User manual of Ultrasonic Fuel sensor

1. Product Overview

This Products adopt non-contact measurement ultrasonic technology, widely used in detecting displacement, thickness, distance, fuel level, liquid level, and transparent material, suitable for measuring of liquid level.

2. Product Introduction

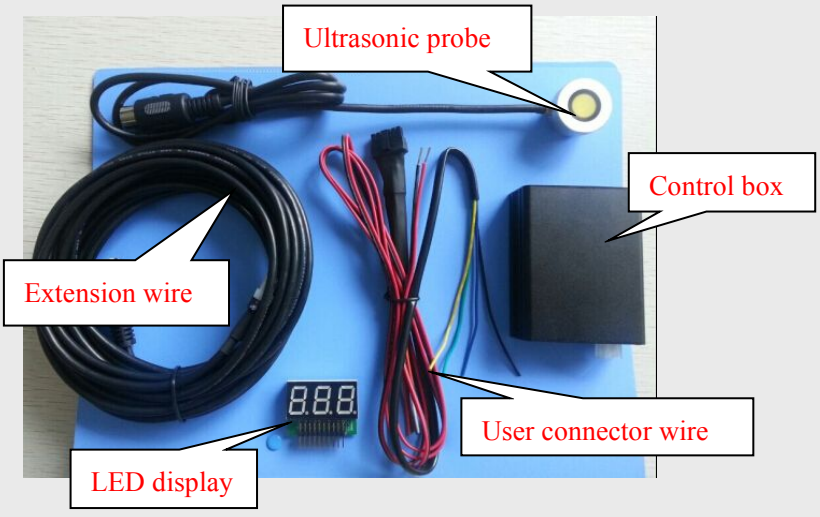
2.1, Standard Component List

No.	Component Name	Qty	Unit	Remark
1	Control Box	1	piece	
2	Ultrasonic probe	1	piece	
3	Extension wire	1	piece	Standard length 8m
4	User connector wire	1	set	Contains power line and user wire

Optional Component (optional as per client's requirement, need to pay separately.)

No.	Component Name	Unit	Remark
1	Specified glue	bottle	
2	LED display	piece	
3	Ultrasonic couplant gel	bottle	
4	Band clamps	piece	
5	Plastic tie	piece	

Below picture shows standard components details：



2.2, Technical Parameters

Working Voltage	9~36VDC
Max Power Consumption	0.8W/ 12VDC
Working Temperature	-40℃~+85℃
Working Humidity	5%~90%
Measurement Range	Depends on container material and thickness. Steel fuel tank and thickness within 5mm, standard range is 1m.
Pressure Range	≤0.8kg or 0.8MPa
Accuracy	±0.5%
Anti-explosion Rate	Intrinsic Safety Exia Ⅱ CT6; Flameproof Exd Ⅱ CT5
Waterproof Rate	IP66 (ultrasonic probe) , IP61 (control box)
Device Interface	Voltage analog output, or RS232 or RS485 digital output
Analog parameter	Voltage range 0 ~5V, actual liquid level and voltage output are proportioned, 5V is defaulted max range.
Digital communication port parameter	The defaulted baudrate is 9600, no parity bit, 8 data bits, 1 stop bit, and no flow control. The real-time liquid level data and smoothed liquid level data are transmitted every 10 seconds. Note: Baudrate and interval of data transmission can be customized.

2.3, Features:

1、High accuracy: The resolution of fuel level height is 0.1mm, measurement accuracy is ±0.5%. The equipment works well even under high temperature and cold external environment condition.

Long-term and stable performance: This equipment adopt the technology of non-contact ultrasonic detection, different from the current used direct contact of float type, pressure type, magnetic sliding type, so it can avoid corrosion and pollution by fuel, and keep long-term stability of performance.

3. Easy installation and maintenance: No need to drill on fuel tank, just install the ultrasonic probe onto the bottom or tank, will not damage original tank and its measuring system. Ensure the normal operation of vehicle original fuel guage.

4. Environmental protection without pollution, little energy consumption, non-contact measurement, avoid dirt and fuel contamination caused by punching hole on tank.

5. Strong reliability: still work normally under the harsh environment, moistureproof, acid proof, flame retardant, anti-interference, and intelligent. This product can be used separately through data screen view directly, also be used with GPS devices, through the GPS device to transmit data to the server for data statistics, analysis and query statements.

2.4、Application Range

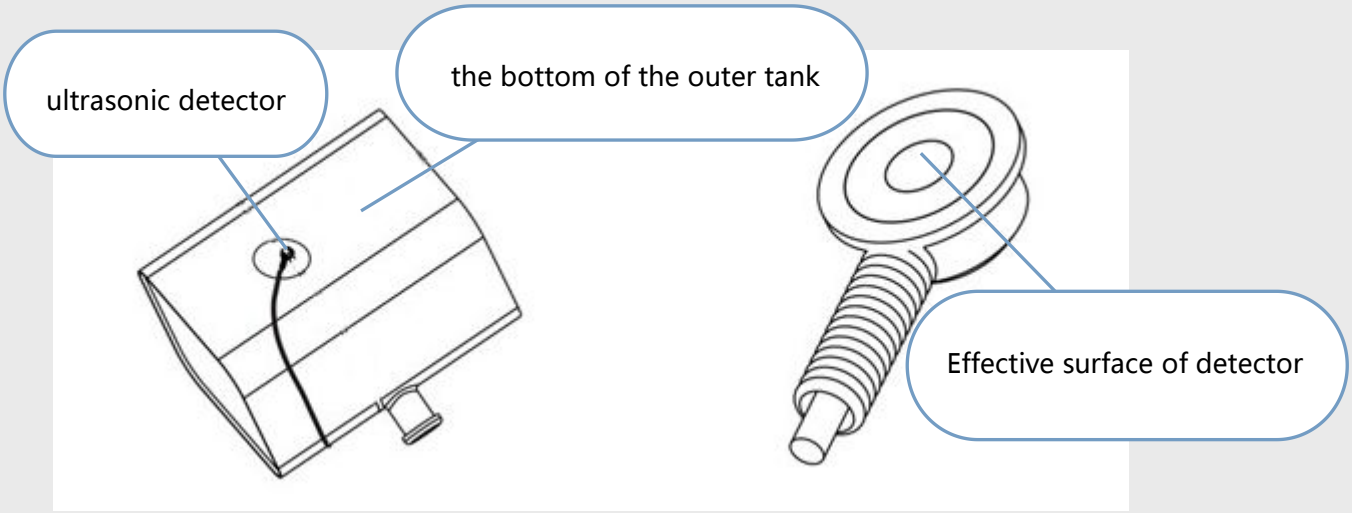
The product is geared to all kinds of vehicles, such as (logistics cars, taxis, buses, commuter trains, etc.), to digital records vehicle refueling, the fuel situation, prevent the oil theft, avoid the waste of resources, improve operating efficiency, and traffic safety, strengthen the operation management of high-tech products.

Production Installation

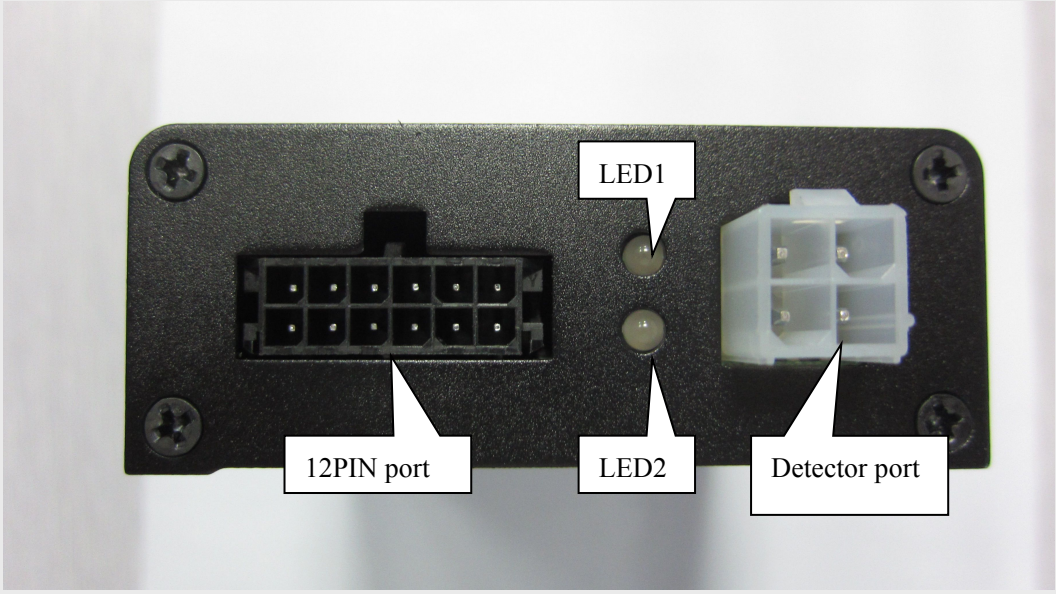
3.1, Installation Tools Preparation

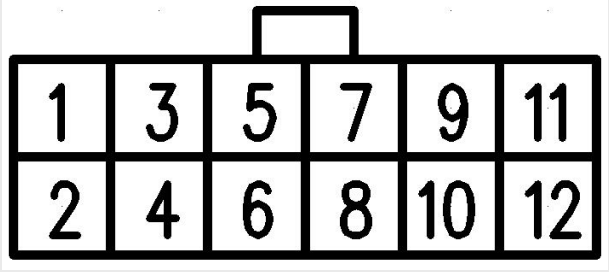
Complete set device, glue, cable tie, fine abrasive paper (500, 1000, 2000 size each one) , rags, a pail of water, ultrasonic complants, the multimeter, vehicle screw remove and installation tool and so on

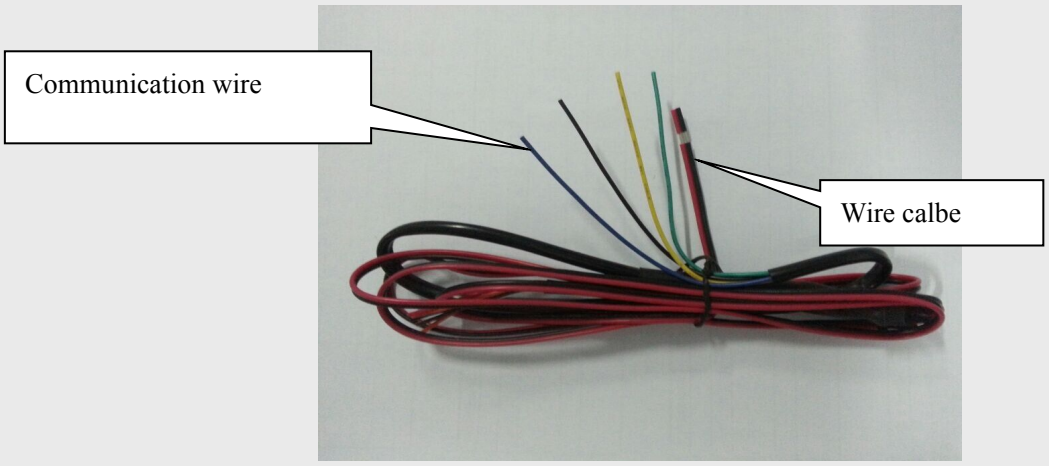
3.3, Installation Diagram



Installation Diagram of Detector







PIN	COLOR	function	description
1	red	+	9~36VDC
2	black	-	
3	NC	NC	NC
4	NC	NC	NC
5	yellow	TXD/B	TUWS02-2： RS232 sending port TUWS02-5： RS485 port B
6	blue	RXD/A	TUWS02-2： RS232 receiving port TUWS02-5： RS485 port A
7	NC	NC	NC
8	NC	NC	NC
9	NC	NC	NC
10	NC	NC	NC
11	green	AOUT	Analog output
12	black	GND	ground

B、LED indicator：

LED	function
LED1	Green light：normal； Red light：abnormal。
LED2	Green： light— power supply normal;off — power supply abnormal. Red： light— analog output abnormal; off—analog output normal.

C、

3、 LED screen display：

a) Above picture shows fuel level height of cm;

b) Above picture shows fuel level height of mm;

c) Above picture shows signal strength;

Above three pictures means the fuel level height is 24.22cm, singal strength is 3.

If system error, LED screen will show as below picture, it's abnormal:

The error code means：

- "1"：detector wire is not connect correct;
- "2"：detector drop off;
- "3"：system power supply voltage abnormal;
- "4"：system reset abnormally;
- "5"：analog output is not match to actual fuel level;
- "6"：fuel level is in blind area.

Above picture means the detector wire is not connect correct and power supply voltage is abnormal.

3.4, Installation Instructions

1, The related vehicle for the ultrasonic sensor installation should be packed on the flat ground, in one stationary situation. Just to ensure the fuel tank is vertical and parallel to the ground. During the installation, the rest fuel in the tank should not be less than 1/4 of the full capacity. In order to make the measurement more accurate by the ultrasonic sensor, there should be one flat place at the bottom of the fuel tank.

2, Choose one flat position for the contact surface between sensor and tank from the center of the tank bottom, and clean the dirt, sand on it to ensure the contact surface be smooth and flat. For the steel fuel tank, the surface paint on the position for the sensor should be removed by the sand paper(Ensure the smooth surface after rubbing by the sand paper). Above the chosen position, there should be no separated parts and other accessories, so the position near to the fuel plug hole is generally selected.

3, Spreading the couplant over the sensor effective surface, ensuring that it doesn’ t contain any bubbles, then make it closely integrated with the chosen position on the fuel tank. After it, connecting the data processing box with the electricity, using the DC level on the multimeter to test the Voltage analog line on the processing box to see whether there is the stable voltage output, and the voltage range is from 0.1V to 6.0V, and the higher fuel level that the bigger voltage is. If there is no voltage value or the value is not normal, then please back to the 2nd step to choose the new position

4, Clean the couplant on the sensor effective surface and tank metal contact surface, and spread one layer of glue over the effective surface sensor, also cannot contain bubbles. After it, press the sensor probe into the tank bottom (not too strong), which is tightly closed to the contact surface. Use a multimeter to measure whether the voltage signal is normal or not. if the signal is not normal, separate the sensor with the tank sooner. If the Signal is normal, keep pressing for 6-10 minutes until the glue preliminary curing

5, After the Glue solidification, re-measured voltage from the analog line voltage should be between 0.1 - 6.0V

6, The processing box should be installed in one friendly position to the driver. The power supply is connected with the vehicle battery, seriport or analog line, GND line is connected to the external device like GSM, GPS device, refer to the pics 4

7. After the installation, please restart the whole set.

3.5, Attention

1, Signal extension line should be wrapped in one layer of protective sleeve, such as heat shrinkable tube, casing.. The wiring should be along the vehicle frame or the original wiring position. The extension line should have at least 20cm distance with the vehicle heating part. The extension line should be bound every 50cm

2, If necessary, it is allowed to lengthen the extension line, but the total length of the extension line should be no more than 15 meters

3, Red line connect positive of car battery, black line connect negative

4. Guarantee

1, one year warranty: repair, replacement and refund; free repair during warranty period, Lifelong maintenance.

2, During the warranty period, repair cause to freight cost paid by the sender.