

RKL-01 Submersible Liquid Level Transmitter User Manual



Revision Time	Reviser	Current Version	Remarks
20250623	SUN	V5.0	

User Notice

Please read this manual carefully before use to ensure safe and optimal operation. Retain this manual for future reference.

Pre-Use Instructions

- Carefully review this manual and follow all operational and safety guidelines to prevent malfunctions and hazards.

Unpacking Inspection

- Upon receipt, carefully inspect the sensor device and accessories for any shipping damage.
- If damage is detected:
- Immediately notify the manufacturer and distributor.
- Retain all packaging materials for return or replacement processing.

Parts List

Item	Quantity	Remarks
RKL-01	1	
Cable	1	The length depends on the order

1. Product Introduction

RKL-01 Submersible Liquid Level Transmitter features a stainless steel isolation diaphragm and utilizes diffusion silicon pressure sensor element, the pressure core body adopts the process of laser trimming resistor for a wide temperature range of zero and sensitivity temperature compensation. Special cable for air-venting conduit and waterproof technology ensures water tightness and ventilation between inside and outside, ensuring long-term measurement stability and accuracy.

2. Product Features

- High accuracy,high sensitivity
- Fast response
- Good stability
- Long service life
- Strong resistance to interference
- Anti-corrosion material optional
- Low temperature drift
- Wide temperature range compensation

3. Specifications

Item	Technical Specification			
Product Diameter	Φ27mm default	Φ19 mm	Φ16 mm	Φ13 mm
Range	0~0.5m...500mH ₂ O Or 0~5KPa...5MPa	0~5m...300mH ₂ O Or 0~50KPa...3MPa	0~0.5m...200mH ₂ O Or 0~5KPa...2MPa	0~3m...300mH ₂ O Or 0~30KPa...3MPa
Temperature Coefficient of Zero	± 0.015%FS/°C@25°C		2%FS (Max)	± 0.015%FS /°C@25°C
Temperature Coefficient of Span	± 0.02%FS/°C@25°C		2%FS (Max)	± 0.02%FS /°C@25°C
Supply Voltage	10-30VDC , 24V typ.			
Output	4-20 mA ,0-5V,0-10V, RS485			
Overload Pressure	1 .5 * FS			
Measuring Medium	The liquid(not sticky) compatible with 316 stainless steel			
Total Accuracy	0.1% FS , 0.25%FS , 0.5%FS (standard)			
Long-term Stability	0.1% FS/year typ . , 0.2% FS/year max			
Ingress Protection	IP68			
Operating Temperature	-20°C~ +85°C			
Compensating Temperature	-10°C~ 70°C , -40°C~ 70°C (Φ27mm)			
Main Material	Sensor:316L , housing:304SS (316L is optional)			
Cable	Outer layer material: PUR,Atmospheric pressure compensation cable,Polymer waterproof plug at cable end,if the range is greater than or equal to 100M,PUR reinforced cable is required.			
Cable Weight	PUR cable: 0.056kg/ m , PUR reinforced cable: 0.06kg/ m			
Power Consumption	Current output:(U*0 .02)W,Voltage output:(U*0 .008)W, Digital output:(U*0 .015)W			
Load Capacity	Current output:≤(U-10)/0.02Ω , Voltage output:≥20 kΩ			
Insulation Resistance	100MΩ@ 250VDC			
Response Time	1 ms			
Pressure Connection	Screw thread , throw-in type			
Weight (Probe Unpacked)	Probe 27mm: 0.3 kg,Probe 19 mm,16 mm,13 mm,Weight: 0.2kg			
Storage Condition	-40°C-75°C (Dry soundings)			

4. Electrical Connections

Connector(Cable)	RS485	Current/Voltage
Red	V+	V+
Black/Green	V-	Signal+
Yellow	RS485A	
Blue	RS485B	

5. Output Types & Formulas

Current Type	$H = (I - 4) / (20 - 4) * \text{Scale range}$
Voltage Type	$H = U / (\text{full scale voltage} - \text{zero point voltage}) * \text{Scale range}$

H: Water level in m;

U: Transmitter output voltage in V;

I: Transmitter output current in mA.

6. Product Dimensions

Unit:mm

The following pictures show product size diagrams with different diameters.

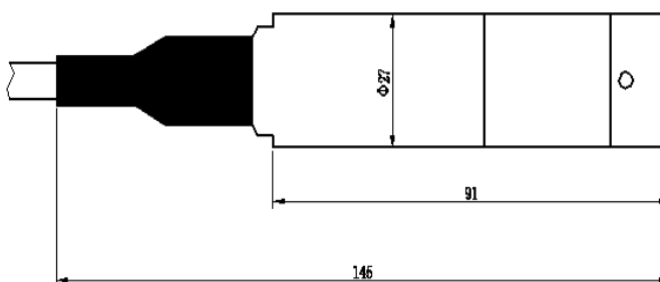


Figure 6.1 Φ27mm Diameter

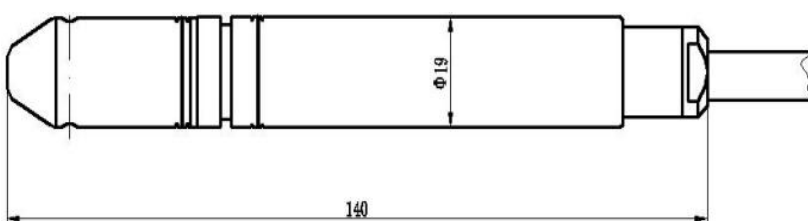


Figure 6.2 Φ19mm Diameter

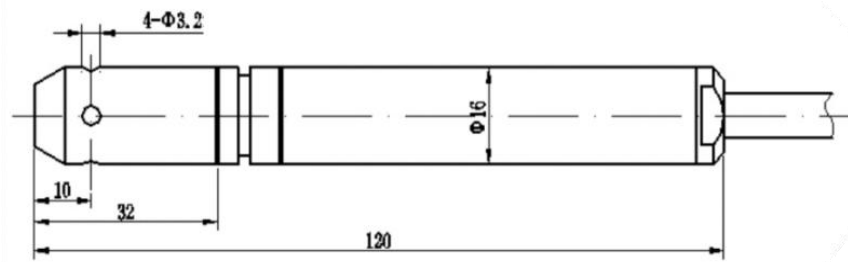


Figure 6.3 Φ16mm Diameter

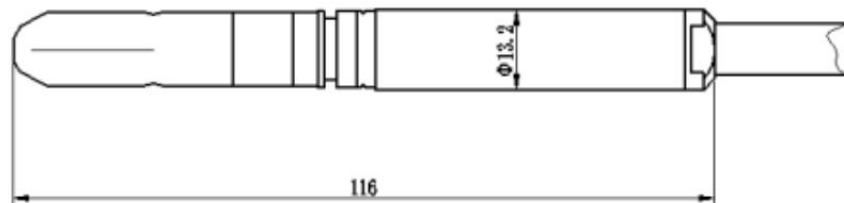


Figure 6.4 Φ13mm Diameter

Fixed Bracket(Optional)

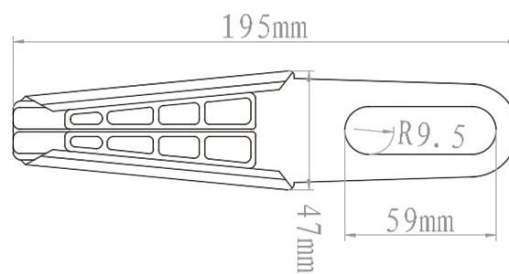


Figure 6.5 Bracket size

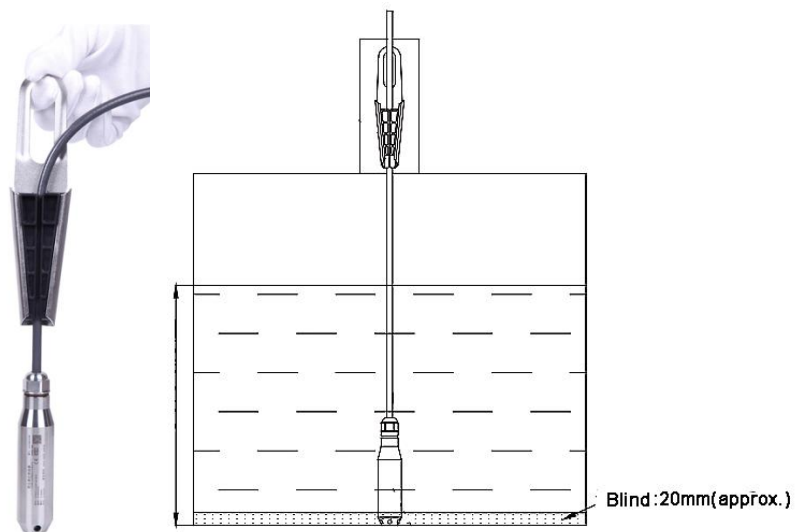


Figure 6.6 Example diagram of bracket

7. Communication Protocol (MODBUS-RTU)

Parameter	Value
Data Bits	8 bits
Check Bit	None
Stop Bit	1 bit
Baud Rate	9600 bps
Slave Address	0x01 (Factory Default)

7.1 Read Real-Time Data

Client sends:

01 03 00 03 00 02 340B

Return:

01 03 04 00 02 01 B4 5A14

7.1.1 Description of Return Data Format

No.	Conception	Byte Number	Description	Remarks
1	Address block	1	Address(0x01)	0x01
2	Function code	1	Only read(0x03)	0x03
3	Number of bytes	2	0X04	4bytes
4	Data block	2	Coefficient/Resolution	0x0002(0.01)
5	Data block	2	Level value	0x01B4(4.36m)
6	Check block	2		0x5A 0x14

7.2 Modify Slave Address

Step 1:

Client sends:(Change slave address from 01H to 02H.)

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x01	0x06	0x00	0x00	0x00	0x02	0x08	0x0B

Response:

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x01	0x06	0x00	0x00	0x00	0x02	0x08	0x0B

Step 2:

Client sends:(Save the new address.)

Slave id	Function code	Address_H	Address_L	Data		CRC_L	CRC_H
0x02	0x06	0x00	0x0F	0x00	0x00	0XB9	0xFA

Response:

Slave id	Function code	Address_H	Address_L	Data		CRC_L	CRC_H
0x02	0x06	0x00	0x0F	0x00	0x00	0XB9	0xFA

7.3 Register Description

Register name	Function code	Register address	Data type	Data length (Byte)	R/W	Remark
Coefficient	0x03	0x0003	Int16	2	R	0-1 1-0.1 2-0.01 3-0.001
Liquid level	0x03	0x0004	Int16	2	R	m
Modify sensor address	0x06	0x0000	Int16	1	W	1-255
Baud rate	0x06	0x0001	Int16	1	W	0-1200 1-2400 2-4800 3-9600 4-19200 5-38400 6-57600 7-115200

8. Installation Guidelines

8.1 Static Water

As shown in figure 8.1,when the sensor is installed in static water such as in pools,water towers,probe is immersed into the bottom and should be as far as possible away from the pump or valves.The terminal box should keep above water surface and prevent water penetrating into cables. Please make sure the airway not be blocked.

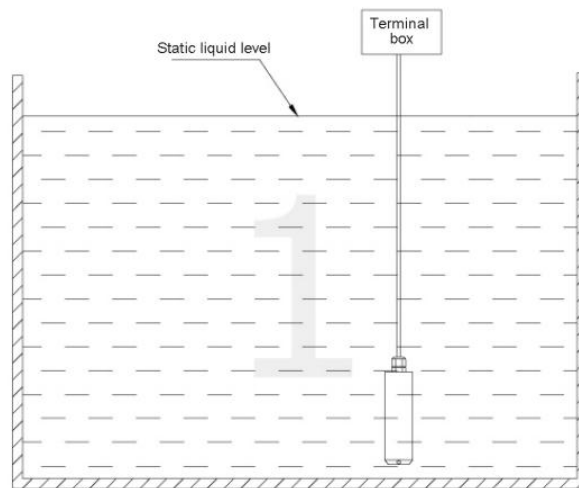


Figure 8.1.1

8.2 Dynamic Water

As shown in picture 2,when installing the sensor in dynamic water environment,such as dams and rivers,insert the probe into a steel pipe(inner dia is around 45 mm),with multiple holes drilled at varying heights on the pipe side wall facing away form the water flow direction.The terminal box should keep above water surface and prevent water penetrating into cables.Please make sure the airway not be blocked.

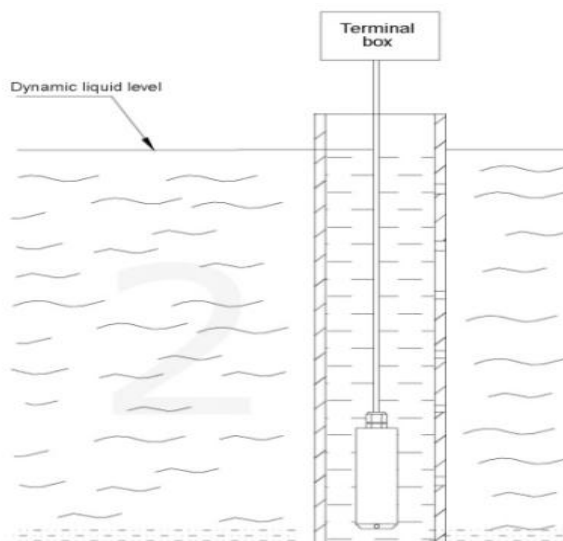


Figure 8.2.1

9. Precautions

Package and Model Verification

- Ensure the packaging is intact and verify the sensor model and specifications match your purchased product.

Powered Wiring Prohibition

- Do not connect wires while powered. Only energize the sensor after confirming correct wiring.

Component Modification Restriction

- Do not alter factory-soldered components or pre-connected wires.

Precautions for Use

- The blind spot of the sensor is 2cm.
- When using the sensor, the bottom filter cap does not need to be removed.
- Do not block the white dust plug at the sensor output end to avoid data errors.

Precision Handling Requirement

The sensor is a precision device. Avoid:

- Unauthorized disassembly.
- Structural components are strictly prohibited from being compressed under stress.

Note: Unauthorized modifications void the warranty.

10. Troubleshooting

Incorrect Output Signals (Analog/RS232/RS485):

- Verify wiring correctness and secure connections.
- Check if the serial port is occupied or malfunctioning.
- Confirm serial port settings (baud rate, data/stop bits) match device requirements.

Persistent Issues:

- Contact the manufacturer if the above steps fail to resolve the problem.

11. Product Maintenance

Maintenance and Safety

- Regularly clean and inspect the sensor to maintain performance.
- Do not expose the sensor to extreme temperatures, moisture, or corrosive substances unless explicitly specified.
- Unauthorized disassembly, modification, or repairs may void the warranty and lead to malfunctions.
- **If the filter cap is blocked and needs to be disassembled for cleaning, please do not touch the bottom membrane and be careful not to bump the membrane with hard objects to avoid sensor data deviation.**

Troubleshooting Protocol

- In case of malfunction, refer to the troubleshooting section of this manual.
- Do not attempt unauthorized disassembly or repairs.
- Contact the manufacturer's after-sales department directly for technical support.

12. Warranty Terms

This product comes with a one-year warranty, starting from the date of delivery. Within twelve months, the Company shall be responsible for free repair or replacement of any failure caused by sensor quality issues (non-human damage). Fees will be charged for repairs or replacements after the warranty period expires.

 Complies with applicable CE directives.

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