ABD Air Bubble Detector
Specification Sheet



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1 Introduction

1.1 Principles and Applications

The Air Bubble Detector (ABD) utilizes the energy differential of infrared light, which is invisible to the naked eye, as it penetrates gases/liquids to determine the presence of droplets/bubbles. This non-contact method enables monitoring for bubbles passing through fluids or droplets within gases. It is suitable for detecting droplets/bubbles in scenarios involving transparent pipelines, transparent liquids, and transparent gases.

The non-contact detection method prevents additional contamination or flow resistance to the monitored medium, making it widely applicable in medical, environmental, food and other industries. The product covers mainstream tubing diameters in these industries mentioned. Operation is completed in three simple steps: "Flip open the cover → Clamp the tubing → Close the cover."

1.2 Features

- Compatible tubing outer diameters: 1.6mm, 2.0mm, 2.5mm, 3.2mm, 4.0mm, 4.8mm, 6.0mm, 6.4mm.
- Multiple output interfaces supported:

  ①Digital signal via UART/TTL level.

  ② Analog voltage output (post-photoelectric conversion) via IO port. Liquid/gas state can be determined by voltage range.

  ③Digital signal via IO port (High level indicates alarm/abnormal state).
- Parameters configurable via UART interface, allowing secondary calibration after integration into host equipment.
- TTL (5V) level communication.
- Supports standardized Modbus RTU protocol.

Foreach Warranty
Please refer to our General Terms of Sale (GTS)

2 Appearance and Dimensions

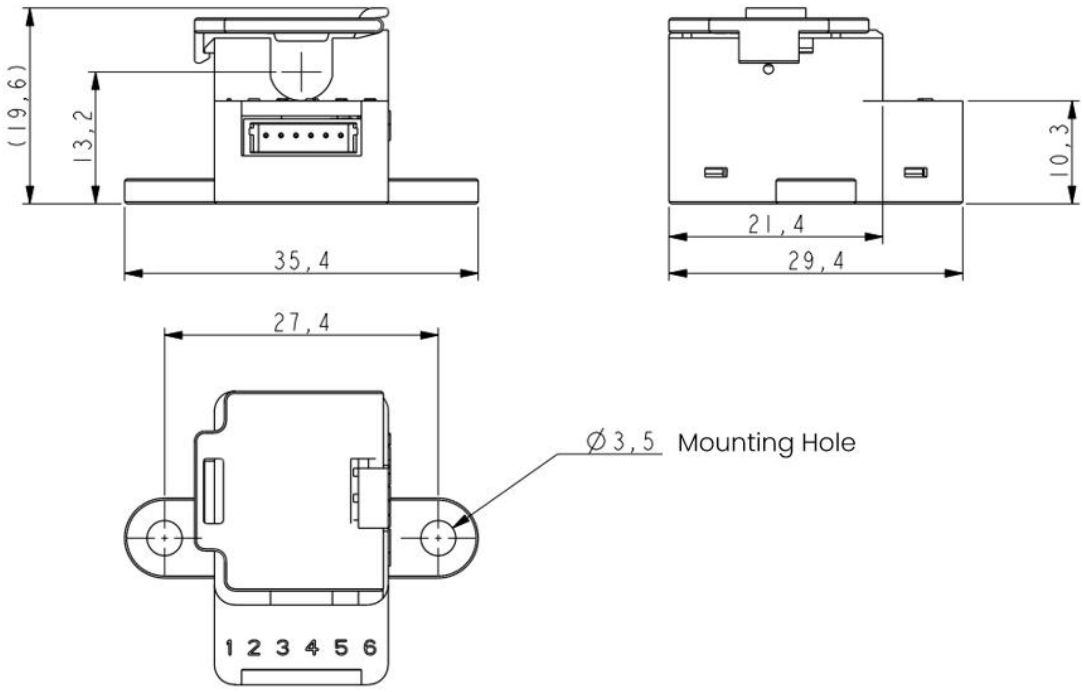


Figure 1 ABD-06M-Vxx (Note 1) Outline Dimensions

Table 1 Interface Definition

Interface Definition				
Interface Model	No.	Signal	Type (Note 2)	Illustrate
S6B-ZR-SM4A-TF	1	VCC	P	+5V DC Power
	2	GND	G	GND / Power Ground
	3	OUT	O	Photoelectric Conversion Voltage (0-5V Analog)
	4	RX	I	Rx (TTL Level)
	5	TX	O	Tx (TTL Level)
	6	OUT	O	IO level: Active-high alarm (5V), requires a pull-up resistor

Note1:

All models share identical external dimensions and mounting holes; only tubing clamp diameter differs.

Vxx suffix denotes tubing outer diameter. V16/V20/V25/V32/V40/V48/V60/V64.

Pin 6 Requirements: Max applied voltage < 25V, Max sink current < 50mA. Pull-up resistor required.

Note2:

P=Power， G=Ground， I=Input，O=Output，I/O=Bidirectional Input/Output.

3 Specifications

Table 2 Specifications

Specifications		
Specification	**Parameter**	
Operating Voltage	5V DC ±5% (P-P ripple < 10%)	
Operating Current	< 20mA	
Communication Interface and Protocol	Interface：TTL232　Protocol：Modbus RTU	
Detectable Bubble /Liquid Size (Note 1)	> 0.8mm width	
Detection Medium	Liquid/Gas(Note 2)	
Compatible Tubing OD	Φ1.6mm, Φ2.0mm, Φ2.5mm, Φ3.2mm, Φ4.0mm, Φ4.8mm, Φ6.0mm, Φ6.4mm	
Compatible Tubing Material (Note 3)	PU, PVC, PTFE, PFA, FEP (Transparent tubing)	
Response Time (Note 4)	Bubble Detection	6ms
	Liquid Detection	6ms
Operating Temperature	15°C ~ 45°C	
Storage Temperature	-25°C ~ +65°C	
Operating Humidity	20 ~ 80%RH at 40°C, No condensation	
Ambient Illumination	Fluorescent light: < 100 lux	
Dimensions	35.4*19.6*29.4mm	
Weight	6.9g	
Positioning Hole Size	Φ3.5mm	

Note 1:

Detectable bubble width refers to the width of the bubble spanning the entire inner diameter of the soft tubing. Tiny bubbles passing through may not be correctly identified.

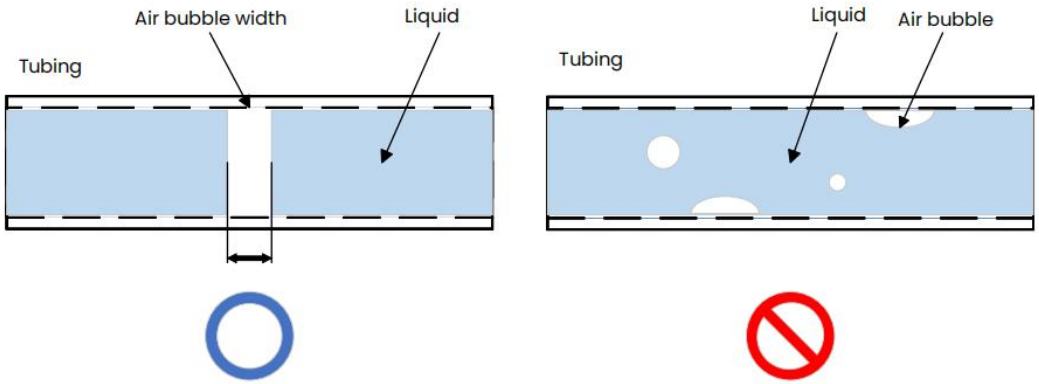


Figure 2 Bubble Width

Similarly, during liquid detection, droplet width refers to the width of liquid spanning the entire tubing inner diameter. Tiny droplets or liquid columns may not be correctly identified. See illustration below.

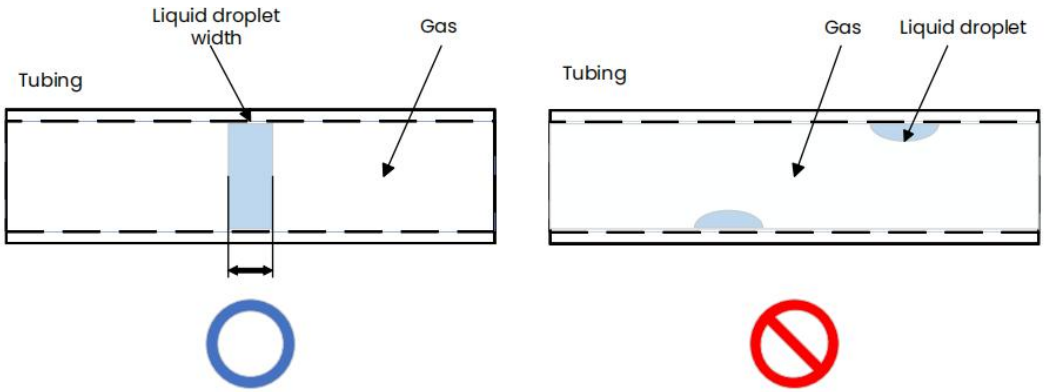


Figure 3 Droplet Width

Note 2:

Contamination or residue inside the tubing may affect detection results. Regular cleaning is recommended.

Note 3:

Tubing materials not listed in this specification, or tubing with non-smooth surfaces, require verification of detection performance after installation.

Note 4:

Response times are representative examples using compatible tubing. Actual response time may vary depending on tubing size, light transmittance, surface condition, etc.

4 Wire (Optional)

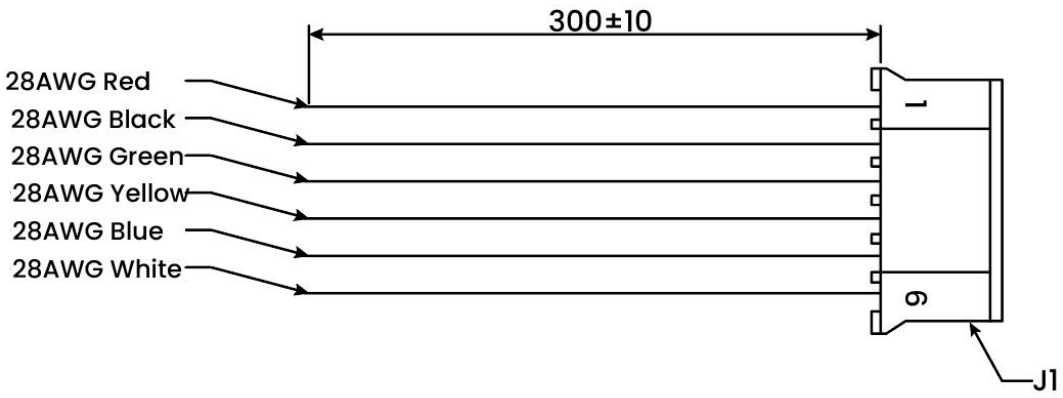


Figure 4 Wire Configuration Diagram

Table 3 Line Sequence Link Relationship

Line Sequence Link Relationship						
Item	Parameter					
J1	1	2	3	4	5	6
Color	Red	Black	Green	Yellow	Blue	White

Notes:

If required, order one cable per Bubble Detector. Cable specification is independent of tubing outer diameter.

Technical Requirements:

1. Wiring sequence must strictly follow the diagram;
2. Connector housings and wires shall be free from damage; terminals must be properly crimped and neatly arranged;
3. Wire cutting precautions:

   Maintain consistent wire length with tolerance of ±2mm;
4. Final product must be free from defects:

   Wire detachment, incorrect wiring sequence, or insulation damage;
5. Connector specifications:

   Housing: JST ZHR-6

   Terminal: JST SZH-002T-P0.5;
6. Materials must comply with ROHS requirements;
7. After insertion into housing:

   No exposed metal parts and no loosening;
8. Tin the stripped wire ends (3-5mm length).

5 Ordering Information

Table 4 Order List

Product Model Information List			
Product Code	Model	Communication Interface and Protocol	Compatible Tubing OD/mm
449050	ABD-06M-V16	Interface：TTL232 Protocol：ModbusRTU	1.6
449051	ABD-06M-V20		2.0
449052	ABD-06M-V25		2.5
449053	ABD-06M-V32		3.2
449058	ABD-06M-V40		4.0
449054	ABD-06M-V48		4.8
449055	ABD-06M-V60		6.0
449056	ABD-06M-V64		6.4

Note: *Batch can be customized, please consult FOREACH for details.*

Table 5 Wire Selection

Wire Selection		
Product Code	Connector Model	Description
399001	ZHR-6	28AWG PVC, Single End ZHR-6, 300mm

ABD	-	**06M**	-	**V**	**16**
Product Code		Interface and Protocol		Structure Type	Compatible Tubing OD
		06M- TTL232/IO ModbusRTU		V- Vertical S- Side-illuminated	16- 1.6mm 20- 2.0mm 25- 2.5mm 32- 3.2mm 40- 4.0mm 48- 4.8mm 60- 6.0mm 64- 6.4mm

Figure 5 ABD Selection Table

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