Bolsen YF-S201

Bolsen YF-S201 Water Flow Sensor Instruction Manual

Model: YF-S201

1. Introduction

This manual provides detailed instructions for the installation, operation, and maintenance of the Bolsen YF-S201 Water Flow Sensor. The YF-S201 is a Hall effect flow sensor designed for precise measurement of water flow rates in various applications. Please read this manual thoroughly before using the device to ensure proper functionality and safety.

2. Product Overview and Features

The Bolsen YF-S201 is a compact and reliable water flow sensor that utilizes the Hall effect principle to detect water flow. It is suitable for measuring flow rates from 1 to 30 liters per minute and can withstand water pressure up to 2.0 MPa. Its robust design ensures durability and consistent performance.

- **Sensor Type:** Hall Effect Sensor
- **Flow Rate Range:** 1 to 30 Liters/Minute
- **Maximum Water Pressure:** 2.0 MPa
- **Output Type:** 5V TTL Pulse Signal
- **Nominal Pipe Connections:** 1/2 inch
- **Compact Design:** Easy to integrate into various systems.

Figure 2.1: Front view of the YF-S201 Water Flow Sensor, showing the label with model number YF-S201, working range 1-30L/min, and water pressure rating. The sensor has threaded connections on both ends and a three-wire cable extending from the bottom.

Figure 2.2: Side view of the YF-S201 Water Flow Sensor, illustrating its compact black plastic body, threaded pipe connections, and the attached three-wire cable with a connector. An arrow indicating flow direction is visible on the top surface.

3. Specifications

Parameter	Value
Model	YF-S201
Sensor Technology	Hall Effect Sensor
Working Voltage	5 to 18V DC (Min. 4.5V)
Max Current Draw	15mA @ 5V
Output Type	5V TTL Pulse
Working Flow Rate	1 to 30 Liters/Minute

Parameter	Value
Maximum Water Pressure	2.0 MPa
Working Temperature Range	-25 to +80°C
Working Humidity Range	35% - 80% RH
Accuracy	±10%
Output Duty Cycle	50% ±10%
Output Rise Time	0.04µs
Output Fall Time	0.18µs
Pulses per Liter	450 pulses/Liter
Durability	Minimum 300,000 cycles
Cable Length	15 cm
Pipe Connections	1/2" nominal pipe, 0.78" outer diameter, 1/2" thread
Dimensions (L x W x H)	2.5" x 1.4" x 1.4" (approx.)
Item Weight	1.76 ounces
Color	Black
Manufacturer	Bolsen

4. Setup and Installation

4.1 Wiring Instructions

The YF-S201 sensor comes with a three-wire cable for electrical connection. Ensure correct polarity to prevent damage to the sensor or connected equipment.

- **Red Wire:** Connect to VCC (Positive Power Supply, 5V to 18V DC).
- **Yellow Wire:** Connect to Signal Output (Pulse Output).
- **Black Wire:** Connect to GND (Ground).

It is recommended to use a pull-up resistor on the signal line if connecting to a microcontroller with internal pull-ups disabled or if the signal is weak over long distances.

4.2 Mechanical Installation

Install the sensor in the water pipe system. Observe the following guidelines:

- **Flow Direction:** Ensure the sensor is installed with the flow direction arrow on its body pointing in the direction of water flow. Incorrect installation will result in inaccurate readings or no output.
- **Pipe Connections:** The sensor features 1/2-inch nominal pipe threads. Use appropriate plumbing fittings and thread sealant (e.g., PTFE tape) to ensure a watertight connection. Avoid overtightening to prevent damage to the sensor body.
- **Positioning:** Install the sensor in a straight section of pipe, away from bends, valves, or pumps, to minimize turbulence and ensure stable flow readings. A straight pipe section of at least 10 times the pipe diameter upstream and 5 times the pipe diameter downstream is recommended.
- **Accessibility:** Install the sensor in an accessible location for future maintenance or inspection.

5. Operating Principles and Flow Rate Calculation

The YF-S201 water flow sensor operates on the Hall effect principle. Inside the sensor, a small turbine rotates as water flows through it. A magnet attached to the turbine passes by a Hall effect sensor, generating a series of electrical pulses. The frequency of these pulses is directly proportional to the water flow rate.

5.1 Pulse Output Characteristics

The sensor outputs a square wave pulse. The relationship between the pulse frequency (F) and the flow rate (Q) in Liters per Minute (L/min) is given by the following formula:

F (Hz) = 7.5 * Q (L/min)

Conversely, to calculate the flow rate from the measured frequency:

Q (L/min) = F (Hz) / 7.5

Additionally, the sensor generates approximately 450 pulses per liter of water. This can be used for total volume measurement:

Volume (Liters) = Total Pulses / 450

To accurately measure the flow rate, connect the yellow signal wire to a microcontroller or a pulse counter capable of measuring high-frequency signals.

6. Maintenance

The Bolsen YF-S201 water flow sensor is designed for low maintenance. However, periodic checks can help ensure its longevity and accuracy:

- **Inspect for Leaks:** Regularly check all connections for any signs of water leakage. Tighten fittings if necessary, but avoid overtightening.
- **Cleanliness:** While designed for water, ensure the sensor is not exposed to excessive debris or sediment in the water, which could impede the turbine's rotation. If the water source is known to contain particulates, consider installing a filter upstream of the sensor.
- **Environmental Conditions:** Ensure the sensor operates within its specified temperature and humidity ranges (-25 to +80°C, 35%-80% RH) to prevent damage.
- **Electrical Connections:** Periodically inspect the wiring for any signs of wear, corrosion, or loose connections.

7. Troubleshooting

Problem	Possible Cause	Solution
No pulse output / Inaccurate readings	Incorrect wiring (VCC, GND, Signal). Insufficient power supply voltage. Sensor installed against flow direction. Turbine obstructed by debris. Flow rate below minimum (1 L/min). Damaged sensor.	Verify wiring connections according to Section 4.1. Ensure power supply is within 5V-18V DC. Check and correct sensor orientation (flow arrow). Inspect sensor for blockages; clean if necessary (ensure water is off). Ensure flow rate is within the specified range. If all else fails, the sensor may be faulty and require replacement.

Problem	Possible Cause	Solution
Leaking connections	Improperly sealed threads. Damaged threads or fittings. Overtightened connections.	Reapply thread sealant (e.g., PTFE tape) and re-tighten connections. Inspect threads on sensor and pipe for damage; replace if necessary. Ensure connections are snug but not excessively tight.

8. Warranty and Support

For information regarding product warranty, technical support, or replacement parts, please contact Bolsen directly through their official channels or the retailer from whom the product was purchased. Keep your purchase receipt as proof of purchase.