RF Admittance Level Sensor

Operation Manual

Version: 2023008

RF admittance level sensor

1. Introduction

RF admittance level sensor uses a unique and advantageous level measuring technology. A capacitor will be formed when the sensor installed in the vessel. The probe (measuring electrode) acts as one plate of the capacitor, and the vessel acts as another plate of the capacitor . (a reference electrode should be added if the vessel is an insulating material). When level increased, the capacitance between these two plates will be changed, this change will cause a change in the radio waves which is acting on the probe of the RF admittance level sensor. This change of radio wave will be detected by the RF circuit and be converted into a linear current output. Since RF admittance level sensor is working based on the capacitance measurement, each working condition environment is different, so each sensor should be installed and calibrated on site before use normally.

2. Features

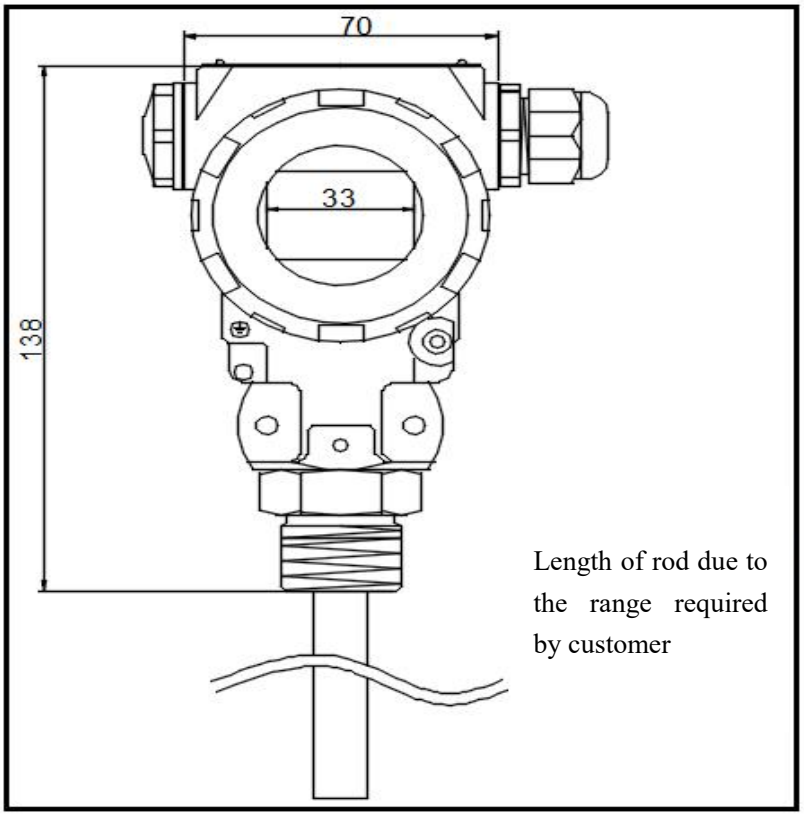
- simple structure, without any moving or elastic components, so gains high reliability and minimal maintenance. Usually it is not necessary to carry out regular large, medium, small maintenance.
- various of signal outputs,conveninent for different system configurations.
- suitable for measuring the material level of high temperature or high pressure vessels, and the measured value is not affected by the temperature, gravity of the medium also the shape and pressure of the container.
- especially being suitable for the measurement of acid, alkali and other highly corrosive liquids.
- completely protection of overcurrent, overvoltage, power polarity.

3. Technology parameters

- measuring range : 0.1-30m
- capacitance range : 10pf - 5000 pf

- accuracy: 0.1% FS, 0.2% FS , 0.5% FS , 1% FS.
- pressure range: -0.1MPa～2MPa;
- electrode temperature resistance: -50～250℃
- ambient Temperature: -40～85℃
- storage temperature: -55℃～+125℃
- signal output: 4-20mA / 4-20mA / 485 communication
- voltage : 15-36V DC
- material: SS316 , 1Gr18Ni19Ti or PTFE
- long term stability: ≤0.1%FS/ year
- temperature drift: ≤0.01%FS/ ℃(within 0-70℃）
- explosion-proof grade: Ex iaIICT6 ;
- protection grade: IP67

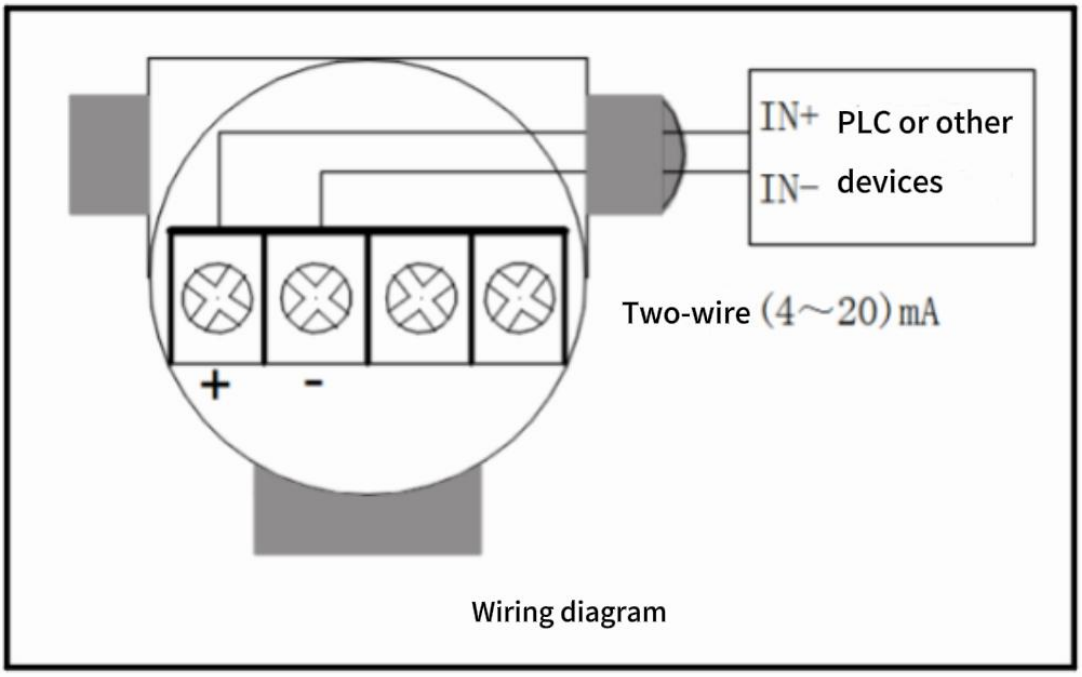
4. Structure



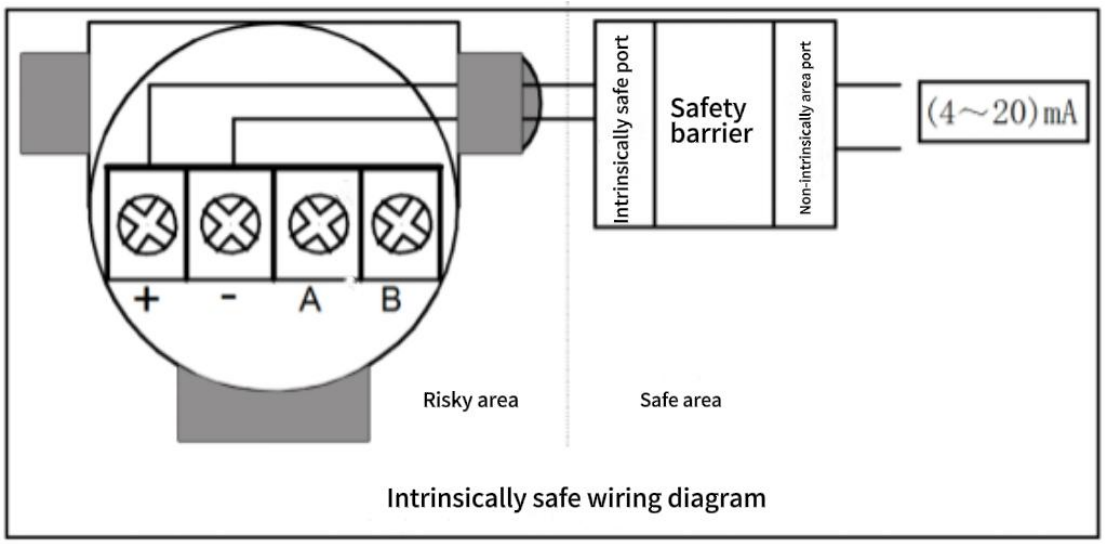
5. Wiring

The wiring diagram above is for 2088 housing 2-wire current signal output and RS485 communication wiring method. Current output and RS485 are alternative. You can only choose one of them.

The signal output of RF admittance level sensor is standard signal, it could be connected with any device which could receive the same signal. For example secondary display meter , PLC and etc.



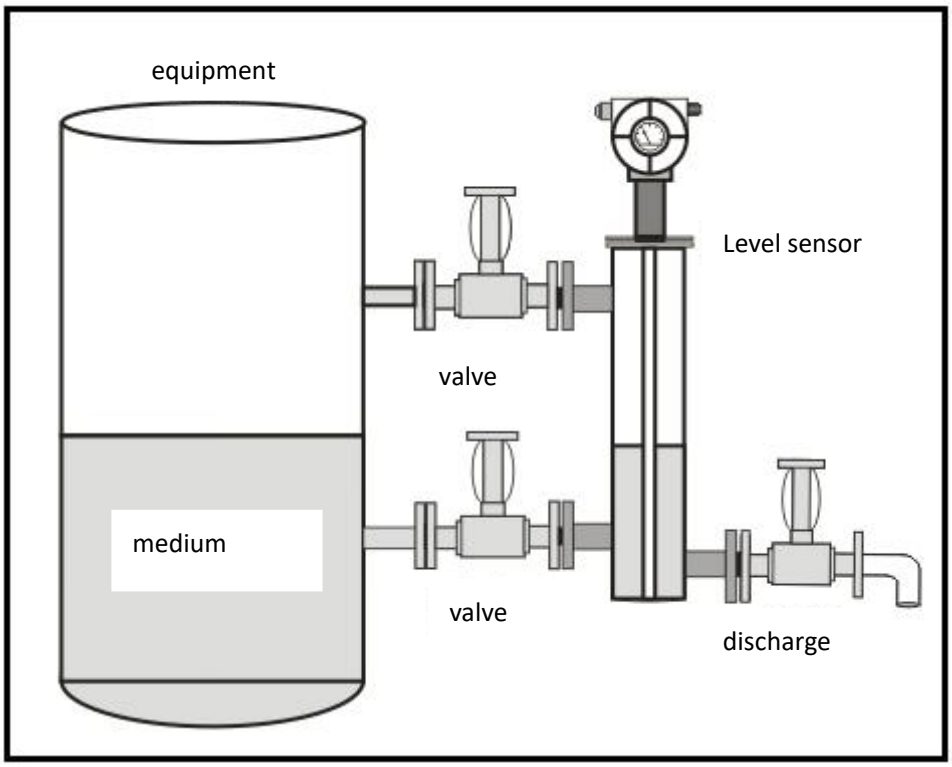
Wiring diagram



Intrinsically safe wiring diagram

6. Installation

Because RF admittance level sensor only has difference on appearance and material compared with capacitance level sensor, but both of them are level measuring instruments. So the installation method is more or less same.

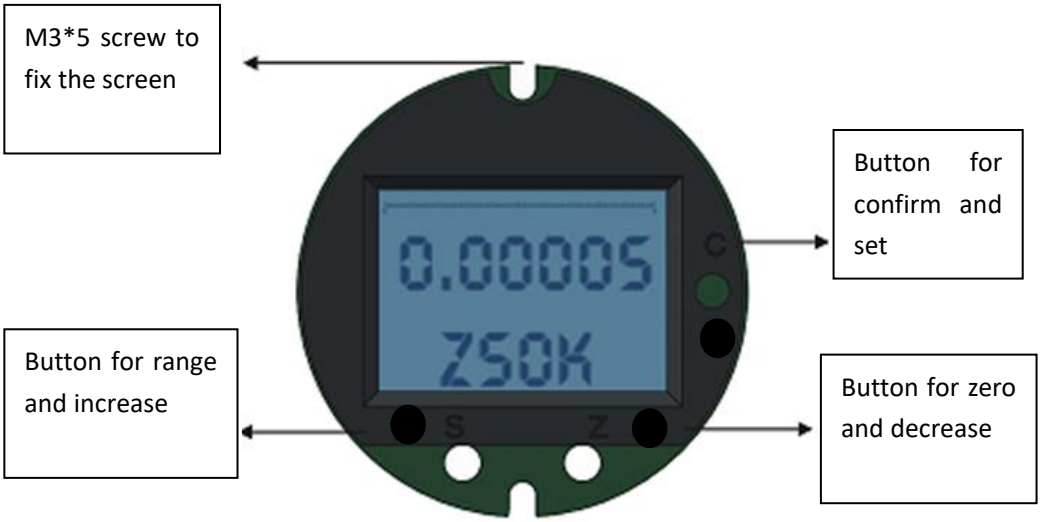


Generally speaking, the installation is very easy and simple. Only need to thead it on the top of tank by installed by flange which is required by the customer and nominated before producing. Of course when use flange, you need use bolts to fix it well and tightly, better add an sealing washer between flanges connection.

Note:

1. **The valves can be added in order facilitate the disassembly of the sensor during maintenance or replacement.**
2. **When installed on metal tank, make sure the sensor is contacted with the tank. If the tank is non-conductive material , you must add auxiliary electrode or install it through metal pipe.**

7. Keyboards instructions



7.1 keys and functions

C (setup): enter the setting status and set data to confirm

S (range): data shift and set the measuring range

Z (zero) : page rolling , change value and set zero point

Input code before modify the parameters: press C key and it will shows 000, change it into the correct code by press Z and S keys, press C to confirm and enter into the suitable interface of menus. Use Z to rolling up and down to shift menus , use C to enter into each menu, press Z to modify the data , press C to save and confirm the change. After all set done, press Z to find End and press C twice to confirm and quit.

7.2 Setting instructions

If there is possible to get empty and full conditions of tank on site, it will be easy to calibrate the range of capacitance value at both 4mA and 20mA points. Details as below:

1. Put the sensor into the tank when liquid is full . Enter into setting and find 1-5 PRE menu , press Z to modify the value close to 1.5 (X≤1.5). Press C to confirm and quit .
2. Zero point calibration: discharge the liquid into empty (zero point), press Z three

times continuously and you will see the capacitance value at present , it means you can calibrate the zero point level data. Press Z again , 4mA current calibration done.

3. Full range calibration: filling liquid into full level , after it is steady, press S three times continuously and you will see the capacitance value at present , it means you can calibrate the full range level data, press S again and 20mA current calibration done .

4. If on site there is impossible to get empty and full level of liquids , then we can try to calculate the capacitance value of both zero level and full level by monitoring the capacitance value changes by 10mm level changing . Enter into 1-8 and 1-9 menu , press Z 、 S keys to cooperate and input the capacitance values of both zero and full range level of data which got from calculation, press C to save .

Menus of capacitance level sensor					
Code	No.	Func	Meaning	Options	Default
PASS 111	1-0	ENd	Finish calibrate	over	quit
	1-1	dAmP	Damping time		0
	1-2	dOT	Decimal point	0,1,2,3	0
	1-3	dISP	Display unit	mm,cm,m	mm
	1-4	PVH	Full range		1000
	1-5	FRE	magnification factor		1
	1-6	dL	4 mA calibrate		4mA
	1-7	dH	20mA calibrate		20mA
	1-8	cL	4 mA capacitance	PF	
	1-9	cH	20mA capacitance	PF	
	1-10	PVL	Zero point		0
PASS 666	Real-time level calibration	Cm		Input the actual liquid level value, press the C key to automatically calibrate	

PASS 222	Check capacitance value	PF		Check capacitance values in real time
Display the real time capacitance value		Press both Z and S to show the capacitance , press C to return		
Note： If the above sub-menus are not operated for more than 1 minute, they will automatically return to the main interface.				