

WB-CLS200 Double-wall Tanks Leak Sensor

User Manual

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1. Introduction

Thanks for using the leak sensor manufactured by Windbell, before use, please read this manual carefully. The leak sensor is specially designed to monitor the leakage of fuel and water in double-wall tanks and double-wall pipelines. The user manual describes the function and characteristics, working principle, operation and maintenance and other aspects of the leak sensor, the user need to read carefully before use.

2. General Safety Rules

The leak sensor is manufactured according to the relevant standards of GB3836.1-2010 <explosive environment - part one: General requirements for equipment> and GB3836.4-2010 <explosive environment- part four: equipment protected by intrinsically safe type "I">. It is suitable for dangerous place II A~ II C, and the temperature group is from T1 to T4.

The leak sensor is tested by state designated quality inspection agency and have obtained the explosion-proof certificate, the explosion-proof mark is Ex ia II C T4 Ga.

3. Features and Parameters

3.1 Features

- Compact and beautiful appearance, easy to maintain.
- Explosion-proof design, safe and reliable.
- High sensitivity and strong anti-interference.
- One same bus can be connected to 8 leak sensors.
- Can identify fuel and water, then give corresponding alarm.
- leak sensor fault alarm function.
- LED alarm prompt function.
- Connect with leak alarm controller by RS485 bus communication, communication distance is up to 600 meters.

3.2 Technical parameters

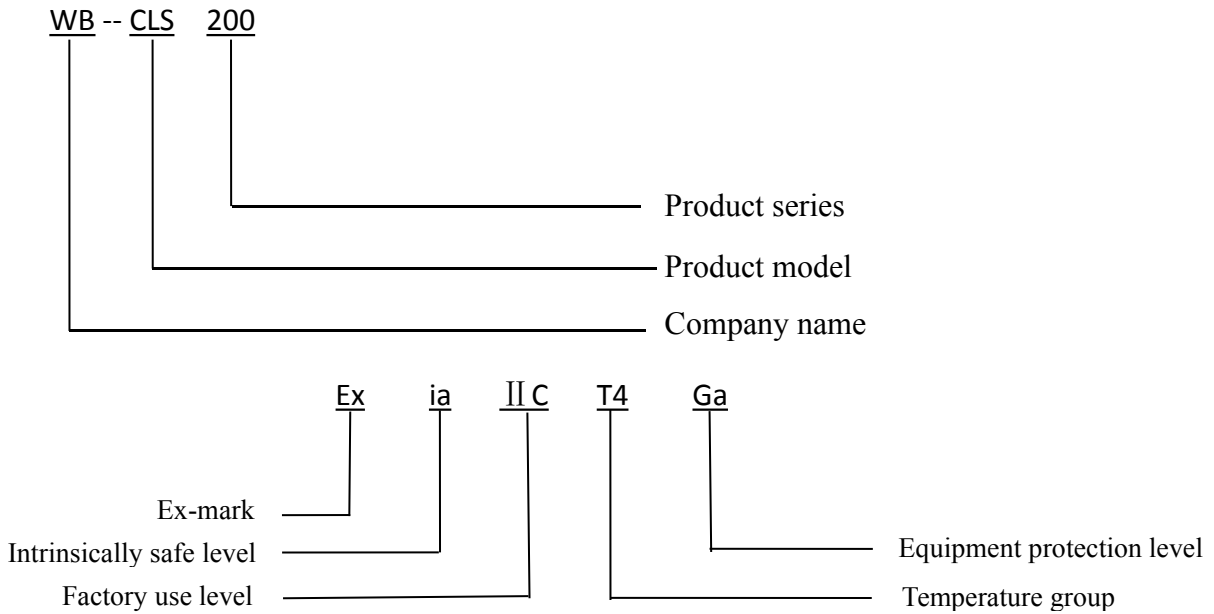
- Working temperature: -40℃ ~ +60℃
- Relative humidity: 30% ~ 90%
- Power supply: DC12V±0.5V (by safety barrier)
- Operating current: <35mA
- Response time: <2S
- Alarm type: LED alarm

- Ex-mark: Ex ia II C T4 Ga
- Intrinsic safety parameter:

Power port: $U_i=12.6\text{VDC}$, $I_i=291\text{mA}$, $P_i=0.92\text{W}$, $C_i=1.6\mu\text{F}$, $L_i=0\text{mH}$;

Signal port: $U_i=7.14\text{VDC}$, $I_i=147\text{mA}$, $P_i=0.26\text{W}$, $C_i=0.11\mu\text{F}$, $L_i=0\text{mH}$.

3.3 Description of model and explosion-proof mark



4. Explosion-proof Key Points

4.1 During structural design of the sensor, various factors such as temperature, sparks and static electricity that may ignite the explosive mixture are fully considered, and the safety of the sensor is ensured by limiting, controlling or preventing dangerous factors such as dangerous temperature, spark and static electricity, to meet the requirements of safety, explosion-proof and other standards of electrical products.

4.2 The explosion-proof structure of the leak sensor is made according to GB 3836.1 and GB 3836.4, and the Ex-mark is Exia II C T4 Ga.

4.3 The overall explosion-proof performance of the sensor should be in accordance with the provisions of GB 3836.1 and GB 3836.4.

4.4 The wiring between the explosion-proof electrical units of the sensor should be in accordance with the corresponding provisions of GB 3836.15.

4.5 The protection level of the sensor is not less than IP20.

4.6 The maximum temperature of the surface of the sensor shell, and the outer shell of the supporting element or device should not exceed 135 °C.

4.7 The internal capacitance and inductance of the sensor should be controlled within the allowable range of GB3836.4-2010.

4.8 The sensor circuit, the shell, and the earth should be able to withstand the dielectric strength of 500V.

4.9 The model of the safety barrier is GSB03, the ex-mark is [Ex ia Ga]IIB, and the intrinsic safety parameters are as follows:

Power port: $U_i=12.6\text{VDC}$, $I_i=291\text{mA}$, $P_i=0.92\text{W}$, $C_i=1.6\mu\text{F}$, $L_i=0\text{mH}$;

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5. Main Composition and Working Principle

5.1 Main composition

The leak sensor is mainly composed of transmitter explosion-proof box, main board, optical sensor shell, and optical detection main board.

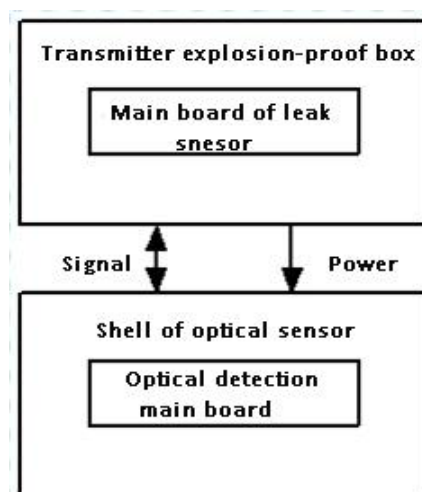


Fig.1 Block diagram of leak sensor system

5.2 Wiring diagram

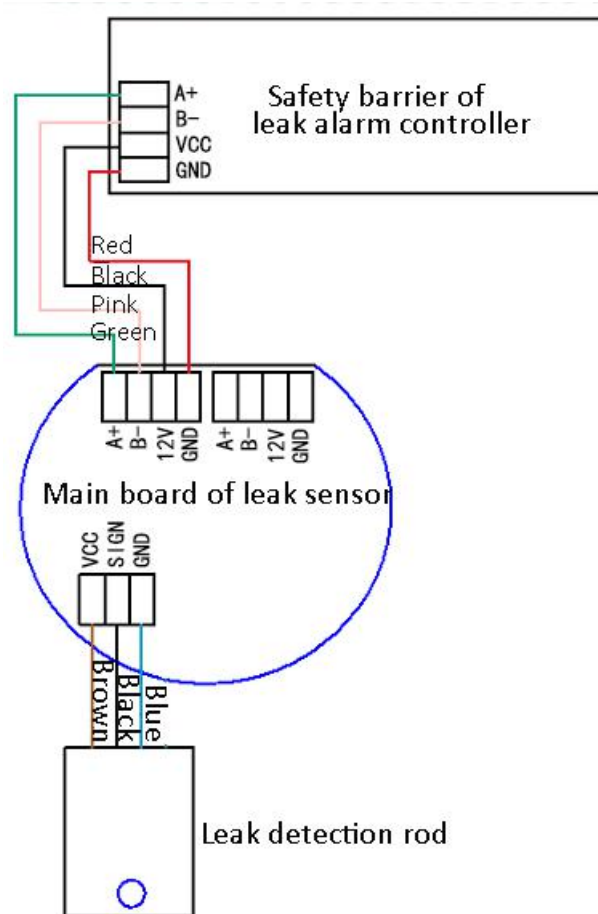


Fig.2 Wiring diagram between leak alarm controller and leak sensor

5.3 Working principle

The leak sensor is specially designed for double-wall tanks and double-wall pipelines, can detect and identify air, water and fuel in the interlayer. The connection between the leak detection transmitter and leak alarm controller is RS485 bus. The leak detection transmitter address can be configured, and one same communication bus can connect with 8 leak detection transmitters at the same time. By Modbus_RTU communication protocol, the controller can read the real-time detection state of the leak detection transmitter.

The leak sensor has four status indication: normal state, oil leakage alarm, water leakage alarm, sensor fault alarm. Four status, the LED light will show different colors, as shown in Table 1.

Table 1 LED light color and its detection status

LED lights	Detection status
Green light on	Normal state
Green light flash	Water leakage alarm
Red light flash	Oil leakage alarm
Red light on	Sensor fault alarm

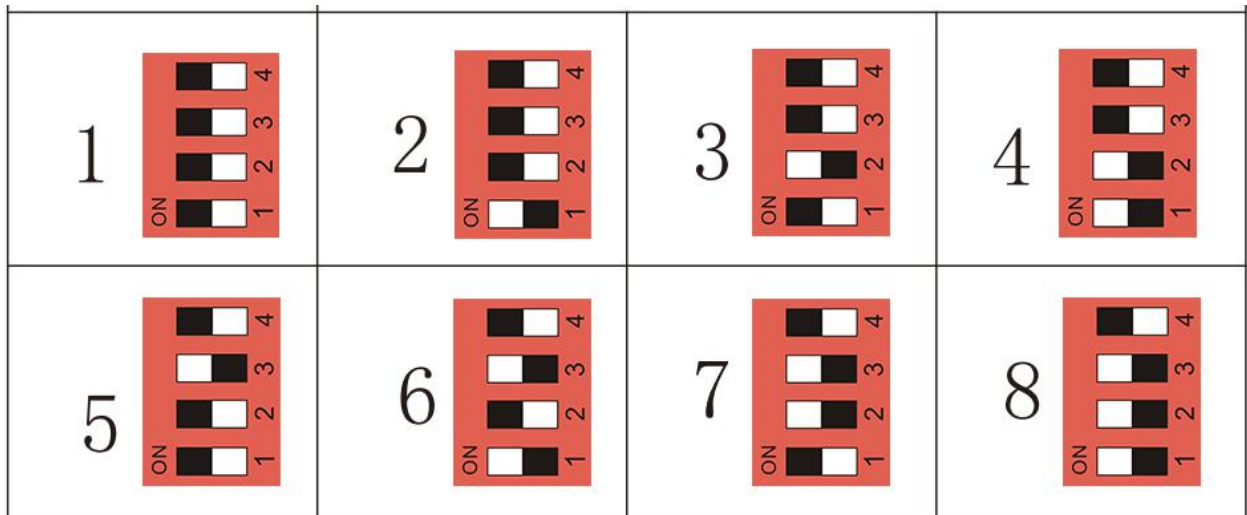
6. Use and Operation

6.1 Address configuration of leak sensor

Before start the system, please set corresponding communication address for each leak sensor.

Operating instructions of dial switch:

- In the dial switch, the white square button is the toggle part of the dial switch.
- In the dial switch, No.1, 2, and 3 are the setting switches, No.4 is the spare switch, do not need to set for temporary.



6.2 Normal state

After power on, if the sensor do not detect the liquid, the corresponding tank state is normal, the status of the LED is normally on a green light.

6.3 Water leakage state

After power on, if the sensor detect the leakage of water, the corresponding tank state is “water leakage”, the status of the LED is on a green flash.

6.4 Fuel leakage state

After power on, if the sensor detect the leakage of fuel, the corresponding tank state is “fuel leakage”, the status of the LED is on a red flash.

6.5 Sensor fault

After power on, if the sensor has a fault, the corresponding tank state is “sensor fault”, the status of the LED is normally on a red light.

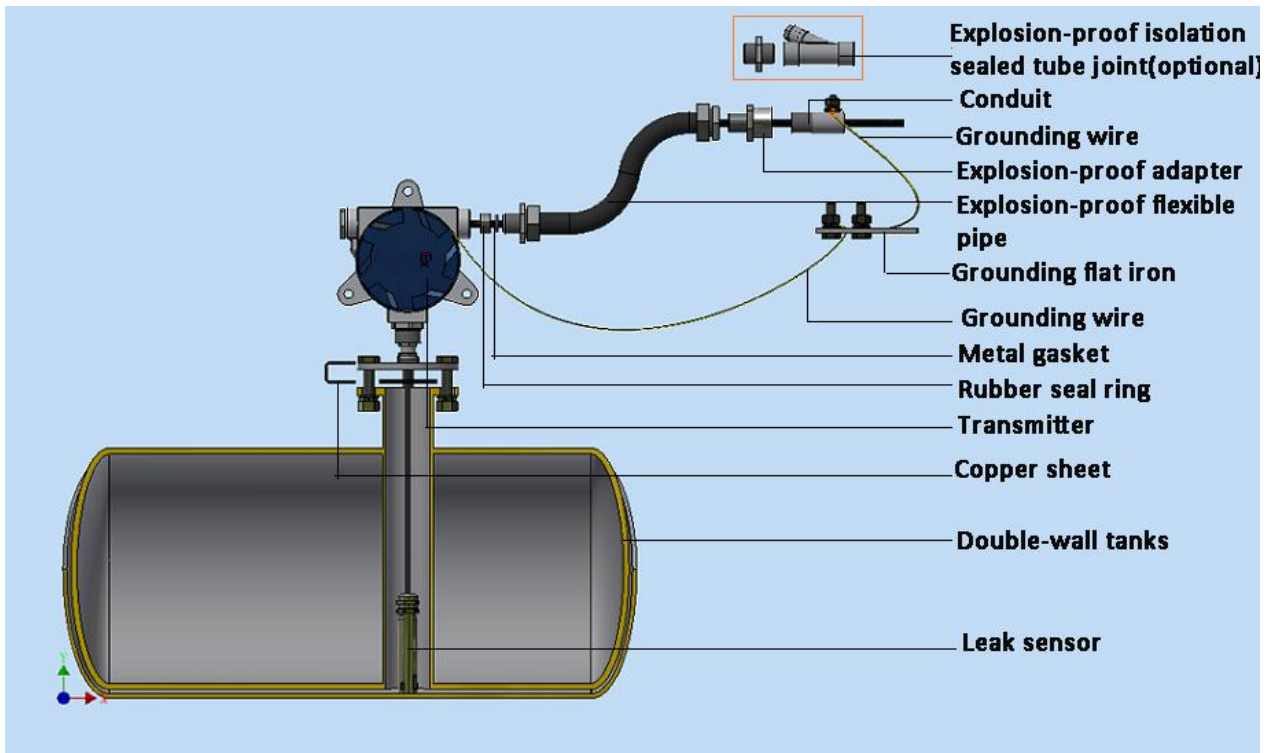
7. Installation Instruction

7.1 Electrical installation precautions

- Please ensure that the shell of the leak alarm controller is effectively grounded.
- Configure the communication address of the sensor according to the configuration requirements.
- Make sure the connection is correct, then can power on the system.
- Do not disassemble the explosion-proof box of the sensor by itself.
- Do not change the structure of components and the explosion-proof box of the sensor, or will affect the explosion-proof performance.
- Product installation, use and maintenance should comply with the relevant provisions in product manual, GB3836.13-1997 <electrical equipment for explosive gas environment-part 13: Maintenance of explosion proof electrical equipment in explosive gas environment>, GB3836.15-2000 <electrical equipment for explosive gas environment-part 15: electrical installations in hazardous locations (except for coal mines)>, GB3836.16-2006 <electrical equipment for explosive gas environment-part 16: Inspection and maintenance of electrical apparatus(except for coal mines)> and GB50257-1996 <Specification for construction and acceptance of electrical apparatus in electrical apparatus installation project at explosion and fire hazard environment>.
- When using the product in zero area, the power supply for safety barrier must comply with the requirements of GB3836.4-2010- article 8.1.
- When using the product in zero area, measures must be taken to prevent the risk of ignition caused by collision and friction.

8. Installation

8.1 Leak sensor field installation diagram



The figure shows the field wiring diagram, equip each double-wall tank with one leak sensor, each leak sensor has a detection rod.

Please refer to the dial switch operation instructions to assign the address for the leak sensor.

8.2 Dimension of the leak sensor

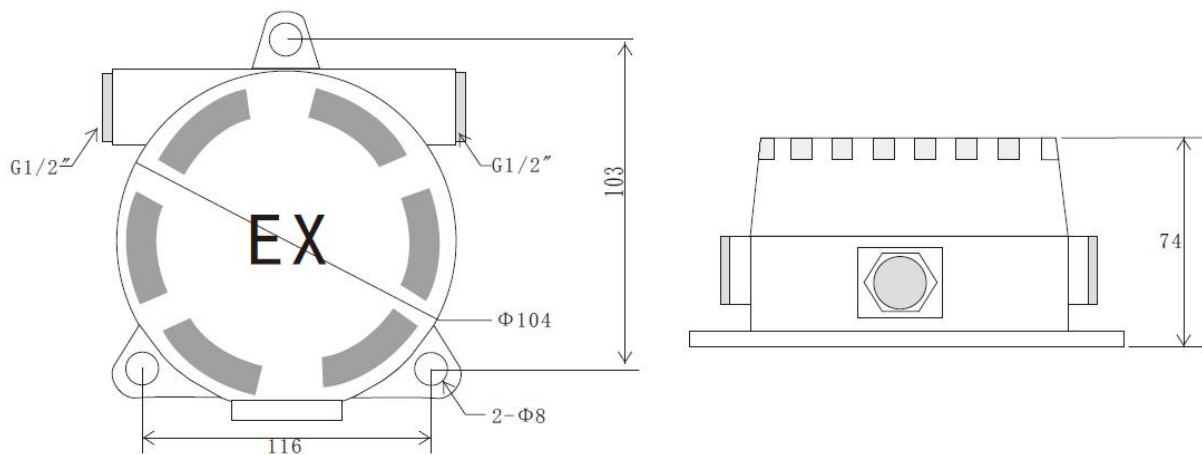


Fig.9 Dimension of leak sensor

9. Warranty and Maintenance

- The warranty of the product is 12 months since installation or 18 months since B/L date which occur earlier.
- The product failure under normal working condition is guaranty.
- Damages caused by artificial and natural disasters are not covered by the warranty.
- Once product failure occurs, please contact with Windbell, and do not repair without authorization, to prevent the occurrence of safety accidents.
- If you cannot troubleshoot the failure at site, please also contact Windbell for further procedures.

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