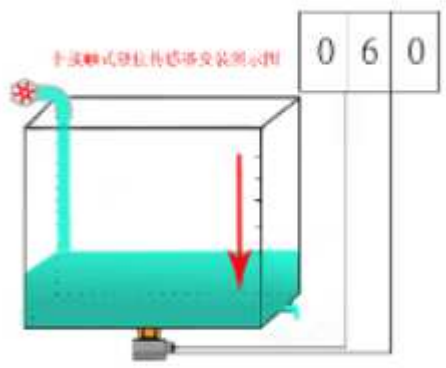
Ultrasonic level detection sensor manual

I. Product Description:

Ultrasonic liquid level detection sensors designed and manufactured by Shenzhen Electro-Union Co., Ltd. Adopt ultrasonic penetrating technology to achieve highly non-contact detection of the liquid in the container and convert the liquid height value into an electrical signal output.

Physical map



Application diagram

II. Product Characteristics

1. Non-contact detection, no contact with the measured liquid
2. Real-time output liquid height value, high precision
3. Suitable for all kinds of liquids
4. Suitable for containers of various materials and thickness
5. Small size, easy installation, suitable for various liquid detection applications
6. Stable product quality, strong anti-interference ability

III, the scope of application

This product is suitable for real-time detection of various liquids and is particularly suitable for detection of liquids that cannot be contacted. Has been widely used in beverage production, household appliances, medical equipment, drinking water equipment, chemical equipment, industrial automation, detection of dangerous liquid items in various industries.

IV, electrical parameters

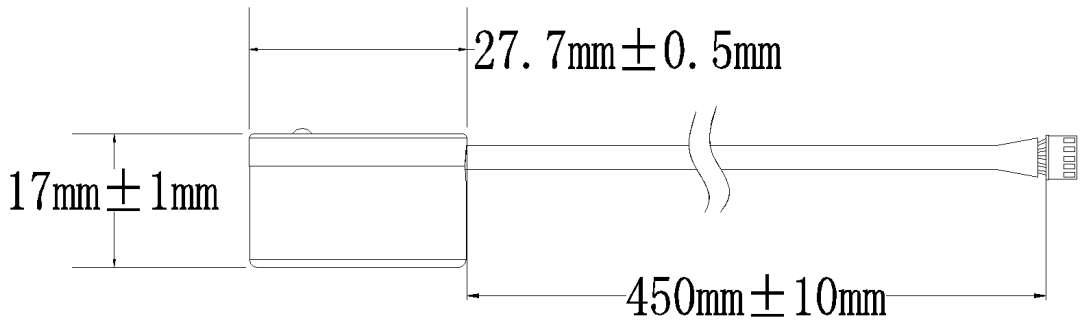
Parameter item	**DS1603L**	**unit**	**Note**
Operating Voltage	3.3 - 12	V	DC
Average current	< 35	mA	(1)
Blind distance	≤ 50	mm	(2)
Detection level height	50 - 2000	mm	(2)
Working period	1	S	
output method	UART Serial port		
Resolution	1	mm	
Liquid response time	2	S	
No liquid response time	10	S	
Normal temperature accuracy	± (3 + H * 0.5 %)	mm	(3)
ESD	± 4 / ± 8	kV	(4)

Note:

1. 5 V power supply, 1 S duty cycle test data.

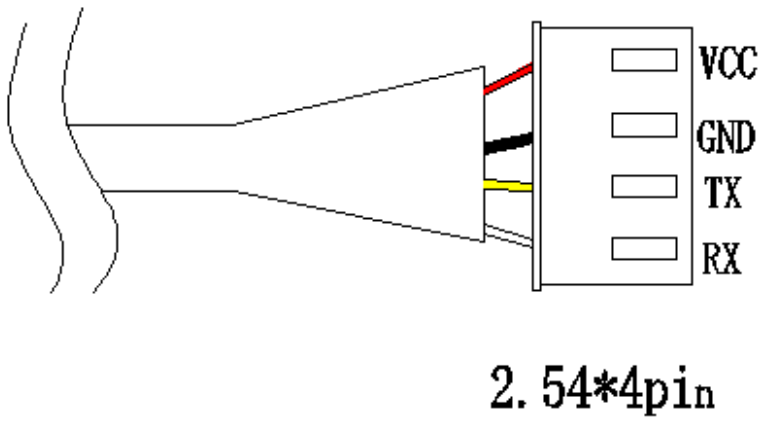
2. 10 mm thickness steel plate container under normal temperature, container diameter 400 mm test water data.
3. The data obtained from testing the water in a 10 mm thick steel plate container at room temperature, H indicates the current liquid level height.
4. The probe housing and output leads conform to IEC61000-4-2 standards.

V, the product size diagram



Product size diagram (unit: mm)

VI, wiring pin definition



Pin ID	Pin name	Pin description	Note
Red lead	VCC	3.3V-12V Power input lead	
Black lead	GND	Ground lead	
Yellow lead	TX	UART Output lead	
White lead	RX		(1)

VII, quality parameters

1. Rated environmental conditions

project	Minimum	Typical value	Maximum	Unit	Note
Storage temperature	-25	25	80	℃	
Storage humidity		65%	90%	RH	(1)
Operating temperature	-15	25	60	℃	
Working humidity		65%	80%	RH	(1)

Note:

a. Ambient temperature 0 – 39 °C. The maximum humidity is 90 % (non-condensing)
b. When the ambient temperature is 40 – 50 °C, the highest humidity is the highest humidity in the natural world at the current temperature (non-condensing)

2. Rated electrical conditions

Parameter item	Specification			Unit	Note
	Minimum	Typical value	Maximum		
Input voltage	3.3	5	12	V	
Peak current		100		mA	
Input ripple			50	mV	Peak-to-peak
Input noise			100	mV	Peak-to-peak
ESD			±4 / ±8	kV	(1)

Remarks (1) Output leads conform to IEC61000-4-2

VIII, data output format

1. UART Communication format: TTL, 9600, n, 8, 1
2. UART Output format

Frame data	Instructions	byte
Frame header	Fixed to 0xFF	1 byte
Data_H	The upper 8 bits of the distance data	1 byte
Data_L	The lower 8 bits of the distance data	1 byte
SUM	Communication checksum	1 byte

3. UART Output example

Frame header	Data_H	Data_L	SUM
0xFF	0x07	0xA1	0xA7

Note: The checksum only retains the lower 8 bits of the accumulated value;

SUM = (Frame header + Data_H + Data_L) & 0xFF
= (0xFF + 0x07 + 0xA1) & 0xFF
= 0xA7

Level value = Data_H * 256 + Data_L = 0x07A1

Convert to decimal equals 1953

Indicates that the current measured range value is 1953 mm.

IX, LED indicator status description

1. LED on: The module is powered but no liquid is detected.
2. LED Slow flash: When the module detects liquid, the LED flashes at a frequency of one second per second.

X, reliability test conditions

Item	Test items	Experimental conditions	Number of samples
1	High temperature and humidity work	65 ℃, 85 % RH, Power: 5 V, 72 hrs	3
2	Low temperature work	-20 ℃, Power: 5 V, 72 hrs	3
3	High temperature and humidity storage	80 ℃, 80 % RH, storage, 72 hrs	3
4	Low temperature storage	-30 ℃, storage, 72 hrs	3
5	Vibration test	10 – 200 Hz, 15 min, 2.0 G, XYZ three axes, 0.5 hours per axis	3
6	Drop test	1.2 m Falling free fall, 5 times onto wooden flooring	3

Remark: After the test, the module passes the function test and is judged as OK. The performance attenuation rate is ≤ 10 %.

XI. Precautions

1. In the practical application of the product, the material used for the liquid container and the thickness of the container will lead to different blind spots.
2. In the actual application of the product, the liquid surface shaking will cause the number of detections within the effective detection range.

   Deviation.

3. The company reserves the right to modify this product manual, please pay attention to it without notice.