User Guide for Indoor Testing

Catalog

1、 Purpose

Based on a series of tests before the actual assembly, to ensure perfect functions of the Ultrasonic Fuel Level Sensor, so that after installation the sensor and GPS can work normally.

2、 The suitable situation

Mainly applicable to the testing machine,and indoor installation testing.

3、 Preparation

1、 A set of device（including Controlling Box、Detector Extension Wire、User Interface Wire）;
2、 Auxiliary installation tool（including screen and wire）;
3、 Ultrasonic couplant;
3、 USB-RS232 conversion module;
4、 Ruler; a multimeter; a computer;
5、 An Iron, plastic or glass containers，At the bottom of the thickness is less than 5mm，the height is between20cm~100cm， a 3cm^2 flat area at the bottom;
6、 12~24V DC;

4、 Indoor simple installation

12~24V(DC)
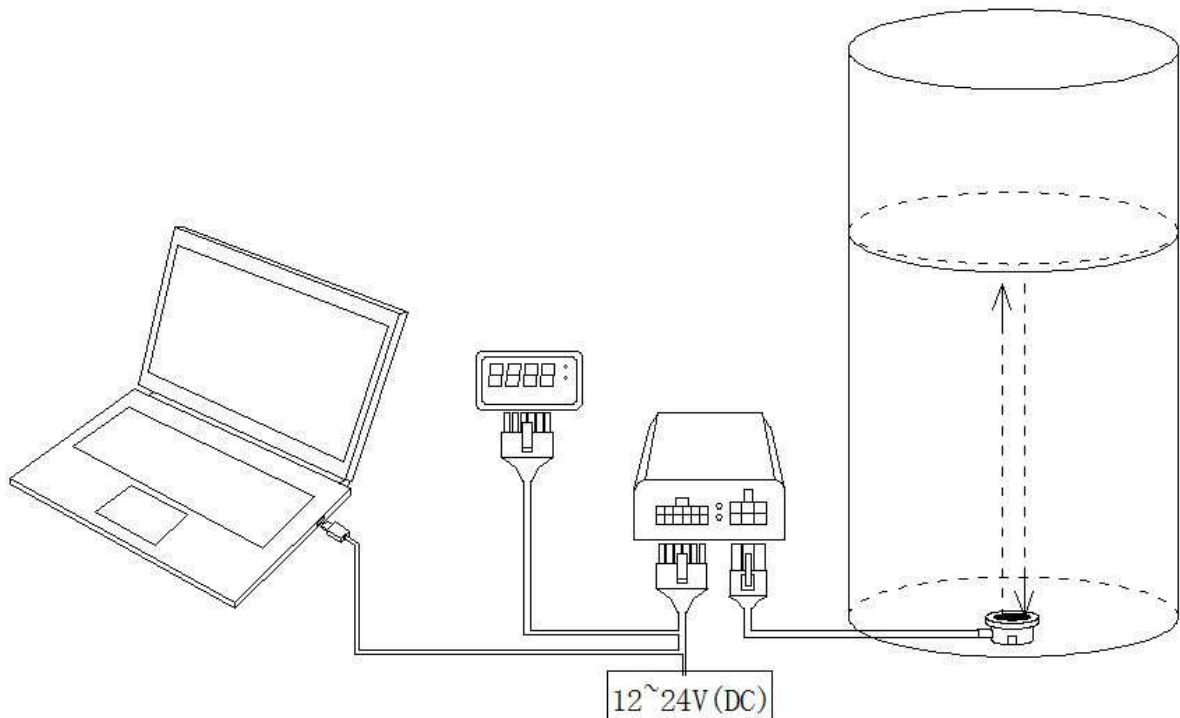
- ➢ According to the assembly diagram，the installation tool and the detector extension wire connect to the controlling box；
- ➢ Detector connect to the extension wire；
- ➢ Yellow wire of User Interface Wire connect to USB-RS232 conversion module Rx，blue wire connect to conversion module Tx,black connect to GND；
- ➢ Clean the bottom of a container to ensure that is clean and flat.

5、 Indoor Simple test

5.1、 Let the controlling box and detector being adaptived

- ➢ Fill the container with water, Surface height above 10 cm, measure the actual height of the water surface；
- ➢ Electricity，auxiliary screen shows "000.0"；
- ➢ Put some couplant on the surface of detector and put it on the tank and adjust the position；
- ➢ Long pressing both Button 1 and 2 and release，screen will be in the strict installation mode；
- ➢ To observe the height of the display value and the actual height is consistent ， If not , slowly moving the detector, until the highly consistent；
- ➢ In the strict installation mode，The controlling box and the detector will automatically adapt, Wait

until the display shows only "2"，press button 2 to exit setup mode, adaptive finished；

5.2、 Screen test

➢ Changing the different water height，measure the actual height of the water surface，comparing the actual value is consistent with the height of the display value, normal deviation was below 2mm；

➢ Atation：The measurement range of the ultrasonic probe depending on the containermaterial and thickness，For 5mm thick steel plate，range is 5~100cm；

5.3、 Serial port test

➢ Start the serial debugging tools

➢ Default serial transmission mode：No parity bit，8 bit data bit，1 stop bit，No flow control，The default baud rate is 9600；

➢ The serial data communication has two modes：Active and passive upload mode，If the customer has no special requirements，The default is the active upload；Computer serial port to send the query command to passive upload
（According to the client's Communication protocol）；

➢ Electricity again，wait for 40seconds，interface of Serial debugging tools will display   string data，
For example   *XD，gh,ij,klmn,adcd,opqr,stuv,wxyz#；

➢

NO.	Field name	Instruction
1	*XD	Start mark
2	e	Protocol version number
3	fg	Software version number
4	h	Hardware version number
5	ij	Reserved
6	klmn	Smoothing value of the height
7	ab	Echo signal strength
8	c	Software status code
9	d	Hardware fault code
10	opqr	Reserved
11	stuv	Real-time value of the height
12	wxyz	Reserved
13	#	End mark
Among them "," is the inter field delimiter		

➢ Real time display shows the numerical value that is with the change of the liquid level real-time change

➢ Smoothing value is through the software algorithm processed values，Different from the Real time display，Follow the steps of the test；

1) The filling process simulation
   - Add water to the container once，so the water level increased more than 3cm;
   - Smoothing the values will be in the liquid level rises more than 3cm after 1 minutes,output the height value.
   - e.g.：The height of the water level is 15.9cm, smoothing value is "1590";
   - Pour in 5cm height water，in 1 minutes the smoothing value is still "1590",1 minute later the smoothing value changes into "2090".
2) Simulate water level rose due to bumps and thermal expansion and contraction
   - Add water to the container once，so the water level increased Less than or equal to 3cm;
   - Smoothing value will be temporarily ignore these tiny rise, the output will maintain the original unchanged.
   - e.g.：The height of the water level is 20.9cm, smoothing value is "2090";
   - Pour in 2cm height water，Because of less than 3cm，Smoothing values will always maintain constant "2090", untill pour in 2cm height water again，With the increase of liquid before accumulates more than 3cm，after 1 minute ,the process is determined as the refueling process，output "2490".
3) The spill process simulation
   - Drainage，so that the height of the liquid level decreased more than 3cm;
   - Smoothing value will display the real time value, until the water height decrease > 3cm 8 minutes later.
   - e.g.：The height of the water level is 24.9cm, smoothing value is "2490";
   - Drainage 10cm，in 8 minutes the smoothing value is still "2490", 8 minutes later smoothing value changes into "1490"
4) Simulate normal fuel consumption
   - Simulate normal fuel consumption，the water height every 10 seconds to fall 0.7mm;
   - Because of the embedded speed sensor，The program will judge whether the vehicle start or not，So the simulation test will be judged for the oil spill.
   - Decreased height less than or equal to 3cm, smoothed values will remain unchanged.For example, smoothing value still maintain "1490".
   - When the height of continued to decline over 3cm，reference to the third step， 8 minutes later，output a height value，at the same time to compensate the height value in ninth minutes.
   - e.g.：The height of the water level is 14.9cm，The water level dropped more than 3cm ,8 minutes later output a numerical value of about 10cm，and high compensation in ninth minutes.
   - To start in tenth minutes, the program again decision for oil spill，The fourth step cycl.
   - Therefore, Simulate normal fuel consumption, the output smoothing value Will show a ladder decline curve.
   - If it is the real driving process, the normal fuel consumption curve is continuous, 0.7mm every 10 seconds fall.

5.4、The analog voltage test

1、The green line connect to multimeter red pen，and black wier connect to multimeter black pen
2、Start up，after 40 seconds　The sensor output a voltage between 0-5V

3、 The analog voltage and high conversion formula：

Maximum voltage:VMAX

Minimum voltage:VMIN

Output voltage:V

The height of liquid level:H

Range   :L

H=(V - VMIN)/(VMAX-VMIN)*L

Here, the unit of H or L is 0.1mm.
L is fixed value, which is 9999.
For example, the Vmax and Vmin in your test is 3V, 0V.
Then if you get V=2V, then the Fuel Level(H) should be: (2-0)/(3-0) *9999=6666.
So the H is 6666x0.1mm= 666.6mm=66.66cm.

According to the measured voltage ，calculate the height value. This height value is smoothed value, processing mode with the same 5.3.