One. Product introduction

By using acoustic media of the tested non-contact and no wear test, Ultrasonic sensors can detect transparency of the object or colored objects, metallic objects or non-metallic objects, as well as solid, liquid or powder material, can detect. Ambient conditions such as smoke, dust environment or under the condition of rain almost does not affect the detection performance of ultrasonic sensor.

Two. the principle of ultrasonic ranging

Launch of the ultrasonic transducer emit ultrasonic pulse, spread through transmission medium to be measured medium, after reflection by sound transmission medium again returns to the receiving transducer, ultrasonic pulse is measured from the launch to receive in the transmitted time of sound transmission medium. then according to the speed of sound, sound transmission medium can calculate the distance from the transducer to the media. To determine the liquid level. So we can calculate the probe to the reflection surface distance D = C * t / 2 (divided by 2 is because the sound waves from transmitting to receiving actual is a back and forth, D is the distance, C is the velocity of sound, t is the time).

Three. product features

High resolution
Short response time
Digital tube display distance measurement
Through RS 232/485 complete parameter Settings
Abundant output way: switch, analog, RS232/485

Four. the main technical indicators

function	integration
Rang	0.05~0.5m、0.1~1m、0.2~3m、0.3~5m、0.4~6m
resolution	3 mm or 0.1% (the greater)
response time	< 200ms
display	LED
Launch Angle	20°
Analog output	4～20mA/500Ω load
Switch output	Relay DC 30 v / 5 a, PNP/NPN (optional)
RS232/485	MODBUS protocol or manufacturer to custom (optional)
power supply	With 24 v (+ / - 15%)
environment temperature	-20～+60℃
Protection grade	IP65 optional IP67
Installation dimensions	M56*2

Five. the installation guide

5.1 installation considerations

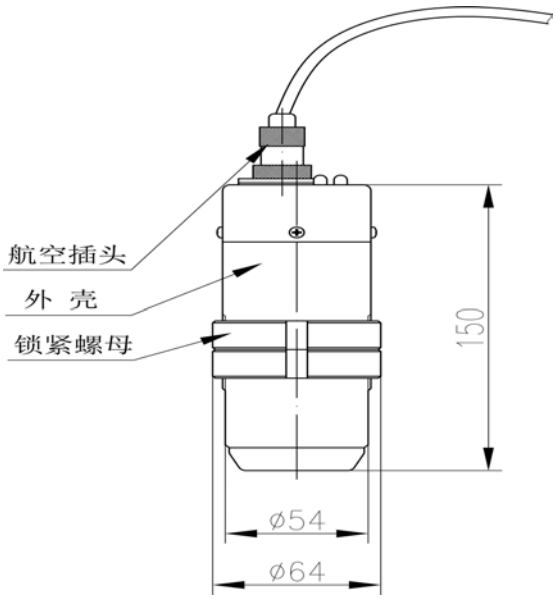
(1) ultrasonic sensor installation emission surface should be perpendicular to the object to be tested

(2) the power cord and output don't pick up the signal lines

5.2 installation size

(1) ultrasonic sensor contour diagram:

(2) ultrasonic sensor size



5.3 physical installation

1) fix a flange over the object to be tested

2)put A sheet of same inner diameter of gasket on the flange

3) put the distance sensor object the flange hole

4) put the distance sensor into the flange holes

5) saw from the bottom of the flange

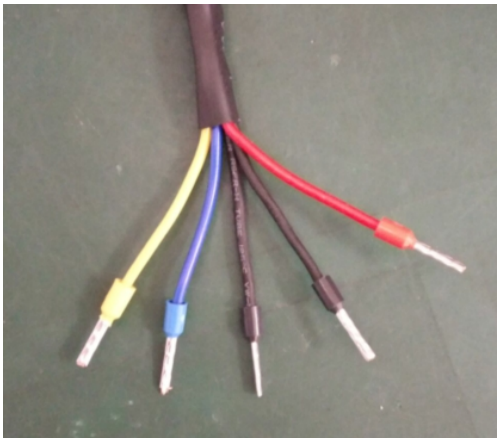
6) put A sheet of same inner diameter of gasket under the flange

7) Screw the nut to fix distance sensor

8）Plug cable in distance sensor

5.4 connection mode

The power cord: 24 v + red line; GND by black line
Current: the current + take the blue line; Current - pick up the yellow line
485 Communication output::A, pick up the yellow line. B take the blue line



The mode of 232 communication

232 Communication output : “SGND” pick up black line,”TXD” take the blue line,”RXD” connect with yellow line.
Note: the black line must be reliable grounding.

Six. Signal

When the initial power on, power light Chang Liang "green light". When Searching the echo signal, the state of light flashing "red light", when the search to the correct echo, status indicators keep Chang Liang "red light".

When normal measurement, digital tube display the actual measured values; When in a state of lost wave, digital tube display"- - -"

Seven. error phenomenon and processing

phenomenon	**reason**	**solution**
Power light green light is not bright	Power is not connected	Check the power cord
Status indicator light flashing red	1.tested distance beyond the sensor range	1.Consider replacement of sensors in a wide range
	2.measured medium with Strong disturbance, severe vibration or dust	2.when measured medium restore calm, device will automatically return to normal measurement
	3.With frequency converter, motor and other strong interference sources	3.Check the surrounding environment, good electromagnetic shielding. Do not share the same with frequency converter, motor power, and ensure the power supply reliable grounding
	4.The probe measured plane misalignment	4.Reinstall the sensors, perpendicular to the surface to be tested
	5.Space with extra object to be tested, such as feed opening support bar, and so on	5.To choose the appropriate installation position, try to avoid distractions
	6.Interface of measured object was in blind area	6.Raise the sensor installation location
	7.measured medium is the loose powder, or liquid level with foam.	7.Remove bubbles, if it is powder producers to counseling

MODBUS—RTU communication protocol

1、The hardware is adopted with RS-485, master-slave half-duplex communication, that is, the host calls the slave address, and the slave answers.

2、Data frame: 10 digits, 1 start bit, 8 data bits and 1 stop bit, without verification. Baud rate: 2400, 4800, 9600 and 19200 (9600 by default).

3、Function code 03H: Read register value

Data sent by the host:

1	2	3	4	5	6	7	8
ADR	03H	High-order byte of initial register	Low-order byte of initial register	High-order byte of register number	Low-order byte of register number	Low-order byte of CRC code	High-order byte of CRC code

The first byte, ADR: address of slave machine (=001~254)

The second byte 03H: Read the register value function code

The third and fourth bytes: the start address of the register to be read

The fifth and sixth bytes: the number of the register to be read

The seventh and eighth bytes: CRC16 verification from byte 1 to byte 6

When the slave machine receives correctly, it will send back following values:

1	2	3	4、5	6、7		M-1、M	M+1	M+2
ADR	03H	Total number of bytes	Register data 1	Register data 2	。。。	Register data M	Low-order byte of CRC code	High-order byte of CRC code

The first byte, ADR: address of slave machine (=001~254)

The second byte 03H: Return to read function code

The third byte: Total number of bytes from 4 to M (included)

Byte from 4 to M: Register data

The M+1 and M+2 bytes: CRC16 verification from byte 1 to byte M

When the slave machine does not receive correctly, it will send back following values:

1	2	3	4	5
ADR	83H	Information code	Low-order byte of CRC code	High-order byte of CRC code

The first byte, ADR: address code of slave machine (=001~254)
The first byte 83H: Register value reading error
The third byte information code: See the table of information code
The fourth and fifth bytes: CRC16 verification from byte 1 to byte 3

4、Function code 06H: Write a single register data

Data sent by the host:

1	2	3	4	5	6	7	8
ADR	06	High-order byte of register address	Low-order byte of register address	High-order byte of data	Low-order byte of data	Low-order byte of CRC code	High-order byte of CRC code

When the slave machine receives correctly, it will send back following values:

1	2	3	4	5	6	7	8
ADR	06	High-order byte of register	Low-order byte of register	High-order byte of data	Low-order byte of data	Low-order byte of CRC code	High-order byte of CRC code

When the slave machine does not receive correctly, it will send back following values:

1	2	3	4	5
ADR	86H	Error information code	Low-order byte of CRC code	High-order byte of CRC code

The first byte, ADR: address code of slave machine (=001~254)
The first byte 86H: function code of writing error of register number
The third byte information code: See the table of information code
The fourth and fifth bytes: CRC16 verification from byte 1 to byte 3

5、Function code 10H: Write multiple register numbers in succession

Data sent by the host:

1	2	3	4	5	6	7
ADR	10H	High-order byte of initial register address	Low-order byte of initial register address	High-order byte of register number	Low-order byte of register number	Total number of data bytes

8、9	10、11	N、N+1	N+2	N+3
Register data 1	Register data 2	Register data M	Low-order byte of CRC code	High-order byte of CRC code

When the slave machine receives correctly, it will send back following values:

1	2	3	4	5	6	7	8
ADR	10H	High-order byte of initial register address	Low-order byte of initial register address	High-order byte of register number	Low-order byte of register number	Low-order byte of CRC code	High-order byte of CRC code

When the slave machine does not receive correctly, it will send back following values:

1	2	3	4	5
ADR	90H	Error information code	Low-order byte of CRC code	High-order byte of CRC code

The first byte, ADR: address code of slave machine (=001~254)

The first byte 90H: function code of writing error of register number

The third byte information code: See the table of information code

The fourth and fifth bytes: CRC16 verification from byte 1 to byte 3

6、Register Definition Table: (Note: Register address coding adopts hexadecimal system.)

Register address	Description	Read Only	Register address	Description	Read Only
0000	Distance/Level instantaneous value (2 bytes MSB first)	√	0001	Analog output instantaneous value (2 bytes MSB first)	√
0002	Instantaneous temperature (2 bytes MSB first)	√	0003	Reserved	
0004	Reserved		0005	Reserved	
0006	Reserved		0007	Reserved	
0008	Reserved		0009	Reserved	
000A	Reserved		000B	Reserved	
000C	Reserved		000D	Reserved	
000E	Reserved		000F	Reserved	
0010	Reserved		0011	Reserved	√
0012	Reserved		0013	Reserved	
0014	Reserved		0015	Reserved	
0016	Reserved		0017	Reserved	
0018	Reserved		0019	Reserved	
001A	Reserved		001B	Reserved	
001C	Reserved		001D	Reserved	
001E	Reserved		001F	Reserved	
0020	Reserved		0021	Reserved	
0022	Alarm 1 value (2 bytes MSB first)		0023	Alarm 1 Diff (2 bytes MSB first)	
0024	Alarm 2 value (2 bytes MSB first)		0025	Alarm 2 Diff (2 bytes MSB first)	
0026	Alarm 3 value (2 bytes MSB first)		0027	Alarm 3 Diff (2 bytes MSB first)	
0028	Alarm 4 value (2 bytes MSB first)		0029	Alarm 4 Diff (2 bytes MSB first)	
002A	Bottom Distance (2 bytes MSB first)		002B	Range-H (2 bytes MSB first)	
002C	Range-L (2 bytes MSB first)		002D	Current set (2 bytes MSB first)	
002E	Blanking (2 bytes MSB first)		002F	Reserved	
0030	Reserved		0031	Reserved	
0032	Reserved		0033	Reserved	
0034	Reserved		0035	Reserved	

0036	Reserved		0037	Reserved	
0038	Reserved		0039	Reserved	
003A	Reserved		003B	Reserved	
003C	Reserved		003D	Reserved	
003E	Reserved		003F	Reserved	
0040	Reserved		0041	Reserved	
0042	Reserved		0043	Reserved	
0044	Reserved		0045	Reserved	
0046	Reserved		0047	Reserved	
0048	Reserved		0049	Reserved	
004A	Reserved		004B	Reserved	
004C	Reserved		004C	Reserved	
004E	Reserved		004F	Reserved	
0050	Reserved		0051	Reserved	
0052	Reserved		0053	Reserved	
0054	Reserved		0055	Reserved	
0056	Reserved		0057	Reserved	
0058	Reserved		0059	Reserved	
005A	Reserved		005B	Reserved	
005C	Alarm 1 mode Alarm 2 mode		005D	Alarm 3 mode Alarm 4 mode	
005E	Type Selection Unit selection		005F	Algorithm selection Safe level	
0060	Transducer Type Damping Rate		0061	Factory reset System reset	
0062	Baud rate Working mode		0063	Reserved	
0064	Reserved		0065	Reserved	
0066	Reserved		0067	Reserved	
0068	Reserved		0069	Reserved	
006A			006B	Phenotype character √ Meter address	

Remarks:

①

It is indicated by 2 bytes, MSB: **(Note: floating-point numbers are rounded by 100 and expressed in hexadecimal)**

◆ The returned distance or level value is expressed in cm.

Example: The current instrument address is 1.

Send:

01 03 00 00 00 01 84 0A

Return:

01 03 02 00 10 b9 88

The two red bytes indicate that the current measurement is 0.16 m (0x0010)

Notes:

Positive and negative identifications: when the measured value and temperature are positive, the highest significant bit of the high byte is 0; when it is negative, the highest significant bit of the high byte is 1;

Examples:

When the current measurement is -0.16 m, figures 01 03 02 80 10 E8 06 return.

②

Measuring mode: 0 -- measuring distance; 1 -- measuring material level

Safe level: =0, hold; =55, minimum; =AA, maximum; =A5, set value

Alarm mode 1, 2, 3, 4: 0 -- close; 1 -- low alarm; 2 -- high alarm

Type Selection: = 0, mm; = 1, cm; = 2, m

Algorithm selection: 0 - special environment 1; 1 -- special environment 2; 2 -- special environment 3; 3 -- special environment 4; 4 -- special environment 5; 5 -- special environment 6; 6 -- special environment 7

Transducer Type: 0 -- option 1; 1 -- option 2; 2 -- option 3; 3 -- option 4; 4 -- option 5; 5 -- option 6; 6 -- option 7; 7 -- option 8; 8 -- option 9;

Damping Rate: 0 -- slow; 1, medium speed; 2 - fast;

Factory reset: 0-No; 1-Yes;

System reset: 0-No; 1-Yes;

Baud rate: 0-2400; 1-4800; 2-9600; 3-19200

Working mode: 0 -- automatic report mode; 1 -- Inquire Mode

③

Regional read-write operation of register

The first region: 0010 — 0021 read only

The second region: 0022 — 005B read-write

The third region: 005C — 004B read-write

Within the same region, a parameter can be read (or write) at a time, and all parameters in the region can be read (or write) in batch. It is not allowed to read and write parameters cross regions.

④

All reserved registers are currently undefined, reserved for upgrade compatibility.

7、Information code table

Information code	Indication
01H	Invalid function code
02H	Invalid data address
03H	Invalid data value
04H	CRC16 verification error
05H	Correct reception
06H	Reception error
07H	Parameter error