasoline and methanol fuels, while simultaneously addressing measurement errors caused by varying fuel grades and significant temperature differences across regions.

2. Performance Indicators

Number	Project	Metric	Remarks
1	Working voltage	DC 5V	Range: 4.5V-9V
		DC 12V / DC 24V	Range: 9V-36V
2	Working current	5-15mA	Excluding analog 4-20mA products
3	Pressure range	-0.1MPa～0.1MPa	
4	Detection range	100mm～1400mm	Customize length as requi- red
5	Length of lead	1000 mm	Customize length as requi- red
6	Probe diameter	Φ16mm	
7	Working temper- ature	-35℃~75℃	
8	Storage temper- ature	-40℃~85℃	
9	Probe temperature tolerance	-50～150℃	
10	Fixed form	Thread installation M20×1.5/Flange installation	Custom specifications requ- ired
11	Anti-hazard cl- assification	Ex iaⅡC T6 Ga	Intrinsic type
12	Accuracy level	1.0	Precision 1.5 within 300mm
13	Numeric output	RS232/RS485/CAN/TTL	The product supports only one signal type as output
14	Analog output	Current: 4～20mA	
		Voltage: 0～3.3V,0～5V,0～10V	

⚠pay attention to：

1. The Simulated Current Must Operate at a Working Voltage of DC24V.

2. The Accuracy Grade Measurement Is the Result of the Laboratory Static Test. The Actual Accuracy Is Subject to the Actual Installation Environment.

3. Lead Definition

Digital transmission lead-out lines: red, black, yellow, green (or blue).

Simulation voltage lead-out lines: red, black, green (blue).

Analog current leads: red and black.

Lead color	Lead description	Remarks
Red line	Positive power sup- ply	
Lineaenigra	Negative terminal of power supply	
Yellow line	RS232 RXD/ RS485 A	RXD receiving term- inal
Green (blue) line	RS232 TXD / RS485 B / Voltage Output	TXD transmitting ter- minal

⚠pay attention to

Special: Three-wire system with 4-20mA signal, where the green (white) wire serves as the current output signal.

All cables must use 4-core connectors. When cutting the cable, follow the standard wiring method. Any excess cable should be insulated.

4. Sensor Calibration

The sensor employs microcomputer control technology, eliminating the need for cumbersome manual calibration during operation. Under normal conditions, the device can be directly applied to measure conventional media without calibration. If calibration is required, the following steps can be taken:

Automatic calibration: When powered, gently immerse the sensor into the medium being measured. Gradually raise the liquid level from the lower end of the sensor's measuring unit (lower hole for sleeve-type sensors) to exceed 90% of the sensor's measuring section. The optimal calibration position is the lower part of the sensor's mounting surface (upper hole for sleeve-type sensors). During calibration, ensure the liquid level rises as high as possible to the lower part of the sensor's mounting surface (upper hole for sleeve-type sensors). This completes the sensor calibration. To prevent calibration failure, repeat this process at least twice. After calibration, maintain power supply for over 10 minutes to ensure complete data preservation.

5. Sensor Installation

Pre-installation preparation:

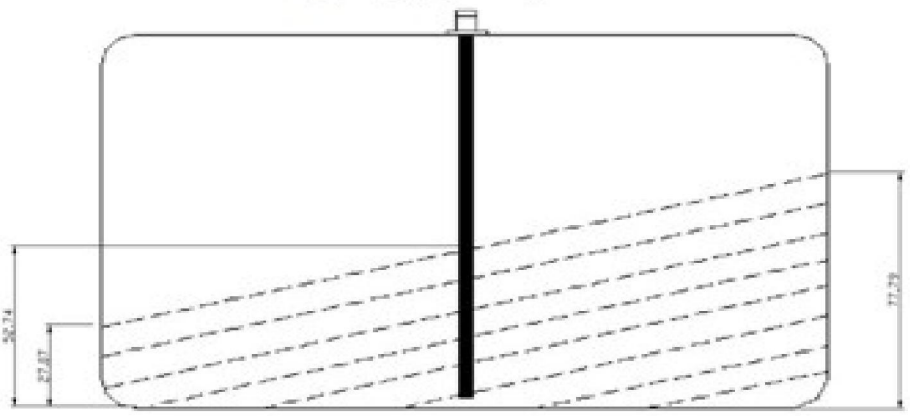
- Check if all required tools are available and if the product accessories are complete.
- Before starting the operation, place the fire extinguisher in an easily accessible location to prevent the fuel tank from catching fire during the process.
- Open the fuel tank cover to ensure proper air circulation inside the tank.
- Select the oil level sensor installation position at the center of the fuel tank. First, clean the oil contamination on the tank surface. During drilling, ensure that no drill debris falls into the tank.
- After installing the sensor, close the fuel tank cover and restore it to its original position.

Installation Tool List

4 Shielded Cable: 220V 10A
Tail wire: 5.00mm
Head: 3.0/4.8
Wrench: 35mm
Nylon tie: 5mm
Orienter: Φ22mm
PP pipe: Diameter 20
Screwdriver: Cross/Yawning Multimeter/Power Test Pen, Oil-Proof Sealant, Adjustable-Speed Drill, Wire Stripper, Waterproof Tape, Double-Sided Tape, etc.

Installation steps:

1. For used vehicles, remove the original sensors and install them directly on new ones.
2. Before installation, verify that all accessories are present and properly fitted, including flanges, rubber gaskets, O-rings, and screws.
3. Place the O-ring at the base of the sensor.
4. Apply oil-resistant sealant to both sides of the rubber pad, then align the holes with the flange and oil tank flange, and secure it with screws. When tightening, apply force symmetrically and alternately to ensure even force distribution in all directions, preventing oil leakage.
5. Insert the sensor and tighten it with a wrench to complete the installation.
6. Connect the power cable and communication cable separately as defined.
7. After confirming the circuit is normal, the sensor power can be connected, and the sensor will function properly.
8. The sensor should be installed as close to the center of the tank as possible to reduce the influence of the oil level fluctuation.



As shown in the figure above, when the oil level tilts, the oil level at the tank's edge will rise or fall depending on the tilt direction. If the sensor is positioned at the tank's edge, it may result in the sensor reading values that are either too high or too low.

6. Sensor Communication Protocol

[Communication parameters: baud rate: 9600, data bits: 8, parity: off, stop bit: 1]

Header: 2 bytes, the outgoing header is 2 bytes, which is $! (0x24 0x21), and the reply header is 1 byte, which is *.

Command word: A 2-byte instruction word, e.g., RY (0x52 0x59).

ID: A 2-byte ASCII serial number, such as 01 (0x30 0x31). The maximum value is 99. Label: A 3-byte response identifier that specifies the data type of the current reply, such as "CFV".

Return value: An ASCII string fixed to 6 bytes, with leading zeros if less than 6 bits, e.g., "00FA32".

Check: 2 bytes, using the sum-of-ones method. The sum of all characters from the header to the value is taken, and the lower 8 bits are converted to ASCII hexadecimal. For example, if the sum is 0x0351, only the lower 8 bits (0x51) are retained, which translates to the ASCII hexadecimal "51" (0x35 0x31).

Tail: 2 bytes, fixed to 0x0D 0x0A

Instruction format: header, command word, ID number, checksum, trailer.

Instruction byte	Baotou [2]	Command word [2]	ID number [2]	Check[2]	Wrap [2]
ASCII	$!	RY	01	51	\r\n
16 radix	24 21	52 59	30 31	35 31	0D 0A

Reply message format: header, identifier, ID number, return value, checksum, footer.

Reply [Byte]	Baotou [1]	Label [3]	ID number [2]	Return value [6]	Check[2]	Wrap [2]
ASCII	*	CFV	01	00FA32	B6	\r\n
16 radix	2A	43 46 56	30 31	30 30 46 41 33 32	42 36	0D 0A

Command example:

Commands sent from the terminal or computer to the level gauge:

ASCII: $!RY0151 Hex: 24 21 52 59 30 31 35 31 0D 0A

Level meter response:

ASCII: *CFV0100FA32B6 Hex: 2A 43 46 56 30 31 30 30 46 41 33 32 42 36 0D 0A

Digital Sensor Protocol:

Number	CW	Information Characteristic	Command Description	Command example	Reply	Remarks
1	RY	CFV	Read the current AD value of the liquid level	$!RY0151	*CFV0100FA32B6	Filtered [Recommended]
2	DO	RFV	Read current level percentage	$!DO0139	*RFV01000.0197	No filter [Not recommended]
3	ID	SID	Set level gauge ID	$!ID0133	*SID01OKOKOK39	Settings successful
4	Z[N]	SZN	Set the filter value to [N]	$!Z40134	*SZN01OKOKOK54 *SZN01NONONO5D	Filter value N: 0 to 9, default 6
5	ST	Not have	Set scheduled send	$!ST014D	No return value	0 seconds ≤ [ID number=interval time] ≤ 60 seconds

⚠pay attention to：

The scheduled notification feature is disabled by default.

Set a scheduled send command, where [ID] bytes represent the send interval. When the send time is 0 or greater than 60, the scheduled send function is disabled.

The uplink message is scheduled to transmit with the identifier 'RFV', containing a filtered percentage value.

7. Description of Filtering Function

When the vehicle is driving normally, the liquid level height changes constantly. If the height changes are displayed in real time, the curve fluctuation is very obvious. At this time, the filter function is added, which makes the oil quantity curve smooth.

The filtering principle involves presenting the primary liquid level height change over a specified period. A microprocessor smooths the transition of the curve, making the overall curve appear more fluid. This process optimizes the measurement curve without compromising data accuracy.

Filter command description: $!Z[N]0134 where: N is the filter value, 01 is the ID value, and 34 is the checksum

Filter value	0	1	2	3	4	5	6	7	8	9
Time (seconds)	0	12	24	36	60	120	180	240	480	960

8. Usage Precautions

1. The RS232/RS485/CAN/0-5V/4 ～ 20mA output signal must be unique. The RS485 bus supports multiple sensors, but each sensor's communication address must be preconfi- gured and unique to prevent bus lockout. As the RS485 bus uses half-duplex chips, a response time must be allocated to the module during data reading. For continuous reading, the interval between two commands should be at least 200ms.

2. Given the complex installation environment of this product, we recommend using an isolated power supply, keeping communication cables short, and opting for shielded cables.

3. For sensors with RS232/RS485/CAN signals, when troubleshooting communication failures, swap the green and yellow wires for testing. Successful communication indicates a wiring error. This procedure applies only to digital communication products.

4. The sensor's supply voltage must not exceed its normal operating voltage, and its power consumption must be at least equal to the power required during normal operation.

5. The actual environment must meet the basic parameter requirements of the sensor and must not exceed the normal range, otherwise it will result in transmission failure,Sensors are damaged, and even cause other accidents.

6. The sensor outputs a position-height signal of the measured medium. When no filtering is applied, the output curve reflects the actual oil level changes, with values fluctuating as the oil level rises or falls. Filtering results in a smoother curve—the greater the filtering value, the smoother the curve—but the oil level value lags behind the actual oil level changes. Thus, the curve's smoothness is directly proportional to the oil level's lag time (reaction time). The factory-set filtering value is determined based on customer feedback and field conditions, representing a suitable setting.

7. Due to the oil type, the medium used in sensor setup differs from the actual medium in use. The sensor features automatic adaptation to various media, which can resolve errors caused by medium differences. Therefore, users should perform sensor calibration before use.

9. Troubleshooting Common Issues

Fault phenome- non	Analysis of cau- ses	Exclusion and Solutions	Remarks
No output/ communication failed	■ circuit break- ers or low voltage; ■ sensor fault; ■ wiring error	Check wiring connections → Verify power supply voltage exceeds 10V during load testing → Confirm power current ranges from 3 to 10mA → Reconnect wires acco- rding to specifications or swap green and yellow wires (for digital communication only) → If all checks pass or current exceeds normal range, the sensor is faulty.	The power supply vo- ltage for the 4~20mA signal output is DC12~ 28V, with a current range of 4~20mA.
Output value unchan- ged	■ Abnormal power supply volta- ge; ■ external disturbance ; ■ The sensor is blocked. ■ sensor fault;	Check if the power supply voltage is normal during load testing (e.g., voltage instability) → Re-power the sensor → Check for severe interference in the envi- ronment → Inspect the sensor's upper and lower holes for blockage → If unobstruc- ted, the sensor is deemed faulty.	Check if the fuel level in the tank remains stable; if it normalizes after power restoration, then focus on inspecting int- erference and power supply components.
The output value has a la- rge error	■ Abnormal power supply voltage; ■ external disturbance ; ■ The sensor is blocked. ■ automatic adapta- tion not completed; ■ sensor fault;	Check if the power supply voltage is normal during load testing (e.g., voltage instability) → verify for severe interfere- nce in the environment → inspect whether the sensor's upper and lower holes are clogged → perform sensor calibration → if still ineffective, the sensor is faulty.	This fault is mostly ca- used by incomplete au- tomatic adaptation, and the sensor calibration operation can be perf- ormed.
Output value fluctuates	■ The oil surface is jumping; ■ The power supply voltage is unstable. ■ external disturbance ; ■ sensor fault;	Check if the oil level is fluctuating → Verify if the power supply voltage is normal → Check for any interference in the environ- ment → Perform sensor calibration → If the issue persists, the sensor is faulty.	Therefore, the fault of- ten occurs on the 0-5V signal.
All the above methods should be carried out when the vehicle terminal, sensor and other related equipment are working normally.			

10. After-sales Service

This product comes with a one-year warranty from the date of sale. During the warranty period, any issues not caused by human factors or

For product damage caused by quality issues, contact the manufacturer for free repair promptly. We will not repair products that customers have disassembled or damaged intentionally.

The product label has been tampered with, making it impossible to identify as our company's product. No repairs will be provided.

After the warranty period ends, repair material costs will be charged for product damage or malfunction caused by usage.

We provide free consultation services for customers regarding product purchase, usage, and installation.

Accessories such as O-rings and sealing gaskets for sensors are not covered by the three guarantees (repair, replacement, and refund).

⚠Note: Do not collide with precision instruments.

ΔWarning: Internal parameter users cannot modify them arbitrarily.

▲Warning: The working environment must not exceed the normal range of the sensor.