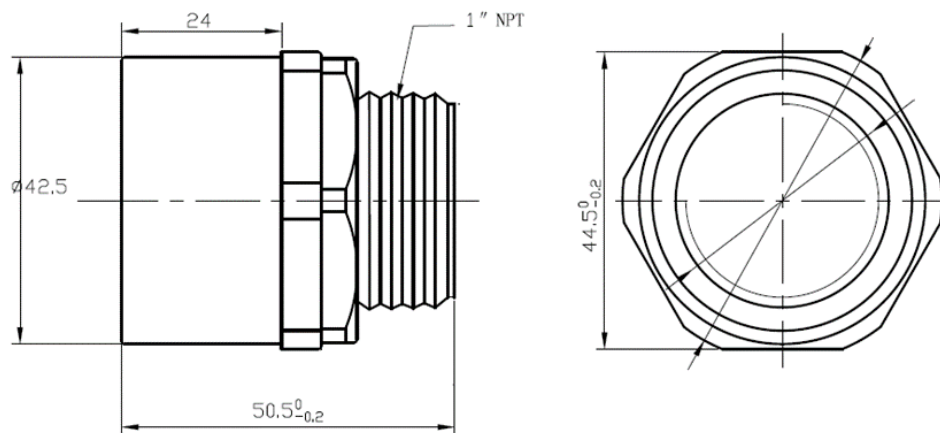# KUS550Series Ultrasonic Sensor

1. Features

- High sensitivity.

- Compact and robust structure.

- IP68 high protection rating.

- Corrosion resistant casing, suitable for corrosive medium and application
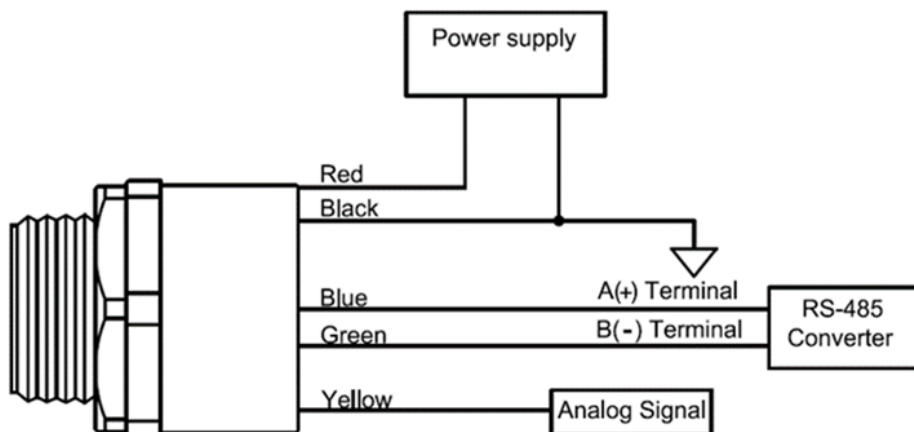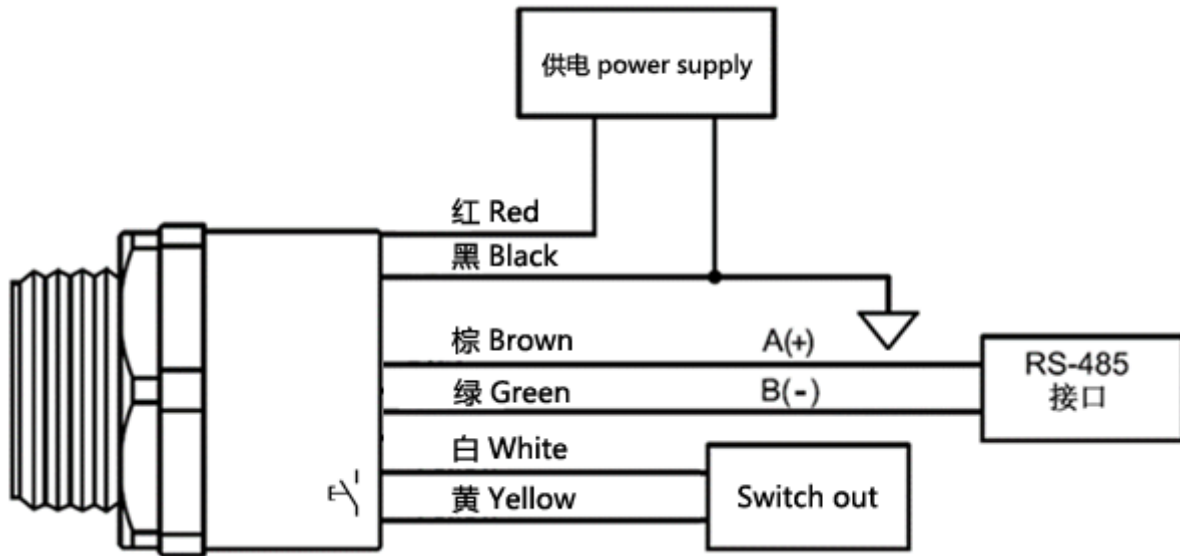
2. Dimension

Unit in the diagram is mm.

3. Electronic interface and signals definition

Analogue output type wiring diagram

Switch output type wiring diagram

4. Parameter

General specifications

Model: KUS550	
Measuring range	0.25m~3m （5m customizable）KUS550A 0.15m-0.6m（1m customizable）KUS550B；
Blind spot	The dead zone of KUS550A is 0 ... 250 mm (within 250mm is unstable working zone, it is not recommended to work in this range); the dead zone of KUS550B is 0-150mm;
Supply voltage	3.3 ... 30 VDC, ripple 10 %SS
Working current	≤ 45 mA (fastest measurement speed), typical power consumption ≤ 10 mA;
Output signal	0-10V. 0-3V 0-5V /4-20mA/NPN/PNP/RS485 Analog output.
Measurement accuracy	≤1 %F.S.
Temperature compensation	Yes
Ranging resolution	0.1mm；

Working conditions

Working temperature	-40…85℃ (233...358K)
Storage temperature	-40…85℃ (233...358K)

Other instructions

Electrical connection	5-core cable (analog output), 6-core cable (switch output) .
Protection class	IP68
Shell material	PVC /PVDF/PTFE/ABS

5. Description of the sensor operation mode

The specific working mode can be set before the factory, or the sensor can be connected through the USB to 485 modules through the Modbus Poll software provided. The first two digits at the blue mark (Trigger Mode and Temperature Compensation 47) are changed to 00~03 as needed.

Select 0 as normal operation mode, internal trigger mode, sampling rate is set to 100-101;

Select 1 as the software trigger mode. The host computer triggers the sensor to send data.

Select 2 as the sleep mode. In the sleep mode, the serial port needs to wake up the preamble code and then start to work normally.

Select 3 is the automatic sending mode, and the sensor will send the measurement value to the serial port periodically. For example, 01 03 06 50 0F 0D5C 00 0F D9 7A, the sixth and seventh byte is the hexadecimal number 0D5C, which is the liquid level value, the unit (the range is greater than 6m is mm, less than 6m is 0.1mm) is 0.1mm, and the decimal value is 342mm at this time. The eighth and ninth byte is the hexadecimal number 000F, this is the temperature value, the unit is ℃, converted to the decimal system that the temperature value is 15℃.

The default is 0.

6. Description of Sensor Functions

Adjusting the analogue output.

The analogue output can be programed as the user want. Such as working at switch output or working at liner output all the parameters can be set by the RS485 interface.

There are 8 types of output functions can be programed.

All the setting routine as follows,

step 1 set one pointed distance by the RS485,

step 2 set another pointed distance by the RS485.

Step3 set the output type liner or switch, and set the related output options

Step4 reboot the sensor.

1. Window mode normally-open and liner mode positive slope output function.
2. Window mode normally-closed and liner mode negative slope output function.
3. Single switching point, normally-open function.
4. Single switching point, normally-closed function.
5. Single switch point with hysteresis gap normally-open function.
6. Single switch point with hysteresis gap normally-closed function.
7. Detection of object presence-normal open function.
8. Detection of object presence-closed open function.

Switching point, Setting distance only after power on. The internal clock can assure

can't be changed after 5 minutes after power on. If want to change the switching point,

the user can only set the request distance after power restart.

For the RS485 output type.
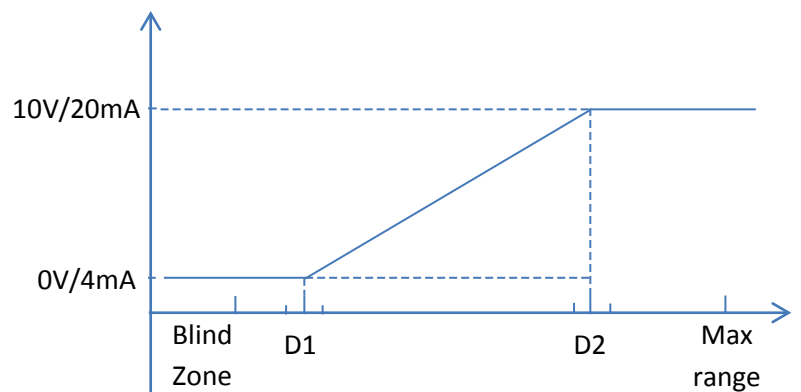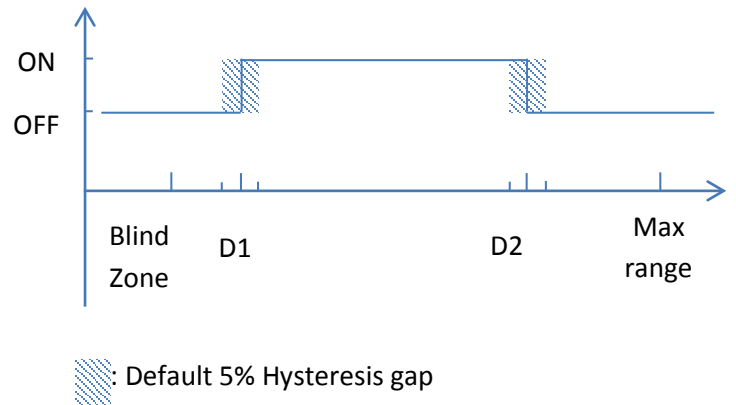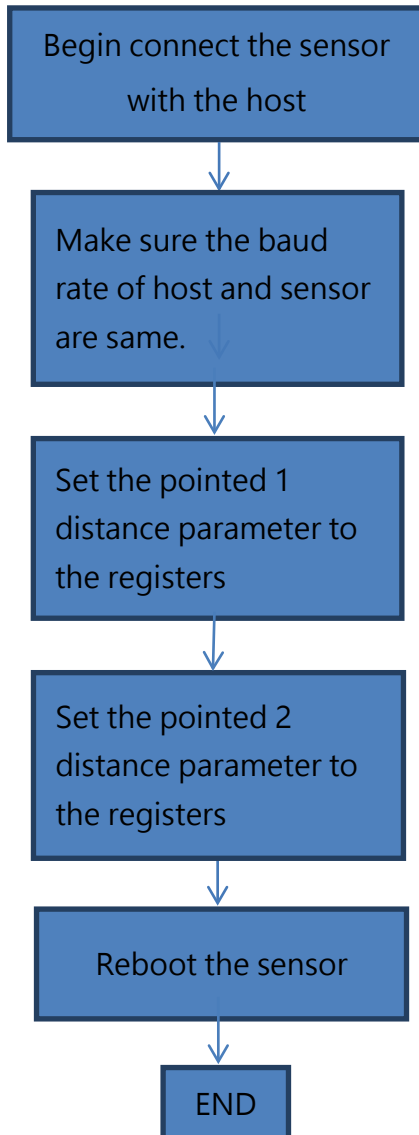
There are 2 kinds of working style,

One for auto measure, the sensor will measure the distance or level repeatedly, and the measurement period can be set by the UART. The measure result can be fetched every time.

The other style is power save mode when the sensor is sleep, until the sensor received the inquiry command with pre-code. Communication protocol is Modus-RTU.

For example, the measure result can be read by access the register 0x101 by Modbus protocol.

For more information please contact us for the software engineering guide.

7. Window mode normally-open and liner mode positive slope output function program routine diagram.

```
┌─────────────────────────┐
│  Begin connect the sensor │
│      with the host        │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│  Make sure the baud       │
│  rate of host and sensor  │
│  are same.                │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│  Set the pointed 1        │
│  distance parameter to    │
│  the registers            │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│  Set the pointed 2        │
│  distance parameter to    │
│  the registers            │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│     Reboot the sensor     │
└─────────────────────────┘
            │
            ▼
       ┌─────────┐
       │   END   │
       └─────────┘
```

▨ : Default 5% Hysteresis gap

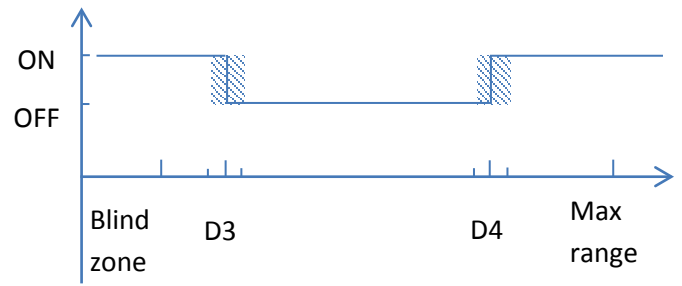Liner output and Program diagram

8. 8 kinds of switch output logic diagram
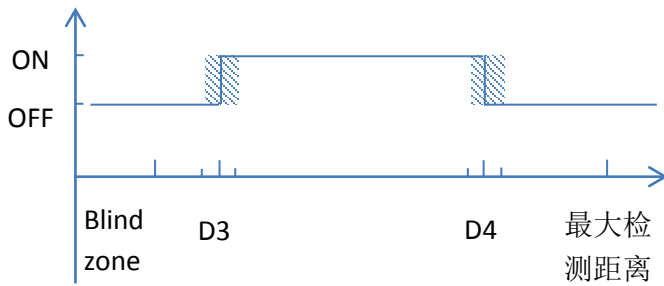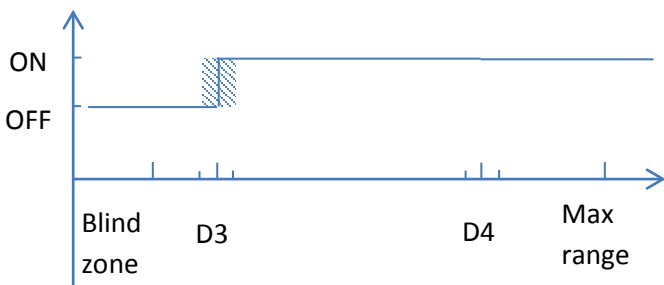

: Default 5% Hysteresis gap

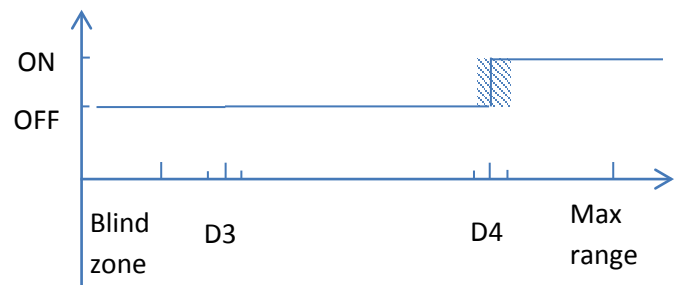1: Window ON Switch output

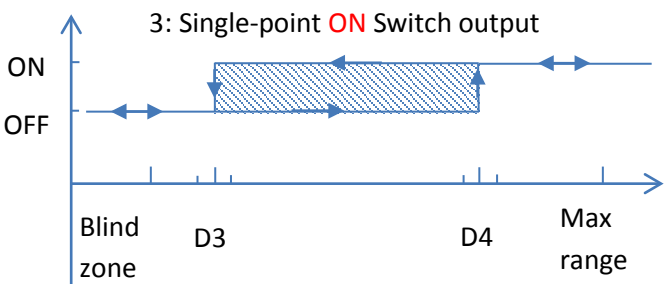: Default 5% Hysteresis gap

2: Window OFF Switch output

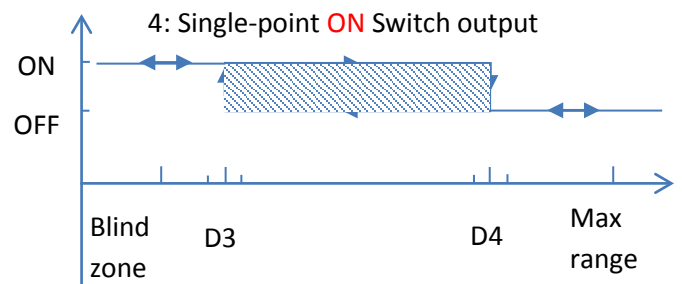: Default 5% Hysteresis gap

3: Single-point ON Switch output

: Default 5% Hysteresis gap

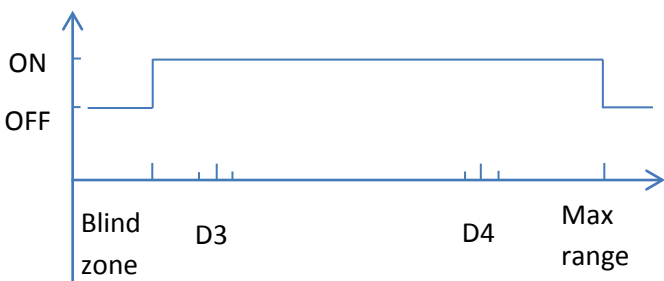4: Single-point ON Switch output

: Hysteresis gap is D4-D3

5: Single-point ON Switch output with huge hysteresis gap

: Hysteresis gap is D4-D3

6: Single-point ON Switch output with huge hysteresis gap

7: Target detection ON switch output

8: Target detection ON switch output

9. Installation conditions

If the sensor is installed at the environment temperature fall below 0℃, It should do well on the protective measures. In case of direct mounting of the sensor in a through hole using the steel nuts, it has to be fixed at the middle of the housing thread.

10. Ordering information

KUS	Model	Output	Max range	Description
	550			
	Customized			
		SW-1	Switch Output，SW-1 for one switch output，SW-2 for 2 switch outputs	
		mA	3 wire 4-20mA output	
		10V	Output is Vout 0-10V	
		5V	Output is Vout 0-5V	
		3V	Output is Vout 0-3V	
		RS485	Output is RS485	
		TTL	UART TTL output	
			XX m	XX m is the maxim range can be detected, the max range is 5 meters. Default is 2.5m
KUS	550	RS485	2m	